Strong Start for Mothers and Newborns Evaluation:

YEAR 5 PROJECT SYNTHESIS

Volume 2: Awardee-Specific Reports

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Introduction

The Strong Start for Mothers and Newborns Evaluation Annual Report Volume 2 presents awardee-specific findings from each of the 27 Strong Start awards, as well as site-specific findings for twelve American Association of Birth Centers sites. Findings presented are based on case studies, analysis of participant-level process evaluation forms (Intake Form, Third Trimester Survey, Postpartum Survey, and Exit Form), State Data Linkage Technical Assistance (TA) information, and Impact Analysis findings.

The case study analysis summarizes findings from four rounds of data collection between March 2014 and May 2017, in evaluation Years 1 through 4. The case studies included in-person and phone-based key informant interviews, focus groups with pregnant and postpartum Strong Start participants, and structured observations of Strong Start service delivery. Information obtained from other background documents is also included.

Participant-level process evaluation data collected for each woman enrolled in Strong Start are presented for each awardee and by enhanced prenatal care model, along with a brief description of each awardee's data quality based on information gathered by the evaluation team throughout data collection.

The State Data Linkage Technical Assistance (TA) task of Strong Start worked to obtain birth certificate, Medicaid eligibility, and Medicaid claims/encounter data from selected states with Strong Start awardees to assess Strong Start's impact on birth outcomes and Medicaid costs. The team chose to pursue data in 20 of the 29 states with Strong Start awardees and sites because they had sufficient enrollment to justify the investment of time and effort. Results of these analyses are available in the evaluation's Final Report.

The Impact Analysis team produced estimates of the impact of enrollment in Strong Start at Birth Centers, Group Prenatal Care practices, and Maternity Care Homes on birth outcomes (e.g., preterm birth, low birthweight), process outcomes (e.g., C-section deliveries), and expenditures and utilization (e.g., total expenditures during prenatal period—reported in this volume as prenatal care expenditures) compared to care in standard practices for select awardees and sites.

Access Community Health Network

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
2,676	• Large, multi-site Federally Qualified Health Center (FQHC) in Chicago serving a significant African American and Latina population • Many patients are young with very low socioeconomic status	• 31 sites across Cook County, IL • Most sites located in Chicago's south and west sides, ranging from large, high-volume clinics to smaller, neighborhood-based clinics	• Intervention categorized as "medium intensity" for offering three to eight care coordination, education, and/or referral encounters, with no other direct enhanced services • Care coordination services provided by Registered Nurses and trained social workers • Focused on psychosocial risk reduction through social work services • Care coordinator encounters (half of which are phone-based) throughout pregnancy and postpartum

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Helped women with the greatest need and improved lives of pregnant patients and their newborns
- Care coordinators explored issues the prenatal care provider did not have time to cover, and identified problems a patient was not comfortable raising with the provider
- Promoted team-based approach to care

CHALLENGES

- Most care coordinators split their time between two or more sites; this made it more difficult to enroll and continuously engage patients in Strong Start
- Data collection burden: implementing a smooth collection and reporting process took time

PARTIALLY SUSTAINED

- Sustained care coordination activities for pregnant patients
- Continued to assess new patients using revised version of the Intake Form
- Received ongoing funding from a Medicaid Managed Care Organization and philanthropic support

KEY FINDINGS: PARTICIPANT-LEVEL DATA[1]

PARTICIPANT-LEVEL DATA QUALITY

- 0.3% rate of missing intake forms; 0.0% rate of missing exit forms
- 3.9% rate of item nonresponse on intake forms; 7.4% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 15.8% of women were teens (under age 20); 13.4% were 35 years or older
- 41.3% of women were black; 51.7% were Hispanic; 4.9% were white
- 22.8% of women were married; 32. 5% were living with a partner; 16.1% were not in a relationship
- 22.6%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 30.9%: C-section rate among women with a delivery
- 12.6%: preterm birth rate among women with a live birth
- 10.3%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted for ACCESS Community Health Network because we did not obtain birth certificate and Medicaid data for Illinois

[1] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Prior to implementing Strong Start, most patients entered prenatal care with the Federally-Qualified Health Center (FQHC) after completing a free pregnancy test at an ACCESS site. Uninsured patients potentially eligible for Medicaid were, at that point, referred to a case manager or application assistor, who could help them apply for Medicaid coverage. Prenatal care at ACCESS was provided by obstetricians (OB) or midwives (most had privileges at multiple area hospitals) and appointments were generally 15 minutes long. Clinicians saw between 20 and 30 patients a day. If a woman was determined to have a medically-complicated pregnancy, she was referred to a specialist for follow-up care. In addition, eight ACCESS clinics offered group prenatal care through *CenteringPregnancy*. However, the overlap between Centering and Strong Start was minimal because only one doctor offered Centering to patients with high-risk pregnancies.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Initially, ACCESS provided Strong Start services at 23 clinic locations, with prenatal care provided by 13 OBs and 7 Certified Nurse-Midwives (CNMs). Over the course of the first evaluation year, ACCESS expanded the number of sites from 23 to 31. At the end of this expansion, all 31 clinics in the ACCESS network that provided prenatal care were participating in Strong Start.

Under Strong Start, ACCESS implemented a Maternity Care Home model of prenatal care, which aligned with its broader efforts towards becoming Patient-Centered Medical Home (PCMH)-accredited. ACCESS care coordinators initially operated in dyads: one Registered Nurse (RN) care coordinator and one care coordinator with their master's degree in social work (MSW). The RNs were better-equipped to work with patients with high-risk medical conditions, while the MSWs had training to address psychosocial concerns. Each Strong Start enrollee was assigned to one of the care coordinators (RN or MSW) working with her OB provider, and each care coordinator had an individual caseload. The dyads reported that they worked collaboratively, however, and "backed one another up" in areas where one was less knowledgeable. However, ACCESS changed the care coordination structure because of budget constraints resulting from increased salary expectations for RN care coordinators. Rather than having four care coordinator dyads, the care coordination team was altered to be made up of five full-time MSWs and two RNs, as well as an outreach worker who helped identify and enroll eligible participants.

> "When I came for my first appointment [my care coordinator] gave me her number and said to call if I needed help with anything. And if I had an emergency or I didn't feel well she could work with the doctor to help me. She also asked me about my weight and diet. She worried. I have called her before to ask about transportation because she said my insurance could help with that. I also called when I wasn't feeling well and she helped."
>
> *- Strong Start participant*

The care coordinators worked across multiple sites because most ACCESS clinics offered prenatal care only on certain days of the week, and obstetrical providers rotated among an established set of clinics. Care coordinators had an estimated three to eight contacts with women over the course of their

pregnancies and postpartum, approximately half of which were in person and half of which were by phone. Occasionally care coordinators conducted home visits – for instance, in one case in which a woman lived far from the clinic but needed weekly progesterone injections, the RN care coordinator went to her home to provide assistance. Care coordinators described themselves as the "liaison" between the patient and the provider, but noted that the nature of their interactions with the providers varied greatly and was largely dependent on individual personalities. For instance, some providers were diligent about providing updates in the electronic health record, others relied on face-to-face interactions or left handwritten notes for the care coordinator, and some communicated very little with the Strong Start team.

> "How could you forget [your care coordinator]? She's like your best friend, giving you hugs, calling your phone…"
>
> *- Strong Start participant*

The Strong Start care coordination intervention at ACCESS was also described as "providing support" and generally offered women the opportunity to follow up with a knowledgeable person other than their clinical provider when they did not understand information or had questions about different aspects of their pregnancy. In particular, key informants noted that care coordinators could help patients with high- risk medical conditions process information they received about their pregnancies. Moreover, care coordinators explained that they were able to attend ultrasounds with participants when they needed the support, and to check in after they received test results, both to help explain the results and for support.

OUTREACH AND ENROLLMENT

ACCESS used an opt-in enrollment approach, meaning that eligible patients were asked to choose between enrolling in Strong Start or receiving prenatal care without additional Strong Start services. To encourage enrollment, the sites employed a "multi-pronged" effort that included recruitment by care coordinators, medical assistants, and providers. ACCESS also implemented an electronic referral process that allowed the provider to indicate a women's eligibility for Strong Start in her medical record by checking "Yes" or "No" for Medicaid coverage and an additional risk factor for preterm birth. This information could also include a patient's preferred language (English or Spanish). These referrals were managed by the care coordinator manager and project director, who assigned patients to care coordinators. Actual enrollment practices varied considerably by site depending on the prenatal care providers' involvement in Strong Start. While some providers were comfortable providing electronic referrals, others preferred to speak with the care coordinator directly, and a handful of providers did not refer patients at all, either because the program was not a priority for them or because they were resistant to the team-based approach.

Key informants felt they enrolled a large number of eligible women into Strong Start, but acknowledged that they did not reach every eligible patient. Care coordinators had large caseloads that made immediate follow-up difficult. Sometimes a woman was identified as eligible but by the time care coordinators connected with her, she was past the gestational age cutoff for program enrollment.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants noted that improving birth outcomes remained a challenge at ACCESS, despite a marked effort to improve and adapt Strong Start interventions. Reducing preterm birth and low birthweight rates was difficult within the awardee's medically high-risk patient population. Key informants also reported that psychosocial factors "beyond the health care walls," such as lack of housing, food insecurity, and safety concerns, had a significant impact on the health of their patients. Both patients and providers commented that care coordinators were an invaluable source of health education for participants throughout and beyond their pregnancies, and a major factor in improving patient retention. Care coordinators were also successful in connecting Strong Start participants with other social services such as housing and employment opportunities.

Program staff noted that Strong Start care coordinators attempted to improve participants' outcomes by providing educational support regarding smoking cessation, diabetes and hypertension management, and by maintaining consistent follow-up with their patients. In addition, one provider observed that fewer babies were admitted to the neonatal intensive care unit (NICU) than in the past, and perceived that Strong Start "seemed to be making a difference" in reducing both preterm birth and low birthweight.

STRONG START PARTICIPANT PERSPECTIVES

Most women chose an ACCESS site for prenatal care based on recommendations from a friend or family member who had previously received services at ACCESS. A few participants also cited location, familiarity with ACCESS, and elevated medical risk factors as reasons for seeking care at an ACCESS health center.

> *I go to my clinic because it's closest. I was at another doctor first, and I didn't like it, so I switched.*
>
> *One of my friends referred me [to ACCESS]. She said they treat you well. I came with her to do her ultrasound and afterwards I transferred to this clinic.*

Participants mentioned both transportation and childcare as barriers to care. Women expressed dissatisfaction with Medicaid-covered transportation, saying unreliable service made it difficult to get to their appointments on time. In addition, although women said they were allowed to bring their older children with them to appointments, some reported problems either physically getting to their appointments with children in tow, or finding someone to care for their child.

> *A lot of [the Medicaid managed care organizations] provide transportation. You have to call 48 hours before your appointment and they still don't come on time. That's why I never use it.*
>
> *Sometimes there isn't anywhere to leave the children and I come carrying them both. Or I call to say I can't make the appointment. My older child is five and I have to leave him with someone. It's very hard work when I don't have someone to leave him with.*

Most women were introduced to the program by a care coordinator during their first visit. However, experiences varied regarding how frequently they met with their care coordinators. Many women said they felt comfortable with their care coordinator and that they could raise issues they did not feel comfortable discussing with their prenatal care provider.

> *With your doctor you talk about how you feel and how the pregnancy is going. With [your care coordinator] it's more of a conversation*
>
> *Just being able to talk to someone, you can't talk to anybody else but you can trust [the Strong Start care coordinator]. And if you don't show up she'll call you. I have to watch myself because I'll catch myself calling her late at night or weekends.*
>
> *I had my medical card taken away from me for two months. And [my care coordinator] got on the phone and fought them until I got it back.*

Some participants suggested improvements around wait times. Some women also complained that they had appointments cancelled the day-of, though they understood it was often because their prenatal care provider was needed for a birth. However, most women were satisfied with care, and said there was not much they would change. Focus group participants were particularly happy with the care provided by the care coordinators and the extra attention and reminders they received throughout their pregnancy.

PROGRAM STRENGTHS

> "[The care coordinator] has made a difference in my pregnancy in the way that she helps me."
>
> *- Strong Start participant*

Key informants were proud of the program's success in helping women with the greatest need and improving the lives of Strong Start participants and their newborns. Specifically, care coordinators were often able to speak to women about issues the provider did not have time to cover and to identify stressors or problems that a patient was not comfortable speaking about with her provider. For example, care coordinators systematically screened for depression, which had been part of ACCESS' pre-existing behavioral health model but was facilitated by Strong Start. As reported in evaluation Year 2, more than eighty percent of pregnant patients received a full Edinburgh depression screen (compared to fifty percent reported in evaluation Year 1).

Key informants also felt that improved provider buy-in over time was a strength of their Strong Start program, as well as the addition of the team-based approach to care. Providers who were initially hesitant about Strong Start ultimately reached out to awardee staff to tell them "how much they love having the support of the care coordinators." Another provider noted that, "there is something about the way this program is structured and the care coordinator I work with that makes it seamless. It actually feels like less work for me."

> "[My care coordinator] motivated me to breastfeed my daughter. This is my third child, [breastfeeding] didn't work with the other two but it's working now. It's not as painful as people say it is."
>
> *- Strong Start participant*

During the award period, ACCESS implemented care coordination system-wide as a "Care Coordination Entity", which was largely attributed to the lessons that emerged from Strong Start. Key informants perceived that care coordinator services reduced unnecessary emergency department visits, provided participants with clarification regarding medical diagnoses and prescriptions, and linked high-risk participants with available community resources. They also provided breastfeeding support and information on family planning options. In general, key informants believed that the program made a positive difference in the lives of enrolled women and their babies.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Most care coordinators split their time between two or more sites, which posed a challenge for enrollment and engagement throughout the program. While many care coordinators used text messaging to communicate with participants, if a care coordinator was not available to conduct enrollment in-person, it could hinder a woman's willingness to participate in the program. Among women who enrolled, fewer in-person meetings with their care coordinator could result in weaker relationships. One care coordinator noted that because of the multi-site arrangement she sometimes felt she was "missing out" on encounters with patients who needed the most help. During site visits it was apparent that the bonds between participants and the care coordinators at the Mount Sinai site were particularly strong, which may have been a function of the fact that Sinai was the one site with dedicated care coordinators.

In addition to logistical challenges related to care coordinators, data collection was also a significant burden for ACCESSS during Strong Start. According to key informants, it took time to "find their footing" and implement a smooth collection and reporting process. At the same time, the data collection forms required by the Strong Start evaluation served as the basis for ongoing risk assessment and allowed ACCESS to track outcomes for patients who received care coordination services.

SUSTAINABILITY

During the last round of case study interviews (and after Strong Start funding had ended) ACCESS still employed six care coordinators who provided support for pregnant patients, and was in the process of hiring a seventh. The ACCESS network's behavioral health specialists and Licensed Clinical Social Workers had begun to work more closely with the care coordinators, which improved communication between behavioral health and OB providers. In addition, ACCESS created a risk stratification system for pregnant patients in order to determine which care coordination services, if any, they were eligible to receive. The caseload for care coordinators is now determined by patient risk levels, meaning some case coordinators have smaller caseloads than in previous years to allow them to better serve medically-complex patients.

ACCESS adapted the Strong Start evaluation Intake Form and planned to continue to assess new patients using a revised version tailored to fit their patient population more specifically. They stopped collecting data through any other Strong Start forms.

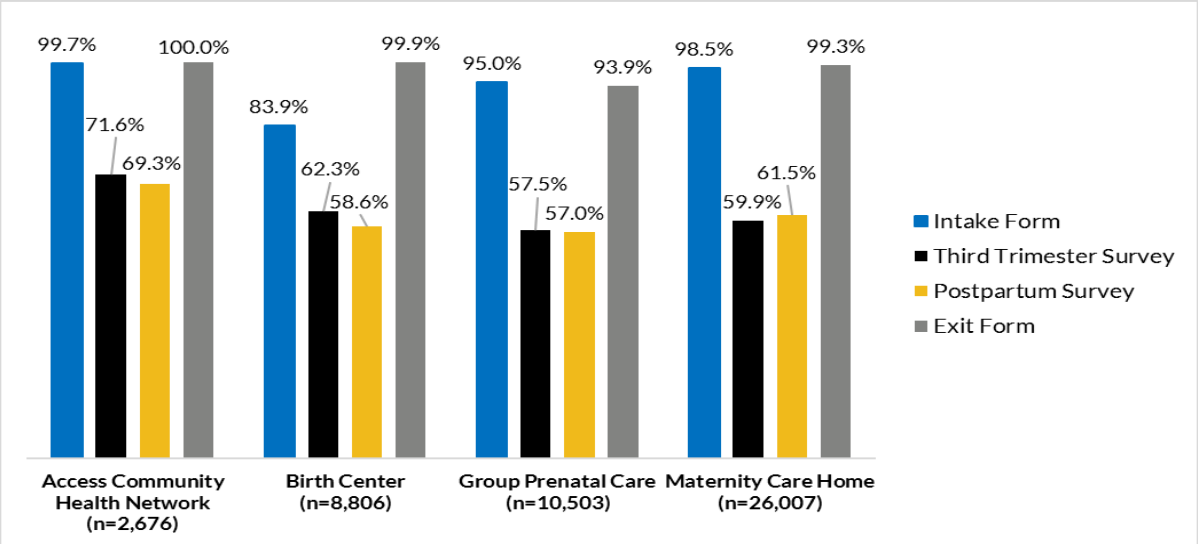
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for ACCESS, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for ACCESS to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 46 ACCESS participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 1: FORM SUBMISSION RATES, ACCESS



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 2,674
- Study IDs represented: 2,676 (suggests that PLPE data were submitted for two extra patients; see information on program report data in Appendix F in Volume 1).
- The awardee tracked enrollment and the completion of forms in their REDCap database starting in July 2015.

HOW FORMS WERE ADMINISTERED:

- Intake: Most were self-administered on paper
- Third Trimester and Postpartum Surveys: Completed over the phone with a care coordinator. Care coordinators found it challenging to allot enough time for patients to complete this survey.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Access operated 31 sites
- Data collection was managed by four care coordinators with responsibilities at multiple sites
- The awardee did not indicate any notable site-specific differences or concerns.

MISSING FORMS:

- Intake: 0.3 percent of Study IDs were missing Intake Forms. In all cases, ACCESS records show the Intake Forms were completed and submitted, but the awardee did not have backup copies to resubmit.
- Third Trimester or Postpartum Survey: About 28 percent of Study IDs were missing the Third Trimester Survey and 31 percent were missing the Postpartum Survey. The awardee indicated these were generally missing because women were lost to follow up (i.e., left care prior to delivery).
- Exit: No Exit Forms were missing.

ITEM NONRESPONSE:

- Intake: Access staff felt that most missing Intake Form questions were to a result of patients being confused by certain questions, unwilling to answer them, or finding the form too long. Care coordinators often reviewed the completed paper Intake survey and gave patients the opportunity to complete skipped questions. However, they noted that in some cases patients declined to provide additional responses.

- Exit: Access FQHC network did not have access to the delivery hospital EHR systems and many providers were not affiliated with the delivery hospitals where patients gave birth. As a result, it was challenging to access delivery and birth information. Data on pregnancy outcome was missing for 16.9 percent of Study IDs.[2]

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes of ACCESS participants. Some highlights include:

- The majority (70.8 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 13.4 percent of participants were 35 and older.
- Most participants were either black (41.3 percent) or Hispanic (51.7 percent) and Hispanic participants primarily reported that they were of Mexican decent (85.0 percent). Women of Mexican descent are not thought to be at particularly high risk for poor birth outcomes.
- Similar to Strong Start participants overall, the largest share of ACCESS participants was in a relationship and living with a partner (32.5 percent); only 22.8 percent were married.
- Among the risk factors collected in the PLPE data, 17.8 percent of ACCESS participants reported having experienced intimate partner violence, 22.6 percent of participants with a prior birth had a prior preterm birth, and 68.7 percent of participants had not planned their Strong Start pregnancy.

TABLE 1: DEMOGRAPHICS, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.3	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**2,623**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	6.5	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	9.3	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	70.8	81.7	72.9	75.1	75.8
35 Years and Older	%	13.4	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.7	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**2,586**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	51.7	25.4	37.1	28.0	29.7
Non-Hispanic White	%	4.9	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	41.3	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	2.1	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	10.2	19.6	12.8	11.3	13.3
Not in Universe	%	39.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**1,338**	**1,854**	**3,583**	**6,951**	**12,388**

[2] Among participants with missing data on pregnancy outcome, 0.2% were missing because they did not have an exit form, 98.4% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 1.3% were missing for other reasons.

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mexican, Mexican American, Chicana	%	85.0	52.6	36.3	55.8	49.7
Puerto Rican	%	2.5	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	10.8	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	1.4	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**2,623**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.1	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	1.6	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**2,588**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	34.9	36.6	30.8	35.3	34.5
In School, Not Employed	%	11.5	8.7	12.6	11.9	11.5
Employed and in School	%	4.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	49.1	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	5.1	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**2,497**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	36.1	15.4	27.8	29.1	26.4
High School Graduate or GED	%	50.9	57.5	58.3	57.9	57.9
Associate's Degree	%	5.3	8.2	5.2	4.6	5.4
Bachelor's Degree	%	3.2	14.5	4.5	3.7	5.8
Other College Degree	%	4.4	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	1.9	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**2,580**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	22.8	42.1	20.4	20.8	24.5
Living with a Partner	%	32.5	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	28.6	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	16.1	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 2: PSYCHOSOCIAL, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.4	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**2,592**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	65.2	51.8	51.8	59.7	56.5
No	%	31.8	44.6	42.3	37.4	39.8
Unsure	%	3.0	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.4	17.0	6.6	3.4	6.8
Not in Universe	%	34.3	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**1,690**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	86.3	61.1	72.6	79.9	75.3
Other	%	6.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	6.9	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	5.2	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**2,492**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	7.9	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	5.2	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**2,494**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	28.6	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	3.2	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**2,547**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	31.8	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	7.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**2,425**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	22.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	3.0	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**2,550**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	69.4	67.9	59.0	65.5	64.5
Mild	%	18.0	21.4	23.8	20.2	21.2
Moderate	%	8.0	6.8	10.3	8.5	8.6
Severe	%	3.8	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	0.7	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	2.1	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**2,576**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	17.8	20.7	17.4	19.8	19.4

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	3.6	18.3	16.3	7.7	11.8
Not in Universe	%	9.1	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**2,295**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.6	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**2,623**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	66.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	20.9	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	13.1	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	66.5	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	18.6	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	28.7	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	17.6	24.6	17.1	15.4	17.2
Childcare Challenges	%	11.3	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	12.0	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).
A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 3: PREGNANCY HISTORY AND INTENTIONS, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.1	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**2,628**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	78.0	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	22.0	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	3.8	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**1,952**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	33.5	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	3.8	2.3	21.8	11.8	12.3

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,950**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	20.5	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	19.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**1,550**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	1.2	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	66.2	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**310**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	44.2	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	67.5	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**277**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	37.5	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	70.2	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**204**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	15.2	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	70.9	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**186**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	7.0	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	70.0	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**210**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	17.6	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 4: PRIOR BIRTH OUTCOMES, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.8	1.7	1.5	0.6	1.0
Not in Universe	%	22.0	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**2,031**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	88.5	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	23.0	23.5	18.9	15.2	17.7
Not in Universe	%	31.5	30.4	45.8	36.9	37.7

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,196**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	23.6	34.6	24.3	27.1	28.1
>= 18 months	%	76.4	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.2	0.1	2.5	1.4	1.4
Not in Universe	%	31.6	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,794**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	22.6	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	8.3	1.3	20.8	13.1	12.6
Not in Universe	%	31.6	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**1,580**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	17.2	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 5: PRE-PREGNANCY MEDICAL CONDITIONS, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	1.8	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**2,582**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	31.3	38.4	60.8	59.6	57.9
Not Trying to Become Pregnant, Not Using Contraception	%	55.3	48.3	3.7	3.6	4.1
Not Trying to Become Pregnant, Sometimes Using Contraception	%	5.3	6.5	7.4	9.6	8.6
Not Trying to Become Pregnant, Using Contraception	%	8.1	6.8	14.5	6.6	10.8
Diabetes Pre-Pregnancy						
Missing Data	%	0.3	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**2,623**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	4.7	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	0.5	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**2,617**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	5.4	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	1.6	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**2,587**	**8,474**	**7,052**	**20,908**	**36,434**

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Underweight (BMI < 18.5)	%	2.4	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	26.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	25.4	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	33.0	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	12.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 6: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	0.8	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**2,610**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	3.8	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	0.6	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**2,613**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	5.6	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	0.7	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**2,612**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	8.8	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	0.6	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**2,613**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	3.3	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	0.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**2,611**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	1.1	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	0.7	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**2,611**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	0.6	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	0.8	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**2,608**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	0.9	1.2	1.5	2.1	1.8

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	0.5	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**2,616**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	20.3	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 7: TREATMENTS DURING PREGNANCY, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	22.9	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**2,027**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	1.7	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	3.4	0.8	10.0	5.1	5.4
Not in Universe	%	84.6	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**317**	**680**	**654**	**2,585**	**3,919**
Yes	%	24.0	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	99.9	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**-**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	99.9	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**-**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 8: PRENATAL CARE, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	0.2	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**2,624**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	62.7	4.7	29.5	64.5	43.3

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Licensed Professional Midwife[3]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	25.0	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	12.3	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**2,629**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.6	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	8.7	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**2,629**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	2.6	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	4.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**2,625**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	100.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	5.2	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	0.4	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**2,619**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	8.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.8	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	0.8	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**2,610**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	0.7	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	3.2	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	0.6	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**2,615**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	23.1	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	3.4	1.5	1.4	2.5	2.4

[3] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only licensed to practice in 28 states.

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Home Visits						
Missing Data	%	0.5	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**2,616**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	3.7	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.2	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	0.5	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**2,616**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	0.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**2,614**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	1.9	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**2,581**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	0.6	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**2,613**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	47.6	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	2.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	5.4	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	5.8	-	4.1	5.1	4.8
Cardiologist	%	3.6	-	6.4	6.9	6.8
Other	%	95.4	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 9: DELIVERY INFORMATION, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	6.2	1.4	25.3	23.3	19.5
Not in Universe	%	33.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,598**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	24.3	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	2.5	0.3	7.8	2.9	3.5
Not in Universe	%	85.2	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**324**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	95.1	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	0.6	4.6	11.5	7.3	7.7
Not in Universe	%	22.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**2,027**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.9	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	0.1	-	8.2
Home birth	%	-	4.3	0.1	-	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	0.9	0.7	12.0	5.6	6.1
Not in Universe	%	22.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**2,019**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	69.1	87.1	70.1	69.5	73.1
C-Section	%	30.9	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)						
Missing Data	%	0.3	0.4	8.7	2.3	3.4
Not in Universe	%	78.4	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**561**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	71.3	83.3	72.9	74.7	75.9
C-Section	%	28.7	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	1.1	4.7	12.5	6.3	7.4
Not in Universe	%	76.2	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**595**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	47.2	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	85.0	96.0	82.7	85.9	87.1

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**393**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	18.3	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 10: BIRTH OUTCOMES, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	16.9	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**2,185**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	92.2	96.2	97.6	94.4	95.5
Stillbirth	%	1.2	0.3	0.9	0.8	0.7
Termination	%	1.1	0.3	0.2	0.6	0.5
Miscarriage	%	5.5	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	1.5	0.7	15.4	5.8	7.0
Not in Universe	%	23.4	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,976**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.9	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	8.6	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	86.8	93.4	86.7	85.7	87.4
Post-Term (42+)	%	0.6	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	2.2	2.1	14.3	8.0	8.3
Not in Universe	%	23.4	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,957**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	2.0	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	8.3	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	83.4	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.3	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 11: SATISFACTION, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	35.4	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**1,698**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	0.6	0.4	1.0	1.3	1.0
Moderately Satisfied	%	5.6	3.3	4.4	7.8	6.2
Very Satisfied	%	51.5	25.6	35.6	46.1	39.8
Extremely Satisfied	%	41.8	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	35.7	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**1,692**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	3.1	2.0	3.1	2.3	2.4
Slightly Satisfied	%	3.6	3.0	4.0	2.9	3.1
Moderately Satisfied	%	14.2	10.4	11.6	12.8	12.1
Very Satisfied	%	50.3	29.1	42.6	46.6	42.1
Extremely Satisfied	%	28.8	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 12: BREASTFEEDING, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	29.2	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**1,862**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	35.1	80.4	47.5	40.5	50.3
Formula Feed Only	%	12.9	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.6	10.8	31.9	32.5	27.8
I Haven't Decided	%	11.3	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	34.0	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**1,735**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	76.5	91.5	76.6	72.6	77.3
No	%	22.7	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	0.7	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 13: FAMILY PLANNING, ACCESS

Data Elements	N or %	Access Community Health Network (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	35.9	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**1,685**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	78.7	77.0	77.5	82.2	80.3
No	%	18.2	20.0	14.0	14.2	15.3
Unsure	%	3.1	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	34.8	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**1,716**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	75.8	84.2	70.8	74.0	75.5
No	%	21.0	13.2	17.7	21.5	19.1
Unsure	%	3.2	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	30.4	41.5	42.9	38.6	40.2
Not in Universe	%	20.1	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**1,301**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	16.8	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	10.8	2.8	11.4	10.9	9.2
LARC – IUD	%	15.4	10.8	11.9	12.3	11.9
Pills	%	7.2	8.6	11.9	13.0	11.8
Injection	%	15.0	5.9	16.2	20.2	16.2
Condoms	%	8.1	26.6	19.8	13.9	17.9
Breastfeeding	%	4.4	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	7.8	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	10.7	16.7	8.1	9.5	10.9
Method Not Indicated	%	2.8	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Illinois

Initial Contact: In January 2015, the evaluation team spoke with officials from the Illinois Department of Healthcare and Family Services (HFS) and the Illinois Department of Public Health (IDPH) to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data (respectively) to the Urban Institute. State officials were receptive to supporting the evaluation, and HFS staff planned to link the Medicaid and birth certificate data.

Data Acquisition Process: Urban submitted applications requesting Medicaid and birth certificate data to HFS and IDPH in February and March 2015, respectively. Urban received provisional approval from HFS in April 2015, pending approval from IDPH; however, state public health officials reported that a state statute prevents IDPH from sharing individual-level birth certificate data without the mother's written consent. Illinois officials had committed to supporting the evaluation via a Letter of Support for the project in 2013 and thus Urban explored alternative approaches to obtaining the data. Unfortunately, these efforts did not yield a viable alternative and, by August 2016, it appeared that Illinois would not be included in the evaluation. However, in December 2016, the team met to discuss the possibility of using aggregate Vital Records data. A new data request for aggregate data was submitted in April 2017.

Final Result: In March 2018, after months of delay, Vital Records notified Urban that the request had finally been approved and they would begin preparing the Data Use Agreement (DUA). Unfortunately, this approval came too late in the evaluation process and Illinois data were not included in the final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Access Community Health Network.

CROSS-CUTTING SUMMARY

ACCESS implemented the Maternity Care home model throughout its FQHC network in Chicago. ACCESS participants were primarily Hispanic (51. 7 percent) and black (41.3 percent), and many experienced circumstances that put them at high risk for poor birth outcomes. For example, a large majority of participants were overweight or obese (71.3 percent), many reported experiencing food insecurity (28.6 percent), and many women who had previously given birth had experienced a preterm birth (22.6 percent). Strong Start care coordinators, who were trained nurses or social workers, met with participants an average of 5.2 times over the course of their pregnancies and helped women develop care plans while focusing on psychosocial risk reduction. The care coordination intervention offered participants an opportunity to follow up with a knowledgeable person other than their clinical provider when they had questions about different aspects of their pregnancy, or when they needed help managing a high-risk medical condition. For instance, ACCESS care coordinators assisted women with a prior preterm birth in securing health plan approval for and arranging a 17P treatment schedule. Women served by ACCESS had a preterm birth rate that was considerably higher than the national average, but ACCESS participants were also a high-risk population overall. Because ACCESS served Medicaid participants with high rates of medical, demographic and social risks, it is to be anticipated that their preterm birth and low birthweight rates would be above national benchmarks for all U.S. women. Among ACCESS Strong Start participants, 12.5 had a preterm birth and 10.3 percent gave birth to a low birthweight baby, compared to 9.8 and 8.2 percent of women nationally. Birth certificate and Medicaid data were not obtained from Illinois, so we cannot assess the outcomes for ACCESS against a matched comparison group, and ACCESS could not be included in the Impact Analysis.

Albert Einstein Healthcare Network

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,429	• Private, nonprofit health system with three acute-care hospitals and many outpatient centers throughout the greater Philadelphia region	• Three sites in the Einstein network including clinics in a large medical center in downtown Philadelphia, PA, in suburban Montgomery County, and in northeastern Philadelphia	• Intervention categorized as "medium intensity" for implementing *CenteringPregnancy* curriculum with no additional enhanced services • Followed *CenteringPregnancy* approach, with customization to meet needs of high-risk, underserved Medicaid population • Two Centering Healthcare Institute (CHI)-trained facilitators led each session, some were co-facilitated by additional clinicians or topic experts (e.g., pediatrician, lactation consultant, domestic violence counselor) that group members could contact for additional services • High-risk participants at whose pregnancies needed to be more closely monitored (e.g., a patient with a heart condition) had individual visits with clinic providers in between Centering sessions

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Positively influenced maternal and newborn outcomes through education and promoting self-care
- Helped women address depression symptoms by fostering discussion and reducing social isolation
- Strengthened connections between participants and providers, making participants more likely to share concerns

CHALLENGES

- Pressure to meet enrollment goals distracted from patient care
- Difficulty securing adequate space to conduct sessions
- Meeting data collection and reporting requirements
- Achieving buy-in from some providers and staff at clinics

SUSTAINED

- Continued Centering with support from external grants and direct support from the Einstein Healthcare Network
- Centering offered to all patients regardless of health insurance coverage

KEY FINDINGS: PARTICIPANT-LEVEL DATA[4]

PARTICIPANT-LEVEL DATA QUALITY

- 21.5% rate of missing intake forms; 5.5% rate of missing exit forms
- 5.3% rate of item nonresponse on intake forms; 5.6% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- The rate of missing data is too high to report age, race/ethnicity, and relationship status
- 25.3%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 28.7%: C-section rate among women with a delivery
- 14.5%: preterm birth rate among women with a live birth
- 12.0%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Higher weekend delivery rates than women in the comparison group – may be due to a reduction in planned inductions.
- Better Apgar scores than infants born to women in the comparison group – marginally significant (p-value<0.10)
- Findings from site-level estimates for Einstein Medical Center – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Not conducted for Einstein because we did not obtain Medicaid claims data from Pennsylvania.

[4] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF CARE

Prior to implementing Strong Start, Albert Einstein Healthcare Network (Einstein) offered pregnant patients a typical model of prenatal care, delivered via brief one-on-one provider visits. Though Medicaid-covered enhanced services—such as nutrition or counseling and social worker services—were available for high-risk pregnant patients, most did not access them. A desire to connect patients with these services was one reason that Einstein decided to pursue the Strong Start award; they also wanted to improve rates of early entry into prenatal care and visit attendance (reporting a baseline no-show rate of approximately 40 percent).

The awardee had prior experience with Centering through pilot programs funded through grants from the March of Dimes and the Pennsylvania Department of Health.[5] These grants supported the Centering Healthcare Institute (CHI) provider training and patient materials for a limited number of groups at the suburban clinic site and at a church near Einstein Medical Center in Philadelphia. Though small, these pilot programs offered encouraging results (e.g., group members formed supportive relationships and continued with their prenatal care) and provided a valuable foundation for Einstein's Strong Start program. The early efforts also brought positive attention to Centering and helped earn health system leadership's support for expanding the model.

DESCRIPTION OF ENHANCED STRONG START SERVICES

With the implementation of Strong Start, Einstein initially scaled up existing Centering programs at two sites – (1) the Paley Clinic in the Einstein Medical Center Philadelphia (a large teaching hospital with a Level One Trauma center) and (2) the Genuardi clinic in suburban Montgomery County, where another Einstein hospital is located. Both sites transitioned to a Centering model for *all* prenatal patients. To help meet Strong Start enrollment goals, Einstein began operating a third Strong Start site in 2016 at the Rising Sun Obstetrics (OB) office in northeastern Philadelphia, an obstetrical practice with 400 to 500 births per year and a large waiting room that could accommodate group sessions.

> "I feel like it's a whole bunch of friends sitting in a room talking. I like that. It's more comfortable than sitting with your doctor asking questions."
>
> *- Strong Start participant*

Einstein's Strong Start sites implemented the *CenteringPregnancy* ("Centering") model, as established by CHI. Each site's Strong Start structure included a project coordinator and several providers who facilitated Centering groups. Sites were supported by three program administrators who oversaw (respectively) Einstein's grants, government relations, and clinical services for women and

[5] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

children. Awardee and site program staff communicated frequently, in part through weekly face-to-face meetings between the site project coordinators for collaborative problem-solving and to share promising practices.

Einstein's Strong Start program followed the essential elements of Centering, with some customization to meet the needs of the high-risk, underserved Medicaid population that Strong Start targeted. Two CHI-trained facilitators led each session, and at least one was a clinician (either a nurse practitioner or family practice doctor). Centering groups met ten times over a seven-month period. Patients were grouped by their estimated delivery date, and average group size was 12-14 women. Group sessions were scheduled for two hours and took place in a private space large enough to accommodate both patient members and support people in a circular seating arrangement. Sessions began with time for socialization (accompanied by healthy snacks, which were paid with non-Strong Start funds), while individual health assessments occurred in a screened-off area in the corner of the room. At the start of the session, group members participated in self-care activities (e.g., weighing themselves and taking their own blood pressure). The second half of the Centering session involved a facilitated discussion about a particular topic, based on core content developed by CHI. Some sessions were co-facilitated by additional clinicians or topic experts (e.g., pediatrician, lactation consultant, domestic violence counselor), and group members were given information about how to contact these experts for additional services.

Some enrollees at high medical risk and whose pregnancies therefore needed to be more closely monitored (e.g., patients with a heart condition) had individual visits with clinic providers in between Centering sessions. These individual "high-risk" visits supplemented, but did not replace, Centering Sessions. At both sites, Centering facilitators and individual visit providers shared access to patient records.

During the Strong Start demonstration period, Einstein received grants that complemented the Strong Start goals. For example, an award through the Health Resources and Services Administration's Healthy Start program funded several new services that were made available to Strong-Start-enrolled patients (e.g., the services of a social worker, a registered dietician, and a patient navigator). In connection to the Healthy Start grant, Einstein completed the Centers for Disease Control and Prevention (CDC)'s Reproductive Life Plan,[6] which was later added as an enhancement to its Strong Start demonstration in January 2015.

OUTREACH AND ENROLLMENT

Early in the Strong Start implementation period, Einstein presented Centering as an option for patients, encouraging an active choice between Centering and standard prenatal appointments. Program leaders made a deliberate decision to change from this opt-in approach to a more directive opt-out process, presenting Centering as "the way Einstein delivers prenatal care." In Year 2 of the demonstration, program staff initiated a new intake process in response to lower-than-expected enrollment. In an attempt to "hook" participants from the start, staff began scheduling multiple initial prenatal care visits simultaneously to introduce patients to group prenatal care and the meeting room, together, rather than individually. These new "Introduction to Centering" groups usually included between six to eight

[6] For more information, see CDC's website: https://www.cdc.gov/preconception/planning.html.

participants alongside some support staff, and were held in the group meeting space. Informants cited this change as having increased enrollment. Using an opt-out enrollment approach reduced women's resistance or hesitancy to engage with the model. Key informants unanimously credited this change with boosting enrollment (group size increased from an average of 6-8 patients to an average of 12-14 patients) and promoting greater acceptance of the program by patients and clinic staff.

Initially, Einstein promoted Centering through a mass media campaign (e.g., billboards, newspaper ads, bus panels). Program staff later decided to scale back this effort, but upon observing a 30 percent drop in enrollment, they resumed the external marketing campaign. Staff created a video about Centering that was shown in clinic waiting rooms, as well as colorful mailing packets, appointment cards, and flyers describing the program. Einstein publicized Centering through a website[7] that explained Centering and provided information about how to enroll.

The awardee also used non-Strong-Start funded incentives to encourage participants to attend appointments and group sessions and to remain engaged with the program throughout the duration of their pregnancies. For example, participants who attended an initial session received a pack of diapers (funded by the Women's Auxiliary), and participants who attended 70 percent of sessions were entered into a raffle for a gift card. The Project Coordinator also connected with participants via text messaging, which was reportedly more effective than reminder calls for promoting regular attendance and for scheduling supplementary appointments for high-risk participants. Finally, Einstein offered Centering groups at three different times of the day. Evening sessions, which the awardee initiated in order to boost enrollment among those with daytime conflicts, proved to be a popular option.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

According to key informants, Einstein's Strong Start Centering program had a positive influence on rates of preterm birth and low birthweight, breastfeeding, and patient satisfaction. They believed Strong Start services contributed to these improvements by educating women about nutrition, enhancing awareness of normal versus problematic pregnancy symptoms, and promoting participants' ability and interest in advocating for their health care. Many women did not attend the hospital's birthing class, so Strong Start Centering sessions incorporated childbirth education. As a result, participants were reportedly more prepared for labor and less likely to want to induce early or have a C-section.

Key informants perceived that Strong Start services also addressed depressive symptoms, reduced stress, improved parenting, and increased patient satisfaction. Strong Start helped to address a taboo around discussing depression by including a facilitated discussion on the topic in Centering groups, which reportedly helped women feel more comfortable expressing their feelings. One key informant noted that Centering also helped to address depressive symptoms by connecting women to others and reducing social isolation.

In general, the group dynamic was credited with strengthening connections between participants and their providers, making participants more likely to raise their concerns. The group dynamic resulted in "a lot of walls coming down," according to one key informant. Support from peers and staff provided

[7] The website address is: https://www.einstein.edu/obstetrics/maternity-care-in-philadelphia/pregnancy-support/.

comfort, enhanced trust, and encouraged participants to take ownership of their health and prenatal care.

STRONG START PARTICIPANT PERSPECTIVES

The Strong Start enrollees who participated in the evaluation's focus groups generally said that they liked the concept of group sessions, including the fact that partners were welcome, when they were first told about Centering.

> *Yeah – I just thought [group discussions] would be a cool new thing to try.*
>
> *She gave me a choice. I didn't want to do it at first, but she said try it and see. And I stayed with it.*
>
> *I bring my husband to Centering meetings…it made me feel good for him to know more information because it's our first child.*

Focus group participants enjoyed the group support, and a few specifically noted that the continuity of providers for the Centering sessions was particularly attractive. The participants preferred the social environment during the first part of the Centering sessions (i.e., during weight, blood pressure, and individual checks) to the long waits before typical OB appointments.

Participants were pleased with the range of topics covered during the sessions, and reported that Centering helped them have a healthier pregnancy and better prepared them to be parents. They especially appreciated hearing about other women's experiences and being able to share their own. Most said they would recommend Centering to others.

> *We talk about breastfeeding, domestic violence, everything really. I like that because we are learning more and more. I didn't know domestic violence happens more when a woman is pregnant.*
>
> *Those of us with kids already can teach [other group members] what we know, like an older sister or mom.*

Participants liked their Centering facilitator, and described how the social worker and other group staff spoke with them individually and discreetly to identify unmet needs. Almost paradoxically, some focus group participants noted that the Centering sessions enhanced confidentiality by avoiding the typical processes of registering at the front desk of the clinic, making appointments with receptionists, or leaving messages to contact the provider. In general, participants were pleased with their prenatal care and had difficulty identifying things they did not like or ways that Centering could be improved.

> *She [the nurse practitioner facilitator] helped me with depression and a domestic violence situation. She's not judging you. She's not talking down to you.*
>
> *The social worker talks individually and also in the group session. He also gave his cell phone number to call.*

Focus group participants did not identify either transportation or childcare as major barriers, though this finding should be tempered by the likelihood that a selection bias exists among focus group participants (i.e., because they were able to attend a focus group, it follows that they were less likely to report challenges with transportation and childcare as barriers to attendance). Their children were usually watched by family or partners, or were in school or daycare. Occasionally the women brought children to Centering and other appointments.

> *Einstein will help you get transportation if you're having trouble –or you can get a pass through insurance.*
>
> *[When I don't have childcare] I just bring [my children] with me.*

PROGRAM STRENGTHS

Key informants reported that Einstein's prior experience with the *CenteringPregnancy* model that was piloted prior to Strong Start implementation enabled the organization to launch the Strong Start demonstration with a foundation of advocates. Some staff medical providers had already been trained and were experienced in delivering prenatal care via the *CenteringPregnancy* model.

> "In your [typical OB] appointment, they'll just give you a [breastfeeding] pamphlet and send you on your way. Centering explains it more, even if you don't talk about it, you're still here listening to it."
>
> *- Strong Start participant*

Respondents shared overwhelmingly positive sentiments about the Group Prenatal Care approach and its impact on patients and providers. One key informant described implementation of Group Prenatal Care at Einstein as a "seismic change" in care provision. Bringing patients together in the Centering room for their first visit was effective because patients reportedly "loved" the approach and connected to the program once they experienced it. Group discussions were valuable for engagement and patient education; as one key informant noted, "99 percent of the time someone in the group will come up with the correct answer and express it in ways that the providers feel could not have been stated any better."

The most significant factor in how well the *CenteringPregnancy* program worked at Einstein was the dedication of Strong Start providers who pressed on, despite initial implementation challenges, and were successful in engaging participants in their care. To that end, awardee respondents remarked that providing support to clinic staff, including education, training, encouragement, and opportunities to recognize progress and celebrate achievements, can go long way in motivating staff and keeping a program going. Hospital leaders also supported the program.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

When asked which part of Strong Start implementation was the most challenging, most key informants pointed to patient recruitment and reaching program enrollment goals. One key informant felt that pressure to meet enrollment goals was so high that it may have distracted from patient care, as Strong Start staff would meet to strategize about how to enroll more participants instead of how to best meet the needs of those already enrolled in the program. Other challenges identified by key informants

included difficulty securing adequate space to conduct the groups, data collection and reporting, and achieving buy-in from some providers and staff at clinics.

Key informants generally thought of the *CenteringPregnancy* model as comprehensive and well-designed, and offered a few ideas for how the program could be modified, within its parameters, to reduce common barriers to participation and retention. Ideas include offering childcare services, hosting smaller groups in order to make sessions shorter, having groups at different times of the day to accommodate competing priorities and different schedules, starting the sessions earlier in pregnancy, and adding a postpartum session. One key informant suggested that starting Centering sessions earlier in pregnancy, when women come for their first appointment, could reduce confusion that stemmed from having to switch from standard prenatal care to Centering during the second trimester.

SUSTAINABILITY

At the time of the final case study interviews, Einstein was sustaining Centering with support from external grants and direct support from the Einstein Healthcare Network. However, key informants expressed concerns about being able to continue to serve Medicaid patients because of uncertainty around Medicaid financing following the 2016 presidential election, and sustaining the program in the long-term. Even though health care payers were interested in referring members to Centering, no health plans had committed to enhanced payments for group prenatal care.

Einstein now offers Centering to all patients regardless of health insurance coverage, and at least one of the co-facilitators is either a nurse practitioner or a certified nurse-midwife. The awardee was not planning to change its group care approach, though key informants said they might consider adjustments to the program recruitment strategy to address some of the continuing challenges around patient enrollment and retention. Einstein was pursuing CHI site certification at the time of the final interviews, after which the organization can conduct its own training for Centering, which will make implementation of the model at new sites more cost-effective.

PARTICIPANT-LEVEL PROCESS EVALUATION

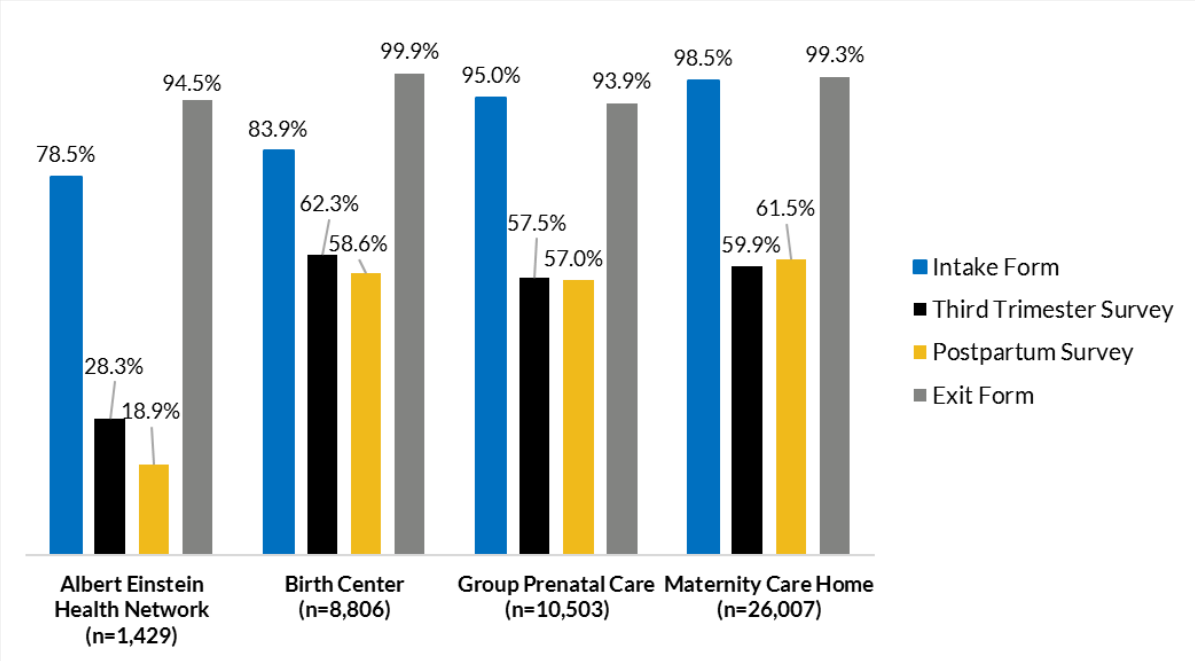
The tables and figures presented in this section summarize findings from the PLPE dataset for Einstein Healthcare Network, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Einstein Healthcare Network to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).

- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 17 Einstein Healthcare Network participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 2: FORM SUBMISSION RATES, EINSTEIN



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,512
- Study IDs represented: 1,429 Study IDs (suggests that PLPE data were missing for 83 patients or 5.5 percent of women enrolled: see information on program report data in Appendix F in Volume 1).

HOW FORMS WERE ADMINISTERED:

- Intake Form: Self-administered on paper during Centering.
- Third Trimester Survey: Self-administered on paper during Centering
- Postpartum Survey: Self-administered at postpartum visit.
- Patients were assured that their responses were confidential; because of this, staff did not check the forms for completeness.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Einstein had two main sites, Philadelphia and Montgomery.
- The evaluation team's main point of contact worked at the Philadelphia site and was able to help answer data quality questions after the Montgomery contact had left.
- Sites transitioned to a new medical records system during Strong Start—Philadelphia early in the evaluation and Montgomery much later. This affected data collection, as some delivery information for Montgomery patients who delivered between 2014 and 2016 was lost.

MISSING FORMS:

- Intake: 21.5 percent of Study IDs were missing Intake Forms. The awardee did not administer the Intake Form until the second or third Centering session, at which point some women had dropped out.
- Third Trimester or Postpartum: About 72 percent of Study IDs were missing the Third Trimester Survey and 81 percent were missing the Postpartum Survey. The awardee noted that these high numbers were due to loss to follow-up and that many women do not return for a postpartum visit or see a different provider who may administer the form.
- Exit: 5.5 percent of Study IDs were missing Exit Forms. These are missing because either (a) patients enrolled before the study's data system was set up, or (b) staff were unable to extract data from the Montgomery site.

ITEM NONRESPONSE:

- Intake: The Intake Form was filled out by patients during Centering, while the clinical staff was checking vital signs and doing belly checks. Staff reported that patients felt rushed to complete the Intake because of its length. They believe patients worried about getting in "trouble" for their answers, even though the awardee staff assured them of confidentiality and never reviewed their responses. They heard from patients that some of the questions, particularly around housing and drug and alcohol use, were "very personal" and they were uncomfortable answering them.
- Exit: The awardee did a quick check of Exit Forms to make sure the necessary items were completed. However, if the Montgomery site coordinator did not submit an Exit Form containing delivery information, the awardee was not able to pull this information. Strong Start pregnancy outcome information is missing for 22.5 percent of participants.[8]

[8] Among participants with missing data on pregnancy outcome, 24.9% were missing because they did not have an exit form, 65.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 10.1% were missing for other reasons.

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes of Einstein participants. Einstein had high rates of missing data (greater than 20 percent) for a number of characteristics and risk factors, including age, race/ethnicity, relationship status, intimate partner violence, and pregnancy intent. Among the risk factors collected in the PLPE data that can be reported confidently, 25.3 percent of Einstein participants with a prior birth had a prior preterm birth.

TABLE 14: DEMOGRAPHICS, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	23.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,087**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	6.4	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	12.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	76.1	81.7	72.9	75.1	75.8
35 Years and Older	%	4.6	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	22.6	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,093**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	16.7	25.4	37.1	28.0	29.7
Non-Hispanic White	%	8.9	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	68.0	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	6.5	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	31.2	19.6	12.8	11.3	13.3
Not in Universe	%	55.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**182**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	14.8	52.6	36.3	55.8	49.7
Puerto Rican	%	63.7	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	15.9	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	21.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,111**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.8	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	23.7	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,077**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	36.6	36.6	30.8	35.3	34.5
In School, Not Employed	%	12.3	8.7	12.6	11.9	11.5

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Employed and in School	%	6.9	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	44.3	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	25.4	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,054**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	21.7	15.4	27.8	29.1	26.4
High School Graduate or GED	%	68.6	57.5	58.3	57.9	57.9
Associate's Degree	%	4.1	8.2	5.2	4.6	5.4
Bachelor's Degree	%	2.8	14.5	4.5	3.7	5.8
Other College Degree	%	2.8	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	26.3	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,040**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	11.1	42.1	20.4	20.8	24.5
Living with a Partner	%	33.0	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	34.0	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	21.9	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 15: PSYCHOSOCIAL, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	23.2	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,085**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	57.9	51.8	51.8	59.7	56.5
No	%	34.4	44.6	42.3	37.4	39.8
Unsure	%	7.7	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	23.2	17.0	6.6	3.4	6.8
Not in Universe	%	32.4	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**628**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	56.1	61.1	72.6	79.9	75.3
Other	%	33.3	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	10.7	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	35.9	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**905**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	14.9	10.7	10.1	13.2	12.1

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Food Insecure at Intake						
Missing Data	%	33.8	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**935**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	24.0	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	22.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,088**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	43.8	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	35.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**906**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	44.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	27.0	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,031**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	48.1	67.9	59.0	65.5	64.5
Mild	%	25.4	21.4	23.8	20.2	21.2
Moderate	%	14.5	6.8	10.3	8.5	8.6
Severe	%	9.6	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	2.4	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	25.6	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,050**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	17.6	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	26.1	18.3	16.3	7.7	11.8
Not in Universe	%	6.2	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**957**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.7	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	21.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,111**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	51.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	32.4	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	16.6	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	65.8	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	12.1	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	25.7	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	22.2	24.6	17.1	15.4	17.2

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Childcare Challenges	%	11.9	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	8.5	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 16: PREGNANCY HISTORY AND INTENTIONS, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.4	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,406**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	75.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	22.4	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	14.0	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**899**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	25.4	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	13.7	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**903**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	42.9	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	40.2	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**528**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	4.4	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	32.2	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**641**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	15.3	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	38.0	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**560**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	3.0	4.1	6.1	11.0	8.1

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Cervical Incompetence						
Missing Data	%	38.2	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**556**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	2.3	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	38.9	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**547**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	38.6	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**551**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 17: PRIOR BIRTH OUTCOMES, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	3.3	1.7	1.5	0.6	1.0
Not in Universe	%	24.6	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,018**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	87.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	33.1	23.5	18.9	15.2	17.7
Not in Universe	%	29.1	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**534**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	24.7	34.6	24.3	27.1	28.1
>= 18 months	%	75.3	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	1.3	0.1	2.5	1.4	1.4
Not in Universe	%	36.8	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**875**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	25.3	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	11.8	1.3	20.8	13.1	12.6
Not in Universe	%	34.3	36.3	44.3	37.2	38.7

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**762**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	16.1	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 18: PRE-PREGNANCY MEDICAL CONDITIONS, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	25.8	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,047**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	23.0	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	65.4	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	4.1	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	10.7	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,261**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	2.0	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	10.7	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,261**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	7.0	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	24.2	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,071**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.5	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	32.1	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	25.1	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	29.7	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	9.6	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 19: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	22.3	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,097**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	6.7	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	22.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,094**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	8.7	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	21.2	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,112**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	2.8	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	20.9	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,117**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	1.5	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	20.5	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,122**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	22.3	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,097**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	22.2	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,099**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	21.2	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**1,112**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	10.5	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 20: TREATMENTS DURING PREGNANCY, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	54.7	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**640**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	12.0	0.8	10.0	5.1	5.4
Not in Universe	%	79.4	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**122**	**680**	**654**	**2,585**	**3,919**
Yes	%	21.3	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	55.8	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**624**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	4.0	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	56.0	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**621**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	2.3	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 21: PRENATAL CARE, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	8.6	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,290**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	2.2	4.7	29.5	64.5	43.3
Licensed Professional Midwife[9]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	88.4	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	9.2	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	5.6	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,333**	**8,778**	**9,740**	**25,360**	**43,878**

[9] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Individual Visits	%	83.3	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	4.4	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	5.6	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,333**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	95.3	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	3.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	26.1	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,043**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	50.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.8	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	37.7	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**880**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	5.5	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.2	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	50.2	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**703**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	3.6	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	1.0	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	46.3	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**758**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	2.0	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.5	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	54.2	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**647**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	3.7	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.3	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	53.9	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**651**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Nutrition Counseling						
Missing Data	%	45.3	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**772**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	34.3	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	39.5	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**854**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	5.4	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.8	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	44.3	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**786**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	26.3	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	2.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	82.4	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	5.5	-	6.4	6.9	6.8
Other	%	21.6	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 22: DELIVERY INFORMATION, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	27.8	1.4	25.3	23.3	19.5
Not in Universe	%	26.5	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**645**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	27.9	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	7.7	0.3	7.8	2.9	3.5
Not in Universe	%	81.7	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**150**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	44.0	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	8.0	4.6	11.5	7.3	7.7

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Not in Universe	%	18.1	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,043**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	97.1	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	2.7	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	10.3	0.7	12.0	5.6	6.1
Not in Universe	%	18.1	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,010**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	71.3	87.1	70.1	69.5	73.1
C-Section	%	28.7	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	7.2	0.4	8.7	2.3	3.4
Not in Universe	%	70.8	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**311**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	76.5	83.3	72.9	74.7	75.9
C-Section	%	23.5	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	8.4	4.7	12.5	6.3	7.4
Not in Universe	%	73.9	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**251**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	47.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	5.6	0.1	6.2	0.7	1.9
Not in Universe	%	80.4	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**198**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	24.7	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 23: BIRTH OUTCOMES, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	22.5	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,095**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	97.7	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	1.3	3.2	1.3	4.1	3.3

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	14.2	0.7	15.4	5.8	7.0
Not in Universe	%	18.6	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**949**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	5.1	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	9.5	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	83.8	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.7	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	13.0	2.1	14.3	8.0	8.3
Not in Universe	%	18.6	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**965**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.5	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	10.6	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	83.6	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	4.4	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 24: SATISFACTION, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	91.7	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**117**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	6.0	3.3	4.4	7.8	6.2
Very Satisfied	%	45.3	25.6	35.6	46.1	39.8
Extremely Satisfied	%	47.9	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	91.8	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**116**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	15.5	10.4	11.6	12.8	12.1
Very Satisfied	%	44.8	29.1	42.6	46.6	42.1
Extremely Satisfied	%	36.2	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 25: BREASTFEEDING, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	74.6	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**359**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	42.9	80.4	47.5	40.5	50.3
Formula Feed Only	%	14.8	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	30.4	10.8	31.9	32.5	27.8
I Haven't Decided	%	12.0	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	91.9	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**114**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	82.5	91.5	76.6	72.6	77.3
No	%	16.7	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 26: FAMILY PLANNING, EINSTEIN

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	92.0	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**113**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	80.5	77.0	77.5	82.2	80.3
No	%	17.7	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	92.0	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**113**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	79.6	84.2	70.8	74.0	75.5
No	%	17.7	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	81.0	41.5	42.9	38.6	40.2
Not in Universe	%	12.6	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**90**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	-	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	-	2.8	11.4	10.9	9.2
LARC - IUD	%	-	10.8	11.9	12.3	11.9
Pills	%	-	8.6	11.9	13.0	11.8
Injection	%	15.6	5.9	16.2	20.2	16.2
Condoms	%	32.2	26.6	19.8	13.9	17.9

Data Elements	N or %	Albert Einstein Health Network (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding	%	2.2	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	13.3	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate and Medicaid Eligibility data were obtained from Pennsylvania

Initial Contact: In March 2015, the evaluation team spoke with officials from the Pennsylvania Department of Human Services (DHS) and the Pennsylvania Department of Health (DOH) to learn about the state's willingness to provide data for the impact analysis. State officials were receptive to supporting the evaluation, and DHS planned to link the Medicaid and birth certificate data. (It was decided that obtaining claims data from the state would not be feasible.)

Data Acquisition Process: Applications requesting Medicaid and birth certificate data were submitted to DHS and DOH in March and April 2015, respectively. In April 2015, the evaluation team received approval from DOH and, following some delays, the team received a fully executed Business Associate Agreement (BAA) from DHS in April 2016. In August 2017, Medicaid provided Urban with linked eligibility and birth certificate data. However, the files did not include the Strong Start participant IDs, which are required to identify the site where the woman received services. The state indicated that they were not able to provide the variable because it was not included in the original Data Use Agreement. The evaluation team had several conversations with the Medicaid agency to resolve the issue and find a way for the variable to be shared. However, the state confirmed that to share the Strong Start ID, the agreements between the state and Urban will have to be amended, which was a time-consuming process. For this reason, the evaluation team decided to move forward without the ID variable. This had no impact on the evaluation team receiving the remaining linked data.

Final Result: Urban received final merged Medicaid eligibility and birth certificate files from the Medicaid agency in August 2017 and included Pennsylvania in its final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES

The Albert Einstein Healthcare Network (Einstein) awardee, which implemented the Group Prenatal Care model, delivered care at two sites included in the impact analysis: Einstein Medical Center Philadelphia and Montgomery Hospital Medical Center. This section presents the evaluation's impacts

results for the awardee as a whole. In addition, the Einstein Medical Center Philadelphia site served a large enough number of Strong Start participants that a site level estimate was also feasible (Table 27).

As described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1, low acceptance rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the acceptance of group prenatal care was low (less than 75 percent) were of particular concern. However, both Einstein sites ultimately used an opt-out approach to enrollment and achieved an acceptance rate above 75 percent. Therefore, low acceptance rate concerns for sites that used an opt-in procedure do not apply to Einstein.

TABLE 27: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR EINSTEIN

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Albert Einstein Healthcare Network			
Einstein Medical Center Philadelphia	Yes	Yes	No
Montgomery Hospital Medical Center	Yes	No	Yes

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[10]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications (described in detail in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1). The Montgomery Hospital Medical Center site fully "saturated" the local area, so we present model estimates for which we drew the comparison group outside the county (alternative specification #1). As we did not receive claims data from Pennsylvania, expenditure and utilization outcome findings are not available, nor are results from alternative specifications that include claims variable controls.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value<0.05 levels. We

[10] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 28 reports the birth and process outcome findings for this Group Prenatal Care model awardee:

- Infants born to women enrolled in Strong Start at Einstein sites are slightly more likely to have an Apgar score greater than or equal to seven (97.6 percent) than infants born to women in the comparison group (96.6 percent), a marginally significant difference of 1.0 percentage points (p-value<0.10).
- Women enrolled in Strong Start have a higher weekend delivery rate (27.4 percent) than comparison group women (23.4 percent), a significant difference of 4.0 percentage points.
- Differences in estimates for Strong Start enrollees and comparison group women are not statistically significant for the other birth outcome variables.

TABLE 28: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT EINSTEIN

Outcomes	Main Model: 2014 - 2016, Strong Start (N=917)	Main Model: 2014 - 2016, Comparison Group Reweighted (N 56,105)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=917, N=52,212)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.4	38.4	0.0	0.0	N/A	N/A
Preterm birth rate	12.1%	11.3%	0.8	0.8	N/A	N/A
Very preterm birth rate	3.6%	3.9%	-0.3	-0.1	N/A	N/A
Birthweight (grams)	3,101.6	3,112.3	-10.7	-19.0	N/A	N/A
Low birthweight rate	12.9%	12.2%	0.6	0.9	N/A	N/A
Very low birthweight rate	1.5%	2.0%	-0.4	-0.4	N/A	N/A
Rate of Apgar score greater than or equal to 7	97.6%	96.6%	**1.0^**	0.9	N/A	N/A
Process Outcomes						
C-section rate	29.6%	27.6%	2.0	2.1	N/A	N/A
VBAC rate[1]	25.9%	24.3%	1.6	0.5	N/A	N/A
Weekend delivery rate	27.4%	23.4%	**4.0****	**3.4***	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 185 Strong Start women and 9076 comparison group women.

Table 28 also shows how the main model estimates are robust to using a comparison group that draws from outside of the county for the Montgomery Hospital Medical Center site (alternative specification 1). Using this updated comparison group, women enrolled in Strong Start at Einstein still have a higher weekend delivery rate than women in the comparison group, but the magnitude of the difference drops slightly from 4.0 to 3.4 percentage points.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for the Einstein Medical Center (Table 29) are nearly identical to the awardee-level analysis. Whereas the weekend delivery rate is 4.0 percentage points higher for Strong Start women at the awardee-level, it is 3.6 percentage points higher at the site-level. The Apgar score finding is also estimated with more precision in the site-specific model.

TABLE 29: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT EINSTEIN MEDICAL CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=674)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=48032)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.4	38.4	0.0	N/A	N/A	N/A
Preterm birth rate	12.0%	11.6%	0.4	N/A	N/A	N/A
Very preterm birth rate	3.7%	3.6%	0.1	N/A	N/A	N/A
Birthweight (grams)	3,070.6	3,088.1	-17.5	N/A	N/A	N/A
Low birthweight rate	13.4%	12.9%	0.4	N/A	N/A	N/A
Very low birthweight rate	1.5%	2.1%	-0.6	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	97.6%	96.2%	**1.5***	N/A	N/A	N/A
Process Outcomes						
C-section rate	28.3%	27.9%	0.4	N/A	N/A	N/A
VBAC rate[1]	26.7%	26.0%	0.7	N/A	N/A	N/A
Weekend delivery rate	27.3%	23.7%	**3.6***	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 131 Strong Start women and 7746 comparison group women.

CROSS-CUTTING SUMMARY

The Albert Einstein Healthcare Network (Einstein) implemented the Group Prenatal Care model under Strong Start. Einstein participants had a considerable amount of missing PLPE data for a large number of characteristics and risk factors. However, previous preterm birth was well reported and more than a quarter of Einstein participants with a prior birth had a prior preterm birth (25.3 percent). The awardee followed the *CenteringPregnancy* approach, with customization to meet needs of high-risk participants. For example, group facilitators often co-lead the sessions with additional clinicians or topic experts (e.g., pediatrician, lactation consultant, domestic violence counselor) that group members could contact for additional services. Moreover, high-risk participants whose pregnancies needed to be more closely monitored (e.g., a patient with a heart condition) had individual visits with specialty clinic providers in between Centering sessions. Preterm birth rates and low birthweight for Einstein participants were high (14.6 percent and 12.1 percent respectively) compared with national rates (9.8 percent and 8.2 percent respectively), indicating high levels of risk consistent with their tailored approach to group prenatal care. Many Strong Start participants reportedly did not attend the hospital's birthing class, so Strong Start education on healthy pregnancy and childbirth was often the single means of preparing women for what to expect. The Impact analysis found that Strong Start participants at Einstein had higher weekend delivery rates than women in the comparison group, which may suggest a reduction in planned inductions. Infants born to women enrolled in Strong Start at Einstein also had marginally ($p<0.10$) better Apgar scores than infants born to women in the comparison group.

Amerigroup Corporation

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
976	• Wholly owned subsidiary of Anthem, Inc. • National managed care organization working extensively with state-sponsored health programs (such as Medicaid) across the United States • Worked in concert with the Southeast Louisiana Area Health Education Center (SELAHEC) to develop Strong Start, and SELAHEC managed day-to-day operations of the award	• Seven sites located in New Orleans, Baton Rouge, and Shreveport, LA	• Intervention categorized as "medium intensity" for implementing *CenteringPregnancy* curriculum with no additional enhanced services • *CenteringPregnancy* model of care, including 10 Group Prenatal Care sessions using the Centering curriculum and materials

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Introduced the Group Prenatal Care model to Louisiana, with potential to begin transforming prenatal care throughout state
- Helped educate and empower women to be involved in their health care, and increased patient satisfaction
- Having "champions" dedicated to making the Centering model work was biggest factor in Amerigroup's success

CHALLENGES

- Incorporating medical residents: residents are required to see a certain number of patients, and groups with low attendance made meeting requirements difficult
- Low patient volume: low attendance led to financial loss, and small groups were often less productive

PARTIALLY SUSTAINED

- Two of the seven sites planned to sustain *CenteringPregnancy* programs with funding from external grants and (for one site) enhanced reimbursement through Amerigroup Louisiana health plan
- One additional site planned to continue Group Prenatal Care independent from the Centering Healthcare Institute (CHI), and only for their Hispanic population

KEY FINDINGS: PARTICIPANT-LEVEL DATA[11]

PARTICIPANT-LEVEL DATA QUALITY

- 0.9% rate of missing intake forms; 1.8% rate of missing exit forms
- 10.3% rate of item nonresponse on intake forms; 20.9% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 13.7% of women were teens (under age 20); 5.9% were 35 years or older
- 72.7% of women were black; 7.2% were Hispanic; 17.1% were white
- 14.0% of women were married; 40.1% were living with a partner; 17.1% were not in a relationship
- 21.4%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 29.5%: C-section rate among women with a delivery
- 12.1%: preterm birth rate among women with a live birth
- 11.1%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Summary impact results not provided here because of concerns about opt-in enrollment strategies and low acceptance rates
- See the Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings
- Valid estimates for Associates in Women's Health at Baton Rouge – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

[11] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Prior to implementing Strong Start, all of Amerigroup's sites offered typical prenatal care delivered through brief one-on-one visits with an obstetrician /gynecologist (OB/GYN) physician or resident. These appointments generally lasted between 5 and 15 minutes, depending on a woman's gestational age and needs. Staffing differed across the sites differed, but all cases included attending physicians, residents who reported to the attending physician, and registered nurses. Because of the rotating nature of the residency programs, patients did not often see the same resident through the entirety of their pregnancy.

Before Strong Start, none of Amerigroup's sites had experience with Group Prenatal Care. However, several years prior to Strong Start, providers within the Ochsner Health System offered "shared" medical appointments to patients with a variety of medical needs. Though the goal of the shared medical appointments was similar to that of Centering, namely to provide patients with more information to enable them to make better choices, the format was described by key informants as more didactic.[12] Additionally, key informants noted that the shared medical appointments did not emphasize peer support, a major component of the Centering model. The shared medical appointments were discontinued in 2011 because of lack of physician buy-in and support.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Under Strong Start, Amerigroup implemented Group Prenatal Care following the *CenteringPregnancy* model. All Strong Start sites followed the Centering Healthcare Institute (CHI) approach with ten group care sessions throughout a seven-month period. Two CHI-trained facilitators led each session. The primary facilitator was an OB/GYN, Nurse Practitioner, or Certified Nurse Midwife, while the co-facilitator was either a Registered Nurse or Medical Assistant. One of the facilitators also served as the Centering coordinator, and as such was responsible for recruiting women into Centering and managing the Strong Start evaluation data collection forms.

> "[The facilitators have] been giving us all the information we when we need it. The Centering notebook is helpful to have at home in case you want to read before. It helps you think about your questions. I'm happy she can clarify my questions. I think [group prenatal care] is making a difference for me and my pregnancy, because I am getting more information."
>
> *- Strong Start participant*

Patients at all sites were assigned to Centering groups based on their estimated due date. Though all of the sites aimed to enroll six to 12 patients in each cohort, the average group size ranged from three to 12 women, depending on the volume of the practice and group attendance. All sites used the

[12] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

CHI materials during the groups, including the Centering notebooks and CHI-developed discussion aides and activities.

Group sessions were scheduled for two hours and took place in a private space with circular seating. Sessions began with time for socialization and healthy snacks (which were paid for by the affiliated health systems), while individual health assessments occurred in a screened-off area. During this assessment, women were encouraged to discuss any questions or concerns with their provider that they were uncomfortable sharing with the group. Women were responsible for collecting their own blood pressure, weight, and urine sample at the beginning of the session. Some sessions were co-facilitated by additional clinicians or topic experts, including pediatricians, nutritionists, and lactation consultants.

> "I like [group facilitators] because they always answered my questions. I had a lot of comfort with asking questions and liked listening to others ask them. It was not hard that [the doctor] doesn't speak Spanish, because [she and the translators] made it comfortable for us."
>
> *- Strong Start participant*

After initial implementation, there were several changes to some of Amerigroup's Strong Start sites. Two sites experienced staff turnover, which resulted in reduced provider buy-in. This lack of buy-in led to reduced Strong Start enrollment. In addition, a new site was added after the first year, bringing the total number of sites in evaluation Year 2 to seven. However, by evaluation Year 3 there were only five sites providing Strong Start services; the two sites that struggled with provider buy-in and staffing changes had ended group prenatal care. Both of those sites experienced problems related to low take-up of Centering and difficulty integrating Centering with the teaching hospitals' medical residency programs. Throughout the course of the evaluation there were no changes to Amerigroup's Strong Start model of care.

OUTREACH AND ENROLLMENT

Amerigroup sites typically employed an opt-in enrollment approach, meaning women were asked to choose between enrollment in Strong Start or participation in a site's standard care model. Ochsner St. Charles reported trying an opt-out approach, where all women were enrolled in Strong Start by default unless they actively chose to opt out of the intervention, but the method resulted in low group attendance rates. A key informant at Ochsner explained, "the patients would be scheduled for their first Centering group and just wouldn't show up, or they'd call and cancel. It works better to have patients who want to come so we don't have as many no-shows or cancellations." Key informants reported that the main reason that patients declined to participate in Centering was lack of childcare.

Some sites used more extensive outreach strategies than others. Outreach efforts included placing an advertisement in a local news publication, handing out flyers at the local Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) office, speaking with providers and family practice doctors in the area, and encouraging patients to refer friends and family. In addition, one site created a Centering promotional video that was featured on its website, Facebook page, and in the hospital waiting rooms.

> "The truth is I could have gone to another clinic. I live farther away, but once I heard about the [Centering group], I decided to stay here."
>
> *- Strong Start participant*

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Overall, key informants had positive impressions of Amerigroup's Strong Start program but expressed varying levels of comfort assessing the program's impact. They believed that improvements in health literacy and psychosocial wellbeing among group care participants could be attributed to the program, and also felt increased education on breastfeeding and family planning under Strong Start likely contributed to improvements in those areas. Key informants generally agreed Strong Start had the potential to improve medical outcomes but most did not feel the program had reached enough women to show any evidence of these improvements.

Key informants generally believed that the Amerigroup Strong Start preterm birth rate was promising and lower than expected, given Louisiana's average rate of close to 15 percent for Medicaid births prior to the program implementation. Key informants cited the education provided as part of group sessions as a likely influence on the decrease in both preterm birth rates but felt too few women had been enrolled at any one site to conduct a rigorous analysis.

> "I thought about [breastfeeding] but it was Centering that persuaded me because of the benefits we heard about."
>
> *- Strong Start participant*

Overall, key informants were pleased to hear that both the Strong Start breastfeeding and C-section rates tracked close to the national average. Historically, Louisiana had one of the lowest breastfeeding rates and one of the highest C-section rates in the country. Awardee- and site-level staff agreed that Strong Start had the most potential to reduce C-section rates by reducing the number of early elective C-sections. Key informants felt the education provided throughout the Centering curriculum on the importance of a full-term pregnancy encouraged women to carry to term even if presented with the option to have a C-section early. Further, the development of a birth plan was instrumental to women successfully having a vaginal birth, according to group facilitators, and having mixed-parity groups prompted first time moms to think more critically about their delivery.

STRONG START PARTICIPANT PERSPECTIVES

Most women chose their prenatal care site because of previous experiences with the clinic, hospital, or health system. Some women had negative experiences at other hospitals that led them to their current Strong Start site, while others chose their clinic based on its general reputation in the community for providing high quality, low cost care.

> *I watched my sister have her baby and she had [provider at the Woman's Health Center] and I watched how he delivered her baby, and he was amazing at it.*
>
> *All of my children I have given birth to here. My [current] doctor was the one who delivered the [child] who passed. I wanted to come back here, because I really liked her and the support I got.*

Most women confirmed provider perceptions that transportation was a challenge for individuals who did not have access to a car. While most women who attended the focus groups drove to their appointments, a number of women had at least some experience using public transportation or Medicaid transportation services.

I used Medicaid transportation once. It's hit or miss. Sometimes it's horrible. Sometimes they are on time. Sometimes they don't show up. There's a number you call and give them your information. They pick up and drop off; it has bi-directionality. You can bring other children with you. You can bring a wheelchair. You can also bring a partner.

Participants reported very satisfactory experiences with Group Prenatal Care. Many women had developed relationships with other women in their group, and kept in touch after the session cycle ended. In addition, women appreciated the "fun" group atmosphere of Centering, as well as the decreased waiting time and education they received about their pregnancies. Most women felt prepared for childbirth, particularly because of the information they received in Centering.

I like the group session atmosphere where you listen to what everyone is going through and you learn from them.

Spanish-speaking participants seemed particularly grateful for the access to additional support and information offered in the group care setting. One woman had recently moved to the United States and was appreciative of the sense of community among women in her group. Other women enjoyed being able to ask questions, and reported little to no communication barrier resulting because a translator was present during group sessions.

I liked the community of group, because I just moved here. All of the people in my group were first time moms so we could all learn from each other. I made friends in the group.

PROGRAM STRENGTHS

Amerigroup key informants were proud of the fact that they were able to bring the Centering model of Group Prenatal Care to Louisiana, believing that Strong Start enabled them to "open the doors" and begin changing how prenatal care was delivered. Through the dedication and hard work of their teams, the model was sustained at several sites. Other achievements included educating and empowering women to be more involved in their health care, delivering prenatal care that generated higher patient satisfaction, and developing patient awareness of community resources. Key informants reported that having "champions" dedicated to making Centering work – at both the awardee and site levels – was the factor with the biggest impact on success. It was important to have a point person who was felt responsible for making sure that Centering operated smoothly, and work through the challenges of implementing the model.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Significant challenges persisted for medical resident training programs that tried to implement Centering. Sites affiliated with two such programs stopped offering group prenatal care before the end of the award period. One high-volume prenatal clinic was staffed with a relatively small number of residents, and clinic directors were hard pressed to commit residents to two-hour group sessions when more women could be served through typical one-on-one prenatal care. The problem was exacerbated by high 'no show' rates among women enrolled in Centering (also a problem in the site's standard prenatal care clinic, but less impactful since the clinic typically overbooked appointments in anticipation

of no shows). Residents also struggled to meet their residency clinic requirements (related to serving a certain number of patients during their obstetrical rotations) when engaged with Centering, because of the large among of time spent with a relatively small number of women, and also related to poor attendance.

In addition, key informants stated that maintaining the necessary patient volume for groups and recruiting women to participate in group prenatal care were ongoing challenges. Low patient volume made it difficult to continue group sessions because seeing fewer patients led to financial loss, and smaller groups were sometimes less productive because fewer women were sharing experiences and asking questions. To help address the challenges, key informants stressed the importance of securing supplementary funding to sustain the program after Strong Start ended, finding grant money to support incentives for patient engagement, and building true provider buy-in and support for the program.

SUSTAINABILITY

The awardee reported a mix of sustainability plans across its sites. Two sites had secured funding to sustain their Centering programs, one site was planning to sustain a modified version of Group Prenatal Care, and two sites were not planning to sustain Group Prenatal Care in any form. Ochsner St. Charles received funding through the Ochsner health system's "excellence grant" program to continue its Centering program. They were also pursuing enhanced reimbursement for patients enrolled in the Amerigroup Louisiana health plan to supplement the grant funding. Daughters of Charity made the decision to continue providing group prenatal care to its Hispanic population, but will do so independently of CHI. Associates in Women's Health reported that it had set aside funds to continue supporting the Centering program's coordinator, which would permit it to continue Centering groups for Medicaid enrollees. The site also secured additional funding in the form of a grant from the Amerigroup Foundation (through the state chapter of the March of Dimes).

PARTICIPANT-LEVEL PROCESS EVALUATION

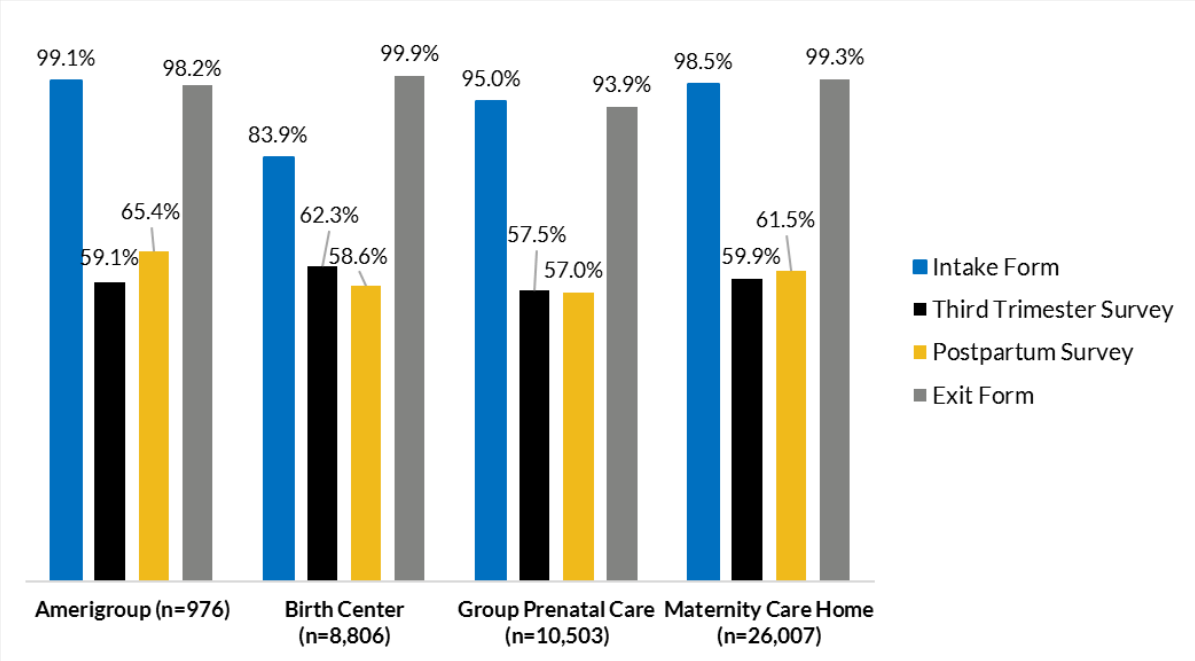
The tables and figures presented in this section summarize findings from the PLPE dataset for Amerigroup, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Amerigroup to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).

- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 31 Amerigroup participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 3: FORM SUBMISSION RATES, AMERIGROUP



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 963
- Study IDs represented: 976 (suggests that PLPE data were submitted for 13 extra patients: see explanation in Appendix F in Volume 1).

HOW FORMS WERE ADMINISTERED:

- Intake: Most were filled out by the patient with help from group care staff, as necessary. The Intake was completed by the Centering Pregnancy coordinator when a participant was counted towards their enrollment total, but never attended any group care sessions.
- Third Trimester and Postpartum Surveys: Surveys were sometime self-administered by patients, but sometimes providers filled this out. If a woman dropped out, staff attempted to contact them to complete the survey, but it is not known how often this was the case.
- The awardee frequently had questions or corrections to their forms after they were already processed by the evaluation team. Corrections were made throughout.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Amerigroup operated five provider sites
- There were numerous cases where Amerigroup reported submitting forms, but the evaluation team had no record of receiving them. The awardee requested that sites locate backup copies and resubmit them. Sites had copies of many, but not all, forms.
- In February 2016, the awardee indicated there was variation in how the sites approached completion of the Postpartum Survey. Some sites attempted to contact participants by phone to collect information if they did not return for a visit; others referred to the medical record to fill in information. After February 2016, all Postpartum Surveys should have been administered in the same manner, potentially by phone, but without drawing on the medical record.
- Site specific issues with the Exit Form were corrected manually by the awardee (e.g., delayed submission of postpartum visit dates, categorizing women as "voluntary withdrawal vs. lost to follow up"). Though corrections were made where possible, the data may not be reliable.

MISSING FORMS:

- Intake: 0.9 percent of Study IDs were missing Intake Forms. The awardee stated that these surveys were completed, but the sites did not have backup copies to submit.
- Third Trimester or Postpartum: About 41 percent of Study IDs were missing the Third Trimester Form and 35 percent were missing the Postpartum Survey. The awardee said that many sites had reunions to bring women back in who might not attend an individual postpartum visit.
- Exit: 1.8 percent of Study IDs were missing Exit Forms. The awardee stated that most of these missing Exit Forms were completed, but they did not have backup copies to submit.

ITEM NONRESPONSE:

- Intake: Women were told they did not have to answer questions if they did not feel comfortable. The awardee said that information on drinking or drugs might be missing because the women thought it was too sensitive or felt it did not apply. And, as noted previously, there are Intake Forms with a great deal of missing data likely attributable to the fact that women enrolled but did not attend the group care sessions.
- Exit: Some sites were not able to get infant information because the participant delivered at a different hospital and they did not have access to the medical records, thus data on women's Strong Start pregnancy outcomes are missing for 21.2 percent of participants.[13]

[13] Among participants with missing data on pregnancy outcome, 9.0% were missing because they did not have an exit form, 83.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 8.0% were missing for other reasons.

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes of Amerigroup participants. Some highlights include:

- The majority (80.3 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 10.1 percent of participants were 18 or 19 years old.
- Most participants were black (72.7 percent). White women accounted for 17.1 percent of Amerigroup enrollees.
- Similar to Strong Start participants overall, the largest share of Amerigroup participants was in a relationship and living with a partner (40.1 percent); only 14.0 percent were married and 17.1 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 15.2 percent of Amerigroup participants reported having experienced intimate partner violence, 21.4 percent of participants with a prior birth had a prior preterm birth, and 75.9 percent of participants had not planned their Strong Start pregnancy.

TABLE 30: DEMOGRAPHICS, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.5	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**931**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	3.7	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	10.1	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	80.3	81.7	72.9	75.1	75.8
35 Years and Older	%	5.9	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.4	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**932**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	7.2	25.4	37.1	28.0	29.7
Non-Hispanic White	%	17.1	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	72.7	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.0	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	12.6	19.6	12.8	11.3	13.3
Not in Universe	%	80.3	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**67**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	22.4	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	65.7	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Living in Shelter or Homeless at Intake						
Missing Data	%	0.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**937**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	12.1	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**831**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	40.4	36.6	30.8	35.3	34.5
In School, Not Employed	%	12.2	8.7	12.6	11.9	11.5
Employed and in School	%	7.9	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	39.5	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	15.3	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**800**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	21.6	15.4	27.8	29.1	26.4
High School Graduate or GED	%	63.6	57.5	58.3	57.9	57.9
Associate's Degree	%	4.9	8.2	5.2	4.6	5.4
Bachelor's Degree	%	5.6	14.5	4.5	3.7	5.8
Other College Degree	%	4.3	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	13.1	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**821**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	14.0	42.1	20.4	20.8	24.5
Living with a Partner	%	40.1	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	28.9	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	17.1	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 31: PSYCHOSOCIAL, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	7.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**872**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	51.9	51.8	51.8	59.7	56.5
No	%	39.0	44.6	42.3	37.4	39.8
Unsure	%	9.1	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	7.7	17.0	6.6	3.4	6.8
Not in Universe	%	44.3	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**453**	**3,778**	**5,026**	**14,735**	**23,539**

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Medicaid	%	62.9	61.1	72.6	79.9	75.3
Other	%	27.8	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	9.3	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	18.5	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**770**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	9.7	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	18.4	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**771**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	23.6	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	12.1	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**831**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	47.4	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	24.4	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**714**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	40.9	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	16.1	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**793**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	49.9	67.9	59.0	65.5	64.5
Mild	%	27.9	21.4	23.8	20.2	21.2
Moderate	%	14.1	6.8	10.3	8.5	8.6
Severe	%	6.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	2.0	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	13.0	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**822**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	15.2	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	14.8	18.3	16.3	7.7	11.8
Not in Universe	%	5.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**750**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.3	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**937**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	68.2	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	26.4	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	5.4	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	53.0	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	9.7	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	8.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	26.5	24.6	17.1	15.4	17.2

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Childcare Challenges	%	11.1	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	12.8	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 32: PREGNANCY HISTORY AND INTENTIONS, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	1.5	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**931**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	63.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	36.8	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	21.1	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**398**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	30.2	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	21.6	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**393**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	12.2	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	26.3	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**348**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	34.7	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**269**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	9.7	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	36.3	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**254**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	4.3	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	36.5	34.9	43.8	47.4	44.1

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**252**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	36.2	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**255**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	4.7	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	36.4	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**253**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 33: PRIOR BIRTH OUTCOMES, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.8	1.7	1.5	0.6	1.0
Not in Universe	%	37.5	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**583**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	84.2	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	9.9	23.5	18.9	15.2	17.7
Not in Universe	%	47.4	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**403**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	21.8	34.6	24.3	27.1	28.1
>= 18 months	%	78.2	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.5	0.1	2.5	1.4	1.4
Not in Universe	%	48.0	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**486**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	21.4	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	19.3	1.3	20.8	13.1	12.6
Not in Universe	%	47.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**316**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	16.5	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 34: PRE-PREGNANCY MEDICAL CONDITIONS, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	12.9	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**823**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	24.1	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	64.6	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.8	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.5	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	33.1	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**632**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	1.9	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	33.1	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**632**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	6.0	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	35.6	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**609**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	5.6	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	33.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	23.8	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	28.9	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	8.5	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 35: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	34.4	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**620**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	7.6	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	34.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**619**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	8.9	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	34.3	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**621**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.0	2.8	6.0	7.9	6.3

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cervical Incompetence						
Missing Data	%	34.2	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**622**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	34.5	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**619**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	34.6	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**618**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	34.7	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**617**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.3	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	34.4	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**620**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	13.9	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 36: TREATMENTS DURING PREGNANCY, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	38.2	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**584**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	5.6	0.8	10.0	5.1	5.4
Not in Universe	%	87.2	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**68**	**680**	**654**	**2,585**	**3,919**
Yes	%	22.1	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	38.3	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**583**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	4.1	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	38.9	1.5	43.7	49.1	38.5

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**577**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 37: PRENATAL CARE, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	33.9	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**625**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	65.8	4.7	29.5	64.5	43.3
Licensed Professional Midwife[14]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	20.6	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	12.2	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	1.9	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**927**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	71.8	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	4.7	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	1.9	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**927**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	73.1	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	5.9	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	34.6	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**618**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	11.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.3	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	35.7	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**608**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	3.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	2.3	1.9	1.7	2.4	2.3

[14] A Licensed Professional Midwife, also known as a Certified Professional Midwife, is only licensed in practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of AABC).

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Doula Encounters						
Missing Data	%	35.3	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**611**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	52.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**454**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	4.2	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.7	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	53.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**437**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	3.2	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.0	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	52.9	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**445**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	1.6	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	1.0	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	52.0	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**454**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	21.1	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.3	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	52.6	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**448**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	32.9	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**634**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	41.5	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.9	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	97.6	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	4.8	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 38: DELIVERY INFORMATION, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	18.9	1.4	25.3	23.3	19.5
Not in Universe	%	26.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**520**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	34.0	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	2.2	0.3	7.8	2.9	3.5
Not in Universe	%	79.4	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**174**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	96.6	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	15.9	4.6	11.5	7.3	7.7
Not in Universe	%	20.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**606**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	100.0	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	16.2	0.7	12.0	5.6	6.1
Not in Universe	%	20.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**603**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	70.5	87.1	70.1	69.5	73.1
C-Section	%	29.5	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	7.6	0.4	8.7	2.3	3.4
Not in Universe	%	62.8	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**280**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	71.1	83.3	72.9	74.7	75.9
C-Section	%	28.9	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	4.6	4.7	12.5	6.3	7.4
Not in Universe	%	79.3	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**153**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	37.3	34.3	38.1	45.6	43.0

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	1.9	0.1	6.2	0.7	1.9
Not in Universe	%	88.5	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**91**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	19.8	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 39: BIRTH OUTCOMES, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	21.2	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**745**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.4	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	15.9	0.7	15.4	5.8	7.0
Not in Universe	%	20.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**601**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	4.2	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	8.0	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	86.9	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	16.5	2.1	14.3	8.0	8.3
Not in Universe	%	20.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**595**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	9.6	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	84.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	4.0	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 40: SATISFACTION, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	61.4	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**365**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	2.2	3.3	4.4	7.8	6.2
Very Satisfied	%	22.7	25.6	35.6	46.1	39.8
Extremely Satisfied	%	75.1	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	66.7	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**315**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	6.3	10.4	11.6	12.8	12.1
Very Satisfied	%	25.7	29.1	42.6	46.6	42.1
Extremely Satisfied	%	65.7	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 41: BREASTFEEDING, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	45.6	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**514**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	36.8	80.4	47.5	40.5	50.3
Formula Feed Only	%	21.2	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	36.8	10.8	31.9	32.5	27.8
I Haven't Decided	%	5.3	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	59.4	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**384**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	70.8	91.5	76.6	72.6	77.3
No	%	28.9	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 42: FAMILY PLANNING, AMERIGROUP

Data Elements	N or %	Amerigroup (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	60.0	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**378**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	91.5	77.0	77.5	82.2	80.3
No	%	7.1	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	59.5	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**383**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	86.4	84.2	70.8	74.0	75.5
No	%	10.4	13.2	17.7	21.5	19.1
Unsure	%	3.1	2.6	11.5	4.5	5.4
Reported Using Contraception Control Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	34.0	41.5	42.9	38.6	40.2
Not in Universe	%	31.0	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**331**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	11.5	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	11.5	2.8	11.4	10.9	9.2
LARC - IUD	%	14.2	10.8	11.9	12.3	11.9
Pills	%	20.2	8.6	11.9	13.0	11.8
Injection	%	19.6	5.9	16.2	20.2	16.2
Condoms	%	12.4	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	5.1	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Louisiana

Initial Contact: Louisiana's Department of Health and Hospitals, which houses Vital Records and administers the state's Medicaid program, discussed the process for vital records data requests with the evaluation team in late March of 2015.

Data Acquisition Process: An application for birth certificate data was submitted that July. In August 2016, The Medicaid Agency approved Urban's IRB application. In July 2016, 2014 and 2015 birth certificate data were received, and the evaluation team submitted a request for 2016 Vital Records and Medicaid data. Medicaid data for 2014-2015 were uploaded in late January of 2017. In July 2017, the team submitted an IRB amendment application to receive additional Medicaid variables for all three years which was approved October 2017.

Final Result: Linked 2016 data were provided to Urban in October – November 2017. Evaluation team received and reviewed the updated Medicaid eligibility and claims data in February 2018, and these data were included in the final year's impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Amerigroup Corporation (Amerigroup) awardee, which implemented the Group Prenatal Care model, delivered care at seven sites included in the impact analysis: Ochsner St. Charles Clinic Uptown; Daughters of Charity Health Center - Gentilly; LSU New Orleans – Perdido Clinic; LSU New Orleans – Daughters of Charity Carrolton Health Center; LSU Shreveport; LSU Woman's Hospital; and Associates in Women's Health at Baton Rouge. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Associates in Woman's Health at Baton Rouge site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 43).

As described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1, low acceptance rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the acceptance of group prenatal care was low (less than 75 percent) were of particular concern – 6 out of 7 sites within the Amerigroup awardee. For such sites, women who enrolled in group prenatal care may be systematically different from those who chose not to enroll and estimates of the impact of enrolling in Strong Start may be biased by selection even after adjusting for differences in observable characteristics. One site, Associates in Women's Health at Baton Rouge, did not raise these specific low acceptance rate concerns because they used an opt-out approach to enrollment and achieved an acceptance rate above 75 percent.

Two sets of estimates are presented in this section: one for the Amerigroup awardee as a whole and one for the Associates in Women's Health at Baton Rouge site. While awardee-level estimates are presented here, they ***should not be interpreted as impact estimates*** because 6 sites used an opt-in enrollment strategy and had a low acceptance rate. Associates in Women's Health at Baton Rouge used

an opt-out enrollment approach with *CenteringPregnancy* as the standard of care for all patients. Therefore, their site-level results likely reflect the impact of enrollment in Strong Start and receiving group prenatal care compared to typical care. For this reason, only results from Associates in Women's Health at Baton Rouge, and not for Amerigroup as a whole, are included from the Amerigroup awardee in the Group Prenatal Care Model analysis presented in the Impact Analysis chapter of Volume 1.

TABLE 43: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR AMERIGROUP

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Amerigroup Corporation			
Ochsner St. Charles Clinic Uptown	No	No	No
Daughters of Charity Health Center - Gentilly	No	No	No
LSU New Orleans - Perdido Clinic	No	No	No
LSU New Orleans – Daughters of Charity Carrolton Health Center	No	No	No
LSU Shreveport Clinic	No	No	No
LSU Baton Rouge - Woman's Hospital	No	No	No
Associates in Women's Health in Baton Rouge	Yes	Yes	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[15]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016.

We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we draw the comparison group outside the county (alternative specification #1) for Amerigroup.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).

[15] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 44 reports the birth and process outcome findings for Amerigroup as a whole. However, these estimates should not be interpreted as an impact of Strong Start because 6 sites used an opt-in enrollment strategy and had a low acceptance rate:

- Infants born to women enrolled in Strong Start are slightly more likely to have an Apgar score greater than or equal to seven (99.9 percent) than infants born to women in the comparison group (99.5 percent), a significant difference of 0.4 percentage points.
- We do not observe differences between Strong Start and comparison group women for other birth outcomes.

TABLE 44: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AMERIGROUP **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2016, Strong Start (N=698)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=49960)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=360, N=28397)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=360, N=28397)
Birth Outcomes						
Clinical gestational age (weeks)	38.4	38.3	0.1	N/A	0.0	0.0
Preterm birth rate	10.6%	11.6%	-1.0	N/A	0.7	0.6
Very preterm birth rate	2.7%	3.2%	-0.5	N/A	0.5	0.4
Birthweight (grams)	3,096.6	3,097.5	-0.9	N/A	-34.0	-31.5
Low birthweight rate	12.2%	12.0%	0.2	N/A	1.3	1.2
Very low birthweight rate	1.3%	1.9%	-0.6	N/A	-0.1	-0.1
Rate of Apgar score greater than or equal to 7	99.9%	99.5%	**0.4***	N/A	0.4	0.2
Process Outcomes						
C-section rate	30.7%	33.2%	-2.5	N/A	**-6.8****	**-6.4****
VBAC rate[1]	17.1%	11.5%	5.6	N/A	8.0	7.3
Weekend delivery rate	18.8%	19.0%	-0.2	N/A	0.6	0.3

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 111 Strong Start women and 9337 comparison group women.

Table I.2 also shows findings from the alternative specification models. When the sample is limited to the claims sample (alternative specification 2), we no longer observe significant differences in Apgar. However, in alternative specifications 2 and 3, Strong Start women are less likely to have a C-section (by 6.8 and 6.4 percentage points) than comparison group women. The C-section difference becomes significant when the sample is limited to singleton births in 2014-2015 and had delivery claims. This suggests that the effect may have been concentrated among these 2014 and 2015 births. Again, because of opt-in enrollment and acceptance rate concerns, these differences should not be interpreted as an impact of Strong Start.

Table 45 reports the expenditure and utilization outcomes findings for Amerigroup. However, these estimates should not be interpreted as an impact of Strong Start because 6 sites used an opt-in enrollment strategy and had a low acceptance rate:

- Women enrolled in Strong Start have fewer hospitalizations during the period after delivery (0.01 visits) than comparison group women (0.03 visits), a significant difference of 0.02 visits.
- We do not observe differences between Strong Start and comparison group women for expenditures or for other utilization outcomes.

TABLE 45: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AMERIGROUP **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=360)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=28397)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,116	$2,073	$43	N/A
Total expenditures during delivery period	$6,753	$7,391	-$638	N/A
Total delivery and postdelivery expenditures[2]	$10,286	$11,426	-$1,140	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.34	1.29	0.04	N/A
Number of hospitalizations 8 months before delivery month	0.04	0.05	-0.01	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.73	0.83	-0.10	N/A
Number of hospitalizations for mother 11 months after delivery month	0.01	0.03	**-0.02****	N/A
Number of ED visits for infant in the first year of life	1.63	1.52	0.11	N/A
Number of hospitalizations for infant in the first year of life	0.07	0.09	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Table 46 reports site-specific maternal and infant birth outcome estimates for the Associates in Women's Health at Baton Rouge site:

- At the site level, we observe lower rate of very preterm birth among infants born to Strong Start women (1.3 percent) than infants born to comparison group women (3.1 percent), a significant difference of 1.8 percentage points.

- Infants born to women enrolled in Strong Start are slightly more likely to have an Apgar score greater than or equal to seven (100 percent) than infants born to women in the comparison group (99.7 percent), a significant difference of 0.3 percentage points. This difference increases when the sample is limited to the claims sample (alternative specification 2, 0.6 percentage points) and when claims controls are added to the model (alternative specification 3, 0.8 percentage points).
- We do not observe differences between Strong Start and comparison group women for other birth outcomes. The sample of Strong Start enrollees with a previous C-section is not sufficient to analyze differences in VBAC.

TABLE 46: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT ASSOCIATES IN WOMEN'S HEALTH AT BATON ROUGE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=226)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=16776)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=86, N=8583)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=86, N=8583)
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.2	0.1	N/A	0.1	0.2
Preterm birth rate	11.1%	12.7%	-1.7	N/A	-0.2	-1.1
Very preterm birth rate	1.3%	3.1%	**-1.8***	N/A	-1.4	-1.7
Birthweight (grams)	3,069.1	3,078.5	-9.4	N/A	-64.1	-47.1
Low birthweight rate	14.2%	13.5%	0.7	N/A	-0.7	-1.6
Very low birthweight rate	0.9%	1.3%	-0.4	N/A	0.4	0.1
Rate of Apgar score greater than or equal to 7	100.0%	99.7%	**0.3****	N/A	**0.6****	**0.8***
Process Outcomes						
C-section rate	34.1%	34.1%	0.0	N/A	-2.5	-1.1
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	19.5%	19.7%	-0.2	N/A	0.0	0.0

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 42 Strong Start women and 3263 comparison group women.

Table 47 reports site-specific expenditure and utilization outcomes estimates for the Associates in Women's Health at Baton Rouge site:

- Women enrolled in Strong Start had a higher mean number of ED visits during the prenatal period (1.43 visits) than comparison group women (1.00 visit), a significant difference of 0.43 visits.
- We do not observe differences for other utilization outcomes or for any expenditures.

TABLE 47: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT ASSOCIATES IN WOMEN'S HEALTH AT BATON ROUGE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=86)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=8583)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,956	$1,877	$79	N/A
Total expenditures during delivery period	$7,203	$7,341	-$138	N/A
Total delivery and postdelivery expenditures[2]	$10,779	$11,052	-$273	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.43	1.00	**0.43***	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.03	-0.01	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.64	0.73	-0.09	N/A
Number of hospitalizations for mother 11 months after delivery month	0.01	0.03	-0.02	N/A
Number of ED visits for infant in the first year of life	1.36	1.24	0.12	N/A
Number of hospitalizations for infant in the first year of life	0.06	0.08	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

Amerigroup Corporation implemented the Group Prenatal Care Model in several locations throughout Louisiana. The awardee followed the *CenteringPregnancy* curriculum and thus, in addition to medically focused check-ups, offered intensive education on such critical topics as breastfeeding, family planning, domestic violence, and childbirth preparation. However, many of Amerigroup's sites—especially those connected to university affiliated teaching hospitals—struggled with both enrollment and achieving high group attendance. On average, women received an average of 5.9 group prenatal care sessions—lower than the 10 prescribed by *CenteringPregnancy*. Amerigroup participants were primarily black (72.7 percent) and exhibited a number of other characteristics that placed them at high risk for poor birth outcomes. For example, they had especially low rates of being married (14.0 percent), nearly a quarter experienced food insecurity (23.6 percent), and a notable 41 percent screened positive for depression—a rate much higher than Strong Start participants as a whole (27.5 percent). Many Amerigroup participants had a prior preterm birth (21.4 percent of women with a prior birth). The

awardee-level impact analysis findings for Amerigroup should not be interpreted as impacts of Strong Start because six out of seven sites used an opt-in enrollment strategy and had a low acceptance rates. One site, however, which was a private group practice (Associates in Women's Health in Baton Rouge), used opt-out enrollment to implement Centering for its entire Medicaid population, and had relatively more success with recruitment and attendance. Strong Start participants at this site had lower rates of very preterm birth and their infants had better Apgar scores than women and infants in the comparison group, but Strong Start participants also had more ED visits during the prenatal period.

Central Jersey Family Health Consortium

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,238	• Regional consortium created by the state of New Jersey to provide and support a network of maternal and child health services	• Seven sites • Six sites active at the end of the award period • Sites concentrated in central New Jersey (including New Brunswick and Newark) and were hospital-based clinics or Federally Qualified Health Centers (FQHCs)	• Intervention categorized as "high intensity" for implementing the *CenteringPregnancy* curriculum while also providing case management services at some sites • Group Prenatal Care, specifically the *CenteringPregnancy* approach, including sessions on nutrition, stress reduction, childbirth preparation, complications, breastfeeding, family planning, and postpartum depression • Strong connections with community resources • Some sites provided Group Prenatal care before the Strong Start award, and others provided it for the first time under Strong Start

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Provided women with increased social support and allowed more time to build relationships with providers and learn about pregnancy, labor and delivery, and breastfeeding
- Prior experience with *CenteringPregnancy* greatly facilitated Strong Start implementation
- Patients and providers expressed satisfaction with the *CenteringPregnancy* model

CHALLENGES

- Staff turnover necessitated continuous training new staff on *CenteringPregnancy* and contributed to lower enrollment and lower program capacity
- Lack of support by administrators at a few sites led to scheduling challenges and lower-than-expected enrollment

PARTIALLY SUSTAINED

- Six of the seven active sites continued Group Prenatal Care after the Strong Start funding period
- One site did not sustain the model because it lacked administrative support

KEY FINDINGS: PARTICIPANT-LEVEL DATA[16]

PARTICIPANT-LEVEL DATA QUALITY

- 6.9% rate of missing intake forms; 6.9% rate of missing exit forms
- 6.4% rate of item nonresponse on intake forms; 4.9% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 13.8% of women were teens (under age 20); 8.2% were 35 years or older
- 36.9% of women were black; 49.1% were Hispanic; 9.7% were white
- 23.9% of women were married; 28.5% were living with a partner; 18.8% were not in a relationship
- 15.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 33.0%: C-section rate among women with a delivery
- 7.1%: preterm birth rate among women with a live birth
- 6.2%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Summary impact results not provided here because of concerns about opt-in enrollment strategies and low acceptance rates.
- See the Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings
- Valid estimates for the combined JFK Medical Center/Family Practice and Newark Community Health Center sites – which, when combined, served a large enough number of women enrolled in Strong Start that a combined-site-level estimate was also feasible – are in the Site-Specific Estimates section

[16] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Central Jersey Family Health Consortium (CJFHC)'s Strong Start award involved seven prenatal care sites, most concentrated in central New Jersey. These sites, which included hospital-based clinics and Federally-Qualified Health Centers (FQHCs), were the Jersey Shore University Medical Center, JFK Family Medicine, Newark Community Health Center, Jewish Renaissance Health Center, Rutgers Medical School, Saint Peter's University Hospital, and Capital Health Systems. Under the pre-Strong Start prenatal care model, patients at CJFHC sites received comprehensive maternity care from obstetricians, certified nurse midwives (CNMs) and other advanced practice nurses (APNs), family medicine physicians, and registered nurses (RNs). The type of practitioner providing care varied by site. Most sites also offered *CenteringPregnancy* (Centering), and some had certification from the Centering Healthcare Institute (CHI).[17] Support from the New Jersey Department of Health and the March of Dimes financed Centering facilitator training for clinical staff. Each site varied in what non-obstetrical specialties and supportive services were available on-site. For instance, Capital Health Systems also offered social services, family guidance, and addiction counseling, and assigned each patient an RN case manager who met with prenatal patients once a trimester and once after birth. All sites offered general medicine and pediatric care.

More broadly, the state had certain programs and standards that influenced pre-Strong Start prenatal care. Managed care organizations provided Medicaid recipients with telephonic care coordination, and many low-income women in the state received home visits through New Jersey's Maternal, Infant and Early Childhood Home Visiting (MIECHV) Program. MIECHV provided ongoing health and parenting information, parent/family support, and links to essential health and social services during pregnancy, infancy, and early childhood. The central New Jersey region also had the Central Intake phone line where staff asked low-income women in search of prenatal care or family support services about their needs and connected with local services.

DESCRIPTION OF ENHANCED STRONG START SERVICES

CJFHC's Group Prenatal Care model followed CHI's Centering curriculum closely. All Group Prenatal Care facilitators and co-facilitators completed CHI's Centering training and used the Centering curriculum materials and the model's essential elements to organize group prenatal sessions. Each group had one clinical facilitator and one co-facilitator. At one site, family practice physicians served as clinical facilitators, but CNMs and APNs served in this role at the other sites. Co-facilitators' credentials

[17] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

ranged by site; for instance, Newark groups had a Certified Medical Technician as a co-facilitator and St. Peter's had an RN case coordinator.

Strong Start staff placed participants into groups based on their gestational age (within a 4- to 6-week window, typically). A few sites had Centering groups tailored to a specific demographic. For example, there was one group for teenage mothers, one for women with gestational diabetes, and at the request of participants, one for Black women only.

> "The nutrition consultant who works at WIC came out and talked about how to breastfeed the baby, how to improve. She talked about a lot of options."
>
> *- Strong Start participant*

In addition to discussing the topics in the Centering curriculum, facilitators invited guest speakers – often health center staff – such as pediatricians, dental hygienists, nutritionists, and lactation consultants. They also incorporated hands-on activities during sessions, as with one Centering group at which facilitators used belly painting to communicate the concept of therapeutic touch. Facilitators also hosted baby showers and postpartum reunions for participants.

In addition to offering Centering, sites had strong connections to community resources and some, though not all, sites had case managers who assisted with linking Strong Start participants to these resources. Case managers or other staff helped to arrange transportation for participants, which sometimes involved scheduling a ride with the Medicaid-provided transit service. Case managers also assisted with other tasks, such as patient follow-up after missed appointments or connecting participants with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

CJFHC had changes to their active sites over the course of Strong Start. Capital Health Systems dropped out after the first year because after a nearby hospital closed, Capital Health administrators did not feel they had the time or resources to continue to offer Centering to a large influx of prenatal patients. St. Peter's University Hospital stopped participating for several months in the second year of Strong Start because they ran into technical difficulties when implementing a new electronic health records system; they had also won a large National Institutes for Health (NIH) grant that temporarily diverted staff efforts. The Jersey Shore University Medical Center clinical staff did their best to run the Centering groups, but scheduling was a challenge, and the result was that staff worked longer hours on Centering days and used lunch and professional development time to cover some of the time the groups required. Jersey Shore University Medical Center dropped out after the second year because of a lack of administrator support for resolving these issues.

OUTREACH AND ENROLLMENT

CJFHC had pre-existing strong connections with community stakeholders, such as the Central Intake, WIC, and Medicaid offices. They worked to make these partners knowledgeable about Centering so that they could refer patients to the program. However, existing patients were the focus of CJFHC's recruitment efforts. All sites served large numbers of Medicaid-eligible patients and spoke to these women during the first prenatal care appointment. CJFHC supported these efforts by creating and distributing recruitment materials to its sites, including a Strong Start "elevator speech" for use on the back of an employee's badge for easy reference and postcard-sized invitations that receptionists could distribute to patients in the waiting room.

> "I went to my appointment and met [midwife] and she told me about it. I thought it was different because they didn't have [Centering] when I had my [first] son so I was excited to see what it was."
>
> *- Strong Start participant*

CJFHC's sites used a mixture of opt-in and out-out approaches to enrollment. Two sites, including JFK Family Medicine, used an opt-out approach, presenting Centering as their usual approach to prenatal care. At these sites, staff assigned eligible patients to a Centering group, and only switched patients to individual care if they explicitly requested it. The other sites used the opt-in approach, where staff asked eligible patients to choose between enrolling in Centering or receiving standard individual prenatal care. Site staff emphasized to the patient that with Centering she would know her appointment schedule in advance, would not have to wait for the appointment, could receive prenatal care with her peers, and get more education about pregnancy when compared to standard care.

Key informants reported that women who declined to participate faced logistical barriers to attending, such as inability to find childcare or conflicts with work or school, or were resistant to discussing their health in a group setting. Some women who had previously given birth felt they did not need additional prenatal education. Key informants also reported challenges with patients dropping out of Centering which they attributed in part to life events, such as moving away or changing work schedules. However, some sites also said that it was common to have dropouts because patients transferred care to a private practice once they had official Medicaid coverage (CJFHC's Strong Start sites treated patients with presumptive Medicaid eligibility, something that private practices were often unwilling to do). Key informants said that patients transferred care for a variety of reasons, including that there was a stigma associated with going to their clinic (which primarily served lower-income patients), that patients desired to have the same provider for prenatal care and delivery, and that patients perceived that "better" care would be available at private practices.

CJFHC faced challenges in reaching their enrollment goals. A sizable number of undocumented patients (40-60% at some sites) proved a barrier to meeting Strong Start enrollment targets. New Jersey has a state program that covers care for undocumented pregnant women,[18] but no federal funds are allotted for these services. As a result, undocumented women in New Jersey's state program were not eligible for the federally-funded Strong Start program, something CJFHC did not realize when calculating their initial enrollment goals. Some sites still chose to invite women who were undocumented to participate in Centering; but because these women were not Medicaid-eligible, they were not enrolled in Strong Start.

[18] Undocumented pregnant women were eligible for public coverage through a supplemental program funded solely with state dollars. Each year, approximately $3.8 million was set aside to cover maternity care for this population. On July 1st of every year, pregnant women who are undocumented could apply for this supplemental healthcare coverage program and begin receiving care until funds ran out (typically after 3 to 5 months). If funds ran out prior to a patient delivering her baby, clinical organizations typically continued to care for these women because the state reimbursed health centers for services provided to individuals without insurance coverage. The health care providers participating in Strong Start did not view the women covered by this temporary program as being a distinct group from others on Medicaid, and they were surprised to learn that they could not enroll these patients in Strong Start.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

> "I'm a nervous wreck. They make me feel 100 percent comfortable, which I need. I always just relax and remember the conversations we had here. Otherwise, I'd be at the hospital 24/7."
>
> *- Strong Start participant*

According to key informants, Strong Start had a positive influence on a range of patient outcomes, not limited to the primary ones of reducing rates of preterm birth and low birthweight. For instance, key informants noted that some friendships and networks had formed in the groups and that Centering provided a support system for women who may not have had adequate support at home or in the community. Also, the key informants believed that Strong Start participants likely had reduced emergency department visits and observation stays because Centering helped women to differentiate between pregnancy symptoms that are normal and those that require medical treatment.

> "The stuff I learned from here, like breastfeeding, I learned a lot about it. I was twenty when I had my first kid, so all that stuff was nasty. But then we had a group here and we was talking about different things and I was like okay with this one I'm going to try to breastfeed 'cause it will be better."
>
> *- Strong Start participant*

Key informants perceived that Centering influenced other outcomes, including promising shifts in delivery method and rates of breastfeeding. They noted that Centering provided education that reduced the chances of a woman seeking an elective C-section and helped women ask informed questions about their delivery options and advocate for their desired care. Regarding breastfeeding, the education in Centering reportedly helped to persuade more women to attempt breastfeeding. Key informants also said that group discussions provided the opportunity for practiced mothers to share their experiences and dispel breastfeeding myths for first-time mothers and women who had never breastfed.

The rate of women who reported receiving family planning counseling after birth (as measured in the evaluation's participant-level data) was lower than key informants expected. However, key informants were confident that Centering sessions during pregnancy discussed family planning options and birth spacing. They also said that it was standard practice at many of their delivering hospitals to offer women a hormonal contraceptive injection (Depo-Provera) between delivery and discharge.

Participant-level data also indicated a Strong Start preterm birth rate that key informants noted was lower than New Jersey Medicaid; they attributed this improvement to Strong Start. Key informants said that women enrolled in Strong Start were at higher risk compared to the state's general pregnant population, so even if Strong Start outcomes were only slightly lower than state benchmarks, this was a significant improvement.

STRONG START PARTICIPANT PERSPECTIVES

Participants had mixed reactions when they learned about Centering. Some were immediately excited about it and looked forward to participating; others admitted they were wary but willing to try it out.

> *I thought it was going to be some, and no offense, but some "white people" stuff. Like we sit in the middle of the room [breathing like Lamaze class]. My whole family [was skeptical] – 'cause I kept calling it a Lamaze class. And they kept saying, "We don't do Lamaze class."*

Many participants had previous births, but had never had the opportunity to try Centering in the past. These experienced mothers said they learned new things in group sessions and expressed that Centering was very different from their past experiences with typical prenatal care. They characterized Centering as being more personalized and compassionate and said that the group provided support.

> *The first time [I was pregnant] I did not do Centering. I felt a lot more prepared [with this pregnancy], not just because I knew what I was going through, but I felt I had more support through the Centering group. In between, we talked. [The advanced practice nurse] talked a lot about our mental health and emotional health. The first time, I didn't feel as much of that. You just do your exams and then leave.*

Participants said they enjoyed their Centering sessions and emphasized the educational component. They described them as fun and informative and said they enjoyed interacting with the other group members. The women said they felt they could discuss anything in class, even sensitive topics. The participants also shared examples of how Centering helped them gain knowledge and, for some, how it influenced their decision to try breastfeeding or a vaginal delivery. For instance, one participant said that Centering convinced her to forego an early elective C-section.

> *I thought I had to have a C-section [with the current pregnancy, because of a previous C-section]. So, I thought if I had to have a C-section, can I have her at 37 weeks? And [the provider] said no, wait until 39 weeks. So, I said, if I have to wait until 39 weeks, I'm going to push her out. I waited the whole term. And she was delivered [vaginally] one day before her due date.*

PROGRAM STRENGTHS

Key informants spoke highly of their experiences implementing Centering and received positive feedback about Centering from patients and providers. They said that Centering was appealing to women who were looking for additional social support. They were proud that the model helped to build relationships among the women in the groups and between women and providers. They also felt that when compared to typical prenatal care, Centering created a dialogue between patients and providers and a level of comfort that allowed women to "open up" and ask questions. The result was that patients learned more about their health, and they felt empowered to ask questions and advocate for themselves. Key informants reported that labor and delivery nurses were often able to identify Strong Start patients because they were more informed and more likely to ask questions about their care.

> "They taught us so much here. How to massage our babies to keep them calm, how to feed them and how to hold the babies so they can feed correctly. And also, if you're having contractions, to relax and breathe."
>
> *- Strong Start participant*

Key informants observed that Centering also offered greater provider continuity during pregnancy than typical care because Centering patients saw the same providers at each prenatal session. With typical prenatal care, patients were likely to see several different providers throughout pregnancy. Another key strength of CJFHC's Strong Start program was that many sites had experience with Centering and thus began Strong Start with trained staff, space in which to hold the sessions, and systems for scheduling sessions. Sites with prior experience got their Strong Start programs up and

running more easily than sites such as St. Peter's, which offered Centering for the first time under Strong Start.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Throughout the course of Strong Start, CJFHC faced implementation challenges. Many challenges related to clinical site staff turnover and a lack of support from site administrators. Staff turnover was especially problematic when the staff person was responsible for Centering patient recruitment or was a Centering facilitator. Site staff recruiting patients for Centering needed time to learn about the program so they could explain it to patients. Clinical staff who served as facilitators had to attend a costly training offered by CHI.

Lack of administrator support presented an even greater difficulty. Key informants found that having an administrator champion was essential to successfully implementing Group Prenatal Care, but some sites lacked a champion. The awardee heard that relative value units (RVUs) were a great concern to some administrators, who were reluctant to use Centering unless every registered patient attended all 10 sessions because they believed that anything less than full attendance would not be cost effective. These sites were not willing to schedule additional Centering groups to accommodate all eligible patients, which hampered enrollment. Lack of support from administrators at one site also resulted in missing exit data for some participants because CJFHC did not have access to medical records, and administrators did not allow the site's medical staff adequate time to perform medical records reviews. As a convener, CJFHC advised and worked with the sites on implementation problems, but awardee staff noted that it was ultimately up to the site to decide what action to take.

SUSTAINABILITY

Key informants reported that six of seven sites active at the end of Strong Start have continued to offer Centering. All the sites that offered Centering for the first time under Strong Start completed the credentialing process through CHI. In addition, the Jewish Renaissance site made Centering the standard of care for all first-time mothers and St. Peter's hired a Spanish-speaking APN. About 65 percent of patients at the St. Peter's site are monolingual Spanish-speakers and were not able to participate in Strong Start because no Centering provider-facilitators spoke Spanish. With this new addition to their staff, St. Peter's anticipated being able to expand Group Prenatal Care participation to Spanish-speaking patients by the end of 2017. St. Peter's was also in the process of opening a birth center, which was going to be staffed by midwives and located within the hospital, but in a physical space separate from the labor and delivery unit. St. Peter's planned to offer Group Prenatal Care at that birth center as well.

CJFHC's sites did not have clear funding mechanisms to continue providing Centering. The evaluation team interviewed St. Peter's and Newark Community Health Center for the year 4 case studies, and both sites had administrator support and limited funds that would allow them to continue. Newark planned to send two experienced providers to a CHI "train the trainer" event, so they could provide future trainings in-house and reduce overall training costs. However, both sites noted that Strong Start funds paid for the Centering book that each patient received. Their internal funds were not sufficient to cover this cost and they were seeking external funding to address this gap.

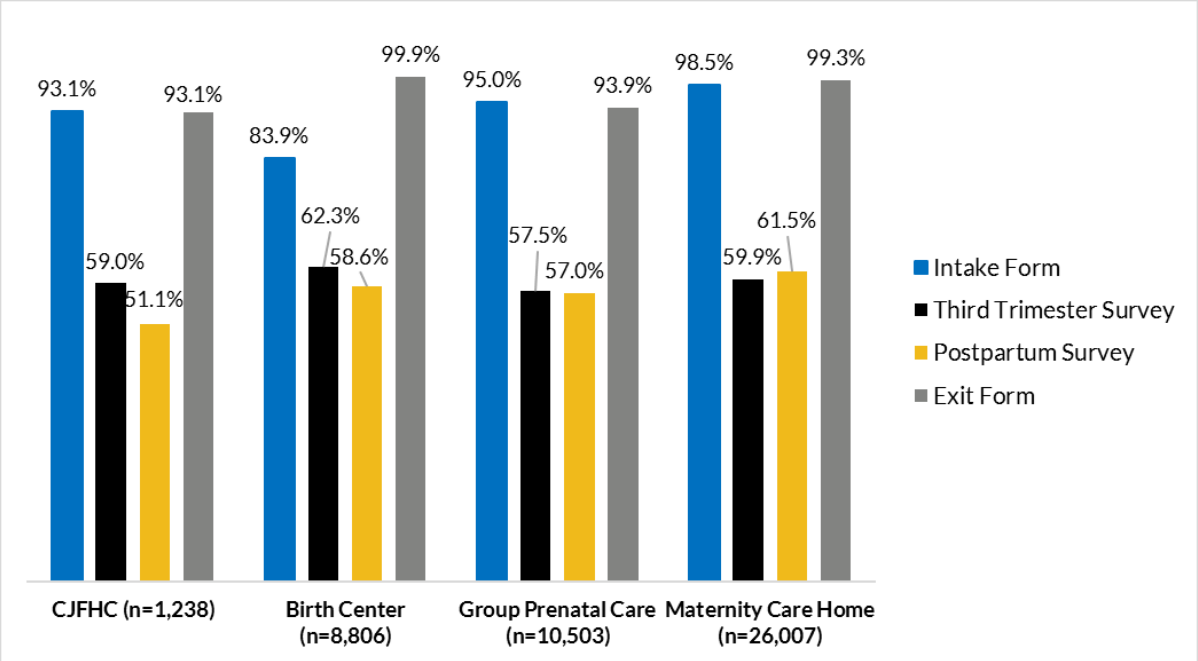
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for CJFHC, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for CJFHC to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 9 CJFHC participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 4: FORM SUBMISSION RATES, CJFHC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment: 1,193
- Study IDs represented: 1,238 (suggests PLPE data were submitted for 45 extra patients: see information on program report data in Appendix F in Volume 1).
- Awardee reported that extra Study IDs likely occurred because Study IDs were assigned when women were recruited to the program, but then did not attend a group session.

HOW FORMS WERE ADMINISTERED:

- All survey forms were completed by patients, with assistance from clinical staff if requested.
- Most surveys were completed by participants while they were in the group prenatal care session, though some were completed in the waiting room.
- Participants were encouraged to answer all questions but were also told that they could skip a question if they were not comfortable.
- Site staff and awardee staff reviewed the questionnaires for accuracy and completeness, but if questions were skipped, the awardee assumed that this was deliberate.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Lack of support from administrators at one site also resulted in missing exit data for some participants because CJFHC did not have access to medical records, and administrators did not allow the site's medical staff adequate time to perform medical records reviews.

MISSING FORMS:

- Intake: 6.9 percent of Study IDs were missing Intake Forms. In most cases, the awardee reported that the forms were completed, but neither the awardee nor sites were able to locate copies for resubmission.
- Third Trimester or Postpartum Survey: About 41 percent of Study IDs were missing the Third Trimester Survey and 49 percent were missing the Postpartum Survey. The awardee reported that some women did not return for a postpartum visit, and those who did had an individual visit where they generally did not see the group care provider.
- Exit: 6.9 percent of Study IDs were missing Exit Forms. As stated above, 61 [X%] were missing because [Strong Start staff were not allowed access to medical records?]. It is unclear why the other [Y5] are missing.

ITEM NONRESPONSE:

- Intake: CJFHC reported that certain questions were problematic and either led to confusion among participants or did not provide a full range of options. Participants also expressed that some questions were too personal and skipped these questions.

- Exit: Many provider sites did not have access to hospital records and were only able to provide limited information about labor and delivery if they had access to any information at all. The awardee noted that some women left Strong Start prior to delivery, so data regarding their pregnancies may be incomplete, 17.6 percent of participants are missing information on their Strong Start pregnancy outcome.[19]

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes of CJFHC participants. Home highlights include:

- The majority of CJFHC participants (77.9 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 9.9 percent of participants were 18 or 19 years old and 8.2 percent were 35 or older.
- Most participants were either Hispanic (49.1 percent) or black (36.9 percent).
- Relationship status among CJFHC participants at intake was fairly equally distributed: 28.8 percent were in a relationship but not living together, 28.5 percent were living with their partner, 23.9 percent were married, and 18.8 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 16.2 percent of CJFHC participants reported having experienced intimate partner violence, 15.1 percent of participants with a prior birth had a prior preterm birth, and 68.2 percent of participants had not planned their Strong Start pregnancy.

TABLE 48: DEMOGRAPHICS, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	7.1	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,142**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	3.9	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	9.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	77.9	81.7	72.9	75.1	75.8
35 Years and Older	%	8.2	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	8.8	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,121**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	49.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	9.7	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	36.9	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	4.3	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	19.2	19.6	12.8	11.3	13.3
Not in Universe	%	36.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**550**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	16.9	52.6	36.3	55.8	49.7

[19] Among participants with missing data on pregnancy outcome, 39.8% were missing because they did not have an exit form, 55.6% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 4.6% were missing for other reasons.

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Puerto Rican	%	15.8	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	64.2	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	6.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,145**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.4	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	10.7	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,098**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	34.8	36.6	30.8	35.3	34.5
In School, Not Employed	%	9.4	8.7	12.6	11.9	11.5
Employed and in School	%	6.0	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	49.8	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	21.5	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**965**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	17.7	15.4	27.8	29.1	26.4
High School Graduate or GED	%	61.8	57.5	58.3	57.9	57.9
Associate's Degree	%	7.5	8.2	5.2	4.6	5.4
Bachelor's Degree	%	7.7	14.5	4.5	3.7	5.8
Other College Degree	%	5.4	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	11.5	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,088**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	23.9	42.1	20.4	20.8	24.5
Living with a Partner	%	28.5	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	28.8	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	18.8	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 49: PSYCHOSOCIAL, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	8.2	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,128**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	39.9	51.8	51.8	59.7	56.5
No	%	54.9	44.6	42.3	37.4	39.8
Unsure	%	5.2	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	8.2	17.0	6.6	3.4	6.8
Not in Universe	%	55.2	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**450**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	64.9	61.1	72.6	79.9	75.3

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Other	%	22.9	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	12.2	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	19.9	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**984**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	3.9	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	16.5	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,026**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	24.3	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	9.8	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,108**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	53.2	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	26.0	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**909**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	30.5	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	15.3	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,041**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	59.2	67.9	59.0	65.5	64.5
Mild	%	24.5	21.4	23.8	20.2	21.2
Moderate	%	9.1	6.8	10.3	8.5	8.6
Severe	%	4.3	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	2.9	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	10.7	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,098**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	16.2	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	16.1	18.3	16.3	7.7	11.8
Not in Universe	%	9.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**911**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	4.0	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	6.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,145**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	56.9	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	33.4	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	9.6	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	66.7	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	13.4	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	14.4	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	22.5	24.6	17.1	15.4	17.2
Childcare Challenges	%	7.7	19.8	9.8	7.9	10.1

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	6.9	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 50: PREGNANCY HISTORY AND INTENTIONS, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.7	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,221**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	59.0	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	37.8	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	11.8	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**619**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	32.5	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	11.7	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**620**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	34.5	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	29.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**408**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	3.7	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	33.7	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**350**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	4.3	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	34.2	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**344**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	-	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	34.7	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**337**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Placenta Abnormalities						
Missing Data	%	34.9	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**335**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	34.5	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**340**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 51: PRIOR BIRTH OUTCOMES, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	3.8	1.7	1.5	0.6	1.0
Not in Universe	%	41.1	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**677**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	70.0	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	17.6	23.5	18.9	15.2	17.7
Not in Universe	%	56.8	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**315**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	17.1	34.6	24.3	27.1	28.1
>= 18 months	%	82.9	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.6	0.1	2.5	1.4	1.4
Not in Universe	%	61.2	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**470**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	15.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	10.6	1.3	20.8	13.1	12.6
Not in Universe	%	56.6	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**404**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	6.4	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 52: PRE-PREGNANCY MEDICAL CONDITIONS, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	11.4	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,089**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	31.8	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	57.6	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.2	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	9.1	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,117**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	9.1	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,117**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	3.0	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	7.9	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,132**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.8	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	35.4	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	31.6	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	24.6	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	5.5	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 53: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	16.6	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,025**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	3.8	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	15.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,039**	**8,722**	**7,631**	**20,216**	**36,569**

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	8.4	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	15.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,043**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	8.6	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	15.5	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,038**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	15.2	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,042**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	1.6	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	16.3	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,029**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	14.7	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,048**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.5	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	15.5	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**1,038**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	23.9	5.2	11.8	17.3	13.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 54: TREATMENTS DURING PREGNANCY, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	21.1	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**970**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	7.8	0.8	10.0	5.1	5.4
Not in Universe	%	87.8	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**54**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Antenatal Steroids						
Missing Data	%	21.5	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**965**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	22.1	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**958**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 55: PRENATAL CARE, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	8.1	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,130**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	15.8	4.7	29.5	64.5	43.3
Licensed Professional Midwife[20]	%	1.3	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	64.9	74.6	37.5	18.3	35.2
Family Medicine Physician	%	17.6	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	7.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,143**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	98.6	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	6.1	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	7.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,143**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	97.7	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	5.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	10.1	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,105**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	70.3	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.4	3.2	2.3	4.6	4.0

[20] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mental Health Encounters						
Missing Data	%	16.9	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,021**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	7.8	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.1	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	10.8	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,096**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	11.6	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,086**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	53.6	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.3	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	36.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**787**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	8.4	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.2	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	14.8	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,047**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	37.4	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	1.1	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	10.9	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,095**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	84.1	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.6	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	17.8	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,010**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	13.3	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,066**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	43.2	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.4	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	74.7	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cardiologist	%	4.6	-	6.4	6.9	6.8
Other	%	43.8	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 56: DELIVERY INFORMATION, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	18.7	1.4	25.3	23.3	19.5
Not in Universe	%	18.8	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**768**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	36.6	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	7.7	0.3	7.8	2.9	3.5
Not in Universe	%	70.1	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**272**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	91.9	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	8.4	4.6	11.5	7.3	7.7
Not in Universe	%	11.5	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**985**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.9	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	10.2	0.7	12.0	5.6	6.1
Not in Universe	%	11.5	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**963**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	67.0	87.1	70.1	69.5	73.1
C-Section	%	33.0	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	8.7	0.4	8.7	2.3	3.4
Not in Universe	%	47.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**537**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	67.6	83.3	72.9	74.7	75.9
C-Section	%	32.4	16.7	27.1	25.3	24.1
Scheduled C Section (Among Women with a C-Section)						
Missing Data	%	10.3	4.7	12.5	6.3	7.4
Not in Universe	%	67.1	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**277**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	32.5	34.3	38.1	45.6	43.0

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	7.0	0.1	6.2	0.7	1.9
Not in Universe	%	83.4	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**118**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	11.9	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 57: BIRTH OUTCOMES, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	17.6	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,013**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.2	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	13.7	0.7	15.4	5.8	7.0
Not in Universe	%	12.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**913**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	2.2	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	4.9	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	91.3	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.5	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	14.8	2.1	14.3	8.0	8.3
Not in Universe	%	12.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**899**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	5.6	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	87.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	5.9	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 58: SATISFACTION, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	55.7	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**544**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	4.2	3.3	4.4	7.8	6.2
Very Satisfied	%	50.9	25.6	35.6	46.1	39.8
Extremely Satisfied	%	43.2	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	55.6	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**546**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	2.7	3.0	4.0	2.9	3.1
Moderately Satisfied	%	16.1	10.4	11.6	12.8	12.1
Very Satisfied	%	55.9	29.1	42.6	46.6	42.1
Extremely Satisfied	%	23.6	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 59: BREASTFEEDING, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	43.9	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**690**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	56.2	80.4	47.5	40.5	50.3
Formula Feed Only	%	3.0	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	30.9	10.8	31.9	32.5	27.8
I Haven't Decided	%	9.9	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	56.5	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**535**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	89.2	91.5	76.6	72.6	77.3
No	%	9.9	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 60: FAMILY PLANNING, CJFHC

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	57.1	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**527**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	CJFHC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	66.8	77.0	77.5	82.2	80.3
No	%	31.1	20.0	14.0	14.2	15.3
Unsure	%	2.1	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	58.3	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**513**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	59.8	84.2	70.8	74.0	75.5
No	%	38.2	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	49.0	41.5	42.9	38.6	40.2
Not in Universe	%	26.0	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**307**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	4.9	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	4.2	2.8	11.4	10.9	9.2
LARC - IUD	%	8.1	10.8	11.9	12.3	11.9
Pills	%	13.0	8.6	11.9	13.0	11.8
Injection	%	14.0	5.9	16.2	20.2	16.2
Condoms	%	34.9	26.6	19.8	13.9	17.9
Breastfeeding	%	8.1	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	7.2	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims were obtained from New Jersey

Initial Contact: In March 2015, the evaluation team spoke with the New Jersey Division of Medical Assistance and Health Services to discuss the Strong Start for Mothers and Newborns evaluation; the agency was enthusiastic about supporting and participating in the study.

Data Acquisition Process: In June 2015, a Data Use Agreement was submitted to New Jersey Department of Health. New Jersey Medicaid, which has a history of linking these data, agreed to perform the linkage and sent a DUA to the Department of Health in March 2016. In August 2016, the Medicaid Agency provided test files to Urban for review. Urban completed and submitted a Business Associate Agreement to obtain the linked birth certificate/Medicaid data, which was approved in July 2017.

Final Result: Initial linked birth certificate and Medicaid data were provided to Urban in July 2017. Complete Medicaid eligibility and claims data were received in November and December of 2017 and are included in the final impact's analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Central Jersey Family Health Consortium (CJFHC) awardee, which implemented the Group Prenatal Care model, delivered care at seven sites included in the impact analysis: Jersey Shore University Medical Center; JFK Medical Center/Family Practice; Newark Community Health Center; Jewish Renaissance Health Center; Rutgers/NJ Medical School; Saint Peter's University Hospital; and Capital Health.

As described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1, low acceptance rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the acceptance of group prenatal care was low (less than 75 percent) were of particular concern – 6 out of 7 sites within the CJFHC awardee. For these six sites, women who enrolled in group prenatal care may be systematically different from those who chose not to enroll and estimates of the impact of enrolling in Strong Start may be biased by selection even after adjusting for differences in observable characteristics. Two sites, Newark Community Health Center and JFK Medical Center/Family Practice, did not raise these specific low acceptance rate concerns because they used an opt-out approach to enrollment and achieved an acceptance rate above 75 percent.

This section presents three sets of estimates (Table 61):

- one for the CJFHC awardee as a whole, which includes the sites with opt-in enrollment strategies and low acceptance rates;
- one for Newark Community Health Center, which used an opt-out enrollment strategy, achieved an acceptance rate above 75 percent, and was large enough to support a site-specific analysis; and
- one for the JFK Medical Center in combination with Newark, because JFK also used an opt-out enrollment strategy and achieved an acceptance rate above 75 percent, but was not large enough to analyze alone.

While awardee-level estimates are presented here, they ***should not be interpreted as impact estimates*** because 6 sites used an opt-in enrollment strategy and had a low acceptance rate. The site-level results that we report for Newark Community Health Center and JFK Medical Center/Family Practice reflect the impact of enrollment in Strong Start and receiving care group prenatal care compared to typical care. Only results from Newark Community Health Center and JFK Medical Center/Family Practice are included in the Group Prenatal Care Model analysis presented in Volume 1.

TABLE 61: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR CJFHC

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Central Jersey Family Health Consortium, Inc.			
Jersey Shore University Medical Center	No	No	No
JFK Medical Center/Family Practice	Yes	Yes	No
Newark Community Health Center	Yes	Yes	No
Jewish Renaissance Health Center	No	No	No
Rutgers/NJ Medical School	No	No	No
Saint Peter's University Hospital	No	No	No
Capital Health	No	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend.[21]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we draw the comparison group outside the county (alternative specification #1) for CJFHC.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

[21] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables. We also present estimates for models where we draw the comparison group outside the county (alternative specification #1).

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 62 reports the birth and process outcome findings for the CJFHC awardee. However, these estimates should not be interpreted as an impact of Strong Start because 6 sites used an opt-in enrollment strategy and had a low acceptance rate. We do not observe any significant differences in birth outcomes between Strong Start enrollees and women in the comparison group in the main model or any alternative specifications.

TABLE 62: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT CJFHC **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2016, Strong Start (N=788)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=29643)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=521, N=18985)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=521, N=18985)
Birth Outcomes						
Clinical gestational age (weeks)	38.9	38.8	0.0	N/A	0.0	0.0
Preterm birth rate	7.1%	7.3%	-0.2	N/A	-0.5	-0.6
Very preterm birth rate	1.6%	1.7%	-0.1	N/A	0.0	-0.1
Birthweight (grams)	3,259.9	3,252.4	7.5	N/A	14.1	20.0
Low birthweight rate	6.7%	7.0%	-0.3	N/A	-0.3	-0.3

Outcomes	Main Model: 2014 - 2016, Strong Start (N=788)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=29643)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=521, N=18985)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=521, N=18985)
Very low birthweight rate	1.1%	0.9%	0.3	N/A	0.3	0.3
Rate of Apgar score greater than or equal to 7	N/A	N/A	N/A	N/A	N/A	N/A
Process Outcomes						
C-section rate	31.7%	31.7%	0.0	N/A	-0.6	-1.1
VBAC rate[1]	16.3%	10.6%	5.7	N/A	2.3	2.6
Weekend delivery rate	25.3%	23.8%	1.5	N/A	1.4	1.4

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 86 Strong Start women and 5338 comparison group women.

Table 63 reports the expenditure and utilization outcome findings for the CJFHC awardee. However, these estimates should not be interpreted as an impact of Strong Start because 6 sites used an opt-in enrollment strategy and had a low acceptance rate:

- Women enrolled in Strong Start have lower average prenatal care expenditures ($3,493) than comparison group women ($4,053), a significant difference of $560.
- Women enrolled in Strong Start have lower average expenditures during the delivery period ($15,297) than comparison group women ($16,566), a significant difference of $1,269.
- Women enrolled in Strong Start and their infants also have lower average total delivery and post-delivery expenditures ($20,175) than comparison group women and infants ($21,994), a significant difference of $1,818.
- Women enrolled in Strong Start have fewer ED visits during the 8 months prior to delivery (0.93 visits) than comparison group women (1.24 visits), a significant difference of 0.30 visits.
- Women enrolled in Strong Start also have slightly fewer hospitalizations prior to delivery (0.02 hospitalizations) than comparison group women (0.04 hospitalizations), a marginally significant difference of 0.01 hospitalizations (p-value<0.10).
- There are no other significant differences in expenditure and utilization outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 63: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT CJFHC **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=521)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=18985)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,493	$4,053	**-$560****	N/A
Total expenditures during delivery period	$15,297	$16,566	**-$1,269****	N/A
Total delivery and postdelivery expenditures[2]	$20,175	$21,994	**-$1,818****	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.93	1.24	**-0.30****	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.04	**-0.01^**	N/A
Number of days in NICU	0.93	1.06	-0.13	N/A
Number of ED visits for mother 11 months after delivery month	0.69	0.77	-0.08	N/A
Number of hospitalizations for mother 11 months after delivery month	0.03	0.04	-0.01	N/A
Number of ED visits for infant in the first year of life	1.45	1.43	0.02	N/A
Number of hospitalizations for infant in the first year of life	0.09	0.09	0.0	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Table 64 reports the birth and process outcome findings for the combined JFK Medical Center/Family Practice and Newark Community Health Center sample:

- Rates of C-section are significantly greater for Strong Start enrollees (37.3 percent) than comparison group women (32.2 percent), a significant difference of 5.1 percentage points.
- We do not observe differences between Strong Start and comparison group women for any other birth outcomes. The sample of Strong Start enrollees with a previous C-section is not sufficient to analyze VBAC.

TABLE 64: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT JFK MEDICAL CENTER/FAMILY PRACTICE AND NEWARK COMMUNITY HEALTH CENTER (COMBINED SITES)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=434)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=26305)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=251, N=15252)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=251, N=15252)
Birth Outcomes						
Clinical gestational age (weeks)	38.8	38.9	-0.1	N/A	-0.1	0.0
Preterm birth rate	9.0%	7.3%	1.7	N/A	1.3	1.2
Very preterm birth rate	1.8%	1.8%	0.1	N/A	0.1	0.2
Birthweight (grams)	3,242.4	3,248.9	-6.5	N/A	6.3	17.4
Low birthweight rate	7.4%	6.9%	0.4	N/A	0.7	0.8
Very low birthweight rate	1.4%	0.9%	0.5	N/A	0.4	0.5
Rate of Apgar score greater than or equal to 7	N/A	N/A	N/A	N/A	N/A	N/A
Process Outcomes						
C-section rate	37.3%	32.2%	**5.1***	N/A	**5.7^**	4.3
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.6%	24.2%	1.4	N/A	0.7	0.7

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 46 Strong Start women and 4782 comparison group women.

Table 64 also shows findings from the alternative specification models. The difference in C-section rates drops to marginal significance when the sample is limited to the claims sample (alternative specification 2) and the difference is no longer observed when claims controls are added to the sample (alternative specification 3). This suggests that the higher rate of C-section among Strong Start participants may be due to higher risk, which is captured by controlling for diagnoses using claims data in alternative specification 3.

Table 65 reports the expenditure and utilization outcome findings for the combined JFK Medical Center/Family Practice and Newark Community Health Center sample, which does not raise acceptance rate concerns because it used an opt-out procedure and achieve an acceptance rate above 75 percent. These findings can be interpreted as impacts:

- Women enrolled in Strong Start have lower average prenatal care expenditures ($3,396) than comparison group women ($4,112), a significant difference of $717.
- Women enrolled in Strong Start have lower average expenditures during the delivery period ($15,886) than comparison group women ($17,341), a significant difference of $1,455.

- This difference extends to lower average total delivery and postdelivery expenditures among Strong Start women and their infants ($21,241) than comparison group women and their infants ($22,823), a marginally significant difference of $1,581 (p-value<0.10).
- Women enrolled in Strong Start have a lower mean number of ED visits during the 8 months prior to delivery (0.93 visits) than comparison group women (1.41 visits), a significant difference of 0.48 visits.
- Women enrolled in Strong Start have a lower mean number of hospitalizations prior to delivery (0.02 hospitalizations) than comparison group women (0.04 hospitalizations), a significant difference of 0.02 hospitalizations.
- There are no other significant differences in utilization outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 65: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT JFK MEDICAL CENTER/FAMILY PRACTICE AND NEWARK COMMUNITY HEALTH CENTER (COMBINED SITES)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=251)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=15252)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,396	$4,112	**-$717****	N/A
Total expenditures during delivery period	$15,886	$17,341	**-$1,455****	N/A
Total delivery and postdelivery expenditures[2]	$21,241	$22,823	**-$1,581^**	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.93	1.41	**-0.48****	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.04	**-0.02***	N/A
Number of days in NICU	0.86	1.09	-0.22	N/A
Number of ED visits for mother 11 months after delivery month	0.65	0.77	-0.12	N/A
Number of hospitalizations for mother 11 months after delivery month	0.03	0.04	0.0	N/A
Number of ED visits for infant in the first year of life	1.27	1.41	-0.14	N/A
Number of hospitalizations for infant in the first year of life	0.10	0.10	0.0	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Table 66 reports the birth and process outcome findings for the Newark Community Health Center site, the only single site without opt-in enrollment and acceptance rate concerns that had a sample large enough to analyze independently. We do not observe any significant differences in birth outcomes between Strong Start enrollees at Newark and women in the comparison group in the main model or any alternative specifications.

TABLE 66: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT NEWARK COMMUNITY HEALTH CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=303)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=21530)	Main Model: 2014 - 2016,	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=170, N=12501)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=170, N=12501)
Birth Outcomes						
Clinical gestational age (weeks)	38.8	38.8	0.0	N/A	-0.1	0.0
Preterm birth rate	9.9%	7.9%	2.0	N/A	2.1	2.1
Very preterm birth rate	2.0%	2.0%	0.0	N/A	0.1	0.2
Birthweight (grams)	3,239.6	3,250.8	-11.2	N/A	-14.5	-9.0
Low birthweight rate	7.6%	7.3%	0.3	N/A	0.6	0.7
Very low birthweight rate	1.0%	1.0%	0.0	N/A	-0.2	-0.1
Rate of Apgar score greater than or equal to 7	N/A	N/A	N/A	N/A	N/A	N/A
Process Outcomes						
C-section rate	38.6%	35.2%	3.5	N/A	3.0	2.1
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.1%	24.1%	1.0	N/A	-1.7	-0.9

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 45 Strong Start women and 4072 comparison group women.

Table 67 reports the expenditure and utilization outcome findings for the Newark Community Health Center site level analysis, which are similar to the combined site findings in Table 18:

- We observe the same patterns of lower average expenditures among Strong Start women than comparison group women at the Newark site as in the combined sample. The magnitude of the differences is greater at Newark: a significant difference of $690 for prenatal care expenditures, a significant difference of $1,654 for total expenditures during the delivery period, and a marginally significant difference of $1,790 (p-value<0.10) for total delivery and postdelivery expenditures.

- As in the combined sample findings, women enrolled in Strong Start have a smaller mean number of ED visits during the 8 months prior to delivery (0.78 visits) than comparison group women (1.25 visits), a significant difference of 0.47 visits. For Newark alone, we do not observe a difference in mean number of hospitalizations prior to delivery as observed in the combined site sample.
- Whereas no difference was found in the combined sample for ED visits for infants, infants born to women enrolled in Strong Start at the Newark site have slightly fewer ED visits (1.12 visits) than comparison group women (1.34 visits), a marginally significant difference of 0.22 visits (p-value<0.10).
- There are no other significant differences in expenditure and utilization outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 67: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT NEWARK COMMUNITY HEALTH CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=170)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=12501)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,225	$3,915	**-$690****	N/A
Total expenditures during delivery period	$15,529	$17,182	**-$1,654****	N/A
Total delivery and postdelivery expenditures[2]	$20,827	$22,616	**-$1,790^**	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.78	1.25	**-0.47****	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.03	-0.01	N/A
Number of days in NICU	0.74	1.07	-0.34	N/A
Number of ED visits for mother 11 months after delivery month	0.59	0.69	-0.10	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.03	0.01	N/A
Number of ED visits for infant in the first year of life	1.12	1.34	**-0.22^**	N/A
Number of hospitalizations for infant in the first year of life	0.09	0.10	-0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Central Jersey Family Health Consortium (CJFHC) implemented the Group Prenatal Care model under Strong Start. The awardee followed the *CenteringPregnancy* curriculum, and thus, in addition to medically-focused check-ups, provided intensive education on topics such as nutrition, stress reduction, childbirth preparation, pregnancy complications, breastfeeding, family planning, and postpartum depression. CJFHC participants appeared to be lower risk than many enrolled in Strong Start on certain measures, for instance they had relatively low rates of smoking and lower rates of prior preterm birth compared to other awardees. Like other Group Prenatal Care awardees, they also enrolled more first-time mothers than observed among the Strong Start population as a whole. The awardee-level impact analysis findings for CJHFC should not be interpreted as impacts of Strong Start because six out of eight sites used an opt-in enrollment strategy and had a low acceptance rate. In combined site-level analysis of JFK Medical Center/Family Practice and Newark Community Health Center, however, Strong Start participants and their infants had lower average prenatal care expenditures, as well as lower average expenditures during the delivery period and the delivery and post-delivery periods than women and their infants in the comparison group. Participants also had fewer ED visits and hospitalizations during the prenatal period. Meanwhile, rates of C-section at these sites were significantly greater for Strong Start enrollees than comparison group women, which could reflect lack of continuity between the prenatal care providers who delivered Strong Start enhanced services and the providers who attended participants' births. For instance, at most CJFHC sites, participants saw the same Group Prenatal Care facilitators throughout pregnancy but delivered their babies under the care of a resident physician or hospitalist who was not involved in their prenatal care.

Florida Association of Healthy Start Coalitions

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,343	• Association of 33 non-profit, regional, Healthy Start coalitions that formed in 1991 to reduce Florida's high infant mortality rate
	• Each coalition comprised of local public and private medical professionals, hospitals, schools, charities and social services organizations
		• Eight sites concentrated in the Tampa Bay, FL area
		  • One site left the program and another joined during the Strong Start period
		  • Sites included Medicaid obstetric group practice clinics, a Federally-Qualified Health Center (FQHC), a hospital-affiliated high-risk clinic, and a public health department
			• Intervention categorized as "high intensity" for offering seven care coordination, education, and/or referral encounters
			• Screenings, care management, patient education, emotional support, referrals, and follow-up through in-person encounters at the clinic, supplemented by telephonic encounters with Maternal Health Specialists (MHS)
			• Average number of MHS-patient encounters grew from 7 to 9.4 over the course of the program

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Intake process identified mental health needs for referrals to mental health case manager
- MHSs established trust and provided support, education, referral, and follow-up beyond typical prenatal care
- Improved continuity of care by providing a regular contact, which reportedly increased postpartum visit rates

CHALLENGES

- Tailoring the model to several different settings, engaging providers and clinic staff, and integrating the MHS into clinic workflow
- Early administrative challenges related to reporting requirements
- Lack of "real time" evaluation data to convince state to expand the program

SUSTAINED

- Continued many Strong Start services at five locations by shifting MHS model into Healthy Start program
- Working with state agencies and other Healthy Start coalitions to expand "pregnancy medical home" approach statewide, including some Strong Start elements

KEY FINDINGS: PARTICIPANT-LEVEL DATA[22]

PARTICIPANT-LEVEL DATA QUALITY

- 0.0% rate of missing intake forms; 0.0% rate of missing exit forms
- 2.1% rate of item nonresponse on intake forms; 14.3% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 19.0% of women were teens (under age 20); 6.5% were 35 years or older
- 42.0% of women were black; 22.4% were Hispanic; 30.1% were white
- 15.1% of women were married; 35.4% were living with a partner; 19.5% were not in a relationship
- 28.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 35.3%: C-section rate among women with a delivery
- 13.9%: preterm birth rate among women with a live birth
- 12.4% low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Strong Start infants had worse birth outcomes than comparison group infants:
    - Lower average gestational age, higher rates of preterm and very preterm birth, lower average birthweight, higher rates of low birthweight and very low birthweight, and worse Apgar scores

[22] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

EXPENDITURE AND UTILIZATION OUTCOMES

- Higher average prenatal care expenditures, expenditures during the delivery period, and delivery and postdelivery expenditures than the comparison group
- More ED visits and hospitalizations for mothers after the delivery month than women in the comparison group – marginally significant (p-value<0.10)
- More NICU days (marginally significant; p-value<0.10) and infant ED visits than the comparison group

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Prior to Strong Start funding, the eight care sites participating under the Florida Association of Healthy Start Coalitions (FAHSC) Strong Start program provided prenatal care services under a standard OB/GYN model.[23] Sites included: privately-owned obstetrics and gynecology practices in Tampa and Lakeland that provided prenatal care primarily to Medicaid enrollees; a privately-owned obstetrics and gynecology clinic with connections to Tampa General Hospital that provided prenatal care to high-risk pregnant women, primarily Medicaid enrollees; a not-for-profit Federally Qualified Health Center (FQHC) that provided family practice, pediatrics, obstetrics and gynecology, and dental care; and a Polk County Health Department clinic that provided typical public health clinic care including primary care, prenatal, pediatric, and pharmacy services.

Each site had previously established connections to community resources through two other programs administered by FAHSC. Healthy Start is primarily a home visiting program for high-risk pregnant women and children up to age 3 that provides information, psychosocial support, referrals, care coordination, and inter-conception education and counseling. A program called, "Mom Care" includes services such as assistance applying for Medicaid, scheduling appointments and coordinating care. The Healthy Start coalitions had partnerships with substance abuse treatment services and mental health providers, domestic violence assistance, and housing/food resources; having these connections in place facilitated referrals.

The clinic-based Maternity Care Home model the awardee implemented through Strong Start complemented its Healthy Start home visiting program, which key informants believed did not suit all high-risk pregnant women. Some patients associated Healthy Start's home visits with welfare and child protective services and preferred that enhanced services be provided at their prenatal care clinics. Some clinicians also preferred enhanced pregnancy-related services to be integrated into the health care setting, as was done through FAHSC's Strong Start model. However, implementing Strong Start required that staff and partners understand the differences in services among Healthy Start, Strong Start and Mom Care. This was a particular concern at one clinic where Strong Start staff were co-located with Healthy Start program coordinators, who initially viewed Strong Start staff as competition against the Healthy Start model. When there was a change in health department leadership, the complementary aspects of the two programs were clarified, highlighting the importance of delineating program boundaries for leadership and staff from the start of a new initiative.

In the case study team's 2016 survey of Medicaid officials in Strong Start states, Florida was one of just a few states (along with Kansas and Texas) that reported a limit on medically-necessary prenatal care visits. Florida Medicaid limits coverage to 10 or 14 visits for a normal or high-risk pregnancy, respectively.

[23] There was previously a small *CenteringPregnancy* program at the Bartow Clinic in Polk County, but it was discontinued because of challenges in scheduling Group Prenatal Care visits.

DESCRIPTION OF ENHANCED STRONG START SERVICES

> "[The Maternal Health Specialist] is someone you can trust…you won't be betrayed."
>
> *- Strong Start participant*

FAHSC embedded Maternal Health Specialists (MHSs) in eight sites, with each MHS covering one or more sites, to test the Maternity Care Home model in different clinical settings and communities of varying sizes and resources. While the MHSs adapted the program to each setting, they generally provided pregnancy and chronic illness education, guidance in healthy decision-making, assistance with doctor-patient communication, care coordination, and emotional and logistical supports and referrals. MHSs received 80 hours of initial Strong Start training, met monthly with a physician advisor for case reviews, and received additional training and materials during the Strong Start program to help them provide better support related to breastfeeding, family planning, and diabetes. They used educational tools including "Beginnings Pregnancy Guide," an evidence-based pregnancy education curriculum, the Fresh Start smoking cessation program, CASA for domestic violence, and Safe Baby for child abuse.

The MHSs had either nursing or social work backgrounds and assisted women through face-to-face meetings before or after regularly-scheduled prenatal and postpartum appointments. As a key informant put it, "the pearl of our program is our personal touch." The in-person educational sessions created a comfortable environment for women to ask questions and share concerns. Between visits, the MHSs used Strong Start-funded mobile phones to maintain contact with participants through calls, texting, and email. Key informants expressed that contact by phone was especially important early in the pregnancy when clients were going into the clinic just once a month. The awardee examined ways to use technology such as online resources and mobile apps to continue education and communication to further supplement in-person encounters. The average number of MHS-client encounters increased over time, from 7 to 9.4, likely reflecting the growing MHS integration into the practice. At some sites, the MHS was the only constant provider for Strong Start enrollees over the course of their pregnancy, as patients often had different providers for prenatal, delivery, and postpartum care.

> "I talked to [my MHS]) about smoking marijuana to help me control my nausea during my pregnancy, and she helped me to find some other ways to do that. I wouldn't have shared that with my doctor. The MHS has time to help me; the doctors' visits are short and we don't really talk."
>
> *- Strong Start participant*

Site participation in Strong Start shifted during the course of the program. During the second program year, FAHSC chose to remove the MHS from the Clearwater clinic of the Community Health Centers of Pinellas, an FQHC, because of a lower-than-expected Medicaid patient population, which resulted in low enrollment. In Polk County, the MHS was moved from the Bartow Clinic to the Lakeland Clinic, which served a higher volume of patients. The awardee added a fourth site for the Exodus Women's Center, the Medicaid-only obstetrics group practice, at the request of the providers who said they valued the MHS's role at their other offices.

OUTREACH AND ENROLLMENT

FAHSC used an opt-in enrollment approach, meaning that eligible women were asked to choose between enrolling in Strong Start or participating in the standard care model (which is described in the first section above). Each MHS was responsible for outreach, adapting the timing of the approach to each site's workflow. At the obstetrical practices, for example, the MHS approached women at their first visit to explain the program and get their consent to screen for program eligibility. Front desk staff were instrumental in helping to identify eligible patients, both by flagging patients who were eligible and by allowing the MHSs to review patient schedules and charts. Over time, providers increasingly referred their eligible patients to the program, indicating that they began to see the value in the program and understand the distinction between Strong Start and Healthy Start.

FAHSC broadened its eligibility criteria in the second year to include adolescent mothers, women who were having their first child, and women with a body mass index (BMI) of 30 or higher unintended pregnancies and multiple gestations. As a result, women needed only be Medicaid eligible to enroll in the program. Staff reported that very few women declined to participate.

Key informants were satisfied with participant retention in Strong Start and in prenatal care, noting an attrition rate much lower than what they saw in their general patient population. Women who did choose to leave the Strong Start program generally did so because they had trouble with transportation, did not wish to remain in the clinic longer than was required for their OB appointments, or decided to switch providers.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Strong Start staff believed that the program had a positive impact on breastfeeding, family planning, depression screening and treatment rates, and receipt of other referred services. They noted that as a part of the intake process, MHSs conducted a depression screening and if warranted (30.5 percent of participants had depressive symptoms), referred women to a mental health case manager who met with each woman in a setting where she was most comfortable – at home, at McDonalds, etc.—and focused on coping with stress, anxiety and depression. In addition, Strong Start participants were more likely than the general prenatal patient population to stay with a practice throughout pregnancy and had higher postpartum visit attendance rates. Key informants reported that compared with 40 to 60 percent postpartum visit rates at other area providers, the Strong Start average postpartum visit completion rate was 79 percent. One Strong Start site with very high-risk patients now has a 90 percent postpartum completion rate, and the site with the lowest postpartum completion rate still experienced an increase from about 50 percent to 63 percent during the course of the program.

Health care costs may have declined, according to key informants, because participants were better educated about when a medical concern warranted a trip to the hospital and how to prevent certain conditions that required an emergency department (ED) visit or longer hospital stays. Participants felt comfortable calling the MHS to ask questions before going to the ED. MHSs also play a key role in getting participants in for a "sick appointment" if they needed to see an obstetrical (OB) provider the same day, and following up with women who missed appointments.

Key informants reported that the MHS emphasis on family planning at every stage of pregnancy has resulted in 60-70 percent of participants having a contraception plan in place before giving birth. One key informant, however, was disappointed that despite family planning conversations, she did not see an improvement in pregnancy spacing and reported many "repeaters" who were pregnant again less than a year after their Strong Start delivery. She noted during the final round of case studies that six or seven women among her Strong Start caseload had returned with another pregnancy since the program ended.

> "When the doctor doesn't explain something to you, she [the MHS] puts your mind at ease to explain it better."
>
> *- Strong Start participant*

The awardee expected but did not yet have evidence that Strong Start may also positively influence birth outcomes such as preterm birth and low birthweight rates, pending completion of an internal evaluation. Key informants reported that vaginal births as compared to C-section rates were difficult to link to the Strong Start intervention because delivery method is very doctor driven. However, they noted that Strong Start's emphasis on vaginal deliveries and breastfeeding were aligned with broader state efforts such as the Healthy Start home visiting program and March of Dimes "39 Week" campaign.

STRONG START PARTICIPANT PERSPECTIVES

Focus group participants shared that they opted to participate in Strong Start because the MHS who approached them seemed very personable and informed. Some women contrasted this to previous experiences whereby they often felt they'd been treated badly by providers because they were on Medicaid. A few women indicated that they chose their current maternity care provider because of Strong Start, even though they had mixed opinions about the OB clinic itself.

> *My sister went to this clinic and told me about Strong Start. That's why I went.*

The focus group participants were grateful for the extra support they received from their MHS. Most participants valued the MHS role in connecting them with resources for social supports and behavioral health. Others appreciated the one-on-one time they had with the MHS to ask questions and get more information about issues related to their pregnancy. They felt more comfortable asking medical questions of the MHS than of their OB provider and trusted their concerns would be kept in confidence.

> *I don't think of [the MHS] as a provider. I think of her as a friend.*
>
> *When I have my OB appointment, I can't understand [the doctor], so I don't ask too many questions. I save my questions for [MHSs name].*
>
> *[The MHS has] helped me find subsidized day care for my son. She's helped me get help with car seats. I can call her and text her whenever.*
>
> *It's hard, but I'm changing my diet to deal with my high blood pressure. I'm trying because [the MHS] told me how important it is, and she asks about it every time I go in.*

A few women indicated they had learned about the importance of family planning from their MHS, and most focus group participants reported they had decided to use contraception after their pregnancy and were planning to breastfeed. One participant emphasized that she viewed her Strong Start experience favorably compared with a prior pregnancy.

> *I don't remember anyone talking to me before [with first pregnancy] like they do now. I would say this is better.*

PROGRAM STRENGTHS

Strong Start staff were most proud of the MHSs' ability to build relationships with vulnerable pregnant women, some of whom had no one else to reach out to and were "on their last thread." Through their personal touch over multiple encounters, the MHSs often established trust and close communication enabling them to provide support, education, referrals, and follow up "above and beyond" what standard prenatal clinic staff were able to offer.

> "When I come in for my OB appointment it lasts only 10 minutes, but I have to wait there for an hour before I can be seen. But I appreciate the time I have with [MHS name]. I can talk about family stuff, finances, all that."
>
> *- Strong Start participant*

The flexibility and commitment, dedication, and "never give up" attitude of staff to figure out ways to make Strong Start successful in different settings were also major strengths of FAHSC's model. Over time, the Strong Start team educated and encouraged providers and other site-level staff to refer patients to MHSs and provide access to patient information. Key informants felt the MHSs were able to establish themselves as a program and resource distinct from Healthy Start. MHSs developed new strategies for providing patient education related to breastfeeding and family planning, using demonstration models in discussions of contraceptives. They took advantage of the high rate of postpartum visits to discuss birth spacing at a time when women may be most receptive to it. Key informants also noted that the MHSs helped address continuity of care issues by giving patients a regular contact at their clinic when their providers rotated across sites.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

> "I probably would skip a lot of my appointments, but the [MHS] is really positive and she teaches me different ways to think about things. We go over my diabetic stuff and she gives me different lists and talks to me about how it could affect the baby's heart."
>
> *- Strong Start participant*

FAHSC faced many implementation challenges including tailoring the model for different settings, securing contracts between FAHSC and the care sites, staffing all care sites quickly, securing space for an MHS to meet privately with women, engaging OBs in a team, and integrating the MHS into the sites' work flows. Key informants found it very difficult to get and keep multiple sites' clinical and non-clinical staff on board with Strong Start. It required meetings, relationship-building, sharing of data, and education on an ongoing basis.

In sites where MHSs were not employees of the clinic, they served as the sole ambassador of the program and adopted creative approaches to collaborating with their office colleagues. For example, one MHS started bringing in home-made brownies for the front desk staff member who sent her the most Strong Start participant referrals in a month. Those sites also did not permit the MHS to access the electronic health record (EHR) out of concerns for the privacy of other patients on the electronic medical record (EMR) system. As a workaround, the practice agreed to print out and give the MHS the relevant part of the EMR for Strong Start participants scheduled for that day. They also allowed the MHS to relay information back to the OB provider by scanning MHS notes into the EMR. However, direct communication between doctors and the MHSs at these clinics was reportedly infrequent. In contrast, the MHS located at another site where she had been a clinic employee was more integrated in the care team. She accessed medical records on a daily basis to identify incoming Strong Start participants and to make notes in the case file to inform the OB providers.

The awardee perceived that early changes in Strong Start program reporting requirements created significant administrative challenges, and inability to obtain real-time evaluation results made it difficult to make the case to state agencies and other Healthy Start coalitions for expanding the program.

The Strong Start team learned a number of lessons based on their successes and challenges. To be successful, participating clinics' medical and administrative staff must support and understand the model and establish a true partnership with the implementing agency. Patient commitment is strengthened when OB providers convey the benefits of the Strong Start model. The enhanced services should be integrated into the practice, even as far as the MHS wearing the same uniform as clinic staff, so that both patients and practice staff perceive the MHS as part of the model of care. The clinic should establish a consistent time for MHS visits that is built into the practice workflow. A key informant expressed that if the MHS visits were part of a routine appointment rather than a voluntary "add on," patients and staff would use and appreciate the services more. Finally, key informants found their clinic-based model to be attractive because "patients come to their appointments," whereas their home visitation programs struggle with completion of visits. They discovered that women most in need, for example with substance abuse or mental health issues, are least likely to want a home visit.

SUSTAINABILITY

The awardee continued many Strong Start services at five locations by transitioning the clinic-based MHS model into its Healthy Start program.[24] Each of four MHSs was assigned to a main site, which included three group practice clinics in Hillsborough County and the Tampa General Hospital Genesis Clinic. Each MHS also rotates once a week to an additional office. The Healthy Start program replaced Strong Start funding of the MHSs' salaries.

The MHSs continue to conduct assessments and screening for depression (Edinburgh scale) at least three times during pregnancy, and will also provide referrals, education, and care navigation. Each MHS

[24] Florida's Healthy Start initiative was signed into law on June 4, 1991 to assist pregnant women, inter-conception women, infants, and children up to age three to obtain the health care and social support needed to reduce the risks for poor maternal and child health outcomes. Services include: Information, referral and ongoing care coordination and support to assure access to needed services; psychosocial, nutritional, and smoking cessation counseling; childbirth, breastfeeding, and substance abuse education; home visiting; and inter-conception education and counseling. For more information, see: http://www.floridahealth.gov/programs-and-services/childrens-health/healthy-start/#heading_2.

conducts one in-person and one phone conversation with each client per month throughout pregnancy. Unlike the Strong Start model, which continued MHS contact through postpartum care, clients are now assigned a new in-home case worker to follow the baby after delivery. Also, the MHSs now close a client case if they cannot reach a client after three attempts, whereas under Strong Start they generally made more attempts.

The main eligibility criteria for MHS services is being deemed high risk according to a Healthy Start assessment, with some discretion by the MHS. The assessment considers chronic illness, mental health needs, and whether a woman has had a prior preterm birth or low birthweight baby. The transition from Strong Start to Healthy Start involved creating new forms that are part of the Healthy Start tracking system (with less information collected compared with Strong Start), and shifting to Healthy Start curriculum and materials.

At the time of the Year 4 evaluation interviews, the awardee was working with state Medicaid and health departments and other Healthy Start coalitions to try to expand the "pregnancy medical home" approach that includes Strong Start elements statewide. The state was redesigning its Healthy Start program, and the awardee's executive director was advocating for incorporating clinic-based care management for high-risk pregnant women. The research team is not aware whether this approach was integrated into the Healthy Start program.

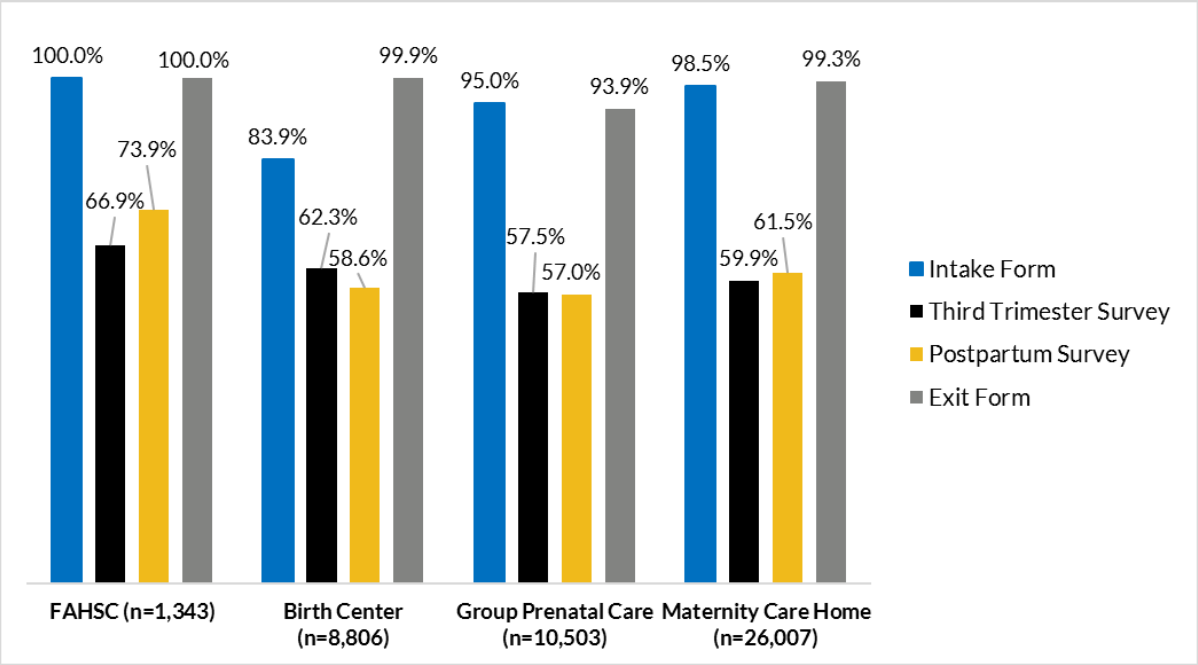
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for FAHSC, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for FAHSC to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 38 FAHSC participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 5: FORM SUBMISSION RATES, FAHSC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,305
- Study IDs represented: 1,343 (suggests PLPE data were submitted for 38 extra patients: see information on program report data in Appendix F in Volume 1).
- The awardee had an electronic data system to track program data, and sites entered patient-level information directly into this system.

HOW FORMS WERE ADMINISTERED:

- Intake Form: Typically completed by a MHS in person with the participant. This was done in a private area. In some cases, the participant's partner was present.
- Third Trimester and Postpartum Surveys: Completed by the participant on their own, unless she was unable to read. In cases where the participant did not return for a postpartum visit, staff would sometimes mail the survey for completion. Staff were trained to review forms for completeness, and given feedback on the percentage of evaluation forms collected.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate any concerns in the availability of completeness of data by site.

MISSING FORMS:

- Intake: No Study IDs were missing Intakes.
- Third Trimester or Postpartum: About 33 percent of Study IDs were missing the Third Trimester Survey and 26 percent were missing the Postpartum Survey. The awardee attributed missing surveys to participants transferring care, sometimes before the completion of the Third Trimester Survey. Some patients were also lost to follow up after delivery; the sites sometimes submitted a Postpartum Survey indicating that the patient was lost to follow-up, which is why this rate is likely lower than for the Third Trimester Survey.
- Exit: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake: In cases where the participant's partner was present, the staff administering the Intake Form sometimes skipped the intimate partner violence questions. For participants who did not drink alcohol, the questions regarding alcohol use were not answered. For participants who did have substance use issues, the participants would sometimes ask to skip these questions "for fear of consequences."
- Exit: Some women transferred care during pregnancy, so delivery and birth outcomes were not available. Nearly 20 percent were missing information on their Strong Start pregnancy outcomes (18.28 percent).[25]

MAIN FINDINGS:

The tables that follow summarized the characteristics and outcomes of FAHSC participants. Some highlights include:

- The majority (74.5 percent) of FAHSC participants were between 20 and 34 years old—the healthiest age range for pregnancy—though 11.9 percent of participants were 18 or 19 years old.
- Most participants were either black (42.0 percent) or white (30.1 percent).
- Similar to Strong Start participants overall, the largest share of FAHSC participants was in a relationship and living with a partner (35.4 percent); only 15.1 percent were married and 19.5 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 35.1 percent of FAHSC participants reported having experienced intimate partner violence, 28.1 percent of participants with a prior birth had a prior preterm birth, and 76.3 percent of participants had not planned their Strong Start pregnancy.

[25] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 74.3% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 25.7% were missing for other reasons.

TABLE 68: DEMOGRAPHICS, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,305**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	7.1	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	11.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	74.5	81.7	72.9	75.1	75.8
35 Years and Older	%	6.5	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.3	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,301**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	22.4	25.4	37.1	28.0	29.7
Non-Hispanic White	%	30.1	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	42.0	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	5.6	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	7.7	19.6	12.8	11.3	13.3
Not in Universe	%	70.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**291**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	16.5	52.6	36.3	55.8	49.7
Puerto Rican	%	39.9	12.5	29.9	3.3	12.4
Cuban	%	14.4	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	21.6	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	7.6	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,305**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	2.5	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	1.2	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,289**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	34.1	36.6	30.8	35.3	34.5
In School, Not Employed	%	13.7	8.7	12.6	11.9	11.5
Employed and in School	%	6.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	45.6	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	2.9	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,267**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	34.9	15.4	27.8	29.1	26.4
High School Graduate or GED	%	51.8	57.5	58.3	57.9	57.9
Associate's Degree	%	5.1	8.2	5.2	4.6	5.4
Bachelor's Degree	%	1.6	14.5	4.5	3.7	5.8
Other College Degree	%	6.6	4.3	4.2	4.7	4.5

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	0.5	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,298**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	15.1	42.1	20.4	20.8	24.5
Living with a Partner	%	35.4	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	30.0	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	19.5	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 69: PSYCHOSOCIAL, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,283**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	63.2	51.8	51.8	59.7	56.5
No	%	34.8	44.6	42.3	37.4	39.8
Unsure	%	1.9	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.7	17.0	6.6	3.4	6.8
Not in Universe	%	36.2	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**811**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	79.3	61.1	72.6	79.9	75.3
Other	%	11.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	9.0	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	1.0	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,292**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	17.0	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	1.9	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,280**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	22.9	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	2.5	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,273**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	47.4	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	2.6	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,271**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	32.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	0.8	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,295**	**7,090**	**8,664**	**23,549**	**39,303**

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
None	%	53.4	67.9	59.0	65.5	64.5
Mild	%	26.3	21.4	23.8	20.2	21.2
Moderate	%	12.3	6.8	10.3	8.5	8.6
Severe	%	7.7	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	5.1	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,238**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	35.1	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	7.0	18.3	16.3	7.7	11.8
Not in Universe	%	13.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,034**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.8	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,305**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	58.9	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	25.4	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	15.7	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	65.9	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	16.8	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	31.2	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	16.6	24.6	17.1	15.4	17.2
Childcare Challenges	%	12.1	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	12.3	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 70: PREGNANCY HISTORY AND INTENTIONS, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,305**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	70.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	29.5	22.4	29.6	27.3	27.6

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	2.6	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**886**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	39.4	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	2.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**884**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	20.2	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	15.6	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**717**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	4.3	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	26.4	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**575**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	25.2	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	31.0	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**516**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	16.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	36.9	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**439**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	37.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**437**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	35.8	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**453**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	5.3	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 71: PRIOR BIRTH OUTCOMES, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.0	1.7	1.5	0.6	1.0
Not in Universe	%	29.5	26.2	32.4	27.5	28.4

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**920**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	87.2	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	3.2	23.5	18.9	15.2	17.7
Not in Universe	%	38.5	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**760**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	33.3	34.6	24.3	27.1	28.1
>= 18 months	%:	66.7	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.2	0.1	2.5	1.4	1.4
Not in Universe	%	38.5	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**800**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	28.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	6.0	1.3	20.8	13.1	12.6
Not in Universe	%	38.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**724**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	19.8	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 72: PRE-PREGNANCY MEDICAL CONDITIONS, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	1.0	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,292**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	23.7	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	65.0	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	2.2	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	9.1	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	0.5	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,298**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	3.2	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	0.6	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,297**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	7.4	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	2.4	3.6	32.1	18.1	18.5

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,274**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	4.0	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	35.1	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	24.5	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	26.4	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	10.0	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 73: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	6.0	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,227**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	3.6	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	5.8	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,229**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	4.1	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	5.7	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,231**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	10.8	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	6.2	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,224**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	1.4	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	5.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,230**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	3.3	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	6.1	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,225**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	6.4	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,221**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.7	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	10.3	0.8	28.0	23.1	19.9

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,171**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	6.8	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 74: TREATMENTS DURING PREGNANCY, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	91.0	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**117**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	3.6	0.8	10.0	5.1	5.4
Not in Universe	%	82.8	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**178**	**680**	**654**	**2,585**	**3,919**
Yes	%	29.8	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	35.4	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**843**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	4.0	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	91.7	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**108**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	13.9	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 75: PRENATAL CARE, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	0.9	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,293**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	88.4	4.7	29.5	64.5	43.3
Licensed Professional Midwife[26]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	10.0	-	26.5	5.7	8.9

[26] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	1.6	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,305**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.2	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	10.1	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,305**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.0	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,305**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	100.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	7.3	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	1.5	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,286**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	1.4	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,287**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	91.9	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**106**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	91.9	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**106**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	91.9	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**106**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	91.8	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**107**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	91.9	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**106**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	8.4	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,196**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	8.5	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.1	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	36.7	52.4	70.7	46.7	52.0
Pulmonologist	%	7.1	-	1.3	1.5	1.4
Endocrinologist	%	14.3	-	4.1	5.1	4.8
Cardiologist	%	14.3	-	6.4	6.9	6.8
Other	%	39.8	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 76: PRENATAL CARE, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	55.6	1.4	25.3	23.3	19.5
Not in Universe	%	29.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**201**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	69.2	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	5.4	0.3	7.8	2.9	3.5
Not in Universe	%	89.3	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**68**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	92.6	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	1.3	4.6	11.5	7.3	7.7
Not in Universe	%	21.8	25.8	15.8	18.2	19.2

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,004**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.5	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	4.5	0.7	12.0	5.6	6.1
Not in Universe	%	21.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**962**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	64.7	87.1	70.1	69.5	73.1
C-Section	%	35.3	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	1.2	0.4	8.7	2.3	3.4
Not in Universe	%	73.4	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**331**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	69.2	83.3	72.9	74.7	75.9
C-Section	%	30.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	10.4	4.7	12.5	6.3	7.4
Not in Universe	%	73.9	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**204**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	46.6	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	85.6	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**188**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	9.6	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 77: BIRTH OUTCOMES, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	18.2	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,068**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	94.9	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	3.5	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	1.4	0.7	15.4	5.8	7.0
Not in Universe	%	22.3	26.1	16.4	18.9	19.8

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**996**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	5.2	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	8.6	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	85.0	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.1	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.3	2.1	14.3	8.0	8.3
Not in Universe	%	22.3	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**971**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	2.5	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	9.9	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	80.5	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	7.1	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 78: SATISFACTION, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	48.6	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**671**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	1.5	0.4	1.0	1.3	1.0
Moderately Satisfied	%	6.3	3.3	4.4	7.8	6.2
Very Satisfied	%	35.6	25.6	35.6	46.1	39.8
Extremely Satisfied	%	56.3	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	48.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**672**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	3.0	2.0	3.1	2.3	2.4
Slightly Satisfied	%	5.2	3.0	4.0	2.9	3.1
Moderately Satisfied	%	13.5	10.4	11.6	12.8	12.1
Very Satisfied	%	39.4	29.1	42.6	46.6	42.1
Extremely Satisfied	%	38.8	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 79: BREASTFEEDING, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	34.5	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**855**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	43.7	80.4	47.5	40.5	50.3
Formula Feed Only	%	15.2	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	29.5	10.8	31.9	32.5	27.8
I Haven't Decided	%	11.6	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	47.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**682**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	75.8	91.5	76.6	72.6	77.3
No	%	24.0	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 80: FAMILY PLANNING, FAHSC

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	49.1	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**664**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	84.3	77.0	77.5	82.2	80.3
No	%	14.0	20.0	14.0	14.2	15.3
Unsure	%	1.7	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	48.4	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**674**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	86.1	84.2	70.8	74.0	75.5
No	%	11.6	13.2	17.7	21.5	19.1
Unsure	%	2.4	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	26.2	41.5	42.9	38.6	40.2
Not in Universe	%	29.3	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**580**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	11.4	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	2.9	2.8	11.4	10.9	9.2
LARC - IUD	%	8.8	10.8	11.9	12.3	11.9
Pills	%	17.6	8.6	11.9	13.0	11.8
Injection	%	22.1	5.9	16.2	20.2	16.2
Condoms	%	12.8	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	FAHSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	19.7	16.7	8.1	9.5	10.9
Method Not Indicated	%	1.9	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Florida

Initial Contact: In March of 2015, the evaluation team contacted the Bureau of Vital Statistics in the Florida Department of Health and the Florida Agency for Health Care Administration (AHCA). Both were receptive to providing data for the evaluation pending submission of formal applications for data requests.

Data Acquisition Process: In March of 2015, the technical assistance team submitted completed applications for both Florida AHCA and Florida DOH. Urban received approval from the Florida Medicaid agency to access Medicaid data in May 2016 after successfully executing a data use agreement (DUA). In July 2016, Medicaid submitted 2014 eligibility and claims data to Urban. The Florida Department of Health (Vital Records) executed a second data use agreement with Urban in August 2016. That same month, the agency provided an IRB exemption for the study.

Final Result: In July 2017, the team received the final, complete birth certificate files, and in August 2017, the final Medicaid files; with these data, Urban completed its linkage process. Urban included Medicaid eligibility and claims data and birth certificate data in the final year's impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Florida Healthy Start Coalition (FL-HS) awardee, which implemented the Maternity Care Home model, delivered care at eight sites included in the impact analysis: Exodus Women's Center-Lakeland Office North; Tampa Obstetrics Exodus Clinic - MLK Jr. Blvd. Tampa; Exodus Women's Center-Tampa Palms Office ; Tampa General Hospital Genesis Clinic; Polk County Health Department-Bartow Clinic; Community Health Centers of Pinellas-Pinellas Park; Tampa Obstetrics Exodus Clinic - 22nd Street Site; and Community Health Centers of Pinellas - Clearwater. This section presents the evaluation's impacts results for the awardee as a whole (Table 81).

TABLE 81: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR FL-HS

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Florida Association of Healthy Start Coalitions			
Exodus Women's Center-Lakeland Office North	Yes	No	No
Tampa Obstetrics Exodus Clinic - MLK Jr. Blvd. Tampa	Yes	No	No
Exodus Women's Center-Tampa Palms Office	Yes	No	No
Tampa General Hospital Genesis Clinic	Yes	No	No
Polk County Health Department-Bartow Clinic	Yes	No	Yes
Community Health Centers of Pinellas-Pinellas Park	Yes	No	No
Tampa Obstetrics Exodus Clinic - 22nd Street Site	Yes	No	No
Community Health Centers of Pinellas - Clearwater	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend.[27]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- In alternative specification #1, we used an out-of-county comparison group.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

[27] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value<0.05 levels. We specifically note the p-value when findings are only marginally significant (p<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 82 reports the birth and process outcome findings for this awardee. Overall, we find that Strong Start is associated with significantly worse birth outcomes for this awardee:

- Women enrolled in Strong Start in FL-HS sites have an average clinical estimate of gestation of 38.2 weeks, which is 0.3 weeks shorter than that of the propensity-score reweighted comparison group of women (38.4 weeks).
- 12.8 percent of women enrolled in Strong Start have a preterm birth and 5.3 percent have a very preterm birth. These rates are 2.2 and 2.0 percentage points greater than rates for women in the comparison group, respectively.
- Consistent with the shorter gestational age, the average birthweight for infants born to women enrolled in Strong Start is 3,114 grams, which is 61.9 grams less than that of infants born to women in the comparison group.
- The rate of low birthweight is 13.8 percent for infants of women enrolled in Strong Start, which is 3.6 percentage points higher than for the comparison group.
- The rate of very low birthweight is 2.8 percent for infants of women enrolled in Strong Start, which is 1.2 percentage points higher than for the comparison group.
- Infants born to women enrolled in Strong Start at FL-HS are 1.3 percentage point less likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group (95.8 vs. 97.1 percent).
- Differences in estimates between the two groups are not statistically significant for process outcomes in Table I.2 in Volume 1.

TABLE 82: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT FL-HS, FAHSC

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1100)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=139525)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=1100, N=141010)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=660, N=64037)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=660, N=64037)
Birth Outcomes						
Clinical gestational age (weeks)	38.2	38.4	**-0.3****	**-0.3****	**-0.3****	**-0.2***
Preterm birth rate	12.8%	10.6%	**2.2***	**2.3***	**2.5***	1.8
Very preterm birth rate	5.3%	3.3%	**2.0****	**2.1****	**1.7***	**1.4^**
Birthweight (grams)	3,114.0	3,175.9	**-61.9****	**-62.8****	**-52.1***	-29.3
Low birthweight rate	13.8%	10.2%	**3.6****	**3.5****	**3.1***	**2.2^**
Very low birthweight rate	2.8%	1.6%	**1.2***	**1.4****	**1.1^**	1.0
Rate of Apgar score greater than or equal to 7	95.8%	97.1%	**-1.3***	**-1.4***	-0.3	0.1
Process Outcomes						
C-section rate	35.5%	33.8%	1.7	0.6	2.4	1.3
VBAC rate[1]	5.0%	4.9%	0.1	0.1	-0.2	-0.2
Weekend delivery rate	20.9%	19.7%	1.2	1.3	1.9	2.5

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 140 Strong Start women and 19035 comparison group women.

Similar results are found for each of these measures when the out-of-county comparison group is employed (alternative specification #1) and when the sample is limited to the claims sample (alternative specification #2). However, most differences are smaller in magnitude and estimated with less precision after adding diagnoses controls from the claims data to the 2014-2015 sample (alternative specification #3). This suggests that the association between Strong Start and worse health outcomes is in part driven by differences in health status between Strong Start enrollees and women in the comparison group. That is, Strong Start women are more likely to be high risk due to factors that cannot be completely controlled for in this evaluation's propensity-score modeling.

Table 83 reports the cost and utilization findings for this awardee. Consistent with the association between Strong Start and worse health outcomes, we find that Strong Start is associated with higher levels of expenditure and utilization:

- Strong Start, relative to the comparison group, is associated with $388 higher expenditures in the eight months prior to the delivery month ($4,418vs. $4,030).
- Strong Start is also associated with $1,389 higher delivery expenditures ($10,922 versus $9,533) and $2,232 higher delivery and post-delivery expenditures ($16,532 versus $14,300).

- Consistent with the expenditure findings, we also find that Strong Start, relative to the comparison group, is positively associated with many of the utilization outcomes in the delivery and post-delivery period. But, many of these associations are only marginally significant (p-value<0.10).
- Infants born to women in Strong Start spent 1.85 days in the NICU compared to 1.27 NICU days for infants of women in the comparison group. This difference is only marginally significant (p-value<0.1).
- Women in Strong Start had 0.11 more ED visits and 0.02 more hospitalizations in the 11 months after the delivery month than women in the comparison group. Both differences are only marginally significant (p-value<0.1).
- Infants born to women in Strong Start had 0.20 more ED visits after deliver than infants of women in the comparison group (1.30 versus 1.10 visits).
- Similar results are found for each of these measures when the out-of-county comparison group is employed (alternative specification #1)

TABLE 83: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT FL-HS

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=660)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=64037)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=660, N=64842)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$4,418	$4,030	**$388****	**$393****
Total expenditures during delivery period	$10,922	$9,533	**$1,389***	**$1,248^**
Total delivery and postdelivery expenditures[2]	$16,532	$14,300	**$2,232***	**$2,083***
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	2.58	2.51	0.07	0.13
Number of hospitalizations 8 months before delivery month	0.08	0.09	-0.01	-0.01
Number of days in NICU	1.85	1.27	**0.58^**	**0.54^**
Number of ED visits for mother 11 months after delivery month	0.96	0.85	**0.11^**	**0.12^**
Number of hospitalizations for mother 11 months after delivery month	0.08	0.06	**0.02^**	**0.02^**
Number of ED visits for infant in the first year of life	1.30	1.10	**0.20****	**0.22****
Number of hospitalizations for infant in the first year of life	0.13	0.11	0.01	0.01

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Florida Association of Healthy Start Coalitions (FAHSC) implemented the Maternity Care Home model under Strong Start by embedding Maternal Health Specialists (MHSs) in different clinical settings and communities of varying sizes and resources. MHSs had either nursing or social work backgrounds and, through a series of in-person and telephonic encounters, provided pregnancy and chronic illness education, guidance in healthy decision-making, assistance with doctor-patient communication, care coordination, and emotional and logistical supports and referrals. Many of the characteristics possessed by women enrolled at FAHSC put them at high risk for poor birth outcomes, including low educational attainment, high rates of smoking, high rates of food insecurity, and high rates of women with a prior preterm birth. In addition, many women had psychosocial risk factors, including high rates of depression and anxiety, and an especially large share of participants who reported having experienced intimate partner violence (35.1 percent for FAHSC vs. 19.4 percent for Strong Start overall). Impact analysis found infants of women enrolled in Strong Start at FAHSC had worse birth outcomes (lower average gestational age, higher rates of preterm and very preterm birth, lower average birthweight, higher rates of low birthweight and very low birthweight, and worse Apgar scores) than infants of women in the comparison group. Strong Start women and their infants had higher average prenatal care expenditures, expenditures during the delivery period, and delivery and postdelivery expenditures than women in the comparison group and their infants. Strong Start women had more ED visits and hospitalizations after the delivery month than women in the comparison group. These findings are marginally significant (p-value<0.10). Infants born to women enrolled in Strong Start have more NICU days (marginally significant; p-value<0.10) and ED visits after delivery than infants born to women in the comparison group. The association between Strong Start and worse birth outcomes is consistent with the high-risk characteristics of participants (described above) that could not be controlled for in the impact analysis.

Grady Memorial Hospital Corporation

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

709	• Grady Health System, the dominant maternity care provider for Medicaid beneficiaries in Atlanta, convened the *Georgia Partnership for Value Added Group Prenatal Care* to implement Strong Start	• Four sites, three in
		• Atlanta, GA and the surrounding suburbs and one in rural area 200 miles south of Atlanta
		  • Sites were a health system, a rural county health department, and two private practices
			• Intervention categorized as "high intensity" for implementing the *CenteringPregnancy* curriculum while also coordinating with the Center for Black Women's Wellness for additional support services
			• *CenteringPregnancy* (Centering) model already provided by each site prior to Strong Start
			• Strong Start added:
			  • Administrative support, including a project coordinator at each site, a Project Director at Grady, and data and evaluation management
			  • Centering co-facilitation at one site by a community partner, The Center for Black Women's Wellness (CBWW); co-facilitators with social work qualifications at other sites

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Strong community partnerships and marketing
- Recruitment training for all staff, including standard prenatal care providers and front desk staff
- Solidified organizational commitment to the existing Centering program and its expansion

CHALLENGES

- Data collection, paperwork and coordination among sites
- Lack of start-up time
- Patient perception that care offered at the health department or by midwives/Centering was substandard (compared to individual care provided by an obstetrician) hindered recruitment and enrollment
- Connecting women with family planning services postpartum and resultant repeat pregnancies in a short time interval

CONTINUING PRIOR ENHANCED MODEL WITHOUT STRONG START ADDITIONS

- *CenteringPregnancy* continued at three sites but program administration, co-facilitation relationships, and data collection were not sustained

KEY FINDINGS: PARTICIPANT-LEVEL DATA[28]

PARTICIPANT-LEVEL DATA QUALITY

- 3.4% rate of missing intake forms; 1.0% rate of missing exit forms
- 3.3% rate of item nonresponse on intake forms; 17.3% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 25.5% of women were teens (under age 20); 3.4% were 35 years or older
- 88.8% of women were black; 4.3% were Hispanic; 4.3% were white
- 12.4% of women were married; 31.0% were living with a partner; 23.5% were not in a relationship
- 15.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 26.4%: C-section rate among women with a delivery
- 9.3%: preterm birth rate among women with a live birth
- 9.5%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Summary impact results not provided here because of concerns about the quality of the available data
- See Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings

[28] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Grady Health System (Grady), the dominant maternity care provider for Medicaid beneficiaries in Atlanta, convened the Georgia Partnership for Value Added Group Prenatal Care, consisting of four Centering Pregnancy providers who serve low-income women in Georgia: Grady Health System; Dougherty County Health Department in Albany, Georgia (rural region 200 miles south of Atlanta); Southside Medical Center in Riverdale (a suburb of Atlanta); and Providence Women's Health Care (3 locations north of Atlanta).

Under its pre-Strong Start prenatal care model, all four sites offered the *CenteringPregnancy* (Centering) model of Group Prenatal Care as either an option, or as the sole means of prenatal care provided at the site.[29] All four sites' approach to Centering is consistent with that of the Centering Healthcare Institute (CHI)-approved methods, including the essential elements of Centering.[30]

> "When I started, I didn't know what a midwife was, so I chose a doctor. But then [the midwife] told me it was a group and fun, so I decided to do it."
>
> *- Strong Start participant*

Grady offered two options to women seeking prenatal care—group prenatal visits with midwives or non-group care with a Morehouse or Emory medical residency clinic. Women with low-risk pregnancies and who were undecided about the type of care to choose were generally counseled towards group care/care by midwives during their initial intake assessment (performed by a Certified Nurse Midwife [CNM]). Women choosing group prenatal care were randomly assigned to either the Morehouse or Emory midwife service unless they expressed a preference. Two co-facilitators led group prenatal care sessions; one was a clinician (either a CNM or a Family Nurse Practitioner) and the other a medical assistant or licensed social worker. All obstetric (OB) care at Grady was provided on a single floor in the medical center, including Centering, Ultrasound, a specialized emergency department (ED) and specialty OB services. Grady is a Baby Friendly hospital,[31] providing a full range of support for mothers breastfeeding their infants.

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[29] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

[30] At the time Strong Start was implemented there were 13 essential elements of Centering: (1) health assessments occur within the group space; (2) participants are included in self-care activities; (3) a facilitative leadership style is used; (4) the group is conducted in a circle; (4) each session has an overall plan; (5) each session has an overall plan; (6) attention is given to the core content, though emphasis may vary; (7) there is stability of group leadership; (8) group conduct honors the contribution of each member; (9) the composition of the group is stable, not rigid; (10) group size is optimal to promote the process; (11) involvement of support people is optional; (12) opportunity for socializing within the group is provided; and, (13) there is ongoing evaluation of outcomes. https://www.centeringhealthcare.org/

[31] The Baby Friendly Birthing Initiative recognizes and awards birthing facilities that successfully implement the Ten Steps to Successful Breastfeeding, which include: 1. Have a written breastfeeding policy 2. Train all health care staff in the skills necessary to implement this policy. 3. Inform all pregnant women about the benefits and management of breastfeeding. 4. Help mothers initiate breastfeeding within one hour of birth. 5. Show mothers how to breastfeed and how to maintain lactation, even if they are

Dougherty County Health Department (Dougherty) used Centering as its only model of prenatal care. At 36 weeks, women were transferred to the care of a private OB with delivery privileges at Phoebe Putnam Hospital in Albany, though participants sometimes chose to continue with Centering sessions as well. The two private OB clinics (Southside Medical Center and Providence Women's Health Care) offered standard prenatal care and had some prior experience with Centering, but wanted to build capacity and further measure the impact of their Group Prenatal Care programs.

At Grady, Southside and Providence, Centering groups met for 10 sessions over the course of a participant's pregnancy—a schedule that had been in use since Group Prenatal Care was established. Dougherty, on the other hand, initially offered nine sessions rather than ten, though as of July 2014 this site also began offering a tenth, postpartum session (differing from the CHI approach of 10 prenatal visits).

DESCRIPTION OF ENHANCED STRONG START SERVICES

With the *CenteringPregnancy* model already established at each site, Strong Start funded support and expansion (rather than initiation) of Group Prenatal Care. Specifically, Strong Start funded new administrative staff to support sites' existing Centering programs, additional co-facilitators with social work backgrounds, the involvement of a community partner at the Grady site, and data management and evaluation.

> "At the doctor's office you sit and wait and wait and wait. At Centering you go in and are learning right away."
>
> *- Strong Start participant*

New staff funded under Strong Start included a project coordinator at each site and a project director at Grady. In addition to the new staff, the Strong Start funding expanded the number of providers who are trained in Centering and increased data analysis and reporting. Under the project director's leadership, awardee staff at Grady frequently communicated with other site staff through bimonthly conference calls and semi-annual, cross-site learning sessions in Macon (approximately halfway between Atlanta and Albany). In addition, the project director traveled regularly between sites, providing guidance and support. Frequent communication allowed sites to share ideas and learn from each other as they added their respective Strong Start enhanced services to their existing group prenatal care programs.

A community partner, The Center for Black Women's Wellness (CBWW) in the southwest part of Atlanta, assisted in Strong Start recruitment among pregnant African American women who participate in health or social service programs at CBWW. Strong Start funded a group co-facilitator from CBWW, a family support worker with CHI training, to attend the Centering sessions at Grady with the referred clients.

A lead evaluator and a data manager at Morehouse School of Medicine led Strong Start data collection efforts and provided data feedback to each site. Their positions were co-funded by another

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separated from their infants. 6. Give infants no food or drink other than breast-milk, unless medically indicated. 7. Practice rooming in - allow mothers and infants to remain together 24 hours a day. 8. Encourage breastfeeding on demand. 9. Give no pacifiers or artificial nipples to breastfeeding infants. 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center. https://www.babyfriendlyusa.org/about-us/10-steps-and-international-code

active community partner, the United Way. The United Way has served as a long-time promoter of *CenteringPregnancy* and supported the evaluation as a means to assess the model for potential ongoing support (i.e., to expand the model to more sites and a broader population) and to examine the impact of variations in the manner and context in which Centering Pregnancy was implemented. In addition to funding Strong Start evaluation activities, the United Way also provided leadership in the Strong Start application process and supported CHI training for CNMs.

OUTREACH AND ENROLLMENT

The outreach and enrollment process for Strong Start was not separate from the Centering outreach and enrollment that had been conducted prior to Strong Start (which was in-reach to their regular population). All sites referred to their program as "Centering" rather than making a distinction or using the name "Strong Start." However, all sites followed the Strong Start enrollment requirements that women were enrolled in Medicaid, signed a consent form, and completed the evaluation forms.

The Centering/Strong Start enrollment processes differed slightly by site. Grady used an "opt-in" approach, with a choice between standard or group prenatal care. However, intake staff and physicians strongly encouraged Centering for low-risk women. The enrollment process began with a pre-screening by a clerk to identify women less than 20 weeks pregnant and generally low-risk.[32] Patients meeting these criteria then met with a CNM for the full intake, which was adapted to include the Strong Start Intake criteria, and, if applicable based on risk level, offered their choice of Centering or standard prenatal care. Risk acceptance varied by medical school. At the Emory pregnancy clinic, women with high blood pressure or gestational diabetes were not offered Centering. Morehouse clinic, on the other hand, allowed women with these risk factors to participate in Centering while also attending the high-risk clinic. Key informants stated that approximately 80 percent of eligible patients opted-in to the Centering program at Grady. The most common reasons that patients chose not to participate included preference for one-on-one care, the timing of the group meetings was not convenient, or lack of child care. To overcome a language barrier, a Spanish-language group began in August 2014.

At Dougherty, most Centering patients came to the clinic for a pregnancy test. Additional women were referred from the nearby university health center. As Centering was the only model of prenatal care provided at this site, an "opt-in" or "opt-out" approach was not needed. Dougherty providers informed prenatal patients that if they did not want to participate in a Centering group, they could choose to go to the local Federally Qualified Health Center or try to get care with an OB, though area OBs generally limited their number of Medicaid patients. Key informants shared that most Dougherty patients chose to participate in group prenatal care (rather than seeking care elsewhere) and that attendance was steady. Dougherty furnished the Centering room with leather chairs and other decorative features to mirror the look of a professional medical office. This was done to mitigate concerns that the health department offered "lesser care" than a private practice and to "set the standard for what women should expect from a health department." Centering staff found that women who declined participation in Centering or dropped out often did so because their mothers or grandmothers told them that "they needed to see a real doctor." Dougherty staff always responded to

[32] Grady uses the language "generally low risk" to acknowledge that many of the prenatal patients who they consider low risk would be considered high risk in other systems whose patient population does not have the same prevalence of poverty and other social risk factors (low education levels, housing instability, and chronic unemployment).

these concerns by inviting family members to a group session and observed increased participation as a result.

Both Providence and Southside used an "opt-in" approach, as well. Key informants reported the practices' nurse would meet with the Strong Start program coordinator to evaluate which patients qualify for Centering based on the screening information. At the time of the Year 1 evaluation interviews, key informants reported that both sites offered Centering to all patients, regardless of Medicaid (and Strong Start) eligibility and pregnancy risk status.[33]

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Since the sites were providing group prenatal care prior to Strong Start through long-established Centering programs, the awardee had prior data showing positive birth outcomes, including consistently lower rates of preterm birth and low birthweight among Centering patients in comparison to overall hospital deliveries (e.g., 5 percent preterm birth rate compared to 14 percent for overall hospital deliveries).[34] As the enhanced Strong Start services supported and expanded the Centering program rather than initiated new prenatal care services for pregnant women, key informants perceived that Strong Start indirectly impacted pregnancy outcomes because the award gave them the opportunity to actively recruit into the Centering model of care - doubling their pre-Strong Start enrollment numbers. Key informants believed that Strong Start and the Centering model of care most influenced breastfeeding, family planning rates and treatment for depression.

Key informants uniformly perceived that breastfeeding was significantly influenced by Centering generally and Strong Start in particular. One key informant noted, "Our [breastfeeding] rate is one thing I can visibly see that I didn't see before Centering. [Women are] excited about it, more knowledgeable about benefits." A lactation consultant attended the Centering session dedicated to breastfeeding, providing education and support and answering questions. In addition, peer-to-peer interaction during the session allowed women to share both fears and positive experiences, "expelling a lot of myths." Key informants believed this education and peer support helped encourage some women to try breastfeeding even if they had not previously considered the option. Support and promotion continued post-delivery, since both Grady and Phoebe Putney Memorial Hospital (Dougherty County) are Baby-Friendly hospitals and Centering coordinators visit with women after delivery to "encourage and keep them focused" as well as conduct follow-up phone calls at one, three and six weeks postpartum.

> "My mother said that [breastfeeding] is 'common.' Then she came to the group and learned that it's helpful to the baby."
>
> *- Strong Start participant*

All sites provided contraceptive education during group sessions, and key informants reported that women received birth control counseling both during pregnancy and after delivery. Dougherty participants completed a Reproductive Life Plan to ensure a method is chosen prior to delivery, and as a result, a key informant reported confidence "that the woman knows what she wants to do and has a plan." Six weeks after delivery, Dougherty held a "mini-reunion" session to follow up with participants and ensure they made an appointment with the

[33] In the Year 4 interviews, key informants reported that only Medicaid enrollees were targeted for Centering at Providence. It is not clear whether this discrepancy is because the approach changed during the Strong Start grant.
[34] It is notable that differences in risk status between women enrolled in Centering and women delivering at the hospital in general may account for differences in preterm birth rates.

delivering provider to obtain their contraceptive method of choice. Staff then conducted follow-up phone calls at one, three and six months to determine whether women received or are continuing to receive birth control. Strong Start staff encourage women who lose Medicaid coverage after postpartum to follow up at the health department for continued family planning thereafter. At Grady Hospital, Strong Start staff met with women just after delivery to discuss family planning options. At the two main hospitals that serve Strong Start participants, women had the option of having a Long Acting Reversible Contraception (LARC) placed immediately after delivery or at their post-partum visit – a service that was fully covered by Medicaid.

Key informants stated the intake screening identified high rates of participants with depressive symptoms that were predominantly situational (i.e., related to socioeconomic disparities and being young, single mothers). The Centering model addressed depression by normalizing the experiences that women were facing and providing a continuous, trusted avenue for seeking help. Informants noted that interacting with the same providers and facilitators at each session created a bond that allowed women to feel more comfortable reaching out for help. In contrast, women in Grady's standard prenatal care might see any one of 32 doctors at each visit, or one of seven midwives. At Dougherty, the social worker funded by Strong Start could "dig deeper" and engage women regarding their depressive symptoms. Across all sites, women were referred to mental health providers for situations that were identified as more serious (prior access to community mental health resources is unknown). The Dougherty social worker assisted women with making appointments and followed up to ensure the visit occurred. Key informants also highlighted the important role played by the Centering co-facilitator from CBWW. Most of the midwives as Grady are white, but the majority of participants were African American. Key informants observed that in some cases, participants related to and engaged more with the co-facilitator who was an African American woman from their community.

Key informants identified a variety of ways in which Strong Start and Centering may have reduced Medicaid costs, including fewer preterm and low birthweight babies and the associated Neonatal Intensive Care Unit (NICU) costs, fewer ED visits (because women are better educated on what constitutes a real emergency and alternate ways to access care), and fewer unintended second pregnancies and associated costs (related to better family planning).

STRONG START PARTICIPANT PERSPECTIVES

Focus group participants in Atlanta mostly chose Grady because it was where they and their family members had traditionally received care. Several participants discussed how they made the decision to participate in a Centering program as opposed to typical OB prenatal care.

> *The midwife gets to know YOU and the doctor just doesn't spend the time.*

Centering participants described how rapport between group members allowed them to talk openly about their concerns and to learn from each other's questions. Strong Start participants felt empowered and confident because of participating in their Centering group sessions.

> *To me, it's just helpful to hear about other women going through the same thing as you are.*

Almost every woman in the focus groups intended to breastfeed for at least six months, and all participants said they had discussed family planning methods in their Centering sessions. However, few had made a decision about which type of contraception, if any, they would use. Participants also reported referrals to psychosocial and other resources.

> *I had some things happen to me in the past and [the facilitator] helped schedule a time for me to talk with someone about it.*

PROGRAM STRENGTHS

Key informants attributed Grady's ability to recruit and enroll a larger population for their Centering programs under Strong Start to several strengths—community partnerships, solid marketing, and recruitment training for all staff, from standard prenatal care providers to front desk staff.

> "I learned that you need to love yourself, be confident, have good self-esteem, and everything's going to be okay."
>
> *- Strong Start participant*

Despite a long history, support for Centering at Grady had been uneven. The program was originally part of a five-year randomized control trial of the National Institutes of Health (NIH), which provided funding, interpreters and organized data collection. After the study funding ended, the program continued as the result of "nurse midwives pulling it together year after year," but interviewees reported that it was not "owned" or fully valued by the hospital. Key informants were proud that Strong Start triggered Grady to become more committed to the Centering program and take steps toward expansion, which they viewed as the key strength of the Strong Start program. In addition, they were proud of being able to reach and positively impact so many women through teamwork across organizations (e.g., community partners, providers, Grady, United Way) to achieve common goals.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The data collection, paperwork and coordination among sites were a consistent struggle that informants felt could have been better streamlined to prevent staff and patients from feeling overwhelmed. While project coordinators took over the administrative responsibilities of Centering that were previously carried out by the sites' clinicians and practice staff, these tasks required more time and attention under Strong Start grant requirements than the awardee originally anticipated. The project coordinator and Morehouse assumed data coding and data cleaning burdens, but Strong Start funding for evaluation staff was insufficient and needed to be partially provided by the United Way.

For patients too, the paperwork was an overwhelming burden, particularly for patients with mental health issues. The patients were given the forms at the beginning of the session, but many were still working through the paperwork well into the session, affecting the group dynamic. Grady addressed this challenge by making the co-facilitator responsible for ensuring forms were completed, but key informants felt that an electronic system (such as an iPad) would have made it less burdensome.

Even though Centering was in place prior to Strong Start, key informants reported that they needed more implementation time. They felt that the lack of start-up time would have been even more challenging had they been one of the sites newly implementing a Centering program.

Despite nearly doubling their enrollment in Centering under Strong Start, key informants reported that recruiting and enrolling women was an ongoing struggle. Many pregnant members of the community believed that the process of obtaining Medicaid coverage to receive prenatal care was too arduous (thus forgoing prenatal care entirely), or that care offered at the health department or by midwives/Centering was substandard compared to standard care provided by an OB. Through Strong Start, the sites worked to streamline processes to get women enrolled in Medicaid and into care, marketed to the local communities to combat the stigma of public health services, and worked with community providers and providers within the sites to promote the Centering model of care.

In addition, myriad challenges faced by their target population even after recruitment were difficult to overcome. The population was predominately African American women with very low incomes and low education levels, and barriers such as a culture of formula feeding; substance abuse (particularly marijuana use and its role as a coping mechanism for situational depression); and difficulty securing stable housing, good nutrition, family planning, and transportation were all common among Strong Start participants.

The exclusion of very high-risk patients from Strong Start Centering programs was a matter of disagreement among sites and informants. According to some key informants, women with conditions that could be classified as "high-risk but manageable" such as hypertension, obesity or gestational diabetes, could benefit from Centering group care just as much, if not more, than lower-risk patients. Patients who developed high-risk conditions were transferred to a specialty Maternal Fetal Medicine (MFM) provider at Grady. Generally, this meant the patient discontinued group prenatal care, but some Morehouse program patients continued to attend sessions and were monitored collaboratively by CNMs and the MFM. This approach was well-received by the patients.

> "I'm not using birth control. I don't believe in condoms because they break, and I just don't like taking drugs."
>
> *- Strong Start participant*

Despite having described family planning counseling and the development of a reproductive life plan as one of the most impactful outcomes of Strong Start/Centering, connecting women with family planning services postpartum was an ongoing challenge, and key informants reported a high number of repeat pregnancies in a short time interval. Dougherty attempted to meet the need for effective family planning through a 10th (postpartum) group session. Key informants at Grady noted they did not have a formal process for ensuring that patients had access to contraceptives after delivery. Focus group feedback indicated there was still some level of resistance to using contraception in any form and distrust regarding the safety of various methods of contraception that were discussed in the group prenatal care sessions. Key informants suggested that the successful use of true "peer" counselors, who were themselves breastfeeding, may be a model for birth control peer counseling.

SUSTAINABILITY

After the award period ended, Centering was continued or expanded at three of the four providers, including Grady, Dougherty, and Southside (Providence Women's Health Care discontinued Centering

in 2016). Other Strong Start enhancements, particularly the co-facilitation arrangement with the CBWW and data collection, were not sustained.

As previously described, the Centering Program at Grady has had a long, yet uneven, history that often relied on the dedication of the nurse midwives to ensure its survival. Key informants credited Strong Start as a catalyst to Grady leadership committing to fully support, sustain and expand the Centering program. A building renovation completed in Year 4 for Grady Women's Health Services provided the Centering program with two new Centering rooms. Grady was also providing funding for the purchase of CHI's *CenteringPregnancy* books and snacks for participants. Grady was further considering expanding Centering to two neighborhood health centers that serve a predominantly Hispanic population and would conduct Spanish-speaking Centering groups.

Southside was also expanding Centering to its satellite clinics, albeit on a less-defined, slower timeline than the Grady expansion. Dougherty continued its Centering program with alternative grant funding sources as they had prior to Strong Start (key informants did not specify funding sources). Centering did not continue at Providence Women's Health Care, as the low volume of Medicaid enrollees—the only patients targeted for Centering at this private clinic—stymied enrollment efforts and the ability to garner enough participants to form Centering groups.

While CBWW was no longer providing a co-facilitator for Centering sessions, Grady was looking for additional opportunities to keep the partnership in place. At the time of Year 4 interviews, the former co-facilitator was giving presentations for Grady's Centering groups to provide resources and information, and CBWW-hosted baby showers continued to provide an enrollment opportunity for the Centering program.

Key informants credit their success to having the right people involved in the planning and providing top-down support. A firm commitment to Centering (including budgetary commitment) was critical to the program's success beyond the term of the Strong Start grant.

PARTICIPANT-LEVEL PROCESS EVALUATION

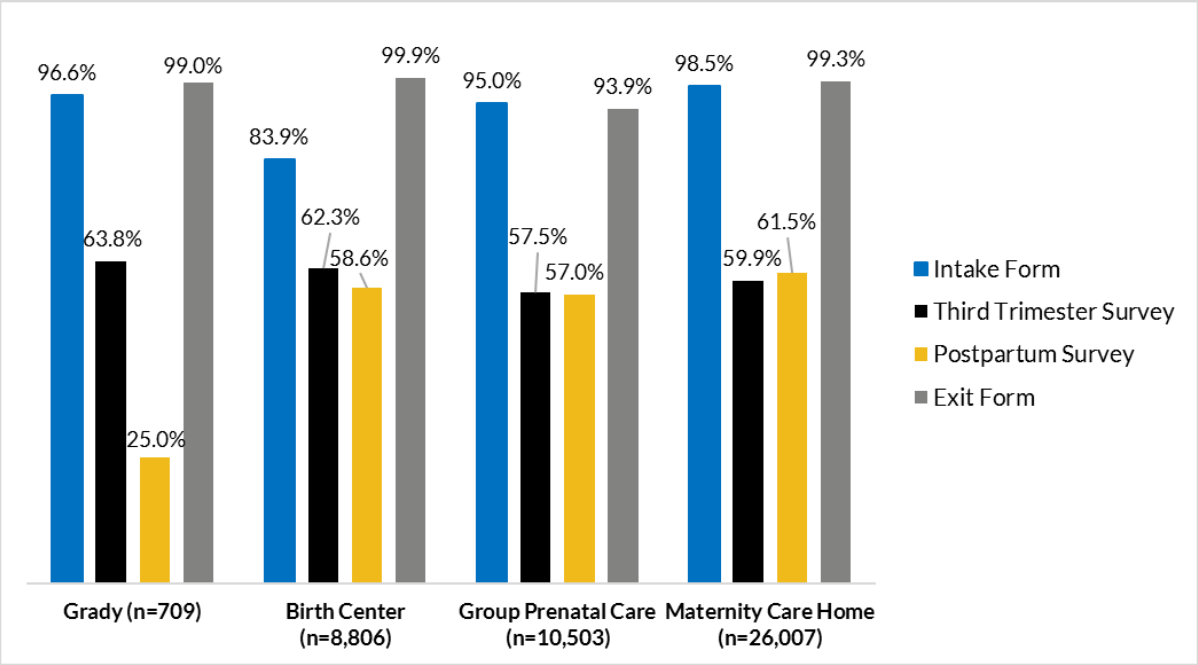
The tables and figures presented in this section summarize findings from the PLPE dataset for Grady, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Grady to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).

- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 6 Grady participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 6: FORM SUBMISSION RATES, GRADY



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,121
- Study IDs represented: 709 (suggests that PLPE data are missing for 412 participants—nearly 37 percent; see information on program report data in Appendix F in Volume 1). Grady has an especially high level of misalignment between the PLPE data submitted and enrollment data reported report to CMMI.
- Grady reported that, early in the project, forms were not being used correctly (e.g., Study IDs were not being correctly assigned to individual patients), and the information collected on those forms was not usable.

HOW FORMS WERE ADMINISTERED:

- Intake Form: In most cases, participants completed the surveys on their own during group sessions. When patients asked why there were so many questions, providers tried to explain that it helped to know risk factors to show that Centering helped "healthy birth outcomes."

- Third Trimester Surveys were also completed during group care sessions. All surveys were reviewed by staff after the session; they would attempt to follow up with patients at the next session to make corrections and complete skipped questions.
- In cases when participants did not return for a postpartum visit, the staff reported that they tried to reach the participant and administer the survey over the phone. Completed surveys were also reviewed by the awardee before submission to the evaluation team.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee said that some sites had administrative changes during the project which resulted in incomplete and missing forms. For example, at the beginning of the project, a site coordinator was not collecting mother or infant data for the crosswalk. The awardee learned about this issue when the site coordinator left her position. They attempted to reconcile the missing data in the summer of 2015, but the numbers were permanently off.

MISSING FORMS:

- Grady's Quarter 3 2016 forms submission was lost in the mail. The awardee attempted to locate copies of surveys and Exit forms, or recomplete Exit forms, and resubmit them.
- Intake Form: 3.4 percent of Study IDs were missing Intakes, likely related to data lost early on.
- Third Trimester or Postpartum Surveys: About 37 percent of Study IDs were missing the Third Trimester Survey and 75 percent are missing the Postpartum Survey. Some patients were lost to follow up which likely accounts for most of the missing forms.
- Exit Form: 1.0 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake: The awardee said that participants questioned why the provider wanted to know so much information, noting that their population can be "distrusting of others" and object to personal questions. The awardee said that questions related to substance use and intimate partner violence may have been skipped because patients feared legal action, and that if patients felt that one question in a group of questions was sensitive, they often skipped the entire group. The awardee believes that the length of the survey was also a factor.
- Exit: Grady was missing BMI for 31.3 percent of participants. The awardee was also missing information on the outcome of women's Strong Start pregnancy for 15.8 percent of participants. [35]

[35] Among participants with missing data on pregnancy outcome, 6.3% were missing because they did not have an exit form, 55.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 38.7% were missing for other reasons.

MAIN FINDINGS:

The following tables summarize the characteristics and outcomes of Grady participants. Some highlights include:

- The majority of Grady participants (71.0 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 17.8 percent of participants were 18 or 19 years old.
- Most Grady participants were black (88.8 percent), followed by low rates of Hispanic (4.3 percent) and white (4.3 percent) participants.
- Only 12.4 percent were married, while 31.0 percent were living with their partner, 33.1 percent were in a relationship but not living together, and 23.5 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 13.8 percent of Grady participants reported having experienced intimate partner violence, 15.1 percent of participants with a prior birth had a prior preterm birth, and 79.7 percent of participants had not planned their Strong Start pregnancy.

TABLE 84: DEMOGRAPHICS, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	4.7	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**670**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	7.8	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	17.8	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	71.0	81.7	72.9	75.1	75.8
35 Years and Older	%	3.4	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	3.6	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**678**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	4.3	25.4	37.1	28.0	29.7
Non-Hispanic White	%	4.3	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	88.8	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	2.7	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	9.1	19.6	12.8	11.3	13.3
Not in Universe	%	86.8	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**29**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	41.4	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	3.4	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**679**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.6	1.2	1.8	1.5	1.5

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Employment and School Status at Intake						
Missing Data	%	5.8	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**662**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	33.7	36.6	30.8	35.3	34.5
In School, Not Employed	%	17.1	8.7	12.6	11.9	11.5
Employed and in School	%	8.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	40.6	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	7.4	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**651**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	25.5	15.4	27.8	29.1	26.4
High School Graduate or GED	%	61.9	57.5	58.3	57.9	57.9
Associate's Degree	%	5.5	8.2	5.2	4.6	5.4
Bachelor's Degree	%	4.3	14.5	4.5	3.7	5.8
Other College Degree	%	2.8	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	6.3	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**659**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	12.4	42.1	20.4	20.8	24.5
Living with a Partner	%	31.0	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	33.1	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	23.5	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 85: PSYCHOSOCIAL, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	4.0	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**675**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	45.3	51.8	51.8	59.7	56.5
No	%	50.1	44.6	42.3	37.4	39.8
Unsure	%	4.6	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	4.0	17.0	6.6	3.4	6.8
Not in Universe	%	52.5	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**306**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	65.0	61.1	72.6	79.9	75.3
Other	%	26.5	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	8.5	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	12.9	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**612**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	5.7	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	11.8	20.4	19.2	10.1	14.3

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**620**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	23.1	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	4.0	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**675**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	64.7	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	14.1	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**604**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	36.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	6.3	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**659**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	51.9	67.9	59.0	65.5	64.5
Mild	%	27.8	21.4	23.8	20.2	21.2
Moderate	%	14.0	6.8	10.3	8.5	8.6
Severe	%	4.7	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.7	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	4.8	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**669**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	13.8	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	5.5	18.3	16.3	7.7	11.8
Not in Universe	%	5.4	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**626**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.6	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	3.4	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**679**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	59.8	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	28.1	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	12.1	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	62.3	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	18.3	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	24.9	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	21.2	24.6	17.1	15.4	17.2
Childcare Challenges	%	8.1	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	4.4	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 86: PREGNANCY HISTORY AND INTENTIONS, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	1.1	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**695**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	59.4	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	40.5	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	22.5	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**260**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	31.2	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	22.3	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**261**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	26.8	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	32.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**193**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	37.0	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**158**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	15.8	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	39.3	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**142**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	-	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	40.5	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**133**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	40.5	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**133**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	40.4	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**134**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 87: PRIOR BIRTH OUTCOMES, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	1.4	1.7	1.5	0.6	1.0
Not in Universe	%	41.1	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**404**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	69.1	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	10.2	23.5	18.9	15.2	17.7
Not in Universe	%	58.0	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**223**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	24.7	34.6	24.3	27.1	28.1
>= 18 months	%	75.3	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	1.1	0.1	2.5	1.4	1.4
Not in Universe	%	60.2	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**272**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	15.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	15.9	1.3	20.8	13.1	12.6
Not in Universe	%	59.6	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**172**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	14.0	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 88: PRE-PREGNANCY MEDICAL CONDITIONS, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	6.3	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**659**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	20.3	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	68.7	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	4.6	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	6.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	24.8	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**529**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	38.2	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	24.2	0.4	22.4	13.7	13.1

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**533**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	46.0	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	31.3	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**483**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	5.0	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	34.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	26.1	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	25.5	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	9.3	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 89: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	27.0	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**513**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	11.9	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	26.9	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**514**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	17.7	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	27.0	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**513**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	3.5	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	27.0	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**513**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	27.2	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**512**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	27.0	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**513**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	26.6	0.6	32.8	22.3	20.5

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**516**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	26.9	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**514**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	28.4	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 90: TREATMENTS DURING PREGNANCY, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	37.6	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**439**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	3.7	0.8	10.0	5.1	5.4
Not in Universe	%	93.2	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**22**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	37.7	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**438**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	37.6	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**439**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 91: PRENATAL CARE, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	20.3	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**560**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	-	4.7	29.5	64.5	43.3

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Licensed Professional Midwife[36]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	18.8	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	81.3	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**696**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	80.9	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	4.5	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**696**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	81.3	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	5.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	25.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**526**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	20.7	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.6	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	26.7	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**515**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	26.7	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**515**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	96.7	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**23**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	96.7	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**23**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5

[36] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Self-Care, Not Centering						
Missing Data	%	96.9	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**22**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	96.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**24**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	96.9	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**22**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	4.5	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	1.0	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	26.5	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**517**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	-	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	-	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 92: DELIVERY INFORMATION, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	20.9	1.4	25.3	23.3	19.5
Not in Universe	%	19.8	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**417**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	48.4	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	2.0	0.3	7.8	2.9	3.5
Not in Universe	%	70.3	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**195**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	96.4	56.1	89.9	90.7	84.4

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	10.5	4.6	11.5	7.3	7.7
Not in Universe	%	15.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**521**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.8	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	11.0	0.7	12.0	5.6	6.1
Not in Universe	%	15.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**518**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	73.6	87.1	70.1	69.5	73.1
C-Section	%	26.4	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	5.1	0.4	8.7	2.3	3.4
Not in Universe	%	52.5	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**298**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	74.2	83.3	72.9	74.7	75.9
C-Section	%	25.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	2.8	4.7	12.5	6.3	7.4
Not in Universe	%	79.5	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**124**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	25.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Not in Universe	%	92.0	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**49**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	22.4	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 93: BIRTH OUTCOMES, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	15.8	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**592**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.1	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	18.1	0.7	15.4	5.8	7.0
Not in Universe	%	16.4	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**461**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.0	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	6.3	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	90.2	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	13.4	2.1	14.3	8.0	8.3
Not in Universe	%	16.4	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**494**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	7.9	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	87.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	2.6	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 94: SATISFACTION, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	75.7	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**171**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	4.1	3.3	4.4	7.8	6.2
Very Satisfied	%	31.0	25.6	35.6	46.1	39.8
Extremely Satisfied	%	63.7	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	75.8	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**170**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	15.9	10.4	11.6	12.8	12.1
Very Satisfied	%	36.5	29.1	42.6	46.6	42.1
Extremely Satisfied	%	41.2	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 95: BREASTFEEDING, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	38.7	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**431**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	47.6	80.4	47.5	40.5	50.3
Formula Feed Only	%	5.1	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	38.3	10.8	31.9	32.5	27.8
I Haven't Decided	%	9.0	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	76.0	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**169**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	88.2	91.5	76.6	72.6	77.3
No	%	10.7	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 96: FAMILY PLANNING, GRADY

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	76.2	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**167**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	90.4	77.0	77.5	82.2	80.3
No	%	7.8	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	76.4	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**166**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	87.3	84.2	70.8	74.0	75.5
No	%	10.8	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	75.4	41.5	42.9	38.6	40.2
Not in Universe	%	4.0	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**145**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	-	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	13.1	2.8	11.4	10.9	9.2
LARC - IUD	%	19.3	10.8	11.9	12.3	11.9
Pills	%	-	8.6	11.9	13.0	11.8
Injection	%	15.9	5.9	16.2	20.2	16.2
Condoms	%	22.8	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	Grady (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	-	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Georgia

Initial Contact: In January 2015, the evaluation team contacted the Georgia Department of Public Health (DPH) and was directed to contact the state's Medicaid agency, the Department of Community Health (DCH), to obtain Medicaid data first before placing a request for birth certificate data. Because of significant turnover at DCH, it took several months to initiate contract. In May of 2015, the evaluation team introduced state officials at DCH to the Strong Start evaluation.

Data Acquisition Process: State officials were receptive to supporting the evaluation and requested further detail regarding the method for identifying which Medicaid enrolled women would be sampled from their files. The team was directed back to DPH as a first step to identify women based on the birth certificate data pull. DPH then directed the team submit a data request application. The Georgia DPH provided IRB and data request approval in July 2016. After approval, the data request needed some slight modifications, but those modifications were completed and approved. The agency provided 2014 and 2015 birth certificate data in March 2017. The 2016 birth certificate files became available in July 2017, and a request to receive those data was submitted in August 2017. Birth certificate data were received September 2017. Additional modifications to the Georgia Medicaid data were needed, and updates were not provided until April 2018.

Final Result: Due to this lengthy delay in receiving updated Medicaid data, Urban dropped Medicaid claims from its request in January 2018. Final linked files were received in April 2018, which was too late for inclusion in the final Impact Analysis. Georgia results do appear in this Volume 2 appendix chapter. However, concerns about the quality of the link between Strong Start participants and birth certificates in Georgia precluded the use data from these states in the impact analysis in Volume 1.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES

The Grady Memorial Hospital Corporation awardee, which implemented the Group Prenatal Care model, delivered care at four sites included in the impact analysis: Grady Health System, Dougherty County Health Department, Southside Medical Center, and Providence Women's Health Care. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Grady

Health System site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 97).

As described in the Impact Analysis chapter of Volume 1, low take-up rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the take-up of group prenatal care was low (less than 75 percent) were of particular concern. Although the Grady Health System used an opt-in approach to enrollment, they achieved a take-up rate above 75 percent. Selection bias concerns do not apply to Grady, however, concerns about the quality of the link between Strong Start participants and birth certificates precluded the use data from these states in the impact analysis in Volume 1.

TABLE 97: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR GRADY MEMORIAL

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Grady Memorial Hospital Corporation			
Grady Health System	No	No	No
Dougherty County Health Department	No	No	No
Southside Medical Center	No	Yes	No
Providence Women's Health Care	No	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.
- We also present estimates of the impact of Strong Start on the following process outcomes:
- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[37]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. As we did not receive claims data from Georgia, expenditure and utilization outcome findings are not reported for this awardee, nor are results from alternative specifications that include claims variable controls. We also did not estimate models where we draw the comparison group outside the county (alternative specification #1) for Grady Memorial because the comparison group could be pulled from the same counties where Strong Start participants reside.

[37] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

Table 98 reports the birth and process outcome findings for the Grady Memorial awardee. We do not observe any significant differences in outcomes between women enrolled in Strong Start at the Grady Memorial awardee and comparison group women.

TABLE 98: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT GRADY MEMORIAL

Outcomes	Main Model: 2014 - 2016, Strong Start (N=500)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=54344)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.5	0.0	N/A	N/A	N/A
Preterm birth rate	9.0%	9.4%	-0.4	N/A	N/A	N/A
Very preterm birth rate	3.0%	2.6%	0.4	N/A	N/A	N/A
Birthweight (grams)	3,091.0	3,089.4	1.6	N/A	N/A	N/A
Low birthweight rate	9.8%	11.0%	-1.2	N/A	N/A	N/A
Very low birthweight rate	1.4%	1.3%	0.1	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	97.6%	97.2%	0.4	N/A	N/A	N/A
Process Outcomes						
C-section rate	27.2%	27.5%	-0.3	N/A	N/A	N/A
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.0%	23.5%	1.5	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 41 Strong Start women and 6351 comparison group women.

Site-specific estimates for the Grady Health System (Table 99) are consistent with the Grady Memorial awardee-level analysis. Again, we do not observe any significant differences in outcomes between women enrolled in Strong Start at the Grady Health System site and comparison group women.

TABLE 99: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT GRADY HEALTH SYSTEM (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=335)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=45068)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.7	0.0	N/A	N/A	N/A
Preterm birth rate	8.1%	8.1%	0.0	N/A	N/A	N/A
Very preterm birth rate	2.7%	2.0%	0.6	N/A	N/A	N/A
Birthweight (grams)	3,082.0	3,099.5	-17.5	N/A	N/A	N/A
Low birthweight rate	8.4%	9.9%	-1.5	N/A	N/A	N/A
Very low birthweight rate	1.2%	0.9%	0.3	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	98.5%	97.7%	0.8	N/A	N/A	N/A
Process Outcomes						
C-section rate	26.0%	24.7%	1.3	N/A	N/A	N/A
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	23.9%	22.8%	1.0	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 26 Strong Start women and 5251 comparison group women.

CROSS-CUTTING SUMMARY

The Grady Memorial Hospital Corporation implemented the Group Prenatal Care model under Strong Start. The majority of Grady participants were black women, and few participants reported being married. A high proportion of participants screened positive for depression, and connecting women with mental health services was a stated focus of the awardee. The awardee had implemented *CenteringPregnancy* model at each of its site prior to Strong Start and used Strong Start funding to recruit more women and enhance support services to participants, including coordinating with the Center for Black Women's Wellness at one site and adding co-facilitators with social work qualifications at three other sites. We also observed that, in addition to the social support provided through group sessions, all women received at least one care coordination encounter, which is an enhancement beyond the traditional *CenteringPregnancy* curriculum. We did not observe statistically significant differences in birth outcomes between women that participated in Strong Start and comparison group women. However, findings for Grady should not be interpreted as impacts of Strong Start because of concerns about the quality of the available data.

Harris County Hospital District

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,264	• County health care system including the city of Houston, Texas • Began offering *CenteringPregnancy* (Centering) in 2005 in addition to typical prenatal care; by 2014, eight of its health care centers were offering Centering	• 7 sites total • Six health centers in the Houston metropolitan area • A teen clinic associated with Baylor University's medical school	• Intervention categorized as "high intensity" for implementing the *CenteringPregnancy* curriculum while also providing case management services • Layered on top of the sites' existing Centering Healthcare Institute (CHI)-approved Centering model • Two Community Health Workers (CHWs) and three Social Workers (SWs) across the sites provided in-reach (to women coming to the clinics for prenatal care) and outreach to recruit eligible pregnant women, and counseling, education, and referrals during pregnancy and postpartum

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Bilingual CHWs established rapport, explained and promoted Centering, connected women to care and coverage
- SWs shared clinically-relevant information with providers and ensured that referrals and supportive services were provided
- Leadership and clinic providers recognized CHW capabilities, which "opened door" to increased integration of CHWs into obstetric (OB) care and chronic disease management

CHALLENGES

- Obtaining provider buy-in, staff transitions, balancing needs of medical residents to achieve requisite patient hours as enrollment in Centering increased
- Among participants: lack of childcare and transportation, low literacy
- Lack of space for private meetings with SWs

CONTINUING PRIOR ENHANCED MODEL WITHOUT STRONG START ADDITIONS

- CHWs and SWs eliminated because of lack of funding, ending dedicated patient in-reach and outreach to enroll patients in Centering
- CHWs for two new state programs, Family Planning Program and Health Texas Women,[38] will focus on contraceptive use but can also provide prenatal care information

KEY FINDINGS: PARTICIPANT-LEVEL DATA[39]

PARTICIPANT-LEVEL DATA QUALITY

- 4.0% rate of missing intake forms; 0.0% rate of missing exit forms
- 1.7% rate of item nonresponse on intake forms; 3.4% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 17.6% of women were teens (under age 20); 13.6% were 35 years or older
- 13.5% of women were black; 83.5% were Hispanic; 2.3% were white
- 29.1% of women were married; 35.8% were living with a partner; 17.0% were not in a relationship
- 12.7%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 22.6%: C-section rate among women with a delivery
- 8.5%: preterm birth rate among women with a live birth
- 5.5%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Impact analysis not conducted for Harris County Hospital District because we did not obtain birth certificate and Medicaid data for Texas

[38] The Family Planning Program and Health Texas Women are two new health programs launched in July 2016 by Texas Medicaid, offering health and family planning services to low-income women in the state. http://www.healthytexaswomen.org/

[39] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Harris Health System is the county health care system of Harris County, which consists of the city of Houston and the surrounding area. It is an integrated delivery system and the primary safety net provider serving the county's low-income population. The system includes 16 community health centers (none are FQHCs), six school-based clinics, a dental center and a dialysis center, mobile health units, a rehabilitation and specialty hospital and two full-service hospitals. Its health centers are designated as a Patient-Centered Medical Homes by the National Committee for Quality Assurance. The system provides virtually all types of medical care except elective plastic surgery, transplants and fertility assistance. It offers behavioral health care and a small outpatient substance abuse program. Harris Health System's Community Outreach Services Department offers Community Health Worker (CHW) continuing education classes, and places CHWs in many of its community sites.[40] Harris Health System also has a Medicaid health plan subsidiary, Community Health Choice, though the system's providers accept all types of insurance and also serve the uninsured.

Harris serves a largely Latina population (80 percent of births), predominantly immigrants. The majority (estimated 70 to 80 percent) of Harris Health System's pregnant patients receive maternity services under CHIP perinatal coverage, either because they are over the income threshold for Medicaid or do not qualify for Medicaid because of their immigration status. CHIP perinatal coverage does not cover complications from pregnancy or any other medical services for postpartum women beyond two postpartum visits (e.g., family planning is not covered).[41,42]

Harris Health System provides typical prenatal care, but in 2005 it also began offering the *CenteringPregnancy* ("Centering") model.[43] As of June 2014, eight of its health centers were using Centering, six of which participated in Strong Start—Acres Home Health Center, Aldine Health Center, Casa de Amigos Health Center, Gulfgate Health Center, Outpatient Center, and the Vallbona Health Center.[44] A seventh Strong Start site was Baylor Teen Clinic. The seven sites are served by one of two medical schools (either The University of Texas or Baylor University). Harris Health System's Centering

[40] Texas Law requires the Texas Department of State Health Services (DSHS) to establish and operate a training and certification program for persons who act as community health workers. Certification requirements include either the completion of an approved 160-hour competency-based Community Health Worker training program certified by DSHS, or at least 1000 cumulative hours of community health work services within the most recent six (6) years. http://www.dshs.texas.gov/mch/chw/Community-Health-Workers_Program.aspx

[41] CHIP Perinatal Coverage Provider Fact Sheet, Texas Health and Human Services Commission, https://hhs.texas.gov/services/health/medicaid-chip/provider-information/chip-perinatal-coverage/chip-perinatal-faqs

[42] Texas did not expand Medicaid for adults under the Affordable Care Act; Medicaid eligibility levels for non-pregnant women are stringent, at 20 percent of the Federal Poverty Level for parents of dependent children. Coverage is not available for childless adults. The Texas Women's Health Program provides limited funding for some family planning services in the state.

[43] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

[44] Two centers did not participate in Strong Start due to distance from Harris system hospitals or low volume. One of these health centers treats only pregnant patients with HIV and has a Centering group tailored to this population.

model follows the Centering Healthcare Institute (CHI) approach and the sites are all CHI-approved. Centering has strong support from Harris Health System's leadership, which recognizes both the health and financial benefits of the model, including retaining women in prenatal care and increasing the number of infants delivered at the system's hospitals.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Harris Health System used Strong Start to enhance the existing model of Centering, using CHWs and social workers (SWs) to recruit Medicaid and CHIP-eligible women into Centering and provide counseling, education, and referrals. As such, it was seamlessly integrated and "layered on top of" the system's existing Centering program. The ability to dedicate CHW and Social Worker (SW) staff to pregnant women was a great advantage to the crowded, busy clinics.

Strong Start in the Harris Health System generally operated with two CHWs and three SWs, who were assigned to different clinics and covered multiple sites.[45] They coordinated with nurse midwives who had primary responsibility for care management. The CHWs conducted outreach at community locations/events, but focused largely on "in-reach" to existing and new patients who presented at the health centers for pregnancy tests or prenatal care. CHWs provided as-needed assistance with Medicaid/CHIP applications and also worked with women to get access to the Harris Health System's financial assistance program (often referred to as the "gold card"), which provided postpartum health care and contraceptive coverage once Medicaid/CHIP coverage ended.

CHWs often attended the first Centering session to ensure that women knew the CHWs were available throughout pregnancy and postpartum. In addition to providing emotional support and practical advice, CHWs made reminder calls about group session appointments, especially early in each Centering group. CHWs often saw Strong Start patients in the waiting room before group sessions, engaged in conversation, and "popped their heads in" during a Centering session to ask if anyone had any particular needs. In addition, the CHWs usually attended the "baby shower" group (Session 8), at which they gave the women Strong Start-funded packets containing information and resources for mom/baby about the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and breastfeeding.

> "We had a social worker come in, and she could help us with whatever we may need—housing, food, things outside of medical care. If we need it, we can reach out to her and she would help us with that."
>
> *- Strong Start participant*

SWs provided counseling and referrals to women once they were enrolled in Strong Start as an enhancement to the education and support provided through Centering. The SWs typically met with enrollees twice during their pregnancy and once postpartum, though were available to meet with higher-risk women (e.g., those with behavioral health needs) more often. At the first meeting, SWs conducted a comprehensive risk assessment that included the Strong Start Intake Form and screening for psychosocial issues, depression and non-medical needs (e.g., housing, food, transportation). A third trimester check-in included follow-up on any referrals made earlier and discussion of how women could advocate for themselves in their care. During the postpartum meeting,

[45] Harris began its Strong Start program with three CHWs and two SWs, but early in the program, lost a CHW and hired an additional SW to ease caseloads and allow practitioners to spend more time with enrollees.

SWs would discuss any other needed resources or questions. Additional meetings, when needed, were conducted in conjunction with Centering sessions or separately (often before or after group sessions), to provide emotional support and counseling as well as referrals to behavioral health services, smoking cessation, and other community resources.

With its heavily Latina Strong Start population, key informants emphasized the importance of a high level of cultural competency among staff caring for these women. In particular, the ability of at least some of the CHWs, SWs and Centering facilitators to be able to communicate in Spanish was seen as a key component to providing effective care.

OUTREACH AND ENROLLMENT

> "I was interested, because I like to learn. I figured if we are all pregnant, it would be a good experience."
>
> *- Strong Start participant*

Early in the program, key informants described how the sites used an opt-in enrollment approach to Centering and Strong Start (wherein women are given a choice between standard or group prenatal care, and also whether or not to participate in the additional Strong Start services and evaluation if they did choose Centering), with the highest-risk women routed into standard prenatal care instead (though they are given the option of also participating in Centering, it is not clear how many did). However, by the second year of implementation, informants were less clear whether Strong Start had an opt-in process that was distinct from Centering, largely because the consent process is informal and Strong Start is well-integrated into the Centering program.

While informants reported staffing transitions that impacted enrollment growth at The University of Texas-affiliated sites, they were able to enroll approximately 60 percent of the eligible population across all sites. Informants in the Baylor University-associated clinics attributed strong enrollment and retention to the efforts of the CHW, who was a true "peer" to the recruited Latina women.

Women who did not speak either English or Spanish could not enroll in Centering or Strong Start, though this likely excluded a relatively small number of women. Informants also noted that enrollment was lower than desired among African Americans and attributed this to a perception (among patients and staff) that Centering was for Latina patients. Strong Start staff worked with clinic staff to ensure the recruitment of all eligible women and did see an increase in uptake among African-American women (though not as large as they would have liked). Informants considered the increase in African-American enrollment a "win" for the Centering program and one that will be sustained going forward. Beyond race-ethnicity issues, key informants reported declines in enrollment in the summer months because women lacked child care to cover school summer vacation. In addition, individual circumstances (e.g. work schedules, inability to ensure consistent transportation in advance) prevented women from committing to the fixed Centering appointment calendar.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants noted that it was difficult to tease out the impact of the Strong Start CHW and SW enhancements, as they were seamlessly integrated with the system's existing Centering program. While they generally agreed that sites' positive birth outcomes (fewer preterm deliveries, higher birthweights, higher rates of breastfeeding, lower rates of C-sections, and somewhat greater contraception use)[46] were largely attributed to the pre-existing Centering model of care, they reported that Strong Start played a vital role by facilitating outreach and enrollment of women with Medicaid/CHIP into the program and providing additional supports that could also contribute to healthier pregnancies. They believed that the increased engagement by SWs and CHWs, particularly because they shared culture and language with the majority of participants, likely improved outcomes for the Medicaid/CHIP population.

Key informants also noted that the CHW helped Strong Start participants connect to resources in the area, such as WIC, car seats, health classes, Supplemental Nutrition Assistance Program (SNAP), and a nutritionist, some of which may have contributed to healthy pregnancies and better birth outcomes. One limitation to postpartum family planning services, and postpartum care in general, is that CHIP prenatal care coverage—the predominant source of coverage for the sizable population of undocumented women—only includes coverage until discharge from the hospital after delivery and two subsequent postpartum visits. The CHW worked with women to get access to the Harris Health System's financial assistance program (i.e., the gold card) to ensure postpartum health care and contraceptive coverage. In this way, Strong Start was able to increase the number of women who attended postpartum visits and were therefore provided with family planning and contraceptive counseling after delivery.

Key informants felt the Strong Start program improved the efficiency of the nurse midwives and Centering program by enrolling and supporting women with additional services for problems that could not be fully addressed in the group. This has allowed the midwives to "do [their] jobs better."

> "I always came because I felt like, I'm a first-time mom and I have to learn all that I can, and I learned a lot."
>
> *- Strong Start participant*

Key informants reported that an internal study conducted toward the end of the program indicated that Centering/Strong Start led to $1-2 million in savings, derived mostly from avoided neonatal intensive care unit (NICU) stays costing an average of $40,000 per premature baby. However, the informants indicated in the Year 4 Evaluation interviews that savings were being evaluated more formally as part of an ongoing overall analysis by the Texas' Delivery System Reform Incentive Payment (DSRIP) program and that "DSRIP is running the show."[47]

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[46] Preterm birth and low birthweight outcomes were based on Q3 2015 PLPE data, in comparison to the state of Texas averages. Other outcomes were based on Q3 2015 PLPE data in comparison to informant perceptions of non-Centering and community rates.

[47] The Delivery System Reform Incentive Payment (DSRIP) initiative "provide(s) states with significant funding that can be used to support hospitals and other providers in changing how they provide care to Medicaid beneficiaries." http://kff.org/medicaid/issue-brief/an-overview-of-delivery-system-reform-incentive-payment-waivers/. To receive funding, participating states implement delivery system reforms that tie provider and health plan payment to performance metrics and improved outcomes. Improved birth outcomes are included in these expectations, and provider payment under DSRIP is based on demonstrated better outcomes reflected in detailed data analysis. Because DSRIP is statewide and supports total Medicaid

STRONG START PARTICIPANT PERSPECTIVES

Focus group participants did not recognize or remember hearing about Strong Start, but did remember being asked to participate in Centering. Several women reported that they agreed to participate because they wanted to learn about their pregnancies, while others were drawn to the group experience as a way to connect with other women.

> *A friend of mine told me about this place, and the classes, and that they guide you through the whole process. So, I came and liked it as well.*

Participants recalled meeting with the CHW and SW, both in and out of Centering sessions, and these staff were available to them if they needed additional assistance with things such as housing, food, or domestic violence. The women agreed that the assistance was very helpful.

> *I met with the CHW. They give you a questionnaire that asks all of the questions—do you need food, do you need this, or that.*

Most participants noted that partners were not welcome in group sessions, and most agreed that partners should not be included and stated they would not have felt comfortable sharing freely if men had been present.

> *They asked us too, but we agreed that it was women stuff and we were talking about women things and didn't want guys to hear.*

Participants reported attending every Centering session, as missed sessions would result in missing information that they looked forward to receiving. Participants reported that a variety of topics were covered in Centering sessions, including breastfeeding, Sudden Infant Death Syndrome (SIDS), domestic violence, signs of early labor and reasons to avoid inductions, and what to do in an emergency. Some participants reported that the breastfeeding information they received in Centering influenced their decision to breastfeed. All pregnant women stated that they intended to at least try breastfeeding, and all postpartum participants reported that they were actually breastfeeding.

> *They talked to us about breastfeeding a baby. It gives the baby all it needs, like eight little drops. I thought you have to give them a whole big bottle full, so I learned things I didn't know.*

Both pregnant and postpartum focus group participants report that family planning was discussed prior to delivery, while postpartum participants confirmed that it is also discussed after pregnancy. All postpartum women attended their postpartum appointment, while pregnant participants indicated that their appointments were already scheduled and they intended to come.

> *Yeah [family planning is discussed after pregnancy], because that's when you receive whatever it is you're going to use. So, they talk about it two times before delivery, then when you came back, they talk about it again, and that's when you get your birth control method.*

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funding, its operation forms the basis of the Medicaid financing and care delivery structure in Texas within which Strong Start and any other targeted Medicaid programs operate.

Compared to previous experiences, participants who had other children reported that the care they received for this pregnancy was much better. They expressed that they felt less rushed, had more time for discussion with their provider, and had more provider continuity which allowed for greater development of trust.

> *Once you see that midwife here so you have more trust, and you can tell her what your issues are. And [in standard care], they just send you on your way.*

PROGRAM STRENGTHS

One CHW in particular provided a key for program success. The bilingual CHW that was a true "peer" to potential enrollees, and she was able to establish a rapport and explain and promote what Centering entailed and how women and their babies could benefit from the program, encouraging enrollment and continuous engagement of Strong Start participants. This CHW also played an important role in connecting women to care and coverage, particularly the gold card program, in anticipation of the loss of Medicaid/CHIP coverage after delivery. Key informants observed that with this CHW's departure from Strong Start, fewer patients were enrolled in coverage after losing Medicaid/CHIP.

Similarly, the SWs contributed substantially to care navigation, sharing clinically-relevant information with providers and ensuring that referrals and supportive services were provided. Having SW staff dedicated to supporting pregnant women was a huge benefit in the crowded, busy clinics whose staff were spread thin and unable to focus solely on pregnant patients. Through Strong Start, the case manager could refer pregnant women to the SWs (and CHWs). The presence of Strong Start-dedicated SWs resulted in more pregnant and postpartum women receiving needed services.

Key informants felt that Strong Start allowed their leadership and clinic providers to see CHW capabilities and the role CHWs could play in boosting enrollment and education. Strong Start "opened the doors" for the clinics to incorporate CHWs into OB care and interventions for chronic disease management more generally going forward.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Key challenges included getting the program off the ground and obtaining buy-in, recruitment, ensuring needed space, and overcoming cultural barriers. Harris Health System encountered some initial challenges with changes to the Strong Start requirements early in the program, including changes to the Strong Start evaluation intake format, introduction of new forms and added requirements for the program's quarterly reports. The SWs had a heavy caseload as they circulated among Strong Start sites, and additional Strong Start-related tasks and tracking added to their workload. Shifting Strong Start staffing (transitioning from an initial three CHWs and two SWs to two CHWs, three SWs, and a data specialist to assist with Exit Forms and other support for Strong Start administration) helped to alleviate this difficulty.

Program staff overcame initial provider skepticism by making presentations about Strong Start at participating sites, explaining the program and emphasizing how it would operate as seamlessly as possible with the existing model of care. Some sites previously viewed pregnant women as "the easy ones" to care for, and did not fully recognize the challenges this population can experience. Providers ultimately appreciated how the Strong Start CHWs and SWs reinforced their messages about the importance of prenatal care and Centering and how they helped to address unmet needs among Centering participants. However, relationships with providers in clinics where residents provided standard care was an ongoing concern, as tensions over competition for patients was a constant "balancing act" to ensure that residents were able to achieve their requisite patient hours among standard care patients as enrollments in Centering increased. The CHWs had to work continuously on provider education, relationship building, and caseload distribution to ensure that eligible women were provided the option of participating in Centering.

Key informants reported that the lack of childcare and transportation were significant barriers to Centering recruitment. Staffing transitions at some sites hurt enrollment and continuity of care for women in Centering, a challenge outside of the Strong Start program's control. Targeted outreach enabled Harris Health System to attract a larger number of African American women into Centering, which was perceived as a "Latina only" program. However, Centering groups were only available in English and Spanish, excluding a small number of immigrant women with other primary languages.

Finding space for private meetings with participants was a consistent challenge for SWs at some sites. CHWs were able to overcome this initial challenge, perhaps because they typically saw less need for privacy compared to SWs. For Centering, most group meeting spaces were adequate, but one of the sites had a very small room that did not meet CHI size requirements. A plan to expand Centering space into a former medical records area was repeatedly delayed for lack of funding. Funding constraints were an ongoing concern throughout Harris Health.

Cultural competence was critical for acknowledging and addressing some women's beliefs among this awardee's largely immigrant population. For example, some women were reluctant to seek care because of their citizenship status. The CHW played a significant role in connecting participants to financial assistance programs for postpartum care, which was important in ensuring high rates of family planning and healthy birth spacing. Many patients have generally low literacy in addition to low health literacy, but not all reveal their challenges to providers, so social worker or CHW support was important to help them understand educational materials and instructions from providers. In addition, behavioral health needs are prevalent among the immigrant population, as well as basic needs such as food, housing, and transportation from the outer parts of the county.

SUSTAINABILITY

Harris's implementation approach was based on layering new staff and services on top of the care that had been traditionally provided, which allowed the awardee to get the program off the ground quickly and avoid duplicating services. However, the layering also made it more challenging to integrate general clinic staff into Strong Start operations and ensure sustainability in the long term.

While Harris' longstanding Centering program will continue, the specific Strong Start staffing positions for CHWs and SWs were eliminated because of lack of funding. As a result, the dedicated patient in-reach (to women coming to the clinics for prenatal care) and outreach to enroll patients in the Centering program was not continued. However, CHWs are being used for two new programs, the Family Planning Program and Healthy Texas Women.[48] These CHWs are focused on contraceptive use but can also provide prenatal care information to women.

Key informants reported that hospital leadership support for maternity care initiatives generally "waxes and wanes," having a significant impact on the sustainability of enhanced services. In addition, transitions in leadership create the need for "retelling the story all over again … to get the same buy-in." In the last year of the program, Harris Health hired a Director of Women's and Children's services (apparently a new administrative function), to oversee the Centering program– a sign of leadership interest in sustaining Centering. Informants also reported that finding funding for CHWs and a SW was "not completely off the table" and that they were waiting for final Strong Start impacts data[49] to make the case for having more dedicated staff for this patient population.

PARTICIPANT-LEVEL PROCESS EVALUATION

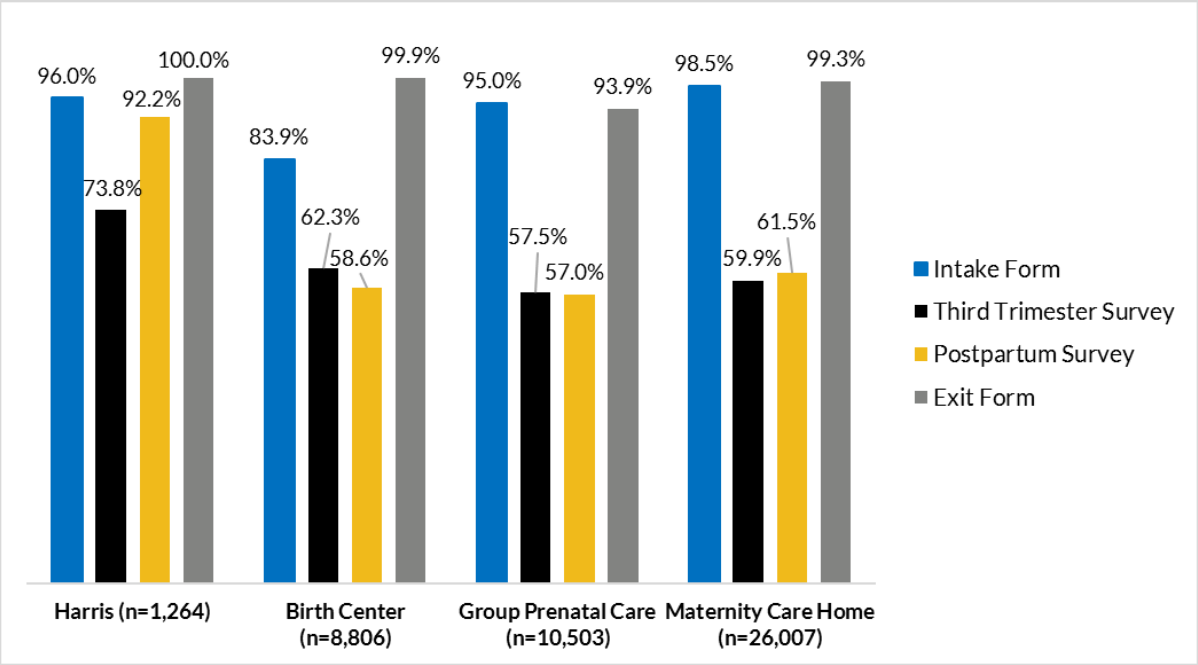
The tables and figures presented in this section summarize findings from the PLPE dataset for Harris, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Harris to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 6 Harris participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

[48] The Family Planning Program and Healthy Texas Women are two new health programs launched in July 2016 by Texas Medicaid, offering health and family planning services to low-income women in the state. https://www.healthytexaswomen.org/
[49] In Texas, the delay between submitting our application and receiving approval was so long, that it was too late to receive and include any data in the impact analysis.

FIGURE 7: FORM SUBMISSION RATES, HARRIS



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,275
- Study IDs represented: 1,264 (suggests PLPE data are missing for 11 participants; see information on program report data in Appendix F in Volume 1).
- The awardee created a physical file for each participant which contained Strong Start materials. All completed surveys were checked with the crosswalk before they submitted them to the evaluation team each quarter. The awardee also integrated the Study ID into their internal tracking database to mitigate recordkeeping errors.

HOW FORMS WERE ADMINISTERED:

- Intake Form: Completed by a healthcare worker who administered the survey in-person.
- Third Trimester Survey was self-administered and reviewed by staff to ensure data quality. If the participant missed the group session, staff attempted to complete it over the phone.
- The Postpartum Survey was collected by a social worker over the phone.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee had one site that was not part of the county health system, but the awardee never shared any information to indicate that differences existed.

MISSING FORMS:

- Intake Form: 4.0 percent of Study IDs were missing Intakes. These missing surveys were due to an error early in the project: some participants were mistakenly given the third trimester survey instead of the Intake.
- Third Trimester or Postpartum Survey: About 26 percent of Study IDs were missing the Third Trimester Survey and 8 percent were missing the Postpartum Survey. Some patients were lost to follow up before or after their deliveries, so that is likely to be the reason for most of these missing forms. The awardee had a standard practice of submitting Postpartum Surveys for patients who could not be reached, checking the "unable to reach" box. That is why the submission rate for the Postpartum Survey is higher than the Third Trimester Survey.
- Exit: No Study IDs were missing Exits.

ITEM NONRESPONSE:

- Intake: The awardee noted that some questions were sensitive, the timeframe was unclear, or the behavior did not apply to the patient.
- Exit: Fewer than 10 percent of participants were missing information on the outcome of their Strong Start pregnancy.[50] These data may be more complete than other awardees because participants gave birth at Harris Hospital, and the awardee was able to capture delivery and birth outcomes for participants that dropped out of Strong Start.

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes for Harris participants. Some highlights include:

- The majority of Harris participants (68.8 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 13.6 percent of participants were 35 or older.
- Most participants were Hispanic (83.5 percent), followed by black (13.5 percent) participants.
- Similar to Strong Start participants overall, the largest share of Harris participants was in a relationship and living with a partner (35.8 percent), while 29.1 percent were married and 17.0 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 17.3 percent of Harris participants reported having experienced intimate partner violence, 12.7 percent of participants with a prior birth had a prior preterm birth, and just over half of participants had not planned their Strong Start pregnancy (58.8 percent).

[50] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 75.2% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 24.8% were missing for other reasons.

TABLE 100: DEMOGRAPHICS, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	4.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,208**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	8.0	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	9.6	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	68.8	81.7	72.9	75.1	75.8
35 Years and Older	%	13.6	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	4.3	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,204**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	83.5	25.4	37.1	28.0	29.7
Non-Hispanic White	%	2.3	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	13.5	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	-	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	5.6	19.6	12.8	11.3	13.3
Not in Universe	%	14.5	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**1,005**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	65.0	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	1.1	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	33.7	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	4.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,208**	**7,374**	**9,864**	**25,160**	**42,398**
Yes		-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	5.3	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,191**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	21.2	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.2	8.7	12.6	11.9	11.5
Employed and in School	%	2.1	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	66.6	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	7.5	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,164**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	65.5	15.4	27.8	29.1	26.4
High School Graduate or GED	%	32.2	57.5	58.3	57.9	57.9
Associate's Degree	%	-	8.2	5.2	4.6	5.4
Bachelor's Degree	%	-	14.5	4.5	3.7	5.8
Other College Degree	%	1.1	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	4.6	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,200**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	29.1	42.1	20.4	20.8	24.5
Living with a Partner	%	35.8	33.2	34.8	31.1	32.3

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
In a Relationship but Not Living Together	%	18.2	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	17.0	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 101: PSYCHOSOCIAL, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	4.5	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,202**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	13.1	51.8	51.8	59.7	56.5
No	%	86.0	44.6	42.3	37.4	39.8
Unsure	%	0.9	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	4.5	17.0	6.6	3.4	6.8
Not in Universe	%	83.1	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**157**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	65.6	61.1	72.6	79.9	75.3
Other	%	28.0	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	-	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	9.4	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,140**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	0.9	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	6.0	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,183**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	13.8	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	4.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,196**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	60.2	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	6.5	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,176**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	12.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	4.5	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,202**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	86.2	67.9	59.0	65.5	64.5
Mild	%	8.8	21.4	23.8	20.2	21.2
Moderate	%	3.9	6.8	10.3	8.5	8.6
Severe	%	1.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
History of Intimate Partner Violence[3]						
Missing Data	%	4.2	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,205**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	17.3	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	4.8	18.3	16.3	7.7	11.8
Not in Universe	%	11.4	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,053**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	1.3	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	4.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,208**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	68.5	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	27.7	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	3.8	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	76.6	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	7.1	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	10.5	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	6.3	24.6	17.1	15.4	17.2
Childcare Challenges	%	3.9	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	13.9	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 102: PREGNANCY HISTORY AND INTENTIONS, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,258**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	72.3	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	27.7	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	7.3	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**818**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	33.9	33.0	26.4	35.8	33.4

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Elective Termination						
Missing Data	%	7.4	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**817**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	4.0	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	10.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**784**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	16.4	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**704**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	7.1	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	16.5	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**702**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	6.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	20.3	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**655**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	20.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**658**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	20.0	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**659**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 103: PRIOR BIRTH OUTCOMES, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	27.7	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**904**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	86.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	15.7	23.5	18.9	15.2	17.7
Not in Universe	%	36.9	30.4	45.8	36.9	37.7

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**597**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	17.6	34.6	24.3	27.1	28.1
>= 18 months	%	82.4	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.1	0.1	2.5	1.4	1.4
Not in Universe	%	37.9	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**780**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	12.7	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	3.5	1.3	20.8	13.1	12.6
Not in Universe	%	37.9	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**737**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	12.6	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 104: PRE-PREGNANCY MEDICAL CONDITIONS, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	4.8	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,197**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	41.2	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	41.9	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	8.1	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	8.9	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	14.6	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,074**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	14.6	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,074**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	-	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	0.7	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,249**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	1.8	4.2	3.7	2.8	3.3

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Normal Weight (=>18.5 BMI <25)	%	33.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	32.8	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	27.1	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	4.8	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 105: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	13.7	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,086**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	8.6	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	13.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,086**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	9.4	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	14.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,081**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	10.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	13.7	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,086**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	13.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,086**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	13.7	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,086**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	13.8	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,084**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	13.7	0.8	28.0	23.1	19.9

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,086**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	3.0	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 106: TREATMENTS DURING PREGNANCY, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	25.1	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**942**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	1.3	0.8	10.0	5.1	5.4
Not in Universe	%	92.1	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**83**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	25.1	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**942**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	25.1	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**942**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 107: PRENATAL CARE, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	9.1	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,144**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	2.2	4.7	29.5	64.5	43.3
Licensed Professional Midwife[51]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	16.7	-	26.5	5.7	8.9

[51] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	79.6	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,258**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.3	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	5.9	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,258**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	95.9	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	7.0	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	1.8	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,235**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	86.8	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	2.8	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	1.8	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,235**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	3.7	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	2.4	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	2.0	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,233**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	1.7	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,236**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	7.0	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.2	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	1.7	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,237**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	1.7	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,237**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Nutrition Counseling						
Missing Data	%	2.1	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,232**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	4.2	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.2	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	1.8	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,235**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	14.8	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,072**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	21.7	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.1	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	23.8	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	76.7	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 108: DELIVERY INFORMATION, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	7.2	1.4	25.3	23.3	19.5
Not in Universe	%	15.7	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**969**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	58.2	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	4.1	0.3	7.8	2.9	3.5
Not in Universe	%	55.2	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**512**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	93.9	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	4.4	4.6	11.5	7.3	7.7
Not in Universe	%	9.9	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,078**	**6,114**	**7,551**	**19,027**	**32,692**

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Hospital	%	99.4	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	4.5	0.7	12.0	5.6	6.1
Not in Universe	%	9.9	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,077**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	77.4	87.1	70.1	69.5	73.1
C-Section	%	22.6	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	1.9	0.4	8.7	2.3	3.4
Not in Universe	%	71.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**333**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	76.0	83.3	72.9	74.7	75.9
C-Section	%	24.0	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	1.4	4.7	12.5	6.3	7.4
Not in Universe	%	80.7	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**225**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	32.4	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	88.9	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**140**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	35.0	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 109: BIRTH OUTCOMES, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	9.3	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,141**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	99.1	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	1.6	0.7	15.4	5.8	7.0
Not in Universe	%	10.1	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,111**	**6,433**	**7,078**	**19,229**	**32,740**

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Very Preterm (20 =< EGA < 34)	%	2.0	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	6.5	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	90.7	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	4.5	2.1	14.3	8.0	8.3
Not in Universe	%	10.1	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,074**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	4.7	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	87.6	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.9	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 110: SATISFACTION, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	35.3	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**814**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	4.4	3.3	4.4	7.8	6.2
Very Satisfied	%	37.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	57.6	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	35.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**812**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	2.6	3.0	4.0	2.9	3.1
Moderately Satisfied	%	9.7	10.4	11.6	12.8	12.1
Very Satisfied	%	46.9	29.1	42.6	46.6	42.1
Extremely Satisfied	%	39.9	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 111: BREASTFEEDING, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	26.5	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**925**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	52.5	80.4	47.5	40.5	50.3
Formula Feed Only	%	4.3	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.9	10.8	31.9	32.5	27.8
I Haven't Decided	%	2.3	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	35.1	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**817**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	93.1	91.5	76.6	72.6	77.3
No	%	6.6	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 112: FAMILY PLANNING, HARRIS

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	35.2	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**815**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	86.6	77.0	77.5	82.2	80.3
No	%	12.5	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	35.2	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**815**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	70.3	84.2	70.8	74.0	75.5
No	%	28.5	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	7.8	41.5	42.9	38.6	40.2
Not in Universe	%	46.7	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**573**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	18.3	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	19.4	2.8	11.4	10.9	9.2
LARC – IUD	%	9.6	10.8	11.9	12.3	11.9
Pills	%	10.6	8.6	11.9	13.0	11.8
Injection	%	15.0	5.9	16.2	20.2	16.2
Condoms	%	13.8	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	Harris (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	10.8	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Texas

Initial Contact: The Texas Health and Human Services Commission (HHSC) was receptive to supporting the Strong Start evaluation when introduced to the project in March 2015. HHSC had previous experience in creating linked data files that employed birth certificate and Medicaid data but identified the linking of birth certificate data for infants with their respective mothers as a challenge. In April 2015, administrators at HHSC introduced the evaluation team to the Texas Department of State Health Services (DSHS) who agreed to assist with the linking of Strong Start participation and comparison group demographic information with infant birth certificate data and then merging these data with Medicaid eligibility and claims data from HHSC.

Data Acquisition Process: The Texas Vital Records Agency notified Urban in November 2015 that the evaluation team needed to obtain IRB approval prior to executing a data use agreement (DUA) to allow for the sharing of birth certificate data. An IRB application was submitted within a month of this notice, but approval of the application took nearly one-and-one-half years and did not occur until April 2017. That same month, upon receiving IRB approval, the evaluation team submitted a Memorandum of Understanding (MOU) to Medicaid for review and approval. Over the ensuring months, Medicaid waited for input on the MOU from Vital Records, but the agency was unresponsive. The evaluation team worked to determine the cause of the delay so the data request process could continue. A DUA and Scope of Work with Medicaid was finally drafted in November 2017 and signed by all parties. However, after submission of the DUA, Medicaid reported that, due to leadership changes, new data request and review protocols were being developed.

Final Result: Ultimately, Texas officials were not able to complete their interagency review and approval processes in time to be able to include their data in the analysis; therefore, no analysis of the impacts of Texas' Strong start awardees is included in the final report.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Harris County Hospital District.

CROSS-CUTTING SUMMARY

The Harris County Hospital District implemented the Group Prenatal Care model under Strong Start. The awardee followed the *CenteringPregnancy* curriculum, and thus, in addition to medically-focused check-ups, provided intensive education on topics such as nutrition, stress reduction, childbirth preparation, pregnancy complications, breastfeeding, family planning, and postpartum depression. Harris also placed Community Health Workers and Social Workers at Strong Start sites to recruit eligible pregnant women into the model and to provide counseling, education, and referrals for program participants during pregnancy and postpartum. Interestingly, however, Harris participants were less likely than other Strong Start enrollees to exhibit prenatal depression or anxiety. Most Harris participants were Hispanic (83.5 percent), primarily of Mexican descent. Many had especially low educational attainment—nearly two-thirds report having less than a high school degree—but otherwise appeared to have fewer notable risk factors than many awardees. For instance, they had very low rates of smoking and lower rates of prior preterm birth compared with other awardees. Descriptively, Harris participants had relatively high rates of gestational diabetes (more than 10 percent), though Hispanic women enrolled in Strong Start did appear to be at greater risk of developing gestational diabetes than women of other race/ethnicities. Preterm birth rates were especially low compared to other Strong Start awardees, as were C-section delivery rates. Impact analysis was not conducted for Harris because we did not obtain birth certificate and Medicaid data from Texas.

HealthInsight of Nevada

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

857	• Private, non-profit Quality Improvement Organization (QIO) working on numerous state, federal, and foundation-funded activities in the states of Nevada, New Mexico, Oregon and Utah
	• Headquartered in Las Vegas
		• Three sites in Reno and Las Vegas, NV, including private physician's offices and a university-based clinic	• Intervention categorized as "medium intensity" because the largest site implemented the *CenteringPregnancy* curriculum with no additional enhanced services
			  • One site implemented the *CenteringPregnancy* model
			  • Two sites implemented locally-developed Group Prenatal Care models

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Provided women with enhanced education through Group Prenatal Care
- Formed strong relationships between women and providers

CHALLENGES

- Lack of provider buy-in slowed implementation and caused enrollment difficulties
- Data collection burden took time away from patient care, though staff acknowledged data was important to prove program's efficacy

SUSTAINED

- All three sites planned to continue Group Prenatal Care, though key informants were unsure as to how long one site would be able to sustain the program

KEY FINDINGS: PARTICIPANT-LEVEL DATA[52]

PARTICIPANT-LEVEL DATA QUALITY

- 1.9% rate of missing intake forms; 45.5% rate of missing exit forms
- 6.1% rate of item nonresponse on intake forms; 5.7% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 23.0% of women were teens (under age 20); 5.9% were 35 years or older
- 24.4% of women were black; 40.1% were Hispanic; 23.3% were white
- 18.3% of women were married; 43.5% were living with a partner; 18.5% were not in a relationship
- 17.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- The rate of missing data is too high to report C-section rate, preterm birth rate, and low birthweight rate

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Marginally higher average gestational ages (p-value<0.10), lower rates of very low birth weight, and better Apgar scores than infants of women in the comparison group
- Findings for site-level estimates for Renown Pregnancy Center – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are reported in Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Not conducted for HealthInsight because we did not obtain Medicaid claims data from Nevada

[52] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Three sites implemented Group Prenatal Care under HealthInsight's Strong Start award: Renown Pregnancy Center (Renown) in Reno and the University of Nevada School of Medicine (UNSOM) and Women's Health Associates of Southern Nevada (WHASN) in Las Vegas. When the Strong Start program began, none of the three sites were offering Group Prenatal Care, though staff had previous experience with the model. In partnership with the March of Dimes, a small number of Renown providers received training from the Centering Healthcare Institute (CHI) on the Centering model several years prior to Strong Start.[53] Implementation of the model ultimately failed at that time because of staff turnover and lack of provider buy-in. Prior to Strong Start, prenatal care at Renown consisted of 15-minute one-on-one appointments with a provider. The Pregnancy Center was staffed by seven physicians who cared for high-risk patients and seven mid-level providers—five midwives and two physician assistants trained in obstetrics—who cared for all new patients and determined their risk level. The staff also included a nurse and several medical assistants, an application assister to help with Medicaid and Marketplace enrollment, and a diabetes educator who was on site once a week to provide nutritional counseling.

WHASN's pre-Strong Start model of care involved an initial prenatal visit with a nurse practitioner, who completed patients' medical history and the Problem Oriented Perinatal Risk Assessment System (POPRAS) form. Patients then saw one of the clinic's two obstetricians (OBs) for the rest of their care. The WHASN clinic also had staff with Group Prenatal Care experience before Strong Start was implemented. Its Nurse Practitioner (NP) had led groups for military spouses whose partners who were often deployed, and she saw firsthand how the groups yielded new friendships. She sought to bring the same level of camaraderie to civilians and won a grant to implement Centering at the clinic in 2012; however, physicians were reluctant to relinquish individual care of their patients to the NP who would run the groups, and thus she was not able to accept the grant.

DESCRIPTION OF ENHANCED STRONG START SERVICES

The three sites implemented different models of Group Prenatal Care. Renown implemented the Centering Healthcare Institute's (CHI) *CenteringPregnancy* (Centering) which was enthusiastically championed by the lead midwife there, who emphasized that Centering is evidence-based and proven to improve outcomes. In contrast to Renown's first implementation of Centering several years ago when only a subset of

> "What I like about the group is the questions from other women I was afraid to ask or forgot to ask."
>
> *- Strong Start participant*

[53] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

providers participated in the optional training, all providers at the Pregnancy Center received CHI training as part of Strong Start implementation. Initially, six providers (all Certified Nurse Midwives or CNMs) served as facilitators and three Medical Assistants (MAs) filled a Centering coordinator role. The coordinators helped to enroll women in Strong Start and manage the data collection process. As a result, Renown maintained a large Centering practice, with 27 to 30 active groups at any given time. Thirty women enrolled each month into groups of 10 enrollees each, and for a time Renown facilitated groups in both English and Spanish. However, by the end of the evaluation, after a loss of staff, only one group was held per month and the Spanish-language group had been eliminated (described more below in the Sustainability section).

At Renown, women attended 10 two-hour Group Prenatal Care sessions over the course of their pregnancy and postpartum period. The facilitators used CHI materials and followed the prescribed curriculum, which covers topics that correspond with the women's gestational age. Also in line with CHI standards, the facilitators allowed women to guide the sessions with their own discussions and questions. They incorporated a breastfeeding video, a visiting lactation consultant, and a tour of Renown's hospital into their standard groups. Groups were held in a clean, private room that once served as a waiting room. Seats were arranged in a square, and an exam table occupied the far side of the room behind a folding screen. At the start of each session, women took their own blood pressure and weight. Each woman met with the medical provider individually while other women socialized—also a key component of CHI's model.

> "I feel like we should get a chance to meet who might deliver our babies."
>
> *- Strong Start participant*

Once the awardee understood that Strong Start gave it the flexibility to use other (non-Centering) models, it recruited the WHASN and UNSOM programs, which used a group prenatal curriculum developed by a doctoral student at Southwest Medical Associates, an early partner that dropped out before the Strong Start award application. This model overlapped with the Centering approach, but key informants reported the following differences: an MA took women's vitals; women met one-on-one with a provider for a health assessment in a private room across the hall from the group session; sessions lasted one-and-a-half hours rather than two; there were eight sessions at most sites instead of 10; and, some of the group activities were different including "icebreaker" exercises intended to keep women engaged. In early 2017, WHASN facilitators (NPs) attended the CHI facilitator training course, and the site began to use a hybrid of the locally-developed group care curriculum and CHI's curriculum.

Another difference between the Centering and non-CHI model was group composition. In the non-CHI group, classes were held twice weekly on different topics, and women were advised to attend one class per month based on any class appropriate to their gestational age. This more flexible schedule was intended to accommodate work schedules and transportation challenges. The flexibility also meant that, unlike in the CHI model, women did not stay with the same group of women throughout pregnancy.

UNSOM reduced the number of group sessions from eight to six near the beginning of program implementation. Topics the site considered part of the core curriculum included what to expect during pregnancy, breastfeeding, family planning, nutrition, and substance use, in addition to some content tailored to the group's needs. At UNSOM, all Strong Start enrollees received a referral to onsite dental care, with about 50 percent of participants receiving a dental visit.

There were several similarities across the three sites regardless of the model of group care offered. Patients attended Group Prenatal Care sessions in place of individual OB appointments. Groups were facilitated by one provider (a CNM or NP) who was supported by an MA. Sessions covered various topics relating to prenatal care and included the use of educational materials. Births were attended by an on-call provider who was not necessarily the Group Prenatal Care facilitator.

OUTREACH AND ENROLLMENT

All three Nevada sites—Renown, WHASN, and UNSOM—used an "opt-in" enrollment process, whereby women were asked to choose between enrollment in Strong Start or participation in the standard prenatal care model. However, providers at the different sites used slightly different enrollment approaches. At Renown, a medical assistant performed financial and intake assessments for all pregnant patients. Then CNM did a full physical examination and presented the options for prenatal care (standard care and Group Prenatal Care). At this point, the CNM described the group approach's selling points, which included more access to providers, free childbirth education, a peer support group, health and diet management, and other benefits. If a woman wanted to enroll in Strong Start at that time, she was referred to the dedicated staff person who handled enrollment. Similarly, at UNSOM, a dedicated staff person handled all enrollment (providers were encouraged to "put a sticky note" on charts for women who were interested in the program).

At WHASN, the NP who led the groups presented Strong Start at the prenatal intake visit. She explained the program helped connect patients with more resources than is possible during a one-on-one appointment, and that they would receive support from other women going through similar experiences. She also used an incentive to encourage women to enroll: she and fellow clinic staff pitched in to buy a crib they displayed in the waiting room. Women who entered Group Prenatal Care were entered into a raffle and had a chance to win the crib.

> "They really pushed Centering. They made it sound good, that it was a group, and questions would be asked. If you go [to an individual prenatal appointment] and it's you and your doctor, you might forget a question."
>
> *- Strong Start participant*

HealthInsight of Nevada identified nine risk factors in its operational plan that sites could use to determine women's eligibility for Strong Start, including (among others) abusing alcohol or illegal drugs, suffering from depression, and having had a C-section. Renown used Medicaid plus one risk factor to determine eligibility, while WHASN and UNSOM offered Strong Start to any woman enrolled in Medicaid. In July 2015, program sites changed eligibility requirements to allow enrollment of minors into the Strong Start program; previously participants had to be 18 or older.

Key informants noted that having flyers and posters in clinic waiting rooms was an especially effective enrollment strategy. These flyers, which were developed by one of the sites and distributed centrally by HealthInsight, included text describing Strong Start and photos of items participants could receive after completion of the program. All three sites used incentives to enroll and engage participants, including bags filled with various supplies for newborns like diapers and blankets. Many of these incentives were funded by a March of Dimes grant and purchased and distributed to clinics by HealthInsight. Clinics also received modest funds to use at their own discretion, and WHASN used some of these funds for additional incentives. HealthInsight decreased enrollment targets during the award period, first from 3600 to 1500, and then to 1000. This shifting target reflected the awardee's lower-

than-projected enrollment experience and ongoing struggles with enrollment throughout the first two years of implementation. For instance, key informants reported in evaluation Year 2 that use of incentives and engaging providers and outside partners, including Medicaid health plans, WIC, health departments and community organizations, had not led to the volume of referrals expected. Staff and site turnover (including a corporate reorganization at the WHASN site that led to a 6-month pause in Strong Start recruitment) posed administrative challenges and limited enrollment. Physician resistance was also barrier to enrollment despite ongoing efforts by supportive providers to win over leadership and staff at each site. Towards the end of implementation, key informants shared that they had surpassed their revised enrollment goal.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

HealthInsight interviewees perceived that Strong Start may have reduced rates of preterm birth and low birthweight, and increased the number of women who breastfed, though their perceptions were anecdotal. Group care participants, according to staff, often had more realistic expectations regarding breastfeeding because they received additional education and support. In sessions focused on breastfeeding, a lactation consultant and the facilitator introduced common breastfeeding challenges and involved group participants with different levels of experience with breastfeeding in the discussion. Informants agreed that having realistic expectations and a better understanding of how to access support services such as lactation consulting led to higher breastfeeding rates.

Awardee staff did not feel they had adequate data to fully assess the impact of Strong Start on maternal and infant outcomes, in large part because recent policy changes, such as the state's Medicaid expansion, could also affect these outcomes. However, they generally agreed that patients were more "nurtured" in the group setting and that this, combined with the additional education, had the potential to improve patient engagement and outcomes overall. Both awardee and site staff said that the additional support provided by Group Prenatal Care was beneficial to Nevada's Medicaid population because it could relieve stress and increase patient engagement. The facilitated discussion format reportedly encouraged women to participate in their care both by asking questions and responding to the questions of others. According to one key informant, this format "allow[ed] patients to see [providers] as humans, not just a provider who is above them." A number of staff also hypothesized that the bonds formed among group members and with group facilitators increased appointment attendance, improved women's nutrition, reduced risky behaviors such as smoking and substance abuse, and resulted in women seeming "more connected" with their babies.

Key informants at WHASN reported a reduction in C-section rates in the last year of the evaluation (though they did not share specific data with the evaluation team). They felt Strong Start could be contributing to this improvement, but did not offer any concrete mechanisms through which this could be happening. According to one key informant, the combination of having physicians who encouraged VBACs and a Group Prenatal Care program that provided education and support on this topic were likely contributing to the reduced C-section rates her clinic had seen. One of the physicians at the clinic received an award for having the lowest C-section rate in Nevada, which was a particularly celebrated victory given what one key informant described as a cultural preference for elective C-sections among women in the Las Vegas area.

STRONG START PARTICIPANT PERSPECTIVES

Many Strong Start participants chose to come to one of the HealthInsight Strong Start clinics because of a recommendation from a friend or family member. Many other participants chose to return to the clinic after previous positive experiences. At Renown, at least one woman felt there were no other options for care in the area, while a number of women at UNSOM chose their site because of proximity to their home.

> *I started coming here [UNSOM] because of a coworker's recommendation for regular healthcare, and I just stuck with it when I was pregnant.*

Overall, women were very satisfied with the care they received at HealthInsight sites. In addition to feeling as though they learned a lot about their pregnancies, several women appreciated the additional support they received in Group Prenatal Care sessions compared with typical prenatal care.

> *I'm 23. I had a baby who died at 18 days. So, I wanted to know everything that has to do with being a mom and taking care of a baby. I learned a lot. I even go back to the pamphlets they gave us when I have questions.*

Though women generally enjoyed the Group Prenatal Care they received at HealthInsight's Strong Start sites, some women expressed desire to have more privacy during the individual part of the visits at Renown. For instance, one participant said,

> *Everybody got to hear the heartbeat and you worry, is my baby's heartbeat—what if it didn't beat? Now you've got the whole group knowing that something's wrong. That was my fear.*

PROGRAM STRENGTHS

Key informants were most proud of the amount of education they could offer participants through Group Prenatal Care and the relationships formed among participants and with providers. One key informant stated that Strong Start provided a supportive environment for pregnant women, many of whom did not intend to become pregnant and who lacked family and peer support. Staff were particularly pleased with the number of women completing the group care program with realistic expectations about breastfeeding and well equipped to handle its challenges. Some sites encouraged partner involvement in group sessions and reported that robust participation by partners had enhanced the quality of the groups.

> "I made my partner go to the CPR class with me. I've never done CPR for babies. I needed to know he knew who did them. [My midwife] ran the groups and she encouraged partners."
>
> *- Strong Start participant*

The Renown site struggled with enrollment initially and was pleased to have been able to fill every group in the last two years by reducing the number of groups held and maintaining a waiting list of patients who could take the place of women who ultimately decided not to participate.

Key informants generally agreed that the ability to overcome challenges related to provider and clinic staff support had a significant influence on whether Group Prenatal Care was successful at each site. One site reported that the addition of administrative staff support was instrumental in relieving providers of many data burdens associated with Strong Start, which ultimately facilitated buy-in.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Though awardee and site staff were pleased with the overall results of their Strong Start program, HealthInsight had to overcome several implementation challenges. At the time the cooperative agreement was funded, the delay between the application and the award release cost HealthInsight some of its original partners, and the awardee struggled to find replacement clinics excited about partnering with them to provide Strong Start services. Once new partners were identified, provider buy-in continued to be a challenge at a number of sites. Implementing Group Prenatal Care required both administrative changes and changes to the way clinical staff provided care, and getting staff excited about so much change was difficult. Informants at WHASN reported that the amount of paperwork required under Strong Start contributed to challenges with provider buy-in because some felt the paperwork took time away from patient care, but staff at this site also acknowledged that the data collected were instrumental to being able to prove the efficacy of their program and secure additional funding. Another challenge was sites' lack of resources for staffing the prenatal group care sessions, as they generally needed more trained facilitators.

Additionally, there was a major identified need for mental health support and resources for women with depression; but, a general mental health provider shortage prevented sites from pursuing targeted care for patients with depression.

SUSTAINABILITY

At the time of the final case study interviews, all three of the sites involved in HealthInsight's Strong Start program were planning to continue Group Prenatal Care, though none had yet secured long-term external funding. Key informants noted that two of the sites (Renown, the Centering site, and WHASN, one of the programs with a locally-developed curriculum) would "absolutely" continue enhanced Group Prenatal Care, likely longer term, while the third (UNSOM, the other local curriculum site) was more unsure because of administrative challenges. Renown was relying on extra funding from a previous grant, while WHASN considered pursuing a March of Dimes grant specifically for implementing *CenteringPregnancy*. Sites reported that their current approaches to Group Prenatal Care were working well. Renown staff did not anticipate changing the structure of the sessions or the programs' target populations, though staff at WHASN were considering fully implementing *CenteringPregnancy* (a change from the local curriculum used for Strong Start) if they received a March of Dimes grant to support startup costs.

Though Renown continued Centering beyond the Strong Start award period, the clinic reduced the number of groups per month from three to one because of recent loss of staff. Until more staff were on-boarded, Renown planned to continue just one group per month. UNSOM staff recently transitioned from being employees of University of Nevada Reno School of Medicine to employees of the newly-opened University of Nevada Las Vegas School of Medicine. This transition made it difficult to focus staff attention on sustaining the Strong Start program beyond the award period.

No sites intended to continue the full amount of data collection that was required for the Strong Start Initiative, although at least two sites expressed interest in continuing to collect a subset of these data. Sites had not decided which data elements to retain, though items of interest included medical and social risk assessments from the Intake Form and patient outcomes data from the Exit Form (preterm birth and low birthweight, in particular).

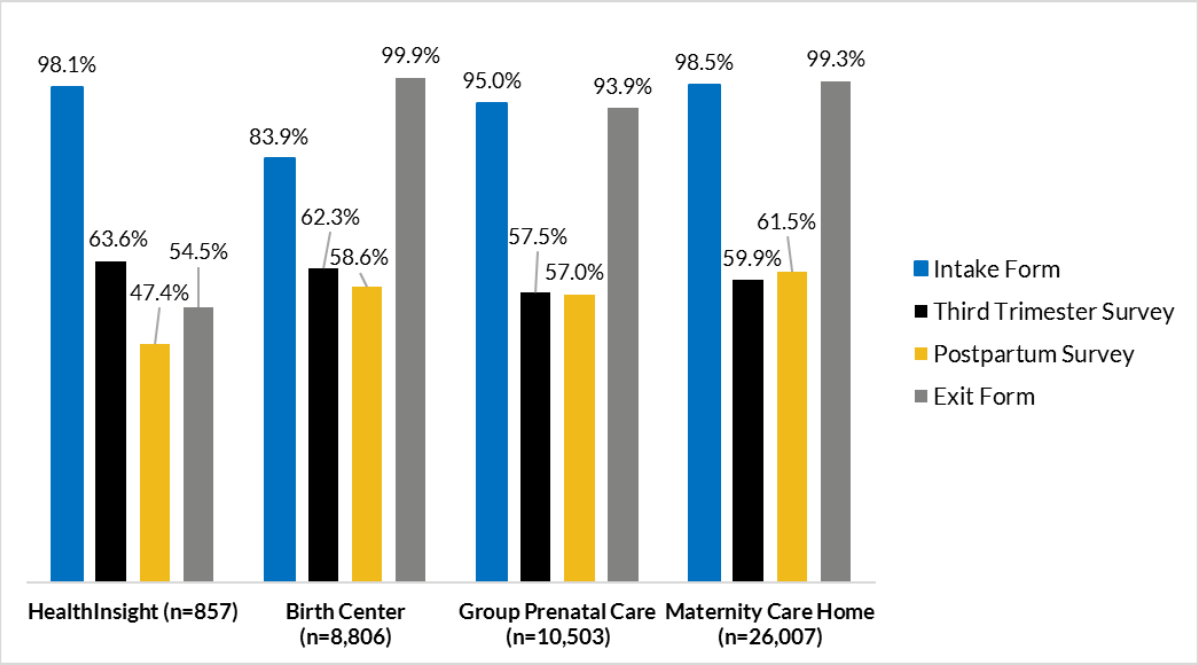
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Health Insight, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Health Insight to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 6 Health Insight participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 8: FORM SUBMISSION RATES, HEALTHINSIGHT



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,069
- Study IDs represented: 857 (suggests that PLPE data are missing for 212 participants; see information on program report data in Appendix F in Volume 1)
- HealthInsight reported that they never reached their enrollment goal of 1,000, only enrolling 922 women. This suggests that the program enrollment totals are off and the PLPE database was missing 65 participants.

HOW FORMS WERE ADMINISTERED:

- All surveys were self-administered by patients on paper forms.
- To encourage completion, staff explained why the information was important; however, the awardee said that patients had many forms to fill out and they tried to complete it quickly.
- Site staff reviewed the forms for completeness when possible, this was often after the appointment. If information was missing, they might review the medical chart or call patients to fill in gaps.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- One site kept all four forms in a file until the participant completed Strong Start. This approach allowed the provider to update forms if some information was not reported and led to few missing forms.
- Other sites had more difficulty completing required forms. The awardee found that many forms were missing or incomplete, and they were not able to retrieve most missing pieces.

MISSING FORMS:

- Intake Form: 1.9 percent of Study IDs were missing Intakes. Some women were added to the crosswalk and attended the first class, but were missing Intake Forms because they did not return the form or return for the next class.
- Third Trimester or Postpartum Surveys: Approximately 36 percent of Study IDs were missing Third Trimester and 53 percent were missing Postpartum Surveys. The awardee indicated these were missing because women were lost to follow-up or sites did not collect them.
- Exit Form: 45.5 percent of Study IDs were missing Exit Forms. The awardee asked problematic sites to complete these forms but they faced understaffing and inaccurate record keeping. In some cases, the Study ID data was not collected properly which this prevented staff from being able to identify which patient was associated with a particular Study ID.

ITEM NONRESPONSE:

- Intake Form: The awardee acknowledged that some questions were skipped by because questions did not apply, the patient perceived they were sensitive, or they did not have enough time to complete the entire survey.
- Exit Form: Among the Exit: The awardee had high rates of missing for key outcome variables, missing information on the outcome of a woman's Strong Start pregnancy for 56.2 percent of participants.[54] Note: we do have vital records data from Nevada summarized at the end of this chapter, which allows us to look at birth outcomes for Strong Start participants.

MAIN FINDINGS:

The tables that follow summarize participant characteristics and outcomes for HealthInsight participants. A few highlights include:

- The majority (71.1 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 16.9 percent of participants were 18 or 19 years old.
- Participants represented a mix of races and ethnicities: 40.1 percent were Hispanic, 24.4 percent were black, 23.3 percent were white, and 12.2 percent were another or multiples races.

[54] Among participants with missing data on pregnancy outcome, 81.6% were missing because they did not have an exit form, 14.9% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 3.6% were missing for other reasons.

- Similar to Strong Start participants overall, the largest share of HealthInsight participants was in a relationship and living with a partner (43.5 percent), while 18.3 percent were married and 18.5 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 22.5 percent of HealthInsight participants reported having experienced intimate partner violence, 17.1 percent of participants with a prior birth had a prior preterm birth, and 73.0 percent of participants had not planned their Strong Start pregnancy.

TABLE 113: DEMOGRAPHICS, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.9	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**835**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	6.1	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	16.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	71.1	81.7	72.9	75.1	75.8
35 Years and Older	%	5.9	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	4.0	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**817**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	40.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	23.3	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	24.4	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	12.2	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	8.3	19.6	12.8	11.3	13.3
Not in Universe	%	53.1	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**328**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	71.0	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	24.1	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	1.6	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**837**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.3	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	6.3	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**797**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	30.5	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.5	8.7	12.6	11.9	11.5
Employed and in School	%	4.1	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	54.8	48.9	51.0	47.4	48.5

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Education Level at Intake						
Missing Data	%	8.3	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**780**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	34.6	15.4	27.8	29.1	26.4
High School Graduate or GED	%	55.9	57.5	58.3	57.9	57.9
Associate's Degree	%	3.3	8.2	5.2	4.6	5.4
Bachelor's Degree	%	3.1	14.5	4.5	3.7	5.8
Other College Degree	%	3.1	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	6.2	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**798**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	18.3	42.1	20.4	20.8	24.5
Living with a Partner	%	43.5	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	19.7	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	18.5	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 114: PSYCHOSOCIAL, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	3.6	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**820**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	64.1	51.8	51.8	59.7	56.5
No	%	31.5	44.6	42.3	37.4	39.8
Unsure	%	4.4	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	3.6	17.0	6.6	3.4	6.8
Not in Universe	%	34.5	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**526**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	78.1	61.1	72.6	79.9	75.3
Other	%	11.2	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	10.6	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	13.9	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**733**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	9.3	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	12.7	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**743**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	32.2	19.1	24.4	19.2	20.3

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
WIC at Intake						
Missing Data	%	5.8	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**802**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	48.9	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	17.6	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**701**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	35.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	9.3	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**772**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	54.3	67.9	59.0	65.5	64.5
Mild	%	25.0	21.4	23.8	20.2	21.2
Moderate	%	11.8	6.8	10.3	8.5	8.6
Severe	%	7.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.8	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	5.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**804**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	22.5	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	7.5	18.3	16.3	7.7	11.8
Not in Universe	%	8.7	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**713**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.7	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	1.6	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**837**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	52.3	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	31.3	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	16.4	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	66.9	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	18.3	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	23.6	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	16.8	24.6	17.1	15.4	17.2
Childcare Challenges	%	10.5	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	9.5	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 115: PREGNANCY HISTORY AND INTENTIONS, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	5.9	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**801**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	60.4	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	20.1	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	53.6	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**224**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	29.9	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	53.1	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**228**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	26.3	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	60.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**169**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	59.5	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**174**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	-	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	59.6	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**173**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	-	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	60.0	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**169**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	59.8	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**171**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	60.2	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**168**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 116: PRIOR BIRTH OUTCOMES, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	2.5	1.7	1.5	0.6	1.0
Not in Universe	%	42.0	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**473**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	78.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	22.7	23.5	18.9	15.2	17.7
Not in Universe	%	54.9	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**191**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	33.5	34.6	24.3	27.1	28.1
>= 18 months	%	66.5	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	1.4	0.1	2.5	1.4	1.4
Not in Universe	%	55.2	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**369**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	17.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	51.9	1.3	20.8	13.1	12.6
Not in Universe	%	28.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**168**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	-	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 117: PRE-PREGNANCY MEDICAL CONDITIONS, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	7.6	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**786**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	27.0	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	61.6	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	5.1	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	6.4	6.8	7.4	9.6	8.6

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Diabetes Pre-Pregnancy						
Missing Data	%	52.8	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**402**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	52.9	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**401**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	3.7	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	56.3	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**372**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	4.8	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	39.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	25.5	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	24.7	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	5.6	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 118: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	56.2	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**373**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	-	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	56.1	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**374**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	3.5	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	56.3	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**372**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	4.8	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	56.2	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**373**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	56.1	0.8	26.2	22.2	18.9

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**374**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	56.3	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**372**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	56.3	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**372**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	56.3	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**372**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	4.3	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 119: TREATMENTS DURING PREGNANCY, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	58.9	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**350**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	47.0	0.8	10.0	5.1	5.4
Not in Universe	%	49.9	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**26**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	59.0	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**349**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	59.0	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**349**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 120: PRENATAL CARE, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	59.8	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**342**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	16.4	4.7	29.5	64.5	43.3
Licensed Professional Midwife[55]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	41.5	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	40.6	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	45.8	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**461**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	65.7	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	5.2	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	45.8	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**461**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	83.1	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	5.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	53.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**398**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	16.6	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.7	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	53.2	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**398**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	53.1	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**399**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	53.5	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**396**	**172**	**6,347**	**16,873**	**23,392**

[55] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Health Education, Not Centering	%	21.7	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	3.1	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	53.5	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**396**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	53.7	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**394**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	13.5	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	2.7	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	52.8	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**402**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	27.9	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	3.2	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	53.8	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**393**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	8.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.0	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	53.6	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**395**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	8.4	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.6	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	96.9	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 121: DELIVERY INFORMATION, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	48.1	1.4	25.3	23.3	19.5
Not in Universe	%	15.3	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**312**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	22.8	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	46.9	0.3	7.8	2.9	3.5
Not in Universe	%	45.8	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**62**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	98.4	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	46.4	4.6	11.5	7.3	7.7
Not in Universe	%	11.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**362**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.7	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	46.8	0.7	12.0	5.6	6.1
Not in Universe	%	11.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**359**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	70.2	87.1	70.1	69.5	73.1
C-Section	%	29.8	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	46.1	0.4	8.7	2.3	3.4
Not in Universe	%	33.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**173**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	69.9	83.3	72.9	74.7	75.9
C-Section	%	30.1	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	47.8	4.7	12.5	6.3	7.4
Not in Universe	%	41.6	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**90**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	40.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	45.8	0.1	6.2	0.7	1.9
Not in Universe	%	49.1	96.0	82.7	85.9	87.1

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**43**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	-	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 122: BIRTH OUTCOMES, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	56.2	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**373**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.4	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	48.3	0.7	15.4	5.8	7.0
Not in Universe	%	11.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**346**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	-	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	5.5	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	91.9	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	47.5	2.1	14.3	8.0	8.3
Not in Universe	%	11.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**353**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	7.9	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	89.5	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	-	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 123: SATISFACTION, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	55.1	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**382**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	1.8	3.3	4.4	7.8	6.2
Very Satisfied	%	31.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	67.0	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	55.3	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**380**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	7.6	10.4	11.6	12.8	12.1
Very Satisfied	%	38.7	29.1	42.6	46.6	42.1
Extremely Satisfied	%	52.1	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 124: BREASTFEEDING, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	40.2	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**509**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	50.7	80.4	47.5	40.5	50.3
Formula Feed Only	%	5.7	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	22.8	10.8	31.9	32.5	27.8
I Haven't Decided	%	20.8	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	57.2	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**364**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	89.6	91.5	76.6	72.6	77.3
No	%	8.0	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 125: FAMILY PLANNING, HEALTHINSIGHT

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	57.5	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**362**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	HealthInsight (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	77.1	77.0	77.5	82.2	80.3
No	%	18.8	20.0	14.0	14.2	15.3
Unsure	%	4.1	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	59.3	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**346**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	76.6	84.2	70.8	74.0	75.5
No	%	18.8	13.2	17.7	21.5	19.1
Unsure	%	4.6	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	52.8	41.5	42.9	38.6	40.2
Not in Universe	%	16.1	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**265**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	6.8	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	4.5	2.8	11.4	10.9	9.2
LARC - IUD	%	6.0	10.8	11.9	12.3	11.9
Pills	%	10.6	8.6	11.9	13.0	11.8
Injection	%	21.1	5.9	16.2	20.2	16.2
Condoms	%	28.7	26.6	19.8	13.9	17.9
Breastfeeding	%	5.3	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	10.2	16.7	8.1	9.5	10.9
Method Not Indicated	%	4.5	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate and Medicaid Eligibility data were obtained from Nevada

Initial Contact: In February 2015, the evaluation team spoke with officials from the Nevada Division of Welfare and Supportive Services (DWSS, which administers the Medicaid program) and the Nevada Division of Public and Behavioral Health (DPBH, which houses Vital Records) to discuss the state's willingness to participate in the Strong Start evaluation and process for releasing Medicaid and birth certificate data. State officials were receptive to supporting the evaluation and preferred that the Urban Institute link the data.

Data Acquisition Process: In July 2015, Urban executed a data use agreement (DUA) with DWSS. By August 2016, DWSS was processing Medicaid eligibility and claims data for live births in 2014 and planned to transfer the data to Urban by October 2016. In March 2016, Urban executed a DUA with DPBH. In July 2016, Urban received 2014 and 2015 birth certificate data from DPBH. In October 2016, the Medicaid Agency submitted its 2014 and 2015 files. It was determined that Medicaid's claims and encounter data would not be useable for the evaluation because of complexities and variation surrounding managed care organizations' data files.

Final Result: In May 2017, Vital Records submitted 2016 birth certificate data, and 2016 Medicaid eligibility data were requested. The Medicaid Agency submitted 2016 data in December 2017. Urban completed its analysis by early 2018 and it is included in the final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES

The HealthInsight awardee, which implemented the Group Prenatal Care model, delivered care at three sites included in the impact analysis: Renown Pregnancy Center in Reno, the University of Nevada School of Medicine in Las Vegas, and Women's Health Associates of Southern Nevada, also in Las Vegas. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Renown site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 126).

As described in the Impact Analysis chapter of Volume 1, low acceptance rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the acceptance rate of group prenatal care was low (less than 75 percent) were of particular concern. Although all HealthInsight sites used an opt-in approach to enrollment, they all achieved an acceptance rate above 75 percent. Therefore, low acceptance rate concerns for sites that used an opt-in procedure do not apply to HealthInsight.

TABLE 126: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR HEALTHINSIGHT

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
HealthInsight of Nevada			
Renown Pregnancy Center	Yes	Yes	No
University of Nevada School of Medicine	Yes	No	No
Women's Health Associates of Southern Nevada	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

- We also present estimates of the impact of Strong Start on the following process outcomes:
  - Whether the delivery is by Cesarean section;
  - Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
  - Whether the delivery occurred over the weekend. [56]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. As we did not receive useable claims and encounter data from Nevada, expenditure and utilization outcome findings are not reported for this awardee, nor are results from alternative specifications that include claims variable controls. We also did not estimate models where we drew the comparison group outside the county (alternative specification #1) for HealthInsight because all comparison groups could be pulled from the same counties where Strong Start participants reside.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value<0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 127 reports the birth and process outcome findings for this awardee:

- Infants born to women enrolled in Strong Start receiving care from HealthInsight have an average gestational age of 38.7 weeks, which is 0.1 weeks longer than women in the propensity-score reweighted comparison group (38.6 weeks). However, this finding is only marginally significant (p-value<0.10).
- Women enrolled in Strong Start (0.0 percent) are 1.1 percentage points less likely to have a very low birthweight infant than women in the comparison group (1.1 percent).
- Infants born to women enrolled in Strong Start are 0.9 percentage points more likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group (99.5 vs. 98.5 percent).
- There are no significant differences between Strong Start women and the comparison group for all other outcomes.

TABLE 127: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT HEALTHINSIGHT

Outcomes	Main Model: 2014 - 2016, Strong Start (N=556)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=38580)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.7	38.6	**0.1^**	N/A	N/A	N/A
Preterm birth rate	7.4%	8.7%	-1.3	N/A	N/A	N/A
Very preterm birth rate	1.6%	2.2%	-0.7	N/A	N/A	N/A
Birthweight (grams)	3,196.0	3,191.6	4.4	N/A	N/A	N/A

[56] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

Outcomes	Main Model: 2014 - 2016, Strong Start (N=556)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=38580)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Low birthweight rate	8.1%	8.5%	-0.4	N/A	N/A	N/A
Very low birthweight rate	0.0%	1.1%	**-1.1****	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	99.5%	98.5%	**0.9****	N/A	N/A	N/A
Process Outcomes						
C-section rate	28.6%	28.5%	0.1	N/A	N/A	N/A
VBAC rate[1]	12.3%	11.8%	0.5	N/A	N/A	N/A
Weekend delivery rate	27.2%	24.3%	2.9	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 65 Strong Start women and 5891 comparison group women.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for the Renown Pregnancy Center (Table 128) are generally consistent with the HealthInsight awardee-level analysis:

- In contrast to the awardee-level estimates, there are is no significant difference in average gestational age between women enrolled at Renown and women in the comparison group.
- Consistent with the awardee-level estimates, women enrolled in Strong Start at Renown are less likely to have a very low birthweight infant and more likely to have an Apgar score greater than or equal to seven than women in the comparison group.

TABLE 128: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT RENOWN (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=288)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=35362)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.8	38.7	0.1	N/A	N/A	N/A
Preterm birth rate	6.9%	8.3%	-1.3	N/A	N/A	N/A
Very preterm birth rate	1.0%	2.0%	-1.0	N/A	N/A	N/A
Birthweight (grams)	3,224.5	3,218.2	6.3	N/A	N/A	N/A
Low birthweight rate	8.0%	7.8%	0.2	N/A	N/A	N/A
Very low birthweight rate	0.0%	0.7%	**-0.7****	N/A	N/A	N/A

Outcomes	Main Model: 2014 - 2016, Strong Start (N=288)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=35362)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Rate of Apgar score greater than or equal to 7	100.0%	98.4%	**1.6****	N/A	N/A	N/A
Process Outcomes						
C-section rate	23.6%	24.6%	-1.0	N/A	N/A	N/A
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	26.4%	25.1%	1.3	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 22 Strong Start women and 5453 comparison group women.

CROSS-CUTTING SUMMARY

HealthInsight of Nevada implemented the Group Prenatal Care model under Strong Start. The largest of the awardee's three sites followed the *CenteringPregnancy* approach while the other two sites used locally-developed Group Prenatal Care models. For all sites, group care sessions involved a medically-focused check-up along with facilitated group discussions on topics such as what to expect during pregnancy, breastfeeding, family planning, nutrition, and substance use. HealthInsight's sites initially struggled with enrollment but were able to overcome these challenges; they all used incentives (not paid for by Strong Start) to enroll and engage participants and the largest site ultimately filled every group and even maintained a waiting list. Among HealthInsight participants, certain psychosocial risk factors were notable. For instance, more than one-third screened positive for depression, and participants reported slightly higher rates of intimate partner violence and somewhat higher rates of food insecurity than average rates among Strong Start participants overall. Impact analysis found infants of women enrolled in Strong Start at HealthInsight had marginally higher average gestational ages (p-value<0.10), lower rates of very low birth weight, and better Apgar scores than infants of women in the comparison group. Case study key informants felt that the bonds formed among Group Prenatal Care participants and with facilitators increased appointment attendance, improved women's nutrition, reduced risky behaviors (such as smoking and substance abuse), and resulted in women seeming "more connected" with their babies.

Johns Hopkins University

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,629	• The Johns Hopkins University School of Medicine and Priority Partners (a Hopkins-affiliated Medicaid managed care organization) collaborated to implement Strong Start	• Five sites in Baltimore City, MD	• Intervention categorized as "medium intensity" for offering three to four care coordination, education, and/or referral encounters, with no other direct enhanced services • Care coordination and social support, consisting of encounters with nurse case managers (CMs) and community health workers (CHWs) throughout pregnancy and postpartum • Baby Basics, a group health literacy program for pregnant women • Quarterly summits, an opportunity for CM/CHW teams from all Strong Start sites to exchange ideas along with providers and community partners

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Care management staff's ability to address patient's health needs and psychosocial needs
- Promoted team-based approach and consistency in care

CHALLENGES

- Clinic staff buy-in and difficulty securing space for Strong Start CMs/CHWs
- Data collection burden: built an electronic system but ultimately could not use it and submitted paper forms

PARTIALLY SUSTAINED

- All sites partially or fully sustained their Strong Start model
- Some sites sustained all three components of the intervention, including care coordination services, Baby Basics classes, and quarterly summits
- Other sites kept care coordination and summits, but eliminated the Baby Basics component

KEY FINDINGS: PARTICIPANT-LEVEL DATA[57]

PARTICIPANT-LEVEL DATA QUALITY

- 0.1% rate of missing intake forms; 0.0% rate of missing exit forms
- 2.0% rate of item nonresponse on intake forms; 8.9% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 19.0% of women were teens (under age 20); 7.9% were 35 years or older
- 72.6% of women were black; 8.1% were Hispanic; 13.0% were white
- 12.8% of women were married; 35.0% were living with a partner; 22.5% were not in a relationship
- 24.9%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 34.0%: C-section rate among women with a delivery
- 13.6%: preterm birth rate among women with a live birth
- 12.8%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Higher rates of preterm birth and very preterm birth, lower rates of low birthweight, lower rates of very low birthweight, and worse Apgar scores than infants in the comparison group
- Difference in very low birthweight is marginally significant (p-value<0.10)
- Findings from site-level estimates for East Baltimore Medical Center, Johns Hopkins Outpatient Center, and Bayview Medical Center, which served a large enough number of women enrolled in Strong Start that site-level estimates were also feasible – are in Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Not conducted for Johns Hopkins because we did not obtain Medicaid claims data from Maryland

[57] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Under its pre-Strong Start model of care, prenatal care was provided within high-volume obstetrical (OB) clinics with close links to Johns Hopkins University School of Medicine (Hopkins) teaching hospitals. Attending physicians and residents were the main providers of prenatal care in the clinics, though some nurse practitioners and midwives also provided care for low-risk patients. Women typically did not see the same provider throughout the prenatal, delivery and postpartum periods unless they were being treated by a high-risk provider. Deliveries were most often attended by residents, meaning that most women's births were generally not attended by their prenatal care providers. This model of clinical prenatal care did not change with the introduction of Strong Start.

Women enrolled in care at Hopkins following a positive pregnancy test, which was typically done at Hopkins, a Hopkins-run mobile clinic, or the health department. Staff also checked Medicaid eligibility status and filed an application on behalf of women who appeared eligible but were not yet enrolled. Subsequently, Hopkins staff scheduled women for a 1 ½ hour nurse visit at a Hopkins clinic of their choosing. During this visit, a nurse performed two risk screens. The first risk screen, a standard form required by Maryland Medicaid for all pregnant women, was sent to the state.[58] The second was the Quality Sentinel (QS) risk screen, which was entered into the Johns Hopkins medical record system.

Hopkins and Priority Partners offered some supportive services to prenatal care patients prior to Strong Start, including access to social workers and nutritionists, but the scope and availability of these services were considered inadequate for meeting Medicaid patients' needs. In addition, Priority Partners had a case management program in place for many years, called Partners with Moms, but interactions were primarily via telephone, and the service was reserved for high-risk pregnant women. Priority Partners found that this form of case management was often ineffective because some women could not be consistently reached by telephone and because it was hard to build trust over the phone. For that reason, Priority Partners had begun to move some case management staff into community settings prior to Strong Start.

DESCRIPTION OF ENHANCED STRONG START SERVICES

The Strong Start program was a Maternity Care Home model branded as the Johns Hopkins Coordinated Antenatal Service Enhancement Maternity Care Home, or J-CASE. Program officials described the model as a "one-stop-shop where you can get whatever you need when you are pregnant." Nurse case managers (CMs) and community health workers (CHWs) were embedded in the Hopkins clinics to provide care coordination and resource referrals for Strong Start enrollees. There were also two additional program components: 1) Baby Basics—a group health education program that used a curriculum that was standard across Baltimore City and 2) Quarterly summits that brought Strong Start staff together with others in Baltimore who were doing related work.

[58] The Maryland Prenatal Risk Assessment may be found here: http://www.medstarfamilychoice.com/documents/forms/MPRA.pdf.

The key feature of the Johns Hopkins Strong Start program included care coordination, using both nurse CMs and lay CHWs, in five maternity clinics operated by Johns Hopkins. Johns Hopkins Outpatient Center (JHOC) and John Hopkins Bayview Medical Center (Bayview) clinics were both located in teaching hospitals and served high risk women with greater medical needs. Johns Hopkins East Baltimore Medical Center (EBMC) was a freestanding clinic serving women with lower medical needs but very high social needs. Wyman Park was another freestanding clinic that served a somewhat less-disadvantaged community and clientele. The Center for Addiction in Pregnancy (CAP) was an inpatient substance abuse treatment center on the campus of Bayview Hospital. Bayview, JHOC, and EBMC all began Strong Start in summer 2013, while Wyman Park and CAP were added in early 2015 to increase enrollment.

Services the nurse case managers and CHWs provided fell within the category of "case management." Strong Start staff assisted women with issues that ranged from managing health conditions to making referrals for social services. Typically, nurse case managers worked with women on issues related to their health. CHWs focused on problems of a psychosocial nature, including help with transportation (offered at no cost by Priority Partners and the health department in certain circumstances), housing, food, obtaining Medicaid, locating free cribs or car seats, and other services including mental health counseling, substance abuse treatment, or dental care. An example of the assistance cited by two case managers was their ability to facilitate access to home administration of progesterone injections (17 Alpha-Hydroxyprogesterone Caproate or 17P) for women at risk of preterm birth. Family planning counseling was primarily the work of the clinical staff, but Strong Start staff supplemented provider education and answer questions as needed. Providers encouraged participants to consider long-acting reversible contraceptives (LARCs), including intrauterine devices (IUDs) inserted at delivery, and key informants reported that uptake of these methods was high because women like the convenience or LARCs. CHWs and case managers also helped women navigate the health system's web portal and alerted them to potential benefits they could receive, such as the $100 gift card Priority Partners provided if they showed up for all of their prenatal care appointments.

Strong Start funds also supported "Baby Basics," a health literacy program for pregnant women. Baby Basics classes used a curriculum developed by the What to Expect Foundation that was designed to help underserved women become proactive healthcare consumers, while also educating them on how to care for themselves and their babies. Baby Basics was offered to all women enrolled in Strong Start free of charge. It used small incentives for participation (e.g., when the woman graduated, there was a "baby shower"). Strong Start funds could not be used for incentives, so the program relied on donations of various types; thus, the incentives varied by site and included a range of items from diapers to car seats.

> "They gave me a Baby Basics book at the beginning. You can talk about anything you want in there."
>
> *- Strong Start participant*

A final component of the project was the Strong Start Quarterly Summit, the only opportunity for the nurse case manager/CHW teams from all Strong Start sites to get together and exchange ideas. Other Hopkins staff (including OB providers) and staff from community organizations doing related work were also invited to these meetings. Members of the evaluation attended the June 2014 summit, where invited speakers gave two presentations, one on the Center for Addiction and Pregnancy and one on the Special Supplemental Nutrition Program for Women, Infants, and Children or WIC (by a member of the Hopkins staff who runs its WIC program).

OUTREACH AND ENROLLMENT

All sites used an opt-out approach, meaning that all women were enrolled into Strong Start by default unless they actively chose to opt out of the intervention. Strong Start targeted members of Priority Partners. Women usually enrolled at their first prenatal visit or soon thereafter. There was not a community-based outreach component to Johns Hopkins Strong Start, aside from occasional home visits conducted with participants who were difficult to get in touch with. A nurse determined a patient's Strong Start eligibility after completing the two mandatory risk screens (described previously). Pregnant women were eligible for the program if they were: (1) enrolled in Medicaid through Priority Partners; and (2) were less than 31 weeks' gestation at the time of their first visit. The gestational age criteria for the first year was 28 weeks[59], but then was changed to 30 weeks with the intention of increasing the number of women the program served. The enrollment process was managed jointly by the CM and the CHW, but generally the CM did the medical screening.

> "Someone who worked with Priority Partners asks you questions and tells you about Strong Start. One of the social workers asks you questions about your pregnancy, whether or not you're depressed, and lets you know you can talk to them."
>
> *- Strong Start participant*

Medicaid rules prohibited Hopkins from steering patients to enroll in Priority Partners, but the community outreach worker could provide community members with information about Strong Start and help inform women's decisions about enrollment in a Medicaid Managed Care Organization (MCO). The CHWs used gift bags as an engagement approach for enrollment and outreach. The women received a Priority Partners bag with a few small items, such as planners and personal hygiene products. Additional information based on the needs identified during the intake process was also included in the bag.

Two new sites were added to the program midway through the award period, to reach and enroll more women in Strong Start. CAP was specifically selected as one of the new sites because the awardee felt the site's patient population was in need of Strong Start services. With the addition of two new sites in 2015 and the raising of the gestational age limit for enrollment to 30 weeks, enrollment grew over time, but did not meet the original enrollment target of 4,000, which staff considered to have been an unreasonable goal. The program was ultimately able to meet its revised enrollment goal of 1,600 participants.

Program staff struggled to generate robust enrollment in Baby Basics classes. In the third year of the evaluation, key informants reported that a new March of Dimes grant would provide new incentives for participation, including breast pumps.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Awardee staff were fairly certain Strong Start had positive impacts on preterm birth and low birthweight rates. Key informants shared that one preliminary internal analysis conducted by the awardee suggested those who are "touched" by the program at least three times had lower rates of preterm birth (10 percent) compared to 14 percent for those enrolled in Strong Start but touched fewer

[59] In July 2014, and after data collection for the awardee case study, CMMI modified program eligibility requirements so that they no longer include a gestational age cutoff or a qualifying preterm risk factor.

times. There was no perceived impact on C-section; this had not been studied quantitatively by the awardee.

Despite additional breastfeeding support and education provided by Baby Basics and the case management dyads, key informants were unsure of whether breastfeeding rates changed because of Strong Start. While women generally had multiple interactions with the case management dyads, it is unclear to what extent interactions focused on breastfeeding, and very few women took advantage of the Baby Basics classes. Though interviewees agreed the additional breastfeeding education and support was beneficial to patients, Hopkins' recent transition to becoming a Baby Friendly health system made it difficult to attribute any changes in breastfeeding rates to a specific intervention.

The awardee did not feel they had enough data to comment on whether its Strong Start program had resulted in any cost savings. From the insurance perspective, comparing cost of care for patients seen at Hopkins with other Baltimore providers could be misleading because Hopkins "has higher institutional charges, so they have not realized savings yet." For this reason, Priority Partners felt a pre-post analysis of cost would be needed to assess cost savings of the program. In the long term, Priority Partners and Johns Hopkins Healthcare hoped the enhanced case management program would improve outcomes enough to decrease the Neonatal Intensive Care Unit (NICU) admissions, which would likely yield cost savings. The awardee also noted that ideally a case management program would encourage patients to follow guidance on recommended care, decrease no shows and help the Hopkins system function more efficiently overall, leading to further cost savings.

The positive outcome most often mentioned by key informants was the care coordination teams' success in providing additional support to women at each site. Site and awardee staff felt the women in their Strong Start program benefitted not only from having someone to talk to about the myriad problems that affected their lives, but also from having someone to help solve these problems. Interviewees reported that one of the biggest benefits of the case management component of Strong Start has been teaching women how to navigate the health system and encouraging them to actively participate in their care. They felt that women were receptive to and appreciated the support.

STRONG START PARTICIPANT PERSPECTIVES

Most focus group participants chose Hopkins for their prenatal care because of previous positive experiences or familiarity with providers at Hopkins. Several women had received care at Hopkins for prior high-risk pregnancies and returned for the current pregnancy because they were satisfied with their earlier experiences. Others were wary of the care offered elsewhere.

> *I had preeclampsia with my first son. They took good care of me. He was early. I had him at seven months, and he weighed 2 pounds. They took good care of him. When it comes to babies, they're on it. I feel comfortable getting my care here. I go to the high-risk clinic, and they treat me like family there.*

A number of women reported meeting with a Strong Start community health worker during their regular prenatal care appointments, though most could not recall details about these encounters. One woman said most of her interactions with the community health worker were over the phone. Overall, women were very appreciative of the additional support provided by the Strong Start staff. One woman

recalled being asked if she wanted to see a counselor and another expressed gratitude that Strong Start helped her whole family, not just with issues related to the current pregnancy.

> *[Community health worker] is the most helpful to me. She has connected me with food banks, toys for tots, and they give you vouchers for dinner so your kids can eat. Most programs just help with the current pregnancy, but she was more with helping with all the other kids too. If I don't have a crib or a pack and play, I can get those.*

Some women who had previously received prenatal care at Hopkins noticed a difference in the care they received with their Strong Start pregnancy. In general, satisfaction was high and participants were appreciative of the additional support provided by the Strong Start staff.

> *When I had my first two, I still liked Hopkins, but finding resources was on me. This time, [community health worker] helps me with everything, which is really helpful.*

PROGRAM STRENGTHS

Overall, key informants were most proud of the case management component of their Strong Start program, particularly being able to provide on-site navigators. When referring to the patient navigation aspect of Hopkins' program, one key informant said, "It's something that hasn't been widely used [at Hopkins], and our patients certainly have demonstrated that they are satisfied with [case management services]." Numerous key informants reported that the dedication of case management staff throughout the intervention was "impressive" and had had a tangible impact on patient experience in and beyond the healthcare system. CM and CHW skills complemented each other, and the team-approach allowed for a professionally trained staff member (the CM) to screen women and identify health needs that the CM focused on specifically (and that would be outside the scope of training of a CHW). Because women at Hopkins saw a variety of clinicians throughout their pregnancies, patient navigation staff provided consistency that might otherwise be lacking. Staff said that anecdotally, they reported that psychosocially-complex patients were adhering to care plans more successfully because of the relationships they developed with their community health workers. Case management staff reported being particularly proud of their accomplishments helping patients find stable housing and completing their education.

> "Stuff happens. It's good to have somebody– I'd say I don't have food in my house and they can help you with a lot of stuff. [I wish] I'd had that help available when I was pregnant with my son. It was a lot harder."
>
> *- Strong Start participant*

Staff of all levels agreed that the quality of case management staff had the biggest impact on how well the Hopkins Strong Start program worked. According to one key informant, "At the end of the day, the front-line staff had to make this work, and they rose to the occasion and did that." Program staff universally agreed that the relationships CHWs developed with patients and community resources were the backbone of a Maternity Care Home intervention. For this reason, staff reported it was important to hire staff with strong community connections and communication skills. Overall, interviewees were pleased with the way staff handled challenges and adapted to changing program requirements.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The biggest challenges, interviewees reported, arose during the early implementation phase. Initially, awardee staff felt it was difficult to get full buy-in from sites because clinic staff didn't understand the purpose of the program, and were concerned that Priority Partners was "spying" on providers. Site staff also reported difficulties securing adequate space for case management staff, which could have been related to initial buy-in challenges. With increased dialogue between the awardee and sites, as well as community health workers' efforts to build rapport with clinic staff, program staff were generally able to overcome these challenges.

Staff of all levels also reported that unclear expectations for data collection led to logistical challenges on the ground and staff frustration. Hopkins built a system to collect Strong Start data electronically, but was not ultimately able to use this system because it was too costly to update as program and evaluation data collection requirements grew. Thus, Strong Start staff ultimately submitted paper evaluation forms.[60]

Strong Start program officials reported that one thing they would have done differently was to project enrollment more realistically. One key informant thought that the enrollment projections they made at the beginning of Strong Start were unrealistically high. The program also struggled to find the best way to implement Baby Basics and increase attendance for these classes.

SUSTAINABILITY

Johns Hopkins has sustained its Strong Start model fully at some sites and partially at others. Some sites have kept all three components of the Maternity Care Home intervention (care coordination services, Baby Basics classes and quarterly summits). Other sites have discontinued Baby Basics classes, but will keep providing care coordination services and holding quarterly summits. Johns Hopkins plans to fund the sustained Strong Start services by incorporating the cost of full-time employees hired for Strong Start into the hospital's case management budget.

Nurse case managers and CHWs will continue to work as dyads providing patient navigation services to Baltimore's pregnant Medicaid population. These services will be offered through the Partners with Mom program, which prior to Strong Start, provided telephonic case management services. Post-Strong Start, case management services will be offered as they were during Strong Start, with no significant changes to the content or number of encounters. These services have since been made available to women insured by all lines of business, not just Priority Partners as was the case during Strong Start.[61] Key informants did note, however, that a majority of Hopkins' Medicaid patients are enrolled in Priority Partners (around 70 percent), so a large proportion of Partners with Mom participants will continue to be Priority Partners members.

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[60] The case study team attempted to clarify the elements of data collection that posed a problem, but were unable to confirm with the awardee.

[61] Key informants provided conflicting information about expansion to non-Priority Partners members during the Year 4 case study interviews. The team was unable to confirm with the awardee whether this expansion was planned, or if it ultimately occurred.

The Baby Basics program has been scaled back at certain clinics because of lack of site and patient buy-in, but continues to operate at the larger Hopkins sites where it was comparatively more successful – though overall enrollment in these classes was low. Priority Partners was also looking to expand Baby Basics classes beyond the Hopkins network to include Baltimore-area Federally-Qualified Health Centers (FQHCs).

Quarterly summits will continue, but will be more focused on staff training than engaging community partners. Key informants did note, however, that community partners will still be an important part of some of these meetings going forward.

The Partners with Mom program does its own intake screening, independent of Strong Start data collection. To reduce redundancy, Strong Start data collection will end, but some aspects (such as depression and anxiety screening) will be pulled from the Strong Start evaluation forms and incorporated into the Partners with Mom intake process.

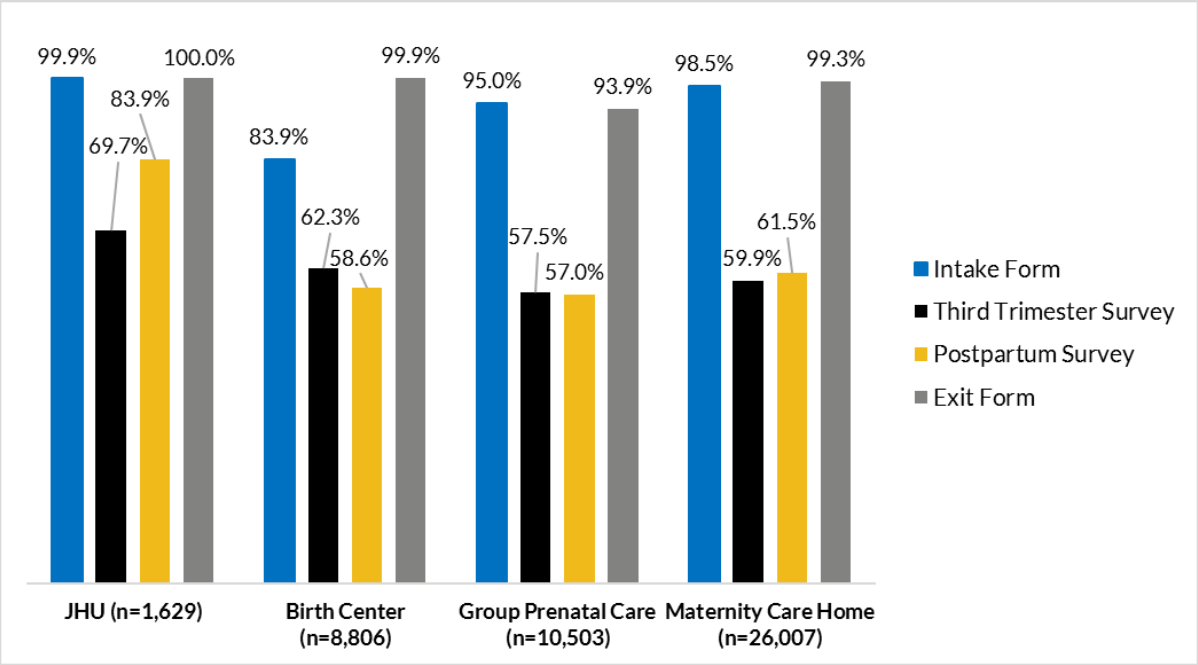
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Johns Hopkins, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for JHU to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 21 JHU participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 9: FORM SUBMISSION RATES, HOPKINS



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,602
- Study IDs represented: 1,629 (suggests that PLPE data were submitted for 27 extra patients: see information on program report data in Appendix F in Volume 1)
- In 2015, the awardee reported instances where ineligible women were counted as enrolled; they attempted to reconcile this problem in their records and asked the evaluation team to delete forms for these patients.

HOW FORMS WERE ADMINISTERED:

- Most surveys were filled out in person, either by the participant or with help from a healthcare worker, if the participant requested it. If the participant did not have time to fill it the survey in person or they missed an appointment, the form was completed through a phone interview.
- Regarding the postpartum form, JHU reported that many of their patients did not attend a postpartum visit, and that the patient population often changes phone numbers and thus could not be reached for a phone interview.
- The awardee had several layers of Quality Assurance for the surveys, including the community health worker, the case manager, and the data coordinator.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not express any site-specific concerns.

MISSING FORMS:

- Intake Form: 0.1 percent of Study IDs were missing Intakes. The awardee said they were completed but was unable to locate back-up copies.
- Third Trimester or Postpartum Surveys: About 30 percent of Study IDs were missing the Third Trimester Survey and 16 percent were missing the Postpartum Survey. The awardee indicated Strong Start staff were not able to meet with the patient during the timeframe when the survey applied, including cases where women were lost to follow up (e.g., left care prior to delivery). Although fewer Postpartum Surveys were missing than Third Trimester Surveys, many postpartum surveys had not been completed; the awardee submitted the blank surveys and checked the box "participant could not be reached."
- Exit Form: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake: The awardee noted issues around the alcohol use questions. The awardee also stated that the homelessness question might have been overlooked because of the survey formatting and that participants might have been reluctant to report this.
- Exit: The awardee had high rates completion for key outcome variables, missing only 1.2 percent for outcome of Strong Start pregnancy among participants.[62]

MAIN FINDINGS:

The tables that follow summarize the characteristics and outcomes of Hopkins participants. Some highlights include:

- The majority (73.1 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 11.5 percent of participants were 18 or 19 years old.
- Most participants were black (72.6 percent), followed by 13.0 percent white and 8.1 percent Hispanic.
- Similar to Strong Start participants overall, the largest share of Hopkins participants was in a relationship and living with a partner (35.0 percent), while 12.8 percent were married and 22.5 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 14.8 percent of Hopkins participants reported having experienced intimate partner violence, 24.9 percent of participants with a prior birth had a prior preterm birth, and 75.1 percent of participants had not planned their Strong Start pregnancy.

[62] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 94.7% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 5.3% were missing for other reasons.

TABLE 129: DEMOGRAPHICS, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.4	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,602**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	7.4	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	11.5	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	73.1	81.7	72.9	75.1	75.8
35 Years and Older	%	7.9	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.4	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,602**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	8.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	13.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	72.6	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	6.4	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	2.0	19.6	12.8	11.3	13.3
Not in Universe	%	90.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**129**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	22.5	52.6	36.3	55.8	49.7
Puerto Rican	%	17.8	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	56.6	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,606**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.1	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	0.9	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,593**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	32.9	36.6	30.8	35.3	34.5
In School, Not Employed	%	13.4	8.7	12.6	11.9	11.5
Employed and in School	%	5.1	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	48.6	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	1.4	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,585**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	31.8	15.4	27.8	29.1	26.4
High School Graduate or GED	%	61.2	57.5	58.3	57.9	57.9
Associate's Degree	%	2.5	8.2	5.2	4.6	5.4
Bachelor's Degree	%	2.8	14.5	4.5	3.7	5.8
Other College Degree	%	1.6	4.3	4.2	4.7	4.5

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	1.6	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,583**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	12.8	42.1	20.4	20.8	24.5
Living with a Partner	%	35.0	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	29.8	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	22.5	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 130: PSYCHOSOCIAL, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.4	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,586**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	70.5	51.8	51.8	59.7	56.5
No	%	24.1	44.6	42.3	37.4	39.8
Unsure	%	5.4	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.4	17.0	6.6	3.4	6.8
Not in Universe	%	29.1	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**1,118**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	82.3	61.1	72.6	79.9	75.3
Other	%	11.5	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	6.2	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	8.3	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,474**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	17.3	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	1.7	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,581**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	15.4	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	2.5	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,568**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	51.5	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	2.1	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,574**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	32.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	0.9	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,593**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	55.2	67.9	59.0	65.5	64.5

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mild	%	26.0	21.4	23.8	20.2	21.2
Moderate	%	11.3	6.8	10.3	8.5	8.6
Severe	%	7.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	0.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,600**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	14.8	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	0.7	18.3	16.3	7.7	11.8
Not in Universe	%	4.2	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,529**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.4	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,606**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	61.6	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	25.0	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	13.4	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	72.0	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	24.8	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	23.3	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	10.0	24.6	17.1	15.4	17.2
Childcare Challenges	%	6.8	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	12.2	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 131: PREGNANCY HISTORY AND INTENTIONS, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,608**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	78.9	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	21.1	26.1	29.6	27.3	27.6

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	4.5	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**1,196**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	36.0	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	3.5	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**1,213**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	45.1	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	36.3	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**685**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	5.7	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	43.8	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**565**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	23.5	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	49.1	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**479**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	9.8	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	50.6	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**455**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	5.1	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	51.4	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**443**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	2.5	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	51.3	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**444**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	2.7	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 132: PRIOR BIRTH OUTCOMES, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.1	1.7	1.5	0.6	1.0
Not in Universe	%	21.1	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,267**	**6,337**	**6,857**	**18,350**	**31,544**

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	84.0	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	12.2	23.5	18.9	15.2	17.7
Not in Universe	%	33.8	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**868**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	23.0	34.6	24.3	27.1	28.1
>= 18 months	%	77.0	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.1	0.1	2.5	1.4	1.4
Not in Universe	%	33.8	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,062**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	24.9	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	8.1	1.3	20.8	13.1	12.6
Not in Universe	%	33.8	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**933**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	13.6	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (interpregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 133: PRE-PREGNANCY MEDICAL CONDITIONS, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	3.2	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,556**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	24.9	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	63.8	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	2.4	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	8.8	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	4.7	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,533**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	2.0	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	4.4	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,538**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	8.5	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	4.8	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,531**	**8,474**	**7,052**	**20,908**	**36,434**

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Underweight (BMI < 18.5)	%	2.5	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	31.4	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	23.7	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	29.2	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	13.2	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 134: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	9.6	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,453**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	5.8	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	9.0	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,463**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	11.1	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	9.8	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,450**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	7.4	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	9.0	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,463**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	1.4	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	9.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,463**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	1.0	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	9.2	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,460**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	9.2	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,460**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.9	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	8.7	0.8	28.0	23.1	19.9

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,468**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	16.5	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 135: TREATMENTS DURING PREGNANCY, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	11.1	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,429**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	1.9	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	1.8	0.8	10.0	5.1	5.4
Not in Universe	%	83.6	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**235**	**680**	**654**	**2,585**	**3,919**
Yes	%	20.9	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	11.9	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,417**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	5.7	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	12.5	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,407**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	1.7	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 136: PRENATAL CARE, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	7.0	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,495**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	70.0	4.7	29.5	64.5	43.3
Licensed Professional Midwife[63]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	11.2	-	26.5	5.7	8.9

[63] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	16.9	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	1.8	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,608**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	98.4	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	8.8	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,608**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	3.0	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,559**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	97.8	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	6.0	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	10.7	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,436**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	9.1	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	4.3	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	10.6	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,438**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	9.5	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,456**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	1.0	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.4	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	8.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,466**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	7.6	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.7	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	9.1	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,461**	**157**	**5,257**	**16,146**	**21,560**

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	8.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,469**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	16.1	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	2.9	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	9.2	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,460**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	5.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	3.4	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	8.8	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,466**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	28.4	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	2.0	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	22.0	52.4	70.7	46.7	52.0
Pulmonologist	%	4.4	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	21.7	-	6.4	6.9	6.8
Other	%	71.2	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 137: ELIVERY INFORMATION, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	6.6	1.4	25.3	23.3	19.5
Not in Universe	%	16.7	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,234**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	34.4	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.4	0.3	7.8	2.9	3.5
Not in Universe	%	73.6	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**418**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	93.3	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	1.4	4.6	11.5	7.3	7.7
Not in Universe	%	6.8	25.8	15.8	18.2	19.2

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,476**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.5	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.4	0.7	12.0	5.6	6.1
Not in Universe	%	6.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,460**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	66.0	87.1	70.1	69.5	73.1
C-Section	%	34.0	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.9	0.4	8.7	2.3	3.4
Not in Universe	%	70.4	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**462**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	68.2	83.3	72.9	74.7	75.9
C-Section	%	31.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	3.2	4.7	12.5	6.3	7.4
Not in Universe	%	69.2	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**445**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	35.7	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	81.9	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**291**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	17.2	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 138: BIRTH OUTCOMES, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	1.2	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,589**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	93.8	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	1.3	0.3	0.2	0.6	0.5
Miscarriage	%	4.3	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	10.3	0.7	15.4	5.8	7.0
Not in Universe	%	7.3	26.1	16.4	18.9	19.8

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,326**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	4.8	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	8.7	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	85.4	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.1	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	2.7	2.1	14.3	8.0	8.3
Not in Universe	%	7.3	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,448**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	2.1	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	10.8	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	81.1	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.0	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 139: SATISFACTION, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	38.6	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**987**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	2.0	0.4	1.0	1.3	1.0
Moderately Satisfied	%	5.9	3.3	4.4	7.8	6.2
Very Satisfied	%	39.9	25.6	35.6	46.1	39.8
Extremely Satisfied	%	51.7	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	38.4	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**991**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	2.3	2.0	3.1	2.3	2.4
Slightly Satisfied	%	4.2	3.0	4.0	2.9	3.1
Moderately Satisfied	%	11.4	10.4	11.6	12.8	12.1
Very Satisfied	%	39.1	29.1	42.6	46.6	42.1
Extremely Satisfied	%	43.0	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 140: BREASTFEEDING, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	31.3	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**1,105**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	23.3	80.4	47.5	40.5	50.3
Formula Feed Only	%	25.7	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	35.3	10.8	31.9	32.5	27.8
I Haven't Decided	%	15.7	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	38.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**985**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	59.6	91.5	76.6	72.6	77.3
No	%	40.0	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 141: FAMILY PLANNING, HOPKINS

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	38.9	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**982**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	95.4	77.0	77.5	82.2	80.3
No	%	4.2	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	38.9	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**983**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	91.0	84.2	70.8	74.0	75.5
No	%	7.4	13.2	17.7	21.5	19.1
Unsure	%	1.5	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	15.9	41.5	43.1	38.8	40.3
Not in Universe	%	28.4	14.0	27.3	21.6	21.4
Women with Non-Missing Data	**N**	**895**	**3,912**	**3,088**	**10,139**	**17,139**
Female Sterilization	%	7.0	41.5	42.9	38.6	40.2
Male Sterilization	%	-	14.0	27.4	21.7	21.5
LARC - Implant	%	23.0	3,912	3,086	10,138	17,136
LARC - IUD	%	20.7	3.2	12.6	12.1	10.2
Pills	%	9.7	3.6	0.7	0.7	1.4
Injection	%	18.5	2.8	11.4	10.9	9.2
Condoms	%	13.7	10.8	11.9	12.3	11.9
Breastfeeding	%	-	8.6	11.9	13.0	11.8
Rhythm or Safe Period	%	-	5.9	16.2	20.2	16.2

Data Elements	N or %	JHU (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	26.6	19.8	13.9	17.9
Spermicide	%	-	12.8	2.9	3.1	5.3
Other Method	%	4.2	2.6	0.5	0.2	0.8
Method Not Indicated	%	1.2	2.6	1.2	1.7	1.8

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate and Medicaid Eligibility data were obtained from Maryland

Initial Contact: In March and April 2015, the evaluation team spoke with officials from the Maryland Department of Health and Mental Hygiene (DHMH), which houses both the Maryland Medical Assistance Programs and the Vital Statistics Administration (VSA), to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data (respectively). State officials were initially receptive to supporting the evaluation; however, after submitting a data request application in April 2015, Urban was informed by VSA officials that the agency did not have the resources (at that time) to participate in the evaluation. However, when re-contacted in November 2015 and presented with a copy of the agency's original Letter of Support, state officials reported that circumstances had improved and they agreed to participate.

Data Acquisition Process: Urban submitted an IRB application to DHMH as part of the process for obtaining Medicaid data from the Office of Health Care Financing, which was quickly approved by the VSA director. In August 2016, Urban facilitated a conference call with VSA, the Office of Health Care Financing, and the Hilltop Institute at University of Maryland, Baltimore County (which performs a wide variety of health services research activities for state and local agencies in Maryland including DHMH) to further discuss the data requests and the process to link Medicaid and birth certificate data. During the call, the parties agreed that: (1) the Hilltop Institute, on behalf of Medicaid, would perform the data linkage and send a linked file to Urban; and (2) a memorandum of agreement and data use agreement (DUA) would be needed (in addition to IRB approval). Following the call, there were several months of discussion with the Hilltop Institute to determine a correct scope of work and budget, and it was ultimately decided that it was not feasible, because of time and cost constraints, to include Medicaid claims in the linkage. In March 2017, an agreement was reached and Medicaid began drafting a DUA. All of the DUAs were finalized and executed in June 2017, and Hilltop began work on the data request.

Final Result: Urban received merged Medicaid eligibility and birth certificate data in November 2017 and these data were used in the evaluation's final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES

The Johns Hopkins University (Hopkins) awardee, which implemented the Maternity Care Home model, delivered care at five sites included in the impact analysis: East Baltimore Medical Center; Johns Hopkins Outpatient Center; Bayview Medical Center; Wyman Park; and CAP. This section presents the evaluation's impacts results for the awardee as a whole. In addition, East Baltimore Medical Center, Johns Hopkins Outpatient Center, and Bayview Medical Center served a large enough number of women enrolled in Strong Start that individual site level estimates were also feasible (Table 142). Case study data indicate that both Johns Hopkins Outpatient Center and Bayview Medical Center served women with greater medical needs.

TABLE 142: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR HOPKINS

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Johns Hopkins University			
East Baltimore Medical Center	Yes	Yes	No
Johns Hopkins Outpatient Center	Yes	Yes	No
Bayview Medical center	Yes	Yes	No
Wyman Park	Yes	No	No
CAP	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[64]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. As we did not receive claims data from Maryland, expenditure and utilization outcome findings are not reported for this awardee, nor are results from alternative specifications that include claims variable controls. We also do not estimate models where we draw the comparison group outside the county (alternative specification #1) for Hopkins because the comparison group could be pulled from the same counties where Strong Start participants reside.

[64] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 143 reports the birth and process outcome findings for the Hopkins awardee:

- There is no statistically significant difference in the average clinical gestational age between infants born to Strong Start enrollees and comparison group women. However, women enrolled in Strong Start at Hopkins sites are more likely to have a preterm birth (13.2 percent) than comparison group women (10.9 percent), a significant difference of 2.3 percentage points. We also observe a higher rate of very preterm birth among infants born to Strong Start women (4.3 percent compared to 3.0 percent). The difference in very low birthweight between the two groups is only marginally significant (p-value<0.10).
- There is no statistically significant difference in the average birthweight between infants born to Strong Start enrollees and comparison group women. However, infants born to Strong Start women are also more likely to have a low birthweight birth (13.4 percent) than infants born to comparison group women (10.5 percent), a significant difference of 2.8 percentage points. We also observe a higher rate of very low birthweight among infants born to Strong Start women (2.3 percent compared to 1.5 percent). The difference in very low birthweight between the two groups is only marginally significant (p-value<0.10).
- Infants born to women enrolled in Strong Start are less likely to have an Apgar score greater than or equal to seven (94.3 percent) than infants born to women in the comparison group (97.2 percent), a significant difference of 2.9 percentage points.
- We do not observe differences between Strong Start and comparison group women for other birth outcomes.

TABLE 143: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT JOHNS HOPKINS UNIVERSITY

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1076)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=36458)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.4	-0.1	N/A	N/A	N/A
Preterm birth rate	13.2%	10.9%	**2.3***	N/A	N/A	N/A
Very preterm birth rate	4.3%	3.0%	**1.3^**	N/A	N/A	N/A
Birthweight (grams)	3,125.9	3,137.3	-11.4	N/A	N/A	N/A
Low birthweight rate	13.4%	10.5%	**2.8****	N/A	N/A	N/A
Very low birthweight rate	2.3%	1.5%	**0.9^**	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	94.3%	97.2%	**-2.9****	N/A	N/A	N/A

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1076)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=36458)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Process Outcomes						
C-section rate	18.7%	19.4%	-0.7	N/A	N/A	N/A
VBAC rate[1]	16.0%	17.5%	-1.5	N/A	N/A	N/A
Weekend delivery rate	24.7%	22.8%	1.9	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 194 Strong Start women and 5917 comparison group women.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for East Baltimore Medical Center (Table 144), Johns Hopkins Outpatient Center (Table 145), and Bayview Medical Center (Table 146) highlight variation in impacts across the Hopkins awardee sites. Key differences are noted below:

- The higher rate of preterm birth (2.3 percentage points) observed among Strong Start participants at the awardee level is only present at the Johns Hopkins Outpatient Center site, where Strong Start women had a preterm birth rate of 15.7 percent compared to 11.6 percent in the comparison group, a significant difference of 4.1 percentage points. No difference in preterm birth rates was observed at other sites, and no differences were observed in rates of very preterm birth.
- The higher rate of low birthweight (2.9 percentage points) observed among Strong Start participants at the awardee level is only present at the East Baltimore Medical Center site, where Strong Start women had a low birthweight rate of 15.3 percent compared to 9.9 percent in the comparison group, a significant difference of 5.4 percentage points. No difference in low birthweight rates was observed at other sites, but the rate of very low birthweight was marginally higher (p-value<0.10) among Strong Start women at the Johns Hopkins Outpatient Center site than among comparison women (3.3 percent compared to 1.6 percent).
- We observe the lower rate of Apgar scores greater than or equal to 7 among infants born to Strong Start women at both the East Baltimore Medical Center and Johns Hopkins Outpatient Center sites (-3.6 and -3.8 percentage points, respectively).
- Finally, Strong Start women at the Bayview Medical Center site had a higher rate of weekend delivery (26.3 percent) than comparison group women (21.3 percent), significant difference of 5.0 percentage points; the difference is not observed at the awardee level.

TABLE 144: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT EAST BALTIMORE MEDICAL CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 -2016, Strong Start (N=262)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=16208)	Main Model: 2014 -2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.4	-0.1	N/A	N/A	N/A
Preterm birth rate	11.5%	10.1%	1.4	N/A	N/A	N/A
Very preterm birth rate	3.8%	2.9%	0.9	N/A	N/A	N/A
Birthweight (grams)	3,088.6	3,121.5	-32.9	N/A	N/A	N/A
Low birthweight rate	15.3%	9.9%	**5.4***	N/A	N/A	N/A
Very low birthweight rate	1.1%	1.4%	-0.2	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	93.5%	97.1%	**-3.6***	N/A	N/A	N/A
Process Outcomes						
C-section rate	19.1%	17.5%	1.6	N/A	N/A	N/A
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.6%	23.9%	1.7	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 38 Strong Start women and 2596 comparison group women.

TABLE 145: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT JOHNS HOPKINS OUTPATIENT CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 -2016, Strong Start (N=395)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=35487)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.2	38.3	-0.2	N/A	N/A	N/A
Preterm birth rate	15.7%	11.6%	**4.1***	N/A	N/A	N/A
Very preterm birth rate	4.3%	3.3%	1.0	N/A	N/A	N/A
Birthweight (grams)	3,124.3	3,117.2	7.0	N/A	N/A	N/A
Low birthweight rate	13.7%	11.2%	2.5	N/A	N/A	N/A
Very low birthweight rate	3.3%	1.6%	**1.7^**	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	93.1%	96.9%	**-3.8****	N/A	N/A	N/A

Outcomes	Main Model: 2014 - 2016, Strong Start (N=395)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=35487)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Process Outcomes						
C-section rate	18.7%	20.4%	-1.7	N/A	N/A	N/A
VBAC rate[1]	15.9%	17.6%	-1.7	N/A	N/A	N/A
Weekend delivery rate	23.8%	23.4%	0.4	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 82 Strong Start women and 5779 comparison group women.

TABLE 146: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT BAYVIEW MEDICAL CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=312)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=32814)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.5	0.1	N/A	N/A	N/A
Preterm birth rate	9.9%	10.0%	-0.1	N/A	N/A	N/A
Very preterm birth rate	2.9%	2.4%	0.4	N/A	N/A	N/A
Birthweight (grams)	3,188.3	3,193.1	-4.8	N/A	N/A	N/A
Low birthweight rate	9.9%	9.5%	0.5	N/A	N/A	N/A
Very low birthweight rate	1.3%	1.1%	0.2	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	96.5%	97.7%	-1.3	N/A	N/A	N/A
Process Outcomes						
C-section rate	16.0%	19.5%	-3.5	N/A	N/A	N/A
VBAC rate[1]	15.4%	17.4%	-2.0	N/A	N/A	N/A
Weekend delivery rate	26.3%	21.2%	**5.0***	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 52 Strong Start women and 5291 comparison group women.

CROSS-CUTTING SUMMARY

The Johns Hopkins University implemented the Maternity Care Home model under Strong Start. Both nurse care managers and lay community health workers provided care coordination services, assisting participants with issues that ranged from managing health conditions to making referrals for social services. Strong Start funds also supported "Baby Basics," a health literacy program for pregnant women, though the awardee struggled to generate robust enrollment in these classes. One of the original goals of the Hopkins Strong Start project was to ensure that participants who had a previous spontaneous preterm birth received progesterone injections regularly to prevent another preterm birth. However, the awardee experienced several barriers to accomplishing this goal, including women entering care late in pregnancy and therefore not being eligible for the intervention, and administratively complex authorization processes for the 17P treatment. Hopkins enrolled a high proportion of women with characteristics that put them at high risk for poor birth outcomes, many of which were not controlled for in the Impact Analysis. For instance, Hopkins enrolled women with substance use disorder who received medication assisted treatment during their pregnancy. One-third of Hopkins participants reported depressive symptoms at intake and 18.4 percent exhibited moderate or severe anxiety. Consistent with these high-risk characteristics, Impact analyses found infants of women enrolled in Strong Start at Johns Hopkins had higher rates of preterm birth, marginally higher rates of very preterm birth (p-value<0.10), and worse Apgar scores than infants of women in the comparison group. However, Hopkins participants did experience lower rates of low birthweight and marginally lower rates of very low birthweight (p-value<0.10) than comparison group women,

Los Angeles Department of Health Services

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
3,142	• Large public health care system serving a majority Hispanic population (64.7%) • Over 800,000 patients treated annually at 19 community-based clinics and four hospitals	• Six sites in Los Angeles county, CA, including downtown Los Angeles and the San Fernando Valley • A mix of large hospital-based outpatient clinics as well as smaller community clinic sites	• Intervention categorized as "high intensity" for offering at least four care coordination, education, and/or referral encounters, as well as psychosocial counseling by licensed clinical social workers • Care coordination services provided by community health workers • Patient risk level (assessed at intake) determined frequency of prenatal encounters, ranging from once a trimester to weekly • Direct mental health services provided by a license clinical social worker • Group health education and resiliency classes co-facilitated by the social worker and a health educator

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Women benefited from additional psychosocial support and coordinated medical care
- Program promoted a collaborative model of care and improved workflow
- Leadership buy-in facilitated the success of the initiative

CHALLENGES

- Lack of system-wide support – including clinic space and implementation time – limited the program's successes
- Persistent stigma around treatment for mental health disorders, traumas, or other psychosocial burdens impeded the program's ability to provide mental health care

SUSTAINED

- Sustained all Strong Start activities, with plans to expand the model to all county locations that provide prenatal care
- Expanded beyond Medi-Cal (California's Medicaid program) to include all women receiving prenatal care at sites currently implementing the program
- Strong Start staff positions are now included in the county budget

KEY FINDINGS: PARTICIPANT-LEVEL DATA[65]

PARTICIPANT-LEVEL DATA QUALITY

- 0.1% rate of missing intake forms; 0.0% rate of missing exit forms
- 3.1% rate of item nonresponse on intake forms; 8.5% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 8.3% of women were teens (under age 20); 18.1% were 35 years or older
- 18.5% of women were black; 64.7% were Hispanic; 5.2% were white
- 27.1% of women were married; 35.5% were living with a partner; 9.9% were not in a relationship
- 23.7%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 34.9%: C-section rate among women with a delivery
- 15.9%: preterm birth rate among women with a live birth
- 8.9%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted for Los Angeles Department of Health Services because we did not obtain birth certificate and Medicaid data for California

[65] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Los Angeles Department of Health Services (LADHS) called their Strong Start program MAMA's Neighborhood, with MAMA's standing for Maternity Assessment, Management, Access and Service. Although the awardee did not use the Maternity Care Home model prior to Strong Start implementation, patients have long had access to a variety of specialists and referral services through the tertiary care centers that comprise the LADHS hospital and ambulatory care network.

While many of the county's Medi-Cal (California's Medicaid program) providers had been offering enhanced prenatal care services through the Comprehensive Perinatal Services Program (CPSP)[66], LADHS had not integrated CPSP into their services offerings, and prenatal patients at LADHS did not have access to case management or care coordination services prior to Strong Start.

DESCRIPTION OF ENHANCED STRONG START SERVICES

MAMA's Neighborhood targeted Medi-Cal beneficiaries up to 28 weeks' gestation. The program provided care coordination, direct mental health services, and health education. One key informant described its mission as providing a "comprehensive, continuous, coordinated and compassionate program for women focused on reducing preterm birth."

Care coordination services identified participants' areas of need and provided linked referrals to community resources. Care coordinators had diverse backgrounds and professional experience, including some who had been trained as medical assistant, and others with prior case management experience. Care Coordinators conducted a comprehensive intake during each participant's first encounter. A risk level was assigned to the participant based on her responses during that encounter, which determined the frequency of follow up encounters. Most care coordination encounters occurred in person either before or after a patient's scheduled prenatal care visit. However, if a care coordinator was unable to see all patients scheduled for a particular day, she would follow up over the phone.

> "I was raped three years ago and this pregnancy brought up a lot of emotions. This year was the first year I had to deal with it being sober. It was really tough. I talked to [the care coordinator] and let her know where I was and how I was feeling. It took three years to admit that it happened. She's really nice and supportive. This is the first counselor I've talked to about it."
>
> *- Strong Start participant*

The information gathered during the intake appointment was also used to guide other aspects of the MAMA's Neighborhood intervention. In particular, the care coordinator created a care plan for each patient and tailored referrals based on participant responses to questions on the Strong Start Intake Form, which was augmented with additional questions designed by LADHS. According to care coordinators, outside referrals were most commonly for the Special Supplemental Nutrition Program

[66] Through CPSP Medi-Cal eligible pregnant women are offered prenatal care, health education, nutrition services, and psychosocial support for up to 60 days postpartum.

for Women, Infants, and Children (WIC), food banks, and urban farmers' markets as well as housing assistance and addiction programs.

Many patients also received referrals to resiliency classes and/or one-on-one counseling with a social worker, both implemented as part of the MAMA's program. Resiliency classes included a health education component with topics on childbirth preparation, healthy eating, postpartum depression and more. LADHS also offered Cognitive Behavior Therapy (CBT) classes as part of its Strong Start program initially, but take-up was ultimately too low to fully launch the curriculum.

LADHS implemented MAMAs at six locations. One site (LA County-USC) was added after the first year of implementation, and another site (Olive View) in the San Fernando Valley, was added in May 2015. LADHS indicated plans to extend this model to all obstetric providers in the county health system.

OUTREACH AND ENROLLMENT

> "I feel more supported. There is more trust. If any of the problems came up that they had asked about [during the prenatal intake], there is that trust established to be able to communicate that and receive help. You can count on the medical staff too."
>
> *- Strong Start participant*

MAMA's Neighborhood was implemented as "standard of care" for Medi-Cal beneficiaries, but also employed an opt-in enrollment process that occurred during a pre-clinical intake appointment. This pre-clinical appointment was dedicated to the Strong Start intake process, and patients were notified at the time of scheduling that their first prenatal appointment would be with a care coordinator rather than a prenatal care provider. During this initial encounter, care coordinators introduced Strong Start as a program aimed at reducing preterm birth and low birthweight by decreasing the mother's stress level during pregnancy. If the patient agreed to participate in the program, the patient stayed for a full Strong Start intake appointment, which lasted approximately two hours. The awardee estimated that over 80 percent of eligible patients decided to enroll in the program, and according to program staff and providers, very few dropped out prior to delivery.

All Medi-Cal-eligible patients who entered care prior to 28 weeks were scheduled for this pre-clinical appointment once their pregnancy was confirmed. The caseload of care coordinators varied by each sites' patient volume rather than patient need and ranged from approximately 30 patients at one site to more than 80 patients at another. Especially high-need participants were enrolled at some of the higher volume LADHS sites, contributing to higher burden (both volume and need-based) on some care coordinators than others.

Care coordinators administered the evaluation's Intake Form as an interview and added some items. One care coordinator noted the importance of closely monitoring patients during the intake appointment: "We also have to observe them, because sometimes they put 'zero' for everything. They think everyone has this stress. Some people don't want to tell us about what's going on in their lives." If any issues arose that could be immediately addressed, the care coordinators provided referrals during the intake appointment. Based on the results of the intake assessments, each patient was assigned a level of psychosocial risk between one (low-risk) and three (high-risk), referred to as their "global risk score." This score determined the frequency of follow-up encounters with the care coordinators. Low-

risk participants received follow-up every trimester, medium-risk participants received monthly follow-up and high-risk participants received more frequent follow-up (e.g., weekly) based on the severity of the individual's needs. In addition to the global score, each patient received a risk score in nine additional risk domains, including drug use, tobacco use, interpersonal, social support, housing instability, food insecurity, generalized anxiety, depression, and medical/obstetric high-risk factors. Care coordinators used these more specific risk domains to guide their referrals and the participant's care plan.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

MAMA's staff expressed confidence that the program had a positive impact on the psychosocial wellbeing of participants. Staff of all levels reported that women enrolled in health education and resiliency classes experienced noticeable reductions in stress and increases in self-efficacy. Some staff also felt the program may have influenced medical outcomes, such as preterm birth and low birthweight. However, others emphasized that it is difficult to "make a one-to-one connection" between improvements in medical outcomes and Strong Start because their patient population is so complex. Moreover, despite recent improvements, many women still deliver outside of the County system, which limits LADHS' access to information on maternal and infant outcomes.

Anecdotally, key informants indicated their belief that cost savings may have resulted from the mental health support provided by care coordinators and mental health professionals. One key informant shared multiple examples of case management successes that resulted in treatment for and prevention of psychotic episodes in MAMA's Neighborhood participants. In these cases, a care coordinator identified a potential mental health crisis early and coordinated with a social worker, psychiatrist and obstetrical provider to manage the case and potentially avoid a crisis. Appropriate management of these cases, key informants suggested, likely resulted in cost savings across numerous systems, including healthcare and social services.

While staff emphasized that they did not have data on emergency department (ED) use, several key informants felt Strong Start may have reduced ED visits by keeping people in outpatient clinics for monitoring rather than sending them to the ED, and generally serving as a touch point for triaging women who might otherwise head to the ED.

STRONG START PARTICIPANT PERSPECTIVES

any participants chose an LADHS site for their most recent pregnancy because they had previously received services there or had friends or family who recommended it. Women recalled being introduced to Strong Start services during their first prenatal appointment. They learned about the classes available through Strong Start as well as other supports such as access to a social worker and community referrals. Many women were drawn in by the classes, especially yoga and parenting classes, but others were not aware that these were available.

> *[The care coordinator] was really nice and I felt warm and comfortable talking with her. She talked to me about the parenting classes they have. She reassured me that she was there to support me. She helped me realize I had a good functioning system.*

Women who had previously received prenatal care at one of the sites noticed an increased emphasis (with their Strong Start-enrolled pregnancy) on healthy diet and exercise as well as diabetes management. These women also felt there was increased attention given to overall patient wellbeing.

> *I only saw a nutritionist once or twice during my [last] pregnancy even though I [was, and am] diabetic. Now, with this pregnancy, I've see seen her four or five times and she talks to me more. There is a greater focus on exercise, on food, and on managing insulin.*

> *During my last pregnancy I had a lot of depression, so right now that is what they are looking after, to make sure I don't get depressed during this pregnancy.*

Participants had mixed reports about how frequently they spoke with Strong Start staff. While some participants only met and spoke with their care coordinator once or twice, others received regular calls and texts from their care coordinator and from individuals affiliated with the community resources to which they had been referred. This may have been by design, as the frequency of encounters was determined by the risk stratification process conducted at intake. Though only a few focus group participants had attended the classes offered as part of MAMA's Neighborhood, those who did found them extremely valuable.

> *I don't see her as often as I'd like but it's because of me. I find it hard to come talk to her. When I do come with my mom, my mom wants to go see her. I do talk to her about certain stuff but only when my mom is there. It's my fault I don't see her.*

> *There are five classes, but one is optional. Home safety, labor and what they do with the baby, car seat and hospital tour, breastfeeding. I like the ones we went to. Being a first-time parent it's really helpful. We were the youngest but there were other first-time parents. They explained how to help with pain naturally in one of the classes. It helps a lot that the classes are free. We might not have gone if they cost money.*

Many participants said that the MAMA's Staff discussed breastfeeding with them as early as the first prenatal appointment, though some were disappointed after receiving limited breastfeeding guidance from the care coordinator. Most participants planned to breastfeed even before discussing it with their provider, but their plans were reinforced by the clinic. Participants received resources about breastfeeding, and many were referred to the local WIC office for additional tools to support breastfeeding.

> *I was planning to do it before, but the information is a lot more convincing because it helps the baby.*

The participants were generally happy with the care they received from LADHS. A small number of participants expressed some dissatisfaction about resident rotations, and suggested the need for a more consistent physician relationship. Most participants suggested improvements around wait times, although some felt they could not raise these issues with their provider.

Overall, participants reported satisfaction with the Strong Start program. Many said they felt very comfortable with their care coordinator and that they could raise issues they did not feel comfortable discussing with their provider. At least one participant also appreciated the consistency of having appointments with the same care coordinator throughout her pregnancy. Women said they would recommend MAMA's Neighborhood to friends and family, and some said they already had.

PROGRAM STRENGTHS

Leadership champions at the administrative and site levels were cited as critical for successful replication of LADHS' Maternity Care Home approach. Having advocates at the county-level allowed the awardee to secure permanent program staff positions within the county budget from the beginning, which was key for the program to initiate system-wide change toward more coordinated care. Key informants also agreed that replication throughout the County health system was smoother at sites that had provider champions who could help achieve clinic-wide buy in early in implementation.

Staff of all levels reported that having a universal Electronic Medical Record (EMR) system prior to program implementation would have been helpful (LADHS' EMR system was being rolled out during the Strong Start award period); they also recommended using a separate case management platform for scheduling and tracking care coordination visits. According to key informants, the need for such systems should be considered when replicating an enhanced model that relies upon case management because an appropriate electronic infrastructure can facilitate communication and increase efficiency.

Adequate and well-planned physical space was important for both protecting the privacy of program participants and easing communication between members of the care team. Providing care coordinators and mental health staff with private space to meet with patients outside the exam room reduced tension between program and clinical staff and allowed time for psychosocial needs of patients to be addressed without disrupting regular clinic flow. Additionally, staff said that open work spaces shared by physicians, nurses and care coordinators facilitate communication and a more integrated care model.

Having a clearly-defined workflow was also cited as a program strength. Staff mentioned the importance of making sure all staff understood what types of patients were appropriate for care coordinators versus those who need to be referred to social work and/or psychiatry. Clear role definitions eased program implementation, and also helped to ensure that patients received risk-appropriate care while also protecting staff from compassion fatigue or providing care for which they were not trained.

> "It's nice that you can come here and get any type of help you need. [...] My fiancé wanted me to switch…but I just felt like the staff here is invested in me. […] They've taken an actual interest."
>
> *- Strong Start participant*

Key informants indicated that interpersonal skills, rather than specific credentials, were the most important consideration in hiring a successful care coordination staff. Specifically, key informants felt the ability to connect with patients and a desire to care for people were essential qualities in a care coordinator. Willingness to learn about the patient population and their needs, as well as language and cultural competency, were cited as key attributes for program success.

Several key informants reported that because of lack of continuity in prenatal care providers at LADHS, care coordinator and social worker continuity improved the patient experience. Consistency in care coordinators was particularly important given that women often share intimate details about their personal lives with care coordinators and mental health staff.

Program staff agreed that patients of all risk levels could benefit from a program like MAMA's Neighborhood. While women with higher-risk pregnancies may have had more to gain from additional psychosocial support and coordinated medical care, key informants reported that women with lower-risk pregnancies still appreciates and benefitted from the additional support provided by the program.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

LADHS staff indicated that their biggest accomplishments in implementing MAMA's Neighborhood centered around transitions to a more collaborative care model. They also acknowledged that the County health system has not recognized the importance of provider continuity, which continues to pose challenges to enacting significant change. Ultimately, however, the skill and commitment of care coordinators helped to mitigate those systemic challenges and was considered by key informants to be the single most important element of the program's success to date.

In addition, awardee staff expressed pride in the care coordination team that was hired. Specifically, they pointed to their flexibility, the amount of time they dedicated to patients, and the network of partners they cultivated to help women with varying levels of need. As a result, staff observed lower levels of stress among their patients, which they attributed to the linkages to resources and psychosocial support care coordinators provided to patients. Increased access to mental health counseling and group resiliency classes were also held up as successes.

> "I had different living situations, and [the care coordinator] gave us a lot of resources. You did have to go find them yourself, but she did make herself available. I didn't check them out, but they told me about it."
>
> *- Strong Start participant*

A goal of MAMA's was to promote collaborative care and improve provider continuity, but some key informants felt that the county system, on the whole, had not yet embraced this model of care. As a result, MAMA's staff felt that some of their efforts were undermined by not having system-wide support. As an example of this lack of support, staff noted that they faced challenges acquiring adequate clinic space and time necessary to make the program successful, noting that this requires "true buy-in" from administrative and provider staff.

Furthermore, with the focus on mental health, LADHS has encountered challenges from the patient-side related to the persistent stigma around treatment for mental health disorders, traumas, or other psychosocial burdens. Mental health care providers tried to "meet participants where they were", and thus shifted from group CBT classes to individualized care because it was better received, though it limited the number of participants they could serve.

SUSTAINABILITY

LADHS has sustained their MAMA's Neighborhood program and has plans to expand the model to all county locations that provide prenatal care. They have retained their care coordination staff, their health educator, and the mental health care providers who offer services to women enrolled in MAMA's. All positions created for Strong Start have been written into the County budget and will remain fully funded even though Strong Start funding has ended.

MAMA's has become the "standard of care" at LADHS sites that have implemented to date. Therefore, the target population for MAMA's has been expanded beyond the Medi-Cal population to include all women receiving prenatal care at the six LADHS sites implementing the program.

LADHS will continue to conduct a risk assessment at intake into prenatal care, provide care coordination to prenatal patients based on their needs, offer mental health services (social work counseling, as well as psychiatric support when necessary), and offer the opportunity to participate in county-developed resiliency/health education classes.

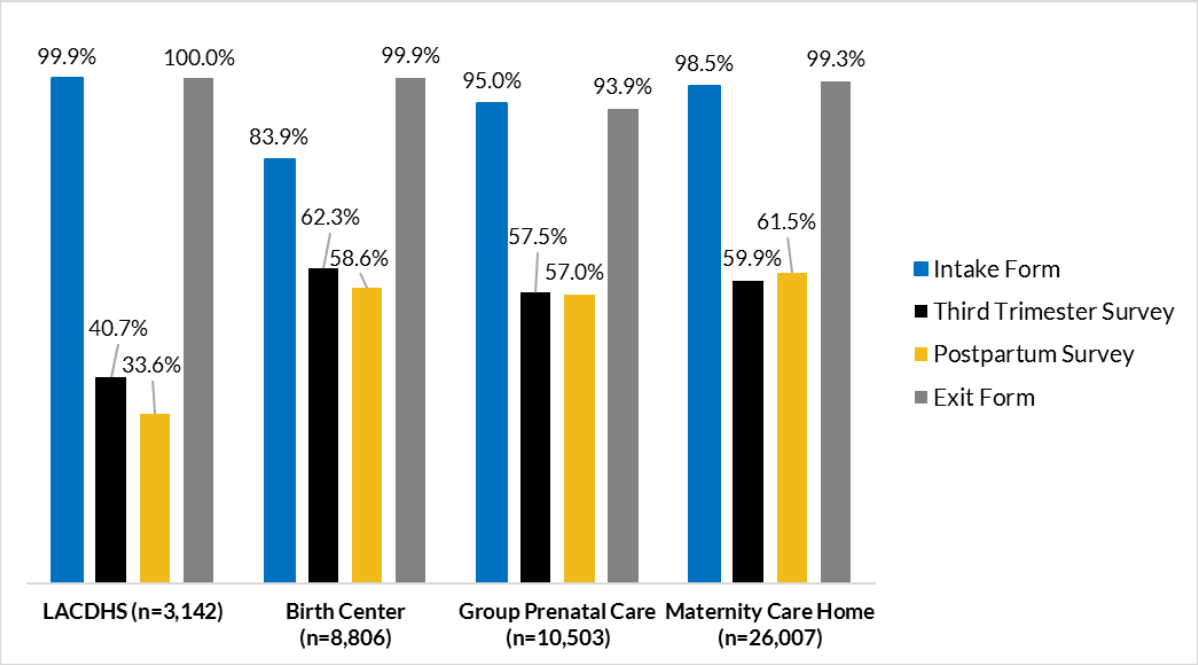
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for LADHS, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for LADHS to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 40 LADHS participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 10: FORM SUBMISSION RATES, LADHS



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 3,203
- Study IDs represented: 3,142 (suggests that 61 participants were missing data: see information on program report data in Appendix F in Volume 1)
- In follow up conversations regarding this discrepancy, LADHS indicated that 3,142 is the correct enrollment total.

HOW FORMS WERE ADMINISTERED:

- Intake Forms were administered by a care coordinator who recorded the information electronically.
- Third Trimester and Postpartum Surveys were self-administered on paper.
- The awardee attempted to follow-up multiple with participants who were lost to follow-up.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not express any site-specific concerns.

MISSING FORMS:

- Intake Form: 0.1 percent of Study IDs were missing Intake Forms.
- Third Trimester or Postpartum Surveys: About 59 percent of Study IDs were missing the Third Trimester Survey and 66 percent were missing the Postpartum Survey. Early in 2015, the awardee noted that many participants transferred care or were lost to follow-up.
- Exit Form: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: At the beginning of Strong Start, LADHS indicated that their diverse population required an "other" race category and a write-in option. The evaluation team accommodated this request. The rate of missing for race and ethnicity was higher than average at 3.5 percent.
- Exit Form: LADHS had a high percentage of missing data for outcome of Strong Start pregnancy (28.1 percent).[67] The awardee said this was because many patients delivered at non-affiliated hospitals.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for LADHS participants. Some highlights include:

- The majority (73.6 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 18.1 percent of participants were 35 or older.
- Most participants were Hispanic (64.7 percent), followed by 18.5 percent black, 11.7 percent other or multiple races, and 5.2 percent white.
- Similar to Strong Start participants overall, the largest share of LADHS participants was in a relationship and living with a partner (35.5 percent), while 27.1 percent were married and only 9.9 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 26.4 percent of LADHS participants reported having experienced intimate partner violence, 23.7 percent of participants with a prior birth had a prior preterm birth, and 57.6 percent of participants had not planned their Strong Start pregnancy.

TABLE 147: DEMOGRAPHICS, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.1	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**3,099**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	2.6	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	5.7	6.5	12.7	9.7	9.8

[67] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 90.2% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 9.8% were missing for other reasons.

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
20 Through 34 Years of Age	%	73.6	81.7	72.9	75.1	75.8
35 Years and Older	%	18.1	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.8	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**3,077**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	64.7	25.4	37.1	28.0	29.7
Non-Hispanic White	%	5.2	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	18.5	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	11.7	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	5.6	19.6	12.8	11.3	13.3
Not in Universe	%	30.2	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**1,991**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	67.0	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	31.6	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	0.7	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**3,099**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.2	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	2.0	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**3,041**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	36.2	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.5	8.7	12.6	11.9	11.5
Employed and in School	%	6.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	46.7	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	1.8	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**3,045**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	30.3	15.4	27.8	29.1	26.4
High School Graduate or GED	%	52.8	57.5	58.3	57.9	57.9
Associate's Degree	%	4.4	8.2	5.2	4.6	5.4
Bachelor's Degree	%	6.6	14.5	4.5	3.7	5.8
Other College Degree	%	5.9	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	0.7	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**3,080**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	27.1	42.1	20.4	20.8	24.5
Living with a Partner	%	35.5	33.2	34.8	31.1	32.3

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
In a Relationship but Not Living Together	%	27.5	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	9.9	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure– indicates a censored cell due to small sample size (N<11).

TABLE 148: PSYCHOSOCIAL, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**3,076**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	63.9	51.8	51.8	59.7	56.5
No	%	33.8	44.6	42.3	37.4	39.8
Unsure	%	2.3	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Not in Universe	%	35.8	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**1,967**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	91.0	61.1	72.6	79.9	75.3
Other	%	5.8	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	3.3	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	4.1	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**2,975**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	4.4	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	9.9	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**2,794**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	17.8	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	1.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**3,043**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	50.6	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	1.9	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**3,042**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	21.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	2.0	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**3,041**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	67.5	67.9	59.0	65.5	64.5
Mild	%	19.7	21.4	23.8	20.2	21.2
Moderate	%	7.5	6.8	10.3	8.5	8.6
Severe	%	5.2	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
History of Intimate Partner Violence[3]						
Missing Data	%	2.3	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**3,032**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	26.4	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	2.3	18.3	16.3	7.7	11.8
Not in Universe	%	1.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**2,977**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.3	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**3,099**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	50.5	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	41.2	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	8.3	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	25.7	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	11.4	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	7.2	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	16.0	24.6	17.1	15.4	17.2
Childcare Challenges	%	4.1	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	57.2	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 149: PREGNANCY HISTORY AND INTENTIONS, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.1	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**3,100**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	66.4	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	33.7	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	6.4	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**1,861**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	39.0	33.0	26.4	35.8	33.4

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Elective Termination						
Missing Data	%	6.3	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**1,863**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	30.1	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	23.7	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**1,323**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	6.2	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	43.7	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**702**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	14.7	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	43.5	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**708**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	15.4	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	46.1	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**628**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	4.6	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	46.3	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**622**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	3.7	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	46.0	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**630**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	4.9	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 150: PRIOR BIRTH OUTCOMES, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.6	1.7	1.5	0.6	1.0
Not in Universe	%	33.7	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**2,040**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	74.5	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	22.1	23.5	18.9	15.2	17.7
Not in Universe	%	51.0	30.4	45.8	36.9	37.7

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**833**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	18.4	34.6	24.3	27.1	28.1
>= 18 months	%	81.6	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.3	0.1	2.5	1.4	1.4
Not in Universe	%	51.0	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,509**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	23.7	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	8.7	1.3	20.8	13.1	12.6
Not in Universe	%	51.0	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**1,249**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	12.9	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 151: PRE-PREGNANCY MEDICAL CONDITIONS, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	2.1	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**3,037**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	42.4	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	42.9	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.3	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	11.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	9.3	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**2,813**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	4.6	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	9.4	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**2,810**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	5.7	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	13.5	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**2,683**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.5	4.2	3.7	2.8	3.3

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Normal Weight (=>18.5 BMI <25)	%	29.6	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	30.9	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	30.3	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	6.7	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 152: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	23.1	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**2,384**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	7.7	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	22.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**2,399**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	6.3	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	22.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**2,416**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	12.7	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	22.2	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**2,413**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	2.2	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	22.5	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**2,403**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	2.5	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	22.9	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**2,392**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	24.4	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**2,346**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	3.6	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	23.7	0.8	28.0	23.1	19.9

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**2,366**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	19.7	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 153: TREATMENTS DURING PREGNANCY, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	39.7	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,869**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	0.8	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	3.7	0.8	10.0	5.1	5.4
Not in Universe	%	88.5	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**243**	**680**	**654**	**2,585**	**3,919**
Yes	%	28.8	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	39.8	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,867**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	4.2	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	40.2	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,854**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	2.0	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 154: PRENATAL CARE, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	43.6	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,751**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	60.1	4.7	29.5	64.5	43.3
Licensed Professional Midwife[68]	%	0.7	18.8	2.3	1.0	5.4
Nurse Practitioner	%	7.4	-	26.5	5.7	8.9

[68] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	26.4	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	5.3	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**3,102**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	86.2	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	7.4	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**3,102**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	3.9	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**2,982**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	99.9	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	3.7	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	16.3	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**2,595**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	10.5	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	3.1	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	9.7	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**2,800**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	40.5	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,845**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	5.9	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	2.1	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	10.1	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**2,788**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	33.7	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**2,056**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	28.7	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**2,213**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	17.4	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	2.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	29.1	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**2,198**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	2.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.5	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	11.0	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**2,761**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	47.4	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.8	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	55.6	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	7.3	-	4.1	5.1	4.8
Cardiologist	%	6.8	-	6.4	6.9	6.8
Other	%	74.7	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 155: DELIVERY INFORMATION, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	7.7	1.4	25.3	23.3	19.5
Not in Universe	%	43.6	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,509**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	53.9	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.8	0.3	7.8	2.9	3.5
Not in Universe	%	73.8	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**788**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	90.9	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	2.7	4.6	11.5	7.3	7.7
Not in Universe	%	34.8	25.8	15.8	18.2	19.2

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,939**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.3	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.9	0.7	12.0	5.6	6.1
Not in Universe	%	34.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,933**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	65.1	87.1	70.1	69.5	73.1
C-Section	%	34.9	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	1.6	0.4	8.7	2.3	3.4
Not in Universe	%	72.0	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**818**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	71.3	83.3	72.9	74.7	75.9
C-Section	%	28.7	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	1.1	4.7	12.5	6.3	7.4
Not in Universe	%	78.3	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**639**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	43.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	87.9	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**376**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	19.7	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 156: BIRTH OUTCOMES, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	28.1	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**2,229**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	89.8	96.2	97.6	94.4	95.5
Stillbirth	%	1.0	0.3	0.9	0.8	0.7
Termination	%	2.2	0.3	0.2	0.6	0.5
Miscarriage	%	7.0	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	9.7	0.7	15.4	5.8	7.0
Not in Universe	%	35.5	26.1	16.4	18.9	19.8

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,700**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	4.7	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	11.2	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	82.5	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.6	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	5.3	2.1	14.3	8.0	8.3
Not in Universe	%	35.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,838**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.8	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	7.1	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	84.4	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.7	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 157: SATISFACTION, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	67.8	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**999**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	1.2	-	1.0	0.6	0.6
Slightly Satisfied	%	3.0	0.4	1.0	1.3	1.0
Moderately Satisfied	%	11.6	3.3	4.4	7.8	6.2
Very Satisfied	%	49.4	25.6	35.6	46.1	39.8
Extremely Satisfied	%	34.7	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	67.7	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**1,001**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	3.8	2.0	3.1	2.3	2.4
Slightly Satisfied	%	5.7	3.0	4.0	2.9	3.1
Moderately Satisfied	%	13.9	10.4	11.6	12.8	12.1
Very Satisfied	%	48.7	29.1	42.6	46.6	42.1
Extremely Satisfied	%	28.0	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 158: BREASTFEEDING, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	60.7	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**1,219**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	64.5	80.4	47.5	40.5	50.3
Formula Feed Only	%	4.8	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	25.1	10.8	31.9	32.5	27.8
I Haven't Decided	%	5.7	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	67.6	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**1,004**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	91.1	91.5	76.6	72.6	77.3
No	%	8.6	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 159: FAMILY PLANNING, LADHS

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	68.7	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**971**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	90.4	77.0	77.5	82.2	80.3
No	%	8.7	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	68.5	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**976**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	86.4	84.2	70.8	74.0	75.5
No	%	13.1	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	66.4	41.5	42.9	38.6	40.2
Not in Universe	%	6.4	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**843**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	10.0	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	17.1	2.8	11.4	10.9	9.2
LARC – IUD	%	18.1	10.8	11.9	12.3	11.9
Pills	%	13.0	8.6	11.9	13.0	11.8
Injection	%	9.0	5.9	16.2	20.2	16.2
Condoms	%	19.5	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	LACDHS (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	7.9	16.7	8.1	9.5	10.9
Method Not Indicated	%	3.2	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid Data were obtained from California

Initial Contact: In December 2014, the evaluation team spoke with officials from the California Committee for the Protection of Human Subjects (CPHS, which acts as the state's Institutional Review Board), the Department of Health Care Services (DHCS, which administers California's Medicaid program),and the Department of Public Health (CPDPH, which houses the Vital Records agency), to learn about the state's process for reviewing and approving requests to utilize Medicaid and birth certificate data for research purposes and to explore their willingness to support the Strong Start evaluation. State officials from all three agencies were receptive to supporting the Strong Start evaluation.

Data Acquisition Process: Staff from the Medicaid agency told us that they would be responsible for linking the Medicaid and birth certificate data. Applications requesting Medicaid and birth certificate data were submitted to CPHS, DHCS, and CDPH, in March 2015. In April 2015, the evaluation team received approval from CPHS and shortly after received approval from DHCS and CDPH. However, numerous delays were encountered, and Urban did not receive any birth certificate data from VSAC until March 2017. Confusion ensued, since the Medicaid agency was supposed to receive the birth certificate data so that it could conduct the merge. Applications were revised, and it was clarified that VSAC would send birth certificate data to the Medicaid Agency, not Urban. In October 2017, VSAC provided the birth certificate data to the Medicaid Agency, which began the linking process. In December 2017, 2014 data were linked and put into California's data release approval protocol. In January 2018, the 2015 data linkage was also completed. However, despite numerous queries, California officials refrained from approving the release of the data.

Final Result: Ultimately, CPHS determined that the state could not release individual-level data to the evaluation, since Urban did not qualify as an "educational institution." This was despite the fact that Urban's IRB application clearly identified the organization as a not-for-profit policy research organization, and that the application had been approved, and renewed annually, since April 2015. State officials offered to share aggregate data, but these data were not useable in our research design. Therefore, no birth certificate or Medicaid data from California were included in our final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for the Los Angeles Department of Health Services.

CROSS-CUTTING SUMMARY

The Los Angeles County Department of Health Services implemented the Maternity Care Home model under Strong Start. Strong Start care coordinators, who had diverse backgrounds and professional experience, conducted a comprehensive intake during each participant's first encounter and assigned a risk level to the participant based on her responses, which guided the development of a care plan and types of referrals, as well as the frequency of follow up encounters. The awardee focused, in particular, on mental health, and many patients received referrals to resiliency classes (covering topics such as childbirth preparation, healthy eating, and postpartum depression) and/or one-on-one counseling with a licensed clinical social worker. More than a quarter of LADHS participants reported experience with intimate partner violence. Approximately 20 percent screened positive for depression and another 12.7 percent exhibited moderate or severe anxiety. The LADHS program was designed to address the psychosocial needs of participants, though capacity constraints did limit to the number of women who could receive these services. In all, about 10 percent received a mental health encounter. Nearly half received a referral for high risk medical services, which corresponds with the preterm birth rates we observe among LADHS participants (15.9 percent). Impact analysis was not conducted for LADHS because we did not obtain birth certificate and Medicaid data from California.

Maricopa Special Health Care District

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
959	• Largest public safety net health system in Arizona • Serves predominantly low-income, minority residents • Consists of the Comprehensive Healthcare Center (CHC) and 10 family health centers throughout the greater Phoenix area	• Five sites including the CHC and four family health centers in Maricopa County, AZ	• Intervention categorized as "low intensity" for offering three care coordination, education, and/or referral encounters (compared to four encounters offered by most awardees), with no other direct enhanced services • Care coordination and social support through in-person and telephonic encounters with a Registered Nurse Care Coordinator (RNCC) and Community Health Workers • Psychosocial risk reduction through RNCC assessment and referrals to health education and supplemental services and resources (e.g., substance use treatment; mental health care; prenatal education; social services)

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Multi-disciplinary team approach with a common vision helped providers and staff share knowledge about community resources available to participants
- Use of the electronic medical record to support Strong Start implementation by documenting interactions and tracking receipt of Strong Start and other health care services

CHALLENGES

- Lower than expected enrollment early in the implementation period
- Maintaining contact and transportation issues made it difficult to keep participants engaged
- Staff turnover impeded enrollment and participant engagement, and made it difficult to meet the program's data reporting requirements

NOT SUSTAINED

- Although not sustained, the awardee continued some processes and improvements initiated under Strong Start, including a breast pump referral process
- Implemented the Healthy Start Program that targeted a similar geographical area as Strong Start and included on-site care coordination and referrals to community services for women during pregnancy and postpartum

KEY FINDINGS: PARTICIPANT-LEVEL DATA[69]

PARTICIPANT-LEVEL DATA QUALITY

- 18.5% rate of missing intake forms; 0.0% rate of missing exit forms
- 1.5% rate of item nonresponse on intake forms; 5.9% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 25.5% of women were teens (under age 20); 6.3% were 35 years or older
- 18.9% of women were black; 64.7% were Hispanic; 13.3% were white
- 14.9% of women were married; 37.0% were living with a partner; 17.3% were not in a relationship
- 20.0%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 19.0%: C-section rate among women with a delivery
- 11.1%: preterm birth rate among women with a live birth
- 8.1%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Lower C-section rates, higher VBAC rates, and marginally higher weekend delivery rates (p-value<0.10) than women in the comparison group
- Higher weekend delivery rates among Strong Start participants may be suggestive of a reduction in planned inductions or scheduled C-sections
- Findings from site-level estimates for MHIS – which served a large number of women enrolled in Strong Start that a site-level estimate was also feasible – are in Site-Specific Estimates section

[69] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

EXPENDITURE AND UTILIZATION OUTCOMES

- Higher prenatal care expenditures, fewer hospitalizations during the prenatal period, and fewer ED visits in the year after delivery than women in the comparison group
- Infants had more ED visits and marginally more hospitalizations (p-value<0.10) in their first year of life than infants in the comparison group
- Findings from site-level estimates for MHIS – which served a large number of women enrolled in Strong Start that a site-level estimate was also feasible – are in Site-Specific Estimates section

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

In its pre-Strong Start prenatal care model, Maricopa Special Health Care District (Maricopa)'s patients received standard prenatal care at a clinic from an obstetrician (OB), certified nurse midwife (CNM), or family practice doctor. While Maricopa prenatal care providers generally did not attend deliveries (Maricopa used a hospitalist model for labor and delivery), they strongly encouraged women to deliver at the Maricopa Medical Center so that the patient's attending staff had access to her medical history through their electronic medical record (EMR). Most patients delivered at the medical center, but some chose to deliver elsewhere (Banner Good Samaritan and St. Joseph's were the two most common alternatives) or they went to the nearest hospital once in labor.

Maricopa also provided a wide range of supportive services beyond medical care through their Family Learning Centers (FLCs). The FLCs were located within four of the Maricopa family health centers. The FLC Coordinators were bilingual (English and Spanish) and had a variety of educational backgrounds including social work, family therapy, and family studies. The coordinators provided patients with health information, social service referrals, group education classes, literacy activities, and assistance with insurance enrollment. For example, the FLCs offered a walking group, nutrition classes, a postpartum support group for Latina women, and a domestic violence program that provided prevention, education, and intervention.

In addition to the support services offered through the FLCs, Maricopa also had clinics targeting specific populations of pregnant women. These included the Internatal Care Clinic (ICC), geared towards women with a history of preterm birth, who had a newborn in the Neonatal Intensive Care Unit (NICU) for 5 days, or who lost a baby; the Refugee Women's Health Clinic (RWHC), geared towards recently immigrated women; and the New Hope Teen Clinic, which targeted pregnant teenagers.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Maricopa's Strong Start Maternity Care Home model had two key components: (1) in-person and telephonic encounters with experienced care coordinators to ensure that patients could access health care and other psychosocial services and (2) social risk reduction through care coordinator assessment, referrals and follow up for a variety of public benefit and community-based needs.

As part of the care coordination component, a Registered Nurse Care Coordinator (RNCC) and Community Health Workers (CHW) provided continuous contact during a patient's pregnancy and postpartum period. The RNCC conducted the initial meeting face-to-face to identify patients' overall health and psychosocial needs, worked with the CHWs to follow up with participants, and managed the data reporting requirements of the Strong Start program. The CHWs primarily scheduled participants' prenatal appointments, called or texted

> "I loved it. Number one, it is comfortable. They are comfortable. We talk so much. You are not a stranger every time. She [RNCC] is very easy to talk to. Every time I have question she answers my questions before I leave."
>
> *- Strong Start participant*

reminders to participants about their prenatal visits, connected participants to supplemental programs and services, and tracked whether participants followed through with referrals. After the initial meeting, the RNCC or CHW worked together and followed up with each patient, either at their prenatal appointments or via phone. Depending on a patient's risk factors and needs, communication may have been weekly, once every several weeks or during scheduled prenatal appointments only. Most patients received at least 3 encounters during their pregnancy and up to their 6-week postpartum follow-up visit.

> "There was more information than with my previous pregnancy, they explained more. Every mother has different situations but they break it down to a "T" what to expect. First baby I didn't have a lot of information but this program explains more."
>
> *- Strong Start participant*

In the initial visit, the RNCC assessed patients' health and psychosocial needs. Then, working with CHWs, the RNCC made referrals for additional services. The RNCC and CHWs often referred participants to Maricopa's FLCs for education about breastfeeding and healthy eating. They also referred participants to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); the Nurse Family Partnership program, a long-term home visitation program for first time mothers; and a program that provided transportation to and from medical appointments. If participants screened positive for depression at their first prenatal care visit, Strong Start staff referred women to a mental health provider and to a social worker in clinics where a social worker was available. In cases of drug or alcohol use problems, Strong Start staff referred participants to the National Council on Alcoholism and Drug Dependence Greater Phoenix, a non-profit organization dedicated to providing substance abuse treatment to women.

It is important to note that Maricopa's electronic medical record (EMR) system played a key role in the Strong Start program. Strong Start staff used their EMR to identify patients eligible for participation, to track participants' use of health services or referrals, and to monitor their appointments (e.g., schedule appointments, identify any missed appointments). The RNCC also used the EMR to share with providers any medical information gathered through Strong Start visits.

There were a few changes throughout the program, but they did not affect the enhanced services. Changes included funding, the number of sites where the program was available, and staff. Partway through evaluation Year 1, Maricopa decreased the number of sites offering Strong Start from five to three because the part-time RNCC was not able to fulfill the evaluation requirements while managing the caseload of five sites. In evaluation Year 2, Maricopa resumed offering Strong Start at all five sites upon receipt of supplemental Strong Start funds, which also allowed them to increase staffing by adding an additional full-time RNCC. Also in evaluation Year 2, there was a slight change in the funding of RNCC services. As of evaluation Year 2, participants enrolled in the Maricopa Health Plan received CHW services through Strong Start and RNCC services through their health plan. Those participants still received all services, but health plan funds covered RNCC services, not Strong Start. In evaluation Year 3, one RNCC was replaced with two CHWs. The program still had one RNCC who conducted the initial visit and assessment while the two additional CHWs continued to assist with care coordination, outreach and follow-up, social support, linking participants to community resources and helping participants use MyChart.

OUTREACH AND ENROLLMENT

Maricopa recruited internally and externally for Strong Start participants. Internally, Strong Start staff reviewed schedules at participating clinics each day to find eligible participants based on health insurance status, gestational age, and risk factors. The staff flagged potentially-eligible patients in the EMR. Externally, Strong Start program staff reached out to community organizations serving low-income women, such as Planned Parenthood, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and the City of Phoenix Department of Social Services, and informed them about Strong Start and asked the organizations to refer pregnant women to their clinics.

Over the course of the program, Maricopa revised Strong Start eligibility criteria. This helped increase enrollment. Initially, Maricopa targeted women with at least one preterm risk factor other than Medicaid eligibility and had enrolled in one of a select few Medicaid health plans in the state. In evaluation Year 2, Maricopa expanded eligibility to women with gestational ages up to 33 weeks and 6 days, who were enrolled in any Medicaid plan in the state. Maricopa also dropped the requirement of a second preterm risk factor.

In enrolling program participants, Maricopa used an opt-in approach, meaning staff asked eligible patients to choose between enrolling in Strong Start or receiving prenatal care without additional Strong Start services. In evaluation Year 3, while continuing to use an opt-in approach, Maricopa began describing Strong Start as a benefit provided by a patient's insurance. Staff invited patients who did not enroll when initially approached to join a second time. According to Maricopa staff, presenting Strong Start in this manner improved eligible patients' perceptions of the program and thus those changes helped improve the program's enrollment.

Maricopa staff reported being satisfied with their site's Strong Start enrollment numbers. They believed enrollment improved over time as they expanded eligibility, increased staffing, and improved their recruitment messages. Additionally, staff noted that the continuous communication among Maricopa Strong Start staff members and partner organizations (two community organizations they referred participants to, Parent Partners Plus and Nurse Family Partnership) may have positively impacted enrollment numbers. For instance, a staff member indicated that regular visits by CHWs to his clinic and speaking to eligible patients about the program helped Maricopa improve enrollment.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Maricopa staff perceived that the Strong Start program had several positive impacts on maternal and infant outcomes, including rates of preterm birth, low birthweight, family planning education, and breastfeeding. Maricopa staff also noted improvements in processes such as referrals to community services and greater personal contact between providers and patients. Of note, Maricopa staff did not attribute their low C-section rates to Maricopa participation in Strong Start, as Maricopa is a teaching hospital that focuses on reducing medically unnecessary C-sections.

One Maricopa staff member observed that Strong Start's emphasis on breastfeeding resulted in a culture change at Maricopa. Prior to Strong Start, Maricopa medical center staff encouraged women who delivered to bottle-feed their newborns. After Strong Start implementation, however, staff encouraged all new mothers to try breastfeeding first, which may have improved breastfeeding rates among participants. Maricopa FLC staff were also certified lactation consultants, and Strong Start staff could make internal referrals for breastfeeding support. Maricopa worked with insurance companies to get faster access to breast pumps using a standardized prescription form, a process that Maricopa institutionalized based on its success with Strong Start participants.

> "I breastfed for three months and I stopped. I talked to my doctor and he said it's very important the baby get the colostrum, it helps her not get sick."
>
> *- Strong Start participant*

Most staff interviewed were not certain Strong Start resulted in cost-savings and cited the lack of a comparison group as a challenge to analyzing cost-savings. Some did hypothesize that if there were any cost savings, they were likely to be from lower Emergency Department and/or Neonatal Intensive Care Unit (NICU) use.

STRONG START PARTICIPANT PERSPECTIVES

The case studies included focus groups with pregnant and postpartum women who participated in Strong Start and some groups with similar non-participants. Strong Start enrollees reported four main reasons for selecting Maricopa as their maternity care provider: because they had received care at Maricopa for years; they had a good experience previously giving birth there; they had a bad experience at a different hospital that they wished to avoid; or, the location of the facility was conveniently close to their homes.

> *For me, my whole family they're all 'County' babies…. Here at 'County' they know you they have all your information. I don't feel comfortable going somewhere else where they don't know you.*

Overall, participants who had a previous pregnancy prior to participating in Strong Start reported that the prenatal care they received through the Strong Start program was better than the standard care they received previously. Particularly, they appreciated the program's educational component and positive communication with their healthcare providers. During past pregnancies, they felt less informed, and described a lack of thorough communication with providers and longer wait times.

> *There was more information than with my previous pregnancy, they explained more. Every mother has different situations but they break it down to a 'T' what to expect. First baby I didn't have a lot of information, but this program explains more.*

Participants described the postpartum medical appointment as useful and discussed several support services they received during the postpartum period, including help with breastfeeding, advice on family planning, and continued support for their psychosocial needs.

> *They check you to make sure your body healed and they talk about birth control options.*

Participants at Maricopa said they would highly recommend the Strong Start program. They explained that they found the program very informative and said they appreciated the help they got with transportation. They were very supportive of the program continuing.

[There's] so much information, it's helpful. They'll take care of transportation if you don't have it.

PROGRAM STRENGTHS

> "[Strong Start] brightens me up because sometimes I don't know things and she [CHW] is like, 'You can go here.' She is very resourceful.
>
> *- Strong Start participant*

Maricopa staff reported feeling proud of the Strong Start program they provided, and they said they were most proud of three factors they thought had the biggest impact on success: (1) a multi-disciplinary team approach with a shared vision; (2) the staff's dedication and commitment to Strong Start and concern for patients; and (3) use of their EMR to support the Strong Start program implementation.

First, staff noted the importance of having a multi-disciplinary team-based approach rather than a provider-led approach to the program. The shared vision among physicians, nurses, manager, care coordinators and CHWs carried through all aspects of Strong Start, from participant registration to the coordination of patient care. This approach was important in helping address patients' concerns and facilitating patients' ability to navigate their care. In addition, it enabled providers, care coordinators, and CHWs to share knowledge about the community resources available to participants—for example, mental health counseling. One Maricopa staff member reported that having a champion within the organization willing to support care coordination and the use of CHWs helped facilitate the team-based approach.

Second, the staff's dedication and commitment to Strong Start and concern for patients supported program success. Staff noted the benefits of the one-on-one interactions providers had with patients, and the ability to link patients to internal (e.g., FLCs) and external resources in the community. As one staff member noted, "With Strong Start, patients had another person on their team, an advocate for the patient, there to help them succeed." Similarly, providers felt supported by the Strong Start staff, since the RNCC and CHWs assisted with many aspects of care that providers lacked the time or ability to cover. This included identifying and addressing the social determinants of health, setting up follow-up appointments, providing more in-depth patient education, and spending more time interacting with patients. One provider summarized with the statement, "[the RNCC and CHWs, the care coordinators] make the life of the provider easier."

Third, Maricopa staff described their use of EMRs as a key program strength. The ability to use the EMR to document and follow participants through Strong Start was helpful in their implementation of the program. Staff documented every interaction they had with a Strong Start participant in the EMR. Embedding the Strong Start program into the EMR allowed the awardee to target enrollment by identifying eligible participants, and it was useful to track both Strong Start service use and the health care services participants received in general. It also improved Maricopa ability to meet the program's data reporting requirements.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The Strong Start team faced and addressed several challenges throughout program implementation, including: (1) lower-than-expected enrollment early in the implementation period, (2) staff turnover, (3) keeping participants engaged, and (4) meeting the program's data reporting requirements (though this challenge was lessened after additional funding was awarded).

To address early enrollment challenges, Maricopa made several adjustments including directing more staff resources to outreach and enrollment using supplemental Strong Start funding, expanding eligibility criteria, and changing the way recruiters presented Strong Start to potential enrollees. These modifications contributed to increased participant enrollment.

Maricopa faced staff turnover early in the program. Initially, Maricopa employed the RNCC part-time and the CHW was 0.8 full-time equivalent (FTE). Both found it difficult to accomplish the multiple tasks of enrollment, care coordination, follow up and monitoring data collection requirements. The awardee addressed this challenge by using additional Strong Start funds to hire another full-time RNCC and CHW, and cross training other Strong Start members to conduct several program activities.

Maintaining participant engagement in Strong Start was a challenge throughout the program. Participants were difficult to contact (e.g., disconnected cell phone service), and often experienced transportation barriers that made it hard to keep appointments. Staff addressed this challenge by using different communication methods depending on what patients preferred (e.g., letters, emails or text messages through the "My Chart" function in the EMR system). Staff also took advantage of patient appointments, engaging patients in-person when they were already at the clinic for care. To help participants with transportation barriers, site staff arranged transportation when needed.

Maricopa also reported challenges complying with Strong Start's data collection requirements, especially during the first evaluation year of the program. The evaluation data collection forms did not become available until after the program started and Maricopa's own Institutional Review Board (IRB) requirements further delayed data collection. Data collection and management was particularly challenging initially because Maricopa had only one part-time RNCC to support Strong Start. Maricopa developed a plan that detailed efforts to improve reporting requirements and obtained supplemental funding for additional staff that helped the awardee meet data collection requirements. Maricopa staff said they wished that there had been more discussion up front about what data needed to be collected and that it was "more of a collaborative process" between the evaluators, the sites and the Center for Medicare and Medicaid Innovation (CMMI).[70]

SUSTAINABILITY

Maricopa did not sustain its Strong Start enhanced prenatal care program. The main factor influencing Maricopa's decision to discontinue Strong Start was the lack of funding and staff to administer the services. In evaluation Year 4, Maricopa sought funding sources to reinstate Strong Start, including

[70] The Center for Medicare and Medicaid Innovation (CMMI) of the Centers for Medicare and Medicaid Services (CMS) contracted with the Urban institute and its partners to evaluate the Strong Start for Mothers and Newborns initiative.

Federally Qualified Health Center funds and state grant funds such as those used for "First Things First," a statewide early childhood development initiative.[71] Maricopa began to explore value-based purchasing through health plans to provide funds to sustain more of the enhanced prenatal care services, but lacked data to provide evidence of successful outcomes.

Maricopa has continued the breast pump referral process that they standardized during the Strong Start program. Awardee staff suggested this process was institutionalized because of its success during Strong Start.

Although Maricopa did not continue Strong Start, the awardee recently implemented the Healthy Start Program in partnership with their local health department.[72] The decision was based on the availability of funds and the match between program goals and Maricopa needs. Like Strong Start, Healthy Start includes a patient outreach specialist, on-site care coordination and referrals to community services to women during pregnancy and postpartum. The program also targets the same geographical area as Strong Start. Unlike Strong Start, however, the Healthy Start Program focuses on African American women with children up to two years old, and since it is not restricted to Medicaid recipients, participants can include undocumented patients. The Comprehensive Health Center and four Maricopa clinics implemented the Healthy Start Program. There was an overlap between the ending of Strong Start and the beginning of the Healthy Start Program at Maricopa, and all 90 eligible Strong Start participants transitioned to Healthy Start after Strong Start ended.

PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Maricopa, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Maricopa to estimates for each model and Strong Start participants overall.

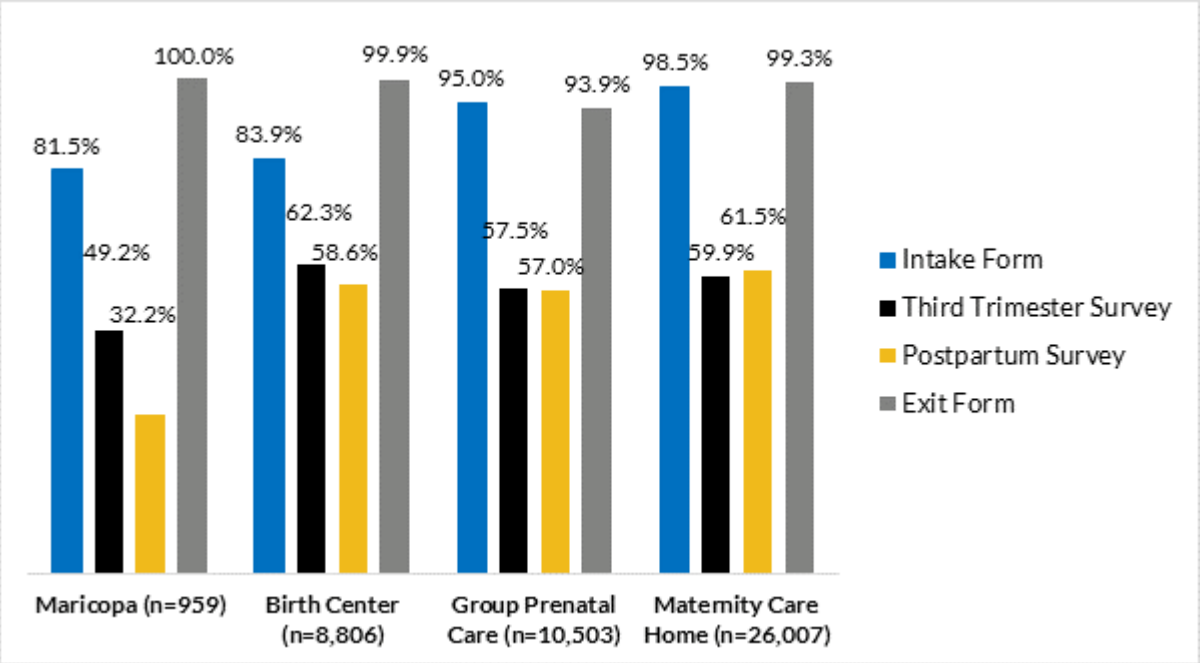
- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).

[71] In 2006, voters passed Proposition 203 to create First Things First an initiative to fund early childhood development and health programs for children from birth to age 5. For more information see: https://www.firstthingsfirst.org/.
[72] The Healthy Start Program, funded by the Health Resources and Services administration (HRSA) exists in 37 states and Washington, D.C. The program serves communities that have an infant mortality rate at least 1.5 times the national average; maternal and infant health issues including low birthweight, preterm delivery, maternal morbidity and mortality; and high rates of poverty, low education, a limited access to health care, and other socioeconomic factors.

- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 9 Maricopa participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 11: FORM SUBMISSION RATES, MARICOPA



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 958
- Study IDs represented: 959 (suggests that PLPE data were submitted for one extra patient: see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- Surveys were generally completed by a healthcare worker when they met in-person with the participant. The healthcare worker used the surveys as a basis for conversation and ensured that the survey questions were complete. The awardee reported that questions with a scale were difficult to administer verbally and often required re-phrasing and interpretation to help the patient respond.
- In some cases, a partner was present for the surveys.
- Some Postpartum forms were completed over the phone.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate that there were any site-specific concerns.

MISSING FORMS:

- Intake Form: 18.5 percent of Study IDs were missing Intake Forms. In 2015, the evaluation team investigated about 20 Intake Forms that the awardee reported submitting, but were never received. These missing forms were never located and Maricopa did not have backup copies. In some cases, participants were given the Intake Form at their first visit and subsequently changed providers, had a miscarriage, or were lost to follow-up. Some forms are also missing because the awardee began enrolling women before the form had received IRB approval.
- Third Trimester or Postpartum Surveys: About 51 percent of Study IDs were missing the Third Trimester Survey and 68 percent were missing the Postpartum Survey. It is not known why so many Third Trimester Surveys were missing, but the awardee indicated that Postpartum Surveys were missing because patients could not be reached after delivery.
- Exit: Form No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: The healthcare worker administering the Intake survey skipped the alcohol-related questions if the patient indicated they did not drink.
- Exit Form: Maricopa had high rates of missing data for key outcomes. Overall, 25.5 percent were missing data on Strong Start pregnancy outcomes.[73] The awardee said that some patients delivered at non-affiliated hospitals, so they were not able to gain access to delivery information.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for Maricopa participants. Some highlights include:

- The majority of Maricopa participants (68.2 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 13.7 percent of participants were 18 or 19 years old and 11.8 percent were less than 18 years old.
- Most participants were Hispanic (64.7 percent), followed by 18.9 percent black and 13.3 percent white.

[73] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 94.6% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 5.4% were missing for other reasons.

- Similar to Strong Start participants overall, the largest share of Maricopa participants was in a relationship and living with a partner (37.0 percent), while 14.9 percent were married and 17.3 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 22.5 percent of Maricopa participants reported having experienced intimate partner violence, 20.0 percent of participants with a prior birth had a prior preterm birth, and 73.4 percent of participants had not planned their Strong Start pregnancy.

TABLE 160: DEMOGRAPHICS, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	18.6	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**773**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	11.8	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	13.7	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	68.2	81.7	72.9	75.1	75.8
35 Years and Older	%	6.3	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	19.2	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**768**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	64.7	25.4	37.1	28.0	29.7
Non-Hispanic White	%	13.3	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	18.9	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.1	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	23.7	19.6	12.8	11.3	13.3
Not in Universe	%	24.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**497**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	87.7	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	10.3	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	18.6	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**773**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	19.7	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**763**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	28.7	36.6	30.8	35.3	34.5
In School, Not Employed	%	15.7	8.7	12.6	11.9	11.5
Employed and in School	%	4.8	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	50.7	48.9	51.0	47.4	48.5

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Education Level at Intake						
Missing Data	%	21.7	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**744**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	43.4	15.4	27.8	29.1	26.4
High School Graduate or GED	%	45.7	57.5	58.3	57.9	57.9
Associate's Degree	%	3.6	8.2	5.2	4.6	5.4
Bachelor's Degree	%	1.5	14.5	4.5	3.7	5.8
Other College Degree	%	5.8	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	19.5	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**765**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	14.9	42.1	20.4	20.8	24.5
Living with a Partner	%	37.0	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	30.8	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	17.3	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 161: PSYCHOSOCIAL, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	19.3	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**767**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	71.8	51.8	51.8	59.7	56.5
No	%	27.9	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	19.3	17.0	6.6	3.4	6.8
Not in Universe	%	22.7	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**551**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	91.5	61.1	72.6	79.9	75.3
Other	%	6.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	-	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	19.3	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**767**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	9.8	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	23.6	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**726**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	7.4	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	19.7	18.4	9.6	5.5	9.0

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**763**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	44.4	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	22.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**733**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	13.0	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	20.4	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**756**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	84.8	67.9	59.0	65.5	64.5
Mild	%	9.9	21.4	23.8	20.2	21.2
Moderate	%	2.8	6.8	10.3	8.5	8.6
Severe	%	2.2	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	19.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**765**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	22.5	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	19.9	18.3	16.3	7.7	11.8
Not in Universe	%	7.5	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**690**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	-	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	18.6	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**773**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	56.8	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	42.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	-	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	95.8	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	-	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	-	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	-	24.6	17.1	15.4	17.2
Childcare Challenges	%	-	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	-	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 162: PREGNANCY HISTORY AND INTENTIONS, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**950**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	68.0	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	32.0	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	2.5	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**622**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	34.9	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	2.1	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**626**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	13.1	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	10.1	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**550**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.5	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	24.9	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**409**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	11.2	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	26.7	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**392**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	7.4	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	29.8	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**363**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	29.6	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**365**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	29.5	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**366**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 163: PRIOR BIRTH OUTCOMES, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	2.0	1.7	1.5	0.6	1.0
Not in Universe	%	32.0	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**627**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	90.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	20.3	23.5	18.9	15.2	17.7
Not in Universe	%	33.6	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**438**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	30.8	34.6	24.3	27.1	28.1
>= 18 months	%	69.2	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.2	0.1	2.5	1.4	1.4
Not in Universe	%	40.3	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**565**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	20.0	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	6.2	1.3	20.8	13.1	12.6
Not in Universe	%	40.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**508**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	12.8	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 164: PRE-PREGNANCY MEDICAL CONDITIONS, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	19.2	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**768**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	26.6	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	64.8	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	8.1	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	4.1	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**911**	**8,750**	**6,757**	**21,525**	**37,032**

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	4.1	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**911**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	5.5	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	2.9	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**922**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.3	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	37.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	25.2	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	28.1	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	6.3	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 165: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	34.2	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**625**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	10.2	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	32.0	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**646**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	13.9	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	25.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**712**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	6.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	23.3	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**729**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	15.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**801**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	35.2	0.8	26.7	23.3	19.7

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**616**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	20.3	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**757**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	3.2	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	25.9	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**704**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	26.8	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 166: TREATMENTS DURING PREGNANCY, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	24.7	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**715**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	2.9	0.8	10.0	5.1	5.4
Not in Universe	%	88.1	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**85**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	25.3	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**710**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	3.5	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	25.3	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**710**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	3.0	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 167: PRENATAL CARE, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	1.8	0.6	20.4	16.4	14.2

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**933**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	49.9	4.7	29.5	64.5	43.3
Licensed Professional Midwife[74]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	3.0	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	46.2	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**950**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.7	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	8.2	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**950**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.1	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**949**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	100.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	6.8	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	2.1	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**930**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	2.3	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**928**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	1.8	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**933**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	1.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**933**	**3,258**	**5,925**	**18,445**	**27,628**

[74] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	1.8	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**933**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	1.8	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**933**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	1.8	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**933**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	2.0	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**931**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	17.7	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.2	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	82.5	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	17.5	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 168: DELIVERY INFORMATION, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	6.4	1.4	25.3	23.3	19.5
Not in Universe	%	33.4	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**572**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	30.9	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.2	0.3	7.8	2.9	3.5
Not in Universe	%	81.4	85.3	74.0	81.4	80.4

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**175**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	52.0	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	1.5	4.6	11.5	7.3	7.7
Not in Universe	%	29.7	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**654**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	100.0	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.1	0.7	12.0	5.6	6.1
Not in Universe	%	29.7	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**648**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	81.0	87.1	70.1	69.5	73.1
C-Section	%	19.0	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.8	0.4	8.7	2.3	3.4
Not in Universe	%	74.7	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**232**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	83.6	83.3	72.9	74.7	75.9
C-Section	%	16.4	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	0.5	4.7	12.5	6.3	7.4
Not in Universe	%	87.1	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**118**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	29.7	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	90.7	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**88**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	35.2	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 169: BIRTH OUTCOMES, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	25.5	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**708**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	93.6	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	5.5	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	1.5	0.7	15.4	5.8	7.0
Not in Universe	%	30.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**649**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.5	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	7.6	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	87.2	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.7	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.9	2.1	14.3	8.0	8.3
Not in Universe	%	30.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**626**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	7.3	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	87.2	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	4.6	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 170: SATISFACTION, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	68.6	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**298**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	4.0	3.3	4.4	7.8	6.2
Very Satisfied	%	18.5	25.6	35.6	46.1	39.8
Extremely Satisfied	%	76.8	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	68.3	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**301**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	8.6	10.4	11.6	12.8	12.1
Very Satisfied	%	32.2	29.1	42.6	46.6	42.1
Extremely Satisfied	%	57.1	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 171: BREASTFEEDING, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	51.4	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**462**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	57.1	80.4	47.5	40.5	50.3
Formula Feed Only	%	11.0	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	25.5	10.8	31.9	32.5	27.8
I Haven't Decided	%	6.3	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	68.1	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**303**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	79.2	91.5	76.6	72.6	77.3
No	%	20.8	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 172: FAMILY PLANNING, MARICOPA

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	68.5	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**299**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	81.6	77.0	77.5	82.2	80.3
No	%	18.1	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	67.9	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**305**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	96.4	84.2	70.8	74.0	75.5
No	%	2.3	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	67.8	41.5	42.9	38.6	40.2
Not in Universe	%	1.3	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**294**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	11.9	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	13.3	2.8	11.4	10.9	9.2
LARC - IUD	%	18.0	10.8	11.9	12.3	11.9
Pills	%	10.2	8.6	11.9	13.0	11.8
Injection	%	29.3	5.9	16.2	20.2	16.2
Condoms	%	7.5	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	Maricopa (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	5.8	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Arizona

Initial Contact: Urban followed a recommendation from the Arizona Health Care Cost Containment System (AHCCCS/Medicaid) and the Arizona Department of Health Services (Vital Records) to work with the Center for Health Information and Research (CHiR), housed at Arizona State University, an organization that has traditionally worked with the agencies to link and analyze state datasets.

Data Acquisition Process: Urban executed a data use agreement with CHiR on June 2016, which was then approved by both Medicaid and Vital Records in July 2016. In October 2016, Urban received 2014 and 2015 linked birth certificate and Medicaid data from CHiR. It was determined that individual claims level data were not included, therefore, an IRB modification was made to receive individual-level claims data. The IRB modification was approved by CHiR in December 2016 and by Medicaid in January 2017. By June 2017, revised data files were submitted to Urban. In September 2017, Urban received updated eligibility files (all data, 2014-2016) and data submission was complete.

Final results: Urban included Medicaid eligibility, Medicaid claims, and birth certificate data in the evaluation's final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Maricopa Special Health Care District (Maricopa) awardee in Arizona, which implemented the Maternity Care Home model, delivered care at five sites included in the impact analysis: Maricopa Integrated Health System's Comprehensive Healthcare Center (MIHS), South Central Family Health Center, 7th Avenue Family Health Center, Maryvale Family Health Center, and Sunnyslope Family Health Center. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the MIHS site served a large enough number of women enrolled in Strong Start that a site level estimate is also feasible (Table 173).

TABLE 173: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR MARICOPA HEALTH CARE DISTRICT

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Maricopa Special Healthcare District			
Maricopa Integrated Health System's (MIHS) Comprehensive Healthcare Center	Yes	Yes	No
South Central Family Health Center	Yes	No	No
7th Avenue Family Health Center	Yes	No	No
Maryvale Family Health Center	Yes	No	No
Sunnyslope Family Health Center	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [75]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we drew the comparison group outside the county (alternative specification #1) for Maricopa.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

[75] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 174 reports the birth and process outcome findings for this awardee:

- C-section rates for women enrolled in Strong Start are 6.2 percentage points lower and VBAC rates are 8.8 percentage points higher than those for women in the comparison group (19.7 percent versus 25.9 percent for C-section and 16.6 percent vs. 7.8 percent for VBAC, Strong Start women versus the comparison group, respectively).
- Consistent with the C-section finding, women enrolled in Strong Start are 3.3 percentage points more likely to have a have a weekend delivery (26.6 percent) than women in the comparison group. However, this finding is only marginally significant (p-value<0.10).
- There are no other significant differences in the birth outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 174: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MARICOPA HEALTH CARE DISTRICT

Outcomes	Main Model: 2014 - 2016, Strong Start (N=568)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=27630)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=406, N=14333)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=406, N=14333)
Birth Outcomes						
Clinical gestational age (weeks)	38.4	38.4	0.1	N/A	0.0	0.1
Preterm birth rate	10.6%	11.0%	-0.4	N/A	0.5	0.4

Outcomes	Main Model: 2014 - 2016, Strong Start (N=568)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=27630)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=406, N=14333)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=406, N=14333)
Very preterm birth rate	3.2%	2.9%	0.2	N/A	0.1	0.1
Birthweight (grams)	3,191.5	3,208.1	-16.6	N/A	-19.9	-4.0
Low birthweight rate	9.3%	9.5%	-0.1	N/A	0.0	-0.6
Very low birthweight rate	1.4%	1.4%	0.0	N/A	0.3	0.1
Rate of Apgar score greater than or equal to 7	98.1%	97.1%	1.0	N/A	0.2	0.5
Process Outcomes						
C-section rate	19.7%	25.9%	**-6.2****	N/A	**-5.5****	**-6.3****
VBAC rate[1]	16.6%	7.8%	**8.8****	N/A	**8.8***	**9.0***
Weekend delivery rate	26.6%	23.3%	**3.3^**	N/A	**4.6***	**4.9***

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 163 Strong Start women and 7141 comparison group women.

Table 174 also shows findings from the alternative specification models. The estimated differences in C-section, VBAC, and weekend delivery rates between Strong Start women and the comparison group are similar to the differences in the main model when we limit the sample to the claims data sample (alternative specification #2) and add diagnosis control variables (alternative specification #3).

Table 175 reports the cost and utilization findings for this awardee:

- Strong Start, relative to the comparison group, is associated with $320 higher expenditures in the eight months prior to the delivery month ($3,469 vs. $3,149).
- Strong Start women have 0.03 fewer hospitalizations in the 8 months before delivery month than women in the comparison group (0.07 versus 0.10 hospitalizations).
- Strong Start women have 0.22 fewer emergency department visits in the 11 months following the delivery month than women in the comparison group (0.64 visits vs. 0.85 visits). Conversely, Strong Start is associated with an increase of 0.33 emergency department visits for the infant 11 months following the delivery (1.61 versus 1.28 visits).
- Strong Start is also associated with an increase of 0.04 hospitalizations for the infant 11 months following the delivery (0.16 vs. 0.12 visits). However, this finding is only marginally significant (p-value<0.1)
- There are no other significant differences in cost and utilization outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 175: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MARICOPA HEALTH CARE DISTRICT

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N 406)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=14333)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,469	$3,149	**$320***	N/A
Total expenditures during delivery period	$7,053	$7,179	-$127	N/A
Total delivery and postdelivery expenditures[2]	$14,596	$13,759	$837	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.09	1.13	-0.04	N/A
Number of hospitalizations 8 months before delivery month	0.07	0.10	**-0.03***	N/A
Number of days in NICU	0.49	0.47	0.02	N/A
Number of ED visits for mother 11 months after delivery month	0.64	0.85	**-0.22****	N/A
Number of hospitalizations for mother 11 months after delivery month	0.05	0.06	0.0	N/A
Number of ED visits for infant in the first year of life	1.61	1.28	**0.33****	N/A
Number of hospitalizations for infant in the first year of life	0.16	0.12	**0.04^**	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for MIHS are generally consistent with the Maricopa awardee-level analysis. Key differences in birth and process outcomes between the Maricopa awardee-level estimates and the MIHS site-level estimates (Table 176) are noted below:

- Women enrolled in Strong Start at MIHS have an average birthweight of 3,140 grams, which is 66.3 grams lower than the average birthweight for the propensity-score reweighted comparison group of women. This difference in birthweight is statistically significant at the MIHS site, but not at the Maricopa awardee-level.
- Consistent with the awardee-level findings, C-section rates for women enrolled in the MIHS Strong Start site are 5.7 percentage points lower and VBAC rates are 10.0 percentage points higher than those for women in the comparison group.
- While the VBAC finding is consistent across alternative specification models, the difference in C-section rates is not statistically significant at the site-level in the claims sample model

(alternative specifications #2) or in the claims sample model with diagnosis controls (alternative specification #3).

- In contrast to the awardee-level model, the weekend delivery rate difference between women enrolled in Strong Start site and the comparison group women is not statistically significant at the site-level.

TABLE 176: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MIHS (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=305)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=25396)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=220, N=14307)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=220, N=14307)
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.3	0.0	N/A	-0.1	-0.1
Preterm birth rate	11.5%	11.4%	0.1	N/A	2.3	1.1
Very preterm birth rate	3.9%	3.3%	0.7	N/A	0.7	0.3
Birthweight (grams)	3,139.6	3,205.9	**-66.3***	N/A	**-85.7***	-55.5
Low birthweight rate	10.5%	9.5%	1.0	N/A	1.4	0.3
Very low birthweight rate	2.0%	1.5%	0.4	N/A	1.3	0.7
Rate of Apgar score greater than or equal to 7	97.4%	97.0%	0.4	N/A	-0.7	-0.2
Process Outcomes						
C-section rate	20.3%	26.0%	**-5.7***	N/A	-2.6	-3.8
VBAC rate[1]	17.3%	7.3%	**10.0****	N/A	**9.7***	**10.0***
Weekend delivery rate	25.9%	23.9%	2.0	N/A	2.7	2.3

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 98 Strong Start women and 6494 comparison group women.

Table 177 reports the cost and utilization findings for this site, which are generally consistent with the awardee-level findings. Key differences between the awardee and site-level estimates are highlighted below:

- In contrast to the awardee-level model, Strong Start, relative to the comparison group, is associated with $2,260 higher delivery and post-delivery expenditures at the MIHS site ($16,746 versus $14,487).
- Also in contrast to the awardee-level model, Strong Start at the MIHS site is not associated with a significant decline in hospitalizations for the mother in the prenatal period.
- While the awardee-level model also found a greater number of ED visits for the infant after delivery among Strong Start women, the magnitude is larger at the site level (0.53 compared to 0.33).

TABLE 177: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MIHS (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N 220)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=14307)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,861	$3,404	**$457^**	N/A
Total expenditures during delivery period	$7,911	$7,351	$561	N/A
Total delivery and postdelivery expenditures[2]	$16,746	$14,487	**$2,260***	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.30	1.23	0.07	N/A
Number of hospitalizations 8 months before delivery month	0.09	0.10	-0.02	N/A
Number of days in NICU	0.64	0.49	0.15	N/A
Number of ED visits for mother 11 months after delivery month	0.74	0.93	**-0.18^**	N/A
Number of hospitalizations for mother 11 months after delivery month	0.05	0.07	-0.01	N/A
Number of ED visits for infant in the first year of life	1.83	1.30	**0.53****	N/A
Number of hospitalizations for infant in the first year of life	0.19	0.13	**0.06^**	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Maricopa Integrated Health System implemented the Maternity Care Home model under Strong Start. MIHS enrolled higher rates of teens than many awardees (25.5 percent vs. 15.2 for Strong Start overall). They also reported relatively high rates of women having experienced intimate partner violence (22.5 percent), which suggests that the MIHS population may have had especially high levels of psychosocial need. Under Maricopa's Strong Start intervention, Registered Nurse Care Coordinators and Community Health Workers provided care coordination and social support via in-person and telephonic encounters. They referred participants to supplemental services and resources, such as substance use treatment, mental health care, social services, and pregnancy, birth, and breastfeeding education. Strong Start reportedly promoted greater personal contact between providers and patients. Impact analysis found Strong Start participants at MIHS had lower C-section rates, higher VBAC rates, and marginally higher weekend delivery rates (p-value<0.10) than women in the comparison group. Higher weekend delivery rates among Strong Start participants may suggest here was a reduction in planned inductions or scheduled C-sections. During the case studies, MIHS key informants reported that, as a teaching hospital, the MIHS hospital focused on reducing medically unnecessary C-sections.

Strong Start participants at MIHS also had higher prenatal care expenditures than women in the comparison group, fewer hospitalizations during the prenatal period, and fewer ED visits for mothers in the year after delivery. Infants born to Strong Start participants had more ED visits in their first year of life and marginally more hospitalizations (p-value<0.10)

Medical University of South Carolina

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
820	• State university with large academic and medical center and statewide network of more than 750 primary and specialty care providers	• Five sites located across South Carolina, including three concentrated in the Charleston area	• Intervention categorized as "high intensity" for offering at least five or more care coordination, education, and/or referral encounters, as well as additional psychosocial counseling (by telephone) by a masters-level social worker, and referrals (when indicated) to a perinatal psychiatrist • Care coordination and social support through telephonic encounters with Registered Nurse (RN) care navigators • Psychosocial risk reduction through social worker assessment and referrals • Promotion of evidence-based prenatal care at obstetric practice sites statewide

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Providing high-quality services and using team-based approach to "meet patients where they are" and build strong relationships that facilitated health improvement
- Telephonic- and text messaging-based communication allowed for more frequent, regular contact with participants with many competing demands for their time and/or who lived in rural or isolated areas
- Around-the-clock access to RN care coordinators

CHALLENGES

- Promoting model among prenatal care providers when most Strong Start service delivery was virtual and therefore "hidden" from providers' view
- Patient population's complex, significant needs which intervention could not always address
- Lagging enrollment for most of the implementation period

NOT SUSTAINED

- MUSC's Strong Start program was not sustained

KEY FINDINGS: PARTICIPANT-LEVEL DATA[76]

PARTICIPANT-LEVEL DATA QUALITY

- 0.0% rate of missing intake forms; 0.0% rate of missing exit forms
- 0.9% rate of item nonresponse on intake forms; 11.3% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 8.4% of women were teens (under age 20); 9.5% were 35 years or older
- 69.4% of women were black; 4.2% were Hispanic; 25.0% were white
- 16.8% of women were married; 26.3% were living with a partner; 15.8% were not in a relationship
- 38.2%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 36.2%: C-section rate among women with a delivery
- 18.8%: preterm birth rate among women with a live birth
- 17.9%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not provided here because there was no appropriate comparison group
- See the Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings
- Findings from site-level estimates for MUSC Downtown – which served a large number of women enrolled in Strong Start that a site-level estimate was also feasible but also lack an appropriate comparison group – are in the Site-Specific Estimates section

[76] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Under its pre-Strong Start prenatal care model, MUSC patients received comprehensive maternity care provided by obstetricians (OBs), maternal and fetal medicine specialists, certified nurse-midwives, family medicine physicians, nurse practitioners, and registered nurses (RNs). As a tertiary care and academic medical center, MUCS provides patients with access to a variety of specialists and referral services. At the MUSC-Downtown (Charleston) site, for instance, a nutritionist or dietician is available 1.5 days per week, and a perinatal psychiatrist is on-site one day per week. In general, MUSC's Strong Start sites did not offer comprehensive care coordination or case management prior to Strong Start implementation. None had a social worker on staff. The MUSC-Downtown site had the best access to this type of service because it relied on the university hospital's on-call social worker, but program staff reported that the hospital social workers were usually "overwhelmed." Key informants generally agreed that social work resources were, prior to Strong Start, inadequate to meet patient needs.

In 2005, MUSC implemented a two-year pilot project which key informants described as the "genesis" of MUSC's Strong Start model. The small-scale project was sponsored by the South Carolina chapter of the March of Dimes and targeted prenatal patients in a tri-county area around Charleston. It aimed to standardize prenatal care, including use of 17 Alpha-Hydroxyprogesterone Caproate (17P) to prevent preterm birth, and provided case management support to patients through a contracted nursing service. The project had promising results; after the grant period ended, MUSC continued the standardized care component through its Preterm Birth Prevention Program[77] but—until the Strong Start opportunity—did not have the funding to continue case management.

DESCRIPTION OF ENHANCES STRONG START SERVICES

MUSC's Strong Start Maternity Care Home model had three key components: (1) telephonic encounters with experienced nurse coordinators to ensure that patients can access health care and other psychosocial services; (2) social risk reduction through social worker assessment, referrals and follow up for a variety of public benefit and community-based needs; and, (3) promotion of evidence-based prenatal care at OB practices throughout South Carolina.

Under the care coordination component, a personal "care navigator" provided sustained contact during a patient's pregnancy and postpartum period. MUSC's two Strong Start care navigators were Registered Nurses who communicated with patients virtually (phone calls, email, and text) on an as-needed basis. Depending on a patient's risk factors and needs, communication may have been daily,

> "[The Strong Start nurse] calls just to ask how I'm doing, the pregnancy, if there's anything she can do. How long we talk depends, the longest call was around 45 minutes. She was pretty persistent – she asked 'are you sure you're okay?'"
>
> *- Strong Start participant*

[77] More information about this program can be found on it's website: http://www.muschealth.com/women/services/pretermprevent.htm.

weekly, or (at a minimum) once every several weeks. Most patients received at least 5 encounters during their pregnancy and postpartum.

Care navigator services were meant to "wrap around" and complement the prenatal care provided at the OB office. The average OB visit at Strong Start sites lasted between 7 and 15 minutes; key informants acknowledged that this was not enough time for patient education or to identify and address psychosocial needs. One prenatal care provider observed, "The patient will leave here and be confused, and because of their relationship with the Strong Start care navigator, they will feel comfortable calling them to ask questions." Care navigators were in regular contact with providers at Strong Start sites, communicating via phone, email, or electronic medical record (EMR)-messaging at least two or three times per week. The care navigator usually initiated communication, most commonly to alert providers of patient concerns, coordinate transportation, or to ensure that patients received services or treatments. Care navigators reported an average caseload of 100-120 Strong Start patients in Year 1, and indicated that caseloads increased over time. With increased caseloads, care navigators needed to prioritize more, and could not communicate as frequently as they once did with patients. Though they emphasized that Strong Start participants were still able to get the support and care they needed, key informants noted that care navigators could not simply "check in" with their caseload as much as they used to (or as they would like to).

> "I didn't have the money for my lights, so [the Strong Start social worker] got in touch to someone to help me with that. She helped me get the baby a crib, car seat, clothes, and diapers."
>
> *- Strong Start participant*

In the first Strong Start project year, program staff identified the need for an additional Strong Start member with social work training to complement the work of care navigators, and applied to use carryover funds from the first project year to hire a social worker. For its social risk reduction component, the MUSC program then hired a social worker (with a Master's degree in Social Work) in fall 2014. The two care navigators co-managed the Strong Start patient population, but referred women with psychosocial needs to the social worker for additional support. For instance, a care navigator would develop a care plan for a new patient and refer her to the social worker for housing and dental assistance. Other resources the social worker helped to secure included maternity and baby supplies (e.g., clothes, diapers, formula), breastfeeding classes, Medicaid coverage, nutrition assistance, employment, General Education Diploma (GED) classes, and mental health care. Key informants highlighted the addition of the social worker as a major success of their program. Her work on psychosocial issues allowed the nurse care navigators to focus on medical needs.

The third component of MUSC's Strong Start Maternity Care Home model was to promote evidence-based prenatal care at participating sites and referring practices. The Maternal-Fetal Medicine specialists (MFMs) involved in Strong Start, with the assistance of care navigators, identified patients at risk of not getting the "cutting-edge standard of care" and took steps to address the problem. For instance, if a Strong Start patient was not taking her prescribed 17P, steps might include reaching out to the patient's provider to discuss a strategy for resuming treatment, or making an appointment for the patient to have a direct consult with an MFM at MUSC. Because this component of the intervention was done on a mostly ad hoc basis and MUSC had a small number of referrals and enrollees from the outlying clinics with non-MUSC providers, this project component had a limited reach.

OUTREACH AND ENROLLMENT

> "I thought that was too good to be true, someone calling up to check up on you and ask if you need anything."
>
> *- Strong Start participant*

MUSC used an opt-in enrollment approach, meaning that eligible patients were asked to choose between enrolling in Strong Start or receiving prenatal care without additional Strong Start services. The awardee deliberately chose this approach because the success of care navigators' activities depended on active participation by Strong Start enrollees (i.e., at the very least, they had to accept care navigators' phone calls). MUSC felt it was important that patients understood and accepted responsibility for their participation in Strong Start. Strong Start eligibility screening and enrollment was handled by two risk assessors through a centralized process. Sites referred patients to the assessors in different ways. The three Charleston-area sites created a list of pregnant Medicaid patients and sent it to the risk assessors, who would then contact women by phone and describe what Strong Start could offer them. Other sites (and referring practices) completed a two-page referral form for potentially-eligible patients, which they faxed or emailed to the risk assessors. Referring practices also had the option to call members of the Strong Start team directly to refer patients to the program. Patients could also self-refer by filling out and submitting the form themselves or by contacting program staff via email using a link on MUSC's Strong Start website.

Most key informants indicated that MUSC's processes for identifying and enrolling Strong Start eligible patients were effective and did not feel they missed eligible women at the primary (Charleston-based) MUSC sites involved in the program. However, a significant percentage of women declined Strong Start enrollment. The opt-in rate was roughly 50 percent in Year 1, but improved to 60 to 65 percent in Year 2. The primary reason patients declined Strong Start was because they felt they had enough support from other programs (e.g., Medicaid Managed Care Organization (MCO) case management, *CenteringPregnancy*), their high-risk prenatal care providers, or friends and family. Some women had busy work or school schedules and did not want additional burdens placed on their time. Multiparous women were more likely to decline enrollment than primiparous women. While the phone-based risk assessment generally worked well, the sensitive nature of some questions (e.g., on substance abuse in the current pregnancy, whether the pregnancy was intended, and public benefit use) and the fact that the calls often lasted at least 10 minutes sometimes prompted women to hang up, at which point it became very difficult to re-engage with them.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

According to key informants interviewed for this study, Strong Start had a positive influence on a range of patient outcomes, not limited to the primary ones of reducing rates of preterm birth and low birthweight. For instance, the evaluation's participant-level data showed that breastfeeding rates among Strong Start participants were considerably higher than the historical average for MUSC's prenatal population. Key informants suggested that Strong Start helped patients with high-risk comorbidities participate in programs that enabled them to improve their health. They also mentioned "overall improved compliance with recommended care" (e.g. regular eye exams, dental care, and flu shots) was achieved under Strong Start, not just for the woman enrolled in the program but for her whole family. Finally, key informants emphasized the holistic, comprehensive approach of MUSC's Maternity Care Home intervention, describing it as a program that had "helped [participants] embrace

that their body is their temple" not just during pregnancy but in the long-term. Prenatal and postpartum visit attendance reportedly increased because participants were more engaged with the health care system via their care navigator and more able to focus on their medical care because other social needs were being met. One key informant estimated that 85 percent of participants returned for their 6-week postpartum visit, compared to around 50 percent of patients in MUSC's general prenatal population.

Key informants thought Strong Start had helped reduce health care and other costs, though their perceptions were based on anecdotal evidence. For instance, one key informant felt the program may have decreased costs because of reductions in disease-related disability. Another pointed out that Strong Start resulted in more prenatal care patients getting treatment for depression, which had the potential to decrease health care costs, as well as costs associated with crisis and other social services. Other potential areas of cost reduction included reductions in the costs of unplanned pregnancies (averted births) related to Strong Start's family planning counseling and referrals, and reductions in unnecessary Emergency Department (ED) visits related to triaging and 24/7 availability of the RN care navigators.

> "[You can call the care navigator] if you have a question [such as] do I need to go in now or wait and call the doctor tomorrow? It's nice to have someone and send them a message. I think it could in some situations eliminate unnecessary visits to the ER."
>
> *- Strong Start participant*

Strong Start was well positioned to address and alleviate depression among participants. Care navigators involved the social worker when a behavioral health need was identified and the team worked together to help manage the patient's care. They had a strong referral connection to an MUSC perinatal psychiatrist (a rarity in prenatal settings) who ran a free walk-in clinic for prenatal patients. At MUSC, providers and program staff noted "a very steep decline" in attendance at the health system's walk-in psychiatric perinatal clinic in the months after Strong Start ended. Key informants shared concerns about drop-in clinic attendance and underscored the value of mental health services for prenatal patients as crucial both during pregnancy and after "so they can participate in family life and have a [positive] relationship with their partner."

STRONG START PARTICIPANT PERSPECTIVES

Participants sought out prenatal care at MUSC because they had high-risk pregnancies and were drawn by MUSC's strong reputation. Participants remembered receiving a phone call about Strong Start, which was described to them as access to a personal nurse they could call with questions or for help securing resources. Most found the idea of the program immediately appealing, and some women said they benefited right away.

> *First, they ask you a bunch of questions, like number of pregnancies, smoking, stuff like that. She said you're assigned a nurse and you call the nurse with any questions, weekend or weekday.*

Some women reported speaking with a Strong Start nurse, while others said they spoke with the Strong Start social worker. In addition to discussing medical updates or questions, the Strong Start nurses/social worker have helped with (among other services) Supplemental Nutrition Assistance Program (SNAP), Medicaid and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits; a referral to grief counseling; job search resources; legal advice; energy assistance; and, cribs and other infant supplies.

On my last call, she was trying to help me and my mother try to get housing. My mother has six kids, and it's me, and this baby, staying in a three-bedroom, so she was trying to get us a trailer. We stayed on the phone for a long time to get information.

Participants unanimously reported high satisfaction with Strong Start, and indicated that their Strong Start nurse or social worker was an important part of their care. They were especially likely to mention Strong Start staff's accessibility when discussing the benefits of the program.

I don't have [a husband]; I have my children but I can't talk to them on that level. To have someone like [the social worker] to call, 'How was your day, how was your doctor's appointment?' It was nice having someone.

PROGRAM STRENGTHS

Key informants were most proud of the high-quality services MUSC provided, including the ability of their care team (the RN care navigators and social worker) to "meet patients where they are" and build strong relationships that facilitated health improvement. One key informant was proud to serve as a much-needed "champion" for Strong Start participants, someone devoted to making sure their medical and psychosocial needs were met. Furthermore, key informants felt that their teamwork-based approach to delivering Strong Start services was a major strength. Once the social worker was added mid-implementation, the care navigators and social worker collaborated to address patients' needs "holistically" and could "compartmentalize each [patient's] issues." Other strengths of MUSC's Maternity Care Home approach included adherence to evidence-based guidelines for prenatal care and the use of the EMR (used by both care navigators and prenatal care providers).

> "If [my care navigator] hadn't heard from me for a week, she would ask what's going on. She checks my records daily. If I didn't call her in the week or day after an appointment, she'd call."
>
> *- Strong Start participant*

Another key strength was the fact that the Strong Start intervention was telephonic and text-based, which allowed for more frequent and regular contact with participants with many competing demands for their time or who lived in rural or isolated areas. Furthermore, the intervention's around-the-clock access was an important part of the program's success. Participants were especially likely to mention Strong Start staff's accessibility when discussing the benefits of the program. In terms of replicability on a larger scale, however, this intense level of support may have been a program weakness. As one key informant noted, "At a larger scale the average nurse isn't going to want to get texts and calls 24/7 as the [Strong Start] care managers do."

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The care team described the challenge of promoting the Maternity Care Home model among prenatal care providers when so much of the work their team did was virtual and therefore "hidden" from providers' view. At the same time, they recognized that the virtual care management model allowed them to care for MUSC patients across the state and target women most in need of enhanced services, as some very high-risk patients traveled far to receive specialized prenatal care at MUSC and would not have been able to attend separate visits for additional support.

For all key informants involved in serving prenatal patients (the Strong Start care team and health care providers), it was sometimes frustrating to encounter their own limitations in meeting the complex and significant needs of the women they were treating. Not every problem could be addressed through the Strong Start intervention. One key informant described this as if "we [had] uncovered this rock in our path and then we couldn't do anything [to get around] it." For prenatal care providers, in particular, it was also difficult at the beginning of program implementation to understand the structure of Strong Start and their specific role in the intervention. At times, it was challenging to ensure that care navigators and prenatal care providers (who did not work at the same locations, physically) gave patients consistent and clear recommendations for care. Key informants noted that collaboration and communication between the providers and care navigators was important, particularly in making sure that a patient's full history was understood in the context of her care.

MUSC noted enrollment challenges during most of the implementation period. In hindsight, some key informants felt the program could have been more thoughtfully marketed to both providers and patients at the start of implementation (e.g., presentations at grand rounds, promotional materials placed at strategic community locations). At the same time, they acknowledged that more outreach and marketing would have been difficult given the program's lean staff. Program staff also said that, at the start of the Strong Start award, they wished the awardee would have spent a greater portion of Strong Start funding on individuals responsible for risk assessment and enrollment; with this alternative approach, MUSC would have had quicker and earlier enrollment success.

Promoting evidence-based MFM prenatal care at OB practices throughout South Carolina was somewhat limited. This component of the intervention was done on a mostly ad hoc basis—for instance, care coordinators may have learned from enrollees that specific providers recommended options other than the standard of care and relayed this information to MFMs working with Strong Start, who subsequently followed up with the other providers to educate and encourage them to provide the highest standard of prenatal care. Given this ad hoc method of implementation, and MUSC's small number of referrals, and the small number of enrollees from the outlying clinics with non-MUSC providers, this standardization has had a limited reach.

SUSTAINABILITY

MUSC's Strong Start program was not sustained after the award period ended. Program staff predicted this outcome during the Year 3 evaluation site visit (in late 2015), suggesting that their Maternity Care Home services would not be continued since they had not identified alternative potential funders for the program at that point. They explained that the Medicaid agency, Medicaid MCOs, and MUSC itself were unlikely candidates for sustaining the program. Medicaid MCOs were reportedly uninterested in funding maternity case management given their own (albeit less intensive) programs providing such services, and the state Medicaid agency had never been particularly supportive of MUSC's Strong Start program. As for institutional funding, one key informant suggested that MUSC's status as a nonprofit teaching hospital and a state entity translated into limited resources and many competing priorities. She explained, "At MUSC…there isn't enough money for extra positions. From a social work standpoint, we tried. But they needed social workers more in other departments." Several Strong Start team members were retained within the MUSC system after the award period, though in different positions and

departments. At least one former Strong Start site is continuing to use a binder of community based services created by the care navigators, but it does not appear that the binder will be updated regularly.

Some key informants felt that MUSC could have done a better job of planning for sustainability and expressed regret that the team had not come together to discuss strategies for continuing their program earlier in the award period. Furthermore, in terms of internal funding, another key informant linked sustainability challenges to the "invisibility" of MUSC's program, noting that while telephonic case management had many benefits, it also meant that much of the work that the care navigators and social worker did was not apparent to prenatal care providers. Key informants reasoned that if providers had actually seen the Strong Start program staff working with patients on a regular basis, they might have been more supportive of continuing the program with departmental funds.

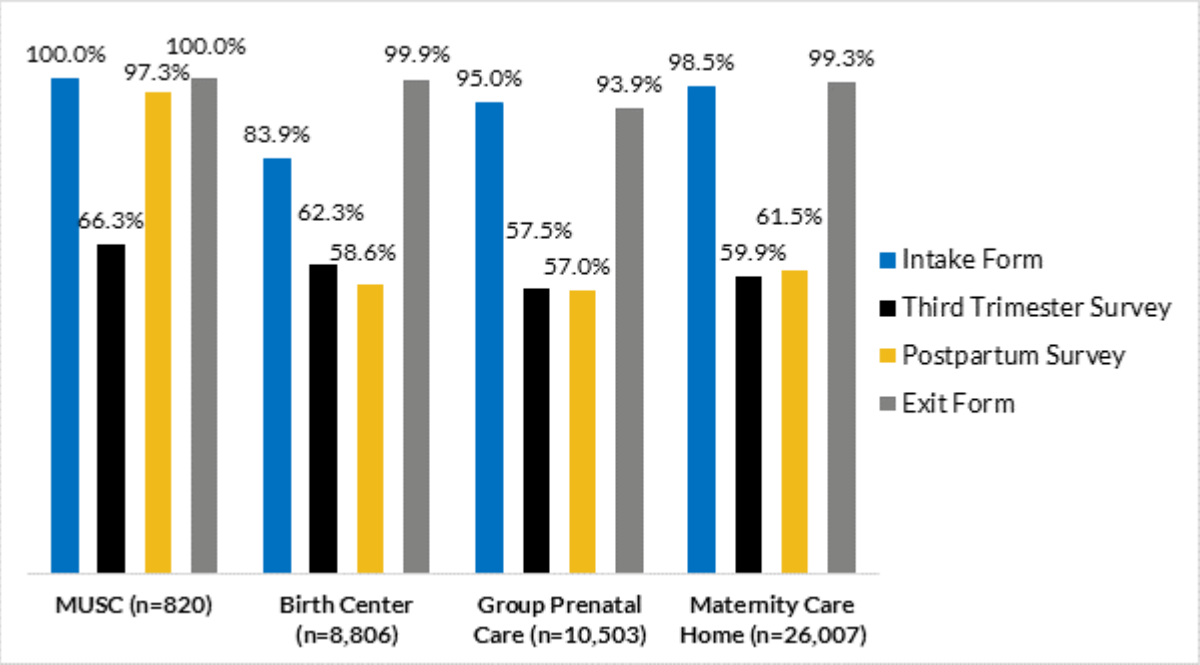
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for MUSC, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for MUSC to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 32 MUSC participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 12: FORM SUBMISSION RATES, MUSC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1203
- Study IDs represented: 820 (MUSC was instructed to count women towards their program enrollment totals who were screened for potential enrollment but did not receive case management services and who did not have valid intake forms, an issue that applied to 383 Study IDs). In some cases, Intakes and/or Exits for these women were submitted to the evaluation team, but these PLPE forms were removed from the final data set because the awardee did not receive Strong Start services.
- How forms were administered:
    - All patient forms were completed by Risk Assessment staff or RN Care Navigators through telephone interviews with patients. They tried to ask the questions in a natural way. Sometimes patients declined to answer questions.
    - MUSC made multiple attempts to reach patients for each survey. Many patients were considered lost to follow-up if their telephone numbers were no longer in service or the Care Navigator could not leave a message.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate there were any site-specific concerns or differences.

MISSING FORMS:

- Intake Form: 6.5 percent of Study IDs, among those eligible for inclusion in the PLPE dataset, had missing Intake Forms.
- Third Trimester and Postpartum Surveys: Approximately 38 percent of Study IDs were missing the Third Trimester Survey and three percent were missing the postpartum. Some surveys were missing because the participants enrolled early in the program and were past the appropriate timeframe when the surveys were implemented. Fewer Postpartum Surveys were missing than Third Trimester Surveys, but although MUSC's Postpartum Survey submission rates were high, 22 percent were submitted blank, with the box checked on the form that indicated the "participant could not be reached."
- Exit Form: There were no missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: There were several patients who did not complete Intake Forms but received Strong Start services. The awardee attempted to fill in as much information as possible so they could be considered "enrolled," but the forms were overwhelmingly incomplete.
- Exit Form: The awardee had high completion rates for key outcomes variables; data on participants' Strong Start pregnancy outcomes are missing for fewer than four percent of enrollees.[78]

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for MUSC participants. Some highlights include:

- The majority of MUSC participants (82.1 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 9.5 percent of participants were 35 or older.
- Most participants were either black (69.4 percent) or white (25.0 percent).
- The largest share of MUSC participants were in a relationship but not living with their partner (41.1 percent); only 16.8 percent were married and 15.8 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 10.2 percent of MUSC participants reported having experienced intimate partner violence, 38.2 percent of participants with a prior birth had a prior preterm birth, and 86.2 percent of participants had not planned their Strong Start pregnancy.

[78] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 96.6% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 3.5% were missing for other reasons.

TABLE 178: DEMOGRAPHICS, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**788**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	1.8	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	6.6	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	82.1	81.7	72.9	75.1	75.8
35 Years and Older	%	9.5	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.5	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**784**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	4.2	25.4	37.1	28.0	29.7
Non-Hispanic White	%	25.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	69.4	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	1.4	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	0.5	19.6	12.8	11.3	13.3
Not in Universe	%	95.3	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**33**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	63.6	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**788**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.4	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	0.3	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**786**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	37.2	36.6	30.8	35.3	34.5
In School, Not Employed	%	9.9	8.7	12.6	11.9	11.5
Employed and in School	%	5.2	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	47.7	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	0.9	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**781**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	24.6	15.4	27.8	29.1	26.4
High School Graduate or GED	%	60.8	57.5	58.3	57.9	57.9
Associate's Degree	%	5.1	8.2	5.2	4.6	5.4
Bachelor's Degree	%	4.0	14.5	4.5	3.7	5.8
Other College Degree	%	5.5	4.3	4.2	4.7	4.5

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	0.3	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**786**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	16.8	42.1	20.4	20.8	24.5
Living with a Partner	%	26.3	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	41.1	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	15.8	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 179: PSYCHOSOCIAL, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**782**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	59.3	51.8	51.8	59.7	56.5
No	%	39.4	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Not in Universe	%	40.4	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**464**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	90.5	61.1	72.6	79.9	75.3
Other	%	5.4	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	4.1	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	0.1	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**787**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	12.7	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	0.9	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**781**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	16.6	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	0.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**781**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	65.3	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	1.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**774**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	12.0	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	0.6	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**783**	**7,090**	**8,664**	**23,549**	**39,303**

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
None	%	80.5	67.9	59.0	65.5	64.5
Mild	%	14.9	21.4	23.8	20.2	21.2
Moderate	%	2.0	6.8	10.3	8.5	8.6
Severe	%	2.6	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	0.0	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	0.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**784**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	10.2	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	0.6	18.3	16.3	7.7	11.8
Not in Universe	%	5.7	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**738**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	1.8	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**788**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	69.5	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	15.9	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	14.6	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	87.9	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	39.6	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	27.9	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	-	24.6	17.1	15.4	17.2
Childcare Challenges	%	7.1	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	16.7	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 180: PREGNANCY HISTORY AND INTENTIONS, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**788**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	77.9	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	22.1	26.1	29.6	27.3	27.6

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	2.5	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**594**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	39.2	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	2.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**592**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	11.1	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	10.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**535**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	10.7	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	53.9	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**189**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	50.3	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	62.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**122**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	23.0	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	60.3	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**139**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	32.4	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	63.3	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**115**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	18.3	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	61.5	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**129**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	27.1	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 181: PRIOR BIRTH OUTCOMES, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.1	1.7	1.5	0.6	1.0
Not in Universe	%	22.1	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**613**	**6,337**	**6,857**	**18,350**	**31,544**

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	90.9	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	6.5	23.5	18.9	15.2	17.7
Not in Universe	%	29.3	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**506**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	27.1	34.6	24.3	27.1	28.1
>= 18 months	%	72.9	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.0	0.1	2.5	1.4	1.4
Not in Universe	%	29.3	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**557**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	38.2	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	9.9	1.3	20.8	13.1	12.6
Not in Universe	%	29.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**479**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	35.1	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 182: PRE-PREGNANCY MEDICAL CONDITIONS, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	0.9	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**781**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	13.8	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	77.0	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	2.8	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	6.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	3.8	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**758**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	7.1	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	4.2	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**755**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	17.6	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	11.9	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**694**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.3	4.2	3.7	2.8	3.3

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Normal Weight (=>18.5 BMI <25)	%	23.6	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	22.8	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	33.4	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	17.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 183: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	13.2	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**684**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	7.9	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	13.6	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**681**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	7.5	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	13.2	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**684**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	7.9	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	13.3	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**683**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	7.5	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	13.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**680**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	3.7	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	13.7	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**680**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	9.8	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**711**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	4.9	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	13.6	0.8	28.0	23.1	19.9

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**681**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	21.0	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 184: TREATMENTS DURING PREGNANCY, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	8.6	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**720**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	6.7	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	1.4	0.8	10.0	5.1	5.4
Not in Universe	%	73.0	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**202**	**680**	**654**	**2,585**	**3,919**
Yes	%	45.0	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	9.3	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**715**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	8.4	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	9.0	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**717**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	5.3	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 185: PRENATAL CARE, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	1.9	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**773**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	48.4	4.7	29.5	64.5	43.3
Licensed Professional Midwife[79]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	34.4	74.6	37.5	18.3	35.2

[79] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	16.7	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**788**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	88.7	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	10.5	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**788**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	7.7	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	4.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.0	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**788**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	100.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	10.3	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	16.0	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**662**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	16.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	3.0	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	14.6	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**673**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	72.8	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**214**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	51.9	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.1	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	73.2	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**211**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	27.5	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.5	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	75.6	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**192**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	75.4	7.2	38.7	30.7	27.9

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**194**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	38.7	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	75.0	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**197**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	6.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	13.3	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	6.2	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**739**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	44.8	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.3	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	86.7	52.4	70.7	46.7	52.0
Pulmonologist	%	4.5	-	1.3	1.5	1.4
Endocrinologist	%	5.1	-	4.1	5.1	4.8
Cardiologist	%	8.2	-	6.4	6.9	6.8
Other	%	25.4	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 186: DELIVERY INFORMATION, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	1.9	1.4	25.3	23.3	19.5
Not in Universe	%	18.3	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**629**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	37.8	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	7.4	0.3	7.8	2.9	3.5
Not in Universe	%	69.8	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**180**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	89.4	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	0.4	4.6	11.5	7.3	7.7
Not in Universe	%	4.6	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**749**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.6	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Delivery Method (Among Women with a Delivery)						
Missing Data	%	0.5	0.7	12.0	5.6	6.1
Not in Universe	%	4.6	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**748**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	63.8	87.1	70.1	69.5	73.1
C-Section	%	36.2	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.1	0.4	8.7	2.3	3.4
Not in Universe	%	76.9	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**181**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	70.7	83.3	72.9	74.7	75.9
C-Section	%	29.3	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	1.6	4.7	12.5	6.3	7.4
Not in Universe	%	65.6	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**258**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	41.9	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	76.5	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**185**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	16.8	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 187: BIRTH OUTCOMES, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	3.7	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**759**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	97.2	96.2	97.6	94.4	95.5
Stillbirth	%	1.8	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	1.3	0.7	15.4	5.8	7.0
Not in Universe	%	6.3	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**728**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	7.0	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	11.8	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	81.0	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Birth Weight (Among Women with Live Births)						
Missing Data	%	0.9	2.1	14.3	8.0	8.3
Not in Universe	%	6.3	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**731**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	3.8	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	14.1	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	77.7	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	4.4	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 188: SATISFACTION, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	24.1	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**598**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	6.9	3.3	4.4	7.8	6.2
Very Satisfied	%	53.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	38.1	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	24.1	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**598**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	12.0	10.4	11.6	12.8	12.1
Very Satisfied	%	50.0	29.1	42.6	46.6	42.1
Extremely Satisfied	%	34.9	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 189: BREASTFEEDING, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	33.4	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**525**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	55.2	80.4	47.5	40.5	50.3
Formula Feed Only	%	9.7	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	25.5	10.8	31.9	32.5	27.8

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
I Haven't Decided	%	9.5	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	24.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**593**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	74.5	91.5	76.6	72.6	77.3
No	%	25.5	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 190: FAMILY PLANNING, MUSC

Data Elements	N or %	MUSC (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	24.0	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**599**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	98.2	77.0	77.5	82.2	80.3
No	%	-	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	23.7	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**601**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	87.2	84.2	70.8	74.0	75.5
No	%	11.0	13.2	17.7	21.5	19.1
Unsure	%	1.8	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	2.7	41.5	42.9	38.6	40.2
Not in Universe	%	30.8	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**524**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	13.5	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	14.5	2.8	11.4	10.9	9.2
LARC - IUD	%	8.2	10.8	11.9	12.3	11.9
Pills	%	7.3	8.6	11.9	13.0	11.8
Injection	%	18.5	5.9	16.2	20.2	16.2
Condoms	%	2.5	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	32.8	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from South Carolina

Initial Contact: The South Carolina Division of Biostatistics, a part of the South Carolina Department of Health and Environmental Control (DHEC), discussed the process of obtaining vital statistics data with the evaluation team in January 2015. Following a productive conversation, the team was forwarded a vital statistics data request application and list of birth certificate variables and were told to reach out to the South Carolina Revenue and Fiscal Affairs Office (RFA) to obtain information on the application process for Medicaid data.

Data Acquisition Process: The RFA official was receptive to the evaluation team's request, and was confident in South Carolina's ability to link Medicaid and vital statistics data. The official shared an application for use of Medicaid data with the evaluation team, and both Medicaid and birth certificate data applications were submitted in March 2015. Following review and approval of the requested Medicaid variables from the South Carolina Revenue and Fiscal Affairs Office (RFA) in July of 2015, Urban sought approval from the Department of Health and Environmental Control to have birth certificate data linked and released to Urban. In August of 2015, DHEC approved the request and Urban received a fully executed data use agreement (DUA). In April 2016, Urban received linked birth certificate and Medicaid data for 2014. In July of 2016 Urban sent an amendment to RFA and DHEC requesting more variables necessary to the propensity scoring of the originally received data. Following the approval of the amendment, an updated 2014 file, and a 2015 data file were submitted to Urban in April 2017. In May 2017 the evaluation team began the process of requesting the 2016 data, and at the end of May, the Medicaid Agency began preparing the data to be submitted.

Final Results: South Carolina submitted all data to the evaluation team in September 2017, and the impact analysis team began their analysis. Merged Medicaid and birth certificate data, as well as claims data, is included in the final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Medical University of South Carolina (MUSC) awardee, which implemented the Maternity Care Home model, delivered care at five sites included in the impact analysis: MUSC – Columbia, MUSC – Mount Pleasant, MUSC – Florence, MUSC – Downtown, and MUSC – North Charleston. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the MUSC-Downtown site served a large enough number of women enrolled in Strong Start that a site level estimate is also feasible (Table 191).

Prior to receiving and analyzing data for MUSC, however, there were concerns that an appropriate comparison group could not be developed for this awardee. First, the case study findings showed that MUSC was the only source of care for high-risk pregnant women on Medicaid in the area that it operates. We therefore drew a comparison group from a matched county outside the area where MUSC sites or participants are located. Second, MUSC is the primary provider for high-risk prenatal and obstetrical care in the ***entire state***, and the Strong Start program included many high-risk women, as

described in the Participant Level Process Evaluation section earlier in this chapter. This was more problematic since using an out-of-county comparison group would not address this concern. Finally, Strong Start women at MUSC were likely to be high risk due to unobservable health risk factors that cannot be controlled for on the birth certificate and claims files. Therefore, it was unlikely that an appropriate comparison can group could be developed this awardee.

Two sets of estimates are presented in this section: one for the MUSC awardee as a whole and one for the MUSC-Downtown Site. For both sets of estimates, we used both a within county comparison group and estimate an alternative specification that uses an out-of-county comparison group. However, while analyses for MUSC are presented here, they ***should not be interpreted as impact estimates*** because the awardee served high-risk patients for most of the state and an appropriate comparison group was not available.

TABLE 191: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR MUSC

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Medical University of South Carolina			
MUSC – Downtown	No	Yes	Yes
MUSC - North Charleston	No	No	Yes
MUSC - Mount Pleasant	No	No	Yes
MUSC- Columbia	No	No	Yes
MUSC – Florence	No	No	Yes

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend. [80]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- In alternative specification #1, we used an out-of-county comparison group as previously described.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative

[80] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).

- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Awardee-level results for MUSC using the comparison group of women who are selected from the same counties as women enrolled in Strong Start are shown in the main model columns of Table 192. These estimates should not be interpreted as an impact of Strong because MUSC is the primary provider for high-risk prenatal and obstetrical care in the entire state and an appropriate comparison group is not available.

- Infants born to women enrolled in Strong Start at MUSC sites have a clinical gestational age of 37.5 weeks, which is 0.3 weeks less than that of infants born to women in the propensity-score reweighted comparison group (37.9 weeks).
- 21.9 percent of infants born to women enrolled in Strong Start have a preterm birth and 7.9 percent have a very preterm birth. These rates are 4.2 and 1.8 percentage points greater than rates for infants born to women in the comparison group, respectively. However, the difference in very preterm birth rates is only marginally significant (p-value<0.10).

- Infants born to women enrolled in Strong Start, on average, weigh 2,981 grams, which is 62.6 grams less than infants born to women in the comparison group (3,043 grams).
- Strong Start infants (20.4 percent) are 4.0 percentage points more likely to have a low birthweight infant than infants in the comparison group (16.4 percent).
- Infants born to women enrolled in Strong Start at MUSC are 2.0 percentage point less likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group (94.8 vs. 96.8 percent).

TABLE 192: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MUSC **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2016, Strong Start (N=784)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=47333)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=784, N=10381)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=614, N=27928)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=614, N=27928)
Birth Outcomes						
Clinical gestational age (weeks)	37.5	37.9	**-0.3****	**-0.4****	**-0.5****	**-0.3^**
Preterm birth rate	21.9%	17.7%	**4.2****	**5.1****	**5.3****	**3.0^**
Very preterm birth rate	7.9%	6.1%	**1.8^**	**1.9^**	**3.3****	1.9
Birthweight (grams)	2,980.6	3,043.2	**-62.6***	**-60.6***	**-92.4****	-49.8
Low birthweight rate	20.4%	16.4%	**4.0****	**4.0***	**4.9****	2.9
Very low birthweight rate	4.0%	3.3%	0.6	0.4	**1.3^**	0.2
Rate of Apgar score greater than or equal to 7	94.8%	96.8%	**-2.0***	**-1.9***	**-2.6****	**-2.4***
Process Outcomes						
C-section rate	38.3%	38.8%	-0.5	-1.8	0.5	-1.8
VBAC rate[1]	15.7%	10.8%	4.9	**5.3^**	4.1	4.7
Weekend delivery rate	N/A	N/A	N/A	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 159 Strong Start women and 7932 comparison group women.

Similar results are found for each of these measures when the out-of-county comparison group is employed (alternative specification #1) and when the sample is limited to the claims sample (alternative specification #2). However, most differences are smaller in magnitude and estimated with less precision after adding diagnoses controls from the claims data to the 2014-2015 sample (alternative specification #3). For example, the estimated differences in very preterm birth rates, average birthweight, and low birthweight are no longer statistically significant, and the differences in clinical gestational age and preterm birth are only marginally significant (p-value<0.10). Consistent with our expectations, these changes in the significance of the findings suggest that the main model findings for MUSC are, at least in part in part, driven by differences in health status between Strong Start enrollees and women in the

comparison group. That is, Strong Start women are more likely to be have high risk factors that cannot be completely controlled for in this evaluation's propensity-score modeling.

Table 193 reports the cost and utilization findings for this awardee:

- Strong Start, relative to the comparison group, is associated with $1,064 higher expenditures in the eight months prior to the delivery month ($5,226 vs. $4,162).
- In the main MUSC model, there are no other significant differences in cost and utilization outcomes between women (and their infants) enrolled in Strong Start and the comparison group.

When we draw the comparison group from outside the county, we find that Strong Start is also associated with $2,528 higher total expenditures during the delivery period and $3,865 higher total delivery and post-delivery expenditures. Strong Start is also associated with 0.09 more hospitalizations 8 months prior to the delivery month compared to the comparison group, and 0.04 more hospitalizations for the infant after delivery. Strong Start is also associated with 0.84 more NICU data for infants, although this finding is only marginally significant (p-value<0.10). Again, these findings should not be interpreted as impacts since they likely reflect the high-risk nature of the population served and the lack of a valid comparison group.

TABLE 193: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MUSC **(SHOULD NOT BE INTERPRETED AS IMPACTS)**

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=614)	Main Model: 2014 - 2015 Births Comparison Group Reweighted (N=27928)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=614, N=6341)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$5,226	$4,162	**$1,064****	**$1,468****
Total expenditures during delivery period	$13,381	$12,010	$1,371	**$2,528****
Total delivery and postdelivery expenditures[2]	$19,543	$17,656	$1,887	**$3,865****
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.87	2.01	-0.14	-0.08
Number of hospitalizations 8 months before delivery month	0.24	0.21	0.03	**0.09****
Number of days in NICU	2.99	2.70	0.29	**0.84^**
Number of ED visits for mother 11 months after delivery month	1.21	1.25	-0.04	-0.07
Number of hospitalizations for mother 11 months after delivery month	0.11	0.12	-0.01	0.03
Number of ED visits for infant in the first year of life	1.41	1.39	0.02	0.11
Number of hospitalizations for infant in the first year of life	0.15	0.13	0.01	**0.04***

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

The MUSC Downtown site served 589 of the 784 Strong Start MUSC enrollees, and the results for this site (Table 194) are similar to those for the awardee as a whole. Consistent with selection concerns—the MUSC Downtown site provides care to the highest risk pregnant women in the South Carolina—most of the negative effects associated with Strong Start are larger in magnitude at the downtown site compared to the awardee-level estimate. This is consistent with the high-risk nature of the awardee's participants at this site. For example:

- Infants born to women enrolled in Strong Start at MUSC Downtown have a lower gestational age (37.3 weeks) than infants in the comparison group (37.7 weeks) by 0.4 weeks. Women enrolled in Strong Start are also 6.1 percentage points more likely to have a preterm birth and 2.9 percentage point more likely to have a very preterm birth than infants of women in the comparison group (vs. 4.2 and 1.8 percentage point differences in the MUSC awardee model, respectively).
- Women enrolled in Strong Start also have lower weight babies (2,946 grams) than women in the comparison group (3,031 grams) by 84.4 grams. They are also 5.6 percentage points more likely to have an infant with low birthweight (22.6 vs. 17.0 percent). These differences in average birthweight and low birthweight rates in the awardee-level model are 60.6 grams and 4.0 percentage points, respectively.
- Infants born to women enrolled in Strong Start at the MUSC Downtown site are 2.7 percentage point less likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group, compared to a difference of 2.0 percentage points in the awardee-level model.
- We find similar results for each of these measures when the out-of-county comparison group is employed (alternative specification #1). Consistent with the awardee-level model, the estimated effects are amplified in the claims model sample (alternative specification #2) but are smaller in magnitude when we add diagnosis variables to this model to further adjust for health status (alternative specification #3). However, differences remain significant in alternative specification #3 at the site level when we further adjust for health status.

TABLE 194: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MUSC DOWNTOWN (SITE-LEVEL; **SHOULD NOT BE INTERPRETED AS IMPACTS**)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=589)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=45593)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=589, N=8059)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=447, N=26879)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=447, N=26879)
Birth Outcomes						
Clinical gestational age (weeks)	37.3	37.7	-0.4**	**-0.4****	**-0.6****	**-0.4****
Preterm birth rate	24.6%	18.6%	6.1**	**6.1****	**7.4****	**5.7****
Very preterm birth rate	9.3%	6.5%	2.9*	**2.5^**	**4.0****	**3.2***
Birthweight (grams)	2,946.4	3,030.8	-84.4**	**-60.3^**	**-113.0****	**-85.2****
Low birthweight rate	22.6%	17.0%	5.6**	**4.1***	**6.2****	**4.8***
Very low birthweight rate	4.6%	3.7%	0.9	0.1	1.4	0.9
Rate of Apgar score greater than or equal to 7	94.0%	96.7%	-2.7**	**-2.4***	**-3.3****	**-2.8***
Process Outcomes						
C-section rate	42.3%	40.7%	1.6	-2.7	1.6	-0.4
VBAC rate[1]	14.6%	10.5%	4.2	**5.6^**	2.0	1.4
Weekend delivery rate	N/A	N/A	N/A	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 123 Strong Start women and 7611 comparison group women.

Table 195 reports the cost and utilization findings for the MUSC Downtown site. We find that, in general, Strong Start at this site is associated with higher expenditures and utilization compared to the comparison group. Compared to the awardee-level estimates, there are more statistically significant findings at the MUSC Downtown site. Again, these findings should not be interpreted as impacts since they likely reflect the high-risk nature of the population served and the lack of a valid comparison group.

- In addition to the observed difference in prenatal care expenditures, Strong Start at MUSC Downtown is also associated with $2,614 higher expenditures during the delivery period relative to the comparison group ($14,214 vs. $11,600), and $3,815 higher delivery and post-delivery expenditures ($20,672 vs. $16,857). These differences were not statistically significant in the awardee-level model.
- Strong Start at MUSC Downtown is also associated with 0.05 more hospitalizations eight months prior to the delivery month (p-value<0.10), 0.16 more ED visits for the mother following the delivery month (p-value<0.10), and 0.17 more ED visits for the infant following delivery.

- Infants born to women in Strong have 0.92 more NICU days than infants born to women in the comparison group (1.34 versus 1.18 days). This difference is only marginally significant (p-value<0.1).
- Findings from where we draw the comparison group from outside the county are consistent with the main site-level estimates.

TABLE 195: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MUSC DOWNTOWN (SITE-LEVEL; **SHOULD NOT BE INTERPRETED AS IMPACTS**)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=447)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=26879)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=447, N=4921)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$5,788	$4,125	**$1,663****	**$1,824****
Total expenditures during delivery period	$14,214	$11,600	**$2,614****	**$2,864****
Total delivery and postdelivery expenditures[2]	$20,672	$16,857	**$3,815****	**$4,275****
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.93	2.06	-0.14	-0.03
Number of hospitalizations 8 months before delivery month	0.25	0.20	**0.05^**	**0.08***
Number of days in NICU	3.36	2.44	**0.92^**	**1.05^**
Number of ED visits for mother 11 months after delivery month	1.34	1.18	**0.16^**	0.05
Number of hospitalizations for mother 11 months after delivery month	0.13	0.10	0.03	0.04
Number of ED visits for infant in the first year of life	1.45	1.29	**0.17***	**0.20***
Number of hospitalizations for infant in the first year of life	0.14	0.12	0.02	**0.04^**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Medical University of South Caroline implemented the Maternity Care Home model under Strong Start, consisting of telephonic care coordination provided by RNs, who communicated with patients via phone calls, email, and texts. Also as part of Strong Start, MUSC hired a social worker who provided assessment, referrals, and follow-up support to Strong Start participants with psychosocial needs. Finally, the awardee focused on promoting evidence-based prenatal care at participating sites and referring OB practices. Many of the characteristics possessed by women enrolled at MUSC put them at high risk for poor birth outcomes. MUSC is the primary provider for high-risk prenatal and obstetrical care in the entire state, and the Strong Start program included a very high proportion of high-risk

women compared to other Strong Start awardees. The pre-pregnancy health of MUSC participants suggests an overall high-risk population, with high rates of pre-pregnancy diabetes, hypertension, and obesity. Especially alarming, among MUSC participants with a prior birth, 38.2 percent had a prior preterm birth and 10.7 percent had a prior stillbirth. The impact analysis findings for MUSC should not be interpreted as impacts of Strong Start because the awardee served high risk patients for most of the state and an appropriate comparison group was not available. The estimates in this chapter likely reflect the high-risk nature of the population served and not the impact of Strong Start.

Meridian Health Plan

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,812	• Physician-owned and operated Medicaid managed care plan providing care in Michigan, Illinois, and Iowa • Operated Maternity Care Home for high-risk, pregnant women in Jackson County, Michigan, selected because of its high rates of teen pregnancy, obesity, and chlamydia	• One site covering Jackson County, west of Detroit, MI	• Intervention categorized as "medium intensity" for offering four care coordination, education, and/or referral encounters • Care coordinators assessed needs and provided referrals for care and support services for all pregnant health plan members • Care coordination encounters were telephonic and occurred at least once every trimester • Also used Community Health Outreach Workers (CHOW), who conducted home visits with high-risk women who couldn't be reached over the phone or who accessed the Emergency Department for prenatal care

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- CHOWs were able to engage hard-to-reach women that may have otherwise not received necessary prenatal care services
- A robust enrollment strategy, including using data to identify eligible women and using an opt-out approach, led to high rates of enrollment

CHALLENGES

- Initial implementation was difficult because of confusion about the roles and responsibilities of Meridian staff members
- Lack of provider buy-in at the start of implementation led to strained relationships among Strong Start program staff and Meridian prenatal care providers

SUSTAINED

- Sustained care coordination services for high-risk pregnant patients, and expanded care coordination services to their other non-pregnant high-risk health plan members as well
- Awardee continued to use the Strong Start depression screening tool, but did not continue other aspects of Strong Start data collection

KEY FINDINGS: PARTICIPANT-LEVEL DATA[81]

PARTICIPANT-LEVEL DATA QUALITY

- 0.4% rate of missing intake forms; 0.9% rate of missing exit forms
- 1.4% rate of item nonresponse on intake forms; 27.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 12.6% of women were teens (under age 20); 4.5% were 35 years or older
- 11.3% of women were black; 3.4% were Hispanic; 83.7% were white
- 26.2% of women were married; 30.3% were living with a partner; 15.9% were not in a relationship
- 14.8%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 32.7%: C-section rate among women with a delivery
- 9.8%: preterm birth rate among women with a live birth
- 7.2%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted for Meridian Health Plan because of concerns about the quality of the link between birth certificates and Medicaid data in Michigan

[81] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Meridian Health Plan is a physician-owned and operated Medicaid managed care plan providing care in Michigan, Illinois, and Iowa. Meridian Health Plan's Strong Start grant supported a maternity care home for high-risk, pregnant women in Jackson County, Michigan. Prior to implementing Strong Start, Meridian Health Plan members were free to select an obstetrical (OB) prenatal care provider of their choice in the plan's network. Prior to Strong Start, Meridian supplemented medical care with basic telephonic care coordination for all pregnant women, and those meeting high-risk criteria (e.g., past preterm birth, high blood pressure, or diabetes) received more intensive healthcare management services from a care manager.

Meridian's care coordinators received training in identifying needs and managing care for pregnant women, and as part of their functions, reviewed historical claims and prescriptions for indications of high blood pressure or any other high-risk conditions. Additionally, the health plan had a demonstration project with Text for Baby, Text to Quit (smoking cessation), and Text for Health that allowed women to access additional health education resources and support through a mobile device. Meridian-enrolled pregnant women could get free phones with 250 minutes per month to be used for health-related calls and texts. If women showed symptoms of depression, either through the initial screening or any time thereafter, the coordinators would "warm" transfer the call to a representative of the Behavioral Health team at Meridian for assistance in scheduling an appointment. Women did not need a referral from their doctor to seek behavioral healthcare on their own.

DESCRIPTION OF ENHANCED STRONG START SERVICES

> "Yes, someone called me and asked a lot of questions. She called periodically and I have her extension number."
>
> *- Strong Start participant*

Under Meridian's Strong Start program, telephone care coordinators placed a welcome call to all pregnant health plan members and incorporated the Strong Start screening tool into the plan's pre-existing prenatal health screening process. One key informant shared how much she loved the Strong Start Intake Form: "It includes so many detailed questions and I get a lot of information on risk factors." The most common risk factors noted in the screening process were smoking, mental illness, substance abuse, and previous preterm births. Care coordinators had a bachelor's degree and were trained on using the Strong Start screening tool. The entire screening time took between 15 and 45 minutes.

Women at the highest risk level, scoring three on a scale of one to three, were eligible for Strong Start. Women who scored three and had exceptionally high levels of risk for preterm birth and low birthweight babies were referred to the medical director and care coordination team nurse for development of a care plan. Women who scored two were further assessed by the care coordination staff for possible inclusion in the Strong Start program. Women who scored "one" were not eligible for Strong Start services, unless they became high risk later in their pregnancy based on claims, referrals from their OB provider, or subsequent phone screenings.

The Strong Start care coordinator called each Strong Start enrollee at least once every trimester to make sure she was keeping up with her appointments; to provide additional education on healthy behaviors such as nutrition, physical activities, immunizations, regular/routine prenatal care and screening tests; and to review what to expect in each trimester (e.g., fetal kick count), and when to be in contact with her provider.

Care coordinators served fifty to sixty percent of Strong Start eligible women by phone. The remainder were referred to the Community Health Outreach Worker (CHOW) for in-person follow up. The CHOW played an important role because of her familiarity with the community and ability to connect with women who were often the most in need of additional personal attention. Said one key informant, "she knows what resources are available and she traverses community chaos to connect [members] with them."

The CHOW undertook a variety of measures to connect with hard-to-reach women. She would go to last known addresses and leave cards with her contact information so that women could reach her. Key informants said that OB office staff would assist in making connections where possible and viewed the CHOW as a valuable resource in helping their patients keep appointments. An OB reported, "we have case managers but they can't visit the homes due to [limited] time, and the community health worker can." Additionally, the CHOW contacted a participant every time she saw in a woman's medical record that she had been to the Emergency Department (ED). Meridian had direct access to the medical records of partner health systems, which allowed for data feeds that provided real-time data. The CHOW also developed relationships with a broad array of community resources in Jackson County. Those entities came to view the CHOW as an important resource in turn.

> "It's refreshing. I have never had an insurance company that cared."
>
> *- Strong Start participant*

Meridian's Strong Start model was supposed to include a support group component in addition to the care coordination and CHOW roles. The support group was to meet bi-weekly at the Center for Family Health (a Federally Qualified Health Center [FQHC] in Jackson County) and use an evidence-based curriculum focused on promoting healthy behaviors and self-management skills. However, transitions at the Center as Strong Start was being established meant that this component of the Strong Start model was not implemented. Instead, following the first year of implementation, Meridian, in conjunction with the Allegiance Health system, planned to fund a nurse educator to work directly with pregnant women who would visit ED and provide education and referral to a provider if they did not yet have one. However, due to restructuring at Allegiance Health, the project was stalled and later abandoned.

As an alternative approach, Meridian purchased "Baby Basics" booklets and planners from the What to Expect Foundation. The telephonic care coordinators and CHOW followed the curriculum to ensure that all women in the program received a consistent message and resources. Meridian care coordinators also distributed this material to OB providers via in-person meetings, and encouraged them to share with members. As part of these meetings, care coordinators talked about the goals of Strong Start, and provided contact information for Strong Start program staff. This approach garnered more buy-in from providers than previous attempts. Meridian also started a new depression screening at intake with a referral process through the CHOW. If a patient received a positive score in their depression screening the CHOW followed up with them in-person at their homes.

OUTREACH AND ENROLLMENT

> "It's my first pregnancy and I wanted to do anything that could bring more information."
>
> *- Strong Start participant*

Enrollment was a particular success of Meridian's Strong Start program. Meridian decided to use an opt-out enrollment strategy, meaning women were enrolled in Strong Start by default, unless they actively chose to opt out of the program. As a health plan, Meridian had access to multiple data sources from which they could identify eligible women, including state enrollment files (which indicated women that were Medicaid-eligible as a result of pregnancy), claims, daily reports from the Allegiance Health ED indicating members who were seen with pregnancy-related issues, and Meridian's member services department. Through these avenues, key informants were confident that the majority of eligible pregnant women were identified early and included in the program.

Very few women opted out of the program – one key informant could recall only one woman who refused to participate. Some women expressed initial hesitation or feared that Strong Start workers were part of state government and would "investigate" them. The care coordinators or CHOW allayed those fears by respectfully listening to and addressing the women's concerns. They explained the distinction between the health plan and the state, assured women that they were not there as representatives of the state or children's services, and described the types of services that Strong Start could provide.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Meridian's key informants felt that Strong Start had a notable, positive impact on preterm birth, low birthweight, breastfeeding, C-section rates, family planning, depression treatment rates, and healthcare costs. In two areas in particular – breastfeeding and C-section deliveries – informants reported that Strong Start efforts were aligned with broader state efforts that also likely influenced these rates. Key informants felt their biggest struggle was in improving the rates of family planning service use, and Strong Start efforts to increase the use Long Acting Reversible Contraceptives (LARCs) were muted by provider influence and preference for oral contraceptives at the postpartum visit.

> "I was told [long gestation] is good for their development."
>
> *- Strong Start participant*

Informants agreed in their perception that Strong Start services had positively influenced the preterm birth rate, and noted that it was an improvement over the health plan's rate prior to Strong Start implementation. They specifically cited improvements in care, such as ensuring that women were scheduled for prenatal care visits with Meridian network providers in the first 42 days of pregnancy, as contributing to the decline in preterm birth rates. Having a CHOW who was able to connect women to providers and make sure they followed up with those providers when they had concerns, rather than waiting or going to the ED, was also cited as a positive influence on preterm birth rates.

Key informants were also satisfied with their rate of low birthweight births, which was slightly below the statewide rate. They felt confident that Strong Start had indirectly influenced the rate by getting women into prenatal care earlier and increasing the length of pregnancy.

Both breastfeeding and family planning were topics of discussion during the telephonic care coordination calls. There was a spike in the rate of women who reported initiating breastfeeding after delivery, but this was likely confounded by the fact that Michigan Medicaid also began covering breast pumps in 2015. Family planning counseling however, was something that key informants reported as being difficult to improve. Telephonic care coordinators began discussing family planning during the first Strong Start encounter, and discussed all options, including LARCs. The CHOW reinforced the message, ensuring that women were thinking about their options early on in pregnancy. Despite these efforts, key informants reported that the decision about contraceptive use was usually made during postpartum visits with the provider, where "old habits die hard," and the providers pushed their preferred method (predominantly oral contraceptives). Even after Meridian removed the prior authorization policy for LARCs, the provider community's continued skepticism reportedly prevented any significant impact on take-up.

> "I am going to try [to breastfeed]. I did it with my last baby and lasted three months."
>
> *- Strong Start participant*

Key informants agreed that that Strong Start had most positively impacted health care costs by keeping members out of the ED. The CHOW followed up with difficult-to-reach members who sought care in the ED–usually because they either didn't have an OB provider, had an OB provider they disliked but weren't aware they could change, or didn't realize that in many cases they should contact their OB before going to the ED. The CHOW provided critical education and support to assist women in connecting them back to their OB with issues, finding new OBs, and generally reducing barriers to obtaining prenatal care. Notably, the health plan offered a 24/7 nurse advice line, which could help reduce ED visits for members who also accessed that resource.

STRONG START PARTICIPANT PERSPECTIVES

During focus groups, Strong Start participants discussed having positive experiences with their practitioner, including getting questions answered and having sufficient time. When asked about getting information they need, most had phone contact with Meridian, but some did not. No one recalled speaking with someone in-person outside their doctor's office or the clinic.

> *"I get a call once a trimester and we talk about my last appointment, complications, glucose levels, the fetal position, and my due date.*

No participants recalled getting referred elsewhere for care or for non-health benefits such as cash assistance or food stamps. All women were certain they had been told about the benefits of staying pregnant for at least 39 weeks, and all reported they had been told about the benefits of breastfeeding. When asked about family planning intentions, five spoke with confidence about their choices and three were still considering their options.

> *"I talked to Meridian on a call and discussed the pills and IUDs.*
>
> *"Yes, we discussed the risks of having a baby before 39 weeks.*

PROGRAM STRENGTHS

The success of the CHOW in engaging hard-to-reach women was the consistent thread that ran throughout the interviews with key informants. Having a Strong Start team member who was integrated in the community and could visit women in their homes and other community settings was the linchpin in engaging those women in care. A successful enrollment strategy, based on multiple data sources to identify pregnant health plan members and an opt-out approach, was also critical for capturing a large proportion of program-eligible women, ensuring early entry into prenatal care, and thus improving the chance of positive outcomes.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

According to key informants, one of the most challenging aspects of Strong Start was the lack of organizational knowledge of "how 'grants' work." [82] With some confusion about roles and responsibilities, Meridian staff struggled initially to put what they proposed for Strong Start into practice. To resolve these challenges, the Meridian and Allegiance leadership teams convened to discuss respective responsibilities and details of how to operationalize the award. Key informants noted that the work plan they ultimately developed included a quality improvement plan for overall project management and oversight, to ensure staff were on track with project tasks.

In addition, key informants felt that better engagement of providers would have increased the potential of Strong Start to reach even more women earlier in their pregnancies. Some providers initially felt defensive, as if Strong Start was implying that the they were not doing a good job providing prenatal care, rather than seeing the program as a source of support to enhance the care they were already providing. This negative relationship persisted throughout the program. It was also challenging to integrate the program into the clinic's workflow. The awardee's early provider engagement strategy, in partnership with Allegiance Health, relied on Allegiance as the intermediary between providers and Meridian. When the partnership dissolved and Meridian reached out individually to providers and established one-on-one relationships, informants observed stronger connections between Strong Start staff and providers and better alignment of goals and priorities. Starting these connections earlier on in the project could have made a big impact.

[82] Key informants referred to the Strong Start cooperative agreement as a grant.

SUSTAINABILITY

Meridian sustained telephonic care coordination for high-need pregnant women and expanded its enhanced care approach to include other non-pregnant high-need members as part of the health plan's larger care coordination efforts. Similarly, the CHOW's role was expanded to work with a broader population of Medicaid and Medicare beneficiaries, not specific to maternity care. Key informants felt that by focusing solely on pregnant women, they were not making the most of their health provider partnerships and were seeking to include more health conditions in their care coordination efforts.

The CHOW continues to use information provided by Allegiance Health on ED visits and inpatient stays to identify members for face-to-face follow up. The awardee noted they have expanded this process with other hospitals and healthcare systems. In addition, Meridian has continued to use the Strong Start depression screening tool, but did not plan to use other Strong Start data collection tools. However, they added some of the questions related to social determinants of health from the Strong Start Intake Form into the scripting used by telephonic care coordinators.

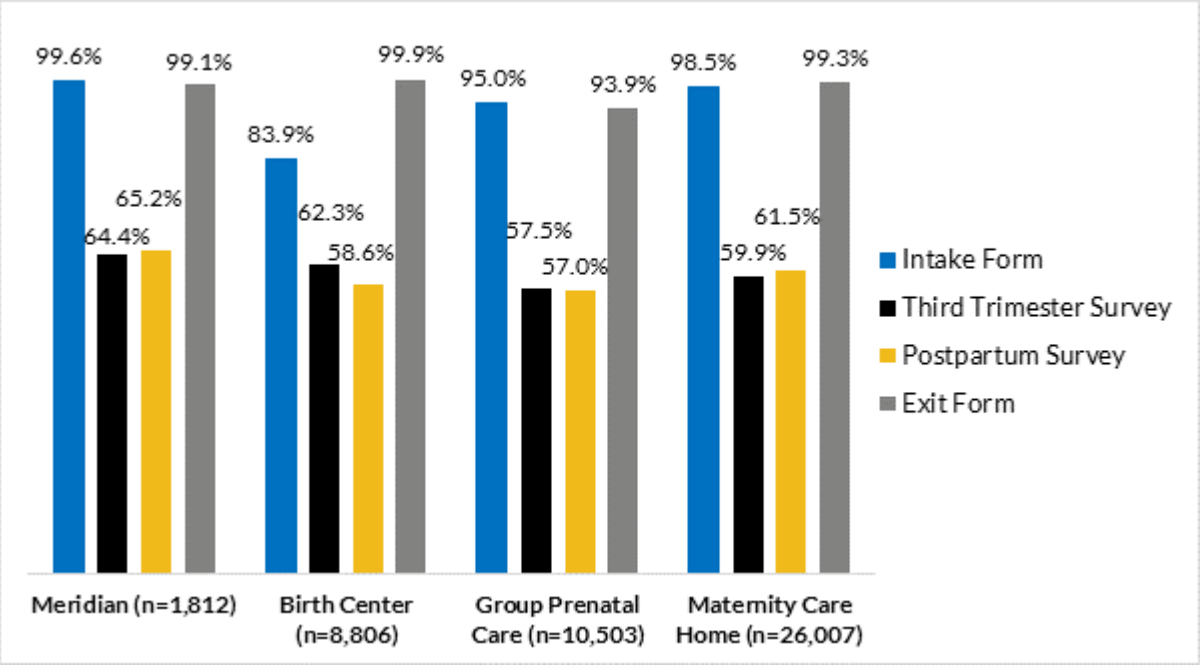
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Meridian, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Meridian to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 25 Meridian participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 13: FORM SUBMISSION RATES, MERIDIAN



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,812
- Study IDs represented: 1,812

HOW FORMS WERE ADMINISTERED:

- Most surveys were administered by Strong Start staff over the phone.
- If a patient could not be reached by phone or if the patient required additional services, they may have been completed in person by the community health worker.
- The awardee held bi-weekly meetings with staff to discuss data integrity issues.

SITE SPECIFIC CONCERNS OR DIFFERENCES:

- Meridian recruited patients from many different providers in their area, but for the purposes of the evaluation, the awardee was considered to have one site. Because it was a phone based intervention centered at the awardee's headquarters.

MISSING FORMS:

- Intake Form: 0.4 percent of Study IDs were missing Intakes.
- Third Trimester or Postpartum Survey: About 36 percent of Study IDs were missing the Third Trimester Survey and 35 percent were missing the Postpartum Survey.
- Exit Form: 0.9 percent of Study IDs were missing Exit Forms. The awardee was not responsive to requests from the evaluation team to submit these remaining Exit Forms.

ITEM NONRESPONSE:

- Intake Form: Meridian noted that Intake Form questions might be unanswered for a few reasons. First, some questions did not have a time frame associated, so patients were not sure whether the question referred to their behaviors during pregnancy or before they became pregnant (e.g., drinking alcohol). Second, because Meridian is the insurer, they believe that patients also declined to answer sensitive questions because they feared it would cause them to lose coverage (e.g., drug use).
- Exit Form: Meridian had a very high percentage of patients who were missing body mass index (53.8 percent) and gestational diabetes (43.5 percent). One likely factor is that the awardee was not allowed to request medical records after a patient dis-enrolled from their health plan. Data on women's Strong Start pregnancy outcomes were missing for only 5.4 percent of participants.[83] It is unclear why the awardee was able to get birth outcome information, but did not have access to other information from the medical record.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for Meridian participants. Some highlights include:

- The majority of Meridian participants (82.9 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 9.9 percent of participants were 18 or 19 years old.
- The majority of participants were white (83.7 percent), followed by 11.3 percent black.
- Similar to Strong Start participants overall, the largest share of Meridian participants was in a relationship and living with a partner (30.3 percent), although 26.2 percent were married and 15.9 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 15.1 percent of Meridian participants reported having experienced intimate partner violence, 14.8 percent of participants with a prior birth had a prior preterm birth, and 75.3 percent of participants had not planned their Strong Start pregnancy.

[83] Among participants with missing data on pregnancy outcome, 17.5% were missing because they did not have an exit form, 45.4% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 37.1% were missing for other reasons.

TABLE 196: DEMOGRAPHICS, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.4	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,779**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	2.7	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	9.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	82.9	81.7	72.9	75.1	75.8
35 Years and Older	%	4.5	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.0	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,769**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	3.4	25.4	37.1	28.0	29.7
Non-Hispanic White	%	83.7	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	11.3	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	1.5	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	1.7	19.6	12.8	11.3	13.3
Not in Universe	%	94.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**61**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	72.1	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	23.0	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.4	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,779**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	1.3	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,764**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	33.7	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.9	8.7	12.6	11.9	11.5
Employed and in School	%	4.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	50.7	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	1.5	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,760**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	24.7	15.4	27.8	29.1	26.4
High School Graduate or GED	%	64.5	57.5	58.3	57.9	57.9
Associate's Degree	%	5.0	8.2	5.2	4.6	5.4
Bachelor's Degree	%	3.4	14.5	4.5	3.7	5.8
Other College Degree	%	2.4	4.3	4.2	4.7	4.5

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	0.9	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,771**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	26.2	42.1	20.4	20.8	24.5
Living with a Partner	%	30.3	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	27.6	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	15.9	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 197: PSYCHOSOCIAL, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.6	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,776**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	51.7	51.8	51.8	59.7	56.5
No	%	48.1	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.6	17.0	6.6	3.4	6.8
Not in Universe	%	48.0	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**919**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	90.6	61.1	72.6	79.9	75.3
Other	%	7.2	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	2.2	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	1.5	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,760**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	23.8	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	3.7	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,720**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	3.6	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	1.6	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,759**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	66.0	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	5.6	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,687**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	8.4	24.7	34.0	26.0	27.5

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	2.7	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,739**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	87.3	67.9	59.0	65.5	64.5
Mild	%	7.0	21.4	23.8	20.2	21.2
Moderate	%	2.2	6.8	10.3	8.5	8.6
Severe	%	3.2	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	1.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,761**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	15.1	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	2.8	18.3	16.3	7.7	11.8
Not in Universe	%	7.4	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,605**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	-	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.4	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,779**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	81.2	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	17.9	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	0.9	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	79.9	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	-	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	14.7	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	-	24.6	17.1	15.4	17.2
Childcare Challenges	%	-	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	9.3	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 198: PREGNANCY HISTORY AND INTENTIONS, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.4	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,779**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	73.6	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	26.2	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	31.8	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**750**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	34.7	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	31.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**749**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	13.8	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	37.4	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**649**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.8	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	44.7	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**520**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	9.6	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	45.1	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**512**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	8.2	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	47.4	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**471**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	47.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**478**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	46.8	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**482**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	2.5	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 199: PRIOR BIRTH OUTCOMES, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.3	1.7	1.5	0.6	1.0
Not in Universe	%	26.7	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,305**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	89.7	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	5.7	23.5	18.9	15.2	17.7
Not in Universe	%	34.2	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**1,075**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	31.6	34.6	24.3	27.1	28.1
>= 18 months	%	68.4	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.5	0.1	2.5	1.4	1.4
Not in Universe	%	34.5	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,161**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	14.8	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	29.5	1.3	20.8	13.1	12.6
Not in Universe	%	34.1	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**650**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	8.2	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 200: PRE-PREGNANCY MEDICAL CONDITIONS, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	1.3	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,763**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	24.7	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	61.4	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.5	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	10.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	41.0	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,054**	**8,750**	**6,757**	**21,525**	**37,032**

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	2.1	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	41.0	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,055**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	4.1	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	53.8	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**826**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.8	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	31.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	25.4	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	29.8	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	10.5	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 201: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	43.6	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,007**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	2.1	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	43.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,006**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	4.1	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	43.5	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,009**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	6.0	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	43.6	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,008**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	43.7	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,006**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	5.2	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	43.7	0.8	26.7	23.3	19.7

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,006**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	1.5	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	43.8	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,005**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	44.5	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**991**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	12.2	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 202: TREATMENTS DURING PREGNANCY, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	52.3	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**852**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	5.6	0.8	10.0	5.1	5.4
Not in Universe	%	89.5	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**88**	**680**	**654**	**2,585**	**3,919**
Yes	%	15.9	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	52.4	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**851**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	1.5	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	52.4	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**850**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 203: PRENATAL CARE, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	45.8	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**968**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	96.3	4.7	29.5	64.5	43.3
Licensed Professional Midwife[84]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	3.5	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,770**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	59.4	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	10.7	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,770**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	1.4	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	6.0	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	40.6	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,062**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	95.1	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	2.8	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	44.9	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**985**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	9.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	2.3	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	44.6	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**990**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	8.5	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	2.4	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	88.2	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**211**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	42.7	16.9	13.4	30.9	26.1

[84] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Health Education Sessions	Mean	2.4	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	50.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**879**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	31.2	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.8	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	88.1	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**213**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	39.0	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	2.4	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	50.9	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**877**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	13.5	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	2.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	51.7	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**864**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	10.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.3	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	44.3	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**996**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	23.2	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.8	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	63.0	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	14.4	-	4.1	5.1	4.8
Cardiologist	%	10.3	-	6.4	6.9	6.8
Other	%	21.9	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 204: DELIVERY INFORMATION, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	48.0	1.4	25.3	23.3	19.5
Not in Universe	%	13.0	27.5	21.6	26.2	25.4

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**697**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	34.0	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	3.1	0.3	7.8	2.9	3.5
Not in Universe	%	85.8	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**199**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	91.0	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	41.6	4.6	11.5	7.3	7.7
Not in Universe	%	5.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**947**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.4	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	7.7	0.7	12.0	5.6	6.1
Not in Universe	%	5.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,553**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	67.3	87.1	70.1	69.5	73.1
C-Section	%	32.7	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	3.0	0.4	8.7	2.3	3.4
Not in Universe	%	70.1	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**480**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	73.1	83.3	72.9	74.7	75.9
C-Section	%	26.9	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	17.8	4.7	12.5	6.3	7.4
Not in Universe	%	70.6	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**207**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	65.2	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	1.0	0.1	6.2	0.7	1.9
Not in Universe	%	89.9	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**163**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	11.7	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 205: BIRTH OUTCOMES, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	5.4	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,690**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.9	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	1.0	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	5.2	0.7	15.4	5.8	7.0
Not in Universe	%	5.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,595**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.7	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	6.1	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	89.1	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.1	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	19.9	2.1	14.3	8.0	8.3
Not in Universe	%	5.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,332**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.0	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	6.2	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	84.8	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	8.0	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 206: SATISFACTION, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	35.1	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**1,160**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	7.8	3.3	4.4	7.8	6.2
Very Satisfied	%	35.3	25.6	35.6	46.1	39.8
Extremely Satisfied	%	55.5	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	35.0	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**1,162**	**4,698**	**3,615**	**13,114**	**21,427**

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Not at All Satisfied	%	0.9	2.0	3.1	2.3	2.4
Slightly Satisfied	%	1.5	3.0	4.0	2.9	3.1
Moderately Satisfied	%	11.4	10.4	11.6	12.8	12.1
Very Satisfied	%	37.3	29.1	42.6	46.6	42.1
Extremely Satisfied	%	49.0	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 207: BREASTFEEDING, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	35.9	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**1,145**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	61.3	80.4	47.5	40.5	50.3
Formula Feed Only	%	19.2	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	11.5	10.8	31.9	32.5	27.8
I Haven't Decided	%	7.9	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	35.2	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**1,158**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	74.1	91.5	76.6	72.6	77.3
No	%	25.9	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 208: FAMILY PLANNING, MERIDIAN

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	35.3	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**1,157**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	71.0	77.0	77.5	82.2	80.3
No	%	27.9	20.0	14.0	14.2	15.3
Unsure	%	1.1	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	34.8	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**1,166**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	51.3	84.2	70.8	74.0	75.5
No	%	48.1	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	34.7	41.5	42.9	38.6	40.2
Not in Universe	%	31.8	14.0	27.4	21.7	21.5

Data Elements	N or %	Meridian (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**598**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	22.4	3.2	12.6	12.1	10.2
Male Sterilization	%	2.3	3.6	0.7	0.7	1.4
LARC - Implant	%	9.7	2.8	11.4	10.9	9.2
LARC - IUD	%	9.0	10.8	11.9	12.3	11.9
Pills	%	14.4	8.6	11.9	13.0	11.8
Injection	%	12.5	5.9	16.2	20.2	16.2
Condoms	%	4.8	26.6	19.8	13.9	17.9
Breastfeeding	%	11.5	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	11.7	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Michigan but problems with data quality prevented the evaluation from including them in the Impact Analysis

Initial Contact: In January 2015, the evaluation team spoke with officials from the Michigan Department of Health and Human Services (MDHHS) to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data to the Urban Institute. In Michigan, both Medicaid and birth certificate data are housed under MDHHS, thus the evaluation team worked with one person within the agency to facilitate the data request.

Data Acquisition Process: Michigan was receptive to supporting the evaluation, and MDHHS staffed planned to link the Medicaid and birth certificate data. The evaluation team submitted data use and nondisclosure agreements in June 2015 to request access to Medicaid and birth certificate data from the MDHHS. After the agreements were submitted, MDHHS asked the evaluation team to submit an IRB application. Urban submitted the IRB application in April 2016, received approval in August 2016, and a DUA was executed in September 2016. Michigan submitted linked 2014 and 2015 birth certificate data in February 2017, and 2016 data were submitted in June 2017. The state submitted all of the Medicaid data at once, in June 2017, as a merged data file. The evaluation team reviewed the data for completeness and found a variety of problems related to the sample and missing data. Despite ongoing communication and collaboration with MDHHS, missing Medicaid data for a substantial proportion of Strong Start participants delayed finalization of these files. These women, when analyzed by Urban, proved to be significantly different from the women who were merged, both demographically and medically. Claims were not requested as this discrepancy was never rectified.

Final Result: Due to data inconsistencies, Urban determined that the Michigan data was not useable for its Impact Analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Meridian Health Plan. In Michigan, the match rate between birth certificates and Medicaid eligibility for Strong Start participants was much lower than in other states. Of particular concern, based on the birth certificate records, the women who did not match were much more likely to have a premature infant or an infant with low birthweight. The low match rate for women participating in Strong Start indicated that there was a systematic problem with the match in Michigan. Consequently, data for Michigan were not included in the impact analysis.

CROSS-CUTTING SUMMARY

The Meridian Health Plan implemented the Maternity Care Home model under Strong Start. Under Meridian's Strong Start program, care coordinators assessed needs and provided referrals for care and support services during care coordination telephone encounters that occurred at least once every trimester. The awardee also employed a Community Health Outreach Worker who conducted home visits for high-risk participants who could not be reached over the phone or who accessed the hospital emergency department for prenatal care. Having a Strong Start team member who was integrated in the community and could visit women in their homes and other community settings was critical to engaging hard-to-reach women Unlike most Strong Start awardees, Meridian enrolled a majority of white participants (83.7 percent). Meridian's participants had among the highest rates of smoking at intake for Strong Start (23.8 percent), but were otherwise lower risk than women enrolled with other awardees—with relatively low rates of depression and anxiety, low rates of reported access barriers, and high rates of insurance prior to Strong Start. Impact analysis was not conducted for Meridian because of concerns about the quality of the link between birth certificates and Medicaid data in Michigan. Descriptively, however, Meridian participants had rates of preterm delivery and C-section deliveries that lined up with national averages.

Mississippi Primary Health Care Association

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
2,628	• Nonprofit organization representing 21 community health center (CHC) members in their effort to improve access to health care for the medically underserved in Mississippi	• Eight CHC sites providing services in 19 clinics in urban, suburban, and rural areas of Mississippi	• Intervention categorized as "medium intensity" for offering care coordination, education and/or referral encounters, while providing no other direct enhanced services at most sites • Varied by site, but included free dental services, home visits, care coordination, appointment "no show" tracking and follow-up, social worker support, and free childcare during the clinic visit • Health care coordinator whose role varied across sites and might have included health education and appointment tracking and follow-up

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- One site integrated many Strong Start features (enhanced screening, education, and follow-up) into its model of care
- Helped direct more attention to social determinants of health in prenatal care delivery

CHALLENGES

- Making free dental care accessible and convenient was harder than anticipated
- Data collection burden was challenging without initial funding for data staff
- Delayed entry to care (resulting from state-level factors) limited Strong Start impact on birth outcomes

PARTIALLY SUSTAINED

- Strong Start staff were not sustained, but many enhanced outreach and education services will continue to be provided by core clinic staff and through routine prenatal care/obstetric services, and at some locations through the state's Perinatal High-Risk Management/Infant Services System (PHRM/ISS)

KEY FINDINGS: PARTICIPANT-LEVEL DATA[85]

PARTICIPANT-LEVEL DATA QUALITY

- 1.5% rate of missing intake forms; 0.6% rate of missing exit forms
- 11.5% rate of item nonresponse on intake forms; 9.7% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 20.1% of women were teens (under age 20); 4.8% were 35 years or older
- 84.8% of women were black; 1.2% were Hispanic; 13.1% were white
- 11.5% of women were married; 19.9% were living with a partner; 25.5% were not in a relationship
- 28.9%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 35.0%: C-section rate among women with a delivery
- 16.3%: preterm birth rate among women with a live birth
- 13.2%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Slightly lower average birthweight and better Apgar scores than infants in the comparison group
- Higher VBAC and weekend delivery rates than women in the comparison group
- These differences in birth and process outcomes are only marginally significant (p-value<0.10)
- Findings from site-level estimates for Central MS Civic Improvement, Family Health Center, and Family Health Care Clinic – which served a large enough number of women enrolled in Strong Start that site-level estimates were also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Not conducted for MPHCA because we did not obtain Medicaid claims data from Mississippi

[85] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

The standard model of prenatal care at Mississippi Primary Health Care Association (MPHCA)'s eight sites, which are all community health centers (CHCs), included wrap-around services provided under other grant programs, notably Title V. The eight participating CHCs provided services at as many as 19 clinics, though the awardee noted that these numbers fluctuated based on clinic capacity and enrollment. At the three clinics visited by the evaluation team, prenatal care was provided by an obstetrician and gynecologist (OB/GYN) with support from nurses and other clinical staff, and consisted of short individual visits (one participant commented that they typically lasted three to four minutes) every two to four weeks, depending on gestational age. In addition to comprehensive OB/GYN medical services that included clinic services and hospital delivery, the standard model included nurse or community health worker home visits, dental care, smoking cessation, some doula services through state public health programs, nutrition counseling and coordination with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), family planning, prescription drugs, transportation, behavioral health screening and referral, childbirth education, and HIV and other screening programs. For patients in conventional prenatal care, dental services were not free prior to Strong Start but were provided on an income-based sliding fee scale. Reimbursement for general maternity care at the sites occurred through the Federally-Qualified Health Center Medicaid Prospective Payment System and wrap-around grant programs. The awardee reported that all sites were either Patient-Centered Medical Home (PCMH)-certified or pursuing certification during the Strong Start award period. Both sites interviewed for the case studies had the PCMH certification from The Joint Commission.

Program Overlap: Patients not enrolled in Strong Start received the same medical OB/GYN care, lactation specialist services, and social service referrals as Strong Start participants, and some of the same health education. Nutritional services were available to all patients through WIC. Women who were not in Strong Start received home visits from other programs, and women could be enrolled in both Strong Start and, where available, the similar Perinatal High-Risk Management/Infant Services System (PHRM/ISS), a Medicaid case management program that provided home visits for beneficiaries with high-risk pregnancies.[86] PHRM/ISS home visits and other services were not reflected in Strong Start data collection.

DESCRIPTION OF ENHANCED STRONG START SERVICES

MPHCA's Strong Start Maternity Care Home model sites offered varying combinations of enhancements under the program, but all provided home visits, care coordination, appointment "no show" tracking and follow-up, and dental services free of charge. All sites also added a health care coordinator whose role varied but could include appointment tracking and follow-up as well as health education at some sites. Some also added social worker support, free childcare during the clinic visit,

[86] "The Perinatal High-Risk Management/Infant Services System (PHRM/ISS) is a Mississippi case management program for high-risk pregnant women and their babies less than one year old. PHRM/ISS provides enhanced access to health care, nutritional and psychosocial support, home visits, and health education." http://msdh.ms.gov/msdhsite/_static/41,0,106.html.

and/or nutritionist services. MPHCA permitted sites to alter the content of their Strong Start programs based on local feasibility and preferences. There was not a required number of encounters for Strong Start enhancements.

> "I did go to the dentist last month, and I really, really did need that because some dentists don't do dental work on pregnant women, or accept Medicaid. It was real hard for me because I did need my teeth cleaned."
>
> *- Strong Start participant*

Free dental care constituted the most significant Strong Start prenatal care enhancement according to key informants – all sites previously offered dental care, but not free of charge. The dental care provided to Strong Start enrollees consisted primarily of exams, cleaning, and treatment of caries and abscesses. Both sites visited for the case studies had dentists on staff and already offered dental services that were integrated with their medical services. In fact, at one site, a dentist served as director of clinical services. Some dentists were reluctant to provide services beyond exams and cleanings to pregnant women because of concerns about possible risks to pregnant patients, so some more serious procedures were scheduled for after delivery.

> "To me [this clinic] is better than the doctor experience I had with my first child because they make you feel comfortable, they're not really based on whether you have insurance or not, they make sure you're ok, they make sure the baby's ok, they make sure you get the right kind of medicine you need…get your vitamins on time. Most doctors don't do that, most doctors don't care."
>
> *- Strong Start participant*

One site ended its participation in Strong Start nearly midway through the program. Concerns about the program's data collection requirements and related administrative burden drove their decision. They noted in particular that the manual nature of the administrative activity was incompatible with the workflow of their fully electronic operation.

OUTREACH AND ENROLLMENT

Strong Start outreach primarily targeted existing patients and was conducted by the health care coordinator, the outreach coordinator, nurses, and/or the OB/GYN physician at the point of encounter during the second prenatal visit. At least one site also participated in health fairs and church gatherings to encourage early entry into maternity care and participation in Strong Start and had a social worker who participated in enrollment outreach. The awardee initially planned to enroll all Medicaid-enrolled patients who sought care before 20 weeks' gestation and had at least one of The American College of Obstetricians and Gynecologists (ACOG) and state socioeconomic (SES) risk factors. However, as enrollment criteria changed over the course of the award period, some sites changed their approach. For example, one site attempted to enroll all Medicaid-eligible pregnant women in Strong Start (regardless of other risk factors and at any gestational age) while another continued to require both a risk factor and the 20-week gestational age limit.

Due in part to the forms required from enrollees to participate in Strong Start, all but one site used an opt-in method of enrollment: women were asked to choose between enrollment in Strong Start or participation in the standard care model. Informants reported a 60 to 70 percent eligibility rate for Strong Start. The remaining 30 to 40 percent of Medicaid patients did not meet the eligibility criteria at some sites (20 weeks or less gestational age at time of screening). They reported a refusal rate of less than 10 percent among women who were eligible.

One site experienced resistance to the Intake Forms by eligible women who did not want to be "bothered" and generally viewed themselves as healthy enough not to need additional services. Staff at one site had concerns about the length of the form and framing of some of the questions, which they felt presumed unhealthy behaviors on the part of enrollees. As a result, they reported using a one-page condensed version containing the same substantive questions but which they felt was better-received by patients. At some but not all sites, women were enrolled in Strong Start even if Medicaid coverage was pending. Informal attrition (20-30 percent) occurred through missed appointments rather than formally discontinuing participation.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

According to the perceptions of key informants interviewed for this study, Strong Start improved preterm delivery rates and low birthweight outcomes. They attributed the improvement to women entering care earlier as a result of Strong Start community outreach (and word-of-mouth) and greater effort by clinic staff to identify and recruit pregnant women in a timely manner. Key informants believed that Strong Start produced savings through reductions in the Neonatal Intensive Care Unit (NICU) stays and maternal hospitalizations.

> "I've been to a lot of major medical facilities, and the difference there is that you're on a time schedule so if you don't have your questions written down before you go to the appointment, you'll forget them by the time it's over because they have a certain quota they have to meet for the day. But here, at least one or two people are going to ask you how's everything going, do you have any problems. It seems to me like they really care about your care here."
>
> *- Strong Start participant*

Providers emphasized contraception options more than they had in the past, both in the third trimester and the postpartum visit clinic-wide, among Strong Start and non-Strong Start enrolled patients. Key informants reported that Long-Acting Reversible Contraceptives (LARC) uptake increased, mainly because more patients were asking for these methods. They believed that birth spacing improved and that they saw fewer "boomerang babies" or repeat births with short inter-pregnancy intervals. This was likely a result of a variety of factors not specific to Strong Start, but the increased emphasis on health education in the program may have played a role. In spite of a general trend of women entering care earlier, one site reported that 30 percent of their maternity patients enrolled in Strong Start in their third trimesters. Women who had a previous pregnancy in Strong Start were more likely to enter care earlier for a subsequent one, according to interviewees, and women with a previous preterm birth were less likely to have another preterm birth.

Key informants reported that Strong Start approaches to education and multiple contacts per visit with a patient "spilled over" to influence the care provided by non-Strong Start staff to patients not enrolled in Strong Start. Key informants believed that more mechanisms for supporting prenatal care access should be deployed, including providing cell phones to help women maintain the same contact information, transportation services provided by the clinic itself, and child care at every site to improve retention. Lack of funding has been a barrier to implementing these recommendations.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start participants chose to participate in Strong Start for a variety of reasons. Among women participating in focus groups, motivation for enrolling in Strong Start included needing additional services or emotional support, wanting a different experience in prenatal care, and getting helpful benefits for free.

> *[The provider said that] Strong Start is good for low income women, that you don't have to pay, and that it will benefit you.*

Within Strong Start focus groups, there was also wide variation in the extent to which participants used enhanced services. In one focus group, nearly all participants had seen the dentist at the site while in another group about half had received dental services or had an upcoming appointment. Some noted that there was a wait of several weeks for dental appointments, while others were able to see the dentist immediately.

All participants at one site said that psychosocial needs were discussed in their first visit, and some were referred to the social worker. Several discussed having or planning home visits. All participants at that site agreed that education on preterm birth was incorporated into their care, though participants in the other Strong Start focus group disagreed. Most women said they planned to try breastfeeding and that they had received education on breastfeeding, primarily from WIC representatives/lactation consultants.

Most participants described favorable effects of Strong Start on their general health status and well-being. Participants said that providers were following their progress more closely as a result of Strong Start and that they always got appointment reminders and follow-up calls to reschedule missed appointments.

> *…[My] first two pregnancies, I stayed in the hospital [during the pregnancy], and this one I feel good.*
>
> *My [blood] pressure doesn't get as far up as with my other kids.*
>
> *I was smoking, I quit.*
>
> *[The health care coordinator] told me how to rest.*

Many women, including those in Strong Start, experienced substantial delays in obtaining Medicaid coverage once they became pregnant, which meant that some did not get coverage until their sixth or seventh month of pregnancy. At least one had not yet gotten coverage by very late in her pregnancy, and some did not have coverage during previous pregnancies, making it harder for them to compare standard Medicaid services to Strong Start enhancements. Some were required to pay copayments for visits while they waited for Medicaid coverage, though others were not. One had paid out-of-pocket for virtually all her prenatal visits.

PROGRAM STRENGTHS

> "If you miss [your appointment they call, ask you if everything's ok; send out letters; remind you of your next appointment."
>
> *- Strong Start participant*

Key informants were most proud of reducing preterm deliveries among women with a history of premature birth, getting women into care earlier, and providing education on a consistent basis. They believed that training and physician leadership support were essential to their success. Key informants reported that the community-based outreach and educational components of the program as well as referrals to WIC and social workers were key strengths of MPHCA's Strong Start program and led to improved outcomes. The availability of child care at one of the study sites also improved attendance at appointments. The home visiting component—which was not always funded by Strong Start—was cited as having a particularly significant impact on NICU stays and prenatal maternal hospitalizations. Key informants appeared uncertain about the effects of dental care and the extent of uptake; some noted that fewer enrollees than anticipated attended their scheduled dental appointments, though rates varied among sites.

Key informants emphasized the importance of continuity of care by the obstetrical provider throughout prenatal care. In addition, having both a nurse practitioner and a physician involved in a patient's care improved the relationship with the patient. Both patients and providers placed significant value on Strong Start's commitment to ensuring that patient questions were answered, whether by the physician, a nurse practitioner or another staff member providing health education. It was helpful to have a care coordinator "right there" to whom the physician could direct patients for further support, all of which contributed to the comprehensiveness of care and patient's sense of caring from staff.

Key informants emphasized the need to overcome patient concerns about the time commitment associated with receiving enhanced services. Encouraging patient-to-patient communication (e.g. in the waiting room, or outside the clinic among patients who knew each other) enhanced program effectiveness by increasing enthusiasm for Strong Start enrollment and appointment attendance. Key informants advocated using social media (such as Facebook) to keep patients engaged and encourage discussion, though there was not a standard approach to this across sites. The awardee reported that social media use was increasing, as was communication with patients by text. Strong Start participants' enthusiasm for the program helped boost enrollment as they promoted it through word-of-mouth, and key informants felt that this enthusiasm also encouraged women to enter prenatal care earlier.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Informants noted that Strong Start data collection was the most challenging aspect of the program and that initial up-front support, such as funding for a data analyst, for those tasks would have mitigated the challenge. They reported frustration with evolving data requirements and had difficulty collecting data from women who were "lost to care" at the sites. While recognizing the appropriateness of adaptability in a pilot program, they emphasized the need for consistency in program requirements and advance notice of administrative changes. They also noted that Strong Start coincided with all the clinics shifting to electronic health records and data submission, creating compatibility issues with Strong Start data collection and additional administrative effort.

Convincing women to use the dental care that was free as part of Strong Start and making it sufficiently accessible also proved challenging. Time required, inconvenience of separate dental and prenatal care appointments and transportation and child care challenges likely deterred dental service uptake. Key informants recommended that in the future, scheduling dental visits to coincide with sonograms would ensure that additional trips to the clinic are not necessary. High attendance rates for sonogram appointments make this a key opportunity to schedule dental care. Apart from inconvenience, obstacles to dental care included apprehension about the experience (concerns about pain, often after going without dental care for extended periods) and lingering misconceptions about dental work harming the pregnancy or baby. Some focus group participants noted past difficulty in finding dentists who both took Medicaid and would treat pregnant women. Informants reported a lack of general awareness of dental care as an important element of prenatal care.

State-level factors outside Strong Start posed challenges to improving outcomes. Key informants noted that Medicaid application processing times were as long as three months, and some Year 4 interviewees reported that processing times had slowed even more since Strong Start ended. This further delayed entry to care for many women and limited opportunities for both timely routine prenatal care and enhanced services. The impact of slow eligibility processing times was more pronounced when the sites attempted to refer women to providers outside of the community health centers, many of whom would only see patients once Medicaid coverage was confirmed. Additionally, Mississippi eliminated maternity services from its public health clinics around the time Strong Start ended, which reportedly reduced access to care, and the state did not expand Medicaid as part of the Affordable Care Act.

SUSTAINABILITY

Strong Start staff was not sustained due to lack of funding. However, home visits, education, and health assessments continued to be provided by social workers, interns, and other core clinic staff. One site that was studied integrated many Strong Start features (enhanced screening, education, and follow-up) into its model of care. The extent to which this integration occurred at other sites is unclear. Community outreach to get women into care earlier was also sustained using existing staff.

Enhancements similar to those in Strong Start continued after the award period through PHRM/ISS and were paid for through the Medicaid managed care plans (MCOs), key informants reported. However, child care and free dental care beyond those dental services provided by the MCOs were not sustained due to lack of funding for these services. Mississippi Medicaid has very limited coverage for adult dental services. Key informants felt that the absence of child care negatively affected patients, even though uptake of child care appeared to be low during the program.

Key informants noted that after the end of Strong Start, some of the CHCs were implementing *CenteringPregnancy* in their care models, adding it to their existing maternity services (none provided Centering during Strong Start). The awardee and sites were also starting to focus more broadly on social determinants of health, in part because Strong Start offered an opportunity to consider the impact of social and economic factors including psychosocial, health literacy, food insecurity, and others.

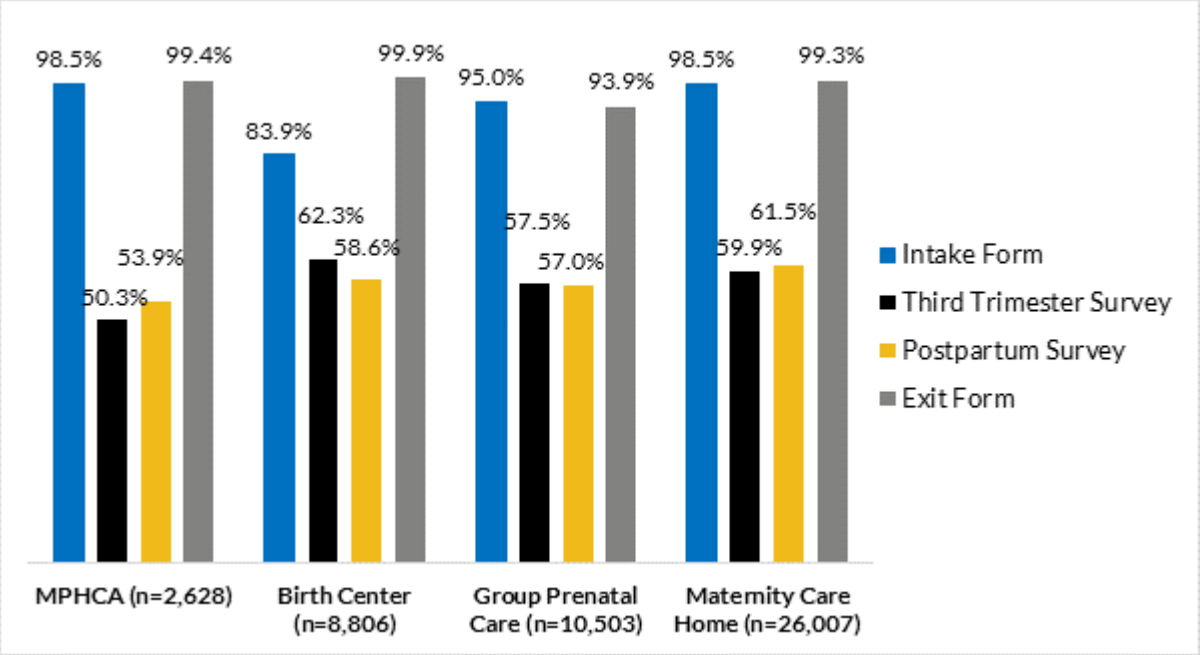
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for MPHCA, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for MPHCA to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 62 MPHCA participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 14: FORM SUBMISSION RATES, MPHCA



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 2,628
- Study IDs represented: 2,628

HOW FORMS WERE ADMINISTERED:

- At the beginning of the project, patients self-administered the surveys. Staff consistently found the forms incomplete or totally blank, and they reviewed this at the next visit when possible. Partway through they switched to having staff assist patients with completion and found that patients still struggled to complete the forms within time constraints they faced.
- Occasionally, the Third Trimester and Postpartum Surveys were mailed to patients who did not complete them in the office with a self-addressed stamped envelope. It is not known how often this approach was used or what the rate of completion was.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- One site replaced the Strong Start Intake Form with their own shorter form that did not include all of the measures the evaluation requested, and stored it in their EHR (was the case for 318 participants). They eventually submitted their own forms in an electronic format. Because they did not use the official Strong Start form, data was collected in a different manner and likely has different patterns of missing data.

MISSING FORMS:

- Intake Form: 1.5 percent of Study IDs had missing Intakes. The awardee attempted to locate these but was not able to. It is not known whether the participants completed these surveys.
- Third Trimester and Postpartum Surveys: About 50 percent of Study IDs were missing the Third Trimester Survey and 46 percent were missing the Postpartum Survey. The awardee stated that some patients did not return for a postpartum visit. Also, a relatively small number of participants had already completed the program by the time these forms were implemented.
- Exit Form: 0.6 percent of Study IDs had missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: Many patients felt certain questions were “suggestive” (e.g. drinking, drugs, and intimate partner violence) and did not answer them.

- Exit Form: Strong Start pregnancy outcome was missing for 15.1 percent of participants.[87] Many of MPHCA's prenatal providers were not affiliated with hospitals where deliveries occurred, so accessing birth outcomes was a challenge in these cases. The awardee worked to build or strengthen partnerships with delivering providers to access missing birth info, but it is unclear how effective that was or if outcome data availability changed over time. MPHCA also had a high rate of data missing for body mass index, with about 32 percent missing.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for MPHCA participants. Some highlights include:

- The majority of MPHCA participants (75.0 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 12.2 percent of participants were 18 or 19 years old and 8.0 percent were less than 18 years old.
- Most participants were black (84.8 percent), followed by 13.1 percent white.
- The largest share of MPHCA participants were in a relationship but not living with their partner (43.1 percent), while 11.5 percent were married and 25.5 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 17.4 percent of MPHCA participants reported having experienced intimate partner violence, 28.9 percent of participants with a prior birth had a prior preterm birth, and 87.2 percent of participants had not planned their Strong Start pregnancy.

TABLE 209: DEMOGRAPHICS, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.6	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**2,525**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	8.0	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	12.2	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	75.0	81.7	72.9	75.1	75.8
35 Years and Older	%	4.8	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	3.8	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**2,469**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	1.2	25.4	37.1	28.0	29.7
Non-Hispanic White	%	13.1	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	84.8	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	1.0	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	40.3	19.6	12.8	11.3	13.3
Not in Universe	%	58.6	59.3	52.6	61.5	59.0

[87] Among participants with missing data on pregnancy outcome, 4.4% were missing because they did not have an exit form, 72.1% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 23.5% were missing for other reasons.

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**29**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	48.3	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	1.5	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**2,527**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.5	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	9.9	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**2,312**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	35.6	36.6	30.8	35.3	34.5
In School, Not Employed	%	16.0	8.7	12.6	11.9	11.5
Employed and in School	%	4.5	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	43.9	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	15.3	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**2,173**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	20.7	15.4	27.8	29.1	26.4
High School Graduate or GED	%	68.7	57.5	58.3	57.9	57.9
Associate's Degree	%	5.8	8.2	5.2	4.6	5.4
Bachelor's Degree	%	2.1	14.5	4.5	3.7	5.8
Other College Degree	%	2.7	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	15.3	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**2,173**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	11.5	42.1	20.4	20.8	24.5
Living with a Partner	%	19.9	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	43.1	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	25.5	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 210: PSYCHOSOCIAL, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	3.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**2,471**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	52.3	51.8	51.8	59.7	56.5
No	%	45.1	44.6	42.3	37.4	39.8
Unsure	%	2.6	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	3.7	17.0	6.6	3.4	6.8
Not in Universe	%	45.9	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**1,292**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	64.5	61.1	72.6	79.9	75.3
Other	%	25.3	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	10.2	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	29.7	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,803**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	19.0	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	16.4	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**2,145**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	16.5	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	7.3	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**2,378**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	55.5	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	19.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**2,057**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	35.2	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	15.9	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**2,159**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	54.9	67.9	59.0	65.5	64.5
Mild	%	24.6	21.4	23.8	20.2	21.2
Moderate	%	11.9	6.8	10.3	8.5	8.6
Severe	%	7.5	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.1	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	10.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**2,296**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	17.4	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	16.0	18.3	16.3	7.7	11.8
Not in Universe	%	3.7	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**2,061**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.0	2.3	3.2	2.5	2.6

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Experiencing Prenatal Care Access Barrier						
Missing Data	%	1.5	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**2,527**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	70.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	24.6	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	5.3	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	62.5	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	3.4	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	16.8	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	17.4	24.6	17.1	15.4	17.2
Childcare Challenges	%	8.5	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	13.7	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 211: PREGNANCY HISTORY AND INTENTIONS, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.5	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**2,553**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	70.0	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	30.0	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	32.7	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**957**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	33.6	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	34.7	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**906**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	8.3	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	36.9	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**849**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	5.7	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	50.5	32.3	41.0	43.1	40.5

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**500**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	13.4	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	52.1	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**459**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	5.9	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	52.4	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**452**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	4.2	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	52.7	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**446**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	2.9	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	52.8	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**443**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 212: PRIOR BIRTH OUTCOMES, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	1.2	1.7	1.5	0.6	1.0
Not in Universe	%	30.3	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,756**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	90.8	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	20.3	23.5	18.9	15.2	17.7
Not in Universe	%	37.1	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**1,093**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	32.1	34.6	24.3	27.1	28.1
>= 18 months	%	67.9	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	8.0	0.1	2.5	1.4	1.4
Not in Universe	%	37.8	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,389**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	28.9	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	27.6	1.3	20.8	13.1	12.6

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Not in Universe	%	37.4	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**899**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	20.2	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 213: PRE-PREGNANCY MEDICAL CONDITIONS, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	17.2	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**2,124**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	12.8	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	59.2	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	11.3	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	16.8	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	34.0	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,694**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	3.0	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	31.9	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,748**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	13.8	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	32.2	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,740**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.5	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	27.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	23.2	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	32.9	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	14.3	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 214: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	36.7	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,623**	**8,722**	**7,767**	**20,070**	**36,559**

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	3.4	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	34.1	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,691**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	15.8	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	37.6	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,601**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	39.3	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,557**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	1.1	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	39.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,565**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	1.0	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	39.3	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,557**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	37.6	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,600**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	0.7	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	35.5	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**1,655**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	25.0	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 215: TREATMENTS DURING PREGNANCY, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	67.4	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**837**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	10.8	0.8	10.0	5.1	5.4
Not in Universe	%	83.8	91.5	83.7	84.8	85.8

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**137**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	67.6	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**831**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	67.7	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**828**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 216: PRENATAL CARE, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	16.7	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**2,137**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	94.4	4.7	29.5	64.5	43.3
Licensed Professional Midwife[88]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	1.4	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	1.5	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	2.6	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.7	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**2,549**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	89.5	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	9.3	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.7	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**2,549**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	0.7	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	6.0	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	8.8	0.6	31.8	8.6	12.4

[88] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**2,339**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	76.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	2.8	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	13.1	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**2,231**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	1.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.3	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	14.1	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**2,203**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	4.3	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	1.0	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	14.6	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**2,192**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	62.3	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	3.4	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	16.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**2,156**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	12.2	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.2	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	19.8	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**2,057**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	28.6	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	9.2	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	13.7	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**2,215**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	74.0	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	3.2	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	16.8	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**2,136**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	5.0	-	2.6	3.2	2.3

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Substance Abuse Services	Mean	1.4	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	16.7	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**2,138**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	8.2	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	75.4	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	22.2	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 217: DELIVERY INFORMATION, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	52.1	1.4	25.3	23.3	19.5
Not in Universe	%	24.4	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**602**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	21.3	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	2.4	0.3	7.8	2.9	3.5
Not in Universe	%	94.3	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**84**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	89.3	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	8.1	4.6	11.5	7.3	7.7
Not in Universe	%	17.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,910**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.8	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	12.3	0.7	12.0	5.6	6.1
Not in Universe	%	17.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,804**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	65.0	87.1	70.1	69.5	73.1
C-Section	%	35.0	12.9	29.9	30.5	26.9

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	4.5	0.4	8.7	2.3	3.4
Not in Universe	%	72.2	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**598**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	70.9	83.3	72.9	74.7	75.9
C-Section	%	29.1	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	13.3	4.7	12.5	6.3	7.4
Not in Universe	%	74.7	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**309**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	58.3	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.7	0.1	6.2	0.7	1.9
Not in Universe	%	87.4	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**306**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	8.8	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 218: BIRTH OUTCOMES, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	15.1	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**2,179**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	95.6	96.2	97.6	94.4	95.5
Stillbirth	%	0.9	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	3.5	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	9.9	0.7	15.4	5.8	7.0
Not in Universe	%	18.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,846**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	5.7	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	10.6	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	82.3	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.4	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	16.4	2.1	14.3	8.0	8.3
Not in Universe	%	18.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,678**	**6,312**	**7,189**	**18,672**	**32,173**

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Very Low Birthweight (< 1,500g)	%	1.8	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	11.4	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	84.3	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	2.5	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 219: SATISFACTION, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	54.8	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**1,160**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	8.0	3.3	4.4	7.8	6.2
Very Satisfied	%	48.4	25.6	35.6	46.1	39.8
Extremely Satisfied	%	42.8	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	54.8	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**1,161**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	1.2	2.0	3.1	2.3	2.4
Slightly Satisfied	%	1.4	3.0	4.0	2.9	3.1
Moderately Satisfied	%	10.9	10.4	11.6	12.8	12.1
Very Satisfied	%	49.1	29.1	42.6	46.6	42.1
Extremely Satisfied	%	37.5	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 220: BREASTFEEDING, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	51.6	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**1,243**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	8.3	80.4	47.5	40.5	50.3
Formula Feed Only	%	25.4	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.7	10.8	31.9	32.5	27.8
I Haven't Decided	%	25.6	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	54.5	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**1,168**	**4,694**	**4,418**	**13,780**	**22,892**

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	44.6	91.5	76.6	72.6	77.3
No	%	37.3	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	18.1	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 221: FAMILY PLANNING, MPHCA

Data Elements	N or %	MPHCA (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	54.1	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**1,177**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	79.7	77.0	77.5	82.2	80.3
No	%	12.1	20.0	14.0	14.2	15.3
Unsure	%	8.2	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	53.7	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**1,188**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	81.1	84.2	70.8	74.0	75.5
No	%	11.2	13.2	17.7	21.5	19.1
Unsure	%	7.7	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	46.3	41.5	42.9	38.6	40.2
Not in Universe	%	16.2	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**964**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	9.1	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	2.2	2.8	11.4	10.9	9.2
LARC – IUD	%	2.5	10.8	11.9	12.3	11.9
Pills	%	14.2	8.6	11.9	13.0	11.8
Injection	%	39.1	5.9	16.2	20.2	16.2
Condoms	%	19.6	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	5.6	16.7	8.1	9.5	10.9
Method Not Indicated	%	6.2	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate and Medicaid Eligibility data were obtained from Mississippi

Initial Contact: In March and April 2015, the evaluation team spoke with officials from the Mississippi Division of Medicaid (DOM) and the Mississippi Department of Health (MDSH) to learn about the state's willingness to participate in the Strong Start analysis and process for releasing state Medicaid and birth certificate data. State officials were receptive to supporting the evaluation, and staff from MSDH planned to link the Medicaid and birth certificate data.

Data Acquisition Process: MSDH sent the Urban Institute a Business Associate Agreement (BAA) to review and sign, and Urban received a fully executed BAA in January 2016 from MSDH to access birth certificate data. In August 2015, the Mississippi DOM initially expressed support for participating in the evaluation; however, in November 2015, our contact notified us that they did not have the personnel resources to participate because of numerous competing demands. After several months and numerous failed attempts to communicate with our contact, including sending the original Letter of Support for Strong Start submitted by the Director of the Division of Medicaid as part of the awardee's original application to CMMI, we leveraged an existing relationship between a colleague at Health Management Associates — a former Medicaid Director—and the Mississippi Medicaid director. Our HMA colleague was immediately successful in reaching the state official in May 2016, and set up and facilitated a conference call between him and the evaluation team. He also persuaded the director to share the agency's data with the evaluation team, and learned that Medicaid had an existing agreement with MSDH to share its data. Additional delays ensued, however, and the evaluators reached out to a contact at CMCS to see if she could reach out to the MS Medicaid Director. Shortly thereafter, state officials contacted Urban to say that they would be able to provide linked birth certificate and Medicaid eligibility data for mothers, but not Medicaid claims or similar eligibility data for infants. In March 2017 a BAA was executed and all interagency approvals were in place by early summer.

Final Result: Urban received linked birth certificate and Medicaid eligibility data in December 2017 and included these data in its final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES

The Mississippi Primary Health Care Association (MPHCA) awardee, which implemented the Maternity Care Home model, delivered care at eight sites included in the impact analysis: Central MS Civic Improvement (Jackson-Hinds Comprehensive Health Center, Inc – JCHC); Delta Health Center, Inc. (DHC); Family Health Care Clinic, Inc. (FHCC); Family Health Center (FHC); G.A. Carmichael Family Health Center, Inc; Greater Meridian Health Clinic, Inc; Mallory (Arenia C) Community Health Center, Inc. (MCHC); and Southeast Mississippi Rural Health Initiative, Inc. (SEMHFHI). This section presents the evaluation's impacts results for the awardee as a whole. In addition, Central MS Civic Improvement (Jackson-Hinds), Family Health Center, and Family Health Care Clinic served a large enough number of women enrolled in Strong Start that individual site level estimates were also feasible (Table 222).

TABLE 222: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR MPHCA

Data Elements	Included in Model Level Analysis	Site-Specific Estimate	Out-of-County Comparison Group
Mississippi Primary Healthcare Association, Inc.			
Central MS Civic Improvement (Jackson-Hinds Comprehensive Health Center, Inc – JCHC)	Yes	Yes	No
Delta Health Center, Inc. (DHC)	Yes	No	No
Family Health Care Clinic, Inc. (FHCC)	Yes	Yes	No
Family Health Center (FHC)	Yes	Yes	No
G.A. Carmichael Family Health Center, Inc	Yes	No	No
Greater Meridian Health Clinic, Inc.	Yes	No	No
Mallory (Arenia C) Community Health Center, Inc. (MCHC)	Yes	No	No
Southeast Mississippi Rural Health Initiative, Inc. (SEMFHI)	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[89]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. As we did not receive claims data from Mississippi, expenditure and utilization outcome findings are not reported for this awardee, nor are results from alternative specifications that include claims variable controls. We also did not estimate models where we draw the comparison group outside the county (alternative specification #1) for MPHCA because the comparison group could be pulled from the same counties where Strong Start participants reside.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 223 reports the birth and process outcome findings for the MPHCA awardee:

- Infants born to women enrolled in Strong Start at MPHCA sites have a slightly lower average birthweight (2,999.9 grams) than infants of comparison group women (3,023.5), a marginally

[89] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

significant difference of 23.7 grams (p-value<0.10). However, there is no statistically significant difference in the rates of low birthweight or very low birthweight between infants of Strong Start enrollees and infants of comparison group women.

- Infants born to women enrolled in Strong Start are also slightly more likely to have an Apgar score greater than or equal to seven (93.6 percent) than infants born to women in the comparison group (92.5 percent), a marginally significant difference of 1.1 percentage points (p-value<0.10).
- Rates of vaginal birth after C-section (VBAC) and weekend delivery are both greater for Strong Start enrollees (12.0 and 15.6 percent, respectively) than comparison group women (8.7 and 13.9 percent, respectively). However, these differences are only marginally significant (p-value<0.10).
- We do not observe differences between Strong Start and comparison group women for other birth outcomes.

TABLE 223: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MPHCA

Outcomes	Main Model: 2014 - 2016, Strong Start (N=2021)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=28161)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	37.9	37.9	0.0	N/A	N/A	N/A
Preterm birth rate	13.9%	14.1%	-0.2	N/A	N/A	N/A
Very preterm birth rate	4.3%	4.5%	-0.2	N/A	N/A	N/A
Birthweight (grams)	2,999.9	3,023.5	**-23.7^**	N/A	N/A	N/A
Low birthweight rate	13.7%	13.8%	0.0	N/A	N/A	N/A
Very low birthweight rate	2.1%	2.6%	-0.4	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	93.6%	92.5%	**1.1^**	N/A	N/A	N/A
Process Outcomes						
C-section rate	38.6%	39.1%	-0.5	N/A	N/A	N/A
VBAC rate[1]	12.0%	8.7%	**3.3^**	N/A	N/A	N/A
Weekend delivery rate	15.6%	13.9%	**1.6^**	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 401 Strong Start women and 5117 comparison group women.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for Central MS Civic Improvement (Jackson-Hinds, Table 224), Family Health Center (Table 225), and Family Health Care Clinic (Table 226) are generally consistent with the MPHCA

awardee-level analysis. Key differences between the MPHCA awardee-level estimates and the site-level estimates are as follows:

- The marginally significant lower birthweight, higher rate of VBAC, and higher rate of Apgar scores greater than or equal to 7 among Strong Start participants observed at the awardee level are not present in any site-level analysis.
- We observe a marginally significant difference (p-value<0.10) in the rate of weekend delivery at the awardee-level and at the Jackson-Hinds and Family Health Center sites, but the magnitudes and directions of the differences vary. The rate of weekend delivery among Strong Start participants across all MPHCA awardee sites is 1.6 percentage points greater than the rate among comparison group women. The difference is larger (2.7 percentage points) at the Jackson-Hinds site, but at the Family Health Center site, Strong Start participants have a lower rate of weekend delivery (-3.6 percentage points) than women in the comparison group.
- We observe no significant differences in maternal and infant birth outcomes at the Family Health Care Clinic site.

TABLE 224: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT CENTRAL MS CIVIC IMPROVEMENT (JACKSON-HINDS, SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=800)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=14289)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	37.8	37.9	-0.1	N/A	N/A	N/A
Preterm birth rate	14.1%	15.0%	-0.9	N/A	N/A	N/A
Very preterm birth rate	5.1%	4.5%	0.7	N/A	N/A	N/A
Birthweight (grams)	2,950.5	2,986.6	-36.1	N/A	N/A	N/A
Low birthweight rate	15.6%	14.7%	0.9	N/A	N/A	N/A
Very low birthweight rate	2.9%	2.5%	0.3	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	90.8%	90.6%	0.2	N/A	N/A	N/A
Process Outcomes						
C-section rate	36.9%	40.0%	-3.1	N/A	N/A	N/A
VBAC rate[1]	13.5%	10.4%	3.1	N/A	N/A	N/A
Weekend delivery rate	16.4%	13.7%	**2.7^**	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 156 Strong Start women and 2701 comparison group women.

TABLE 225: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT FAMILY HEALTH CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=328)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=6492)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	37.8	37.8	0.0	N/A	N/A	N/A
Preterm birth rate	14.0%	15.5%	-1.5	N/A	N/A	N/A
Very preterm birth rate	4.0%	4.2%	-0.2	N/A	N/A	N/A
Birthweight (grams)	2,987.5	3,034.8	-47.4	N/A	N/A	N/A
Low birthweight rate	14.3%	14.9%	-0.6	N/A	N/A	N/A
Very low birthweight rate	1.5%	2.3%	-0.7	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	94.5%	93.2%	1.3	N/A	N/A	N/A
Process Outcomes						
C-section rate	41.5%	41.3%	0.1	N/A	N/A	N/A
VBAC rate[2]	16.7%	9.7%	7.0	N/A	N/A	N/A
Weekend delivery rate	10.7%	14.3%	**-3.6^**	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] Difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[2] Estimates are among women with a previous C-section. The sample sizes are 96 Strong Start women and 1202 comparison group women.

TABLE 226: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT FAMILY HEALTH CARE CLINIC (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=307)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=11209)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
Birth Outcomes						
Clinical gestational age (weeks)	38.0	38.1	-0.1	N/A	N/A	N/A
Preterm birth rate	14.0%	11.9%	2.1	N/A	N/A	N/A
Very preterm birth rate	2.9%	3.5%	-0.5	N/A	N/A	N/A
Birthweight (grams)	3,111.3	3,105.7	5.6	N/A	N/A	N/A
Low birthweight rate	11.1%	10.2%	0.9	N/A	N/A	N/A
Very low birthweight rate	1.3%	1.9%	-0.6	N/A	N/A	N/A
Rate of Apgar score greater than or equal to 7	96.1%	95.2%	0.9	N/A	N/A	N/A
Process Outcomes						
C-section rate	39.7%	38.0%	1.8	N/A	N/A	N/A

Outcomes	Main Model: 2014 - 2016, Strong Start (N=307)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=11209)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference†	Alternative Specification 3: Claims Sample, Claims Controls, Difference†
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	10.7%	11.3%	-0.6	N/A	N/A	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 44 Strong Start women and 1977 comparison group women.

CROSS-CUTTING SUMMARY

The Mississippi Primary Health Care Association (MPHCA) implemented the Maternity Care Home model under Strong Start. Many of the characteristics possessed by women enrolled at MPHCA put them at high risk for poor birth outcomes. Most participants were black (84.8 percent), many were teens (20.2 percent), and one-quarter of participants were not in a relationship. MPHCA participants had especially high rates of anxiety and depression at intake and relatively high rates of having experienced intimate partner violence. MPHCA's Strong Start sites offered varying combinations of enhancements under the program, but all provided home visits, care coordination, appointment "no show" tracking and follow-up, and dental services free of charge. All sites added a Strong Start care coordinator and some also added social worker support, free childcare during the clinic visit, and/or nutritionist services. One of the challenges for MPHCA was getting eligible pregnant women enrolled in Medicaid because of lengthy application processing times. This further delayed entry to care for many women and limited opportunities for both timely routine prenatal care and enhanced services under Strong Start, though case study key informants credited the program with directing more prenatal care provider attention to social determinants of health. Infants born to women enrolled in Strong Start at MPHCA sites had a slightly lower average birthweight but better Apgar scores than infants of comparison group women. In addition, Strong Start participants at MPHCA had higher VBAC and weekend delivery rates than women in the comparison group. However, these differences in birth and process outcomes were only marginally significant (p-value<0.10). More than 62 percent of participants received health education during their pregnancies which may have helped in preparing them for childbirth and advocating for VBAC.

Oklahoma Health Care Authority

GROUP PRENATAL CARE AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

869	• Oklahoma's Medicaid agency: The Oklahoma Health Care Authority (OKHCA)	• Six unique sites across Oklahoma ever participated in the program, with three concentrated in the Oklahoma City area
		  • Four sites implemented Group Prenatal Care and four sites implemented Maternity Care Homes (with two sites implementing both models)
		  • OKHCA provided telephonic care coordination under the Maternity Care Home model, and is considered a Strong Start site though it is not a prenatal care provider
		• Two sites exclusively served American Indian patients, or spouses of American Indians
			• Group Prenatal Care intervention categorized as "low intensity" for offering 8 group sessions (in contrast to *CenteringPregnancy*'s 10 sessions)
			• Group Prenatal Care: based on a modified version of *CenteringPregnancy*
			• Maternity Care Home intervention categorized as "medium intensity" for providing four care coordination, education, and/or referral encounters with no additional direct enhanced services
			• Maternity Care Home: added in second year of award, included one in-person enrollment session followed by four telephonic or in-person encounters with a care coordinator (typically one per trimester and one postpartum)
			  • Optional group classes for Maternity Care Home participants at some sites
			  • Telephonic care coordination provided by OKHCA for eligible women in the Tulsa area

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Care coordinators formed supportive relationships with patients and helped connect some with needed community-based services, including breastfeeding support and non-clinical social services
- Patients who participated in Group Prenatal Care appreciated the opportunity to learn with and from other pregnant women

CHALLENGES

- Sites implementing Group Prenatal Care were unsuccessful in achieving enrollment targets, and all but one site either transitioned to the Maternity Care Home approach or dropped out of Strong Start
- Staff turnover at awardee level
- Some care coordinators felt they had not received sufficient training

NOT SUSTAINED

- OKHCA's Strong Start program was not sustained

KEY FINDINGS: PARTICIPANT-LEVEL DATA[90]

PARTICIPANT-LEVEL DATA QUALITY

- 1.2% rate of missing intake forms; 11.3% rate of missing exit forms
- 4.1% rate of item nonresponse on intake forms; 27.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 17.1% of women were teens (under age 20); 8.5% were 35 years or older
- 8.7% of women were black; 42.1% were Hispanic; 17.8% were white
- 34.9% of women were married; 33.8% were living with a partner; 14.1% were not in a relationship
- 17.9%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- The rate of missing data is too high to report C-section rate and low birthweight rate
- 10.9%: preterm birth rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted for Oklahoma Health Care Authority because we did not obtain birth certificate and Medicaid data for Oklahoma

[90] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Each of the sites that participated in OKHCA's Strong Start program offered some version of typical prenatal care before the initiative. Oklahoma City Indian Clinic (OKCIC) provided free health care services to over 220 Native American tribes in the Oklahoma City area. Services included pediatric, prenatal care, family medicine, dental, optometry, behavioral health, substance abuse treatment, and nutrition programs. OKCIC did not provide labor and delivery services, and prenatal patients typically delivered at a local hospital. Choctaw Nation offered comprehensive care to individuals who were Native American or expecting a Native American child with services including dental, mammography, ultrasound, laboratory, radiology, pharmacy, primary care, emergency care, pediatrics, inpatient mental health, and substance abuse services. Oklahoma State University (OSU), which dropped out of the demonstration in 2015, provided services to predominantly African American and Latino populations. Two additional sites joined after the start of Strong Start: Variety Care and Mary Mahoney. These Federally Qualified Health Centers provided a range of services including prenatal care, dental, and behavioral health. Variety Care served a primarily Latino population, including many undocumented individuals. Mary Mahoney was located in a rural area and served a primarily African-American population.

Of the five prenatal care provider sites that participated in Strong Start over the course of the demonstration, none had previous experience with a Group Prenatal Care or Maternity Care Home approach. Before Strong Start, all sites delivered prenatal care through individual appointments with a provider (physician, resident, nurse practitioner, physician assistant, or certified nurse midwife, depending on the site).

DESCRIPTION OF ENHANCED STRONG START SERVICES

OKHCA initially applied to Strong Start as a Group Prenatal Care awardee, and in the first year of Strong Start, all three participating sites at that time (OKCIC, Choctaw Nation, and OSU) implemented Group Prenatal Care using an adapted version of the evidence-based Centering Healthcare Institute (CHI) *CenteringPregnancy* approach.[91] The sites relied on the Centering materials, but OKHCA condensed the curriculum into eight sessions, rather than the 10 typically delivered under Centering. OKHCA reduced the number of sessions to minimize transportation and scheduling barriers for enrollees, and also to shorten the length of the intervention because patients at OKCIC transfer care around 36 weeks to a delivery provider.

[91] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

Patients were placed in groups based on their gestational age, and group sizes averaged between three and five women, reflecting the sites' enrollment challenges (most Strong Start awardees reported groups of 8-12 women). Partners, family members, and friends were strongly encouraged to accompany patients to group sessions at all of the Strong Start sites, and each group was facilitated by one or two clinicians. Though providers at all sites completed the Centering training initially, staff turnover resulted in a number of new hires, some of whom had not completed Centering training before facilitating the groups. Under Strong Start, OKHCA also used materials developed by the March of Dimes-funded program, *Coming of the Blessing*, a prenatal education curriculum targeting American Indian women. In particular, Centering facilitators used the *Coming of the Blessing* curriculum book at sites serving American Indian women to tie in culturally appropriate topics and activities into the group discussion.

In the second year of Strong Start, OSU exited the program after facing enrollment challenges and limited provider buy-in. Also during the second year, the OKCIC site shifted from a Group Prenatal Care model to a Maternity Care Home model. Under its Maternity Care Home intervention, OKCIC offered four encounters with a care manager (one in each trimester and one postpartum). Although the clinic no longer provided Group Prenatal Care, it began offering a series of four optional classes to Strong Start enrollees. The curriculum was very loosely based on some Centering topics and included sessions focused on prenatal nutrition, breastfeeding, labor and delivery, and newborn care. Through a donation from a local church, OKCIC was able to offer a car seat to every Strong Start enrollee who attended all four classes. Several Strong Start participants reported attending the classes so that they could receive the car seat.

> "[The group sessions] were very informative. My favorite was the labor and delivery class. There was a lot of different stuff that I didn't already know, despite having five pregnancies before this one. I wanted to be up-to-date because I think there are a lot of changes in medical care."
>
> *- Strong Start participant*

Between the second and third years of Strong Start implementation, two new sites – Variety Care and Mary Mahoney – joined the project. Initially, they both considered implementing Group Prenatal Care, and Variety Care enrolled a few participants in the Group Prenatal Care model for a very short-lived program. Ultimately, however, both the new sites chose to test the Maternity Care Home approach, since other sites struggled to successfully implement Group Prenatal Care. These sites used a similar approach: a face-to-face enrollment session by a care coordinator (primarily Registered Nurses or RNs), followed by at least three encounters over the course of the pregnancy (either in-person or by phone), and one postpartum encounter. At Variety Care, almost all encounters were by phone, because it was logistically difficult for the clinic's single care coordinator to meet with participants in person across different sites. Phone encounters varied in length and content, depending on patient need. The care coordinators at Variety Care and Mary Mahoney also provided referrals for social services like the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Low Income Home Energy Assistance Program (LIHEAP), and the Supplemental Nutrition Assistance Program (SNAP).

In the third year of the program, OKHCA added a telephonic care coordination component to their Strong Start intervention. Under this program, the Tulsa Department of Health recruited pregnant Medicaid-beneficiaries and one of two OKHCA staff provided care coordination services to women who enrolled in the program. The content of phone conversations and assistance provided were dictated by participant needs, but frequently included assistance locating nearby WIC offices, breastfeeding education, and referrals for behavioral health services. Enrollment in the telephonic care coordination program was capped at 200, reflecting staffing constraints at OKHCA (only two individuals were providing the telephonic care coordination services).

OUTREACH AND ENROLLMENT

> "[Attending all four classes] is how I got car seats for both my babies."
>
> *- Strong Start participant*

The three original Strong Start sites (Choctaw Nation, OKCIC, and OSU) initially used an opt-in approach, meaning that eligible patients were asked to choose between enrolling in the Strong Start Group Prenatal Care services or receiving standard prenatal care without additional Strong Start services. At each of these sites, the Centering facilitator or the site's Strong Start coordinator explained the benefits of the Group Prenatal Care approach. For example, the sites emphasized the enhanced educational aspects – even for multiparous mothers – and the fact that Strong Start participants have more time with a provider and do not have to wait in a waiting room before their visit. Within the first year of implementation, however, OKCIC switched to an opt-out approach, where providers explained group care to patients in person at the initial prenatal visit and then referred them to the site's Strong Start coordinator to complete the enrollment process. After their initial appointment, women were automatically placed into a Centering group (though they were informed that they can opt-out at any point and continue with standard care). Similarly, when Variety Care and Mary Mahoney joined Strong Start, they implemented an opt-out approach for their Maternity Care Home initiatives.

Choctaw Nation maintained its opt-in approach throughout the intervention, but struggled to achieve desired enrollment levels. OSU similarly struggled with its opt-in enrollment structure, before ending its participation in Strong Start. The other three sites reported that the opt-out process helped with enrollment, but caused confusion in some cases. For example, at OKCIC, some women were surprised upon arrival at their first prenatal care appointment to learn they were enrolled in Group Prenatal Care. At Variety Care, where the Strong Start care coordinator called enrollees to provide care coordination services by phone, some women were unsure why they were being contacted.

> "[The provider] called me and said, you want to join this program with us? A bunch of pregnant women gathered together and you get to talk about all kinds of stuff and the different stages and I said, sure, why not? I didn't have anybody [during the Strong Start-enrolled pregnancy, since she was recently divorced] so it was really nice having somebody there with you that could relate and talk to you about things."
>
> *- Strong Start participant*

Women eligible for the telephonic care coordination intervention were contacted by Tulsa Department of Health staff and asked if they wanted to enroll and receive additional services. Key informants reported that many of these women did not know why they were being contacted and did not answer subsequent phone calls.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

According to key informants, the Strong Start Group Prenatal Care approach had the potential to improve clinical outcomes and reduce costs to the Medicaid program. However, many key informants felt that Strong Start initiatives had been hampered by limited patient engagement and support from prenatal care providers. By the end of the initiative, only one site was implementing Group Prenatal Care, the original intended model intervention.

Key informants were pleased with their program's low birthweight and preterm birth rates but were unsure that Strong Start had played any role in influencing these outcomes. They reported that for most sites, the Maternity Care Home model did not represent a major change compared to the standard model of care being implemented before Strong Start, so it was unlikely that Strong Start was responsible for any significant improvements in health outcomes. Additionally, key informants noted potentially confounding factors for low birthweight and preterm birth rates as well as C-section rates. For instance, during the award period OKCIC also operated an intensive home visiting intervention that targeted these outcomes, and a statewide initiative to reduce C-section rates preceded Strong Start.

Key informants were surprised by what they perceived as low breastfeeding rates across the sites, given that most sites encouraged and supported breastfeeding through educational activities and referrals to outside breastfeeding supports where possible.

Overall, OKHCA staff were proud of the relationships that care coordinators built with patients, but did not feel confident suggesting that the intervention had resulted directly in any measurable health or behavioral outcomes.

STRONG START PARTICIPANT PERSPECTIVES

Some participants recall receiving a phone call about Strong Start, and others recall being enrolled at the clinic or seeing flyers in the waiting room. Most who actively chose to participate in Strong Start were drawn to the program because of the promise of peer support, additional educational opportunities, and – for those who participated in Group Prenatal Care - to avoid spending time in the waiting room. At OKCIC, many participants enrolled in the optional classes so that they could receive a car seat after completing all four classes. (Both quotes below refer to Group Prenatal Care.)

> *[The provider] called me and said, you want to join this program with us? A bunch of pregnant women gathered together and you get to talk about all kinds of stuff and the different stages and I said, sure, why not? I didn't have anybody [during the Strong Start-enrolled pregnancy, since she was recently divorced] so it was really nice having somebody there with you that could relate and talk to you about things.*

> *There is really no reason not to do it because, are you really going to have more fun in the waiting room?*

Participants were satisfied with their experiences with Group Prenatal Care. Participants enrolled in the Maternity Care Home model were not familiar with Strong Start by name, but they did recall participating in the optional classes and spoke highly of those. In particular, they appreciated additional social support from peers, additional time with a prenatal care provider, and the opportunity to ask questions (and discuss responses) in an open, inclusive setting. Additionally, the participants felt that the diverse experiences of group members (including previous pregnancies, or labor and delivery methods) enhanced their understanding of the different options available to them.

> *No one wants to hear from a pregnant woman about what they are going through. If it wasn't for [Group Prenatal Care] during the pregnancy, I would have had no one to [turn] to.*

Finally, several participants knew their clinic's care coordinator by name and reported that she had provided useful information and referrals to community resources.

PROGRAM STRENGTHS

Key informants were most proud of the relationships built between the care coordinators and Strong Start participants at sites that implemented the Maternity Care Home model. They felt that the care coordinators were successful in providing targeted assistance to pregnant women who lacked resources or support systems to help them access services. For example, one care coordinator visited a participant in her home to help her enroll in Medicaid and then arranged for transportation for her subsequent prenatal care appointment. Key informants asserted that this type of hands-on approach enabled high-risk individuals to get necessary prenatal care that could help improve newborn and maternal outcomes. Through Strong Start, pregnant women learned about and accessed community resources.

> "They actually got down on the ground with us and taught us how to alleviate pain [during labor]…they would help us beyond the classes too. The lady helped me sign on to [Medicaid]."
>
> *- Strong Start participant*

Additionally, key informants believed that the Group Prenatal Care model was promising, even though the sites that implemented it experienced low enrollment throughout the entire initiative. Some key informants noted that Group Prenatal Care cannot be successful for all populations and thought that group care's structured schedule was not well-suited to Oklahoma's Medicaid population, in particular because of transportation barriers. However, informants were proud of the fact that several sites adapted educational components of the Group Prenatal Care approach into their Maternity Care Home models in the form of optional classes. These optional classes allowed pregnant women to access additional educational resources and peer support in a way that fit their schedules.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

At an organizational level, the awardee struggled with staff turnover and securing buy-in and visibility within the Medicaid department. Strong Start was managed by two mid-level staff at OKHCA and key informants felt that others in the department had not given the program enough attention or support for it to realize its full potential. The original Principal Investigator and provider champion left her role

after Strong Start began, and key informants reported that this shift resulted in a lack of institutional knowledge and hampered enthusiasm for the project outside the few staff who were directly involved.

At the clinic level, Strong Start care coordinators faced a number of challenges. Toward the beginning of the award period, none of the clinics were able to sustain robust enrollment and participation in the Group Prenatal Care model; the clinics cited common problems such as transportation barriers and scheduling conflicts for potential participants. The rural locations, in particular, struggled to recruit participants into Group Prenatal Care. Even within the urban centers, public transportation was limited and did not reach some clinic locations.

Several care coordinators reported feeling isolated in their roles and said they wished they had more support from providers or other staff. In general, program staff asserted that providers "believed in the program" but were unavailable or uninterested in taking on a champion role. Care coordinators also described a need for more structured training. OKHCA provided some training to all care coordinators at the beginning of Strong Start, but some staff newly hired during the project felt that they did not receive sufficient training and were unsure of their roles.

SUSTAINABILITY

OKHCA's Strong Start program was not sustained at any of the prenatal care provider sites. Some clinic staff members who participated in the program hoped to sustain activities they had implemented under the grant, but no dedicated funding sources had been identified by the conclusion of the program. Additionally, the awardee itself was not planning to continue any Strong Start activities after the grant's conclusion – its telephonic care coordination program was not sustained. The state was facing a significant budget shortfall, and a representative from OKHCA explained that there was no state funding to maintain Strong Start care coordination. Staff turnover at the awardee level further compromised sustainability planning, and ultimately no Strong Start activities continued beyond the end of the funding period.

PARTICIPANT-LEVEL PROCESS EVALUATION

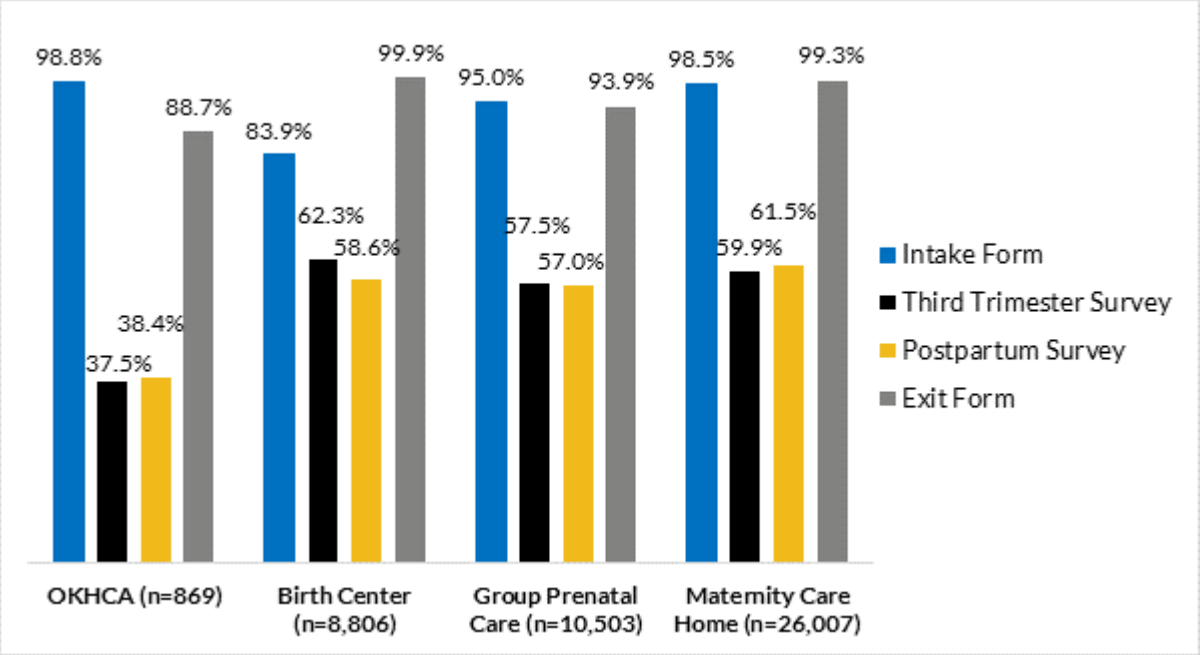
The tables and figures presented in this section summarize findings from the PLPE dataset for OKHCA, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for OKHCA to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.

- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 15 OKHCA participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 15: FORM SUBMISSION RATES, OKHCA



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 868
- Study IDs represented: 869 (suggests that PLPE data were submitted for one extra patient: see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- Intake Forms were self-administered by patients on paper. Though forms were designed to be accessible to individuals with low literacy, the awardee indicated that this still posed challenges for their population. Staff checked these for completion, but patients could still decline to answer questions.
- Third Trimester and Postpartum Surveys were generally completed in an interview format by staff.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- OKHCA had sites that stopped participating part way through. The awardee indicated that these sites were not responsive to requests regarding missing forms or data quality issues.

MISSING FORMS:

- Intake Form: 1.2 percent of Study IDs were missing Intake Forms. The awardee said that most of these were completed, but they were not received by the evaluation team and the awardee did not have back-up copies to submit.
- Third Trimester or Postpartum Surveys: About 63 percent of Study IDs were missing the Third Trimester Survey and 62 percent were missing the Postpartum Survey.
- Exit Form: 11.3 percent of Study IDs were missing Exit Forms. The awardee said that these forms were from sites that dropped out of Strong Start. The awardee tried to incentivize form completion at these sites, but their efforts were not very successful, and the forms remained missing.

ITEM NONRESPONSE:

- Intake Form: OKHCA said that women skipped questions that they felt were "personal" and that Medicaid patients were concerned about being "reported" and having their baby or children removed from the home because of their responses. The awardee believed this was especially true for Native American women, who made up a majority of patients at two Strong Start sites, and for undocumented women, who are eligible for prenatal care through CHIP in Oklahoma. The awardee also said that some scales might have been skipped if the participant read the first question and thought it did not apply.
- Exit Form: OKHCA does not have data on Strong Start pregnancy outcomes for approximately 20 percent of participants.[92] OKHCA's data was also missing body mass index for about 70 percent of participants.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for OKHCA participants. Some highlights include:

- The majority of OKHCA participants (74.4 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 10.4 percent of participants were 18 or 19 years old.
- Participants represented a mix of races of ethnicities: 42.1 percent were Hispanic, 31.4 percent were another or multiple races, 17.8 percent white, and 8.7 percent black. Among participants who were another or multiple races, 95.4 percent were American Indian.

[92] Among participants with missing data on pregnancy outcome, 55.7% were missing because they did not have an exit form, 41.5% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 2.8% were missing for other reasons.

- Unlike Strong Start participants overall, being married was the most common relationship status among OKHCA participants (34.9 percent), while 33.8 percent were living with a partner and 14.1 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 20.6 percent of OKHCA participants reported having experienced intimate partner violence, 17.9 percent of participants with a prior birth had a prior preterm birth, and 62.0 percent of participants had not planned their Strong Start pregnancy.

TABLE 227: DEMOGRAPHICS, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.3	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**843**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	6.6	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	10.4	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	74.4	81.7	72.9	75.1	75.8
35 Years and Older	%	8.5	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.9	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**838**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	42.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	17.8	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	8.7	16.1	45.0	44.8	39.8
Other Race/Multiple Races[93]	%	31.4	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	11.4	19.6	12.8	11.3	13.3
Not in Universe	%	47.3	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**353**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	65.7	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	31.7	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	1.2	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**844**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	3.4	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	4.6	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**815**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	35.6	36.6	30.8	35.3	34.5

[93] Most women in the other category for this awardee were Native American, as opposed to Asian or mixed race.

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
In School, Not Employed	%	9.2	8.7	12.6	11.9	11.5
Employed and in School	%	6.7	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	48.5	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	11.7	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**754**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	35.9	15.4	27.8	29.1	26.4
High School Graduate or GED	%	49.5	57.5	58.3	57.9	57.9
Associate's Degree	%	5.4	8.2	5.2	4.6	5.4
Bachelor's Degree	%	5.2	14.5	4.5	3.7	5.8
Other College Degree	%	4.0	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	3.6	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**823**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	34.9	42.1	20.4	20.8	24.5
Living with a Partner	%	33.8	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	17.3	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	14.1	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 228: PSYCHOSOCIAL, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.6	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**840**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	37.1	51.8	51.8	59.7	56.5
No	%	58.2	44.6	42.3	37.4	39.8
Unsure	%	4.6	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.6	17.0	6.6	3.4	6.8
Not in Universe	%	61.8	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**312**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	48.1	61.1	72.6	79.9	75.3
Other	%	45.2	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	6.7	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	8.2	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**784**	**6,687**	**7,859**	**23,400**	**37,946**

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	11.2	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	6.0	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**803**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	22.3	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	3.0	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**828**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	46.9	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	13.3	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**740**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	21.4	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	4.4	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**816**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	69.0	67.9	59.0	65.5	64.5
Mild	%	19.4	21.4	23.8	20.2	21.2
Moderate	%	7.5	6.8	10.3	8.5	8.6
Severe	%	3.6	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	1.9	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**838**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	20.6	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	4.3	18.3	16.3	7.7	11.8
Not in Universe	%	6.0	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**766**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	1.7	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	1.2	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**844**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	71.6	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	24.3	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	4.1	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	47.5	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	9.6	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	12.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	26.7	24.6	17.1	15.4	17.2
Childcare Challenges	%	17.5	19.8	9.8	7.9	10.1

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	10.4	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 229: PREGNANCY HISTORY AND INTENTIONS, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	2.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**837**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	67.7	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	29.3	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	47.9	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**195**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	30.8	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	48.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**187**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	-	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	50.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**177**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	58.4	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**105**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	11.4	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	58.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**105**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	11.4	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	59.7	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**94**	**3,428**	**2,759**	**6,467**	**12,654**

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	59.7	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**94**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	59.6	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**95**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 230: PRIOR BIRTH OUTCOMES, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	33.4	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**565**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	88.3	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	15.0	23.5	18.9	15.2	17.7
Not in Universe	%	40.4	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**381**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	24.4	34.6	24.3	27.1	28.1
>= 18 months	%	75.6	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	1.2	0.1	2.5	1.4	1.4
Not in Universe	%	41.3	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**491**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	17.9	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	46.5	1.3	20.8	13.1	12.6
Not in Universe	%	35.6	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**153**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	-	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 231: PRE-PREGNANCY MEDICAL CONDITIONS, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	3.9	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**821**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	38.0	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	48.5	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.7	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	9.9	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	64.1	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**307**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	63.6	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**311**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	3.9	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	70.1	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**255**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	5.1	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	32.9	45.2	33.9	31.0	34.9
Overweight (=>25 BMI <30)	%	23.9	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	27.8	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	10.2	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 232: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	69.3	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**262**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	-	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	69.0	0.7	26.5	20.9	18.2

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**265**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	4.5	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	69.2	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**263**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.7	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	69.8	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**258**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	70.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**256**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	69.8	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**258**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	69.2	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**263**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	70.4	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**253**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	4.7	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 233: TREATMENTS DURING PREGNANCY, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	75.8	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**207**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	18.1	0.8	10.0	5.1	5.4
Not in Universe	%	79.0	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**24**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Antenatal Steroids						
Missing Data	%	76.0	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**205**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	75.4	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**210**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 234: PRENATAL CARE, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	63.3	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**313**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	52.7	4.7	29.5	64.5	43.3
Licensed Professional Midwife[94]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	31.9	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	12.8	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	11.5	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**756**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	36.1	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	6.8	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	11.5	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**756**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	16.8	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	4.4	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	71.0	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**248**	**8,732**	**7,081**	**23,342**	**39,155**

[94] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Care Coordinator Encounters	%	52.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	5.9	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	74.9	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**214**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	8.4	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.6	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	74.0	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**222**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	76.7	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**199**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	32.7	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	4.0	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	75.9	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**206**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	22.3	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	4.8	1.4	1.4	1.6	1.5
Self-Care, Not Centering						
Missing Data	%	77.5	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**192**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	14.6	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	4.9	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	76.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**200**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	27.0	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	3.4	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	77.3	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**194**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	73.8	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**224**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	12.1	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	56.5	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 235: DELIVERY INFORMATION, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	60.0	1.4	25.3	23.3	19.5
Not in Universe	%	15.1	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**213**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	35.2	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	14.4	0.3	7.8	2.9	3.5
Not in Universe	%	79.7	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**50**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	92.0	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	47.3	4.6	11.5	7.3	7.7
Not in Universe	%	11.6	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**351**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	98.6	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	49.1	0.7	12.0	5.6	6.1
Not in Universe	%	11.6	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**336**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	69.0	87.1	70.1	69.5	73.1

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
C-Section	%	31.0	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	24.0	0.4	8.7	2.3	3.4
Not in Universe	%	60.7	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**131**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	75.6	83.3	72.9	74.7	75.9
C-Section	%	24.4	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	16.3	4.7	12.5	6.3	7.4
Not in Universe	%	76.3	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**63**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	47.6	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	11.5	0.1	6.2	0.7	1.9
Not in Universe	%	83.1	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**46**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	-	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 236: BIRTH OUTCOMES, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	20.6	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**678**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	96.5	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	3.1	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	16.4	0.7	15.4	5.8	7.0
Not in Universe	%	11.9	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**612**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	4.6	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	6.4	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	84.8	93.4	86.7	85.7	87.4
Post-Term (42+)	%	4.2	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	52.7	2.1	14.3	8.0	8.3
Not in Universe	%	11.9	26.1	16.4	18.9	19.8

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**302**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2,500g)	%	4.3	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500g < 4,000g)	%	88.1	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.6	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 237: SATISFACTION, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	67.0	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**282**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	3.2	3.3	4.4	7.8	6.2
Very Satisfied	%	34.4	25.6	35.6	46.1	39.8
Extremely Satisfied	%	61.0	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	67.0	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**282**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	7.4	10.4	11.6	12.8	12.1
Very Satisfied	%	31.9	29.1	42.6	46.6	42.1
Extremely Satisfied	%	56.4	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 238: BREASTFEEDING, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	63.9	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**308**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	70.8	80.4	47.5	40.5	50.3
Formula Feed Only	%	4.9	4.0	10.1	15.3	11.9

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Both Breast and Formula Feed	%	16.6	10.8	31.9	32.5	27.8
I Haven't Decided	%	7.8	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	66.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**284**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	88.7	91.5	76.6	72.6	77.3
No	%	10.9	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 239: FAMILY PLANNING, OKHCA

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	67.0	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**282**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	82.6	77.0	77.5	82.2	80.3
No	%	13.5	20.0	14.0	14.2	15.3
Unsure	%	3.9	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	67.2	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**280**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	64.6	84.2	70.8	74.0	75.5
No	%	27.5	13.2	17.7	21.5	19.1
Unsure	%	7.9	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	62.4	41.5	42.9	38.6	40.2
Not in Universe	%	16.4	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**181**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	14.4	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	6.1	2.8	11.4	10.9	9.2
LARC - IUD	%	12.2	10.8	11.9	12.3	11.9
Pills	%	22.7	8.6	11.9	13.0	11.8
Injection	%	11.6	5.9	16.2	20.2	16.2
Condoms	%	8.8	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-

Data Elements	N or %	OKHCA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Other Method	%	14.4	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

The evaluation team did not seek data in Oklahoma because total Strong Start enrollment in the state was too low to warrant the large investment of time and resources required.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Oklahoma Health Care Authority.

CROSS-CUTTING SUMMARY

The Oklahoma Health Care Authority implemented the Group Prenatal Care and Maternity Care Home models under Strong Start. Initially approved as a Group Prenatal Care awardee, OKHCA followed a modified version of the *CenteringPregnancy* curriculum, offering eight instead of Centering's ten group sessions. But OKHCA's sites struggled to achieve enrollment targets under Group Prenatal Care, which key informants attributed to limited patient engagement and lack of support from prenatal care providers. Most sites transitioned to the Maternity Care Home model in the program's second year, and offered at least four in-person or telephonic encounters with a Strong Start care manager during pregnancy and postpartum. Care managers assessed participants' needs, provided care coordination services, and made referrals to social and other supportive services. Participants enrolled in OKHCA's program represented a mix of races of ethnicities, but had the most American Indian participants of any awardee. Unlike Strong Start participants overall, being married was the most common relationship status among OKHCA participants (34.9 percent), but they had other psychosocial risk factors, including especially low rates of educational attainment and higher rates of living in a shelter or being homeless than all but one other awardee. Impact analysis was not conducted for OKHCA because we did not obtain birth certificate and Medicaid data from Oklahoma. Descriptively, however, we observe that 11 percent of participants had a preterm birth, which aligns with the Strong Start rate overall.

Providence Health Foundation of Providence Hospital

BIRTH CENTER, GROUP PRENATAL CARE, AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

3,458	• Center for Perinatal Advocacy at Providence Hospital in Washington, DC convened National Capital Strong Start award
	• Only Strong Start awardee to implement all three models of enhanced prenatal care
		• Six unique sites participated in Strong Start, including three hospitals and three Federally Qualified Health Centers
		  • One Birth Center site
		  • Two Group Prenatal Care sites
		  • Three Maternity Care Home sites
		• One hospital dropped out, leaving five active sites at end of award period
		• Combined, awardee served majority of pregnant Medicaid beneficiaries in DC
			• Birth Center intervention categorized as "high intensity" for offering monthly or more frequent encounters with a perinatal navigator
			  • Midwifery model of care supplemented by assessment, psychosocial support, and referrals by "Perinatal Navigator"
			  • Group Prenatal Care intervention categorized as "medium intensity" for implementing the *CenteringPregnancy* curriculum with no additional enhanced services
			• Maternity Care Home intervention categorized as "medium intensity" for offering at least four care coordination, education, and/or referral encounters
			• Care coordination and social support provided by professional and "lay" community health workers

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Across all three models, existing care approaches augmented by enhanced psychosocial support, education, improved access, and referrals to social and community services
- Achieved one of the highest levels of enrollment of all the Strong Start awardees
- Unabashed administrative and provider support of Strong Start at all three sites led to successful operations and sustainment of models

CHALLENGES

- Collecting and reporting data for CMMI and evaluation was insufficiently supported, burdensome, and time-consuming
- Inefficient feedback loop for reported data meant awardee lacked information that could have helped it modify care approaches
- Maternity Care Home sites sometimes struggled to integrate care management/navigator support into the clinics' routine prenatal care operations

PARTIALLY SUSTAINED

- Three sites sustained prenatal care enhancements, including Perinatal Navigator support at the Birth Center site, *CenteringPregnancy* at a Group Prenatal Care site (in place prior to Strong Start), and Family Support Workers at a Maternity Care Home site (also in place prior to Strong Start)
- Intake data collection sustained at some sites, though not with Strong Start forms

KEY FINDINGS: PARTICIPANT-LEVEL DATA[95]

PARTICIPANT-LEVEL DATA QUALITY

- 0.0% rate of missing intake forms; 1.2% rate of missing exit forms
- 4.2% rate of item nonresponse on intake forms; 11.3% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 13.9% of women were teens (under age 20); 10.6% were 35 years or older
- 67.6% of women were black; 28.0% were Hispanic; 1.2% were white
- 17.9% of women were married; 28.3% were living with a partner; 21.4% were not in a relationship
- 15.4%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 25.3%: C-section rate among women with a delivery
- 7.0%: preterm birth rate among women with a live birth
- 8.1%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Birth Center infants had higher average clinical gestational ages and birthweights and lower rates of preterm birth, very preterm birth, low birthweight, and very low birthweight than infants in the comparison group
- Birth Center participants also had lower rates of C-section than women in the comparison group

[95] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

- Maternity Care Home participants had higher rates of C-section than women in the comparison group – marginally significant (p-value<0.10)
- The Group Prenatal Care intervention had too few enrollees to merit its own impact analysis
- Findings from site-level estimates for MCH intervention sites Howard University, Mary's Center, and Unity Health Care – which served a large enough number of women enrolled in Strong Start that site-level estimates were also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Birth Center participants had fewer prenatal ED visits in the prenatal period and marginally fewer ED visits in the period after delivery (p-value<0.10) than women in the comparison group
- Maternity Care Home participants had marginally lower average prenatal care expenditure (p-value<0.10) and fewer prenatal hospitalization than women in the comparison group
- Maternity Care Home infants had more ED visits in their first year of life than infants in the comparison group
- The Group Prenatal Care intervention had too few enrollees to merit its own impact analysis
- Findings from site-level estimates for MCH intervention sites Howard University, Mary's Center, and Unity Health Care – which served a large enough number of women enrolled in Strong Start that site-level estimates were also feasible – are in the Site-Specific Estimates section

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Birth Center Model

Community of Hope's Family Health and Birth Center offered comprehensive obstetric and gynecological care through the midwifery model to women of all ages prior to Strong Start. Risk screening was always an important part of the birth center's model of care, designed to initially determine whether women were eligible to receive birth center care and then ongoing to be sure that conditions necessitating a transfer do not develop. All women started individual appointments with a midwife, but at 20-24 weeks' gestation, they were encouraged to participate in the Center's Group Prenatal Care program in place of their individual appointments. An estimated 50 to 70 percent of patients chose to do so prior to Strong Start. Following the *CenteringPregnancy* model, the groups were facilitated by a Certified Nurse Midwife (CNM), who conducted individual health assessments, and a prenatal lactation educator.[96] Patients generally had the option of delivering with the birth center's CNMs at either the center or MedStar Washington Hospital Center. However, for a period during the Strong Start demonstration, the Family Health and Birth Center halted deliveries at the birth center because it lacked experienced nurse midwives, an issue that was ultimately resolved. The birth center provided doula services to women who needed additional support during their delivery, but doula support was typically not extended to women during their pregnancies.

Group Prenatal Care

Providence Hospital's Center for Life provided maternity care to low-income families residing in primarily the Southeast and Northeast quadrants of Washington, D.C. as well as the close-in Maryland suburbs (e.g., in Prince George's County). Providence had offered Group Prenatal Care – following the *CenteringPregnancy* model – to pregnant patients since 2007 to address very low levels of prenatal patient satisfaction attributed to long wait times and short appointments.

Maternity Care Home

Prior to Strong Start, Howard University Hospital offered typical maternity care to pregnant patients in three clinic settings, each staffed by faculty physicians and residents, with support from medical assistants. The clinics did not have registered nurses or social workers on staff and thus had to refer patients needing psychosocial support to the community; for those with more intensive behavioral health needs, clinics referred women to Howard's psychiatry department and nearby outpatient clinic. Howard offered Breastfeeding Lactation Education Support Services (B.L.E.S.S.), an initiative that

[96] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

included a support center ("Beautiful Beginnings Club") and childbirth education classes. Howard also had two full-time perinatologists and a Level III Neonatal Intensive Care Unit (NICU).

Mary's Center is a Federally Qualified Health Center (FQHC) and certified Patient Centered Medical Home (PCMH) that served families in the Adams Morgan and northeast neighborhoods of DC, as well as close-in Maryland suburbs in both Montgomery and Prince George's Counties. In addition to family and pediatric care, Mary's Center has always provided comprehensive perinatal care, including enhanced care delivered by "Family Support Workers," typically college educated social service staff who provide education and referrals to community organizations and resources. Mary's Center also offered Group Prenatal Care, but Strong Start participants were not enrolled in this program.

Unity Healthcare is also an FQHC and PCMH, operating 29 clinics across D.C.'s Wards 5, 6, 7, and 8, representing a majority of the city's Medically Underserved Areas. Prior to Strong Start (which was implemented in seven of its locations), Unity provided comprehensive family, pediatric, and perinatal care but did not provide enhanced prenatal care services or supports like those offered by Strong Start (e.g., care coordination or psychosocial support services).

DESCRIPTION OF ENHANCED STRONG START SERVICES

The National Capital Strong Start awardee was the only awardee in Strong Start that implemented all three models of enhanced prenatal care: Birth Center care augmented by a Perinatal Navigator; Group Prenatal Care; and the Maternity Care Home model.

> "I like the fact that they talked about breastfeeding. It was so hard with my first son. The lady gave me a number to call [to reach someone] to help me with breastfeeding. I got some good information from her. "
>
> *- Strong Start participant*

Under Strong Start, the Community of Hope's Family Health and Birth Center provided enhanced psychosocial support to supplement its midwifery model of care. Specifically, a Perinatal Navigator was hired to meet with Strong Start participants to provide education on a variety of topics (e.g. nutrition, breastfeeding, exercise), referrals to community services, care coordination, and emotional support. Though this provider was the only Birth Center not affiliated with the American Association of Birth Centers (AABC) award, its enhanced model of care followed a similar strategy. The Perinatal Navigator met with women either in-person—before or after prenatal care visits—or over the phone at least once a month throughout the course of a client's pregnancy and postpartum, with encounters lasting between 10 and 30 minutes. A major focus of the Navigator was to answers any questions women might have, provide clarification on issues discussed with midwifes during individual appointments, and provide support to women confronting psychosocial challenges, such as those related to partners, family, or jobs. In addition, the Birth Center also offered all Strong Start participants the opportunity to meet with a doula throughout their pregnancy and postpartum. Early on, the doula coordinator matched each Strong Start participant with one of eight doulas during their second or third trimester and Doulas and participants met at least two times prenatally, at delivery, and once postpartum. Doulas assisted their clients with nutrition, breastfeeding, exercise, and labor preparation. In Year 1, it was estimated that between 80 and 90 percent of all women in Strong Start had a doula present during delivery. Later in the award period, however, a shortage of Doulas meant that far fewer women received this additional support under the program.

Providence Hospital's Group Prenatal Care intervention, following the Centering Healthcare Institute (CHI)'s *CenteringPregnancy*® (Centering) model, provided women with ten sessions over the course of a seven-month period. Two CHI-trained facilitators led each session, one of whom was a CNM. Patients were assigned to Centering groups based on their estimated due date and preferred language; groups were conducted in both English and (more often, over time) Spanish. The average group size ranged from 8 to 12 women (in addition to partners, family members, children, and friends who were invited to accompany women if desired), and lasted for two hours. Following the Centering model, sessions began with time for socialization and healthy snacks while women collected their own blood pressure and weight. Individual health assessments, conducted by the CNM, occurred simultaneously in a screened-off area. Following the individual assessments, group learning would occur on a broad range of topics – including nutrition, breastfeeding, exercise, family planning and birth spacing, domestic violence, and childbirth preparation. With Strong Start, Providence used award funding to partially pay for a Centering Coordinator position; otherwise, the care approach at Providence was the same as that provided before Strong Start.

All three Maternity Care Home models followed a similar approach to implementing Strong Start. At Howard University Hospital, enhanced prenatal care services were provided by three Perinatal Navigators with various levels of training: a registered nurse, a part time social worker, and a peer navigator similar in age and background to participants. These staff educated women on the importance of prenatal care, encouraging them to attend prenatal visits and preparing them for their prenatal care visits. They also discussed the importance of breastfeeding. The Navigators worked in tandem to address women's needs based on their own areas of expertise. For instance, when Strong Start enrollees needed help with housing or baby equipment (e.g., strollers, cribs, car seats), they were referred to the Perinatal Navigator trained as a social worker. Meanwhile, the nurse Navigator focused more on medical risks and needs. Encounters occurred either when participants came in for prenatal appointments or by phone call and text message. Frequency of contacts varied across the staff, ranging from weekly to only in conjunction with scheduled visits.

Mary's Center implemented the Strong Start Maternity Care Home model at two sites in D.C. and recruited participants from two additional sites in Maryland. Enhanced services were delivered by "Family Support Workers" who screened patients at intake and provided education and referrals to resources, including the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), in-house nutritionists, exercise classes, smoking cessation assistance, and mental health services. Family Support Workers also followed up with patients when needed (e.g. to check on whether patients kept or missed an appointments).

> "My son and I were homeless for a while. [The Prenatal Care Associate] was there for me, basically for anything. She tries to find resources to help you, or just to talk."
>
> *- Strong Start participant*

Unity Healthcare hired four "Prenatal Care Associates" (PCAs) to implement its Maternity Care Home model at seven sites. Like the models described above, Unity PCAs provided patient education and case management services through four to five prenatal and one postpartum encounters. PCAs also provided emotional support and followed up with women when they missed appointments. In Year 2, Unity began offering prenatal care classes based on a March of Dimes curriculum, three times each week, run by a nurse.

OUTREACH AND ENROLLMENT

All sites used an "opt-in" enrollment approach whereby women were asked to choose between enrollment in Strong Start or participation in the standard prenatal care system used by the site.

> "I wanted to be part of [Strong Start] to help my community be better."
>
> *- Strong Start participant*

At the Community of Hope Family Health and Birth Center, many patients learned about Strong Start during their orientation to the birth center—either from the Perinatal Navigator or the prenatal lactation educator—while some were told about the program by the midwife during their initial prenatal appointment. Strong Start was introduced as a national research project designed to provide women with extra support from the Perinatal Navigator and a doula. According to key informants between 80 and 90 percent of patients agreed to participate; of those who declined, the majority said they did not want to "share their information with the government." When not busy with clients, the Birth Center's Perinatal Navigator sometimes recruited women at two other Community of Hope clinic sites or conducted outreach at health fairs, community events, and at high schools.

At Providence Hospital, all women were strongly encouraged to try Centering; however, they retained the right to choose between the group model and typical one-on-one prenatal visits. After assessing risk during the initial prenatal appointment, eligible patients were introduced to Centering by a midwife or the Centering Coordinator. Centering was described to women as a new model of prenatal care that provides more education and that has succeeded in improving birth outcomes. According to key informants, most women were enthusiastic about Centering, particularly Hispanic patients, who were particularly excited about the group environment. However, an estimated 15-20 percent of women declined Centering, with the most common reasons being work schedules and lack of childcare.

Outreach and enrollment in the awardee's three Maternity Care Homes occurred in roughly the same manner across all sites. At Howard University, Perinatal Navigators reviewed the schedule for each clinic and approached all pregnant patients enrolled in Medicaid. Doctors and other clinic staff also alerted the Navigators if they thought a patient was eligible. Navigators explained to women that Strong Start was a voluntary program that could help them and provided them an information sheet to review. Key informants estimated that roughly 80 percent of eligible women chose to enroll in Strong Start. Women who declined generally did so because they were already in a program providing similar services, such as DC Healthy Start.

Mary's Center and Unity both offered Strong Start to all pregnant women eligible for Medicaid, regardless of their gestational age or the presence of any additional risk factor (beyond being covered by Medicaid, a proxy for "high risk").

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants representing all three models were confident that Strong Start had a positive influence on a range of patient outcomes. While they acknowledged there was room for improvement in these outcomes, informants also commented that the socioeconomic challenges facing Strong Start participants were significant in the Washington D.C. area and that the services provided by Strong Start

had a positive impact. Elements of enhanced prenatal care predated Strong Start at several sites (Providence Hospital, Community of Hope Family Health and Birth Center, and Mary's Center), but Strong Start further enhanced sites' capacity to provide comprehensive, high quality care. Overall, informants commented that Strong Start's most significant influence stemmed from the educational and psychosocial services the initiative supported.

Across models, key informants were relatively satisfied with rates of preterm birth and low birthweight for women in the program and (again) felt that, given the population they served, they represented an improvement over pre-Strong Start rates. While some informants were reluctant to attribute improvements directly to Strong Start, most agreed that the program's emphasis on education and improving access to care were likely contributing to better maternal and newborn outcomes.

> "[The Perinatal Navigator] checks in and see how you're doing, if you need anything, if your pregnancy is going well. We talk about breastfeeding, and just encouragement. I was having issues with my boyfriend and she [tried] to keep my spirits up."
>
> *- Strong Start participant*

Many informants also believed that breastfeeding rates had improved, though they acknowledged that partner hospitals' active participation in the Baby-Friendly[97] initiative was likely also an important factor positively impacting breastfeeding outcomes in the D.C. area. Community of Hope's Birth Center and Providence Hospital both pointed to their certified lactation consultants, who worked together with Strong Start staff, as pivotal in achieving improved breastfeeding rates.

STRONG START PARTICIPANT PERSPECTIVES

Participants sought prenatal care from the providers participating in the National Capital Strong Start award for a variety of reasons. At the Community of Hope Family Health and Birth Center, pregnant and postpartum women said they were referred there by a friend or family member or explained that their children received primary care at the site, while others were specifically drawn to the center's midwifery model of care, having a natural birth, and learning Lamaze methods. Howard University patients mainly chose the hospital for its convenient location or because they already had ties to the institution. Participants at Unity sought care there because of their familiarity and comfort level with the provider. In nearly all instances, women recalled that Strong Start was described to them as a special program for Medicaid enrollees designed to improve outcomes and remembered being given a choice of whether to participate or not (though some said they felt "really pushed" to participate).

> *I decided to join for the extra support. I knew nothing about breastfeeding when I started, and now…I'm a pro!*

[97] The Baby Friendly Birthing Initiative recognizes and awards birthing facilities that successfully implement the Ten Steps to Successful Breastfeeding, which include: 1. Have a written breastfeeding policy 2. Train all health care staff in the skills necessary to implement this policy. 3. Inform all pregnant women about the benefits and management of breastfeeding. 4. Help mothers initiate breastfeeding within one hour of birth. 5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants. 6. Give infants no food or drink other than breast-milk, unless medically indicated. 7. Practice rooming in - allow mothers and infants to remain together 24 hours a day. 8. Encourage breastfeeding on demand. 9. Give no pacifiers or artificial nipples to breastfeeding infants. 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.

I wanted to do a delivery at a birth center. My mother introduced me to the birthing center because she had all 13 of her children naturally.

Women described how Perinatal Navigators, PCAs, and FSWs checked in with them about their needs, encouraged healthy behaviors, and offered emotional support, communicating with both by phone and in person. Breastfeeding and family planning options were frequently discussed, and women described working with a lactation consultant or participating in a breastfeeding support group. Many women described how Strong Start staff significantly decreased their stress, noting that they could "talk about anything" with them and expressing great appreciation for the support they provided.

[The navigator] made my pregnancy stress-free. She made my appointments for me. She called me to remind me…and asked if I needed help getting to appointments. She asked me about personal stuff. Me and my husband were going through something real bad, and my blood pressure was always high. Her saying I could talk to her about anything personal really stuck with me. You can tell when someone can be trusted, and you could tell she really cared.

Strong Start participants reported high satisfaction with the program and in most cases, rated their most recent maternity care experience under Strong Start as more positive than previous pregnancies.

[The care manager at Unity] stayed on top of [my case] so I could keep track of my blood pressure. She would make sure I wasn't in pain…and took directly to my doctor. [This pregnancy] went smoother because I had support and when I got to the hospital everything went smooth.

The care [at Community of Hope Birth Center] was a lot more personable. I had my first son at [an area hospital], and I always felt like things were rushed and my OB wasn't as concerned about my birth plan or the things I wanted to have. I felt that the care I received here was better.

PROGRAM STRENGTHS

Key informants from across the National Capital Strong Start award identified many key strengths in the three enhanced prenatal care models they implemented. For three of the sites (Community of Hope Birth Center, Providence Hospital, and Mary's Center), Strong Start represented an augmentation of a delivery model they already embraced, precisely because they believed it was a better way to provide prenatal care and improve birth outcomes. This augmentation generally took the shape of enhanced support services in the form of education, improved access, and referrals to social and community services. Across all sites, key informants agreed that this was Strong Start's biggest strength.

Another key strength of the awardee was its success with enrollment. After initial implementation delays, enrollment for the sites collaborating under the National Capital Strong Start effort worked hard to identify and enroll eligible pregnant women and, ultimately, achieved one of the highest levels of enrollment of all the Strong Start awardees.

Three of the five participating sites had unabashed administrative and provider champions supporting Strong Start, an ingredient that help them be successful in operating and, ultimately, sustaining their models (see below). This was true at Providence Hospital, where leadership support for *CenteringPregnancy* was strong, even as the program became increasingly used by immigrant women

without insurance coverage. Community of Hope received outspoken support from midwives staffing the birth center. And among the Maternity Care Homes, Mary's Center received unequivocal support from management and obstetrical providers and, not coincidentally, was also the only site implementing this model that sustained Strong Start.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

National Capital Strong Start officials consistently described the data collection requirements associated with the award as the most challenging barrier to successful implementation. The data collection "burden" encompassed both program reporting (for CMMI management) and evaluation reporting. Intake and Exit Forms were often the target of criticism because of how long they took to complete (for both patients and staff), and officials never felt they received sufficient resources to support this data collection, nor sufficient acknowledgment from federal officials and the evaluation for how it took time away from patient care. Finally, key informants were frustrated that there wasn't a more efficient feedback loop that would enable them to receive reports from the data they were collecting and reporting, reports that might help them modify their care approaches.

Key informants at two of the awardee's Maternity Care Home sites – Howard University and Unity Healthcare – acknowledged that they were never fully able to overcome challenges surrounding the integration of Strong Start's care management/navigator support system into the clinics' routine prenatal care operations. Strong links between clinical providers and care managers were difficult to form, and providers were not always aware of what or how Strong Start staff were working to support their mutual goals of improved birth outcomes.

SUSTAINABILITY

Of the five sites comprising the National Capital Strong Start award, three sustained enhanced services. Providence Hospital, which had a pre-existing Group Prenatal Care program that pre-dated Strong Start, is continuing to support the model with hospital discretionary funds. Community of Hope Family Health and Birth Center is sustaining its Perinatal Navigator services primarily through new grant funding from DC's Department of Health's "Healthy Start" program, a home visiting intervention that concentrates on postpartum support for low-income mothers in Wards 5, 7, and 8. Mary's Center, which recently achieved NCQA Level II Patient Centered Medical Home status, has retained Family Support Workers; these positions existed prior to Strong Start and continue to be supported by a broad range of funding sources.

The other two Maternity Care Home sites, Unity Healthcare and Howard University Hospital, did not sustain their Strong Start interventions. At Unity, key informants remarked that, while they received "positive feedback from obstetrical (OB) providers about case management" offered by the Strong Start PCAs, there was no funding available to sustain the positions. Informants felt they lacked support at a larger, organizational level, which undermined efforts to raise funds to continue supporting PCAs. Howard University Hospital did not continue the model because it did not receive funding from the hospital's discretionary budget, and other sources of support were not obtained.

None of the sites are continuing data collection using Strong Start's forms, though many key informants reported that they had their own data collection systems in place and would continue to rely on those to assess patient needs and the efficacy of their programs.

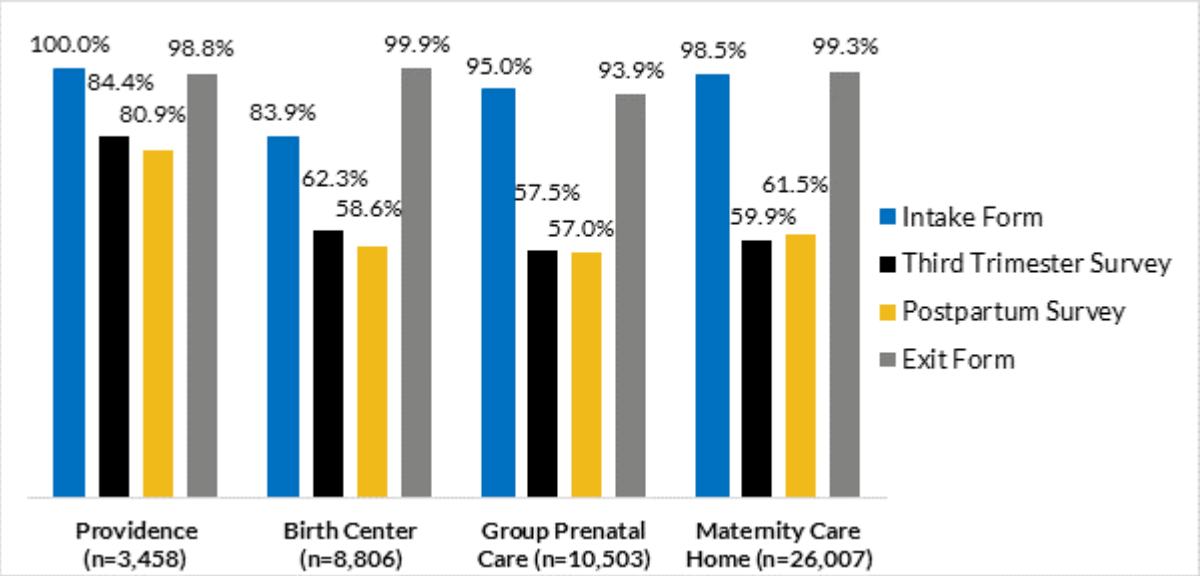
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Providence, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Providence to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 39 Providence participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 16: FORM SUBMISSION RATES, PROVIDENCE



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 3,456
- Study IDs represented: 3,458 (Suggests that PLPE data were submitted for two extra patients; see information on program report data in Appendix F in Volume 1)
- In 2015, to increase submission rates and hold sites accountable, the awardee began to withhold payment until sites submitted the PLPE forms.

HOW FORMS WERE ADMINISTERED:

- All surveys were completed by the patients on paper and reviewed by a staff member who checked for completeness and attempted to have the patient complete skipped questions.
- If a patient did not complete a form, staff would follow up with them three times to complete the form in person or over the phone.
- Each site filled out their own Exit Forms. Staff attempted to contact the hospital to locate birth information or searched in a Medicaid database to locate information about the baby. If they were unable to locate information in the medical chart, staff also followed up with patients to ask about their receipt of referrals, such as 17P, birth outcomes, and infant name.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Providence had six sites, which included a birth center, three hospital-based clinics, and two FQHCs.
- The availability of services varied by site; if a site referred out for services, they had limited ability to report on whether they were received. For example, FQHCs did not offer 17P, so patients were referred to local hospitals and the administration of the medication would not be in their medical record.

MISSING FORMS:

- Intake Form: No Study IDs were missing Intakes.
- Third Trimester or Postpartum Surveys: About 16 percent of Study IDs were missing the Third Trimester Survey and 19 percent were missing the Postpartum Survey. These forms are most likely missing because patients transferred care during pregnancy or were lost to follow-up.
- Exit Form: 1.2 percent of Study IDs were missing Exit Forms. The evaluation team attempted to request these remaining Exit Forms from the awardee. About half of these were from a site that stopped participating and did not respond to the awardee's request. The remaining forms were missing for unknown reasons.

ITEM NONRESPONSE:

- Intake Form: About 8 percent of patients did not complete the question about education. The awardee said that most of their participants had not attended college and may have skipped it for this reason. They also thought that patients with substance use problems likely skipped those questions.
- Exit: The awardee had some missing data for key outcomes variables. Data on Strong Start pregnancy outcome are missing for 14.3 percent of participants.[98]

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes of Providence participants. Some highlights include:

- The majority of Providence participants (75.6 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 10.6 percent of participants were 35 or older.
- Most participants were either black (67.6 percent) or Hispanic (28.0 percent).
- The largest share of Providence participants was in a relationship but not living with a partner (32.4 percent), although 17.9 percent were married and 21.4 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 16.9 percent of Providence participants reported having experienced intimate partner violence, 15.4 percent of participants with a prior birth had a prior preterm birth, and 70.6 percent of participants had not planned their Strong Start pregnancy.

TABLE 240: DEMOGRAPHICS, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.1	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**3,417**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	5.6	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	8.3	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	75.6	81.7	72.9	75.1	75.8
35 Years and Older	%	10.6	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	2.1	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**3,347**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	28.0	25.4	37.1	28.0	29.7
Non-Hispanic White	%	1.2	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	67.6	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.2	5.4	5.1	4.7	4.9

[98] Among participants with missing data on pregnancy outcome, 8.6% were missing because they did not have an exit form, 77.4% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 14.1% were missing for other reasons.

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Ethnicity (Among Hispanic Women)						
Missing Data	%	9.9	19.6	12.8	11.3	13.3
Not in Universe	%	62.8	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**936**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	10.1	52.6	36.3	55.8	49.7
Puerto Rican	%	2.1	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	86.9	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**3,418**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	3.2	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	2.0	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**3,349**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	35.6	36.6	30.8	35.3	34.5
In School, Not Employed	%	14.9	8.7	12.6	11.9	11.5
Employed and in School	%	5.8	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	43.7	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	7.8	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**3,154**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	28.2	15.4	27.8	29.1	26.4
High School Graduate or GED	%	58.8	57.5	58.3	57.9	57.9
Associate's Degree	%	4.3	8.2	5.2	4.6	5.4
Bachelor's Degree	%	5.2	14.5	4.5	3.7	5.8
Other College Degree	%	3.6	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	2.5	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**3,332**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	17.9	42.1	20.4	20.8	24.5
Living with a Partner	%	28.3	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	32.4	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	21.4	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 241: PSYCHOSOCIAL, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**3,390**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	82.2	51.8	51.8	59.7	56.5
No	%	15.1	44.6	42.3	37.4	39.8
Unsure	%	2.7	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Not in Universe	%	17.6	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**2,787**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	85.4	61.1	72.6	79.9	75.3
Other	%	5.6	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	9.0	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	7.6	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**3,158**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	6.6	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	6.3	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**3,202**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	27.0	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	3.0	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**3,315**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	33.3	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	11.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**3,016**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	30.6	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	3.8	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**3,288**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	62.8	67.9	59.0	65.5	64.5
Mild	%	22.5	21.4	23.8	20.2	21.2
Moderate	%	8.9	6.8	10.3	8.5	8.6
Severe	%	4.6	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.3	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	2.1	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**3,348**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	16.9	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	4.3	18.3	16.3	7.7	11.8
Not in Universe	%	7.2	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**3,028**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.4	2.3	3.2	2.5	2.6

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**3,418**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	55.2	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	28.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	16.0	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	65.6	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	22.2	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	29.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	21.0	24.6	17.1	15.4	17.2
Childcare Challenges	%	9.7	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	3.6	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 242: PREGNANCY HISTORY AND INTENTIONS, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.1	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**3,414**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	74.6	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	24.9	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	11.9	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**2,161**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	33.5	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	11.5	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**2,174**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	29.9	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	30.0	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**1,543**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.9	0.9	2.3	4.2	3.1

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Preeclampsia						
Missing Data	%	26.2	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**1,671**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	7.8	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	28.2	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**1,605**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	4.0	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	29.8	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**1,550**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	29.8	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**1,550**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	29.9	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**1,547**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 243: PRIOR BIRTH OUTCOMES, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.8	1.7	1.5	0.6	1.0
Not in Universe	%	25.5	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**2,521**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	85.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	11.8	23.5	18.9	15.2	17.7
Not in Universe	%	37.0	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**1,750**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	19.5	34.6	24.3	27.1	28.1
>= 18 months	%	80.5	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.4	0.1	2.5	1.4	1.4
Not in Universe	%	37.0	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**2,140**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	15.4	13.2	21.3	23.9	21.1

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	11.6	1.3	20.8	13.1	12.6
Not in Universe	%	36.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**1,783**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	10.0	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 244: PRE-PREGNANCY MEDICAL CONDITIONS, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	3.3	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**3,305**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	29.4	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	59.0	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	3.8	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.8	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	9.3	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**3,100**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	1.4	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	9.1	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**3,108**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	3.5	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	14.4	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**2,927**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	1.9	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	33.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	28.8	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	27.9	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	7.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 245: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	12.8	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**2,983**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	3.1	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	12.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**2,986**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	3.0	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	12.6	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**2,987**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	4.0	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	12.8	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**2,982**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	0.5	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	13.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**2,976**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	1.1	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	12.9	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**2,977**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	0.5	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	13.2	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**2,969**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	0.5	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	21.6	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**2,679**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	7.7	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 246: TREATMENTS DURING PREGNANCY, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	48.6	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,756**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	6.2	0.8	10.0	5.1	5.4
Not in Universe	%	89.2	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**155**	**680**	**654**	**2,585**	**3,919**
Yes	%	11.6	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	54.5	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,555**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	1.5	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	54.8	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,545**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 247: PRENATAL CARE, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	6.8	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**3,188**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	35.2	4.7	29.5	64.5	43.3
Licensed Professional Midwife[99]	%	1.7	18.8	2.3	1.0	5.4
Nurse Practitioner	%	0.4	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	61.4	74.6	37.5	18.3	35.2
Family Medicine Physician	%	1.2	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	1.2	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**3,377**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	96.3	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	7.2	9.3	5.3	8.8	8.3

[99] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care (Group Visits)						
Missing Data	%	1.2	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**3,377**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	3.1	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	6.6	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	3.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**3,311**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	96.1	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	4.9	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	5.2	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**3,240**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	3.9	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	3.2	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	6.2	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**3,206**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	2.7	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	2.2	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	42.8	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,956**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	63.7	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.8	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	43.2	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,942**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	44.3	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,903**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	9.4	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	2.6	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	42.8	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,957**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	71.5	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	2.0	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	44.0	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,914**	**8,152**	**6,511**	**17,470**	**32,133**

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Substance Abuse Services	%	2.4	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.6	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	6.0	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**3,213**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	11.1	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	59.3	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	4.2	-	4.1	5.1	4.8
Cardiologist	%	10.7	-	6.4	6.9	6.8
Other	%	40.7	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 248: DELIVERY INFORMATION, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	36.8	1.4	25.3	23.3	19.5
Not in Universe	%	21.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,444**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	19.7	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	4.5	0.3	7.8	2.9	3.5
Not in Universe	%	90.5	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**173**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	93.1	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	3.2	4.6	11.5	7.3	7.7
Not in Universe	%	16.1	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**2,759**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.1	51.8	99.4	99.5	90.6
Birth center	%	0.5	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	4.6	0.7	12.0	5.6	6.1
Not in Universe	%	16.1	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**2,712**	**6,454**	**7,497**	**19,466**	**33,417**

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal	%	74.7	87.1	70.1	69.5	73.1
C-Section	%	25.3	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	2.1	0.4	8.7	2.3	3.4
Not in Universe	%	70.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**933**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	79.2	83.3	72.9	74.7	75.9
C-Section	%	20.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	9.9	4.7	12.5	6.3	7.4
Not in Universe	%	78.7	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**387**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	42.9	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	1.2	0.1	6.2	0.7	1.9
Not in Universe	%	88.5	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**352**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	23.6	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 249: BIRTH OUTCOMES, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	14.3	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**2,929**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	96.0	96.2	97.6	94.4	95.5
Stillbirth	%	0.5	0.3	0.9	0.8	0.7
Termination	%	0.7	0.3	0.2	0.6	0.5
Miscarriage	%	2.8	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	5.2	0.7	15.4	5.8	7.0
Not in Universe	%	16.6	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**2,674**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	1.6	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	5.4	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	91.6	93.4	86.7	85.7	87.4
Post-Term (42+)	%	1.3	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	5.6	2.1	14.3	8.0	8.3
Not in Universe	%	16.6	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**2,661**	**6,312**	**7,189**	**18,672**	**32,173**

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Very Low Birthweight (< 1,500g)	%	0.9	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	7.2	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	85.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	5.9	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 250: SATISFACTION, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	29.2	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**2,421**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	0.7	-	1.0	0.6	0.6
Slightly Satisfied	%	1.0	0.4	1.0	1.3	1.0
Moderately Satisfied	%	6.4	3.3	4.4	7.8	6.2
Very Satisfied	%	59.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	32.7	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	29.0	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**2,429**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	2.1	2.0	3.1	2.3	2.4
Slightly Satisfied	%	3.1	3.0	4.0	2.9	3.1
Moderately Satisfied	%	12.1	10.4	11.6	12.8	12.1
Very Satisfied	%	61.3	29.1	42.6	46.6	42.1
Extremely Satisfied	%	21.4	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 251: BREASTFEEDING, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	17.3	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**2,826**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	36.8	80.4	47.5	40.5	50.3
Formula Feed Only	%	8.8	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.2	10.8	31.9	32.5	27.8
I Haven't Decided	%	14.1	4.8	10.5	11.8	10.1

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Initiation After Delivery						
Missing Data	%	22.8	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**2,641**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	82.1	91.5	76.6	72.6	77.3
No	%	14.0	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	3.9	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 252: FAMILY PLANNING, PROVIDENCE

Data Elements	N or %	Providence (All Approaches)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	23.6	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**2,612**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	71.6	77.0	77.5	82.2	80.3
No	%	24.2	20.0	14.0	14.2	15.3
Unsure	%	4.2	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	23.6	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**2,613**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	56.4	84.2	70.8	74.0	75.5
No	%	37.8	13.2	17.7	21.5	19.1
Unsure	%	5.8	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	19.2	41.5	42.9	38.6	40.2
Not in Universe	%	37.7	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**1,475**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	5.3	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	9.0	2.8	11.4	10.9	9.2
LARC - IUD	%	8.0	10.8	11.9	12.3	11.9
Pills	%	9.5	8.6	11.9	13.0	11.8
Injection	%	23.3	5.9	16.2	20.2	16.2
Condoms	%	24.5	26.6	19.8	13.9	17.9
Breastfeeding	%	6.8	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	1.8	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	9.2	16.7	8.1	9.5	10.9
Method Not Indicated	%	2.0	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from the District of Columbia

First Contact: In April 2015, the evaluation team spoke with the Department of Health Care Finance (DHCF) to discuss their willingness to participate in the Strong Start evaluation and their process for releasing Medicaid data to Urban for the impact analysis. Also at that time, a conversation was initiated with the Department of Health (DOH) regarding the possibility of accessing birth certificate data. Both agencies were eager to participate in the evaluation, and Medicaid officials indicated that they would prefer linking the data.

Data Acquisition Process: In July 2015, Urban submitted a data request application to Department of Health, which was approved in October 2015. In June 2016, DOH provided 2014 birth certificate data to Urban. In January 2017, a data use agreement (DUA) between Urban and the Medicaid agency was executed, in which DHCF agreed to merge the Medicaid and birth certificate data. Following the DUA, Medicaid officials changed their minds and decided they would prefer that Urban link birth certificate and Medicaid data, and proceeded to share eligibility and claims files with Urban in June 2017. The Vital Records Agency submitted updated 2014 and 2015 birth certificate data in May 2017. As Urban worked to complete the merge, it became apparent that some necessary matching variables were missing. The evaluation team submitted amended data requests to vital records and Medicaid during summer 2017 and received final Medicaid data in August 2017 and final birth certificate data in December 2017.

Final Result: Urban successfully merged all birth certificate and Medicaid files and D.C.'s data are included in the final impacts analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Providence Health Foundation of Providence Hospital (Providence) awardee implemented all three Strong Start models: Birth Center, Group Prenatal Care, and Maternity Care Home. This section presents the evaluation's impacts results separately for the Birth Center model and for the Maternity Care Home model. The Group Prenatal Care model did not serve enough women to be included in our awardee-level analysis, but it is included in the model-level analysis presented in Volume 1 (Table 253).

TABLE 253: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR PROVIDENCE

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
Providence Health Foundation of Providence Hospital			
Birth Center Model			
Community of Hope's Family Health and Birth Center	Yes	Yes	No
Group Prenatal Care Model			
Providence Hospital	Yes	No	No

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
Maternity Care Home Model			
MedStar Washington Hospital Center	Yes	No	No
Howard University Hospital	Yes	Yes	No
Mary's Center	Yes	Yes	No
Unity Health Care	Yes	Yes	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 at five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC), and
- Whether the delivery occurred over the weekend.[100]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we draw the comparison group outside the county (alternative specification #1) for Providence.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;

[100] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value<0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1 of the final report.

BIRTH CENTER MODEL

The Providence awardee delivered care at one birth center site included in the impacts analysis, Community of Hope Birth Center. This site served a large enough number of women enrolled in Strong Start that a site level estimate was feasible. Community of Hope was the only Providence birth center site.

Table 254 reports the birth and process outcome findings for the Providence birth center:

- Infants born to women enrolled in Strong Start at the Providence birth center site have an average clinical gestational age of 39.1 weeks, which is greater than that of infants born to women in the propensity-score reweighted comparison group by 0.4 weeks. Similarly, infants born to Strong Start women are 3.3 percentage points less likely to be preterm (5.4 percent compared to 8.8 percent) and 1.8 percentage points less likely to be very preterm (1.2 percent compared to 3.0 percent).
- Infants born to Strong Start women have an average birthweight of 3274.7 grams, which is 116.2 grams greater than that of comparison infants. Similarly, infants born to Strong Start women are 4.4 percentage points less likely to be low birthweight (5.8 percent compared to 10.2 percent) and 1.3 percentage points less likely to be very preterm (0.4 percent compared to 1.7 percent).
- Rates of C-section are also lower for Strong Start enrollees (21.0 percent) than comparison group women (28.8 percent), a difference of 7.8 percentage points.
- Differences in estimates for Strong Start enrollees and comparison group women are not statistically significant for Apgar score or weekend delivery, and the sample of Strong Start enrollees with a previous C-section is not sufficient to analyze VBAC.

TABLE 254: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT PROVIDENCE COMMUNITY OF HOPE BIRTH CENTER

Outcomes	Main Model: 2014 - 2016, Strong Start (N=257)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=11168)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=149, N=5902)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=149, N=5902)
Birth Outcomes						
Clinical gestational age (weeks)	39.1	38.7	**0.4****	N/A	0.3	**0.3^**
Preterm birth rate	5.4%	8.8%	**-3.3***	N/A	-2.0	-2.3
Very preterm birth rate	1.2%	3.0%	**-1.8***	N/A	-1.1	-0.6
Birthweight (grams)	3,274.7	3,158.4	**116.2****	N/A	**110.6***	**135.9****
Low birthweight rate	5.8%	10.2%	**-4.4****	N/A	-2.9	-3.4
Very low birthweight rate	0.4%	1.7%	**-1.3****	N/A	-1.0	-0.7
Rate of Apgar score greater than or equal to 7	98.8%	98.1%	0.7	N/A	0.3	0.0
Process Outcomes						
C-section rate	21.0%	28.8%	**-7.8****	N/A	**-7.5***	**-8.3***
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	26.8%	25.9%	1.0	N/A	4.6	5.3

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 17 Strong Start women and 1446comparison group women.

Table 254 also shows findings from the alternative specification models. When we limit the sample to the claims data sample (alternative specification 2) and add claims control variables (alternative specification 3), we only observe significant differences between Strong Start women and comparison group women for two outcomes: birthweight (in grams) and C-section. For both outcomes, the magnitude of the difference decreases when the sample is limited to 2014-2015 claims analysis sample, but increases above our main model estimate when diagnoses controls are added to the model. The loss of effect for the other variables is driven by reducing the sample from the 2014-2016 birth certificate analysis sample to the 2014-2015 claims analysis sample, rather than by adding the diagnoses control variables. After adding the diagnoses control variables, the difference for clinical gestational age regains marginal significance.

Table 255 reports the expenditure and utilization outcomes findings for the Community of Hope Birth Center:

- Women enrolled in Strong Start have a smaller mean number of ED visits in the prenatal period (1.09 visits) than comparison group women (1.34 visits), a significant difference of 0.26 visits.

- Strong Start enrollees also have fewer ED visits in the period after delivery (0.78 visits) than comparison group women (0.97 visits), a marginally significant difference of 0.19 visits (p-value<0.10).
- There are no other significant differences in expenditure and utilization outcomes between women enrolled in Strong Start and women in the comparison group.

TABLE 255: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT PROVIDENCE COMMUNITY OF HOPE BIRTH CENTER

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=149)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5902)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,387	$1,606	-$219	N/A
Total expenditures during delivery period	$8,709	$8,444	$264	N/A
Total delivery and postdelivery expenditures[2]	$12,012	$12,410	-$398	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.09	1.34	**-0.26***	N/A
Number of hospitalizations 8 months before delivery month	0.05	0.04	0.01	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.78	0.97	**-0.19^**	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.05	-0.01	N/A
Number of ED visits for infant in the first year of life	1.54	1.59	-0.04	N/A
Number of hospitalizations for infant in the first year of life	0.09	0.11	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

MATERNITY CARE HOME MODEL

The Providence awardee delivered care at three maternity care home sites included in the impacts analysis: Howard University Hospital; Mary's Center; and Unity Health Care. This section presents the evaluation's impacts results for the Maternity Care Home model for the awardee as a whole. In addition, all three sites served a large enough number of women enrolled in Strong Start that site level estimates were also feasible.

Awardee-Level Estimates

Table 256 reports the birth and process outcome findings for the Providence maternity care home model sites:

- Women enrolled in Strong Start have a higher C-section rate (31.3 percent) than comparison group women (28.9 percent), a marginally significant difference (p-value<0.10) of 2.4 percentage points.
- We find no other significant differences in birth outcomes between Strong Start enrollees and women in the comparison group.

TABLE 256: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT PROVIDENCE HEALTH FOUNDATION OF PROVIDENCE HOSPITAL, MATERNITY CARE HOME MODEL

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1603)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=23029)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference1 † (N=773, N=6131)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=773, N=6131)
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.6	0.0	N/A	-0.1	-0.1
Preterm birth rate	10.1%	10.0%	0.1	N/A	0.3	0.3
Very preterm birth rate	3.4%	3.5%	-0.1	N/A	0.0	0.1
Birthweight (grams)	3,148.0	3,160.0	-12.0	N/A	-3.8	-7.7
Low birthweight rate	11.4%	10.2%	1.2	N/A	0.4	0.6
Very low birthweight rate	1.8%	2.1%	-0.3	N/A	0.0	0.2
Rate of Apgar score greater than or equal to 7	97.2%	97.6%	-0.4	N/A	0.2	0.2
Process Outcomes						
C-section rate	31.3%	28.9%	**2.4^**	N/A	0.8	0.5
VBAC rate[1]	20.9%	22.2%	-1.3	N/A	0.3	0.7
Weekend delivery rate	24.7%	24.7%	0.0	N/A	-0.6	-0.6

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 239 Strong Start women and 3491 comparison group women.

Table 256 also shows findings from the alternative specification models. When we limit the sample to the claims data sample (alternative specification 2) and add claims control variables (alternative specification 3), no differences between Strong Start women and comparison group women are statistically significant.

Table 257 reports the expenditure and utilization outcomes findings for the Providence maternity care home model sites:

- Women enrolled in Strong Start have lower average prenatal care expenditures ($1,405) than comparison group women ($1,591), a marginally significant difference of $186 (p-value<0.10).
- Women enrolled in Strong Start have a smaller mean number of hospitalizations during the prenatal period (0.03 hospitalizations) than comparison group women (0.05 hospitalizations), a significant difference of 0.02 hospitalizations.
- Infants born to women enrolled in Strong Start have a greater mean number of infant ED visits following delivery (1.63 visits) than comparison group infants (1.44 visits), a significant difference of 0.18 visits.
- There are no other significant differences in expenditure or utilization outcomes.

TABLE 257: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT PROVIDENCE HEALTH FOUNDATION OF PROVIDENCE HOSPITAL, MATERNITY CARE HOME MODEL

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=773)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=6131)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,405	$1,591	**-$186^**	N/A
Total expenditures during delivery period	$7,715	$7,852	-$138	N/A
Total delivery and postdelivery expenditures[2]	$11,671	$11,515	$155	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.24	1.30	-0.06	N/A
Number of hospitalizations 8 months before delivery month	0.03	0.05	**-0.02***	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.82	0.85	-0.04	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.05	-0.01	N/A
Number of ED visits for infant in the first year of life	1.63	1.44	**0.18***	N/A
Number of hospitalizations for infant in the first year of life	0.12	0.11	0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Site-Specific Estimates

Similar to our awardee-level analysis, we find small differences in outcomes between Strong Start and comparison group women in our site-specific estimates for Howard University (Table 258), Mary's Center (Table 259), and Unity Health Care (Table 260), but these differences are not robust to alternative specifications:

- At the Howard University site, we again see that Strong Start enrollees have higher rates of C-section (37.4 percent) than women in the comparison group (32.1 percent), a marginally significant difference of 5.3 percentage points (p-value<0.10). Strong Start women also have a lower rate of VBAC (12.3 percent) than comparison women (22.8 percent), a 10.5 percentage point difference. We no longer observe either difference in the alternative specifications and we do not observe these differences at other sites.
- At the Mary's Center site, infants born to Strong Start enrollees have slightly higher average clinical gestational age (by 0.2 weeks) and average birthweight (by 69.5 grams) than infants born to comparison women. While the difference in birthweight remains significant and increases to 86.2 percentage points when we limit the sample to women included in our claims analysis (alternative specification 2), we no longer observe the difference when diagnosis controls are added to the model (alternative specification 3). We do not observe the difference in gestational age in either alternative specification.
- At the Unity Health Care Site, however, infants born to Strong Start women have a slightly lower average birthweight, by 47.2 grams, but we no longer observe the difference when claims controls are added to the model.

TABLE 258: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT HOWARD UNIVERSITY (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=340)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=11458)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=195, N=5817)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=195, N=5817)
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.4	-0.1	N/A	-0.2	-0.2
Preterm birth rate	10.6%	11.6%	-1.0	N/A	-1.0	-0.8
Very preterm birth rate	4.4%	4.7%	-0.3	N/A	-1.4	-0.9
Birthweight (grams)	3,103.3	3,111.7	-8.5	N/A	26.2	26.3
Low birthweight rate	12.6%	12.2%	0.4	N/A	-0.5	-0.1
Very low birthweight rate	2.1%	2.9%	-0.9	N/A	-1.0	-0.8
Rate of Apgar score greater than or equal to 7	97.3%	97.3%	0.0	N/A	0.8	0.9
Process Outcomes						
C-section rate	37.4%	32.1%	**5.3^**	N/A	4.7	3.4

Outcomes	Main Model: 2014 - 2016, Strong Start (N=340)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=11458)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=195, N=5817)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=195, N=5817)
VBAC rate[1]	12.3%	22.8%	**-10.5***	N/A	-8.8	-8.5
Weekend delivery rate	22.6%	23.9%	-1.3	N/A	-3.4	-2.9

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 57 Strong Start women and 1500 comparison group women.

TABLE 259: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MARY'S CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=461)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=22817)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=212, N=5764)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=212, N=5764)
Birth Outcomes						
Clinical gestational age (weeks)	38.9	38.7	**0.2***	N/A	0.2	0.1
Preterm birth rate	8.7%	7.8%	0.9	N/A	0.2	1.4
Very preterm birth rate	2.4%	2.4%	0.0	N/A	0.6	1.4
Birthweight (grams)	3,307.6	3,238.1	**69.5***	N/A	**86.2***	54.3
Low birthweight rate	7.4%	7.0%	0.3	N/A	-0.3	0.6
Very low birthweight rate	1.1%	1.4%	-0.3	N/A	-0.8	-0.2
Rate of Apgar score greater than or equal to 7	97.4%	97.7%	-0.3	N/A	0.3	-0.1
Process Outcomes						
C-section rate	26.2%	26.3%	0.0	N/A	-3.0	-0.7
VBAC rate[1]	20.8%	22.5%	-1.7	N/A	-1.7	-2.6
Weekend delivery rate	24.1%	24.8%	-0.7	N/A	2.2	1.3

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 72 Strong Start women and 3472 comparison group women.

TABLE 260: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNITY HEALTH CARE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=790)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=21315)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=355, N=5941)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=355, N=5941)
Birth Outcomes						
Clinical gestational age (weeks)	38.5	38.5	0.0	N/A	-0.1	-0.2
Preterm birth rate	10.9%	10.8%	0.1	N/A	0.5	0.7
Very preterm birth rate	3.7%	4.0%	-0.3	N/A	-0.4	-0.3
Birthweight (grams)	3,074.4	3,121.6	**-47.2***	N/A	-49.0	-50.9
Low birthweight rate	13.4%	11.5%	2.0	N/A	1.0	1.5
Very low birthweight rate	2.2%	2.5%	-0.3	N/A	0.4	0.6
Rate of Apgar score greater than or equal to 7	97.0%	97.5%	-0.6	N/A	-0.5	-0.4
Process Outcomes						
C-section rate	31.3%	30.1%	1.2	N/A	0.7	0.4
VBAC rate[1]	24.8%	22.7%	2.0	N/A	6.9	7.3
Weekend delivery rate	25.8%	25.0%	0.8	N/A	-0.5	-0.5

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 109 Strong Start women and 3203 comparison group women.

The tables below report the site-specific expenditure and utilization outcome findings for Howard University (Table 261), Mary's Center (Table 262), and Unity Health Care (Table 263):

- Despite finding awardee-level differences, we do not observe differences in expenditures or utilization between Strong Start enrollees and comparison group women at the Howard University site.
- At the Mary's Center site, women enrolled in Strong Start have slightly lower average prenatal care costs ($658) than comparison group women ($800), a marginally significant difference of $141 (p-value<0.10).
- Women enrolled in Strong Start at the Unity Health Care site have lower average prenatal care costs ($1,551) than comparison group women ($1,869), a significant difference of $318.
- Women enrolled in Strong Start at the Unity Health Care site also have fewer hospitalizations during the prenatal period (0.03 hospitalizations) than comparison group women (0.06 hospitalizations), a significant difference of 0.03 hospitalizations.
- Finally, women enrolled in Strong Start at the United Health Care site have fewer ED visits after delivery (0.80) than comparison group women (0.98), a significant difference of 0.17 visits.

TABLE 261: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT HOWARD UNIVERSITY (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=195)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5817)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,892	$1,991	-$99	N/A
Total expenditures during delivery period	$6,506	$7,339	-$833	N/A
Total delivery and postdelivery expenditures[2]	$10,495	$11,672	-$1,177	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.66	1.78	-0.13	N/A
Number of hospitalizations 8 months before delivery month	0.05	0.07	-0.02	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.12	1.12	0.0	N/A
Number of hospitalizations for mother 11 months after delivery month	0.05	0.07	-0.02	N/A
Number of ED visits for infant in the first year of life	1.83	1.59	0.24	N/A
Number of hospitalizations for infant in the first year of life	0.13	0.11	0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

TABLE 262: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MARY'S CENTER (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=212)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5764)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$658	$800	**-$141^**	N/A
Total expenditures during delivery period	$8,310	$8,544	-$233	N/A
Total delivery and postdelivery expenditures[2]	$11,813	$11,424	$389	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.56	0.55	0.0	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.01	0.01	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.53	0.44	0.09	N/A

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=212)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5764)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Number of hospitalizations for mother 11 months after delivery month	0.04	0.03	0.01	N/A
Number of ED visits for infant in the first year of life	1.32	1.19	0.13	N/A
Number of hospitalizations for infant in the first year of life	0.11	0.09	0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

TABLE 263: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNITY HEALTH CARE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=355)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5941)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,551	$1,869	**-$318***	N/A
Total expenditures during delivery period	$7,983	$7,777	$206	N/A
Total delivery and postdelivery expenditures[2]	$12,230	$11,672	$558	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.41	1.58	-0.17	N/A
Number of hospitalizations 8 months before delivery month	0.03	0.06	**-0.03***	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.80	0.98	**-0.17***	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.05	-0.01	N/A
Number of ED visits for infant in the first year of life	1.70	1.59	0.12	N/A
Number of hospitalizations for infant in the first year of life	0.11	0.11	0.0	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Providence Health Foundation implemented all three Strong Start interventions. At its Birth Center site, the awardee supplemented the midwifery model of care with monthly or more frequent encounters with a perinatal navigator, whose services included risk assessment, psychosocial support, and referrals. Providence's Group Prenatal Care approach followed the *CenteringPregnancy* curriculum and, thus provided intensive education on topics as breastfeeding, family planning, domestic violence, and childbirth preparation in addition to medically focused check-ups. The awardee's Maternity Care Home sites each provided at least four care coordination, education, and/or referral encounters via professionally credentialed and "lay" community health workers. The majority of Providence participants across all three interventions were black women, and participants reported especially high rates of being homeless or living in a shelter, food insecurity, and not being in a relationship. Providence participants had relatively low rates of cigarette smoking and intimate partner violence. They also reported low rates of gestational diabetes, preeclampsia, and other risk factors from prior pregnancies, which may be driven in part by the lower-risk profiles observed among Providence Birth Center participants. Impact analysis found infants of women enrolled in the awardee's Birth Center had higher average clinical gestational ages and birthweights, and women experienced lower rates of preterm birth, very preterm birth, giving birth to low birthweight and very low birthweight infants, than did women and infants in the comparison group. Strong Start participants at the awardee's Birth Center also had lower rates of C-section than women in the comparison group and had fewer prenatal ED visits and marginally fewer ED visits in the year after delivery (p-value<0.10). Case study key informants felt the Birth Center model's emphasis on education and improving access to care, along with its regular prenatal psychosocial support from perinatal navigators and doulas, contributed to better maternal and newborn outcomes. Women enrolled in Providence's Maternity Care Home sites had higher C-section rates than comparison group women, a marginally significant difference (p-value<0.10). Maternity Care Home participants also had marginally lower prenatal care expenditures (p-value<0.10) and fewer prenatal hospitalizations, but their infants had more ED visits in their first year of life than infants in the comparison group. The differences in impacts between these two interventions may be attributable, in part, to differences in participant characteristics if Providence Maternity Care Home participants were higher risk than Providence Birth Center participants in ways that the impact analysis was unable to control for, such as homelessness and food insecurity. Providence's Group Prenatal Care intervention had too few enrollees to merit its own impact analysis.

Signature Medical Group

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
1,802	• Large physician-owned multi-specialty group serving St. Louis, Kansas City, and parts of southwestern Missouri	• Nine sites throughout St. Louis, Kansas City, and Bolivar, Missouri	• Intervention categorized as "high intensity" for offering five to seven care coordination, education, and/or referral encounters, as well as direct counseling support • Enhanced services included home visits, patient education, medical advice in between prenatal visits, brief interpersonal therapy and counseling, care coordination, and case management services • One nurse navigator and four prenatal care coordinators (social workers) worked together closely to provide the services

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Strong Start staff and leadership
- Prenatal care coordinators integrated themselves into physician offices
- Strong community relationships

CHALLENGES

- Enrolling patients in Medicaid
- Gaining stakeholder buy-in at the beginning of implementation

SUSTAINED

- Sustained all elements of the Strong Start program, and retained all program staff

KEY FINDINGS: PARTICIPANT-LEVEL DATA[101]

PARTICIPANT-LEVEL DATA QUALITY

- 3.1% rate of missing intake forms; 1.8% rate of missing exit forms
- 13.7% rate of item nonresponse on intake forms; 16.5% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 15.2% of women were teens (under age 20); 6.3% were 35 years or older
- 15.4% of women were black; 3.4% were Hispanic; 77.9% were white
- 27.7% of women were married; 35.9% were living with a partner; 14.8% were not in a relationship
- 16.8%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 28.8%: C-section rate among women with a delivery
- 9.1%: preterm birth rate among women with a live birth
- 6.7%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Lower rates of very preterm birth, better Apgar scores, lower C-section rates, and lower weekend delivery rates (marginally significant; p-value<0.10) than the comparison group
- Findings from site-level estimates for Women's Clinic – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Lower average prenatal care expenditures and fewer ED visits following delivery than the comparison group
- Findings from site-level estimates for Women's Clinic – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

[101] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Signature's obstetrics and gynecology (OB/GYN) practices provide the full range of obstetrics and gynecology care including prenatal counseling, pregnancy counseling, and ultrasound services. Under its pre-Strong Start prenatal care model, Signature assigned all prenatal patients, including Medicaid-enrolled patients, to a specific physician who provided care throughout the course of their pregnancy. Key informants highlighted this approach to maternity care because they perceived this level of care continuity to be uncommon for other organizations in the area that accept Medicaid, such as the local health department and community health centers. Signature staff scheduled prenatal visits monthly in the first trimester, then bi-weekly and ultimately weekly in the second and third trimesters. Each prenatal visit lasted approximately 15 minutes. Prior to Strong Start, some nurses and office staff helped patients identify resources to help with transportation to and from appointments. However, nurses and staff did this on an ad hoc basis and patients received no other psychosocial support from Signature staff.

Access to pregnancy-related Medicaid coverage was difficult because there were substantial enrollment delays. Missouri Medicaid has presumptive eligibility for pregnant women, which is intended to alleviate the challenge of late entry into prenatal care due to Medicaid eligibility determination delays. However, pregnant women were not aware that they could receive care while awaiting eligibility determination and some Signature offices were unwilling to provide care prior to Medicaid enrollment.

Key informants estimated that the eligibility determination process for pregnancy-related Medicaid took three to four months; sometimes there were problems that took as long as six to eight months to resolve, which delayed patients from receiving prenatal care. This process shortened drastically after Strong Start implementation, due to improvements in process at the state level and the assistance of Strong Start prenatal care coordinators (PCCs), who helped patients enroll in Medicaid.

DESCRIPTION OF ENHANCED STRONG START SERVICES

> "For first time moms, [the Strong Start program]'s amazing."
>
> *- Strong Start participant*

In contrast to other awardees, Signature secured Strong Start funding and implemented the program internally, choosing the Maternity Care Home model. The enhanced services involved in the model were patient education, medical advice in between prenatal visits, brief interpersonal therapy and counseling, care coordination, and case management services. The Strong Start program staff included a Registered Nurse (RN) navigator, a program coordinator, and four prenatal care coordinators who were all social workers (three master's-level and one bachelor's-level). These staff worked closely together to meet the needs of the Strong Start program participants.

The prenatal coordinators worked in one of three geographic regions (Bolivar, Kansas City, or St. Louis), and the nurse navigator worked with patients in all regions on a remote basis. In Year 2, Signature added one OB/GYN office for a total of nine Strong Start sites across the three cities. The new

site, located in Kansas City, used the same outreach and enrollment process as other sites (described below), and provided the same enhanced services as the other Signature sites. The new site doubled the overall number of patients enrolled in Signature's Strong Start program.

The nurse navigator collaborated with providers and prenatal care coordinators to determine patients' initial pregnancy risk status (with a focus on medical factors), provided individualized patient education based on that risk status and patient health behaviors, and provided medical advice between prenatal visits. The prenatal care coordinators assessed for psychosocial risk factors and provided or referred participants to any services that they needed to support a healthy outcome for the mother and her baby. For example, the prenatal care coordinators provided cognitive behavioral therapy and relationship counseling as needed, and they connected participants to support services based at Signature and within the community. Examples of in-house Signature support service resources included the "Nutrition Edge" program, where obstetric patients consulted with a nutritionist at Signature; and the community-assistance prescription cards that Signature gave to patients who could not afford their prescriptions. Prenatal care coordinators also connected Strong Start participants to community-based support services such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Nurses for Newborns, Maternal and Child Health Family Coalition; Good Shepherd Children and Family Services; local health departments; domestic violence organizations; local churches; Planned Parenthood; and transportation assistance. Since beginning the Strong Start program, the nurse navigator and prenatal care coordinators identified and developed relationships with more than 130 community organizations where they could refer Strong Start participants for psychosocial support.

Typically, PCCs met with each Strong Start participant at least three times during her pregnancy, including an initial assessment visit that occurred when the patient entered prenatal care and follow-up visits that occurred approximately at the third trimester and postpartum. More frequent visits occurred if there was a change in risk status (e.g., diagnosis of gestational diabetes) or if a participant was receiving counseling from the coordinator. While PCCs preferred that the visits occurred in-person at the participants' homes, in practice, they also occurred in the physician offices and via telephone. The setting of the visits varied among sites and was based on participant preferences. For example, in Bolivar, about half of the participants preferred to visit with the prenatal care coordinator in the physician offices, whereas in Kansas City, much of the interaction with participants occurred via phone. In between visits, the nurse navigator and prenatal care coordinators emphasized that they were "available 24 hours a day, 7 days a week, and [Strong Start participants] can call us anytime if they have a question."

> "She tells you stuff no one else will. Like babies' doctors. I didn't know you were supposed to look for them way ahead of time. She gives you resources for groups, or if you lost your job, employment opportunities. WIC information, food stamps. Things you don't know exist."
>
> *- Strong Start participant*

PCCs fully integrated themselves into providers' offices, and the nurse navigator and PCCs had access to the electronic medical record (EMR) system in each of the Strong Start-participating practices. They entered notes into the systems for providers to see, and vice versa. Shared access to and use of the EMR helped the physicians, nurses, nurse navigator, and prenatal care coordinators know which patients were enrolled or potentially eligible for Strong Start and allowed all members of the team to have access to both medical and psychosocial information about participants.

Although it took some time for all providers to buy in to the Strong Start program and become accustomed to the presence of PCCs in their offices, at the end of the program, providers stated they appreciated the support and psychosocial care PCCs offered Strong Start patients. Many key informants spoke to the ability of Strong Start staff to provide more holistic care than medical care alone. One key informant described the Strong Start staff as "an extension of the physician's office."

OUTREACH AND ENROLLMENT

Signature's target population for enhanced services was the Medicaid and Children's Health Insurance Program (CHIP) population. Site staff, including registrars, providers, and nurses, identified most potentially-eligible Strong Start participants. Signature also received referrals from community organizations such as Planned Parenthood and Federally Qualified Health Centers in the area. Key informants reported increased outreach and partnership with community groups helped them identify potential participants and build a "brand" for the program. For example, awardee program staff met with community providers to make sure the providers had Strong Start program brochures and understood the services and support offered to participants.

Signature used an opt-out enrollment approach, and very few women opted not to participate. Staff presented the program as an extension of care that the patients were already receiving from their provider and enrolled participants by default unless they explicitly opted out. As one key informant described it, "The way we present it, we have very few who say they do not want it." Key informants attributed high take-up to the program's flexibility and responsiveness that allowed PCCs to assist each woman to the degree she needed and wanted. For example, some women may have had good social supports but were motivated to participate because the PCC could help them get baby supplies from a community partner, such as Helping Hand-Me-Downs.

> "I think because of the program, my Medicaid [eligibility determination] went through faster. My doctor's office referred me to Strong Start and they pushed me through quickly."
>
> *- Strong Start participant*

Signature helped women enroll in Medicaid so they could receive prenatal care at Signature. The group developed an internal system shared across sites to track where each Medicaid applicant was in the application process. They also developed a strong working relationship with the state Medicaid office, which helped them to assist applicants in meeting application requirements. The PCC in the Bolivar office was responsible for communicating with the state Medicaid office and shared feedback with the other PCCs to assist patients at their sites. Using both approaches, the PCCs helped many women enroll in Medicaid. This assistance, coupled with improvements in Medicaid enrollment thanks to streamlined state level processes, significantly expedited the approval and processing procedures and allowed women to begin prenatal care sooner and benefit more fully from Strong Start services.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants perceived that Strong Start had a positive influence on a range of patient outcomes, including maternal and child health outcomes and psychosocial outcomes. In particular, they said that women felt more supported and less stressed than before Strong Start and that women were more likely to share symptoms of depression and anxiety with their prenatal care coordinators than they were with obstetrical providers. This resulted in more frequent connections with resources and treatment methods that PCCs could tailor to the women's preferences and needs.

> "Of course, if you are stressed about different things, they can help you with it and make a solution. It is benefitting you and your baby and making you healthier."
>
> *- Strong Start participant*

Key informants stated that Signature's Strong Start preterm birth rate had declined (from 10.4% pre-Strong Start to 9.1%) thanks to Strong Start. They also said that most (93%) Strong Start participants received postnatal family planning counseling. Finally, key informants said that Strong Start participants completed a high number (mean = 10.3) of prenatal visits with their obstetrical providers.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees who participated in the evaluation's focus groups were uniformly enthusiastic about and appreciative of the Strong Start program. They used words like "family" to describe the PCCs and spoke highly of the level of support they received. Some participants mentioned that without the PCCs, they would not have known to breastfeed or find their babies a pediatrician in a timely manner.

Focus group participants described many kinds of support, resources, and referrals they had received from the prenatal care coordinators including WIC, a birthing class, car care, counseling, Head Start (for patients' other young children), a local pregnancy resource center, information about Medicaid transportation benefits and education about nutrition and breastfeeding.

> *She helped me get my rent paid one month through a church, and my rent is $600 a month.*
>
> *I didn't know [the Medicaid health plan] had fuel assistance if you drive back and forth [to medical appointments]. She was like, here is the number.*

The focus group participants were all very complimentary about the care and support they received throughout their pregnancies and their relationship with their prenatal care coordinators, doctors, and nurses.

> *[The PCC] gave me resources and she shared her own experiences because I didn't know what to do because my partner is not in my life at all. I had a lot of questions and she was really supportive and gave me many options.*
>
> *The nurses over at Citizens Memorial Hospital are so good. I love my doctor. They are very thorough. They pay attention to everything going on with you. They listen to anything you say. Very supportive. There weren't any kinks or flaws. They are so on top of it.*

Focus group participants described Signature's opt-out method of program enrollment, and said they thought it worked.

> *I thought Strong Start was a waste of time, but they convinced me to try it and [the PCC] was sweet. They said they were willing to help with diapers and things. I saw that Strong Start could also help with other things and totally changed my mind.*

Many focus group participants believed that participating in Strong Start has been beneficial to their own or their baby's health. Specifically, they said that they have more knowledge about how to take care of their baby and how to deal with stress.

> *The connections and information about getting materials was really what made this pregnancy different.*

Generally, participants who had a pregnancy prior to Strong Start said that the prenatal care they had received through the Strong Start program was different and better than prenatal care they received in the past. All participants said they would recommend the Strong Start program to others.

PROGRAM STRENGTHS

Key informants were proud of how they had transformed prenatal care delivery into a psychosocial model, noting that they saw a parallel transformation in improved health outcomes for women and their families.

> "[The PCC] gave me resources for everything. I had more support from her than any pregnancy ever…If I didn't know about breastmilk, I wouldn't have done it. This is first time I've ever breastfed. She made my pregnancy."
>
> *- Strong Start participant*

Key informants identified the program's biggest strength as the people involved in the program, which included having the right staff and the right leadership. Key informants noted that their leaders were champions of the program and were the "glue" that held everyone together. As one key informant said, "We were able to get the right people in place and let them succeed."

The PCCs were well-qualified to provide participants with psychosocial support. All had training as licensed social workers, and the program coordinator was a licensed clinical social worker and trained psychotherapist. The PCCs also had years of experience in social work to draw upon, with training and experience in case management and counseling. They had connections with a full array of psychosocial resources available in the community. Finally, the PCCs participated in ongoing training and met regularly to discuss difficult cases so they could all learn from each other.

The flexibility regarding where to meet participants (e.g. home, physician's office) permitted participants and PCCs to meet in a location that felt most comfortable and was the most convenient option for the participant. Having the PCCs available in the office enabled them to have their initial meeting with participants face-to-face, which key informants said was an opportunity to build trust and gave PCCs the chance to hear a patient's story, note any barriers to care she was experiencing, and help her overcome those barriers.

> "[The PCC] was helping with my postpartum depression and she'd just sit down and talk without rushing. I stayed there for two hours after my appointment talking to her."
>
> *- Strong Start participant*

PCCs fully integrated themselves into the physician offices. They could access office schedules to determine when their patients were coming in to see the doctors. This helped PCCs track their patients' care, which also helped to prevent missed appointments. The integration also provided an added opportunity to follow up with patients who may have needed extra support, and served as a reminder to communicate any relevant information about the patient to the doctor before the appointment. PCCs could also access the EHR systems across offices. This enabled them to view medical histories and stay abreast of participants' medical experiences, which could be especially helpful before they met the patient for first time. It also facilitated two-way communication between the PCCs and physicians, as both could leave notes in the system, which helped providers tailor their care to patients based not only on their medical needs, but also on other patient problems or concerns. Of note, since EMR systems varied across offices, key informants said it was important to set up processes for their staff to learn how to use the different systems.

Finally, key informants were proud of the relationships they built within the community, which they saw as "wrapping their arms around" the Strong Start program to offer additional support and services. As one key informant said, "We are solving these (psychosocial) issues under a model that works, that incorporates a variety of community partners. We are doing it and it is awesome." As one key informant said, "We don't have a resource list. We have relationships." When they made a referral, staff could tell patients exactly who they were going to see and what to expect. Community agencies also referred patients to Signature and the Strong Start program, in what one key informant describes as "a symbiotic relationship." These relationships existed in both urban (e.g., St. Louis and Kansas City) and rural areas (e.g., Bolivar).

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Most key informants felt the most challenging aspect of Strong Start implementation was getting patients enrolled in Medicaid when they first joined the program. At first, there was a tremendous backlog that was very stressful, but in Year 2 of the Strong Start evaluation, the processing time for Medicaid applications reportedly decreased from seven months to 30 days.

Another challenge key informants voiced was gaining stakeholder buy-in at the beginning of implementation. There were some administrators, physicians, and community partners who initially were not supportive of the program. Program staff had to educate and inform these stakeholders, practice patience, and be willing and flexible enough to change direction when needed.

SUSTAINABILITY

The awardee is sustaining all Strong Start program elements, and retaining all program staff, though they have discussed renaming the program. They have added a dietician who offers information and support by phone, and a key informant noted, "We have not stopped thinking about how to make it better."

At the time of the final round of evaluation interviews, the awardee was funding the program internally and had not yet identified an external funding mechanism; however, they continued to seek one by building on relationships within the community and pursuing discussions with business health coalitions and commercial insurers. Awardee staff were engaged in a multi-tiered approach to sustain the program, including working with their state Medicaid office and a managed care organization to apply for other grant funding; approaching physicians in their practices to help fund the salaries of PCCs; and disseminating outcomes data and information about the Strong Start program at professional conferences and in the media.

Signature's target population for enhanced services continues to be the Medicaid and CHIP population. However, they are open to expanding the program to include women in commercial payer plans should commercial plans want to fund the services.

Leaders at Signature believed the program would pay for itself. They said that reduced the Neonatal Intensive Care Unit (NICU) utilization related to better birth outcomes had already resulted in substantial cost savings for payers. Although they had not formally studied these cost savings at the time of the last interviews, Signature leadership said that during the Strong Start funding period, about 600 Signature patients gained Medicaid coverage through the help of the prenatal care coordinators, resulting in cost savings to Signature of around $250,000. Signature also was gaining about 70 referrals a year they did not believe they would receive without the community outreach of the Strong Start program staff. Finally, they saw financial value in their ability to know patients are following their care plans and reducing the risk of adverse outcomes, and Signature physicians felt better about their malpractice liability, knowing that this patient population was well-cared for.

Signature has continued to collect program data and analyzes the data quarterly. They modified some of the data collection questions from Strong Start evaluation forms to make them more conversational in nature because they found the original wording cumbersome. One key informant emphasized the importance of using data to tell a story, stating that "We've learned that we need the data to be able to talk to payers and physicians. Ultimately, are we making a difference?"

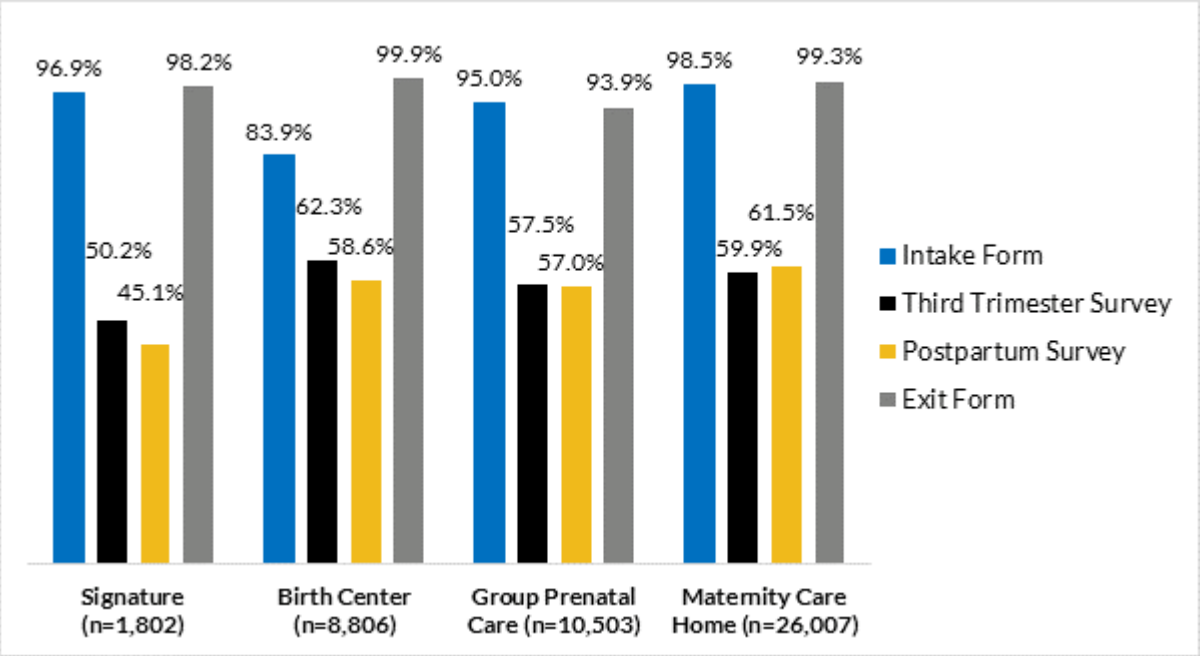
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for Signature, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Signature to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 23 Signature participants).

In addition, we briefly summarize the quality of the data submitted by awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 17: FORM SUBMISSION RATES, SIGNATURE



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,809
- Study IDs represented: 1,802 (suggests that PLPE data are missing for seven participants patients: see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- Patient surveys were completed by care coordinators, who administered the questionnaire in person or over the phone. Care coordinators told the patients they could decline to answer questions if they were uncomfortable. They sometimes rephrased questions to put participants at ease.
- The awardee sometimes looked to the electronic medical record to fill in holes for missing data or to correct contradictory information.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Signature operated a total of nine sites, which were served by four care coordinators who worked closely together; The awardee did not indicate any site-specific concerns.

MISSING FORMS:

- Early in the program, the surveys were completed on paper, but the awardee transitioned to electronic submission. Some missing forms had low Study ID numbers, indicating they were from early in the program when the awardee was submitting paper forms. The awardee believed that some of these missing forms were completed on paper, but they did not have backup copies to submit.
- Intake Form: 3.1 percent of Study IDs were missing Intakes.
- Third Trimester or Postpartum Surveys: About 50 percent of Study IDs were missing the Third Trimester Survey and 55 percent were missing the Postpartum Survey. These were mostly missing because women were lost to follow up.
- Exit Form: 1.8 percent of Study IDs were missing Exit Forms. The evaluation team requested these from the awardee, but they were not able to supply this data.

ITEM NONRESPONSE:

- Intake Form: The care coordinators said that some questions were "insensitive", such as those about parental drug use; they did their best to get the information requested. The awardee also indicated that some patients did not identify with any of the racial or ethnic categories listed, so they selected "other" or skipped the question. For women with other children, care coordinators were not always able to get a specific date for the date of last baby's birth (only year or month and year were captured), so this variable, and the related interpregnancy interval measure, was missing.
- Exit Form: Data on Strong Start pregnancy outcome were missing for 14.3 percent of participants.[102]

[102] Among participants with missing data on pregnancy outcome, 12.6% were missing because they did not have an exit form, 74.4% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 13.0% were missing for other reasons.

MAIN FINDINGS:

The following tables summarize characteristics and outcomes for Signature participants. Some highlights include:

- The majority of Signature participants (78.6 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 10.9 percent of participants were 18 or 19 years old.
- Most participants were white (77.9 percent), followed by 15.4 percent black.
- Similar to Strong Start participants overall, the largest share of Signature participants was in a relationship and living with a partner (35.9 percent), although 27.7 percent were married and 14.8 percent were not in a relationship.
- Rates of missing data among Signature participants were too high (greater than 20 percent) to report intimate partner violence or pregnancy intent. Among the risk factors collected in the PLPE data that can be reported confidently, 16.8 percent of Signature participants with a prior birth had a prior preterm birth.

TABLE 264: DEMOGRAPHICS, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	3.5	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,716**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	4.3	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	10.9	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	78.6	81.7	72.9	75.1	75.8
35 Years and Older	%	6.3	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	4.8	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,694**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	3.4	25.4	37.1	28.0	29.7
Non-Hispanic White	%	77.9	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	15.4	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.3	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	5.7	19.6	12.8	11.3	13.3
Not in Universe	%	91.1	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**57**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	15.8	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	82.5	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	3.1	16.1	5.0	1.5	5.2

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,724**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.2	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	14.3	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,524**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	45.3	36.6	30.8	35.3	34.5
In School, Not Employed	%	7.7	8.7	12.6	11.9	11.5
Employed and in School	%	6.4	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	40.6	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	21.1	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,403**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	13.8	15.4	27.8	29.1	26.4
High School Graduate or GED	%	64.7	57.5	58.3	57.9	57.9
Associate's Degree	%	5.9	8.2	5.2	4.6	5.4
Bachelor's Degree	%	6.8	14.5	4.5	3.7	5.8
Other College Degree	%	8.8	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	13.5	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,539**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	27.7	42.1	20.4	20.8	24.5
Living with a Partner	%	35.9	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	21.6	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	14.8	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 265: PSYCHOSOCIAL, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	15.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,500**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	44.9	51.8	51.8	59.7	56.5
No	%	51.3	44.6	42.3	37.4	39.8
Unsure	%	3.9	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	15.7	17.0	6.6	3.4	6.8
Not in Universe	%	46.5	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**673**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	41.5	61.1	72.6	79.9	75.3
Other	%	55.0	30.0	18.6	13.5	17.2

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Both Medicaid and Other Health Insurance	%	3.6	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	12.9	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,550**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	20.4	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	30.0	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,245**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	12.9	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	21.8	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,392**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	56.0	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	28.3	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,275**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	24.6	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	27.9	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,282**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	64.5	67.9	59.0	65.5	64.5
Mild	%	18.7	21.4	23.8	20.2	21.2
Moderate	%	10.2	6.8	10.3	8.5	8.6
Severe	%	6.3	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	27.4	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,291**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	23.7	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	26.2	18.3	16.3	7.7	11.8
Not in Universe	%	9.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,139**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.9	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	3.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,724**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	77.6	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	11.1	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	11.3	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	49.6	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	12.7	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	58.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	23.0	24.6	17.1	15.4	17.2
Childcare Challenges	%	12.7	19.8	9.8	7.9	10.1

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	4.9	0.6	0.7	0.7	0.7
Other	%	19.6	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 266: PREGNANCY HISTORY AND INTENTIONS, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.8	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,765**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	72.0	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	28.0	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	8.1	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**1,136**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	36.2	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	8.2	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**1,135**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	13.3	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	16.4	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**989**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.1	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	63.2	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**156**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	55.8	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	65.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**117**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	41.0	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	67.1	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**87**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	20.7	0.4	2.4	3.8	2.6

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Placenta Abnormalities						
Missing Data	%	66.8	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**91**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	24.2	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	67.1	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**87**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	21.8	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 267: PRIOR BIRTH OUTCOMES, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	1.0	1.7	1.5	0.6	1.0
Not in Universe	%	28.6	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,254**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	89.2	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	20.6	23.5	18.9	15.2	17.7
Not in Universe	%	35.7	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**777**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	37.6	34.6	24.3	27.1	28.1
>= 18 months	%	62.4	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	2.0	0.1	2.5	1.4	1.4
Not in Universe	%	37.0	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**1,084**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	16.8	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	10.0	1.3	20.8	13.1	12.6
Not in Universe	%	36.4	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**953**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	8.8	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 268: PRE-PREGNANCY MEDICAL CONDITIONS, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	23.7	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,357**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	25.1	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	65.7	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	8.7	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	17.0	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,477**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	2.2	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	16.1	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,493**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	2.7	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	21.1	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,403**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.0	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	39.3	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	25.4	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	23.7	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	8.6	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 269: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	27.0	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,299**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	5.0	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	26.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,308**	**8,722**	**7,631**	**20,216**	**36,569**

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	5.1	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	27.3	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,293**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.7	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	28.2	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,278**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	1.6	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	28.2	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,278**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	2.3	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	28.1	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,279**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	1.0	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	27.2	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,296**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	1.9	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	28.9	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**1,265**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	10.0	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 270: TREATMENTS DURING PREGNANCY, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	27.3	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,293**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	0.9	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	4.6	0.8	10.0	5.1	5.4
Not in Universe	%	88.1	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**129**	**680**	**654**	**2,585**	**3,919**
Yes	%	16.3	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	26.9	1.3	43.5	46.0	36.7

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,301**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	1.7	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	27.4	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,291**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 271: PRENATAL CARE, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	21.6	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,394**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	100.0	4.7	29.5	64.5	43.3
Licensed Professional Midwife[103]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	1.8	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,747**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	90.2	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	10.3	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	1.8	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,747**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	10.8	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,587**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	91.9	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	3.3	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	11.8	5.2	35.2	16.4	18.5

[103] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,569**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	46.3	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	2.1	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	11.2	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,579**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	16.4	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,487**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	39.9	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	2.1	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	16.5	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,486**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	18.7	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.6	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	16.5	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,485**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	42.3	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	2.3	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	16.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,484**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	25.1	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.8	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	17.1	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,475**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	7.1	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	1.5	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	15.5	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,503**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	8.6	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.1	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	92.1	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 272: DELIVERY INFORMATION, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	11.4	1.4	25.3	23.3	19.5
Not in Universe	%	26.4	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,107**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	51.9	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	5.0	0.3	7.8	2.9	3.5
Not in Universe	%	65.9	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**518**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	96.7	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	7.6	4.6	11.5	7.3	7.7
Not in Universe	%	15.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,369**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.4	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	3.8	0.7	12.0	5.6	6.1
Not in Universe	%	15.4	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,438**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	71.2	87.1	70.1	69.5	73.1
C-Section	%	28.8	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	2.5	0.4	8.7	2.3	3.4
Not in Universe	%	71.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**461**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	76.8	83.3	72.9	74.7	75.9
C-Section	%	23.2	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	3.2	4.7	12.5	6.3	7.4
Not in Universe	%	74.9	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**389**	**429**	**1,586**	**4,495**	**6,510**

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	50.4	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	1.8	0.1	6.2	0.7	1.9
Not in Universe	%	83.5	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**261**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	9.6	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 273: BIRTH OUTCOMES, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	14.3	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,525**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	96.1	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	3.3	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	7.0	0.7	15.4	5.8	7.0
Not in Universe	%	15.9	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,372**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	2.1	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	7.0	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	90.7	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	9.1	2.1	14.3	8.0	8.3
Not in Universe	%	15.9	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,335**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	6.1	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	86.3	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	7.0	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 274: SATISFACTION, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	57.3	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**759**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	1.3	3.3	4.4	7.8	6.2
Very Satisfied	%	25.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	72.9	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	57.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**756**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	6.1	10.4	11.6	12.8	12.1
Very Satisfied	%	30.8	29.1	42.6	46.6	42.1
Extremely Satisfied	%	61.2	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 275: BREASTFEEDING, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	50.9	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**874**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	72.5	80.4	47.5	40.5	50.3
Formula Feed Only	%	10.8	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	13.7	10.8	31.9	32.5	27.8
I Haven't Decided	%	3.0	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	57.6	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**754**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	77.3	91.5	76.6	72.6	77.3
No	%	22.4	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 276:FAMILY PLANNING, SIGNATURE

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	57.3	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**759**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	Signature (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	93.0	77.0	77.5	82.2	80.3
No	%	6.6	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	57.8	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**751**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	88.0	84.2	70.8	74.0	75.5
No	%	10.7	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	55.0	41.5	42.9	38.6	40.2
Not in Universe	%	7.8	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**661**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	15.3	3.2	12.6	12.1	10.2
Male Sterilization	%	3.5	3.6	0.7	0.7	1.4
LARC - Implant	%	8.9	2.8	11.4	10.9	9.2
LARC - IUD	%	16.0	10.8	11.9	12.3	11.9
Pills	%	20.3	8.6	11.9	13.0	11.8
Injection	%	5.9	5.9	16.2	20.2	16.2
Condoms	%	16.2	26.6	19.8	13.9	17.9
Breastfeeding	%	8.5	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	4.2	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Missouri

Initial Contact: In May 2015, the evaluation team spoke with officials at the Section of Epidemiology for Public Health Practices, Missouri Department of Health and Senior Services (DHSS, which houses Vital Records), about their willingness to release birth certificate data to the Urban Institute. State officials were receptive to supporting the evaluation, and indicated their preference to link Medicaid and birth certificate data, with some assistance from Urban. While completing our applications in September 2015 to access data from the Department of Social Services (DSS, which houses Medicaid), and the DHSS, state officials informed us that they did not have the resources to participate. We said that we understood their constraints and asked if we could touch base again in early 2016 in hopes that their situation had improved. After contacting both agencies in January 2016, reminding them of the available stipend, and after sharing copies of the Letters of Support that their agency directors

submitted as part of the Strong Start awardee's original application to CMS, both agencies were persuaded to participate in the evaluation and DHSS agreed to do the data linkage.

Data Acquisition Process: Urban completed and submitted its application to Medicaid in April 2016 and received approval in June 2016. We completed and submitted an IRB application to DHSS in March 2016, but due to unforeseen delays, the application was not approved until April 2017. The Medicaid agency submitted some data elements in June 2017 and, following approval of the IRB, the Vital Records Agency submitted linked birth certificate data in July 2017.

Final Result: Urban included Medicaid eligibility and claims data and birth certificate data in the final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The Signature Medical Group awardee in Missouri, which implemented the Maternity Care Home model, delivered care at nine sites included in the impacts analysis: Allied Associates in OB/GYN, Bolivar OB/GYN, Genesis OB/GYN, OB/GYN Physicians, The Healthcare group for Women, Women's Health Partners, Independence Women's Clinic, Northland OB/GYN, and McCaffrey. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Independence Women's Clinic site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 277).

TABLE 277: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR SIGNATURE MEDICAL GROUP

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
Signature Medical Group			
Allied Associates in OB/GYN	Yes	No	No
Bolivar OB/GYN	Yes	No	No
Genesis OB/GYN	Yes	No	No
OB/GYN Physicians	Yes	No	No
The Healthcare Group for Women	Yes	No	No
Women's Health Partners	Yes	No	No
Independence Women's Clinic	Yes	Yes	No
Northland OB/GYN	Yes	No	No
McCaffrey	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [104]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we drew the comparison group outside the county (alternative specification #1) for Signature.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

[104] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables. For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 278 reports the birth and process outcome findings for this awardee:

- There is no statistically significant difference in the rate of preterm birth between infants born to women enrolled in Strong Start (9.2 percent) and infants born to women in the comparison group (9.1 percent). However, the rate of very preterm birth is 1.6 percent for Strong Start infants, which is 0.8 percentage points lower than the rate for the comparison group (2.4 percent).
- Among infants born to women enrolled in Strong Start at Signature sites, 98.8 percent have an Apgar score greater than or equal to seven, which is 1.0 percentage points higher than that of infants born to women in the propensity-score reweighted comparison group.
- The C-section rate for women enrolled in Strong Start (28.6 percent) is 2.8 percentage points lower than the rate for women in the comparison group.
- The weekend delivery rate for Strong Start enrollees (17.1 percent) is 1.9 percentage points lower than the rate for comparison group women. However, this finding is only marginally significant (p-value<0.1).

TABLE 278: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT SIGNATURE MEDICAL GROUP

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1340)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=38166)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=779, N=24742)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=779, N=24742)
Birth Outcomes						
Clinical gestational age (weeks)	38.5	38.6	0.0	N/A	0.0	-0.1
Preterm birth rate	9.2%	9.1%	0.1	N/A	0.5	0.8
Very preterm birth rate	1.6%	2.4%	**-0.8***	N/A	**-0.8^**	-0.6
Birthweight (grams)	3,276.8	3,262.4	14.4	N/A	10.0	2.6
Low birthweight rate	7.8%	8.4%	-0.5	N/A	0.1	0.5
Very low birthweight rate	0.9%	1.2%	-0.3	N/A	-0.1	-0.1
Rate of Apgar score greater than or equal to 7	98.8%	97.8%	**1.0****	N/A	**1.1***	**1.0***
Process Outcomes						
C-section rate	28.6%	31.4%	**-2.8***	N/A	-1.0	-0.3

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1340)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=38166)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=779, N=24742)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=779, N=24742)
VBAC rate[1]	10.7%	14.4%	-3.7	N/A	**-7.8****	**-8.1****
Weekend delivery rate	17.1%	19.0%	**-1.9^**	N/A	**-2.7^**	**-2.6^**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 168 Strong Start women and 5859 comparison group women.

Table 278 also shows findings from the alternative specification models among the 2014-2015 claims sample (alternative specification #2) and among the claims sample that includes diagnostic controls from the claims data (alternative specification #3). These findings are generally consistent with the main model, but there are a few differences to note. First, while the difference in VBAC rates among Strong Start women and comparison group women is not statistically significant in the main model, the difference is statistically significant in alternative specification #2 (-7.8 percentage points) and alternative specification #3 (-8.1 percentage points). Second, the estimated difference in very preterm birth rates is only marginally significant in alternative specification #2 (p-value<0.1) and is no longer statistically significant in alternative specification #3.

Table 279 reports the cost and utilization findings for this awardee:

- Women in Strong Start have average prenatal care expenditures of $2,259, which is $286 less than prenatal care expenditures for women in the comparison group.
- Women enrolled in Strong Start and their infants both have fewer emergency department visits in the post-delivery period than women in the comparison group and their infants (0.51 versus 0.59 for mothers and 0.94 versus 1.15 for infants).
- There are no other significant differences in cost and utilization outcomes between women/infants enrolled in Strong Start and women/infants in the comparison group.

TABLE 279: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT SIGNATURE MEDICAL GROUP

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=779)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=24742)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,259	$2,545	**-$286****	N/A
Total expenditures during delivery period	$6,558	$6,731	-$174	N/A
Total delivery and postdelivery expenditures[2]	$10,227	$10,585	-$358	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.93	0.84	0.08	N/A
Number of hospitalizations 8 months before delivery month	0.03	0.04	0.0	N/A
Number of days in NICU	0.98	1.12	-0.14	N/A
Number of ED visits for mother 11 months after delivery month	0.51	0.59	**-0.09***	N/A
Number of hospitalizations for mother 11 months after delivery month	0.02	0.03	-0.01	N/A
Number of ED visits for infant in the first year of life	0.94	1.15	**-0.21****	N/A
Number of hospitalizations for infant in the first year of life	0.08	0.08	0.0	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Site-specific estimates for the Independence Women's Clinic (Table 280) are generally consistent with the Signature awardee-level analysis. Key differences between the Signature awardee-level estimates and the Independence site-level estimates are noted below:

- The -1.2 percentage point difference in very preterm birth rates between women enrolled in Strong Start at Independence and women in the comparison group is only marginally significant (p-value<0.10).
- In addition to having a lower rate of very preterm birth, infants born to women enrolled in Strong Start at Independence are 0.7 percentage points less likely to have a very low birthweight (0.3 percent) than infants in the comparison group (1.1 percent). While the differences in very preterm and very low birthweight are marginally significant in the main site-level model (p-value<0.1), the estimates are estimated with more precision in the alternative specification models.

- In contrast to the Signature awardee-level estimates, the differences in C-section rate are not statistically significant at the Independence site in the main model or in the alternative specification models.
- The weekend delivery rate is 6.2 percentage points lower for Strong Start enrollees (14.0 percent) than comparison group women. This finding is only marginally significant (p-value<0.10) and smaller (1.9 percentage points) in the awardee-level model.
- In contrast to the awardee-level model, the difference in Apgar scores between infants born to women enrolled in Strong Start and infants born to women in the comparison group is not significant in the main Independence site-level model.

TABLE 280: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT INDEPENDENCE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=315)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=10942)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=162, N=4886)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=162, N=4886)
Birth Outcomes						
Clinical gestational age (weeks)	38.5	38.6	-0.1	N/A	-0.2	-0.2
Preterm birth rate	10.5%	9.8%	0.6	N/A	2.1	2.1
Very preterm birth rate	1.3%	2.5%	**-1.2^**	N/A	**-1.6****	**-1.5****
Birthweight (grams)	3,282.6	3,248.8	33.8	N/A	0.8	5.2
Low birthweight rate	8.9%	9.5%	-0.6	N/A	2.7	2.5
Very low birthweight rate	0.3%	1.1%	**-0.7^**	N/A	**-0.7****	**-0.8****
Rate of Apgar score greater than or equal to 7	99.0%	98.2%	0.8	N/A	**1.2^**	**1.7***
Process Outcomes						
C-section rate	26.3%	26.6%	-0.3	N/A	0.0	1.5
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	14.0%	20.2%	**-6.2****	N/A	-4.9	**-5.1^**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 44 Strong Start women and 1626 comparison group women.

Table 281 reports the cost and utilization findings for the Signature site. Key differences between the Signature site-level estimates and the awardee-level estimates are noted below:

- Women in Strong Start at Signature have average prenatal care expenditures that do not differ than those for women in the comparison group.
- Women enrolled in Strong Start at Signature have 0.49 fewer emergency department visits in the prenatal period than women in the comparison group (1.83 versus 1.34 visits).
- There are no other significant differences in cost and utilization outcomes between women/infants enrolled in Strong Start at Signature and women/infants in the comparison group.

TABLE 281: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT INDEPENDENCE (SITE-LEVEL)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=162)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=4886)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,786	$3,042	-$255	N/A
Total expenditures during delivery period	$5,930	$6,442	-$512	N/A
Total delivery and postdelivery expenditures[2]	$9,883	$10,711	-$828	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.83	1.34	**0.49****	N/A
Number of hospitalizations 8 months before delivery month	0.05	0.04	0.01	N/A
Number of days in NICU	0.78	1.13	-0.35	N/A
Number of ED visits for mother 11 months after delivery month	0.72	0.83	-0.12	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.04	0.0	N/A
Number of ED visits for infant in the first year of life	0.99	1.13	-0.14	N/A
Number of hospitalizations for infant in the first year of life	0.10	0.09	0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The Signature Medical Group implemented the Maternity Care Home model under Strong Start. Signature's Strong Start team – a nurse navigator and social work-trained care coordinators– provided health education, medical advice, brief interpersonal therapy and counseling, care coordination, and case management services to participants throughout pregnancy and postpartum. The team had access to provider sites' EMRs, which enhanced delivery of integrated and coordinated care to Strong Start enrollees. The program aimed to prepare participants for delivery, including understanding different labor and delivery options such as a vaginal birth after C-section (VBAC) for women with a previous C-section. Strong Start emphasized "going the full 40," in line with the organizational culture at Signature which supports full term pregnancies and particularly discourages elective deliveries before 39 weeks without a medical reason. The program also sought to improve maternal and infant outcomes such as low birthweight by providing education about nutrition, connecting women with nutritionists, and getting women enrolled in WIC early in their pregnancies. Unlike most awardees' participants, the majority of Signature participants were white, but they had high rates of some risk factors (e.g. high rates of smoking). Nutrition and WIC enrollment were focuses of the program, but Signature participants entered care with lower rates of overweight and obesity and higher rates of WIC enrollment than Strong Start participants overall. Impact analysis found Signature's Strong Start participants and their infants had lower rates of very preterm birth, better Apgar scores, lower C-section rates, and marginally lower weekend delivery rates (p-value<0.10) than women and their infants in the comparison group. Lower C-section rates and very preterm birth rates correspond to Signature's goals of promoting full-term birth and avoiding elective deliveries. Signature's Strong Start participants and their infants also had lower average prenatal care expenditures and fewer maternal and infant ED visits following delivery than women and their infants in the comparison group.

St. John Providence Health System


GROUP PRENATAL CARE AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

247	• Catholic health system comprised of five hospitals and 125 medical facilities
	• One of the largest health systems in the Detroit Metropolitan area
	• St. John Community Health Investment Corporation operated Strong Start within its community-focused Infant Mortality Program
		• Four unique sites located in hospitals and an obstetrical (OB)/primary care clinic, including three sites in the Detroit area and one site in Flint, MI
		• All four sites attempted Group Prenatal Care; one site also implemented Maternity Care Home model
			• Though the awardee was initially approved for Group Prenatal Care, no sites effectively implemented the model and therefore the evaluation did not classify its intensity level
			  • After efforts to establish Group Prenatal Care as an alternative to individual prenatal visits failed, sites implemented "group prenatal care support sessions" modeled after *CenteringPregnancy* curriculum
			• Introduced Maternity Care Home model at one site midway through the award period, whereby social worker provided information and emotional support in person, by phone, or occasionally a home visit
			  • Maternity Care Home intervention categorized as "low intensity" for providing no standard number of care coordination, education, and/or referral encounters, and no other direct enhanced services
			  • Majority of participants enrolled in the Maternity Care Home model

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Provided emotional support and pregnancy-related information to vulnerable women
- Educated nursing staff about psychosocial influences on pregnancy

CHALLENGES

- Inability to retain OB leadership support and engagement, or to integrate Group Prenatal care visits into the St. John model of care
- Outreach and enrollment barriers including institutional policy, leadership changes, and the logistics of meeting women face-to-face
- Budget decreases and operational transitions resulting in staff cuts and elimination of midwives who had supported Centering

PARTIALLY SUSTAINED AT ONE SITE

- Planned to revive a support group for high-risk pregnant women in collaboration with Michigan Medicaid's Maternal and Infant Health Program, including use of Strong Start evaluation's Intake Form and postpartum survey
- Social worker support at one Detroit-area site was expected to continue, funded under the St. John Community Health budget

KEY FINDINGS: PARTICIPANT-LEVEL DATA[105]

PARTICIPANT-LEVEL DATA QUALITY

- 21.5% rate of missing intake forms; 2.8% rate of missing exit forms
- 1.5% rate of item nonresponse on intake forms; 21.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- The rate of missing data is too high to report age, race/ethnicity, or relationship status.
- 32.9%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 31.1%: C-section rate among women with a delivery
- 19.4%: preterm birth rate among women with a live birth
- 14.5%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted because of concerns about the quality of the link between birth certificates and Medicaid data in Michigan

[105] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

The St. John Providence Health System (St. John), a faith-based health system and the largest provider of inpatient care in southeast Michigan, is comprised of five hospitals and 125 medical facilities. St. John offers a range of maternity care services from holistic, low-intervention births to services for high-risk pregnancies. St. John Hospital and Medical Center is accredited as a Baby Friendly Hospital. The vast majority of St. John maternity patients are eligible for Medicaid.

Prior to implementing Strong Start, St. John offered a relatively robust set of psychosocial services for maternity patients, including multiple activities under the health system's Infant Mortality Program that were intended to educate, mentor, and support pregnant women, their partners, and their young children.[106] For example, social workers and registered nurses conduct home visits to connect women with housing, nutrition, substance abuse and domestic violence resources. St. John did not, however, offer Group Prenatal Care prior to implementing Strong Start. The four Strong Start sites included: (1) St. John Hospital and Medical Center's OB clinic, on the East Side of Detroit; a (2) primary care/OB clinic and (3) hospital in Southfield, MI (West Side); and (4) a Medical Center in Flint, MI.

DESCRIPTION OF ENHANCED STRONG START SERVICES

The awardee planned to obtain certification from Centering Healthcare Institute (CHI) to offer the *CenteringPregnancy* (Centering) model in conjunction with Strong Start.[107] However, obstetrician (OB) leadership appeared to misunderstand that Centering is an alternative (meant to fully replace) a typical OB visit; instead, they viewed the program as an educational supplement. Without OB leadership support for Group Prenatal Care as a substitute for their standard model of care, which involved typical OB one-on-one OB visits, St. John offered "group prenatal care support sessions" that supplemented individual prenatal visits with clinical providers. The Strong Start social worker and nurse facilitated the groups at the East and West Side sites, while the outreach worker provided childcare. Centering, as a true alternative to standard prenatal care, was attempted at the West Side sites, but ended when a physician-facilitator left the program. A Centering group was also launched at Hurley Medical Center in Flint, MI, but ended early (with only a handful of participants ever enrolled) after Hurley restructured its midwifery program and the midwives staffing the Centering sessions left.

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[106] The Infant Mortality Program includes: Partners in Pregnancy (mentors for high-risk pregnant women), Read Write Now and Jubilee Support Groups for mothers and children under 5 years old, Fatherhood Program (mentoring and father family groups), Baby Friendly designation and Mother Nurture Breastfeeding program, and Maternal Infant Health Program (MIHP, home visiting and care coordination).

[107] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

The group prenatal care support sessions used St. John's own group care curriculum that was modeled after the CHI curriculum, but these sessions did not replace standard prenatal care visits. Prenatal care groups were formed according to gestational age. Sessions lasted an average of 90 minutes and included self-care activities such as weight and blood pressure, a health assessment by a nurse, a facilitated discussion related to the participants' stage of pregnancy, and peer support. The group sessions occasionally included guest speakers such as peer breastfeeding counselors, labor and delivery nurses, and nutritionists. The co-facilitator's social work background was an essential component to connecting women with resources in their community. Key informants reported that the women's psychosocial needs were extensive and included behavioral and substance abuse counseling, housing, food and parenting support. Additionally, key informants shared that 80 percent of women needed transportation assistance to get to the group sessions.

> "We've received LOTS of information about how good [breastfeeding] is for your baby and I'm going to try it."
>
> *- Strong Start participant*

Because enrollment was very low and many women were not attending the groups regularly or stopped coming to the group sessions, during Year 3 the awardee implemented a Maternity Care Home model whereby the social worker provided information and emotional support to participants at the East Side OB clinic in person, by phone, or at an occasional home visit. These women constituted the vast majority of Strong Start participants.

OUTREACH AND ENROLLMENT

The Strong Start project director, childcare coordinator, and social worker conducted outreach and enrollment using an opt-in model, meaning that eligible patients were asked to choose between enrolling in Strong Start or receiving prenatal care without additional Strong Start services. Outreach and enrollment were often disrupted, however, by institutional policy, leadership changes, and the logistics of meeting women face to face. The awardee was unable to overcome the myriad barriers and failed to come close to enrollment goals.

Strong Start relied primarily on internal recruitment methods. The East Side site allowed Strong Start staff to view the schedule of appointments and follow up by phone with potentially eligible patients scheduled for new OB exams. On Wednesdays and Fridays, the West Side sites allowed the Strong Start social worker (who was also the Strong Start program coordinator) to recruit new OB patients in the waiting room and in exam rooms while patients were waiting for the OB. During Year 2 the awardee received approval from the IRB to display a Strong Start poster in the sites' waiting rooms. The awardee noted interest among a broad range of patients at the clinics and shared that even "veteran moms" (women for whom this is not their first pregnancy and often joined at a later gestational age) felt they might benefit from the group sessions. "The word 'support' stuck out the most to me," said a Strong Start participant.

Strong Start staff also recruited at community events (e.g., hosting a table at health fairs), and by reaching out to OB practices affiliated with other health systems and a Federally-Qualified Health Center (FQHC). Interested Medicaid-eligible patients were referred to the Strong Start Coordinator (staff were careful to use the title "coordinator" instead of "social worker" because sometimes the women associated the latter with Child Protective Services).

> "They came to my home to discuss Strong Start. It sounded like a good idea."
>
> *- Strong Start participant*

For a short period during Year 1, the social worker and childcare coordinator extended outreach to home visits for new OB patients. They brought a gift (baby soap, a washcloth, baby lotion, and a safety pamphlet about the danger of keeping a baby in a hot car), explained the value of Strong Start, and established a personal connection. Key informants reported that about 30 percent of these women chose to participate, increasing Strong Start enrollment.

However, St. John's internal IRB directed Strong Start staff to discontinue home visits, which they considered not allowable in part because home visits may skew the selection of participants, impeding the value of the project for research. Also, because the awardee had commenced home visit outreach without IRB approval, they were reprimanded by the IRB and required to suspend recruitment activities for 90 days. Key informants noted that the only group (of the ten begun by that point) that completed the full curriculum was the group recruited through home visits. Poor retention led to the other groups dissolving before completion. Another enrollment disruption occurred when the West Side sites suspended all outreach during the turnover of leadership.

Key informants felt the Maternity Care Home model was a better fit for women who had significant resource and psychosocial support needs but who were unable or unwilling to attend group sessions. Changes were made to the St. John Institutional Review Board (IRB) process that alleviated many of the challenges Strong Start previously faced in conducting outreach, home visits, and other activities. St. John also enhanced their enrollment efforts by dividing recruitment responsibility between the outreach and enrollment coordinator and the social worker. The program coordinator would spend two days per week in the Eastside OB clinic, helping to develop a better relationship with the OB clinic staff and enhancing recruitment. Even with these improvements, however, the awardee remained far from their revised enrollment goal.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

> "It's like your home and a group of women sharing personal issues. Like a family with civilized conversations. Everyone is supportive."
>
> *- Strong Start participant*

Even with very limited enrollment on which to base their observations, key informants felt that Strong Start had positive effects on both physical and psychosocial outcomes. An early internal analysis by St. John staff (albeit based on a small sample) indicated a lower preterm birth rate among Strong Start participants compared with historical data. Key informants also believed that Strong Start had a positive influence on breastfeeding rates, vaginal deliveries, and Medicaid costs. They posited that education, psychosocial support, and peer support provided in the groups and through the Maternity Care Home enhancements were the key factors behind the improvements. Strong Start participants appreciated being respected and not being judged for having questions or not knowing certain things.

Strong Start educated women about their health care rights and responsibilities and the importance of prenatal care and helped more women access prenatal care. When the OB clinic was turning women away due to lack of appointment capacity, Strong Start staff successfully advocated on their behalf and the clinic opened up additional prenatal appointment slots. One key informant reported that several

moms shared in the group or with her directly that they have carried their current pregnancies to fuller term than previous pregnancies.

Key informants assumed that Strong Start led to cost savings through fewer babies going to the neonatal intensive care unit (NICU) and reduced emergency department (ED) visits after educating women not to use the ED in place of regular medical care. Participants also reportedly saved money if, through Strong Start education, they chose to breastfeed instead of purchasing formula., though they would likely get most of their formula through the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Strong Start had limited influence, however, on participants' access to postpartum family planning because providers and staff within the Catholic St. John health system may only discuss natural methods and recommend that women space pregnancies at 12 to 18 months. Despite these limitations, Strong Start group sessions provided a forum for women to discuss family planning l options with each other.

STRONG START PARTICIPANT PERSPECTIVES

Some Strong Start focus group participants reported that they enrolled in the group sessions because they wanted the support. Others enrolled just because someone called them and asked them to come.

> *I saw a card in the medical clinic for a support group and I thought I needed it.*
>
> *The Social Worker at the OB clinic kept hounding me so I went.*

Participants highlighted the fact that they learned new information and valued having a connection to other women in their group. Participants said they have discussed "everything" including relationships, nutrition, smoking and "baby daddy" issues. Several said they made use of a container where group members could anonymously leave questions that would be discussed during the session. One woman shared that there was special value in getting information from experienced moms. Several participants expressed that they did not feel like they were being told what to do during group prenatal support sessions; instead, they felt comfortable sharing questions and concerns and learning from each other.

> *They make sure we ask all our questions and have the topics we want covered.*
>
> *I spent a lot of time talking about my other child. I vented and cried and it was really supportive.*

A few women said they felt like they learned more at the group sessions than they did from their OB provider during one-on-one prenatal appointments. One participant said that when the midwife checked the baby's heartbeat during the individual health assessment (during group), she explained what the heartbeat was and what that meant–information her OB had never provided. Another participant said the nutrition chart used in sessions was very helpful, covering what to eat and not to eat. All focus group participants agreed that the nurse and midwife who ran the group in the first year were very knowledgeable about the topics being covered and they created a comfortable atmosphere. Several said they thought the co-facilitators and guest speakers did a good job of talking about topics

such as breastfeeding, the importance of staying pregnant to 39 weeks, not sleeping with your baby, and anything else the women wanted to talk about. Many participants said they were going to at least try breastfeeding, though a few were undecided or opposed.

Some women highlighted the value of the social worker visits and ongoing communication as part of the Maternity Home Care model. Two women said that their home visits with the social worker were originally scheduled for 30 minutes, but ended up lasting 2 hours because they had so much to talk about, and she was there to be supportive.

> *I was skeptical. But I've learned a lot. They always have resources and I can talk to the social worker.*
>
> *They call and text all the time, just checking in.*

Unlike the CHI Centering Pregnancy model, St. John's group prenatal care support sessions did not replace OB care. Some women were able to schedule their OB appointments on the same day as their group. However, for others, scheduling the appointments on the same day as a group session was impossible, requiring two trips for women who already faced transportation challenges.

PROGRAM STRENGTHS

Even though St. John did not accomplish the original goal of establishing a Centering program, key informants felt that strong support and educational components of their program were helpful to pregnant women. Strong Start enabled women, many of whom did not have a family or community support system, to get the emotional support they needed and their questions answered. A key informant explained, "I have seen moms come in with no support. They exchange phone numbers and see each other outside the group. One mom would pick up the other mom in group to help her with transportation." Strong Start educated women about their pregnancies, including those who were pregnant before but still lacked knowledge about pregnancy and prenatal care.

> "Physicians and nurses don't have answers and are not equipped to provide help with their psychosocial needs."
>
> *- Key informant*

Key informants were also proud of getting the OB clinic nursing staff to understand that psychosocial issues have an impact on pregnancy and to appreciate the value of the social worker. The nurses initially viewed Strong Start as a hindrance, but the Strong Start staff made themselves "visible without forcing themselves" on the clinic. Once nurses saw they could trust and depend on the Strong Start staff to support them, they became partners.

The tenacity and persistence of Strong Start staff had a significant impact on how the program worked. For example, while the medical staff were not making referrals, the outreach coordinator had to obtain the appointment sheets for all patients and make "cold calls" to introduce Strong Start.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

> "[Group prenatal care] is a good idea and a good model. We underestimated the degree of change that would be needed to implement."
>
> *- Key Informant*

The awardee encountered several significant challenges implementing Strong Start. Key informants believed that if the CHI approval and IRB processes had not been so stringent, they could have retained the engagement of the OB leadership that had been instrumental in applying for Strong Start funding. Loss of engagement made it difficult to develop coordinated approaches to identifying potential participants and to access adequate meeting space (leadership did not provide dedicated space). Key informants shared that although the OB provider leadership was supportive in concept, it seemed that every administrative hurdle encountered gave leadership more reason to temper their support for Strong Start implementation. Further, OB leadership appeared to misunderstand that Centering was an alternative (meant to fully replace) a typical OB visit; instead, they viewed the program as an educational supplement. Finally, one key informant said it has been difficult to garner support and resources for Strong Start when St. John Health System was scaling back other programs and resources due to budget cuts, noting "You can't start a new program when others are shutting down." Budget decreases and operational transitions in the health system resulted in a reduction of nursing and social worker staff at the OB clinics and elimination of nurse midwifery services at the hospital's maternity care department.

Overall, the awardee was not able to effectively integrate Group Prenatal Care visits into the St. John model of care. The health system did not accept the full Centering model, and the individual health assessment included in each group prenatal care support session did not replace OB prenatal visits. Further, information from the support sessions was not shared with the obstetrician or certified nurse midwife conducting the typical one-on-one prenatal appointments (or vice versa). Looking back, key informants stated that that they might not have proposed the CHI centering model if they knew how hard it would be to implement. Also, they would have taken more time to educate physicians on what would actually take place by bringing in *CenteringPregnancy* experts to talk to physicians.

The most challenging aspects were unsuccessful attempts to get medical staff to see the entire vision of Strong Start or the benefits of Centering and the midwifery model of care. Despite meetings, relationship-building, sharing of data, and ongoing education, key informants learned that St. John does not include nor embrace the midwifery model of care. Informants felt that they would have achieved much better enrollment had they implemented the Maternity Care Home model with home visits from the start.

The Strong Start program also struggled with enrollment and retention in the group prenatal care support sessions. Suspension of in-home visits for outreach and lack of referrals from nursing and medical staff posed challenges, and many women declined to participate. One program staff explained, "If they decline it's because of their work schedule, the times don't fit, they don't want to be in a group, or they are not interested in participating without an incentive [such as baby supplies]." Among women who did enroll in Strong Start, attendance was low. A key informant shared that they would often get a verbal commitment from 12 to 15 women and out of those, about one quarter showed up consistently. She stated, "We've tried everything – food, transportation, child care, moving locations and the time of day the group is held." The childcare coordinator even put together a gift basket and told women that

they would draw the winner from a bowl of names of those who came to all of the classes. Barriers to retention included the time commitment required to attend both the group and individual prenatal appointments, unreliable transportation, and other life events taking priority. One key informant explained that a fundamental reality is that Strong Start patients "are more concerned with how they are going to feed their families than making it to a group session in addition to their monthly OB appointments."

SUSTAINABILITY

Key informants did not think that Centering could be successful at St. John without a midwifery practice or physician support for the midwifery model of care. However, while the Strong Start group prenatal care support sessions have ended, key informants were planning to revive a support group for pregnant women that would be open to all women with high-risk pregnancies, not just those with Medicaid coverage. Women could join the group at any time during their pregnancy. Among other topics, the group would cover postpartum depression symptoms and treatment, which informants have identified as an unmet need. The support group will be held on the East Side of Detroit, which has more poverty, higher infant mortality, and more women with high-risk pregnancies than in the Detroit suburb of Southfield (West Side). The former Strong Start staff, who are Community Health employees, will be responsible for the groups, and the only additional costs to Community Health beyond current operating expenses would be for refreshments. For the new planned support group, key informants would like to use the Strong Start Intake risk assessment and postpartum forms, as well as the risk domain sheet from the Michigan Medicaid's Maternal and Infant Health Program (MIHP),[108] to identify participants' needs.

The awardee was continuing some Strong Start Maternity Care Home services at the East Side OB clinic in collaboration with the MIHP. Over the course of the Strong Start program, the OB clinic staff reportedly began viewing the social worker's presence as a positive enhancement to OB services. After Strong Start funding ended, the former Strong Start social worker, nurse, or outreach coordinator were visiting the clinic a total of four days each week to talk to Medicaid-enrolled women about participating in MIHP, which includes assessment of maternal and infant risk factors and up to nine home visits during pregnancy and postpartum to provide support and care coordination. Contact information of interested patients is passed to the St. John MIHP coordinators, who then reach out to schedule a visit. As part of the MIHP recruitment, the former Strong Start social worker also discusses resources to help pregnant patients address food insecurity, homelessness, and domestic violence issues, and encourages them to participate in parenting classes offered twice a month at St. John. The former Strong Start staff are funded under the St. John Community Health budget (which also receives some Medicaid funding for its MIHP activities) as an extension of the prenatal medical services provided at St. John.

[108] MIHP is a component of the Michigan Medicaid program that provides home visitation support, care coordination, and childbirth/parenting education for pregnant women and infants on Medicaid, intended to promote healthy pregnancies, positive birth outcomes, and healthy infant growth and development. A licensed social worker and a registered nurse conduct up to nine visits for the mom and up to nine (with exceptions) for the infant through the child's first year. http://www.michigan.gov/mihp/

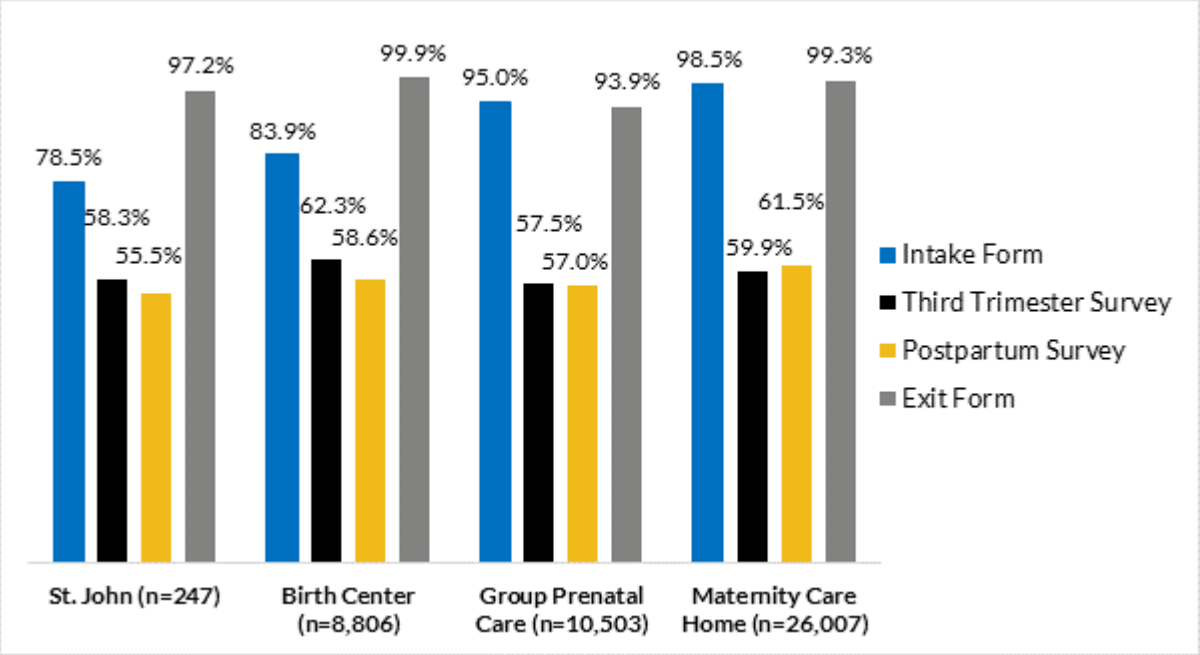
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for St. John, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for St. John to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 6 St. John participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 18: FORM SUBMISSION RATES, ST. JOHN



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment: 245
- Study IDs represented: 247 (suggests that PLPE data were submitted for two extra patients: see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- The awardee did not respond to questions about why certain forms were missing or why questions on the forms were unanswered.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The evaluation team does not have any information about site specific concerns.

MISSING FORMS:

- Intake Form: 21.5 percent of Study IDs were missing Intake Forms. The awardee did not provide any information to explain why these forms were missing.
- Third Trimester or Postpartum Surveys: About 42 percent of Study IDs were missing the Third Trimester Survey and 45 percent were missing the Postpartum Survey.
- Exit Form: 2.8 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: This awardee's Intake Forms had lower than average rates of missing for key variables, such as race and ethnicity, education and depression symptoms.
- Exit: About 61 percent of forms were missing BMI and 41 percent were missing information on gestational diabetes. Data on Strong Start pregnancy outcomes were missing for 20.3 percent of participants.[109]

MAIN FINDINGS:

St. John participants had high rates of missing data (greater than 20 percent) for a number of characteristics and risk factors, including age, race/ethnicity, relationship status, intimate partner violence, and pregnancy intent. Among the risk factors collected in the PLPE data that can be reported confidently, 32.9 percent of St. John participants with a prior birth had a prior preterm birth.

[109] Among participants with missing data on pregnancy outcome, 14.3% were missing because they did not have an exit form, 18.4% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 67.3% were missing for other reasons.

TABLE 282: DEMOGRAPHICS, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	20.7	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**191**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	-	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	8.4	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	79.6	81.7	72.9	75.1	75.8
35 Years and Older	%	9.9	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	20.7	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**191**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	-	25.4	37.1	28.0	29.7
Non-Hispanic White	%	5.8	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	89.5	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	-	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	22.8	19.6	12.8	11.3	13.3
Not in Universe	%	75.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**-**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	-	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	20.7	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**191**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	21.6	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**189**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	24.9	36.6	30.8	35.3	34.5
In School, Not Employed	%	12.7	8.7	12.6	11.9	11.5
Employed and in School	%	-	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	57.1	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	22.0	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**188**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	25.0	15.4	27.8	29.1	26.4
High School Graduate or GED	%	65.4	57.5	58.3	57.9	57.9
Associate's Degree	%	-	8.2	5.2	4.6	5.4
Bachelor's Degree	%	-	14.5	4.5	3.7	5.8
Other College Degree	%	-	4.3	4.2	4.7	4.5

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	20.7	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**191**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	9.4	42.1	20.4	20.8	24.5
Living with a Partner	%	27.2	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	23.0	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	40.3	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 283: PSYCHOSOCIAL, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	22.0	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**188**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	87.2	51.8	51.8	59.7	56.5
No	%	12.8	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	22.0	17.0	6.6	3.4	6.8
Not in Universe	%	10.0	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**164**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	79.3	61.1	72.6	79.9	75.3
Other	%	-	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	14.6	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	24.1	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**183**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	8.2	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	22.8	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**186**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	28.0	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	23.2	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**185**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	79.5	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	22.8	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**186**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	40.9	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	21.6	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**189**	**7,090**	**8,664**	**23,549**	**39,303**

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
None	%	42.3	67.9	59.0	65.5	64.5
Mild	%	36.5	21.4	23.8	20.2	21.2
Moderate	%	14.3	6.8	10.3	8.5	8.6
Severe	%	-	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	22.0	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**188**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	24.5	17.5	14.0	6.4	10.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	21.6	18.3	16.3	7.7	11.8
Not in Universe	%	19.9	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**141**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	-	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	20.7	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**191**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	52.4	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	25.7	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	22.0	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	70.3	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	33.0	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	34.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	-	24.6	17.1	15.4	17.2
Childcare Challenges	%	15.4	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	12.1	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 284:PREGNANCY HISTORY AND INTENTIONS, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	7.9	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**222**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	81.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	22.8	26.1	29.6	27.3	27.6

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	26.6	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**122**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	39.3	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	27.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**119**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	33.6	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	44.4	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**79**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	65.1	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**29**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	-	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	66.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**26**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	-	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	66.0	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**27**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	67.2	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**24**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	67.2	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**24**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 285: PRIOR BIRTH OUTCOMES, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	1.2	1.7	1.5	0.6	1.0
Not in Universe	%	24.9	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**178**	**6,337**	**6,857**	**18,350**	**31,544**

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	83.1	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	31.5	23.5	18.9	15.2	17.7
Not in Universe	%	28.6	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**96**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	25.0	34.6	24.3	27.1	28.1
>= 18 months	%	75.0	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.8	0.1	2.5	1.4	1.4
Not in Universe	%	38.6	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**146**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	32.9	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	53.5	1.3	20.8	13.1	12.6
Not in Universe	%	36.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**24**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	-	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 286: PRE-PREGNANCY MEDICAL CONDITIONS, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	22.8	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**186**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	18.3	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	70.4	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	10.2	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	34.9	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**157**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	34.4	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**158**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	12.7	0.8	8.3	7.5	6.1

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's BMI at First Prenatal Visit						
Missing Data	%	61.0	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**94**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	-	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	37.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	16.0	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	28.7	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	16.0	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 287: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	34.0	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**159**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	10.7	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	34.0	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**159**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	15.7	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	41.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**142**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	9.9	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	34.9	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**157**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	34.4	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**158**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	34.4	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**158**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	38.6	0.6	32.8	22.3	20.5

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**148**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	61.4	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**93**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	37.6	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 288: TREATMENTS DURING PREGNANCY

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	42.3	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**139**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	7.5	0.8	10.0	5.1	5.4
Not in Universe	%	78.0	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**35**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	41.5	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**141**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	20.6	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	41.9	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**140**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	10.7	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 289: PRENATAL CARE, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	73.0	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**65**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	29.2	4.7	29.5	64.5	43.3
Licensed Professional Midwife[110]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	70.8	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	2.9	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**234**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	45.7	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	7.6	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	2.9	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**234**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	42.3	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**139**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	91.4	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	4.0	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	44.4	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**134**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	46.1	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**130**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	53.9	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**111**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	47.7	16.9	13.4	30.9	26.1

[110] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Health Education Sessions	Mean	3.9	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	53.9	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**111**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	53.1	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**113**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	44.2	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	3.9	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	53.9	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**111**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	21.6	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.0	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	55.2	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**108**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	57.7	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**102**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	-	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	-	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 290: DELIVERY INFORMATION, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	17.8	1.4	25.3	23.3	19.5
Not in Universe	%	26.1	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**135**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	30.4	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	3.7	0.3	7.8	2.9	3.5
Not in Universe	%	80.1	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**39**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	89.7	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	13.3	4.6	11.5	7.3	7.7
Not in Universe	%	18.3	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**165**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	97.6	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	14.9	0.7	12.0	5.6	6.1
Not in Universe	%	18.3	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**161**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	68.9	87.1	70.1	69.5	73.1
C-Section	%	31.1	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	7.5	0.4	8.7	2.3	3.4
Not in Universe	%	75.9	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**40**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	72.5	83.3	72.9	74.7	75.9
C-Section	%	27.5	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	4.1	4.7	12.5	6.3	7.4
Not in Universe	%	76.3	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**47**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	40.4	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	2.9	0.1	6.2	0.7	1.9
Not in Universe	%	81.3	96.0	82.7	85.9	87.1

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**38**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	-	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 291: BIRTH OUTCOMES, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	20.3	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**192**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.4	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	8.7	0.7	15.4	5.8	7.0
Not in Universe	%	18.7	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**175**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	8.6	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	10.9	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	80.0	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	15.4	2.1	14.3	8.0	8.3
Not in Universe	%	18.7	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**159**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	10.7	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	83.6	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	-	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 292: SATISFACTION, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	66.8	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**80**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	12.5	3.3	4.4	7.8	6.2
Very Satisfied	%	40.0	25.6	35.6	46.1	39.8
Extremely Satisfied	%	42.5	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	66.8	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**80**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	10.0	10.4	11.6	12.8	12.1
Very Satisfied	%	32.5	29.1	42.6	46.6	42.1
Extremely Satisfied	%	41.3	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 293: BREASTFEEDING, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	43.2	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**137**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	39.4	80.4	47.5	40.5	50.3
Formula Feed Only	%	17.5	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	29.2	10.8	31.9	32.5	27.8
I Haven't Decided	%	13.9	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	67.2	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**79**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	77.2	91.5	76.6	72.6	77.3
No	%	22.8	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 294: FAMILY PLANNING, ST. JOHN

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	67.2	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**79**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	St. John (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	88.6	77.0	77.5	82.2	80.3
No	%	-	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	67.6	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**78**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	61.5	84.2	70.8	74.0	75.5
No	%	34.6	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	44.4	41.5	42.9	38.6	40.2
Not in Universe	%	35.7	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**48**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	-	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	-	2.8	11.4	10.9	9.2
LARC - IUD	%	-	10.8	11.9	12.3	11.9
Pills	%	-	8.6	11.9	13.0	11.8
Injection	%	29.2	5.9	16.2	20.2	16.2
Condoms	%	-	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	-	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Michigan but problems with data quality prevented the evaluation from including them in the Impact Analysis

Initial Contact: In January 2015, the evaluation team spoke with officials from the Michigan Department of Health and Human Services (MDHHS) to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data to the Urban Institute. In Michigan, both Medicaid and birth certificate data are housed under MDHHS, thus the evaluation team worked with one person within the agency to facilitate the data request.

Data Acquisition Process: Michigan was receptive to supporting the evaluation, and MDHHS staffed planned to link the Medicaid and birth certificate data. The evaluation team submitted data use and nondisclosure agreements in June 2015 to request access to Medicaid and birth certificate data from the MDHHS. After the agreements were submitted, MDHHS asked the evaluation team to submit an IRB application. Urban submitted the IRB application in April 2016, received approval in August 2016, and a DUA was executed in September 2016. Michigan submitted linked 2014 and 2015 birth certificate data in February 2017, and 2016 data were submitted in June 2017. The state submitted all of the Medicaid data at once, in June 2017, as a merged data file. The evaluation team reviewed the data for completeness and found a variety of problems related to the sample and missing data. Despite ongoing communication and collaboration with MDHHS, missing Medicaid data for a substantial proportion of Strong Start participants delayed finalization of these files. These women, when analyzed by Urban, proved to be significantly different from the women who were merged, both demographically and medically. Claims were not requested as this discrepancy was never rectified.

Final Result: Due to data inconsistencies, Urban determined that the Michigan data was not useable for its Impact Analysis.

(This summary is identical to that appearing for Meridian Health Plan.)

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for St. John Providence Health System. In Michigan, the match rate between birth certificates and Medicaid eligibility for Strong Start participants was much lower than in other states. Importantly, based on the birth certificate records, the women who did not match were much more likely to have a premature infant or an infant with low birthweight. Based on the low match rate for women participating in Strong Start, there was concern that there was a systematic problem with the match in Michigan. Consequently, data for Michigan were not included in the impact analysis.

CROSS-CUTTING SUMMARY

The St. John Providence Health System initially attempted to implement Group Prenatal Care but ultimately implemented a Maternity Care Home model under Strong Start. Because of low leadership buy-in and a lack of clear understanding of Group Prenatal Care, the awardee began by implementing "group prenatal care support sessions" that were modeled after the *CenteringPregnancy* curriculum, but these sessions were a supplement rather than alternative to typical one-on-one prenatal care visits and were not well-attended. Despite sustained efforts by program staff, the awardee was never able to implement *CenteringPregnancy*. Midway through the award period, one St. John's site specifically adopted a Maternity Care Home model, providing information and psychosocial support to participants via in-person and telephonic encounters with a social worker. Overall enrollment rates were the lowest of any Strong Start awardee. Case study key informants reported that barriers within the health system, in addition to individual barriers, stigma, isolation, and past racism and traumas, were persistent challenges to improving prenatal care. Often the program lost contact with the highest-risk participants because they were transient, had inconsistent phone access, or otherwise could not be reached. St. John

participants had high rates of missing data (greater than 20 percent) for a number of characteristics and risk factors. St. John participants in the designated Maternity Care Home intervention had higher rates of prior preterm birth than Strong Start participants overall. Impact analysis was not conducted for St. John because of concerns about the quality of the link between birth certificates and Medicaid data in Michigan. Descriptively, St. John participants had higher C-section, preterm birth, and low birth weight rates than other Strong Start awardees, which were already higher than the national average for US women. Although it was expected that Medicaid beneficiaries served by Strong Start would have preterm birth and low birth weight rates above national benchmarks for all U.S. women, the differences for St. John are much higher: 19.5 percent of participants had a preterm birth compared to 9.8 percent nationally and 14.5 percent of participants gave birth to a low birth weight baby compared to 8.2 percent nationally.

Texas Tech University Health Sciences Center

GROUP PRENATAL CARE AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,094	• School of Nursing at Texas Tech University Health Sciences Center (TTUHSC), composed of health professions graduate schools and health care facilities affiliated with Texas Tech University in Lubbock, Texas	• Two Maternity Care Home sites:
		  • Large obstetrics (OB) clinic within School of Medicine
		  • Neighborhood prenatal clinic
		• One Group Prenatal Care site, a nurse-managed Federally Qualified Health Center (FQHC) providing midwifery and women's health care in a low-income neighborhood
			• Group Prenatal Care intervention categorized as "medium intensity" for implementing the *CenteringPregnancy* curriculum with no additional enhanced services
			• Maternity Care Home intervention categorized as "high intensity" for offering at six to ten care coordination, education and/or referral encounters (compared to four encounters offered by most awardees), as well as enhanced psychosocial support
			  • Encounters included education, referrals and psychosocial support from two community health workers (CHWs) during clinic visits; three home visits; and telephone calls and texts

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Perceived improvements in maternal and infant health outcomes,
- Third trimester encounter with CHW considered the strongest, most impactful part of intervention
- Trusting relationships with CHWs, promoting confidence and informed decision-making
- Centering participants' personal connections with facilitator and fellow group participants

CHALLENGES

- Administrative burden: time-consuming database development and project management
- Insufficient number of CHW-participant encounters for women with the highest levels of need, and lack of community resources
- Ongoing enrollment and attendance challenges at Group Prenatal Care site

PARTIALLY SUSTAINED

- Planned to expand the CHW model (as "Life Coaches") to high-risk patients at all TTUHSC chronic care clinics
  - Pregnant women would continue to be screened for high risk
  - Some Strong Start survey questions might be used but without full data collection
- Continued efforts to expand Group Prenatal Care as the preferred model at the FQHC

KEY FINDINGS: PARTICIPANT-LEVEL DATA[111]

PARTICIPANT-LEVEL DATA QUALITY

- 3.0% rate of missing intake forms; 0.5% rate of missing exit forms
- 7.0% rate of item nonresponse on intake forms; 19.4% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 17.2% of women were teens (under age 20); 7.3% were 35 years or older
- 14.4% of women were black; 59.6% were Hispanic; 23.0% were white
- 23.9% of women were married; 34.1% were living with a partner; 22.8% were not in a relationship
- 29.7%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 19.5%: C-section rate among women with a delivery
- 11.0%: preterm birth rate among women with a live birth
- 7.4%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted because we did not obtain birth certificate and Medicaid data for Texas

[111] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Three clinics were included in the Texas Tech University Health Sciences Center (TTUHSC) Strong Start award: a large obstetric (OB) clinic housed within the School of Medicine's Medical Pavilion; a neighborhood prenatal clinic (Grand Expectations); and a nurse-managed Federally Qualified Health Center, the Larry Combest Center (Combest Center). The OB clinic, located on the main TTUHSC campus, offered typical physician-led care with nurses and physician OB staff including medical residents who care for pregnant patients during three-month rotations. Part of an academic medical center, the OB clinic referred patients to other TTUHSC providers and services including a dietitian, social worker, doula, nurse care navigator, behavioral health provider, laboratory services, transportation assistance, and TTUHSC's high-risk clinic. The Grand Expectations clinic was founded in a low-income Lubbock neighborhood because the OB clinic is not geographically accessible to many low-income women in the community, resulting in frequent missed prenatal appointments. At the Grand Expectations clinic, TTUHSC provided routine primary care (including pregnancy tests) and prenatal care with one-on-one visits with a Nurse Practitioner until 34 weeks gestation. Pregnant patients were then transferred to the OB clinic for physician care until delivery. The Grand Expectations clinic was staffed by one Nurse Practitioner, registered nurses, residents on rotations, and is connected to a WIC office.

These two clinics served the majority of Medicaid-covered and low-income pregnant women in the region. All pregnant women enrolled in Medicaid or CHIP are in Managed Care Organizations (MCOs), which have pregnancy-related programs (free car seats, prenatal classes) but do not advertise them widely– women must request the services or notify the plan that they have been assessed as high-risk by a provider. Language barriers, especially among women from Honduras and El Salvador, prevent many women from understanding or accessing services the MCOs offer.

Prior to Strong Start, the Combest Center did not offer prenatal services. The center was designated a Patient Centered Medical Home by NCQA the year before Strong Start began. It is also a certified signup location for My Texas benefits, so patients can sign up for Supplemental Nutrition Assistance Program (SNAP) or other public assistance programs. With the simultaneous introduction of prenatal care and Strong Start, the center began offering midwifery care and Centering as the default model for all pregnant patients, with individual visits with the Nurse Practitioner for those who opt out.

DESCRIPTION OF ENHANCED STRONG START SERVICES

TTUHSC provided Strong Start services under two models of care, based on location: maternity care home services (OB clinic and Grand Expectations) and Group Prenatal Care (Combest Center).

Maternity Care Home: TTUHSC used Strong Start funding to employ two Community Health Workers (CHWs) to provide care navigation, health education, referrals, encouragement to attend clinical visits, and other support to eligible women served by its large OB clinic and smaller Grand Expectations community clinic.

The CHWs were from the Lubbock area and were relatively young and Latina, reflecting the demographics of the patient population. They were certified as CHWs by the state[112] and had experience with pregnant patients and/or chronic disease management prior to Strong Start, but also received additional training from TTUHSC on issues related to pregnancy, chronic illnesses and community health management. The CHWs had a supervisor and a clinical advisor, and weekly meetings allowed in-depth discussion of single cases – key informants gave an example of discussing appropriate referrals for a teenage patient with unstable housing, hypertension and diabetes.

> "[The CHW] discusses what is good and bad for the baby. We went into my nursery and looked over what I have."
>
> *- Strong Start participant*

The CHWs typically met with Strong Start participants during clinic visits and also had up to three visits at the woman's home (or an alternate location such as a coffee shop), supplemented by telephone calls and texts between visits as needed. The first meeting took place at prenatal intake at the clinic or within four weeks of program enrollment (often a home visit), the second during the third trimester, and the final visit was postpartum. If participants resisted a postpartum Strong Start visit or did not respond to attempts to schedule it, CHWs tried to meet them before or after a postpartum clinical visit. The number of total encounters increased over the Strong Start period from about 4-6 to 6-10 per participant, reflecting an increase in phone contact with participants to improve retention. The CHWs also increased use of text messaging, finding that participants were more likely to respond to texts than phone calls.

Most resource referrals by the Strong Start CHWs were for food assistance and nutrition (SNAP, the Special Supplemental Nutrition Program for Women, Infants, and Children or WIC, and emergency food assistance), prescription drug assistance,[113] and specialists. The CHWs educated participants on topics including prenatal health, parenting and childcare (e.g., the importance of car seats and how to obtain them), nutrition, chronic illness care, behavioral health, and psychosocial health. They assisted with making and keeping clinical appointments, including making referrals for transportation assistance. During a home visit, the CHWs would examine the space and supplies available for the baby and help connect the participant to resources to help fill gaps. During the second year of Strong Start, the CHWs began supplementing providers' family planning discussions by developing and sharing a handout during the 3rd trimester visit that described family planning options and whether each is covered under various programs. For example, a CHW reported that that tubal ligations are covered by Medicaid but not CHIP. A key informant said, "It's good for moms to know what [family planning method] they want prior to their postpartum visit, giving them time to decide before Medicaid runs out."

[112] In Texas, CHWs must be certified, which requires completion of 160 hours of coursework in eight core competencies: communication, interpersonal skills, service coordination, capacity-building, advocacy, teaching, organizational skills, and specific community health knowledge base.
[113] Texas Medicaid covers a limited number of prescriptions per person per month.

Group Prenatal Care: The Combest Center began offering Group Prenatal Care during the second Strong Start program year and received its Centering Health Institute (CHI) certificate in December 2015.[114] Its Centering program followed the CHI curriculum, differing from the CHI model only in combining women of different gestational ages into one group because of the small number of participants enrolled. A key informant noted that breastfeeding was discussed in 4 or 5 sessions. All Combest Center patients received referrals when needed for food bank vouchers, care coordination, transportation, and other services.

The Group Prenatal Care program was staffed by a nurse midwife (partly funded by Strong Start) and a registered nurse (RN) with extensive experience in prenatal and postpartum care. The RN is CHI-certified and co-facilitated groups with the midwife, the Strong Start project director (a professor at the school of nursing who is an RN), or the TTUHSC director of nurse midwifery.

OUTREACH AND ENROLLMENT

Maternity Care Home: TTUHSC used an opt-in enrollment process for the Strong Start Maternity Care Home program, whereby women were asked to choose between enrolling in Strong Start or participating in the standard care model. Key informants reported that about 60 percent of eligible women agreed to participate. CHWs were present at the clinics on days when the new-patient prenatal care intake process was conducted so that they could immediately meet with participants identified by the clinic nurses and recruit for Strong Start. Initially, many women did not complete the lengthy Strong Start Intake Form that included sensitive questions, resulting in TTUHSC "losing" nearly half their early enrollment. To solve this problem, the awardee developed a one-page version of the Intake Form for use at the initial nurse or CHW encounter, and the CHWs completed the full form with the participant over the phone or at the second visit as they established a relationship, supplemented by relevant information the CHW identified on the patient electronic medical record (EMR). Key informants reported that these changes increased enrollment from five to eight patients enrolled per day of appointments to 10 per day. After completing the modified Strong Start Intake Form, the CHWs assessed the women's needs, and then scheduled a home visit within the following four weeks.

> "I didn't have anything like [Strong Start] with my first pregnancy and I really just wanted support, especially from an outside source. Sometimes you don't get that from your family."
>
> *- Strong Start participant*

Women with high health needs, such as diabetic patients, were most likely to be receptive to the enhanced services. Women who declined participation generally cited lack of interest, lack of time for the extra meetings, or had other children and felt they did not need further guidance. High-risk patients who were first-time mothers below 185 percent of poverty and who might otherwise be enrolled in Strong Start were referred instead to the Nurse Family Partnership, a state program that

[114] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

provides up to weekly nurse home visits starting in the second trimester until the child's second birthday.

Despite efforts to maintain contact by phone in between visits, some participants were "lost to care" over the course of their pregnancies, and about half of participants did not return for their postpartum visit. Slowed enrollment related to CHW staff turnover, along with high rates of declines and no-shows, prompted the awardee to revise its enrollment goals and focus efforts to engage the nurses at the OB clinic to increase referrals to Strong Start (e.g., offering gift certificates to nurses making the most referrals) and to re-engage the Nurse Practitioner at the smaller Grand Expectations clinic. That site ceased Strong Start early in Year 4 after the Nurse Practitioner left the clinic.

Group Prenatal Care: The Combest Center used an opt-out approach for Centering, whereby all women were enrolled in Centering by default unless they actively chose to opt out of Group Prenatal Care and attend individual visits with the Nurse Practitioner. However, despite awardee efforts, including implementing a major marketing/awareness campaign involving fliers, posters, and news coverage, enrollment in Centering remained a major challenge. This was primarily because the site just began offering prenatal care and needed to introduce its new service to the community. Many women who did come to the center for prenatal care declined Centering because they worked and did not have the time to spend two hours on each prenatal visit. Also, while the Combest Center has translation services during individual prenatal appointments, Centering groups were conducted only in English, creating a barrier to Centering for the women who spoke only Spanish.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

> "[The CHW] told me to stop smoking marijuana, talked about weight. It made me more confident that someone cared, was concerned, helped me stop doing what I was doing."
>
> *- Strong Start participant*

Maternity Care Home: The awardee's internal evaluation found that Strong Start had a positive influence on a range of maternal and infant outcomes. Based on both the awardee's analysis and staff perceptions, key informants reported that the Maternity Care Home component reduced rates of preterm birth and low birthweight, increased breastfeeding, and helped women have less stressful pregnancies. Informants attributed these outcomes to health and nutrition education and materials (e.g., a program guide to reduce smoking), assistance with food vouchers and boxes, referrals to housing and other resources, and emotional support. A key informant said, "The moms talk continuously about how much they've learned… they're changing the meals they have and are cooking for pregnancy and lactation."

Key informants highlighted that for women who completed the third trimester encounter with the CHW, that encounter had a significant correlation with lower preterm births and neonatal intensive care unit (NICU) stays, and higher breastfeeding rates, prenatal and postpartum visits, and satisfaction. Strong Start participants were reportedly more likely to plan to use family planning after delivery than those receiving standard care, which was attributed to the CHWs discussing family planning during a home visit and emphasizing the benefits of long-acting reversible contraception (LARC). In fact, key informants reported that nearly all participants selected LARCs for family planning – although lack of full support from the OB chairman for intrauterine device (IUD) insertion immediately after delivery inhibited such procedures at that time. Key informants also reported that the Strong Start Maternity

Care Home achieved significant savings through lower NICU days and wider birth spacing related to greater use of LARCs.

The program benefited the staff as well. A key informant said, "Overall, Strong Start has helped me become a stronger person. I see so many situations that [the women] go through, and being a part of Strong Start and seeing the impact we make has been very rewarding."

Group Prenatal Care: Key informants reported that their newer and smaller Group Prenatal Care program was just beginning to show lower rates of preterm birth and low birthweight (though this was very preliminary and based on very small enrollment numbers), which they attributed to Centering's emphasis on nutrition and food assistance, and enhanced confidence and sense of family and well-being. Family planning education among Centering participants was more intensive than in standard care because the women could spend more time and discuss options "rather than simply being told" what to do. A key informant related, "[With group support, the Centering participants] are not afraid to ask questions. So much is brought up in group sessions, and also they have more time with the midwives."

Key informants believed that the Centering program may achieve cost savings through lower emergency department (ED) visits because the participants feel comfortable with the facilitator and ask her questions, learn from group discussions about normal and abnormal pregnancy-related symptoms, and are more informed about how to access resources than other patients. Key informant pointed out, however, that women at the Combest Center who opt out of Centering reportedly have a good relationship with the nurse midwife and likely achieve similar cost savings compared to standard care.

STRONG START PARTICIPANT PERSPECTIVES

Focus groups included women participating in the Strong Start Maternity Care Home program. They valued the role of the CHWs, and they said they had enrolled in Strong Start because they wanted support and someone they could contact "who could explain information instead of just handing materials [to them]". Most of the women said they were not told why they were chosen for the Strong Start program, though one participant said she was invited because of her marijuana use. She accepted because she wanted to bring her child into a healthier environment:

> *I was smoking marijuana with my [unborn] child and they kind of addressed with me the effects it has on the baby… [the Social Worker] approached me about Strong Start and how it can help, I don't have anyone else to talk to and my family sure don't care. So, I wanted to bring this baby in to the world differently.*

Participants felt comfortable asking questions and sharing personal information with the CHWs as well as with the Nurse Practitioner who saw them regularly at the Grand Expectations neighborhood clinic. Most focus group participants said the CHW did not refer them to another health care provider or to non-health services. One participant, however, said she was referred to a nutritionist, and another woman with prior pregnancy complications said that the CHW discussed risk factors for early deliveries. Despite receiving pamphlets and watching a WIC video about breastfeeding, only about half of the focus group participants said they planned to breastfeed; most focus group participants had already made their decision before receiving the information.

In general, the participants felt supported by Strong Start's enhanced services and believed the CHW was helping to make their pregnancies healthier. Some women, however, felt that nutrition advice is "easier said than done," mentioning financial constraints or noting that they eat what their family eats. They particularly viewed phone calls and home visits from the CHWs as supportive and helpful in many ways including preparation for delivery.

[The CHW] has already helped me a few times, she helped me come up with my birthing plan.

PROGRAM STRENGTHS

Personal relationships, education, and communication were the key strengths of TTUHSC's Strong Start approaches. Key informants were also very pleased with the Strong Start database they developed that facilitated patient tracking and provided reports for weekly team meetings at which they assessed progress and made tweaks where necessary.

Maternity Care Home: In addition to the perceived improvements in maternal and infant health outcomes described above (preterm birth, low birthweight, NICU days, breastfeeding, LARC use), Strong Start staff were most proud of the relationships the CHWs built with the women, which promoted participants' confidence and reduced their anxiety. One CHW said, "Rapport and relationship-building are the key – if they trust us…we can help them and their families in the long term." In addition, participants learned about healthy lifestyles and how to access various Medicaid and non-health resources including family planning, dental care, or housing services. The participants seemed more comfortable making nutrition and lifestyle decisions based on good information. Key informants described examples of helping young and particularly vulnerable participants meet critical needs and learn how to better manage their lives.

Key informants felt the 3rd trimester encounter with the CHW was perhaps the strongest component of the program, with the greatest impact on outcomes. This meeting, generally a home visit, was essential for educating participants about how to take care of themselves after pregnancy, healthy intervals for planning another pregnancy, and which family planning method was best for them.

Group Prenatal Care: For the awardee's small Centering program, a key strength was the personal connection with the Centering facilitator and fellow group participants, which helped the women learn about their options, build confidence, and feel better supported. Key informants described how participants who were initially strangers formed friendships and kept in touch after delivering their babies. Another strength was the educational component of the CHI curriculum. Key informants believed that Centering, surrounded by a medical home model, teaches women "life skills in addition to learning about their specific pregnancy" that will "stay with families for the rest of their lives." Three Centering participants were of young maternal age (15 years old) who consistently came to their group visits and had healthy babies.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

TTUHSC encountered challenges related to administrative/evaluation requirements, project budget limitations, the intake process, enrollment and retention, staff buy-in, and inadequate community resources. The awardee staff team found that development of the Strong Start tracking database and project management required a major time investment, and duplication in documentation (CHW notes were entered into both the EMR and the Strong Start database) created a substantial paperwork burden.

Maternity Care Home: The greatest Maternity Care Home challenges were reaching participants after delivery and getting participants to return for their postpartum visits before their Medicaid/CHIP coverage ended. CHWs partially overcame this issue by visiting participants while still in the hospital after delivery with a gift bag, educating them about coverage end dates, and making an appointment for postpartum follow-up.

CHWs also found that they were sometimes unable to address important needs because of a lack of resources in the community. Affordable options for mental health, substance use treatment, and housing were extremely limited, and the only state substance use treatment program available had a years-long waiting list. In addition, family planning could be a challenging topic for CHWs to discuss with participants because some women had negative perceptions of family planning (often based on anecdotal information) or were discouraged from using contraception by their partners. The CHWs found it helpful to use March of Dimes materials and discuss the pros and cons of contraception options, and to try to involve the woman's partner in decisions. Other ongoing challenges included Medicaid transportation restrictions, lack of child care or after-hour services for working women, some patients' lack of prioritizing appointments, and difficulty reaching women whose phone numbers and addresses change frequently.

Given the multiple and varied needs of the participants, CHWs found that three in-person visits were insufficient, leaving twelve- to sixteen-week gaps between visits. Although they increasingly used phone and text communication between visits, the CHWs believed additional in-person meetings are necessary to maintain strong and effective relationships.

Group Prenatal Care: Despite various marketing efforts, enrollment in the Combest Center's Group Prenatal Care program remained low. Although a Centering Healthcare Institute (CHI) representative discussed participation issues with them, key informants reported that few women were coming to the Combest Center for prenatal care, and most pregnant patients were not interested in Centering and chose standard nurse-midwifery care. Many women had work/school schedule conflicts, and those who did enroll in Centering often missed group sessions. Participation actually declined over time despite handwritten invitations, phone calls, incentives, snacks, and discussing the group during standard prenatal visits. Key informants acknowledged the need to better connect and communicate with the community and consider hiring a Spanish-speaking provider.

SUSTAINABILITY

Key informants were confident that the CHW support component of their Maternity Care Home model would be continued and expanded to other patient populations, and that TTUHSC will continue to encourage Centering at the Combest Center despite difficulties attracting patients.

According to key informants, the president of the Health Sciences Center was very impressed with the internal Strong Start evaluation results and decided to expand the CHW model to non-maternity high- risk patients at all of TTUHSC's chronic care clinics as part of TTUHSC's Strategic Plan. Under this performance initiative, CHWs would be referred to as "Life Coaches" and provide support and referrals to high-risk patients. The Pavilion OB clinic and the Combest Center would continue to screen women (regardless of Medicaid eligibility) using the ACOG form for intake and the Strong Start criteria for high risk including prior preterm delivery or pregnancy loss, diabetes, and hypertension. One of the current Strong Start CHWs and a newly hired CHW would provide education, support and referrals to a broader high-risk patient base. For pregnant women, the awardee may continue to use some questions from Strong Start's third trimester and postpartum surveys about delivery plans, satisfaction, and breastfeeding plans to help them assess educational needs and evaluate their program. However, they do not expect to continue full data collection at the same level as under Strong Start. Short term funding for two CHWs was expected to come from the Health Sciences Center budget. TTUHSC would seek long term funding to cover additional CHWs (completing the School of Nursing's certified CHW educational program) for the OB and chronic care clinics from external, not-yet-determined sources.

Key informants planned to continue to try to expand Group Prenatal Care as the preferred model at the Combest Center, despite the fact that it became harder to maintain Centering patient participation over time. A new group began in early 2017 (after Strong Start ended), and some informants reported that women were not showing up to those sessions. However, another informant reported later that approximately five women were attending each Centering session and the number of women seeking prenatal care at the Combest Center was slowly increasing.

PARTICIPANT-LEVEL PROCESS EVALUATION

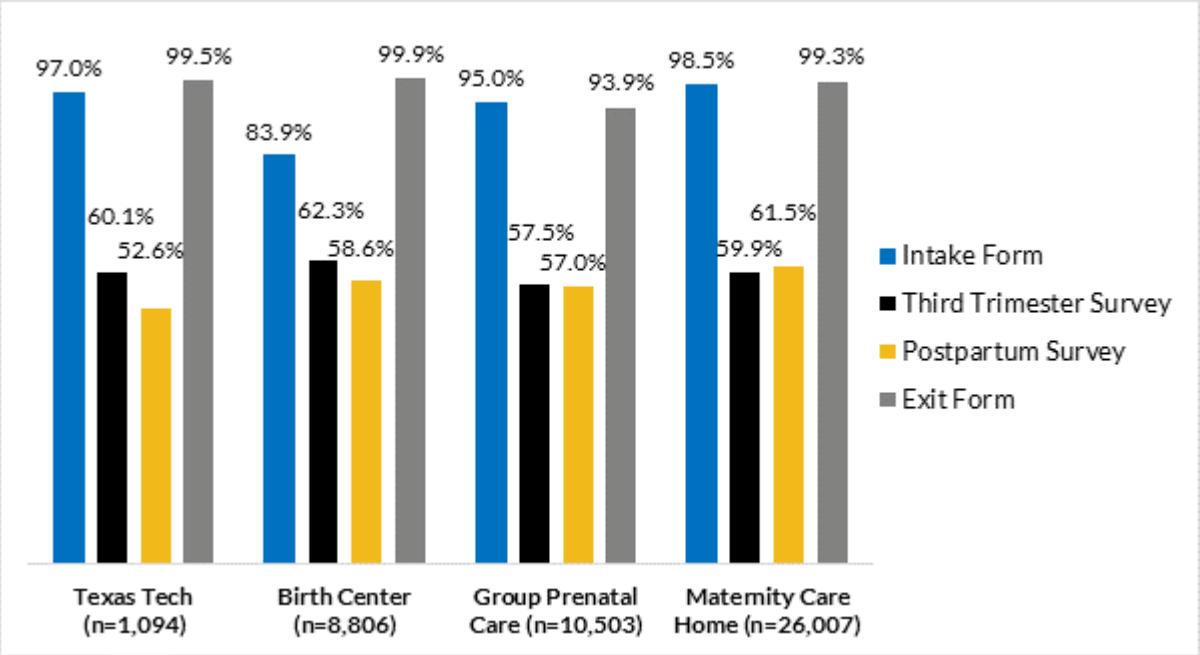
The tables and figures presented in this section summarize findings from the PLPE dataset for Texas Tech, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for Texas Tech to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).

- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 20 Texas Tech participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 19: FORM SUBMISSION RATES, TTUHSC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,103
- Study IDs represented: 1,094 (suggests that PLPE data were missing for nine participants: see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- Intake Form: Patients filled out Intakes on paper. Staff generally did not follow up with patients about skipped questions. We learned during case study discussions that they used a different form to collect Intake Information than that provided by the evaluation team, but the information they collected was compatible with what was requested by the evaluation team and was integrated into the PLPE dataset.
- Third Trimester and Postpartum Surveys: These surveys were sometimes completed by the patients on paper, and sometimes they were completed over the phone in interview format.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The evaluation team did not indicate any site-specific concerns.

MISSING FORMS:

- Intake Form: 3.0 percent of Study IDs were missing Intakes. The awardee said these participants never received an Intake assessment. but did not specify why.
- Third Trimester or Postpartum Survey: About 40 percent of Study IDs were missing the Third Trimester Survey and 47 percent were missing the Postpartum Survey. The awardee said that some surveys were missing because women had given birth prior to the forms being implemented. They also noted that postpartum visit attendance was low, but they tried to administer this survey over the phone.
- Exit Form: 0.5 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Form: About 33 percent of Study IDs were missing education level. The awardee noted that many of their participants did not have a college degree and some did not have a high school diploma, so they might have skipped those questions. The awardee observed that many participants indicated that they did not drink alcohol and skipped all the other questions in that section. Also, women who did not smoke or did not have a partner often skipped related to smoking and intimate partner violence.
- Exit Form: Data on Strong Start pregnancy outcome were missing for eight percent of participants.[115] The awardee had minimal missing data for EGA, delivery method and birthweight. More than 65 percent of participants are missing infant date of birth on the crosswalk, from which EGA was calculated.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes of Texas Tech participants. Some highlights include:

- The majority of Texas Tech participants (75.5 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 11.5 percent of participants were 18 or 19 years old.
- Most participants were Hispanic (59.6 percent), followed by 23.0 percent white and 14.4 percent black.

[115] Among participants with missing data on pregnancy outcome, 6.7% were missing because they did not have an exit form, 84.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 9.3% were missing for other reasons.

- Similar to Strong Start participants overall, the largest share of Texas Tech participants was in a relationship and living with a partner (34.1 percent), while 19.2 percent were married and 22.8 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 19.9 percent of Texas Tech participants reported having experienced intimate partner violence, 29.7 percent of participants with a prior birth had a prior preterm birth, and 72.6 percent of participants had not planned their Strong Start pregnancy.

TABLE 295: DEMOGRAPHICS, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	4.6	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,025**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	5.7	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	11.5	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	75.5	81.7	72.9	75.1	75.8
35 Years and Older	%	7.3	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	7.6	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**992**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	59.6	25.4	37.1	28.0	29.7
Non-Hispanic White	%	23.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	14.4	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.0	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	15.0	19.6	12.8	11.3	13.3
Not in Universe	%	30.0	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**591**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	25.0	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	74.3	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	3.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,041**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	7.7	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**991**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	36.5	36.6	30.8	35.3	34.5
In School, Not Employed	%	8.7	8.7	12.6	11.9	11.5
Employed and in School	%	4.6	5.7	5.5	5.4	5.5

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Neither Employed nor in School	%	50.2	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	10.9	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**957**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	30.7	15.4	27.8	29.1	26.4
High School Graduate or GED	%	52.9	57.5	58.3	57.9	57.9
Associate's Degree	%	3.0	8.2	5.2	4.6	5.4
Bachelor's Degree	%	2.5	14.5	4.5	3.7	5.8
Other College Degree	%	10.9	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	5.1	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,019**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	23.9	42.1	20.4	20.8	24.5
Living with a Partner	%	34.1	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	19.2	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	22.8	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 296: PSYCHOSOCIAL, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	4.2	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,029**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	35.1	51.8	51.8	59.7	56.5
No	%	63.9	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	4.2	17.0	6.6	3.4	6.8
Not in Universe	%	62.2	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**361**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	63.2	61.1	72.6	79.9	75.3
Other	%	30.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	6.1	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	8.5	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**983**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	11.5	10.7	10.1	13.2	12.1

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Food Insecure at Intake						
Missing Data	%	14.8	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**915**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	23.2	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	5.6	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,014**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	47.0	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	25.1	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**804**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	26.0	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	17.5	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**886**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	64.1	67.9	59.0	65.5	64.5
Mild	%	19.9	21.4	23.8	20.2	21.2
Moderate	%	7.6	6.8	10.3	8.5	8.6
Severe	%	6.4	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	2.0	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	14.4	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**919**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	19.9	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	14.8	18.3	16.3	7.7	11.8
Not in Universe	%	16.3	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**740**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	-	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	3.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,041**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	71.9	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	22.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	5.4	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	47.8	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	6.1	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	21.5	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	18.8	24.6	17.1	15.4	17.2
Childcare Challenges	%	12.6	19.8	9.8	7.9	10.1

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	16.0	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 297: PREGNANCY HISTORY AND INTENTIONS, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.6	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,068**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	77.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	22.8	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	3.7	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**789**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	35.5	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	3.8	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**788**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	4.2	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	6.6	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**758**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	7.8	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	43.8	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**359**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	23.4	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	43.9	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**357**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	22.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	49.6	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**296**	**3,428**	**2,759**	**6,467**	**12,654**

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	6.8	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	51.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**281**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	50.9	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**282**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 298: PRIOR BIRTH OUTCOMES, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	22.9	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**823**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	91.3	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	19.8	23.5	18.9	15.2	17.7
Not in Universe	%	28.7	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**553**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	36.7	34.6	24.3	27.1	28.1
>= 18 months	%	63.3	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.7	0.1	2.5	1.4	1.4
Not in Universe	%	30.1	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**744**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	29.7	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	9.5	1.3	20.8	13.1	12.6
Not in Universe	%	29.8	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**652**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	16.4	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 299: PRE-PREGNANCY MEDICAL CONDITIONS, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	6.7	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,002**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	27.4	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	63.0	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	8.8	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	12.6	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**939**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	14.8	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	8.9	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**978**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	8.9	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	7.9	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**989**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	2.8	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	30.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	24.9	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	33.3	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	8.8	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 300: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	10.1	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**966**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	7.0	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	9.5	0.7	26.5	20.9	18.2

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**972**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	10.5	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	13.0	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**934**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	15.6	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	10.9	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**957**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	4.9	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	11.1	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**955**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	12.1	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**944**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	2.8	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	12.6	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**939**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	6.8	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	9.9	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**968**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	43.4	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 301: TREATMENTS DURING PREGNANCY, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	6.7	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,002**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	1.8	0.8	10.0	5.1	5.4
Not in Universe	%	79.0	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**207**	**680**	**654**	**2,585**	**3,919**

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	6.7	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,002**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	6.6	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,003**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 302: PRENATAL CARE, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	0.5	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,069**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	99.9	4.7	29.5	64.5	43.3
Licensed Professional Midwife[116]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.5	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,069**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	93.2	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	11.2	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.5	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,069**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	5.0	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	11.8	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	5.8	0.6	31.8	8.6	12.4

[116] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,012**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	96.0	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	3.6	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	98.9	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**12**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	98.6	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**15**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	75.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**268**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	98.5	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.7	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	74.7	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**272**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	98.5	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.3	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	98.8	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**13**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	98.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**15**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	99.1	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**-**	**8,152**	**6,511**	**17,470**	**32,133**

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	98.4	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**17**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	-	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	-	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 303: DELIVERY INFORMATION, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C sections)						
Missing Data	%	1.9	1.4	25.3	23.3	19.5
Not in Universe	%	16.4	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**877**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	27.5	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.7	0.3	7.8	2.9	3.5
Not in Universe	%	77.1	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**238**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	92.9	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	0.6	4.6	11.5	7.3	7.7
Not in Universe	%	8.3	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**979**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.4	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	4.5	0.7	12.0	5.6	6.1
Not in Universe	%	8.3	25.8	15.8	18.2	19.2

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**937**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	80.5	87.1	70.1	69.5	73.1
C-Section	%	19.5	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	1.3	0.4	8.7	2.3	3.4
Not in Universe	%	74.9	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**256**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	88.3	83.3	72.9	74.7	75.9
C-Section	%	11.7	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	1.4	4.7	12.5	6.3	7.4
Not in Universe	%	82.5	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**173**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	50.9	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.5	0.1	6.2	0.7	1.9
Not in Universe	%	82.2	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**186**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	32.3	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 304: BIRTH OUTCOMES, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	7.0	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**999**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	97.1	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	1.9	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	2.6	0.7	15.4	5.8	7.0
Not in Universe	%	9.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**947**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.2	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	7.8	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	86.8	93.4	86.7	85.7	87.4
Post-Term (42+)	%	2.2	2.0	1.4	1.3	1.5

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.1	2.1	14.3	8.0	8.3
Not in Universe	%	9.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**942**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.6	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	5.8	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	87.5	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	5.1	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 305: SATISFACTION, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	48.9	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**549**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	2.4	0.4	1.0	1.3	1.0
Moderately Satisfied	%	19.3	3.3	4.4	7.8	6.2
Very Satisfied	%	49.7	25.6	35.6	46.1	39.8
Extremely Satisfied	%	27.3	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	48.6	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**552**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	2.7	2.0	3.1	2.3	2.4
Slightly Satisfied	%	3.1	3.0	4.0	2.9	3.1
Moderately Satisfied	%	23.4	10.4	11.6	12.8	12.1
Very Satisfied	%	47.1	29.1	42.6	46.6	42.1
Extremely Satisfied	%	23.7	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 306: BREASTFEEDING, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	40.0	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**644**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	55.6	80.4	47.5	40.5	50.3

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Formula Feed Only	%	16.5	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	19.6	10.8	31.9	32.5	27.8
I Haven't Decided	%	8.4	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	47.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**562**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	73.7	91.5	76.6	72.6	77.3
No	%	26.2	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 307: FAMILY PLANNING, TTUHSC

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	48.3	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**555**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	84.1	77.0	77.5	82.2	80.3
No	%	15.3	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	47.8	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**561**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	90.4	84.2	70.8	74.0	75.5
No	%	7.8	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	47.5	41.5	42.9	38.6	40.2
Not in Universe	%	5.3	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**507**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	19.9	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	15.6	2.8	11.4	10.9	9.2
LARC - IUD	%	15.2	10.8	11.9	12.3	11.9
Pills	%	15.6	8.6	11.9	13.0	11.8
Injection	%	16.0	5.9	16.2	20.2	16.2
Condoms	%	6.9	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-

Data Elements	N or %	Texas Tech (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Other Method	%	6.7	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Texas

Initial Contact: The Texas Health and Human Services Commission (HHSC) was receptive to supporting the Strong Start evaluation when introduced to the project in March 2015. HHSC had previous experience in creating linked data files that employed birth certificate and Medicaid data but identified the linking of birth certificate data for infants with their respective mothers as a challenge. In April 2015, administrators at HHSC introduced the evaluation team to the Texas Department of State Health Services (DSHS) who agreed to assist with the linking of Strong Start participation and comparison group demographic information with infant birth certificate data and then merging these data with Medicaid eligibility and claims data from HHSC.

Data Acquisition Process: The Texas Vital Records Agency notified Urban in November 2015 that the evaluation team needed to obtain IRB approval prior to executing a data use agreement (DUA) to allow for the sharing of birth certificate data. An IRB application was submitted within a month of this notice, but approval of the application took nearly one-and-one-half years and did not occur until April 2017. That same month, upon receiving IRB approval, the evaluation team submitted a Memorandum of Understanding (MOU) to Medicaid for review and approval. Over the ensuring months, Medicaid waited for input on the MOU from Vital Records, but the agency was unresponsive. The evaluation team worked to determine the cause of the delay so the data request process could continue. A DUA and Scope of Work with Medicaid was finally drafted in November 2017 and signed by all parties. However, after submission of the DUA, Medicaid reported that, due to leadership changes, new data request and review protocols were being developed.

Final Result: Ultimately, Texas officials were not able to complete their interagency review and approval processes in time to be able to include their data in the analysis; therefore, no analysis of the impacts of Texas' Strong start awardees is included in the final report.

(This summary is identical to that appearing for Harris County Hospital District.)

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Texas Tech University Health Sciences Center.

CROSS-CUTTING SUMMARY

The Texas Tech University Health Sciences Center implemented the Group Prenatal Care and Maternity Care Home models under Strong Start. The awardee's Group Prenatal Care intervention followed the *CenteringPregnancy* curriculum and thus, in addition to medically-focused check-ups, provided intensive education on topics such as nutrition, stress reduction, childbirth preparation, pregnancy complications, breastfeeding, family planning, and postpartum depression. Under Texas Tech's Maternity Care Home intervention, CHWs provided six to ten care coordination encounters (including several home visits) as well as enhanced psychosocial support. CHWs provided health and nutrition education and materials (e.g., a program guide to reduce smoking), assistance with food sources, referrals to housing and other resources, and emotional support. The majority of Texas Tech participants were Hispanic and many had nutritional needs, as evidenced by high rates of food insecurity and obesity. Texas Tech referred high risk, low-income patients who were first-time mothers to the Nurse Family Partnership instead of Strong Start, which likely contributed to a higher than average share of women with a prior birth. These women also had especially high rates of prior preterm birth, prior low birth weight birth, and short inter-pregnancy interval. Despite enrolling a high proportion of women with these risk factors, Texas Tech had C-section rates that were especially low compared to other Strong Start awardees, while VBAC rates were especially high. Texas Tech participants also had similar rates of preterm birth to Strong Start participants overall and lower rates of low birth weight. Despite serving a high-risk Medicaid population, the Texas Tech rate of low birth weight (7.4 percent) is lower than the national average for all U.S. women (8.2 percent). Impact analysis was not conducted for Texas Tech because we were unable to obtain birth certificate and Medicaid data from Texas state agencies.

United Neighborhood Health Services

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,174	• Federally Qualified Health Center founded in 1976
	• Approximately half the patients across sites are African American; approximately half are immigrants, including a significant population of monolingual Spanish-speaking patients
		• Eight sites across Nashville, TN	• Intervention categorized as "medium intensity" for offering four care coordination, education and/or referral encounters, with no other direct enhanced services
			  • Encounters were with a health coach throughout pregnancy (typically at intake, 20 weeks, and 24 weeks' gestation) immediately preceding or following appointment with provider
			  • Health coaches provide care coordination and referrals to WIC, housing, transportation, and other social services
			  • Health coaches provide a postpartum visit either in the clinic or at home

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Health coaches provided additional support and an opportunity to discuss issues that participants did not raise with their provider
- Many participants appreciated prenatal care "booklets" developed by Strong Start staff and thought the information contained in the booklets helped them have healthy pregnancies

CHALLENGES

- Data collection was burdensome, although UNHS found that hiring a data analyst helped free up provider and health coach time
- Late entry to care was common and made it challenging to deliver the full Strong Start intervention

PARTIALLY SUSTAINED

- Health coaches left their roles, but the clinics now employ care managers who deliver similar services to UNHS' prenatal population and other patients

KEY FINDINGS: PARTICIPANT-LEVEL DATA[117]

PARTICIPANT-LEVEL DATA QUALITY

- 0.3% rate of missing intake forms; 0.1% rate of missing exit forms
- 4.1% rate of item nonresponse on intake forms; 5.5% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 14.3% of women were teens (under age 20); 11.5% were 35 years or older
- 34.3% of women were black; 52.1% were Hispanic; 11.3% were white
- 29.6% of women were married; 34.5% were living with a partner; 14.4% were not in a relationship
- 18.4%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 27.3%: C-section rate among women with a delivery
- 13.7%: preterm birth rate among women with a live birth
- 7.6%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Higher average gestational ages and better Apgar scores than the comparison group
- Findings from site-level estimates for Cayce Clinic – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Lower average prenatal care expenditures, fewer ED visits and hospitalizations in the prenatal period, and more hospitalizations 11 months after the delivery month than women in the comparison group – all findings, except for ED visits in the prenatal period, are marginally significant (p-value<0.10).
- Findings from site-level estimates for Cayce Clinic – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

[117] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Under its pre-Strong Start prenatal care model, UNHS patients received traditional maternity care from a provider. Before Strong Start, none of the UNHS clinics offered care coordination, health coaching, or social service referrals.

As an FQHC, UNHS offers "comprehensive family care" which includes prenatal and well-child services. When Strong Start began, UNHS employed two obstetricians, three family practice physicians, and one certified nurse midwife who provided prenatal care. It also offered dental care at two sites, and substance abuse treatment at two downtown clinics for the homeless (substance abuse treatment services were not co-located at any of the 8 clinics where prenatal care was offered, but Strong Start participants could technically access services at any of the UNHS sites). Additionally, mental health services were provided at all UNHS clinics.

UNHS providers did not attend births, and at the beginning of the program, pregnant women selected a local hospital for their birth, and transferred care to that hospital between 28 and 32 weeks' gestation. In the second year of Strong Start implementation, UNHS shifted its model to retain patients up until delivery, at which point patients went to their pre-selected delivery hospital for the birth, where they were attended by a hospitalist. Additionally, UNHS strengthened its relationship with one local hospital (St. Thomas), and all women enrolled at UNHS began delivering at St. Thomas exclusively.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Under Strong Start, UNHS implemented a Maternity Care Home model. Health coaches were the centerpiece of this intervention. At the start of Strong Start, UNHS employed five full time staff on the grant – a program director (who hired, trained, and supervised staff), a program assistant (who was responsible for data and reporting), and three health coaches. Initially, all three health coaches were social workers. After Strong Start implementation began, program staff identified the need for a Spanish-speaking health coach and hired a bilingual Spanish-English Medical Assistant to serve as a fourth coach. Additionally, a Spanish interpreter joined the team to assist the other health coaches who did not speak Spanish. One key informant noted that Spanish-speaking staff were critical to the project not just because of their language skills but also for cultural reasons. One provider said of the bilingual coach, "Having someone who understands the culture of [Spanish-speaking patients] is really important. Our Latina patients don't ask many questions. They really trust the doctor. So, they tell the coach things they wouldn't tell [a provider]".

> "Recently, I met with [a health coach] when she came into one of my appointments when I was waiting for [the provider] to talk to me. She gave me little insights about how to deal with the baby and how to care for it. She didn't want me to worry about anything."
>
> *- Strong Start participant*

As part of the intervention, health coaches identified patient needs and provided a variety of services to meet those needs. These services included care coordination and referrals to social services

such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), housing and transportation assistance. They also provided general health education and some basic resources on family planning and breastfeeding (providers also talked to patients about family planning and breastfeeding).

The health coaches met with patients at least three times – typically at intake, at 20 weeks and at 24 weeks' gestation. The health coach sessions lasted about an hour and were usually conducted either before or after a prenatal care appointment. Most encounters occurred in person, although health coaches also spoke to some patients via phone after they had transferred care (in the first year of the program, when patients were transferring away from UNHS at the end of their second trimester). Health coaches attempted to remain connected with patients who were seeking care elsewhere to encourage them to return to UNHS for their postpartum care.

> "I like how they gave us booklets. I bring them everywhere with me. When you're a first-time mom, [you're] lost. When I started Strong Start, I got a lot of different booklets, like what to eat and look for during my first trimester. That was awesome. It helped a lot."
>
> *- Strong Start participant*

In partnership with several local community agencies, Strong Start program staff introduced optional classes for Strong Start enrollees. Classes were offered individually (as opposed to a series) and were typically one hour long. Program staff reported that participants were engaged in the classes and requested additional offerings, but despite enthusiasm among some patients, class size remained relatively small, with an average of about two to seven women per class. In the third year, the program employed a Family Nurse Practitioner (FNP) to serve as a certified lactation consultant and conduct a breastfeeding class for Strong Start participants. Strong Start staff also referred interested women to a breastfeeding class at Vanderbilt and the local health department, but the former was cost prohibitive for many patients and the latter was frequently full.

Finally, UNHS developed educational materials specifically for Strong Start enrollees. They developed four printed booklets – one for each trimester and one for postpartum – with information relevant to that gestational period. The health coaches used and referred to the booklets during their patient encounters, and Strong Start participants could keep the booklets. Program staff felt that these materials were useful for directing conversations with patients and also said patients appreciated having them to take home and refer to later.

OUTREACH AND ENROLLMENT

Health coaches advertised the Strong Start program at schools, neighborhood events, and health fairs. Most women came to UNHS for the first prenatal care appointment after their pregnancy was already confirmed (frequently at the health department). Immediately following the first prenatal care appointment, health coaches met with patients to describe Strong Start and screen them for eligibility. Initially, women were eligible if they were Medicaid/CHIP-insured (or eligible) and met the gestational age requirements (under 24 weeks). However, UNHS found that many women were entering care later

in their pregnancies[118] and so program staff altered the eligibility requirements so that women who were up to 28 weeks pregnant could enroll.

> "I met with my provider and then another lady came in and told me about Strong Start. I didn't know what it was because it was still new. I told them that I would think about it."
>
> *- Strong Start participant*

UNHS used an opt-out approach to enrollment. Providers described the health coach services, which were presented as an integral part of UNHS's prenatal care approach. The program was introduced to all patients, but only women who qualified and completed the evaluation forms were officially enrolled in Strong Start. Program staff intentionally tried to enroll patients at their first visit to engage them right away and get them connected with a health coach before they "lose interest." There was no formal consent process, but women could decline services at any time. Strong Start staff told women they would receive a gift (donated baby clothing, diapers, and wipes) at the postpartum visit if they had completed all four visits with a health coach. Program staff reported that very few women declined the enhanced services. Although few women declined, UNHS still faced some challenges related to enrollment. Staff turnover and logistical and scheduling challenges meant there was not always a health coach present to enroll or meet with potential participants. This issue was somewhat ameliorated when UNHS developed a more effective scheduling system for health coaches who worked across the participating clinics.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants interviewed for this study felt UNHS' preterm and low birthweight rates were still too high and were unsure about Strong Start's ability to influence those rates. They observed the many factors that were "working against" improvements in these outcomes but which they did not design their Strong Start intervention to address, such as medical risks. However, in the final year of the project, key staff reported significant drops in low birthweight rates, and perceived that Strong Start may have had an influence. The intervention had not changed in that final year, but one informant thought it may have taken a few years for the intervention to "kick in."

UNHS key informants were more confident that their Maternity Care Home model positively influenced rates of breastfeeding. The clinics employed an FNP certified as a lactation consultant who provided care to many Strong Start enrollees and also received referrals from the health coaches.

Informants thought that Strong Start could also improve rates of family planning counseling but noted that most family planning care came from prenatal care providers, not health coaches. Program staff were very enthusiastic about UNHS's collaboration with a local program called Step Ahead that provided free long-acting reversible contraceptive (LARC) services to anyone who needed them.

[118] According to the Strong Start program monitoring data, 47 percent of enrollees entered prenatal care before 13 weeks of gestation and 67 percent before 19 weeks of gestation. A similar trend is found in the Strong Start Participant-Level Process Evaluation data, which shows that 41 percent of enrollees entered care in the first trimester and 64 percent before the end of the second trimester.

STRONG START PARTICIPANT PERSPECTIVES

Many women chose to receive care at UNHS because the clinics accepted uninsured patients, and/or they had heard positive things about UNHS from their friends or family. Many were uninsured when they began prenatal care, and health coaches helped them apply for Medicaid or CHIP. Some program participants recalled hearing about Strong Start at their first appointment, but others did not recall hearing specifically about the program and thought that health coaches were part of UNHS's standard model of care.

> *I remember my [health coach] because I loved her. She told me that after I had the baby, the program would come out and check on me and the baby. That's what convinced me to stay with UNHS.*

Most women spoke positively of their relationships with health coaches, although most did not feel close to their coach or communicate with them outside of clinic. Many participants especially appreciated the booklets that health coaches distributed for each trimester, and many also described the process of setting personal goals at their first meeting with the health coach.

> *[The booklet] is how I know what to ask about. I read through it and then highlight the places where I want to ask questions.*

> *At my first meeting, we had a paper to write down our goals. That was helpful. I wrote down [that I wanted to] have a healthy baby.*

Overall, women were pleased with the care they received at UNHS and their relationships with the health coaches. Some women compared Strong Start favorably to past pregnancies and said they appreciated the extra support. However, several women expressed frustration that they had to transfer care for delivery and that they could not get an ultrasound at UNHS.

> *I think they genuinely care and want to help you and make sure it's an easier process on you. I like it. It's helpful.*

PROGRAM STRENGTHS

Key informants were proud that they believed they were beginning to observe some significant improvements in clinical outcomes in the final year of the program. They were also proud that the Strong Start approach had begun to be accepted and appreciated throughout the UNHS sites and at all staff levels. Many key informants spoke highly of the booklets that the team had developed as part of Strong Start. They believed that program participants appreciated the booklets and felt empowered to ask questions at their appointments. Program staff also described health coaches as dedicated and "a good fit for the population," and said they were critical for program success.

Additionally, key informants noted that Strong Start allowed UNHS to strengthen their relationship with a St. Thomas hospital and improve referral and communication patterns for their shared patients. This relationship allowed for greater continuity of care for patients and providers, which key informants thought improved quality of care overall. Program staff thought that Strong Start specifically helped to encourage this relationship.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Program staff felt that data collection for Strong Start was burdensome and difficult toward the beginning of the program. In response to this challenge, UNHS hired a dedicated data analyst to manage program and evaluation data, which freed up providers and health coaches to support patients.

Key informants also reported that it took some time to find health coaches who fit well within the program. Once they were in place, however, the program seemed to "gel," according to awardee staff.

Although it wasn't a key Strong Start outcome, UNHS was interested in improving early entry into prenatal care. Key informants reported that almost a third of their patients did not access prenatal care until their second trimester, despite a broad "in-reach" strategy and same-day appointment scheduling. Strong Start staff wanted to improve the rate of early entry into prenatal care, and acknowledged that it made it difficult to deliver the full spectrum of Strong Start services when women entered care later.

SUSTAINABILITY

Many services provided under Strong Start are being maintained at UNHS's sites (including all seven of the clinics that participated throughout the project period), thanks to a state Medicaid value-based payment reform pilot that began on January 1st, 2017. The pilot provides per member per month payments to clinics to support implementation of the patient centered medical home model. UNHS planned to use these funds to support care management both for its prenatal population and for "high utilizers" with chronic conditions. UNHS did not plan to continue with the data collection processes that were in place as part of Strong Start. Following the conclusion of Strong Start, care managers (similar to health coaches) were expanded to all 12 UNHS clinics. However, most of the existing health coaches left UNHS for other positions because of a funding gap between Strong Start and the new Medicaid pilot. As a result, most of the care managers are new hires. For the prenatal population, UNHS planned to maintain the same structure introduced under Strong Start – each enrollee would receive at least three encounters during pregnancy and one postpartum encounter. Finally, the clinics continued to distribute the booklets they created for Strong Start participants in the new program.

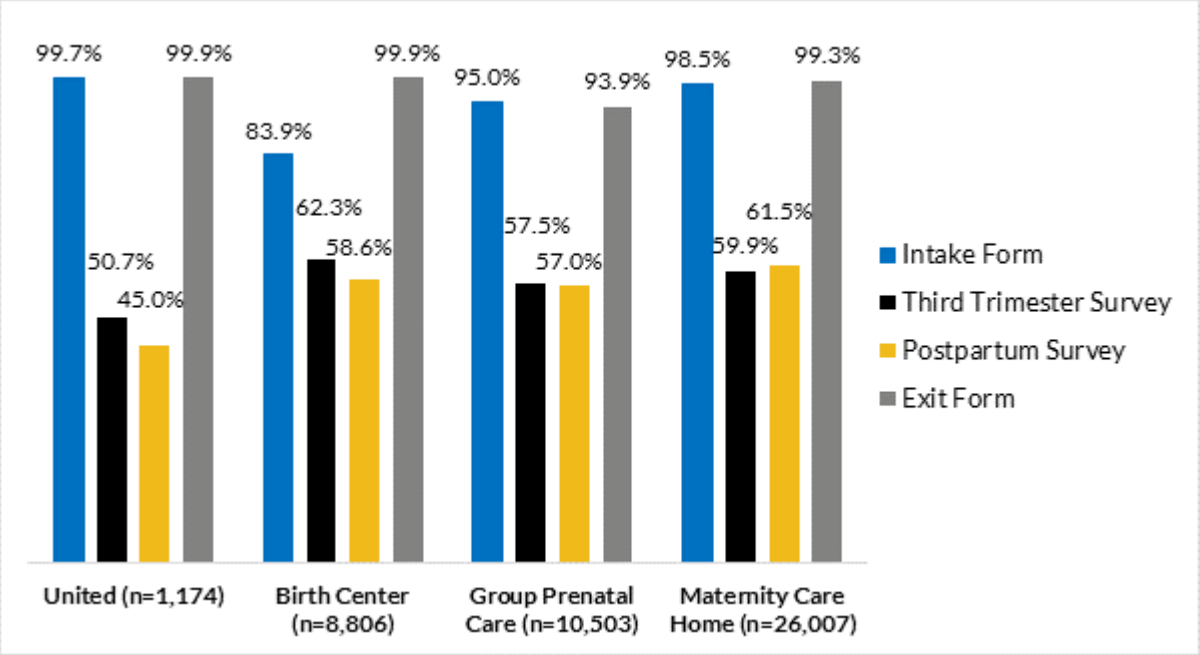
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for UNHS, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for UNHS to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 16 UNHS participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 20: FORM SUBMISSION RATES, UNHS



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,207
- Study IDs represented: 1,174 Study IDs (Suggests that PLPE data was not submitted for 33 participants; see information on program report data in Appendix F in Volume 1)
- The awardee said that in the first few months of Strong Start, there were cases where women were enrolled in the program but did not complete Intake Forms, so they were not assigned Study IDs. Those women were still counted toward the program enrollment total.

HOW FORMS WERE ADMINISTERED:

- Health Coaches administered the Intake Form, Third Trimester Survey, and Postpartum Survey in-person with participants; They used the interview as an opportunity to discuss the results.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee team did not indicate that there were any site-specific concerns or differences.

MISSING FORMS:

- Intake Forms: 0.3 percent of Study IDs were missing Intake Forms. The awardee attempted to locate and resubmit copies of the Intake Forms but was not able to do so.
- Third Trimester or Postpartum Surveys: About 49 percent of Study IDs were missing the Third Trimester Survey and 55 percent were missing the Postpartum Survey. The awardee had some participants who transferred care, delivered with other providers, or were lost to follow-up, which meant that these surveys were not completed.
- Exit Forms: 0.1 percent of Study IDs were missing Exit Forms. The awardee attempted to locate and resubmit copies of the Exit Forms but was not able to do so.

ITEM NONRESPONSE:

- Intake Forms: The awardee indicated that participants may have been reluctant to answer questions they feared might cause them to lose custody of their babies. They also said that many participants had low education levels and may have been uncomfortable answering those questions (education level was missing for nearly 19 percent of participants).
- Exit Forms: The awardee had some participants who transferred care, delivered with other providers, or were lost to follow-up. As a result, Strong Start pregnancy outcomes are missing for 20.3 percent of participants.[119]

[119] Among participants with missing data on pregnancy outcome, 0.4% were missing because they did not have an exit form, 95.7% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 3.8% were missing for other reasons.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for UNHS participants. Some highlights include:

- The majority of UNHS participants (74.2 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 11.5 percent of participants were 35 or older.
- Most participants were Hispanic (52.1 percent), followed by 34.3 percent black and 11.3 percent white.
- Similar to Strong Start participants overall, the largest share of UNHS participants was in a relationship and living with a partner (34.5 percent), although 29.6 percent were married and 14.4 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 14.9 percent of UNHS participants reported having experienced intimate partner violence, 18.4 percent of participants with a prior birth had a prior preterm birth, and 64.5 percent had an unintended pregnancy.

TABLE 308: DEMOGRAPHICS, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.3	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,155**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	5.3	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	9.0	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	74.2	81.7	72.9	75.1	75.8
35 Years and Older	%	11.5	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.9	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,136**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	52.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	11.3	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	34.3	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	2.3	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	5.0	19.6	12.8	11.3	13.3
Not in Universe	%	43.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**592**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	54.2	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	44.4	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Living in Shelter or Homeless at Intake						
Missing Data	%	0.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,155**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.9	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	2.5	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,129**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	33.8	36.6	30.8	35.3	34.5
In School, Not Employed	%	8.4	8.7	12.6	11.9	11.5
Employed and in School	%	4.5	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	53.2	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	18.7	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**941**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	38.6	15.4	27.8	29.1	26.4
High School Graduate or GED	%	48.5	57.5	58.3	57.9	57.9
Associate's Degree	%	1.9	8.2	5.2	4.6	5.4
Bachelor's Degree	%	3.5	14.5	4.5	3.7	5.8
Other College Degree	%	7.5	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	1.6	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,140**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	29.6	42.1	20.4	20.8	24.5
Living with a Partner	%	34.5	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	21.5	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	14.4	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 309: PSYCHOSOCIAL, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	2.1	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,134**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	33.6	51.8	51.8	59.7	56.5
No	%	64.6	44.6	42.3	37.4	39.8
Unsure	%	1.9	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	2.1	17.0	6.6	3.4	6.8
Not in Universe	%	65.0	40.0	45.0	38.9	40.5

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**381**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	52.2	61.1	72.6	79.9	75.3
Other	%	35.4	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	12.3	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	2.7	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,127**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	10.9	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	7.5	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,071**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	11.0	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	6.0	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,089**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	24.1	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	7.7	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,069**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	13.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	4.1	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,111**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	81.0	67.9	59.0	65.5	64.5
Mild	%	12.4	21.4	23.8	20.2	21.2
Moderate	%	3.3	6.8	10.3	8.5	8.6
Severe	%	2.6	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	4.4	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,107**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	14.9	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	7.1	18.3	16.3	7.7	11.8
Not in Universe	%	8.4	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**979**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	1.1	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.3	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,155**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	79.6	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	17.5	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	2.9	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	69.5	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	6.4	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	7.6	16.1	19.9	20.8	19.9

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Work Hours Make It Difficult	%	9.7	24.6	17.1	15.4	17.2
Childcare Challenges	%	-	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	23.7	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 310: PREGNANCY HISTORY AND INTENTIONS, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,158**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	73.2	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	26.7	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	9.4	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**740**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	33.2	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	10.2	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**731**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	9.3	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	15.9	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**665**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.7	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	50.0	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**270**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	16.7	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	51.5	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**253**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	11.1	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	53.5	34.9	43.8	47.4	44.1

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**229**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	53.7	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**227**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	53.5	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**229**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 311: PRIOR BIRTH OUTCOMES, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	26.8	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**842**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	89.9	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	6.7	23.5	18.9	15.2	17.7
Not in Universe	%	34.4	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**682**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	22.4	34.6	24.3	27.1	28.1
>= 18 months	%	77.6	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.4	0.1	2.5	1.4	1.4
Not in Universe	%	34.6	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**752**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	18.4	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	11.2	1.3	20.8	13.1	12.6
Not in Universe	%	34.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**628**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	11.5	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 312: PRE-PREGNANCY MEDICAL CONDITIONS, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	1.7	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,138**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	35.5	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	57.8	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	6.2	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	9.5	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,048**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	2.6	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	9.2	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,052**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	5.7	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	1.1	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,145**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.2	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	34.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	29.7	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	26.2	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	6.4	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 313: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	32.8	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**778**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	3.5	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	32.4	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**783**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	4.7	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	32.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**786**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	6.6	2.8	6.0	7.9	6.3

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cervical Incompetence						
Missing Data	%	62.8	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**431**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	61.1	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**450**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	3.1	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	64.9	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**406**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	57.5	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**492**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	36.7	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**733**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	8.2	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 314: TREATMENTS DURING PREGNANCY, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	54.4	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**528**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	6.6	0.8	10.0	5.1	5.4
Not in Universe	%	88.0	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**62**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	54.3	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**529**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	54.3	1.5	43.7	49.1	38.5

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**529**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 315: PRENATAL CARE, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	6.0	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,089**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	50.4	4.7	29.5	64.5	43.3
Licensed Professional Midwife[120]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	23.1	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	1.8	74.6	37.5	18.3	35.2
Family Medicine Physician	%	24.3	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,157**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	98.4	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	5.7	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,157**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.5	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,152**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	96.2	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	4.0	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	3.0	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,123**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	4.8	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.7	1.9	1.7	2.4	2.3

[120] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Doula Encounters						
Missing Data	%	3.3	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,120**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	2.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,135**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	4.8	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	4.2	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	1.5	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,141**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	2.0	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.0	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	1.6	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,139**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	1.1	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	2.2	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	1.8	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,137**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	3.9	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.4	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	2.2	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,132**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	8.2	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,063**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	11.1	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.1	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	80.9	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	22.6	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 316: DELIVERY INFORMATION, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	28.9	1.4	25.3	23.3	19.5
Not in Universe	%	34.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**429**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	27.7	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	3.9	0.3	7.8	2.9	3.5
Not in Universe	%	89.6	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**75**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	85.3	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	2.1	4.6	11.5	7.3	7.7
Not in Universe	%	27.9	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**811**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.5	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.6	0.7	12.0	5.6	6.1
Not in Universe	%	27.9	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**805**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	72.7	87.1	70.1	69.5	73.1
C-Section	%	27.3	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	1.0	0.4	8.7	2.3	3.4
Not in Universe	%	79.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**224**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	76.3	83.3	72.9	74.7	75.9
C-Section	%	23.7	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	8.5	4.7	12.5	6.3	7.4
Not in Universe	%	80.9	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**122**	**429**	**1,586**	**4,495**	**6,510**

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	58.2	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Not in Universe	%	87.4	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**145**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	16.6	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 317: BIRTH OUTCOMES, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	20.3	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**923**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	90.0	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	8.8	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	4.0	0.7	15.4	5.8	7.0
Not in Universe	%	28.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**786**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.9	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	9.8	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	82.3	93.4	86.7	85.7	87.4
Post-Term (42+)	%	3.9	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.7	2.1	14.3	8.0	8.3
Not in Universe	%	28.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**789**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.5	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	6.1	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	83.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	8.5	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 318: SATISFACTION, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	58.2	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**484**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	8.1	3.3	4.4	7.8	6.2
Very Satisfied	%	53.5	25.6	35.6	46.1	39.8
Extremely Satisfied	%	37.4	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	58.3	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**483**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	11.2	10.4	11.6	12.8	12.1
Very Satisfied	%	54.5	29.1	42.6	46.6	42.1
Extremely Satisfied	%	32.5	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 319: BREASTFEEDING, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	50.8	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**570**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	31.9	80.4	47.5	40.5	50.3
Formula Feed Only	%	16.3	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	47.0	10.8	31.9	32.5	27.8
I Haven't Decided	%	4.7	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	57.4	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**493**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	80.3	91.5	76.6	72.6	77.3
No	%	17.8	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 320: FAMILY PLANNING, UNHS

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	58.1	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**485**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	United (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	77.7	77.0	77.5	82.2	80.3
No	%	15.1	20.0	14.0	14.2	15.3
Unsure	%	7.2	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	57.5	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**492**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	75.8	84.2	70.8	74.0	75.5
No	%	18.3	13.2	17.7	21.5	19.1
Unsure	%	5.9	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	55.4	41.5	42.9	38.6	40.2
Not in Universe	%	12.3	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**373**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	4.3	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	7.2	2.8	11.4	10.9	9.2
LARC - IUD	%	22.8	10.8	11.9	12.3	11.9
Pills	%	13.9	8.6	11.9	13.0	11.8
Injection	%	8.8	5.9	16.2	20.2	16.2
Condoms	%	19.8	26.6	19.8	13.9	17.9
Breastfeeding	%	8.0	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	9.4	16.7	8.1	9.5	10.9
Method Not Indicated	%	3.2	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Tennessee

Initial Contact: In April 2015, the evaluation team spoke with the Division of Policy, Planning, and Assessment within the Tennessee Department of Health (TDH) to learn about the state's willingness to participate in the Strong Start evaluation and the process for releasing state Medicaid, CHIP, and birth certificate data to Urban for its impact analysis. State officials were receptive to supporting the evaluation, and the Office of Vital Records said that it would be able to link Medicaid and birth certificate data on our behalf.

Data Acquisition Process: The evaluation team submitted a data request form to Vital Records in June 2015 and submitted an IRB application to the TDH in January 2016. After the standard 12-week review process, the IRB office requested revisions to the application in May 2016, which were submitted in August 2016. Following IRB approval, an official data request application was completed in October 2016. In December 2016, the Medicaid Agency shared its claims file for Urban to review. At that time, the evaluation team also learned that an IRB application with the Medicaid agency would not be necessary. In January 2017, all parties agreed on a process of sharing, merging, and submitting the requested data files, with Vital Records submitting the merged files to Urban.

Final Result: Urban received the merged file in August 2017. Unfortunately, the file did not contain CHIP data. Urban reiterated its request for CHIP data; however, it was determined that receiving CHIP data was not feasible in the remaining timeframe of the evaluation. Urban included Medicaid eligibility and claims data and birth certificate data in the final year's impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The United Neighborhood Health Services (UNHS) awardee, which implemented the Maternity Care Home model, delivered care at seven sites included in the impacts analysis, as shown in Table 321. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Cayce Clinic site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 321).

TABLE 321: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR UNHS

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
United Neighborhood Health Services, Inc.			
Cayce Clinic	Yes	Yes	No
Main Street Clinic	Yes	No	No
Dickerson Road Clinic	Yes	No	No
Madison Clinic	Yes	No	No
Southside Clinic	Yes	No	No
Unity Clinic	Yes	No	No
Waverly Clinic	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [121]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we drew the comparison group outside the county (alternative specification #1) for this awardee.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

[121] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 322 reports the birth and process outcome findings for this awardee:

- Infants born to women enrolled in Strong Start at UNHS have a clinical gestational age of 38.6 weeks, which is 0.2 weeks more than that of infants born to women in the propensity-score reweighted comparison group. This difference is not statistically significant in the 2014-2015 claims sample (alternative specification #2) or in the claims sample that includes diagnoses control variables (alternative specification #3).
- Infants born to women enrolled in Strong Start at UNHS are 1.2 percentage point more likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group (99.1 vs. 97.9 percent).
- There are no other significant differences in birth and process outcomes between the two groups.

TABLE 322: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNHS

Outcomes	Main Model: 2014 - 2016, Strong Start (N=679)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=59751)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=276, N=27531)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=276, N=27531)
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.4	**0.2***	N/A	0.1	0.1
Preterm birth rate	10.2%	11.2%	-1.1	N/A	-1.1	-1.4
Very preterm birth rate	4.0%	3.1%	0.8	N/A	1.2	1.1
Birthweight (grams)	3,209.4	3,187.4	21.9	N/A	-17.6	-12.5
Low birthweight rate	8.5%	9.9%	-1.4	N/A	-1.5	-1.6
Very low birthweight rate	1.8%	1.7%	0.1	N/A	1.0	0.9
Rate of Apgar score greater than or equal to 7	99.1%	97.9%	**1.2****	N/A	**1.3^**	**1.6^**
Process Outcomes						
C-section rate	31.2%	31.7%	-0.5	N/A	**5.1^**	4.8

Outcomes	Main Model: 2014 - 2016, Strong Start (N=679)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=59751)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=276, N=27531)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=276, N=27531)
VBAC rate[1]	12.0%	13.4%	-1.4	N/A	**-5.2^**	**-5.2^**
Weekend delivery rate	23.9%	21.3%	2.6	N/A	2.1	1.9

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 108 Strong Start women and 9814 comparison group women.

As noted above, we no longer observe a difference in clinical gestational age in alternative specifications. When the sample is limited to the 2014-2015 claims sample (alternative specification #2), our estimated difference in Apgar score becomes less precise and we observe marginally higher rates of C-section (5.1 percentage points) and lower rates of VBAC (5.2 percentage points) among Strong Start women (p-value<0.10). The VBAC difference remained marginally significant after adding diagnoses controls from the claims data to the claims sample (alternative specification #3).

Table 323 reports the expenditure and utilization outcome findings for the awardee:

- Expenditures in the 8 months before the delivery period for women who enroll in Strong Start are $1,914, on average, which is $307 less than for women in the comparison group. This finding is only marginally significant (p-value<0.1).
- Women who enroll in Strong Start at UNHS have 0.30 fewer emergency department visits and 0.02 fewer hospitalizations in the prenatal period than women in the comparison group (1.26 versus 1.56 visits and 0.03 versus 0.05 hospitalizations). The difference in hospitalizations is only marginally significant (p-value<0.1).
- In the 11 months following the delivery month, women who enroll in Strong Start have 0.04 more hospitalizations than women in the comparison group (0.10 versus 0.07 hospitalizations). This finding is only marginally significant (p-value<0.10).

TABLE 323: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNHS

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=276)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=27531)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,914	$2,221	**-$307^**	N/A
Total expenditures during delivery period	$11,963	$11,577	$386	N/A
Total delivery and postdelivery expenditures[2]	$18,358	$17,323	$1,035	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.26	1.56	**-0.30****	N/A
Number of hospitalizations 8 months before delivery month	0.03	0.05	**-0.02^**	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.47	1.36	0.11	N/A
Number of hospitalizations for mother 11 months after delivery month	0.10	0.07	**0.04^**	N/A
Number of ED visits for infant in the first year of life	1.36	1.36	0.0	N/A
Number of hospitalizations for infant in the first year of life	0.08	0.08	-0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Site-specific birth and process outcome estimates (Table 324) for the Cayce Clinic site are generally consistent with the UNHS awardee-level estimates. However, there are three findings that are statistically significant in the site-level model that are not significant in the UNHS awardee-level model:

- Infants born to Strong Start women at Cayce are 3.2 percentage points less likely to be preterm compared to infants in the comparison group (9.2 percent versus 12.3 percent). This finding is marginally significant (p-value<0.1) in the main model and is not statistically significant in the alternative specification models.

- Women enrolled in Strong Start have higher weight babies (3,214 grams) than women in the comparison group (3,148 grams) by 66.3 grams. This finding is not statistically significant in the alternative specification models.
- Rates of cesarean section are 5.1 percentage points lower for women who enroll in Strong Start and receive care at Cayce (27.5 percent) than for women in the comparison group (32.6 percent). This finding is only marginally significant (p-value<0.1) and is not statistically significant in the alternative specification models.

TABLE 324: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT CAYCE CLINIC (SITE-SPECIFIC)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=251)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=50385)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=93, N=21716)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=93, N=21716)
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.3	**0.3****	N/A	**0.4^**	**0.3^**
Preterm birth rate	9.2%	12.3%	**-3.2^**	N/A	-3.3	-3.0
Very preterm birth rate	3.6%	3.5%	0.1	N/A	0.9	0.8
Birthweight (grams)	3,214.4	3,148.1	**66.3***	N/A	58.4	53.8
Low birthweight rate	9.2%	11.1%	-1.9	N/A	-1.5	-1.3
Very low birthweight rate	1.2%	1.9%	-0.7	N/A	-0.7	-0.8
Rate of Apgar score greater than or equal to 7	100.0%	97.6%	**2.4****	N/A	**2.6****	**2.7****
Process Outcomes						
C-section rate	27.5%	32.6%	**-5.1^**	N/A	5.4	5.0
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	23.9%	22.0%	1.9	N/A	1.4	0.9

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 41 Strong Start women and 8354 comparison group women.

TABLE 325: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT CAYCE CLINIC (SITE-SPECIFIC)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=93)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=21716)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,058	$2,115	-$57	N/A
Total expenditures during delivery period	$10,565	$9,968	$597	N/A
Total delivery and postdelivery expenditures[2]	$16,448	$15,504	$944	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.39	1.50	-0.11	N/A
Number of hospitalizations 8 months before delivery month	0.05	0.06	0.0	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.92	1.29	**0.63***	N/A
Number of hospitalizations for mother 11 months after delivery month	0.12	0.07	0.05	N/A
Number of ED visits for infant in the first year of life	1.30	1.36	-0.06	N/A
Number of hospitalizations for infant in the first year of life	0.06	0.08	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

United Neighborhood Health Services implemented the Maternity Care Home model under Strong Start. Participants at UNHS were generally lower risk than the average Strong Start participant. For example, UNHS participants had high rates of marriage and low rates of cigarette smoking, food insecurity, depression, anxiety, and prior preterm birth. UNHS's Maternity Care Home intervention provided a series of in-person or home-based encounters with health coaches (trained as social workers or medical assistants). Health coaches supported participants through care coordination; prenatal and health education using a series of booklets developed expressly for Strong Start; and referrals to WIC, affordable housing options, transportation, and other social services. Strong Start prompted UNHS to strengthen its relationship with a local delivery hospital (where patients transferred for labor and delivery care, as UNHS prenatal care providers did not attend births), which awardee program staff felt improved referral and communication patterns for their shared patients. The awardee reported that an established relationship with a single delivery hospital allowed for greater continuity of care for patients and providers and improved the quality of maternity care overall. UNHS participants had fewer

prenatal care visits (5.7) than the average for Strong Start participants (8.3), which may be related to participant-level factors. For example, many women were reportedly initiated care late in pregnancy and many also experienced transportation barriers to care. Impact analysis found infants of women enrolled in Strong Start at UNHS had higher average gestational ages and better Apgar scores than infants of women in the comparison group. Strong Start participants at UNHS also had marginally lower average prenatal care expenditures (p-value<0.10), fewer ED visits and marginally fewer hospitalizations (p-value<0.10) in the prenatal period, and more hospitalizations 11 months after the delivery month (p-value<0.10) than women in the comparison group.

University of Alabama at Birmingham

MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,322	• Academic medical center with seven women's health clinics	• Four sites, including three UAB satellite clinics in county health departments (two that merged in the second year of implementation) Obstetrics Complications Clinic, the primary site of referrals for high-risk pregnancies in northern Alabama	• Intervention categorized as "medium intensity" for offering fewer than four care coordination, education and/or referral encounters (the number offered by most awardees), while also providing nutritionist services to high-risk women with elevated BMI scores
			  • Enhanced risk screening at intake and referrals to needed support services, with a particular emphasis on depression screening
			  • Enhanced nutritional support provided by a registered dietician for women with a body mass index (BMI) <19 or ≥30
			• Maternity education classes in Year 1 and maternity education videos that were subsequently developed and available in the last program year

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Strong Start intake assessment was more comprehensive than previous initial obstetric (OB) intake assessment, and successful in eliciting important patient history and concerns
- Enhanced enrollment through use of additional resources
- Engaged providers through personal communication and adjusting Strong Start interventions around existing clinical workflows

CHALLENGES

- Poor access to care except during pregnancy leading to serious chronic diseases prior to pregnancy and very high preterm birth rate
- Referral model with inability to confirm receipt or impact of additional services
- Existing Medicaid prenatal care program with social work assessments each trimester and other competing academic studies created confusion among women about the specific elements of Strong Start

NOT SUSTAINED

- Discontinued comprehensive screening using the Strong Start Intake Form and the additional nutritional counseling
- Implemented universal screening for depression for pregnant women three times during pregnancy, through it was not clear this decision was related to Strong Start
- A mobile app with Strong Start maternity education videos continued to be used
- Strong Start eligible population will continue to receive enhanced prenatal care through MOM Care, a pre-existing care coordination and psychosocial support available to all pregnant Medicaid enrollees

KEY FINDINGS: PARTICIPANT-LEVEL DATA[122]

PARTICIPANT-LEVEL DATA QUALITY

- 0.0% rate of missing intake forms; 0.0% rate of missing exit forms
- 1.5% rate of item nonresponse on intake forms; 8.5% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 16.6% of women were teens (under age 20); 6.8% were 35 years or older
- 77.5% of women were black; 2.6% were Hispanic; 19.6% were white
- 13.0% of women were married; 24.4% were living with a partner; 24.0% were not in a relationship
- 40.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 27.7%: C-section rate among women with a delivery
- 20.2%: preterm birth rate among women with a live birth
- 18.8%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not provided here because there was no appropriate comparison group – see the Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings
- Descriptive findings from site-level estimates for UAB OCC – which served a large number of women enrolled in Strong Start that a site-level estimate was feasible but still lacked an appropriate comparison group – are in the Site-Specific Estimates section

[122] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

The Strong Start awardee was the Department of Maternal and Fetal Medicine of the University of Alabama at Birmingham Health System (UAB), one of the largest academic medical centers in the United States. The UAB Department of Maternal and Fetal Medicine is composed of seven women's health clinics and UAB Hospital's Labor and Delivery unit. The Obstetrical Complications Clinic (referred to by staff and patients as "the Complications Clinic") is the only clinic located on UAB's campus and a primary referral center for high risk pregnancies in the State of Alabama. Only obstetric and gynecological (OB/GYN) services are offered at this Strong Start site. Also, three satellite clinics, physically located within county health department space, participated in the Strong Start program but during the second year, two of the sites consolidated into one clinic with the same catchment area. In addition to OB/GYN care, each of these satellite clinics offers adult health, pediatric, dental and family planning services.

UAB's patients include many of the highest-risk pregnant women in the state's Medicaid program. Many are uninsured and lack adequate access to care between pregnancies, largely due to Alabama Medicaid's coverage policies for adults. Alabama Medicaid's upper income eligibility threshold for parents is 18 percent of the Federal Poverty Level. No other adults qualify for Medicaid in Alabama.

Alabama has a long history of providing care coordination and psychosocial support for pregnant Medicaid enrollees through its Maternity Care Program. In each of the state's 14 maternity care districts, a primary contractor works with maternity care providers to deliver enhanced support. The Maternity Care Program, called either Steps Ahead or MOM Care in the UAB regions, requires a minimum of two encounters with a care coordinator, usually a Bachelors- or Masters-level social worker or a registered nurse with experience in care coordination. The initial encounter occurs at entry into Medicaid for prenatal services and the other required encounter must occur after delivery, but before the mother has left the hospital.

Prior to Strong Start implementation, UAB employed three Masters-level social workers at the Complications Clinic who served as Steps Ahead care coordinators, while the other health department clinics participating in Strong Start each staffed one care coordinator. At all UAB clinics, Medicaid enrollees generally received four care coordination visits during pregnancy through Steps Ahead: one during each trimester and one postpartum. The Steps Ahead care coordinators met with women to discuss options for prenatal care and delivery, perform a psychosocial/medical risk assessment (including the Beck depression inventory as needed), and educate women on the importance of breastfeeding and smoking cessation. Family planning and newborn care were discussed in third trimester and postpartum visits. In addition to education, the care coordinators assisted patients with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and Medicaid applications and provided

> "The longer you're here, the more papers and packets you get, and it gets pushed to the back of the folder…unless the Strong Start is how I get to see the nutritionist or the social worker, then no, I don't think it's really different….I have a nutritionist at [another doctor] that I see more than the one here."
>
> *- Strong Start Participant*

referrals to community resources such as behavioral health services, monetary assistance for utilities, and housing assistance.

DESCRIPTION OF ENHANCED STRONG START SERVICES

UAB implemented a Maternity Care Home model that included: 1) enhanced risk screening at intake and referrals to needed support services, with a particular emphasis on depression screening, all conducted by a dedicated Strong Start clinical research nurse with a Master's degree in pediatric nursing, 2) enhanced nutritional support provided by a registered dietician, and 3) maternity education for participants in the form of group classes that were available in the first year of Strong Start and videos that were subsequently developed. UAB's Strong Start program targeted pregnant Medicaid beneficiaries with at least one other risk factor for preterm birth.

The primary Strong Start intervention at UAB was to perform a comprehensive risk screening and to refer women who needed clinical and social services. Initially, UAB employed a full-time clinical research nurse with a Master's degree in pediatric nursing to conduct an enhanced intake screening with women who appeared to be eligible for Strong Start. In Year 2 of implementation, UAB hired a second staff person, a nurse practitioner, to expand the screening and intake services to more women. During the intake encounter, which generally occurred at the woman's first prenatal visit or her second visit following an initial contact with the Steps Ahead care coordinator, the nurse used the Strong Start evaluation's Intake Form to guide her interview. She assessed various risk factors with a focus on depression, although she did not use a formal, validated screening tool for depression. The nurse then discussed the various support services available to pregnant women and provided referrals, including to Early Head Start programs, prenatal and parenting classes (offered by Strong Start in Year 1 of the program or separately by UAB), home visits (offered by a non-profit group in the community), mental health and substance abuse counseling (at a community outpatient center), and doula support, among others. One key informant reported that approximately 50 percent of participants were referred for mental health services to address depression and possibly substance use. To support this intensive intake (which often lasted up to 30 minutes), the nurse provided each patient with a March of Dimes-produced "Baby Book" that illustrated what to expect during pregnancy and how to prepare for childbirth, as well as a large folder that included dozens of educational brochures and hand-outs with information about available services. Because the referral providers were not affiliated with UAB, key informants reported that they were unable to follow up on the referrals or track whether women received the recommended services.

There was no Strong Start protocol for the nurses to meet in person with the participants again (though there was phone follow-up during the third trimester and post-partum to complete Strong Start paperwork). However, the Strong Start nurses reported that they provided each woman with their contact information and invited women to call "any time" with questions or concerns, "or if they just need someone to talk to" and occasionally used their own clinic time to follow up individually with certain patients.

The second key component of UAB's Strong Start model was the addition of enhanced nutritional services. Prior to Strong Start, UAB already had a registered dietician on staff who was available to work with women who had diabetes. Strong Start funding supported another ½ full-time equivalent

(FTE) dietician so that Strong Start enrollees with a body mass index (BMI) <19 or ≥30, regardless of medical diagnoses, received one-on-one nutritional support. This dietician performed a 30-minute nutritional assessment and counseling session aimed at educating patients on healthy eating habits, offering strategies for addressing dietary challenges, and providing various brochures on a variety of topics. Women whose dietary health needs changed during their pregnancy received an additional nutritional counseling session with discussions of dietary habits, barriers to adherence to nutritional advice, and strategies for exercise and losing weight after delivery. Approximately 60 percent of Strong Start participants were referred for nutritional counseling.

> "The [Strong Start] program is educational."
>
> *- Strong Start participant*

The third component of UAB's Strong Start model was educational programming, which encompassed a range of topics including preterm birth, mental health, nutrition, exercise, contraception and pregnancy spacing, immunizations, common concerns in pregnancy, and other topics related to prenatal care. In the first program year, UAB delivered the programming through group educational sessions which were poorly attended. The Strong Start staff then created a series of educational videos that patients could access from home or on a smartphone. Uptake of educational videos was also poor, related in part to the need to sign in and log-on to get access to the videos. UAB then launched a mobile app, My Family PLAN, that was not funded by Strong Start but was partly supported through a separate grant program. UAB promoted the app throughout the state through Medicaid and the Department of Health. During the last year of Strong Start, UAB reported that the app had 635 users, about 72 percent of whom used it more than once, suggesting that most users found it helpful. UAB was not able to determine who was using the app or how many were Strong Start participants.

OUTREACH AND ENROLLMENT

At the onset of the Strong Start program, UAB established Strong Start eligibility criteria as 1) gestation up to 26 weeks, 2) eligible for Medicaid, and 3) at least one additional preterm birth risk factor. Being African American was the most prevalent risk factor that qualified UAB prenatal patients for Strong Start. Non-African American women had to have other risk factors (e.g., history of preterm labor, gestational diabetes) to be eligible for UAB's Strong Start program.

UAB employed an opt-in enrollment approach, meaning women were asked to choose between enrollment in Strong Start or participation in UAB's standard care model, to meet the University Institutional Review Board's requirements for informed consent. Originally, the program attempted outreach and enrollment via phone but quickly switched to an in-person enrollment process because the phone enrollment yielded a refusal rate of over 40 percent.

The enrollment process developed by UAB started with the program's clinical research nurse combing through UAB's electronic medical record and scheduling system to identify women coming in for their "new OB" or "4 week" appointments who appeared to be eligible for Strong Start. She then traveled to the various clinics to meet the identified women in person and conduct the intake screening (described above). The majority of her time was spent at the Complications Clinic where all patients had high-risk pregnancies. At the end of each interview, the nurse asked each woman if she'd like to participate in Strong Start, describing it as a "research project" that was studying ways to improve birth

outcomes and reduce preterm birth rates. Although enrollment was opt-in, the nurse was persuasive and developed effective strategies for encouraging reluctant women (such as those with previous pregnancies), explaining that participating in the program could be especially helpful in teaching researchers and other young, first-time mothers about her prior experiences.

As noted above, the enrollment encounter represented the bulk of UAB's Strong Start intervention, as the clinical research nurse performed the intake assessment and then provided referrals to external resources. In Implementation Year 1, the clinical research nurse was the only staff person fully devoted to intake and enrollment, and UAB estimated that only about one quarter of all potentially eligible women were approached for enrollment. In Year 2 of Strong Start, partially in response to a program enrollment requirement from CMMI, UAB hired a second nurse stationed at the Complications Clinic to perform enrollments. In the month after the second nurse was hired, enrollment at the three UAB sites increased from an average of 27 women per month to 50 women per month.

In the second implementation year, UAB started recruiting women with pending Medicaid applications, whereas previously they waited for women to be enrolled in Medicaid before approaching them for Strong Start enrollment. At the same time, Alabama implemented an online Medicaid application process, further expediting Medicaid enrollment. After these changes were made, key informants reported that around 73 percent of eligible women chose to participate in the program. UAB staff also reported that in later years of the program, they received referrals to Strong Start from participants who recommended it to their friends and relatives.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Regarding Strong Start's primary objectives to reduce preterm birth and low birthweight, most key informants felt that UAB's preterm birth rate was intractably high as a result of the lack of continuous health coverage for low-income women and the resulting poor access to care for a population with underlying complex health problems in addition to pregnancy. Alabama as a whole has the third highest preterm birth rate in the nation, ranking 48th nationally in full-term deliveries. UAB is a high-risk service center for the state, and their preterm birth rate is double the Alabama average.[123] UAB's system-wide low birthweight rate was the highest among Strong Start awardees and more than double the state average of 10 percent.[124]

The UAB staff did point to some success from the Strong Start program. Because of the consistent application of comprehensive screening using the Strong Start Intake Form, rather than selective screening with a conventional tool, after Strong Start began, more women were identified as needing mental health and nutritional counseling and were referred for services. One key informant described the Intake Form as an "amazing" screening tool. Additionally, because the screening through the Strong Start program was administered by nurses as opposed to social workers through the Steps Ahead program, participants were reportedly more willing to disclose behavioral health issues, "sharing information that they would not otherwise share with a provider." UAB staff reported that fear of losing custody of their children has historically prevented pregnant women from fully disclosing mental health

[123] March of Dimes 2015 Premature Birth Report Card, http://www.marchofdimes.org/mission/prematurity-reportcard.aspx. Based on 2014 data.
[124] Centers for Disease Control, http://www.cdc.gov/nchs/pressroom/states/AL_2015.pdf. Based on 2014 data.

issues to social workers in the Steps Ahead program. UAB staff also emphasized program staffing continuity and the ability of the enrollment staff to establish trust quickly through personal, culturally appropriate communication as key success factors.

UAB staff felt Strong Start participants were often challenged to follow through with their referrals as community services and the resources to pay for them were quite limited. The awardee attempted to mitigate lack of resources by updating their community resource referral list frequently and by subsidizing the $10-$20 fee associated with services at a local community mental health center. Though some UAB staff indicated that patients received additional referrals during pregnancy, because there was no formal follow-up after the first visit, the mechanism for triggering additional services was unclear.

Though the program was unable to track outcomes from referrals, key informants believed that the screenings and referrals for mental health, domestic violence, and substance abuse resources improved the psychosocial health of participants. They also perceived that because Strong Start's nutritional counseling was more available at earlier stages of pregnancy and provided important preventive care, fewer women gained weight inappropriately during their pregnancies.

Though key informants largely felt that rates of preterm birth and low birthweight had not improved, they reported possible reductions in emergency department (ED) and hospital visits for those who engaged with the enhanced services. One resident conducted a small study in which 60 patients watched the UAB-produced video on common concerns in pregnancy and when to visit the emergency department. The study concluded that those who watched the video had fewer ED visits and lower costs. Key informants did not provide additional information on study methodology.

STRONG START PARTICIPANT PERSPECTIVES

Most focus group participants were recruited into Strong Start through the Complications Clinic and were experiencing high-risk pregnancies. As a teaching facility, UAB staffs the Complications Clinic with fellows, residents and students. A few focus group participants praised the continuity of care that they received, but most complained about seeing different doctors every time they came for a visit.

> *It's stressful having different doctors. My lab work got mixed up, so I had to leave work and get more blood work. When I came back, I had a different doctor, so it stressed me out.*

All the women participating in the focus groups were involved in multiple pregnancy-related programs, and there appeared to be general confusion about which programs provided the services they were receiving. Participants were most familiar with Steps Ahead but were unsure what it provided, though some mentioned free car seats and cribs or help with Medicaid and WIC as elements of the program. They remembered enrolling in Strong Start, receiving screenings, and in some cases counseling. Focus group participants tended to characterize Strong Start as a research program and several were involved in more than one research project, including a study across the South of the impact of obesity on birth outcomes. One participant commented,

I remember sitting in here talking to [a nurse] about it, but it went so fast and it was so early in my pregnancy that there was a lot going on and a lot of information to take in, and it was at the end of the appointment. We had been here for like three hours and I don't remember what she said at all, other than 'there's this thing called Strong Start,' and I was like, yes, I'll do it.

Participants had different opinions on whether the care they received under Strong Start was different from care they received during prior pregnancies. In the early focus groups, several participants commented that they felt like they were being more closely followed through the Strong Start program and several women specifically mentioned seeing the Strong Start nurse and nutritionist.

It feels like they're paying closer attention this time and I get better care.

They are very concerned. They care. They make sure my [blood] sugar's on point. They follow up.

Participants who received counseling generally reported it to be helpful, regardless of the auspices under which it was offered. However, most participants did not regard the counseling as having a significant impact on their pregnancy or birth outcome. Participants who had previously been diagnosed with mental health conditions said they continued to see the outside providers who were treating them. The remainder said their Strong Start screenings did not result in referrals. The one participant who remembered enrolling and receiving referral services said she found the services helpful and believed that they resulted in a healthier pregnancy and better outcome. Most participants also saw social workers about three times (through the Steps Ahead program). All had seen a nutritionist, though not necessarily through Strong Start.

PROGRAM STRENGTHS

Through iterative qualitative improvement cycles, UAB was able to achieve a fairly high level of voluntary enrollment using an intensive face-to-face approach. Strong Start services were provided by the same staff at all participating clinical sites so UAB maintained a consistent approach to the maternity care home model.

Key informants reported that many of the concepts, skills, and features of Strong Start (e.g. social worker visits and various screenings for some patients) already existed at UAB, but Strong Start's consistent application of them was valuable. Strong Start expanded nutrition counseling services to more women, and identified and referred more women for behavioral health services.

> "They ask: 'Do you have suicidal thoughts? Does someone at home abuse you?' I thought it was kind of cool that they do that…"
>
> *- Strong Start participant*

The development of a mobile app to combat the issues of poor participation in prenatal education was an innovative strategy. As described above, the relatively higher volume of women accessing the app as opposed to attending education classes or watching videos suggests that UAB was successful in adapting to women's educational preferences. Key informants reported that the app was a promising tool whose use should be expanded further, but no additional information on the subsequent uptake or impact of the app is available.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Although the awardee successfully launched the program early in the first year of the Strong Start demonstration, site-level staff initially had difficulty enrolling multiparous patients, which resulted in an overall refusal rate of 40 to 50 percent. Shifting to an enrollment approach that emphasized how the project's findings could benefit all women led to higher enrollment rates.

Enrollment staff also reported having to reduce the amount of time they spent with patients because of the volume of paperwork required by Strong Start. As the program became more established, site-level staff found they were not able to maintain the patient database, complete program and evaluation forms, and spend enough time with patients. As a result, the awardee hired a part-time Office Service Specialist (OSS) to assist the Strong Start clinical research nurse on an as-needed basis, and who helped to absorb the data burden by maintaining the patient database and helping to complete forms.

Key informants generally agreed that a lack of communication about the Strong Start rollout may have contributed to sporadic resistance to the program among clinic nurses. Clinical staff were not formally introduced to Strong Start and nurses and providers appeared reluctant to cooperate, perceiving that the lengthy intake, screening, and referral process would interrupt clinical flow. Additionally, as one informant explained, "UAB has so much research, that there's no way the providers can keep up with everything." When describing initial challenges faced by site-level staff, another informant noted, "In the beginning there was a lot of opposition at the Complications Clinic because some of the nurses felt like we were treading on their territory. But now it's much better." A concerted effort on the part of program staff to communicate with providers in person about Strong Start services improved tenuous relationships with clinical staff.

Key informants reported working to make sure that Strong Start intake processes and nutritional counseling sessions did not impede provider work flow in the clinic by working these services around clinic schedules and being willing to interrupt intake to accommodate providers. The Strong Start staff worked hard to overcome this perception through regular communication and by being flexible, often initiating intake while the patient was waiting to be seen, letting the provider see the patient when the provider was available, and then resuming the Strong Start intake process when the provider had concluded the visit.

Initially, the Strong Start clinical research nurse could not document her interactions with Strong Start participants in UAB's Electronic Medical Record (EMR), and staff noted that there was no way for providers to identify Strong Start participants in their caseload based on their medical records. Later, Strong Start staff could document notes in the EMR; however, they reported that providers rarely reviewed Strong Start notes and Strong Start staff periodically communicated with providers in person or via fax and email when there were specific areas of concern.

SUSTAINABILITY

While the awardee is not sustaining Strong Start or continuing use of the Intake Form, UAB is implementing universal screening for depression for pregnant women three times during pregnancy, consistent with United States Preventive Services Task Force recommendations. It is not clear whether Strong Start contributed to this decision.

Nutritional screening and subsequent counseling for all patients with high or low BMI was not continued. Key informants estimated that 75 percent of patients already had excessively low or high BMI (with obesity presenting the more frequent challenge), making universal screening and referral for nutrition counseling not feasible with existing staff. They noted that the UAB system had recently made BMI education for those who are identified as having extreme BMI a priority, even though screening is not universal. They continued to offer nutritional services for women diagnosed with diabetes.

Steps Ahead, which is not affiliated with Strong Start, continues to provide enhanced services to this population through social worker assessments, as it had prior to Strong Start.

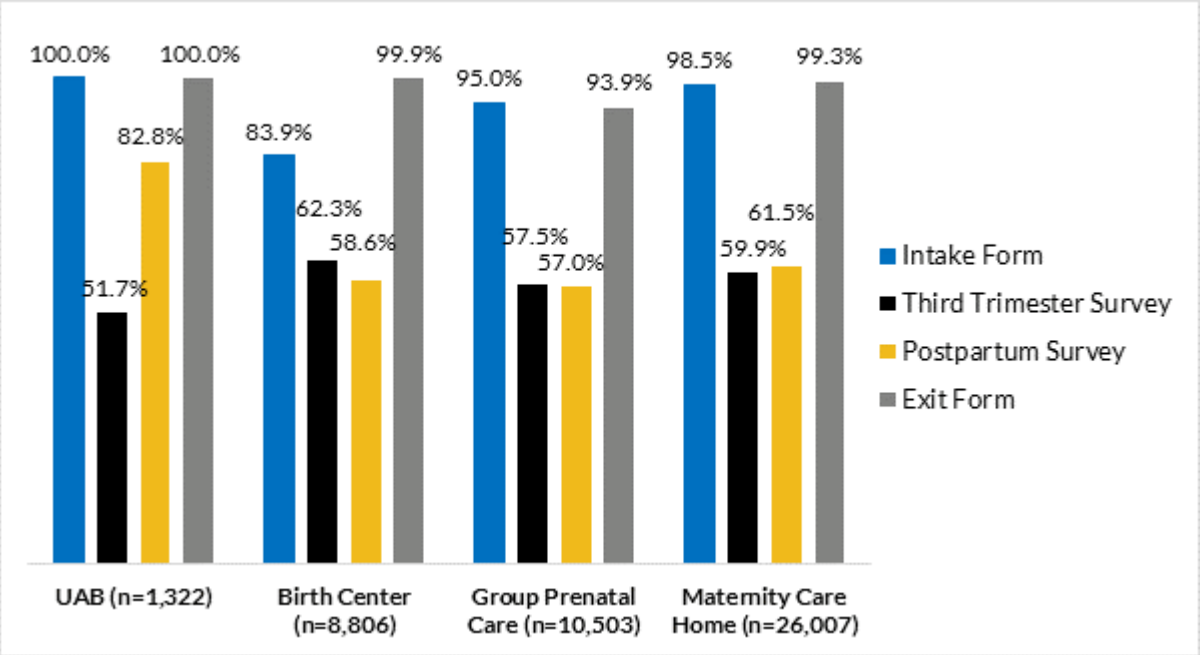
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for UAB, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for UAB to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 42 UAB participants).

In addition, we briefly summarize the quality of the data submitted by the awardee. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 21: FORM SUBMISSION RATES, UAB



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,322
- Study IDs represented: 1,322 Study IDs

HOW FORMS WERE ADMINISTERED:

- The Intake Form, Third Trimester Survey, and Postpartum Survey were generally completed by the Strong Start nurse using an interview format.
- The Intake Form was completed in-person. About a quarter of the Third Trimester and Postpartum Surveys were completed in-person. The remaining were collected over the phone.
- In some cases, the Strong Start nurse would ask the participant to complete the Intake Form questions about depression, anxiety, and current intimate partner violence on their own. The nurse reviewed the responses.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate any notable site-specific concerns or differences.

MISSING FORMS:

- Intake Forms: No Study IDs were missing Intake Forms.
- Third Trimester or Postpartum Surveys: About 48 percent of Study IDs were missing the Third Trimester Survey and 17 percent were missing the Postpartum Survey. The awardee explained that they began enrolling participants in May 2013, when these surveys were not available, so early participants were not able to complete them, and when the surveys were made available, UAB's IRB submission encountered a lengthy review delaying implementation further. '. There were also missing surveys because patients dropped out of the program or were lost to follow-up.
- Exit Forms: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Forms: The awardee said they did not have many problems with participants refusing to answer questions on the Intake Form. Their data showed lower than average rates of missing for race/ethnicity, education, and depression symptoms. They believe this was due, in part, to maintaining patient privacy during the completion of the form.
- Exit Forms: Data on Strong Start pregnancy outcomes are missing for 5.7 percent of participants.[125]

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for UAB participants. Some highlights include:

- The majority of UAB participants (76.6 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 10.2 percent of participants were 18 or 19 years old.
- Most participants were black (77.5 percent), followed by 19.6 percent white and 2.6 percent Hispanic.
- The largest share of UAB participants was in a relationship but not living with a partner (38.6 percent), although 13.0 percent were married and 24.0 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 27.6 percent of UAB participants reported having experienced intimate partner violence, 40.1 percent of participants with a prior birth had a prior preterm birth, and 81.7 percent of participants had not planned their Strong Start pregnancy. Nearly one-third of UAB participants were referred for high-risk medical services.

[125] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 95.9% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 4.1% were missing for other reasons.

TABLE 326: DEMOGRAPHICS, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,280**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	6.4	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	10.2	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	76.6	81.7	72.9	75.1	75.8
35 Years and Older	%	6.8	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.2	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,278**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	2.6	25.4	37.1	28.0	29.7
Non-Hispanic White	%	19.6	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	77.5	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	-	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	0.5	19.6	12.8	11.3	13.3
Not in Universe	%	96.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**33**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	69.7	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,280**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	0.9	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	0.7	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,271**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	32.0	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.3	8.7	12.6	11.9	11.5
Employed and in School	%	5.8	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	51.8	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	0.7	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,271**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	25.5	15.4	27.8	29.1	26.4
High School Graduate or GED	%	65.8	57.5	58.3	57.9	57.9
Associate's Degree	%	3.4	8.2	5.2	4.6	5.4
Bachelor's Degree	%	2.1	14.5	4.5	3.7	5.8
Other College Degree	%	3.2	4.3	4.2	4.7	4.5

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Relationship Status at Intake						
Missing Data	%	0.9	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,268**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	13.0	42.1	20.4	20.8	24.5
Living with a Partner	%	24.4	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	38.6	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	24.0	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 327: PSYCHOSOCIAL, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.1	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,266**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	72.0	51.8	51.8	59.7	56.5
No	%	27.3	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.1	17.0	6.6	3.4	6.8
Not in Universe	%	27.7	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**911**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	86.6	61.1	72.6	79.9	75.3
Other	%	8.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	4.7	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	0.5	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,274**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	19.6	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	2.3	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,250**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	28.1	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	1.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,256**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	56.0	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	6.0	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,203**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	51.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	1.9	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,256**	**7,090**	**8,664**	**23,549**	**39,303**

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
None	%	41.8	67.9	59.0	65.5	64.5
Mild	%	36.1	21.4	23.8	20.2	21.2
Moderate	%	14.3	6.8	10.3	8.5	8.6
Severe	%	6.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.6	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	0.4	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,275**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	27.6	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	1.6	18.3	16.3	7.7	11.8
Not in Universe	%	10.2	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,129**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.1	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,280**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	83.6	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	15.3	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	1.1	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	82.4	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	-	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	11.9	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	-	24.6	17.1	15.4	17.2
Childcare Challenges	%	-	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	6.2	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 328: PREGNANCY HISTORY AND INTENTIONS, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,280**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	71.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	28.5	26.1	29.6	27.3	27.6

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	2.1	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**888**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	43.5	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	2.2	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**887**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	10.4	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	9.2	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**797**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	7.4	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	24.4	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**603**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	17.9	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	30.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**526**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	5.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	30.8	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**521**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	4.6	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	32.5	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**499**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	31.9	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**507**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 329: PRIOR BIRTH OUTCOMES, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.0	1.7	1.5	0.6	1.0
Not in Universe	%	28.5	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**915**	**6,337**	**6,857**	**18,350**	**31,544**

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	86.1	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	8.3	23.5	18.9	15.2	17.7
Not in Universe	%	38.4	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**682**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	26.7	34.6	24.3	27.1	28.1
>= 18 months	%	73.3	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.0	0.1	2.5	1.4	1.4
Not in Universe	%	38.4	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**788**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	40.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	2.8	1.3	20.8	13.1	12.6
Not in Universe	%	38.4	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**752**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	24.2	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 330: PRE-PREGNANCY MEDICAL CONDITIONS, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	1.3	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,263**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	18.3	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	69.9	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	1.4	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	10.4	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	1.4	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,262**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	7.9	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	1.2	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,265**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	13.1	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	0.6	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,272**	**8,474**	**7,052**	**20,908**	**36,434**

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Underweight (BMI < 18.5)	%	3.4	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	31.7	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	22.6	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	29.5	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	12.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 331: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	7.4	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,185**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	12.9	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	7.3	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,186**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	6.2	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	4.9	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,217**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	7.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	3.4	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,236**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	2.4	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	5.2	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,214**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	7.2	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,188**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	1.2	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	3.7	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,233**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.0	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	6.6	0.8	28.0	23.1	19.9

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,195**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	14.4	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. – indicates a censored cell due to small sample size (N<11).

TABLE 332: TREATMENTS DURING PREGNANCY, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	8.2	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,175**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	1.8	0.8	10.0	5.1	5.4
Not in Universe	%	75.3	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**293**	**680**	**654**	**2,585**	**3,919**
Yes	%	24.2	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	8.5	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,171**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	10.9	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	8.4	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,172**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	1.8	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 333: PRENATAL CARE, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	0.9	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,268**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	1.1	4.7	29.5	64.5	43.3
Licensed Professional Midwife[126]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9

[126] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	98.8	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,280**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.1	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	11.1	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,280**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,277**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	99.6	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.7	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	1.8	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,257**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	9.5	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	1.6	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	1.8	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,257**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	35.6	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**824**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	81.8	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	1.3	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	36.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**819**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	36.1	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**818**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	35.6	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**824**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	53.6	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.3	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	35.9	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**820**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	8.2	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	2.1	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	2.2	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,252**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	32.0	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.4	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	10.6	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	5.9	-	6.4	6.9	6.8
Other	%	88.1	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 334: DELIVERY INFORMATION, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C sections)						
Missing Data	%	3.2	1.4	25.3	23.3	19.5
Not in Universe	%	15.5	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,040**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	41.7	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.0	0.3	7.8	2.9	3.5
Not in Universe	%	66.1	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**434**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	100.0	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	2.3	4.6	11.5	7.3	7.7
Not in Universe	%	6.1	25.8	15.8	18.2	19.2

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,173**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.5	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.7	0.7	12.0	5.6	6.1
Not in Universe	%	6.1	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,168**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	72.3	87.1	70.1	69.5	73.1
C-Section	%	27.7	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.6	0.4	8.7	2.3	3.4
Not in Universe	%	69.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**381**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	81.1	83.3	72.9	74.7	75.9
C-Section	%	18.9	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	0.5	4.7	12.5	6.3	7.4
Not in Universe	%	74.8	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**316**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	38.3	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	84.3	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**201**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	23.4	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 335: BIRTH OUTCOMES, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	5.7	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,207**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	97.1	96.2	97.6	94.4	95.5
Stillbirth	%	2.5	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	2.7	0.7	15.4	5.8	7.0
Not in Universe	%	8.4	26.1	16.4	18.9	19.8

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,138**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	8.0	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	12.2	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	79.0	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.2	2.1	14.3	8.0	8.3
Not in Universe	%	8.4	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,131**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	4.1	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	14.8	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	75.6	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	5.6	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 336: SATISFACTION, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	44.5	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**711**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	1.5	0.4	1.0	1.3	1.0
Moderately Satisfied	%	7.9	3.3	4.4	7.8	6.2
Very Satisfied	%	43.9	25.6	35.6	46.1	39.8
Extremely Satisfied	%	45.3	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	44.7	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**708**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	4.5	2.0	3.1	2.3	2.4
Slightly Satisfied	%	3.5	3.0	4.0	2.9	3.1
Moderately Satisfied	%	13.8	10.4	11.6	12.8	12.1
Very Satisfied	%	41.4	29.1	42.6	46.6	42.1
Extremely Satisfied	%	36.7	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 337: BREASTFEEDING, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	48.4	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**661**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	30.4	80.4	47.5	40.5	50.3
Formula Feed Only	%	22.5	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.4	10.8	31.9	32.5	27.8
I Haven't Decided	%	6.7	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	37.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**797**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	70.3	91.5	76.6	72.6	77.3
No	%	29.7	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 338: FAMILY PLANNING, UAB

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	38.4	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**789**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	96.2	77.0	77.5	82.2	80.3
No	%	3.4	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	39.5	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**775**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	74.3	84.2	70.8	74.0	75.5
No	%	25.3	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	17.3	41.5	42.9	38.6	40.2
Not in Universe	%	37.7	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**576**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	14.4	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	9.9	2.8	11.4	10.9	9.2
LARC - IUD	%	10.1	10.8	11.9	12.3	11.9
Pills	%	11.6	8.6	11.9	13.0	11.8
Injection	%	45.3	5.9	16.2	20.2	16.2
Condoms	%	5.7	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3

Data Elements	N or %	UAB (Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	2.3	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Alabama

Initial Contact: In March 2015, the evaluation team spoke with officials from the Alabama Medicaid Agency and the Alabama Department of Public Health (ADPH) to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data. State officials were receptive to supporting the evaluation, but said they would prefer that Urban link the Medicaid and birth certificate data.

Data Acquisition Process: Following approval to access Medicaid data from the Alabama Medicaid agency in June 2015, Urban sought approval from the Alabama Department of Public Health (ADPH) to access birth certificate data. Urban received a fully executed data use agreement from ADPH in July 2016, and in August 2016, Urban received 2014 and 2015 birth certificate data from ADPH. The Medicaid agency provided sample data to Urban in August 2016 including aggregated expenditure data. In October 2016, the Medicaid agency submitted 2014 and 2015 data files. Following this submission, the Urban evaluation team began merging the datasets. However, the match rate for the merge was very low, requiring additional back and forth with the Medicaid agency to resolve the problem. In March 2017, Medicaid approved submission of additional variables to help with the matching process. In May 2017, ADPH submitted 2016 birth certificate data. Urban received the final Medicaid claims data in November 2017.

Final Result: Urban completed the merge of all years of birth certificate, Medicaid eligibility and Medicaid claims data, which were included in the final year's impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The University of Alabama at Birmingham (UAB) awardee, which implemented the Maternity Care Home model, delivered care at four sites included in the impacts analysis: Eastern Health Clinic, West End Health Clinic, Western Health Clinic, and UAB Obstetrics Complication Clinic. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the UAB Obstetrics Complication Clinic (OBCC) site served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible (Table 339).

Prior to receiving and analyzing data for UAB, however, there were concerns that an appropriate comparison group could not be developed for this awardee. First, the case study findings showed that UAB was the only source of care for high-risk pregnant women on Medicaid in the area that it operates. We therefore drew a comparison group from a matched county outside the area where UAB sites or participants are located. Second, UAB is the primary provider for high-risk prenatal and obstetrical care in most of the state, and the Strong Start program included many high-risk women. Using an out-of-county comparison group would not account for the broad reach of the high-risk program. Finally, Strong Start women at UAB were likely to be high risk due to unobservable health risk factors that cannot be controlled for on the birth certificate and claims files. Therefore, it was unlikely that an appropriate comparison can group could be developed this awardee.

Two sets of estimates are presented in this section: one for the UAB awardee as a whole and one for the UAB OBCC site. For both sets of estimates, we used both a within county comparison group and estimate an alternative specification that uses an out-of-county comparison group. However, while analyses for UAB are presented here, they ***should not be interpreted as impact estimates*** given the challenge of identifying an appropriate comparison group.

TABLE 339: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR UAB

Data Elements	Included in Model-Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
Eastern Health Clinic	No	No	Yes
West End Health Clinic	No	No	Yes
Western Health Clinic	No	No	Yes
UAB Obstetrics Complication Clinic (OBCC)	No	Yes	Yes

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [127]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model

[127] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- In alternative specification #1, we used an out-of-county comparison group as previously described.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 340 reports the birth and process outcome findings for this Maternity Care Home model awardee. These estimates should not be interpreted as an impact of Strong Start because UAB is the primary provider for high-risk prenatal and obstetrical care in most of the state and an appropriate comparison group was not available.

- Overall, Strong Start enrollment at the UAB enrolled is associated with significantly worse birth outcomes, i.e., lower average clinical gestational age, higher preterm and very preterm birth rates, lower average birthweight, higher rates of low birthweight and very low birthweight, and lower Apgar scores.
- However, rates of cesarean section are 5.1 percentage points lower for women who enroll in Strong Start and receive care at UAB (28.3 percent) than for women in the comparison group (33.5 percent).
- Similarly, rates of vaginal births after cesarean section (VBAC) are 8.7 percentage points higher for women who enroll in Strong Start (18.9 percent) compared to women in the comparison group (10.1 percent). Consistent with lower rates of planned inductions, 24.9 percent of women who enroll in Strong Start have weekend deliveries compared to 17.5 percent of women in the comparison group.

TABLE 340: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UAB (SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=957)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=38530)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=957, N=26570)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=563, N=19423)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=563, N=19423)
Birth Outcomes						
Clinical gestational age (weeks)	37.8	38.1	-0.3**	-0.2^	-0.4**	-0.3*
Preterm birth rate	19.0%	14.1%	5.0**	4.0**	6.8**	4.9**
Very preterm birth rate	7.2%	4.5%	2.7**	2.6**	3.7**	3.1**
Birthweight (grams)	2,981.4	3,037.3	-55.8*	-42.4^	-102.5**	-73.9*
Low birthweight rate	19.9%	15.0%	4.9**	4.4**	7.5**	5.5**
Very low birthweight rate	4.3%	2.7%	1.5*	1.5*	2.8**	2.7**
Rate of Apgar score greater than or equal to 7	92.1%	97.0%	-4.9**	-5.5**	-5.2**	-4.7**
Process Outcomes						
C-section rate	28.3%	33.5%	-5.1**	-7.2**	-5.7**	-5.8**
VBAC rate[1]	18.9%	10.1%	8.7*	12.6**	4.7	3.5
Weekend delivery rate	24.9%	17.5%	7.3**	8.0**	7.6**	7.2**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 106 Strong Start women and 4826 comparison group women.

Similar results are found for each of these measures when the out-of-county comparison group is employed (alternative specification #1). The estimated effects are typically larger in magnitude when the sample is limited to the 2014-2015 claims sample (alternative specification #2)—the one exception is that VBAC finding is smaller and no longer statistically significant. Many differences are smaller in

magnitude after adding diagnoses controls from the claims data to the claims sample (alternative specification #3). Consistent with our expectations, this suggests that the main model findings for MUSC are, in part, driven by differences in health status between Strong Start enrollees and women in the comparison group. That is, Strong Start women are more likely to be high risk due to factors that cannot be completely controlled for in this evaluation's propensity-score modeling.

Table 341 reports the expenditure and utilization outcome findings for the UAB awardee:

- Expenditures in the 8 months before the delivery period for women who enroll in Strong Start are $3,089, on average, which is $1,089 more than for women in the comparison group.
- Consistent with Strong Start at UAB being associated with worse birth outcomes, delivery expenditures for women who enroll in Strong Start and their infants are $15,816, on average, which is $5,286 higher than expenditures for women in the comparison group and their infants. Total expenditures for the mother and infant from delivery until the infant's first birthday are $21,158 for women who enroll in Strong Start and their infants and $14,649 for women and infants in the comparison group, a difference of $6,508.
- Women who enroll in Strong Start have 0.30 fewer emergency department visits in the prenatal period than women in the comparison group (0.85 vs. 1.15 visits).
- Consistent with the increase in delivery and post-delivery expenditures, infants born to women who enroll in Strong Start at UAB spend 3.40 days in the NICU, which is 1.46 days more than infants in the comparison group.
- In the 11 months following the delivery months, women who enroll in Strong Start visit the emergency department less often, but have more hospitalizations than women in the comparison group (0.31 versus 0.42 visits and 0.07 versus 0.05 hospitalizations). The difference in hospitalizations is only marginally significant (p-value<0.10).
- Findings from the alternative specification model where we draw the comparison group from outside the county are generally consistent with those from the main model.

TABLE 341: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UAB (SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=563)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=19423)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=563, N=13554)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$3,089	$2,000	$1,089**	$1,148**
Total expenditures during delivery period	$15,816	$10,530	$5,286**	$5,419**
Total delivery and postdelivery expenditures[2]	$21,158	$14,649	$6,508**	$6,487**
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.85	1.15	-0.30**	-0.43**
Number of hospitalizations 8 months before delivery month	0.16	0.18	-0.01	-0.04
Number of days in NICU	3.40	1.94	1.46**	1.39**
Number of ED visits for mother 11 months after delivery month	0.31	0.42	-0.11**	-0.15**
Number of hospitalizations for mother 11 months after delivery month	0.07	0.05	0.02^	0.02

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=563)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=19423)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=563, N=13554)
Number of ED visits for infant in the first year of life	1.17	1.25	-0.08	-0.26**
Number of hospitalizations for infant in the first year of life	0.14	0.13	0.01	-0.01

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Table 342 includes site-specific birth and process outcome findings for UAB OBCC. Key similarities and differences between the site and awardee-level estimates are noted below. These estimates should not be interpreted as an impact of Strong Start because at this site is the primary provider for high-risk prenatal and obstetrical care in most of the state and an appropriate comparison group was not available.

- Consistent with the awardee-level estimates, Strong Start at UAB-OBCC is associated with lower average clinical gestational age, higher preterm and very preterm birth rates, lower average birthweight, higher rates of low birthweight and very low birthweight, and lower Apgar scores.
- In contrast with the awardee-level estimates, rates of cesarean section and VBAC are no different for women who enroll in Strong Start and receive care UAB-OBCC than rates for women in the comparison group.
- Findings from the alternative specification models are generally consistent with the main model and with the patterns observed in the UAB awardee-level models.

TABLE 342:EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UAB OBCC (SITE-LEVEL; SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=511)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=25416)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=511, N=15723)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=253, N=12450)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=253, N=12450)
Birth Outcomes						
Clinical gestational age (weeks)	37.3	38.1	-0.7**	-0.7**	-1.1**	-0.8**
Preterm birth rate	26.0%	15.0%	11.0**	11.2**	14.8**	9.6**

Outcomes	Main Model: 2014 - 2016, Strong Start (N=511)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=25416)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=511, N=15723)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=253, N=12450)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=253, N=12450)
Very preterm birth rate	10.6%	4.9%	5.7**	5.9**	7.4**	4.8*
Birthweight (grams)	2,916.3	3,055.4	-139.1**	-138.3**	-247.6**	-190.1**
Low birthweight rate	24.5%	15.8%	8.7**	9.2**	14.5**	10.1**
Very low birthweight rate	5.7%	2.9%	2.7**	2.9**	4.5**	3.6*
Rate of Apgar score greater than or equal to 7	92.2%	96.9%	-4.8**	-5.6**	-5.2**	-4.2*
Process Outcomes						
C-section rate	34.4%	33.9%	0.6	-1.3	0.4	-1.6
VBAC rate[1]	20.3%	12.1%	8.2	12.1*	3.3	4.7
Weekend delivery rate	24.9%	17.8%	7.1**	7.6**	9.2**	8.7**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 64 Strong Start women and 2949 comparison group women.

Table 343 reports the expenditure and utilization outcome findings for the UAB OBCC site level analysis. Overall, the expenditure findings are consistent with those from the UAB awardee-level model. That is, Strong Start is associated with higher prenatal care expenditures, expenditures during the delivery period, and expenditures during the delivery and post-delivery period. The utilization findings in the awardee and site-level models are also very similar.

TABLE 343: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UAB OBCC (SITE-LEVEL; SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=253)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=12450)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=253, N=7715)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$4,303	$2,507	$1,795**	$2,236**
Total expenditures during delivery period	$20,332	$12,274	$8,058**	$10,013**
Total delivery and postdelivery expenditures[2]	$26,208	$16,725	$9,483**	$11,679**
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.01	1.37	-0.36**	-0.66**
Number of hospitalizations 8 months before delivery month	0.29	0.24	0.05	0.10*
Number of days in NICU	5.28	2.79	2.48**	3.07**

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=253)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=12450)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=253, N=7715)
Number of ED visits for mother 11 months after delivery month	0.33	0.53	-0.20**	-0.23**
Number of hospitalizations for mother 11 months after delivery month	0.08	0.06	0.02	0.03
Number of ED visits for infant in the first year of life	1.08	1.22	-0.14	-0.25*
Number of hospitalizations for infant in the first year of life	0.13	0.13	0.0	0.02

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The University of Alabama at Birmingham implemented the Maternity Care Home model under Strong Start. The pre-pregnancy health of UAB participants suggests a high-risk population with high rates of cigarette smoking, food insecurity, depression, anxiety, intimate partner violence, and unintended pregnancy. Further, UAB participants with a prior birth also had higher rates of stillbirth, prior preterm birth, and prior low birth weight than the average Strong Start participant. UAB's Strong Start program emphasized screening participants for depression as part of a comprehensive screening for clinical and social risks, as well as providing referrals to address identified needs. However, many Strong Start participants were reportedly unable to follow through with their referrals because community services were quite limited. In some cases, the awardee subsidized the fee associated with services at a local community mental health center. Enhanced nutritional support provided by a registered dietician for women with particularly low or high BMI was another key component of UAB's Strong Start program. Finally, the awardee also focused on the provision of health education, though participant uptake was low for both classes and instructional videos. Despite the high-risk profile of UAB participants, descriptively, they had only slightly higher rates of C-section than the Strong Start average, and much higher rates of VBAC. UAB participants did, however, have rates of preterm birth and low birth weight that are nearly twice the average for Strong Start – outcomes that correspond to the high-risk characteristics of their participants. The impact analysis findings for UAB should not be interpreted as impacts of Strong Start because the awardee served high risk patients for most of the state and an appropriate comparison group was not available. The estimates in this chapter likely reflect the high-risk nature of the population served and not the impact of Strong Start.

University of Kentucky Research Foundation

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

696	• Affiliated with the academic medical center at the University of Kentucky (UK), and responsible for managing all external grants and contracts at UK	• Seven sites including:
		  • Two at UK-affiliated prenatal clinics in Lexington
		  • One in Frankfort
		  • One in Madisonville, and
		  • Threes at health departments of rural counties in the southeastern part of the state
			• Intervention categorized as "high intensity" for implementing the *CenteringPregnancy* curriculum with additional EMPOWR component (developed for Strong Start) and a targeted curriculum for specific high-risk groups
			• Groups targeted four populations: Hispanic women, tobacco users, diabetic/obese patients, women with substance use disorder
			• Added EMPOWR (Efforts to Maximize Perinatal Outcomes in Women at Risk) component which was developed for Strong Start and targeted risks prevalent among Kentucky's pregnant, low-income population
			• Special attention to opioid-addicted women through the PATHWAY group, which used a modified version of Centering including more frequent visits

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Fostered important connections to community organizations, such as tobacco cessation programs and breastfeeding coordinators
- PATHWAY and the group for Hispanic women were felt to be especially successful because they filled a need in the community

CHALLENGES

- Lack of broad support made implementation difficult, and buy-in varied considerably among the many levels of staff involved in the program (e.g., attending physicians, medical residents, administrative staff, nurses)
- Securing adequate space for group sessions, especially during early implementation

PARTIALLY SUSTAINED

- UKRF sustained the PATHWAY group and the group for Hispanic women at one site
- Other sites and groups were not sustained

KEY FINDINGS: PARTICIPANT-LEVEL DATA[128]

PARTICIPANT-LEVEL DATA QUALITY

- 0.0% rate of missing intake forms; 0.0% rate of missing exit forms
- 5.3% rate of item nonresponse on intake forms; 12.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 18.0% of women were teens (under age 20); 6.7% were 35 years or older
- 12.5% of women were black; 33.5% were Hispanic; 50.1% were white
- 29.8% of women were married; 38.1% were living with a partner; 13.3% were not in a relationship
- 24.2%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 30.6%: C-section rate among women with a delivery
- 9.0%: preterm birth rate among women with a live birth
- 9.6%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted because we did not obtain birth certificate and Medicaid data for Kentucky

[128] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

The University of Kentucky Research Foundation (UKRF) is affiliated with the academic medical center at the University of Kentucky (UK), which encompasses colleges of dentistry, health sciences, medicine, nursing, pharmacy, and public health. Prior to implementing Strong Start, two UKRF Strong Start sites offered prenatal care services using the *CenteringPregnancy* model, though on a more limited basis.[129] For instance, the Polk Dalton/Lexington site was providing Centering to the Hispanic population exclusively to first time mothers (with a very small number of groups).

Patients who were not offered Centering received standard prenatal care. For example, patients met with a doctor, nurse, or certified medical assistant for approximately 15 minutes at each visit. Prior to Strong Start patients who received this type of care were permitted to enroll in additional health education classes, but often merely received educational materials from a prenatal health educator, such as a folder and pamphlets. Under standard prenatal care, patients with high-risk pregnancies often did not receive comprehensive information about issues particular to their pregnancy.

DESCRIPTION OF ENHANCED STRONG START SERVICES

The Centering Pregnancy program followed the approach prescribed by the Centering Healthcare Institute (CHI), but with the addition of EMPOWER (Efforts to Maximize Perinatal Outcomes in Women at Risk) a component developed by UKRF for Strong Start, which targeted specific risks prevalent among Kentucky's pregnant, low-income population. UKRF also customized their Group Prenatal Care program to meet the needs of four specific groups of patients:

1. Hispanic: No further customization was done for this population but through Strong Start UKFR expanded the number of groups targeting Hispanic women. EMPOWR increased the efforts to connect participants to additional culturally-relevant community resources for the population. These groups were facilitated by an English-speaking Certified Nurse Midwife with the aid of a Spanish-language interpreter.
2. Tobacco/psychosocial: The new component added by Strong Start largely consisted of additional tobacco cessation education (including the risks of secondhand smoke), referrals for help with smoking, psychosocial interventions, and breastfeeding education during every Centering Pregnancy session.

[129] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

3. Diabetic/obese: A diabetic-trained educator developed the program, which included offering the patients tools for managing diabetes and arranging for nutritionists to speak at the Centering groups. For a woman to be enrolled in the diabetes/obesity group, she must have had gestational diabetes previously, a family member with diabetes, or a BMI greater than 30.
4. Women with substance use disorder: The first group of this type focused on women with opioid addition and began in January 2015 at the Polk Dalton site. Initial delays in implementation stemmed from the extensive provider requirements to prescribe Subutex, a prescription drug that treats opioid addiction. In Year 3 of the evaluation, UKFR began referring to the group as PATHWAY, with PATH standing for Perinatal Assistance and Treatment Home [See box].

With the exception of PATHWAY, UKRF's Centering groups met ten times over the course of a women's pregnancy, with sessions spaced more closely as pregnancy progressed. Groups were scheduled for two hours and typically consisted of six to ten patients of similar gestational age. They were co-facilitated by two health care providers (advanced practice nurses and/or resident physicians). Sessions were designed to begin with time for informal discussion and individual health measurements. The remainder of the Centering session was spent discussing the topics in the CHI and EMPOWR curriculum. An expert guest speaker, such as a lactation consultant, was invited to some sessions. Mothers with high medical risk also had individual visits with specialists, separate from their prenatal Centering sessions. Referrals were usually an important part of the group facilitator role; the group facilitator also usually checked to see if referrals were completed and helped Centering patients make appointments.

UKRF's PATHWAY Group for Women with Opioid Addiction

The PATHWAY group differs from *CenteringPregnancy* in several ways:

1. To follow the Subutex prescription schedule, groups met every two weeks throughout a women's pregnancy – compared to every four weeks initially, and every two weeks for only the last six weeks of pregnancy for standard Centering groups. Facilitators still followed the Centering curriculum, but because of the increased number of sessions, they spread out the content to span across multiple sessions. This allowed them to bring more community organizations into the group to help women.
2. Rather than meeting with a provider in a separate space within the Centering room, patients were taken back to meet with the provider individually to receive their Subutex prescription and discuss any issues. These appointments generally took between 15 and 25 minutes (including waiting time for the provider).
3. No partners were allowed in the group because "women with substance abuse issues are almost always…connected with men who give them drugs or money to get the drugs."
4. The group was led by two facilitators, in addition to a counselor who was an expert in substance abuse issues. A social worker was also available at the clinic for one-on-one counseling.
5. Groups were comprised of women of all gestational ages. As such, much of the information in the Centering curriculum was repeated throughout a woman's pregnancy.

All facilitators were certified by CHI. UK also offered Centering training (hosted by CHI) to all staff and providers interested in knowing more about the program and scheduled Advanced Facilitator Training with CHI for those who had completed the initial CHI training.

OUTREACH AND ENROLLMENT

UKRF experienced challenges with enrollment throughout the course of Strong Start. Key informants noted that the decision to use either opt-in or opt-out enrollment was made based on the preference of clinic leadership. The Lexington sites made the decision to use an opt-in enrollment approach, where women were asked to choose between enrollment in Strong Start or participation in the standard care model, while the three rural health department sites decided to use opt-out enrollment, meaning all women were enrolled into Strong Start by default unless they actively chose to opt out of the intervention. Sites using opt-in enrollment reported that a higher proportion of eligible patients declined to participant in Strong Start than sites using opt-out enrollment. A notable exception among opt-in sites was the site that implemented the PATHWAY substance use group where the opt-in rate for the PATHWAY group was near 100 percent.

In addition to enrollment challenges, UKFR also experienced barriers to care among their Strong Start participants. Transportation was a barrier cited by several sites, and sites found solutions for women, that included assistance with setting up rides with the Medicaid vendor, use of taxi vouchers, and being flexible with patients who showed up late. Childcare was also a barrier because UKFR generally discouraged women from bringing their children with them to group sessions. However, if women had no other options for childcare, they were permitted to bring their children.

> "Everyone is really nice here. This is the place where everyone understands that you can be a drug addict and pregnant at the same time. That shameful scorning--they are not judging you. It's a blessing as far as I'm concerned. More than anything else."
>
> *- Strong Start participant*

UKRF increased its community outreach efforts during Strong Start. Awardee staff created a brochure about Centering that was handed out at local health departments and community organizations that commonly provided referrals for prenatal care. In addition, a TV special aired on a local station about Centering at UKFR that included awardee staff, a Centering facilitator and patient.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants felt that Strong Start had a positive impact on a range of patient outcomes, with key indicator rates often being as good as or better than the state or national averages in the Medicaid population. Given that most UKRF Strong Start participants had high-risk pregnancies (UK is a tertiary care center receiving high-risk pregnancy transfers from across the state), informants found preterm and low birthweight outcomes to be promising, especially among pregnant women with substance-abuse disorders. In addition, several key informants mentioned the benefits of spending more time discussing family planning and breastfeeding during group sessions. They felt the model resulted in better breastfeeding initiation and postpartum contraception use.

Key informants felt that Strong Start helped to improve provider continuity at participating sites. Prior to Strong Start implementation, women receiving standard prenatal care were served by a rotating set of attending and resident physicians at most sites. Under Strong Start, however, women

> "They ask you as soon as you come in what kind of birth control you are planning to use. They don't force you or anything, it's up to us. They just want you to know about it, and they provide it here too."
>
> *- Strong Start participant*

met with the same Group Prenatal Care facilitators for each session, and the providers that conducted individual health exams for the groups were also generally consistent. Key informants felt that the continuity provided by group sessions was important and appealed to patients. However, Strong Start provider continuity did not extend to labor and delivery care; at all sites, deliveries were attended by the doctor who was on call at the time, who usually was not the woman's Centering provider.

STRONG START PARTICIPANT PERSPECTIVES

Focus group participants described a variety of reasons for choosing Strong Start sites for their care, including location, convenience, health plan requirements, prior positive experiences, or because they were referred from other providers or by satisfied family and friends. Some focus group participants reported being initially hesitant about Centering; however, despite their initial hesitancy, they reported positive experiences.

> *[My Medicaid plan] gave me the options to choose other clinics but I have friends that were treated very well so I chose to come here.*
>
> *I was a little skeptical. I showed up to my first group, I didn't know any of the girls and we didn't connect right away. I didn't know if it was something I wanted to do. Over the months we grew together. We were on the same level, had the same feelings.*

Participants generally had positive impressions of Centering, and liked the additional education that they received. They all spoke favorably of their Centering facilitators and felt comfortable asking questions and discussing personal issues with them. In addition, participants with prior (typical) prenatal care experience reported that they learned more through Centering than they had during previous pregnancies. All preferred Centering to their previous care experiences.

> *I absolutely felt comfortable with [my facilitator]. She was someone I went to for the group, but I could also talk to her outside of the group. When it came close to delivery, I had pains, I could call and text her…she would ask me questions and help me call the hospital if I needed to go.*
>
> *I think [Centering was] more helpful, to be honest.*

Family planning was also a common topic during Group Prenatal Care sessions. Participants received information about each method so they could make an informed decision. All participants said they had discussed breastfeeding in at least one of their Centering sessions, citing health benefits as one of the mains reasons to breastfeed.

> *I liked it when a lactation specialist came and talked to us in one of the sessions.*

A focus group was also held with women participating in the PATHWAY group. Attending groups was difficult for women who had long drives, ranging from 45 minutes to 2 hours. However, without many other care options in the state for opioid-addicted pregnant women, they had little choice but to make the trip, often multiple times per week. Many of the group members were concerned about losing custody of their newborn, and they appreciated the frankness of the facilitators in communicating the consequences of not seeking treatment. Finally, the women in PATHWAY described being treated poorly by other healthcare providers because of their history of substance abuse. They expressed gratitude for the compassionate and "judgment-free" space that UKRF provided. Several had a hard time imaging what life would be like without this program.

> *They don't look down on you. If you went to a regular doctor they would probably not see you and judge you. They'd probably call a social worker on you. But here it's better.*
>
> *I really like this place, I don't know where I'd be without this. I'd either have lost my baby or my baby would've been taken by social workers.*

PROGRAM STRENGTHS

UKRF key informants described several different program strengths. Many key informants highlighted the successes of two types of UKRF groups in particular. The groups for Hispanic women were considered especially successful since Hispanic prenatal patients are often recent immigrants with few connections in the United States, and can be isolated at home caring for small children while their partners work during the day. In addition, key informants felt the creation and operational success of the PATHWAY program was a major accomplishment that filled a significant unmet need in the area.

> "I thought that 38 weeks was pretty normal for a baby. But then I realized that the brain and lungs develop even more in those last two weeks…we learned that [at Centering]. That's something I didn't know before."
>
> *- Strong Start participant*

In addition, UKRF has successfully partnered with several community organizations to better meet the needs of their Strong Start population. For instance, health department tobacco cessation and breastfeeding coordinators are frequent guest speakers at Centering sessions. Finally, at one site, recruitment was touted as a program strength, since group facilitators themselves were involved. Key informants felt this added an important personal element.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The most challenging aspect of implementation, which the awardee never fully overcame, was provider buy-in. To be successful, Strong Start needed support from multiple levels: attending physicians, residents, administrative staff, nurses, medical assistants, and so on. But not all sites had broad-based support throughout the award period. Some key informants noted that the physician providers who agreed to implement Group Prenatal Care were not the ones most involved in actual implementation. Key informants wondered whether they should have pursued a written agreement at the start of the award, showing that administration and department leaders would support program implementation

and work collaboratively to make it successful. They acknowledged that leaders may not have signed such an agreement, but speculated that it could have been helpful.

> "I just felt there was such a good feeling of support…the facilitator was always available – you could text and call her anytime."
>
> *- Strong Start participant*

Having a program champion or "cheerleader" was another way to address the challenge of broad-based support. Key informants described this individual as someone who was willing to put in the time to educate staff on Group Prenatal Care, address resistance to the model, and keep the program running smoothly so that everyone remained committed to implementation. One key informant suggested that nurses were the most likely champions for Group Prenatal Care and had been the "glue" that held programs together at UKRF sites.

Finally, the awardee noted a couple barriers that sites were able to address during the implementation period. Securing adequate space was sometimes a problem, but eventually all sites identified a space suitable for group sessions even if it meant being flexible (e.g., using a space that doubled as a patient waiting room). For PATHWAY, program staff identified a problem early on where participants stayed at the group care session just long enough to receive their suboxone or (less commonly) methadone treatment; they were called out of the group one by one for their individual health exams (when the suboxone/methadone was dispensed) but many left the facility directly after instead of returning to the group discussion for the remainder of the session. Key informants explained that the methadone treatment was often "the real driver" motivating women to attend prenatal care sessions, especially early in recovery. Program staff worked out a solution with the providers, asking them to hold off on providing the suboxone/methadone treatment until the end of the group discussion, allowing the group facilitators to distribute it.

SUSTAINABILITY

UKRF has partially sustained its Strong Start program with institutional funding from UK's obstetrics department and continues to provide the Group Prenatal Care model for two prenatal populations at the Polk Dalton site: women with opioid use disorder and Spanish speakers. Key informants felt that implementation had been particularly successful for these two groups at Polk Dalton, which is also the UKRF site that had some (limited) experience with Centering prior to Strong Start. Group prenatal care has not been sustained at other UKRF sites or for any other populations at the Polk Dalton site.

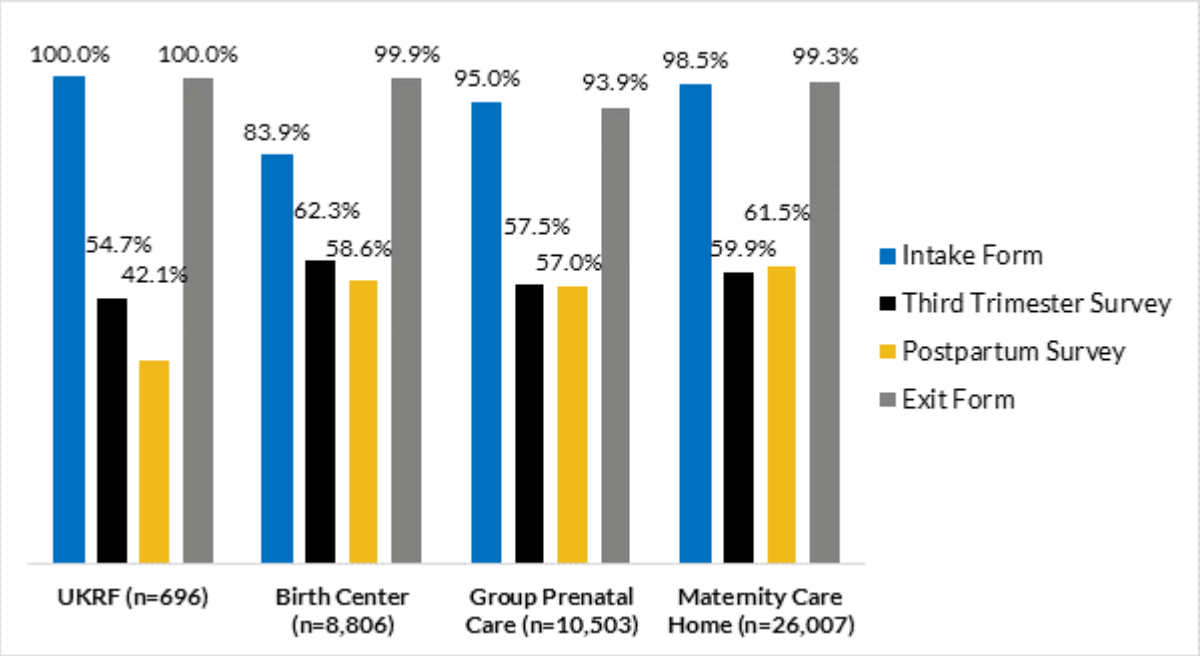
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for UKRF, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for UKRF to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 7 UKRF participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 22: FORM SUBMISSION RATES, UKRF



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 696
- Study IDs represented: 696 Study IDs

HOW FORMS WERE ADMINISTERED:

- Most UKRF patients filled out electronic versions of the forms.
- Some participants completed forms on paper. This occurred when the scannable forms were implemented in early 2014 and no electronic data submission possible. In cases where paper forms were used, staff reviewed the paper before entering into the RedCap database.
- Over time, Strong Start staff learned which questions might need clarification, and they would explain them to participants. They also found that participants often ran out of time, so they started to allow them to complete the survey during the next group session.
- The awardee attempted to contact patients up to three times to complete each form.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate there were any notable site-specific concerns or difference.

MISSING FORMS:

- Intake Form: No Study IDs were missing Intake Forms.
- Third Trimester and Postpartum Surveys: About 45 percent of Study IDs were missing the Third Trimester Survey and 58 percent were missing the Postpartum Survey. Of those missing either the Third Trimester Survey or the Postpartum Survey, 31 percent had stopped receiving SS services prior to delivery. As noted previously, the awardee tried to contact each participant three times before considering the survey missing.
- Exit Form: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Forms: The awardee said that participants might skip the questions related to drugs and alcohol because they did not use them and felt the questions did not apply, or they were using and did not want to disclose this. A high percentage of patients were missing educational level (42 percent). The awardee also said that participants might skip the education question because they did not have a college degree and felt it did not apply. For number of hours worked per week at a job, the awardee collected text responses; however, an integer was required for the PLPE database. The awardee declined to change these text answers to integers, so all non-integer values were set to missing.

- Exit Forms: Group Prenatal Care facilitators were responsible for reviewing the medical record for each patient and completing the Exit Form in the awardee's RedCap database. The awardee found that facilitators were not always entering all the information that was requested. Also, early in the project, UKRF indicated that some participants delivered at non-UK sites, and their birth outcomes would be difficult to track down. In the end, Strong Start pregnancy outcomes were missing for about 20 percent of participants.[130] In addition, Type 1 was 100 percent missing. The awardee did not differentiate between type 1 and 2 diabetes when collecting evaluation data, so all cases of diabetes were coded as type 2. Finally, the awardee did not collect information on cervical incompetence, HIV, and congenital abnormalities of the fetus.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for UKRF participants. Some highlights include:

- The majority of UKRF participants (75.2 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 12.8 percent of participants were 18 or 19 years old.
- Most participants were white (50.1 percent), followed by 33.5 percent Hispanic and 12.5 percent black.
- Similar to Strong Start participants overall, the largest share of UKRF participants was in a relationship and living with a partner (38.1 percent), although 29.8 percent were married and 13.3 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 26.0 percent of UKRF participants reported having experienced intimate partner violence, 24.2 percent of participants with a prior birth had a prior preterm birth, and 63.3 percent of participants had not planned their Strong Start pregnancy.

TABLE 344: DEMOGRAPHICS, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.0	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**682**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	5.3	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	12.8	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	75.2	81.7	72.9	75.1	75.8
35 Years and Older	%	6.7	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	1.6	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**678**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	33.5	25.4	37.1	28.0	29.7
Non-Hispanic White	%	50.1	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	12.5	16.1	45.0	44.8	39.8

[130] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 62.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 38.0% were missing for other reasons.

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Other Race/Multiple Races	%	3.8	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	3.5	19.6	12.8	11.3	13.3
Not in Universe	%	63.6	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**227**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	71.8	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	25.6	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**689**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	5.8	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	2.5	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**672**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	27.5	36.6	30.8	35.3	34.5
In School, Not Employed	%	10.6	8.7	12.6	11.9	11.5
Employed and in School	%	5.7	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	56.3	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	32.9	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**462**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	0.0	15.4	27.8	29.1	26.4
High School Graduate or GED	%	82.9	57.5	58.3	57.9	57.9
Associate's Degree	%	6.7	8.2	5.2	4.6	5.4
Bachelor's Degree	%	6.3	14.5	4.5	3.7	5.8
Other College Degree	%	4.1	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	1.6	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**678**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	29.8	42.1	20.4	20.8	24.5
Living with a Partner	%	38.1	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	18.9	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	13.3	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 345: PSYCHOSOCIAL, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.9	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**683**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	54.2	51.8	51.8	59.7	56.5

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
No	%	42.2	44.6	42.3	37.4	39.8
Unsure	%	3.7	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.9	17.0	6.6	3.4	6.8
Not in Universe	%	45.4	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**370**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	66.8	61.1	72.6	79.9	75.3
Other	%	24.3	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	8.9	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	0.0	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**689**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	32.4	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	7.1	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**640**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	30.9	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	1.5	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**679**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	62.0	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	11.2	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**612**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	38.7	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	7.1	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**640**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	57.0	67.9	59.0	65.5	64.5
Mild	%	26.1	21.4	23.8	20.2	21.2
Moderate	%	9.5	6.8	10.3	8.5	8.6
Severe	%	6.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	4.5	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**658**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	26.0	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	9.3	18.3	16.3	7.7	11.8
Not in Universe	%	6.5	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**580**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	6.0	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.0	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**689**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	54.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	31.9	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	14.1	6.6	10.6	8.8	8.9

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	59.6	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	9.5	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	18.6	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	17.7	24.6	17.1	15.4	17.2
Childcare Challenges	%	11.7	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	20.8	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 346: PREGNANCY HISTORY AND INTENTIONS, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.3	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**687**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	66.1	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	34.1	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	0.1	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**453**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	-	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	0.1	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**453**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	-	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	1.5	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**444**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	63.6	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**16**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	-	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	61.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**31**	**3,560**	**2,867**	**6,986**	**13,413**

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	67.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	64.4	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**-**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	62.6	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**23**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	56.5	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	64.0	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**13**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	100.0	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 347: PRIOR BIRTH OUTCOMES, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.0	1.7	1.5	0.6	1.0
Not in Universe	%	34.1	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**454**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	85.7	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	14.4	23.5	18.9	15.2	17.7
Not in Universe	%	43.5	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**290**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	27.9	34.6	24.3	27.1	28.1
>= 18 months	%	72.1	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.0	0.1	2.5	1.4	1.4
Not in Universe	%	43.5	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**389**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	24.2	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	54.1	1.3	20.8	13.1	12.6
Not in Universe	%	43.5	36.3	44.3	37.2	38.7

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**16**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	100.0	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 348: PRE-PREGNANCY MEDICAL CONDITIONS. UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	3.6	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**664**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	36.7	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	52.4	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	10.1	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	98.5	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**-**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	-	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	0.6	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**685**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	-	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	38.6	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**423**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.3	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	32.6	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	28.8	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	28.6	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	6.6	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 349: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	3.5	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**665**	**8,722**	**7,767**	**20,070**	**36,559**

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	2.3	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	3.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**665**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	2.1	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	3.5	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**665**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.0	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	100.0	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**0**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	N/A	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	3.5	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**665**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	3.5	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**665**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	100.0	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**-**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	20.6	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**547**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	12.2	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 350: TREATMENTS DURING PREGNANCY, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	48.5	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**355**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	11.3	0.8	10.0	5.1	5.4
Not in Universe	%	86.4	91.5	83.7	84.8	85.8

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**16**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	100.0	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**-**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	100.0	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**-**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 351: PRENATAL CARE, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	4.6	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**657**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	74.7	4.7	29.5	64.5	43.3
Licensed Professional Midwife[131]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	25.3	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**689**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	-	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	-	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**689**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	83.5	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	7.5	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	100.0	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**-**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	-	99.5	46.1	93.0	86.0

[131] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Care Coordinator Encounters	Mean	-	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	100.0	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**-**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	100.0	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**-**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	100.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**-**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	100.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**-**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	100.0	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**-**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	100.0	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**-**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	75.5	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**169**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	24.3	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	100.0	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**-**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	-	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	-	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 352: DELIVERY INFORMATION, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C sections)						
Missing Data	%	78.8	1.4	25.3	23.3	19.5
Not in Universe	%	21.2	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**0**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	N/A	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.0	0.3	7.8	2.9	3.5
Not in Universe	%	100.0	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**0**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	N/A	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	0.0	4.6	11.5	7.3	7.7
Not in Universe	%	21.2	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**543**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	100.0	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.5	0.7	12.0	5.6	6.1
Not in Universe	%	21.2	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**526**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	69.4	87.1	70.1	69.5	73.1
C-Section	%	30.6	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.9	0.4	8.7	2.3	3.4
Not in Universe	%	69.5	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**204**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	69.6	83.3	72.9	74.7	75.9
C-Section	%	30.4	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	23.4	4.7	12.5	6.3	7.4
Not in Universe	%	76.6	90.5	72.2	76.1	78.0

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**-**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	-	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	88.1	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**82**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	15.9	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 353: BIRTH OUTCOMES, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	19.9	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**552**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.4	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	3.0	0.7	15.4	5.8	7.0
Not in Universe	%	21.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**522**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	2.3	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	6.7	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	89.8	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	4.8	2.1	14.3	8.0	8.3
Not in Universe	%	21.2	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**510**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	8.6	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	83.5	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.9	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 354: SATISFACTION, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	60.5	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**272**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	3.3	3.3	4.4	7.8	6.2
Very Satisfied	%	47.1	25.6	35.6	46.1	39.8
Extremely Satisfied	%	47.1	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	61.1	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**268**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	4.9	3.0	4.0	2.9	3.1
Moderately Satisfied	%	6.3	10.4	11.6	12.8	12.1
Very Satisfied	%	57.8	29.1	42.6	46.6	42.1
Extremely Satisfied	%	27.6	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 355: BREASTFEEDING, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	45.9	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**373**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	53.9	80.4	47.5	40.5	50.3
Formula Feed Only	%	13.9	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	26.0	10.8	31.9	32.5	27.8
I Haven't Decided	%	6.2	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	57.8	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**291**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	72.5	91.5	76.6	72.6	77.3
No	%	-	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	27.5	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 356: FAMILY PLANNING, UKRF

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	57.8	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**291**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	UKRF (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	86.6	77.0	77.5	82.2	80.3
No	%	-	20.0	14.0	14.2	15.3
Unsure	%	13.4	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	57.8	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**291**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	76.6	84.2	70.8	74.0	75.5
No	%	-	13.2	17.7	21.5	19.1
Unsure	%	23.4	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	57.8	41.5	42.9	38.6	40.2
Not in Universe	%	9.9	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**223**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	17.0	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	13.0	2.8	11.4	10.9	9.2
LARC – IUD	%	17.0	10.8	11.9	12.3	11.9
Pills	%	11.2	8.6	11.9	13.0	11.8
Injection	%	6.7	5.9	16.2	20.2	16.2
Condoms	%	18.8	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	9.0	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Kentucky

Initial Contact: In May 2015, the evaluation team spoke with officials from the Division of Epidemiology and Health Planning, which houses the Vital Statistics Branch, about the state's willingness to participate in the Strong Start evaluation and process for releasing state birth certificate data to the Urban Institute for the impact analysis. State officials were receptive to supporting the evaluation, and they had access to and experience with linking birth certificates and Medicaid data. Therefore, the state felt it would be best for the agency to link the Medicaid and birth certificate data. The evaluation also reached out to Kentucky Medicaid to assess their willingness to share Medicaid data, but struggled to establish a primary contract at the agency.

Data Acquisition Process: After finally making contact with Kentucky Medicaid in the fall of 2015, and after several follow up phone calls with the Department for Medicaid Services (DMAS) within the

Kentucky Cabinet for Health and Family Services (CHFS), DMAS requested examples of data use agreements used by Urban with other states. DMAS also shared that they had an existing agreement with the Office of Vital Statistics, CHFS, to access its birth certificate data. Upon receiving permission from several state agencies, Urban shared several examples of signed data use agreements for the impact analysis in February 2016. DMAS sent a draft DUA to Urban in August 2016 which was fully executed DUA by November 2016. However, following the DUA, the Medicaid agency's privacy officer raised additional concerns about consumer privacy and the idea of linking Medicaid data with birth certificates.

Final Result: Several conversations occurred with the Medicaid Privacy Officer in an attempt to resolve the issue, but in June 2017 the agency informed the evaluation team that they would not be able to provide the requested data. The evaluation team made one final attempt to request and obtain aggregate data measures, but was unsuccessful. Thus, Kentucky data were not included in the final impact analysis.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for the University of Kentucky Research Foundation.

CROSS-CUTTING SUMMARY

The University of Kentucky Research Foundation implemented the Group Prenatal Care model under Strong Start. The awardee followed the *CenteringPregnancy* model with additions to the curriculum and the creation of special targeted groups for Hispanic women, tobacco users, diabetic/obese patients, and women with opioid addiction (this final group was called the PATHWAY program). Group care sessions delved into a range of topics, but UKRF added a component called EMPOWR (Efforts to Maximize Perinatal Outcomes in Women at Risk) to Centering in order to target risks prevalent among the state's pregnant, low-income population, such as tobacco use. Though lack of broad support from prenatal care administrators and providers made implementation difficult for some UKRF sites, the groups for Hispanic women and PATHWAY were perceived as especially successful because they filled a need in the community. Many of the characteristics of participants overall reflect the targeted groups organized by UKRF. While half of participants were white, one-third were Hispanic, and UKRF participants had a higher rate of overweight and obesity than the Strong Start average. Nearly one-third of participants smoked cigarettes at intake, a rate more than twice that of Strong Start participants overall. Participants also reported high rates of intimate partner violence, depression, and anxiety. Impact analysis was not conducted for UKRF because we did not obtain birth certificate and Medicaid data from Kentucky. Descriptively, UKRF participants had higher rates of C-section and lower rates of VBAC than the Strong Start average. Their rate of low birth weight tracked with the Strong Start average, but the rate of preterm birth (9 percent) was slightly lower than the 9.8 percent preterm birth rate of U.S. women overall.

University of Puerto Rico

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
928	• Medical Sciences Campus, one of eleven UPR campuses, and includes the Schools of Medicine, Pharmacy, Dentistry, Nursing, Public Health, and Health-Related Professions	• One site, the University Hospital's high-volume prenatal care clinic in San Juan, a primary referral site for low-income women with high-risk pregnancies from all parts of Puerto Rico	• Intervention categorized as "high intensity" for implementing the *CenteringPregnancy* curriculum plus two additional group sessions, while also operating special prenatal care groups targeting high-risk women with conditions such as HIV, Zika, diabetes, and rheumatic diseases • Other notable distinctions include the inclusion of patients who begin care after 20 weeks' gestation and use of three facilitators • Enhanced education in family planning, C-section deliveries, and breastfeeding • Referrals to clinical and psychosocial resources available on UPR's medical campus • Medical school residents played increasingly significant role in UPR's Strong Start program administration

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Support of hospital and prenatal clinic leadership (e.g., obstetrical department chair, hospital's executive director, nursing supervisor)
- Location of the group sessions at University Hospital, where Puerto Rico's most qualified physicians work
- Enthusiasm and persistence of Group Prenatal Care facilitators
- Quality and scope of enhanced education included in Group Prenatal curriculum

CHALLENGES

- Persistent resistance from "old-guard" nurses who were more comfortable with one-on-one prenatal care
- Lack of child care (children under 12 years old could not enter the hospital except as patients) was barrier to Group Prenatal Care attendance
- Lack of staff and resources to gather and analyze program data, including lack of an electronic medical records system

SUSTAINED

- UPR sustained all 32 of its prenatal care groups and made Group Prenatal Care its standard model of care for all pregnant patients at the University Hospital site

KEY FINDINGS: PARTICIPANT-LEVEL DATA[132]

PARTICIPANT-LEVEL DATA QUALITY

- 2.2% rate of missing intake forms; 0.0% rate of missing exit forms
- 6.0% rate of item nonresponse on intake forms; 12.4% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 17.7% of women were teens (under age 20); 14.3% were 35 years or older
- 0.3% of women were black; 98.3% were Hispanic; 1.4% were white
- 21.6% of women were married; 46.5% were living with a partner; 14.2% were not in a relationship
- 36.2%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 47.5%: C-section rate among women with a delivery
- 21.4%: preterm birth rate among women with a live birth
- 17.7%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted because we did not obtain birth certificate and Medicaid data for Puerto Rico

[132] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Key informants described their pre-Strong Start model of prenatal care as "very traditional," and noted that, with Group Prenatal Care they wanted to "change perceptions" among patients and providers about what prenatal care could, and should, entail. UPR's typical prenatal care consisted of brief individual visits with residents or obstetrical/gynecological (OB/GYN) physicians. Patients waited long hours to see medical providers. They were typically given a specific day for their appointment, but not a specific time; rather, they lined up prior to the clinic's opening and were seen on a 'first come first served' basis throughout the day. Patients were not permitted to bring partners or family members to the exam room for their visit, and typically saw different prenatal care providers at each appointment.

Although Group Prenatal Care was new to UPR prior to Strong Start, one of the Strong Start project directors had many years of experience running an empowerment group for women with HIV focused on addressing hopelessness and stress, and improving communication. She felt this HIV-focused group shared key features with the Group Prenatal Care model, including an emphasis on peer support and "getting patients more involved in their care." Strong Start was an opportunity to expand the group model to other high-risk patients.

DESCRIPTION OF ENHANCED STRONG START SERVICES

UPR's approach to Group Prenatal Care was similar to the Centering Healthcare Institute (CHI)'s *CenteringPregnancy* model, though the awardee departed from the Centering protocol in several notable ways.[133] The awardee used the Centering curriculum and materials, but expanded the program from 10 to 12 sessions. The additional sessions included an initial meeting that served as an introduction to the program and an extra final session that covered postpartum health, C-sections and third trimester material. Program staff also adapted the curriculum by adding to its childbirth preparation component and incorporating childhood games (like musical chairs and 'hot potato') into the sessions to encourage active participation by group members. Additionally, participation in UPR's Strong Start demonstration was open to pregnant women who began care in the clinic after 20 weeks' gestation and before 29 weeks' gestation.

> "The learning is both for the woman who is pregnant and the person accompanying them. It is really encouraging for us pregnant women, it really relaxes us. Being pregnant can be a little hectic. Centering is a way to smooth this process."
>
> *- Strong Start participant*

[133] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

Prenatal care groups were led by an OB/GYN physician (a UPR faculty member) and supported by two additional staff, an RN and the Strong Start program coordinator. Early in the implementation period, program staff (OBs and some registered nurses or RNs) received training by CHI officials, who visited UPR. Frequent staff changes (common in a teaching facility like UPR) required continuous training on the model; however, this was typically provided by the program coordinator, who had extensive training on the CHI model. UPR also strived to involve other University Hospital staff members and some external partners in group sessions. Breastfeeding peer educators from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) led the breastfeeding discussion, which key informants felt was an important way to introduce patients to support available through WIC. Other specialists (e.g., audiologists or neonatologists) also participated in some sessions as guest speakers. Strong Start project directors invited pre-med students, residents, and individuals from other departments to sit-in during sessions, including nurses from the hospital's emergency department (which key informants described as "low volume") across the hall from the dedicated group meeting space. One key informant explained their open-door policy by saying, "It's to their benefit to learn…the more people who've been exposed to the program, the better eventually."

In addition to their group care sessions, patients with certain high-risk conditions (e.g., diabetics, women with heart problems) also received care from specialists within and outside of the UPR system. Key informants felt that care was usually well-coordinated between Strong Start providers and specialists, particularly since Medicaid managed care plans required that primary care providers and OB/GYNs were notified of and signed off on the services specialists ordered for their patients.

After Year 2 of the demonstration period, the awardee implemented a number of diagnosis-specific groups, including groups for women with HIV, diabetes, diagnosed with or at a high risk of contracting Zika virus, and rheumatic diseases.

OUTREACH AND ENROLLMENT

In spring 2015, with the enthusiastic support of the University Hospital Administrator, the clinic adopted Group Prenatal Care as its standard model of care for all patients (including those ineligible for Strong Start). As part of this transition, UPR implemented an opt-out enrollment approach, meaning that all women were enrolled into Strong Start by default, unless they actively chose to opt out of the intervention. Key informants noted a positive impact on patient recruitment, retention and attendance at both prenatal and postpartum visits after adopting group care as the standard model, perhaps driven by the fact that women now had consistent and reliable appointments that began and ended at their scheduled times. Strong Start facilitators were responsible for recruiting participants from those already presenting at University Hospital clinic for prenatal care (i.e., "in reach").

> "What sold me was that your partner could come in with you because in [traditional care], your partner can't come in. They can only be there for the sonogram. Sometimes though, you want them to be there with you. There are times [your partner] wants to be there and the doctors won't let them."
>
> *- Strong Start participant*

Word of mouth was the most significant outreach mode for UPR's Strong Start program, and interest in the Group Prenatal Care model spread substantially this way. Spreading awareness via word-of-mouth was important because "once [the] community and patients know about how this works they

love it." Key informants believed that when participants shared positive experiences with *CenteringPregnancy* with their friends and family, women were open to the idea of Group Prenatal Care.

UPR did little to actively market the program outside the clinic, though an article on group care in the Puerto Rico Journal of Public Health resulted in a few referrals to the program. At the program's inception, flyers were sent to WIC offices around Puerto Rico to promote Strong Start. This strategy was not particularly effective, which key informants attributed to limited resources and a lack of people stationed within WIC offices. As one key informant noted: "I think if someone can go [to WIC] every other week, we would probably have better numbers. I think the resources are the main problem. If we had exterior help, it would be a great support." Texting was not a strategy employed by UPR's Strong Start program, either for outreach/enrollment or as part of service delivery. Unlike most participants in Strong Start demonstrations taking place across the mainland of the United States, many of the women who participated in UPR's demonstration lived in rural areas and did not own cell phones.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants conducted their own internal analyses of Strong Start data. Based on these analyses they felt confident that Group Prenatal Care had positive effects on physical outcomes, particularly preterm births and breastfeeding rates, and on psychological outcomes such as postpartum depression.

More specifically, Strong Start program leaders published two articles in an open-source journal showing improved outcomes and reduced costs for women receiving group prenatal. In one study, they found that infants born to women in group care had higher mean birthweights (6.59 lbs. vs. 6.33 lbs.) and higher gestational age (37.8 weeks vs. 36.8 weeks) compared to women who received standard prenatal care. This study also found women in Group Prenatal Care experienced lower rates of preterm birth than those in standard care: 27.7 percent vs. 34.1 percent.[134] A second study found lower costs associated with Group Prenatal Care compared to standard care, which were attributed to decreased rates of preterm birth and decreased infant days in neonatal intensive care units.

Another outcome of note was UPR's success, especially toward the end of Strong Start, in increasing the rate of LARC (long-acting reversible contraception) use among its patients. With new support from the Centers for Disease Control (CDC) Foundation's "ZCAN" initiative, a response to the Zika crisis, Puerto Rico received thousands of donated LARCs and other contraceptives. UPR, in turn, made the methods available free of charge to all women over the age of 18. The ZCAN initiative complemented the Group Prenatal Care model's facilitated discussion related to family planning.

STRONG START PARTICIPANT PERSPECTIVES

Many patients had been diagnosed with a high-risk pregnancy and came to UPR because it was the only hospital on the island where they could receive appropriate care covered by Medicaid. Some women

[134] All findings statistically significant ($P<0.05$). Zorrilla, C. D., Mosquera, A. M., López Pérez, L. A., Rabionet, S., & Rivera-Viñas, J. (2017). Improved Infant Outcomes with Group Prenatal Care in Puerto Rico (S. Yub Ku, Ed). *Source Journal of Obstetrics and Gynaecology*, *1*(1), 2016th ser., 1-9. Retrieved March 2017, from http://sourcejournals.com/article/improved-infant-outcomes-with-group-prenatal-care-in-puerto-rico-sjog/.

also noted that they had sought out UPR because of previous positive experiences they had at the hospital or because their friends had recommended UPR's *CenteringPregnancy* program.

> *I have a friend who already gave birth but she participated in Centering…She told me to come here and to come to the Centering program because they let you be with your partner.*

> *In traditional care, there are a lot of residents and every visit a new resident sees you. There isn't a single person who has your case. They told me that in Centering you would only have one doctor and they would know your situation and that the doctor would be meeting one-on-one with [my specialist]. That was one of the things that motivated me to join Centering.*

Most participants were excited about the model because it allowed them to involve partners in their prenatal care and avoid spending the whole day at the hospital when they had a prenatal care appointment. Women also enjoyed having a consistent prenatal care provider. Patients who were hesitant to participate were able to try Centering before making a final decision. Many women developed close relationships with their providers and felt they had plenty of opportunities to ask questions about their pregnancy during Centering sessions. In addition to more individualized attention, focus group participants felt that Centering was a more efficient way to receive care because it allowed them to avoid waiting long hours for care (as was typical for prenatal care patients prior to the implementation the Strong Start demonstration). They appreciated the enhanced education and the peer support.

> *The dynamic with the medical team is different in Centering. Upstairs [with standard care], there is a lot of tension. They treat you as if they are in hurry, like "let's go!" Sometimes you want to leave too because you have things to do or because you left your kids with someone. But in Centering, things are more relaxed and that gives you the opportunity to learn a little bit more. Not only are the patients more relaxed but so are the nurses. The doctors communicate with us better since they are more relaxed.*

> *In my previous pregnancy, because it was my first pregnancy and I didn't know, I would come to the emergency room all the time. In this pregnancy, I have not gone to the emergency room at all. I am more calm and relaxed.*

While all focus group participants were overwhelmingly satisfied with Group Prenatal Care and preferred it to standard care, they offered some suggestions for improvement. The most common suggestion was to increase privacy for the individual assessment by putting up a curtain (the exams were happening in a semi-screened off corner of the room). Other suggestions included creating a waiting room for women who arrive prior to the session start time and providing more guidance about outside referrals. Many first-time mothers were unaware of the responsibility they had in coordinating their own external appointments. Some women also reported being frustrated with the repetition of sessions. For example, a focus group participant described being placed in a group with postpartum women while she herself was still pregnant, and attending multiple sessions on the same topic.

I think they should put a curtain up in the second Centering room so there can be more privacy between the doctor and the patient. But I also understand that the room is new and that this is all new for the hospital. Sometimes it's hard to hear the doctor [in the individual assessments] when everyone in the group is talking.

PROGRAM STRENGTHS

Support of hospital and prenatal clinic leadership was a key strength of UPR's Strong Start program. The case study team interviewed many UPR leaders during the Year 2 site visit, including the OB/GYN department chair, the head of the prenatal care clinic, the hospital's executive director, and the nursing supervisor; without exception, each of these individuals expressed support for and satisfaction with Group Prenatal Care. Some also remarked that they were impressed with the "relative ease" with which the program had grown and been expanded to the entire clinic. As an example of leadership support for Group Prenatal Care, the hospital nursing supervisor had little direct involvement in the program but worked with the hospital kitchen to secure snacks for the clinic's group sessions (including snacks for both for the pregnant woman and a partner) on an ongoing basis.

> "Last week, when my husband couldn't come with me, everyone was asking me why he didn't come and was asking if he was okay. Everyone looks out for another. Even though we don't talk outside of Centering, when you are there, you feel loved."
>
> *- Strong Start participant*

To build and maintain this support, Strong Start program leaders were diligent advocates for the program and opened up Centering sessions to any provider or University Hospital staff interested in learning more about the model. They also addressed common concerns about Group Prenatal Care including the fear that high-risk conditions would be "missed" or harder to monitor in a group setting, and that care quality would suffer with condensed individual assessments in the context of larger group sessions.

Key informants believed that, in Puerto Rico, the location of the group sessions was important to their success. That is, implementing Group Prenatal Care at University Hospital where the island's most qualified physicians work was helpful because Puerto Ricans tended to associate quality health care with close proximity to doctors. In contrast, key informants said that they would not expect Group Prenatal Care to have been as popular among women if it was implemented in community centers or non-medical locations.

Key informants highlighted additional strengths including the enthusiasm and persistence of Centering facilitators, and the quality and scope of enhanced education included in the Group Prenatal Care curriculum. They noted their program's success at implementing Group Prenatal Care among a high-risk population, including creation of their special groups targeting women with such complex conditions as HIV, diabetes, and Zika. Finally, they were proud that they had pushed the boundaries of the *CenteringPregnancy* model by involving medical residents in group care, primarily as a means for introducing the next generation of physicians to this innovative approach.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

UPR's Strong Start program met persistent resistance from "old-guard" nurses who were more comfortable with the status-quo approach of one-on-one prenatal care, but the Strong Start program director and key staff were successful in persuading hospital administrators that Group Prenatal Care should be the hospital's standard approach. Informants were also proud that they further pushed the boundaries of the *CenteringPregnancy* model by involving medical residents in group care, primarily as a means for introducing the next generation of physicians to this innovative approach.

Child care was a persistent challenge to attendance at Group Prenatal Care sessions. Children under the age of 12 years old could not enter the hospital (except as patients), so parents could not bring their young children with them to sessions. UPR attempted to mitigate this challenge by scheduling groups during the morning hours (7:30 AM to 12:30 PM) because that's when children were in school or had child care through Head Start. This presented a challenge to the clinic, however, which had limited access to space for Group Prenatal Care sessions and could not take advantage of space availability during afternoons.

One of the largest challenges experienced by the program was an overall lack of staff and resources to gather and analyze data. Complying with Strong Start rules for data submission was difficult, but staff efforts paid off handsomely in that they were able to demonstrate their program's effectiveness through their own analyses. In considering what Strong Start could have done differently, staff said they wished that they had had more ability to gather and report comprehensive data on their patients, service delivery, and outcomes. They also lamented the lack of an electronic medical records system that would have made this task easier.

SUSTAINABILITY

UPR sustained all 32 of its prenatal care groups and made Group Prenatal Care its standard model of care for all pregnant patients. It also became CHI-certified in *CenteringPregnancy* in November of 2016, and is the first primarily non-English speaking provider to achieve this certification. UPR does not intend to continue the full data collection that was required for the Strong Start initiative because the awardee does not have the resources, but will continue to collect the data required to maintain its CHI certification.

University Hospital has dedicated funding for two nurses to continue facilitating Group Prenatal Care in the prenatal clinic, thanks to the extra funding UPR received to deal with the Zika epidemic. In the future, enhanced reimbursement from Medicaid and commercial insurers would be critical for successful program implementation so that the Group Prenatal Care program would have the resources to be implemented fully and sustained. As described previously, UPR published two journal articles using data from their Group Prenatal Care program showing improved outcomes and reduced costs for mothers receiving group care compared to women in typical care, and key informants felt these publications helped them make a strong case for sustaining the model.

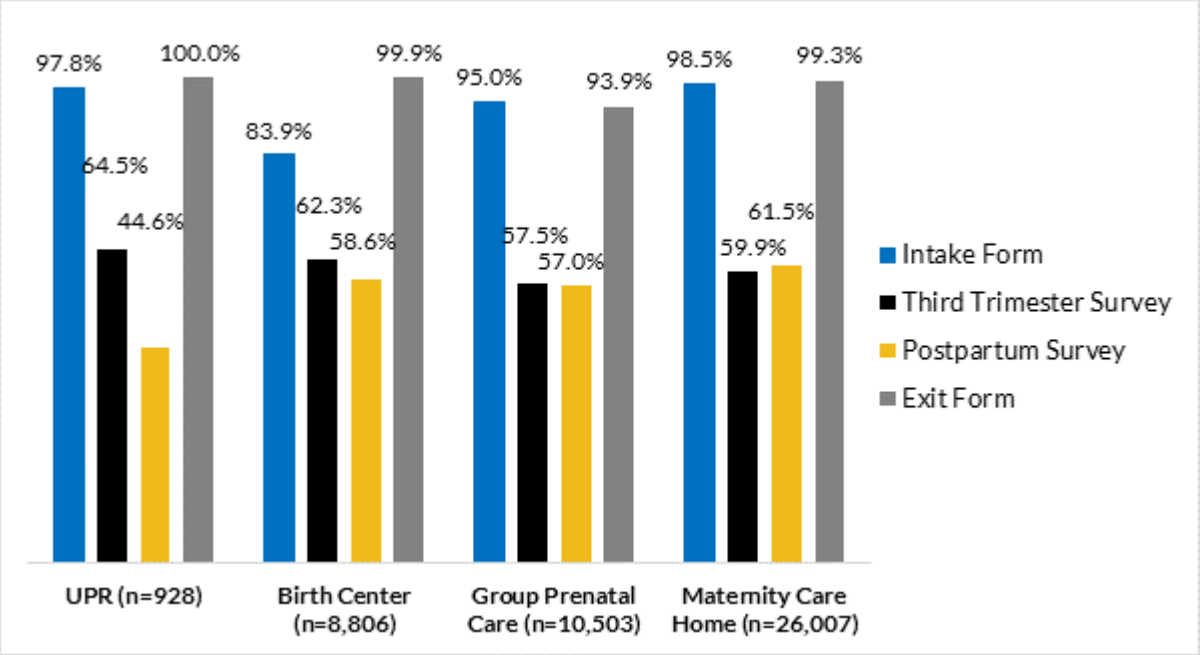
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for UPR, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for UPR to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 27 UPR participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 23: FORM SUBMISSION RATES, UPR



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 928
- Study IDs represented: 928 Study IDs

HOW FORMS WERE ADMINISTERED:

- Participants filled out the forms on paper; In late 2015, the awardee implemented a new system where staff reviewed the forms for completeness with the patient present.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- Not applicable, as the awardee had only one site.

MISSING FORMS:

- Intake Forms: 2.2 percent of Study IDs were missing Intake Forms.
- Third Trimester or Postpartum Surveys: About 36 percent of Study IDs were missing the Third Trimester Survey and 55 percent were missing the Postpartum Survey. A small number of these were missing because the participants enrolled before the form was implemented. Other participants were lost to follow-up.
- Exit Forms: No Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Forms: The awardee said that patients likely skipped questions because participants complained that the form was too long and that they "wanted to leave." Regarding specific questions, the awardee said that most participants did not drink during pregnancy, so they thought the alcohol-related questions did not apply and skipped them. The awardee believed the same was true of questions related to substance use and smoking. Education level had a higher than average percentage of missing responses, with nearly 20 percent missing. The awardee did not say why this might have occurred.
- Exit Forms: UPR had good rates of completion for key birth outcome variables. Strong Start pregnancy outcome data are missing for only 4.4 percent of participants.[135] This was likely because few other providers in the area that offered deliveries. At the end of the project period, the awardee did not have the resources to submit comprehensive Exit Forms for the 150 remaining participants. Instead, they submitted abbreviated Exit Forms which contained the key birth outcome variables and several key medical risk factors, such as diabetes and preeclampsia.

[135] Among participants with missing data on pregnancy outcome, 0.0% were missing because they did not have an exit form, 90.0% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 10.0% were missing for other reasons.

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for UPR participants. Some highlights include:

- The majority of UPR participants (68.0 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 14.3 percent of participants were 35 or older.
- Nearly all participants were Hispanic (98.3 percent), among whom 96.1 percent were Puerto Rican.
- Similar to Strong Start participants overall, the largest share of UPR participants was in a relationship and living with a partner (46.5 percent), although 21.6 percent were married and 14.2 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 15.6 percent of UPR participants reported having experienced intimate partner violence, 36.2 percent of participants with a prior birth had a prior preterm birth, and 70.7 percent of participants had not planned their Strong Start pregnancy.

TABLE 357: DEMOGRAPHICS, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	2.1	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**882**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	7.4	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	10.3	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	68.0	81.7	72.9	75.1	75.8
35 Years and Older	%	14.3	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	3.9	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**866**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	98.3	25.4	37.1	28.0	29.7
Non-Hispanic White	%	1.4	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	0.3	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	-	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	4.3	19.6	12.8	11.3	13.3
Not in Universe	%	1.2	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**851**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	-	52.6	36.3	55.8	49.7
Puerto Rican	%	96.1	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	2.7	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	2.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**882**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	3.4	1.2	1.8	1.5	1.5

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Employment and School Status at Intake						
Missing Data	%	9.1	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**819**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	24.4	36.6	30.8	35.3	34.5
In School, Not Employed	%	15.8	8.7	12.6	11.9	11.5
Employed and in School	%	4.4	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	55.4	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	19.6	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**724**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	9.9	15.4	27.8	29.1	26.4
High School Graduate or GED	%	49.7	57.5	58.3	57.9	57.9
Associate's Degree	%	15.5	8.2	5.2	4.6	5.4
Bachelor's Degree	%	8.7	14.5	4.5	3.7	5.8
Other College Degree	%	16.2	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	6.0	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**847**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	21.6	42.1	20.4	20.8	24.5
Living with a Partner	%	46.5	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	17.7	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	14.2	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 358:PSYCHOSOCIAL, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	4.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**859**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	84.7	51.8	51.8	59.7	56.5
No	%	13.5	44.6	42.3	37.4	39.8
Unsure	%	1.7	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	4.7	17.0	6.6	3.4	6.8
Not in Universe	%	14.5	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**728**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	84.6	61.1	72.6	79.9	75.3
Other	%	8.7	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	6.7	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	13.2	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**782**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	3.2	10.7	10.1	13.2	12.1

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Food Insecure at Intake						
Missing Data	%	10.9	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**803**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	27.3	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	3.9	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**866**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	87.3	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	24.1	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**684**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	40.2	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	9.4	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**816**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	55.9	67.9	59.0	65.5	64.5
Mild	%	27.2	21.4	23.8	20.2	21.2
Moderate	%	8.9	6.8	10.3	8.5	8.6
Severe	%	5.9	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	2.1	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	4.1	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**864**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	15.6	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	12.0	18.3	16.3	7.7	11.8
Not in Universe	%	7.2	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**728**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	4.5	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	2.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**882**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	56.1	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	29.5	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	14.4	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	62.3	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	15.2	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	28.9	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	6.7	24.6	17.1	15.4	17.2
Childcare Challenges	%	14.2	19.8	9.8	7.9	10.1

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	16.3	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 359: PREGNANCY HISTORY AND INTENTIONS, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**901**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	71.1	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	28.9	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	32.0	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**353**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	26.9	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	31.5	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**357**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	-	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	32.1	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**352**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	55.2	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**144**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	38.9	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	59.3	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**107**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	18.7	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	60.5	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**96**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Placenta Abnormalities						
Missing Data	%	61.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**91**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	60.9	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**92**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 360: PRIOR BIRTH OUTCOMES, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.8	1.7	1.5	0.6	1.0
Not in Universe	%	28.9	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**634**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	87.4	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	11.5	23.5	18.9	15.2	17.7
Not in Universe	%	37.7	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**457**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	29.5	34.6	24.3	27.1	28.1
>= 18 months	%	70.5	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	1.7	0.1	2.5	1.4	1.4
Not in Universe	%	38.5	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**539**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	36.2	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	27.9	1.3	20.8	13.1	12.6
Not in Universe	%	38.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**303**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	-	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 361: PRE-PREGNANCY MEDICAL CONDITIONS, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	6.9	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**839**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	29.3	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	64.8	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	5.1	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	1.2	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**890**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	13.5	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	0.9	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**893**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	14.8	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	19.9	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**722**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	6.2	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	34.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	22.9	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	27.6	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	8.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 362: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	0.6	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**896**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	4.6	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	17.1	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**747**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	5.5	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	0.6	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**896**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	8.9	2.8	6.0	7.9	6.3

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cervical Incompetence						
Missing Data	%	17.0	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**748**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	17.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**748**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	17.0	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**748**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	17.1	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**747**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	5.8	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	17.0	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**748**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	3.5	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 363: TREATMENTS DURING PREGNANCY, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	25.0	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**676**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	6.3	0.8	10.0	5.1	5.4
Not in Universe	%	78.4	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**138**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	25.0	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**676**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	5.2	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	25.1	1.5	43.7	49.1	38.5

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**675**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 364: PRENATAL CARE, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	19.2	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**728**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	100.0	4.7	29.5	64.5	43.3
Licensed Professional Midwife[136]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	-	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**901**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	82.0	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	3.2	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**901**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	83.4	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	7.4	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	17.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**746**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	6.4	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	1.1	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	17.2	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**746**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	17.9	89.3	36.1	15.7	34.9

[136] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**740**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	16.9	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**749**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	17.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**748**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self Care, not Centering						
Missing Data	%	16.9	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**749**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	17.2	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**746**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	10.7	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	17.1	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**747**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	17.4	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**744**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	27.0	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.5	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	48.9	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	23.6	-	4.1	5.1	4.8
Cardiologist	%	18.5	-	6.4	6.9	6.8
Other	%	24.2	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 365: DELIVERY INFORMATION, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	20.4	1.4	25.3	23.3	19.5
Not in Universe	%	22.1	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**518**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	41.1	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.2	0.3	7.8	2.9	3.5
Not in Universe	%	76.4	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**211**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	99.5	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	1.9	4.6	11.5	7.3	7.7
Not in Universe	%	6.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**830**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.9	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	2.7	0.7	12.0	5.6	6.1
Not in Universe	%	6.0	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**823**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	52.5	87.1	70.1	69.5	73.1
C-Section	%	47.5	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.7	0.4	8.7	2.3	3.4
Not in Universe	%	70.9	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**256**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	65.2	83.3	72.9	74.7	75.9
C-Section	%	34.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	8.4	4.7	12.5	6.3	7.4
Not in Universe	%	56.6	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**315**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	46.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	75.7	96.0	82.7	85.9	87.1

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**219**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	17.4	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 366: BIRTH OUTCOMES, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	4.4	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**861**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	95.2	96.2	97.6	94.4	95.5
Stillbirth	%	3.1	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	1.6	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	4.8	0.7	15.4	5.8	7.0
Not in Universe	%	9.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**777**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	5.7	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	15.7	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	77.3	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	3.0	2.1	14.3	8.0	8.3
Not in Universe	%	9.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**793**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	2.0	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	15.6	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	77.9	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	4.4	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 367: SATISFACTION, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	55.8	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**398**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	2.8	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	6.0	3.3	4.4	7.8	6.2
Very Satisfied	%	26.6	25.6	35.6	46.1	39.8
Extremely Satisfied	%	63.1	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	55.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**401**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	9.5	2.0	3.1	2.3	2.4
Slightly Satisfied	%	10.2	3.0	4.0	2.9	3.1
Moderately Satisfied	%	15.7	10.4	11.6	12.8	12.1
Very Satisfied	%	30.7	29.1	42.6	46.6	42.1
Extremely Satisfied	%	33.9	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 368: BREASTFEEDING, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	38.2	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**557**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	50.6	80.4	47.5	40.5	50.3
Formula Feed Only	%	10.2	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	31.4	10.8	31.9	32.5	27.8
I Haven't Decided	%	7.7	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	56.9	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**388**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	74.7	91.5	76.6	72.6	77.3
No	%	24.7	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 369: FAMILY PLANNING, UPR

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	57.4	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**384**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	UPR (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	57.6	77.0	77.5	82.2	80.3
No	%	40.9	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	58.3	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**376**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	70.2	84.2	70.8	74.0	75.5
No	%	27.9	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	55.3	41.5	42.9	38.6	40.2
Not in Universe	%	15.4	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**264**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	22.3	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	-	2.8	11.4	10.9	9.2
LARC - IUD	%	4.2	10.8	11.9	12.3	11.9
Pills	%	6.4	8.6	11.9	13.0	11.8
Injection	%	-	5.9	16.2	20.2	16.2
Condoms	%	35.2	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	12.5	16.7	8.1	9.5	10.9
Method Not Indicated	%	5.3	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Puerto Rico

Although Puerto Rico had not been an intended target for the impact analysis, the evaluation team did inquire about the possibility of working with the Puerto Rico vital records agency to acquire birth certificate data. The agency did not reply to repeated attempts however, and no more efforts were made to obtain data.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for the University of Puerto Rico.

CROSS-CUTTING SUMMARY

The University of Puerto Rico implemented the Group Prenatal Care model under Strong Start, following the *CenteringPregnancy* approach. Group Prenatal Care represented a significant change from the awardee's "very traditional" pre-Strong Start model of prenatal care, under which patients lined up prior to the clinic's opening and were seen on a 'first come first served' basis throughout the day, were not permitted to bring partners or family members to the exam room for their visits, and typically saw different prenatal care providers at each appointment. UPR's single Strong Start site served as the island of Puerto Rico's primary referral site for low-income women with high-risk pregnancies, and the characteristics of the UPR participants reflected this high-risk status, Compared to Strong Start participants overall, UPR participants had higher rates of homelessness or living in a shelter, food insecurity, depression, and anxiety. They were also at greater medical risk due to high rates of prior preterm birth. While data quality for risk factors from prior births was poor, the data available were suggestive of high risk related to prior gestational diabetes and prior preeclampsia, which correspond to high rates of pre-pregnancy diabetes and pre-pregnancy hypertension. UPR made some notable modifications to the *CenteringPregnancy* curriculum, including the addition of two sessions to the curriculum (an introductory session and extra final session that covered postpartum health, C-sections and third trimester material), and also the creation of special groups for as women with HIV, diabetes, rheumatic diseases and Zika. These extra sessions may have contributed to a higher average number of group prenatal care visits among UPR participants (7.4) than Group Prenatal Care participants overall (5.7). Impact analysis was not conducted for UPR because we did not obtain birth certificate and Medicaid data from Puerto Rico. Descriptively, however, UPR participants had much higher rates of C-section, preterm birth, and low birth weight births than the Strong Start averages, reflective of both the fact that UPR served a very high-risk population and that Puerto Rico generally experiences worse birth outcomes than the mainland U.S.

University of South Alabama

GROUP PRENATAL CARE AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,457	• University of South Alabama (USA) Department of Obstetrics and Gynecology implemented Strong Start within the USA Health System, as well as with community partners	• Seven unique sites located in the Mobile, AL area, including university-based prenatal care clinics and Federally-Qualified Health Centers (FQHCs)
		• All seven sites implemented the Maternity Care Home model, and two also briefly implemented Group Prenatal Care
			• Maternity Care Home intervention categorized as "low intensity" for offering just one screening and referral encounter (compared to four encounters offered by most awardees), and one nutrition education session with a registered dietician for some women (e.g., teens, primaparous women, or those with unhealthy weight)
			• Intake encounter during which a Master's-level social worker or a Registered Nurse administered and discussed risk assessments, with phone-follow up as needed
			  • For some women (e.g., teens, primaparous women, or those with unhealthy weight) one nutrition education session with a registered dietician
			  • Group Prenatal Care intervention categorized as "medium intensity" for implementing the *CenteringPregnancy* curriculum with no additional enhanced services

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- In-person intake meetings were best way to engage and enroll potential Strong Start participants
- Screening for depression using the Edinburgh Postnatal Depression Screen (EPDS) and Strong Start Intake Form, and intervening when problems were identified

CHALLENGES

- Changing report requirements for the Strong Start program monitoring component
- Persistent lack of provider buy-in: Strong Start staff continuously relayed the benefits of the program to convince providers of its value
- Participants did not have consistent phone access; care coordinators often tried to connect with women during clinic appointments
- Group Prenatal Care implementation was not successful because of low attendance at group sessions

NOT SUSTAINED

- USA discontinued its Strong Start program because of lack of external funding, though providers planned to continue screening for depression and substance abuse
- Strong Start eligible population will continue to receive enhanced prenatal care through MOM Care, a pre-existing care coordination and psychosocial support available to all pregnant Medicaid enrollees

KEY FINDINGS: PARTICIPANT-LEVEL DATA[137]

PARTICIPANT-LEVEL DATA QUALITY

- 0.1% rate of missing intake forms; 0.0% rate of missing exit forms
- 4.8% rate of item nonresponse on intake forms; 4.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 20.9% of women were teens (under age 20); 5.6% were 35 years or older
- 59.5% of women were black; 1.8% were Hispanic; 35.0% were white
- 16.0% of women were married; 27.7% were living with a partner; 25.1% were not in a relationship
- 36.5%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 32.1%: C-section rate among women with a delivery
- 14.9%: preterm birth rate among women with a live birth
- 11.7%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Higher rates of very low birthweight than the comparison group – marginally significant difference (p-value<0.10)
- Lower C-section rates (marginally significant; p-value<0.10) and higher weekend delivery rates than the comparison group – the latter finding may be suggestive of lower rates of planned inductions or scheduled C-sections

[137] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

EXPENDITURE AND UTILIZATION OUTCOMES

- Higher average expenditures during the delivery postdelivery period than the comparison group
- Fewer ED visits in the prenatal period, fewer ED visits in the post-delivery period, and marginally fewer hospitalizations (p-value<0.10) in the post-delivery period than the comparison group
- Infants born to women who enroll in Strong Start visited the ED more often than infants of women in the comparison group

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Two of the University of South Alabama (USA)'s four Strong Start sites were staffed by USA Department of obstetrics and gynecology (OB/GYN) residents and attending physicians (the Resident and Faculty Clinics). The other two sites were Federally Qualified Health Centers (FQHCs): the Mobile County Health Department and Mostellar Medical Center. Prior to implementing Strong Start, women at the Resident Clinic and Faculty Clinic received typical prenatal care following the American Congress of Obstetricians and Gynecologists (ACOG) Guidelines. This involved brief appointments with a physician or resident, with limited psychosocial and support beyond services offered through the state's MOM Care program (described below). Awardee staff generally agreed that USA's pre-Strong Start model of care was reactive, rather than prevention focused. Women seeking prenatal care through the USA Health System had access to pediatric and family medicine clinics in close proximity and could travel seamlessly throughout the USA network. Women with high-risk pregnancies were transferred to USA's high-risk clinic, which participated in, but did not directly enroll women into, the Strong Start demonstration. The transition of patients to different USA clinics was in large part aided by the electronic medical record system, which allowed physicians and other caregivers to access patient records from all USA facilities.

Patients who received care at Mostellar Medical Clinic, on the other hand, had long had access to a broad array of medical and non-medical services. Obstetric and gynecological care were provided by one nurse practitioner, the primary care giver at the site. She was supported by two licensed professional nurses (LPNs) – both of whom also served as MOM Care coordinators – and an attending physician from USA who provided oversight for more complex obstetrical patients once a week. In addition to women's health services, Mostellar patients had access to adult internal medicine, pediatric, mental health, dentistry, optometry, trauma, and family planning services. Mostellar also had a number of non-medical services and programs available to patients. These included the Indigent Drug Program, Medicaid eligibility and Health Insurance Marketplace enrollment support, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and Reach out and Read, a national program in which participating physicians "prescribe" reading to young children. The nurse practitioner also provided diabetes education, referrals to community resources, and drug screening and counseling.

The fourth site, the Women's Center, was operated out of the Mobile County Health Department and was staffed jointly by the health department and USA. It was the busiest of the county health department clinics and served a large portion of the Medicaid and uninsured population in the area. The facility was certified as a Patient Centered Medical Home and offered comprehensive obstetric and gynecological care. Like Mostellar, there was one full-time nurse practitioner on staff as well as a number of rotating USA resident and attending physicians.

MOM Care: All pregnant Medicaid enrollees in Alabama are eligible for care coordination and support services through Alabama Medicaid's Maternity Care program (called MOM Care in the Mobile area), including those seeking prenatal care at the USA Strong Start sites. Medicaid enrollees received four MOM Care coordination visits during pregnancy: one during each trimester and one postpartum.

Once a clinician confirmed a woman's pregnancy, she was sent to a MOM Care coordinator. During the first appointment, a care coordinator performed an 11-page psychosocial/medical risk assessment and presented the pregnant woman with all of her options for prenatal and birth care in the area. The woman typically received information regarding the importance of breastfeeding and smoking cessation during the first encounter. Additional education on nutrition and pregnancy-safe medication was incorporated into the second and third trimester encounters, with continued emphasis on the importance of breastfeeding and an introduction to family planning. The third trimester visit included information on planning for the baby and obtaining family support. Family planning and support were discussed again during the postpartum visit, along with questions or concerns about newborn care. In addition to education, the care coordinators assisted patients with WIC and Medicaid applications and provided referrals to community resources.

DESCRIPTION OF ENHANCED STRONG START SERVICES

The pre-Strong Start model of care at USA already included psychosocial enhancements to typical prenatal care, offered through the long-standing MOM Care program. Thus, Strong Start's Maternity Care Home model did not offer substantial changes to the existing model. Rather, it added: 1) enhanced psychosocial screening and support at intake by Strong Start staff; and 2) enhanced nutritional support through one visit with a registered dietician for a subset of participants eligible for this service. The awardee described both of these additions as individualized, one-time encounters with follow-up by the clinical coordinator at a later date.

> "All of them ask you over and over about whether or not there's anything else you want to talk to them about. Everyone is very patient."
>
> *- Strong Start participant*

The enhanced psychosocial screening and support (often described by program staff as the "social work encounter") was provided by either the clinical coordinator, a bachelor's-level registered nurse, or a master's level social worker. Both individuals were dedicated Strong Start staff. The social worker encounter occurred at intake and included the administration of three screeners and the Strong Start Intake Form, which eligible patients completed in the waiting room prior to the visit. During the encounter, the Strong Start staff member described Strong Start and asked patients to enroll, then reviewed the completed forms for the presence of psychosocial risk factors and used patient responses to guide the rest of the discussion. Site-level key informants also emphasized the importance of verbally asking patients certain sensitive questions (e.g., about substance abuse, depression, and domestic violence) because the patient population in Mobile was reluctant to share personal information on "official" forms. If the patient was struggling with any of those issues, the Strong Start staff member provided immediate counseling.

The information gathered during intake also guided the referrals provided at the encounter. Common referrals included Altapoint, a regional mental health care system; Alabama Quit Line for smokers; and Narcotics Anonymous. Although this initial social worker encounter was the only one offered by USA's Strong Start program, the MOM Care clinical coordinator followed up with each patient by phone to provide additional support.

Each woman's BMI was calculated during the initial encounter to determine if she was eligible for enhanced nutritional support. While all teens and first-time mothers were automatically referred to the

Strong Start dietician, others had to possess one or more of the following risk factors: anemia, diabetes, five or more previous pregnancies, unhealthy weight (BMI above 30 or below 19), history of premature birth or low birthweight, or a short interpregnancy interval of 12 months or less. A typical nutritional support encounter lasted approximately 20 minutes and began with a discussion of the patient's current diet and her budgetary constraints. Based on the patient's food preferences and budget, the dietician would recommend increasing or decreasing the intake of certain foods. At the end of the visit, she provided patients with pamphlets on nutrition and exercise that summarized the information received during the counseling session. While patients only received one nutritional counseling session as part of Strong Start, they were given the dietician's phone number and received a follow-up call from the clinical coordinator.

> "We all have [the clinical coordinator's] cell phone number. They don't care what time you call and it doesn't matter if you call 20 times a day. She will not give up until she talks to you."
>
> *- Strong Start participant*

USA also implemented the Group Prenatal Care model, and specifically the *CenteringPregnancy* approach, at the Women's Center Site.[138] During the first year of implementation, the site received Centering Healthcare Institute (CHI) certification. However, as of October 2015, Women's Center discontinued its Centering program because of limited participation, attrition, and financial concerns. After the Women's Center discontinued Group Prenatal Care, USA attempted to implement the model at the USA OB/GYN clinic, but that site faced similar challenges and ended Group Prenatal Care services in the same year the model was implemented. Both the Women's Center and the OB/GYN clinic continued to provide care using on the Maternity Care Home model. Overall, around 20 percent of USA's Strong Start participants were in the Group Prenatal Care model and 80 percent were enrolled in a Maternity Care Home.

OUTREACH AND ENROLLMENT

USA used an opt-in enrollment approach, meaning women were asked to choose between enrollment in Strong Start and participation in the standard care model (as described above). Despite enrollment challenges early in the program and continued use of risk-related eligibility criteria[139] even when such criteria were no longer required by Strong Start, USA was able to meet enrollment goals.[140] Strong Start staff had the most success with enrolling patients one-on-one during intake appointments, rather than the initial approach of attempting to enroll women over the phone. Women who declined enrollment tended to fall into three groups: those who were uncomfortable providing their information to Medicaid

[138] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

[139] Eligibility criteria included having at least one of the following risk factors: BMI below 19 or at least 30; age less than 19 years; depression assessed with the EPDS; alcohol use assessed with the T-ACE; drug use assessed with the DAST 10; tobacco use; first pregnancy; short birth interval of 12 months or less; history of or current partner abuse; and diabetes before pregnancy.

[140] In their enrollment totals, USA included a group of over 100 women for whom the awardee's Institutional Review Board (IRB) revoked consent after determining that proper procedures had not been followed. The Strong Start program allowed USA to count these women in their total enrollment, but the evaluation team was not allowed to access any data on these women, including Participant-Level Process Evaluation forms and impacts analysis identifiers.

or another government entity; women with limited risk factors who did not feel they needed to enroll; and women with serious risk factors who were reluctant to share any information about themselves with staff during prenatal visits.

USA organized a number of outreach efforts at the awardee-level. For instance, the Principal Investigator, the clinical coordinator, and a nurse practitioner did an interview with a local television station that featured a past Strong Start participant and her baby. This television segment included an overview of the problem of preterm birth and low birthweight in Alabama, as well as a description of Strong Start and its goals to improve maternal and child health. The awardee also developed a local Strong Start website, which highlighted the Strong Start model offered through USA's program, eligibility criteria, and contact information for the program coordinator.

> "I've been offered more information with Strong Start than my first two pregnancies. You're always learning new things. I think it's really helpful."
>
> *- Strong Start participant*

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants had varying impressions of the impact of Strong Start. Some key informants felt Strong Start had a marginally positive impact on preterm births, low birthweight, and breastfeeding, while another was unsure that Strong Start impacted any of these outcomes. All agreed that other factors, such as the MOM Care program and the hospital's Baby Friendly initiative,[141] likely contributed to improvement. Key informants felt that the USA Strong Start program did not impact certain outcomes, such as family planning and method of delivery, as those topics were not specifically addressed through its Maternity Care Home model.

With regards to Group Prenatal Care, key informants felt it was too early to assess whether the Group Prenatal Care model would have a measurable impact on outcomes. However, anecdotally, awardee and site-level staff agreed that the most significant benefits of this model could be for young mothers who had limited social support systems.

Key informants felt that the Strong Start preterm birth rate was still too high, but noted that preterm birth rates among the broader population were much higher. One key informant noted that preterm birth rates in Alabama were among the highest in the nation.[142] Key informants also felt that Strong Start services, such as nutritional support for women who were overweight and underweight, likely influenced both preterm and low birthweight rates in a positive way.

There was not consensus among key informants about the impact of Strong Start on healthcare costs, and key informants did not feel they had sufficient information to determine actual cost savings.

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[141] The Baby Friendly Birthing Initiative recognizes and awards birthing facilities that successfully implement the Ten Steps to Successful Breastfeeding, which include: 1. Have a written breastfeeding policy 2. Train all health care staff in the skills necessary to implement this policy. 3. Inform all pregnant women about the benefits and management of breastfeeding. 4. Help mothers initiate breastfeeding within one hour of birth. 5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants. 6. Give infants no food or drink other than breast-milk, unless medically indicated. 7. Practice rooming in - allow mothers and infants to remain together 24 hours a day. 8. Encourage breastfeeding on demand. 9. Give no pacifiers or artificial nipples to breastfeeding infants. 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or birth center.

[142] According to the March of Dimes, the preterm birth rate in Alabama was 11.7% in 2015. https://www.marchofdimes.org/peristats/pdflib/998/premature-birth-report-card-Alabama.pdf

They speculated about the ways in which Strong Start might have impacted costs through better maternal and infant outcomes, such as reducing costs associated with neonatal intensive care unit (NICU) care for preterm babies. However, one key informant did not feel Strong Start impacted healthcare costs at all, as the program (in her view) replicated what MOM Care was already providing for pregnant women on Medicaid.

STRONG START PARTICIPANT PERSPECTIVES

Most women reported choosing their USA Strong Start site for maternity care because of its good reputation or a previous positive experience at the site. Participants recalled discussing healthy eating, time management, mental health and substance abuse during the Strong Start social work encounter. One woman said Strong Start helped her quit smoking, and a number of others mentioned being connected to additional community resources. In addition to the social work encounter, two women had received nutritional advice from the Strong Start dietician.

> *The dietician got on me about eating a bunch of pickles. They tell you about portions and walking for 30 minutes to an hour a day. They tell me how much water to drink.*

Participants gave mixed reviews of their prenatal care providers. Some women felt supported by the care they received, emphasizing there was ample time to ask questions during appointments, but others felt the clinic was too busy to allow adequate time to ask questions. However, all were very enthusiastic about the additional support they received through Strong Start. All women agreed they received more education during their Strong Start pregnancy than during previous pregnancies. Women also felt their care was more individualized and supportive and many were particularly appreciative to have the clinical coordinator's phone number.

> *I like the support. It feels like a pregnancy team.*

PROGRAM STRENGTHS

Key informants found that meeting with participants and potential participants face-to-face was the best way to engage with them and convey the benefits of Strong Start. This in-person approach was replicated in other programs within the USA Health System. Additionally, key informants shared that screening for depression using the Edinburgh Postnatal Depression Screen (EPDS) and Strong Start Intake Form, and intervening when problems were identified, was a successful component of the program and would, in the opinion of some key informants, show the strongest impact on outcomes and morbidity. Physicians were supportive of the screenings, including those for drug and alcohol use, and were likely to continue to use them after Strong Start ended.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

According to key informants, the changing report requirements for the Strong Start program monitoring component was the biggest implementation challenge, making it more difficult for Strong Start staff who were already working hard to establish their credibility at the sites. In addition, lack of

provider buy-in was also a significant challenge, which Strong Start staff addressed by repeating the "what, why, and anticipated outcomes." The Strong Start team was ultimately able to convince both patients and office staff that Strong Start offered benefits. Eventually, enough people bought in to the program or realized it would be around regardless of their own opinion, and they committed to making it work.

In addition, communication with participants was a persistent challenge as their phone access was inconsistent. In these cases, Strong Start staff checked the EHR for alternate numbers and tried to connect with participants at clinic appointments. Key informants also shared that some participants were not compliant with referrals and recommendations and did not exhibit willingness to learn about and change their health behaviors.

Participation in Group Prenatal Care was a consistent challenge across the two sites where USA implemented the model. While key informants felt Group Prenatal Care, and the *CenteringPregnancy* approach specifically, was the most effective model of prenatal care, they could not overcome the implementation challenges of small group size (average of two participants per session compared to the ideal group size of 8-10) and attrition despite participants' expressed interest in the Group Prenatal Care model – at least at the Mobile County Health Department site. Staff turnover, including the loss of a Centering champion, exacerbated these challenges.

SUSTAINABILITY

USA discontinued Strong Start services because of lack of external funding for the program once the award period ended. At the time of the Year 4 evaluation interviews, the main Strong Start staff had already moved on to different positions. In response to the November 2016 national elections, Alabama Medicaid postponed implementation of Regional Care Organizations, which key informants had earlier expected to provide financial support for enhanced prenatal care such as the Strong Start model.[143]

In addition, USA providers planned to continue and expand the use of the Edinburgh Postpartum Depression Scale (EPDS) and the Drug Abuse Screening Test (DAST-10) forms to other non-pregnant populations. Key informants credited the Strong Start program with inspiring USA providers to begin using these screening tools (though these specific screeners are not the same tools used in the Strong Start evaluation forms).

Though the Strong Start program was not sustained, several key informants felt the MOM Care program's social work services and WIC nutritional counseling meet the same needs as Strong Start. MOM Care also provides care management that USA's Strong Start model did not.

[143] Regional Care Organizations (RCOs) are community and provider-led regional organizations that would receive a capitated payment to provide and coordinate health care for Medicaid patients. The intent is to slow the growth in costs and improve health outcomes by creating an incentive for more preventative care and management of chronic conditions. The Alabama Medicaid Commissioner pushed back Regional Care Organizations (RCO) implementation in October 2017, and later announced she was uncertain as to whether or not the state would continue with implementation plans.

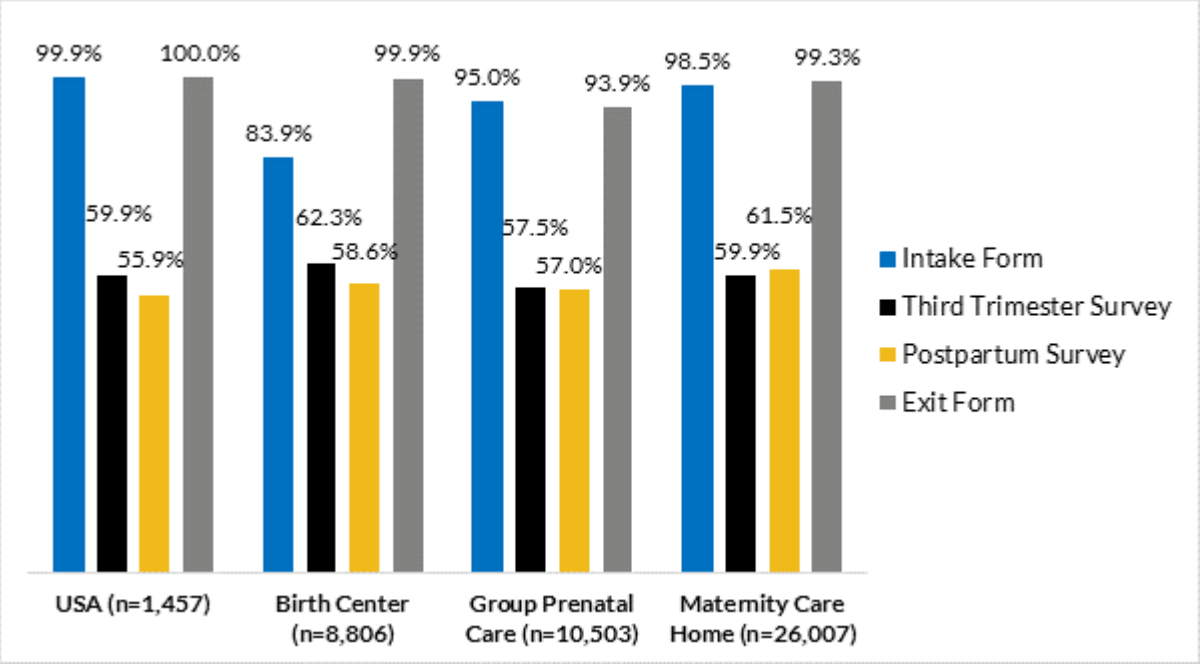
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for USA, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for USA to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 24 USA participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 24: FORM SUBMISSION RATES, USA



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,580
- Study IDs represented: 1,457 Study IDs (Suggests that PLPE data was not submitted for 123 participants; see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- All forms were completed on paper by the participants.
- Participants were told that they could skip questions they did not feel comfortable answering.
- The awardee found that participants often did not follow directions, so they did a thorough review after the participant completed the form. Staff looked for problems such as dates written in the wrong format or comments written outside the boxes. The staff transferred the responses onto a new form and retained the original patient-completed form as backup.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- This awardee had two sites that dropped out during the program period. Both sites were private practices with a single provider and only enrolled a few patients (10 patients total).

MISSING FORMS:

- The awardee was initially approved by the IRB to collect and submit Intake Forms, and they were not required to collect consent from participants. However, when the crosswalk was implemented to collect personally identifiable information, the IRB terms changed, and the awardee was required to consent participants. As a result, participants who enrolled from October 1, 2013 through March 14, 2014 did not sign a consent form at enrollment; the awardee attempted to get consent from these early participants, but most either refused or could not be reached. As a result, these participants have Intake Forms, but no other forms and no personally identifiable information.
- Intake Forms: 0.1 percent of Study IDs were missing Intake Forms. One participant did not complete the Intake Form. The others were completed and submitted, but the evaluation team did not receive them. The awardee was not able to locate copies.
- Third Trimester or Postpartum Surveys: About 40 percent of Study IDs were missing the Third Trimester Survey and 44 percent were missing the Postpartum Survey. The awardee did not indicate why these forms were missing, but many were likely lost to follow-up or transferred are. If a patient did not have a postpartum visit, they did not complete a Postpartum Survey. In some cases, the awardee submitted Postpartum Surveys that were blank, other than the box indicating that the participant could not be reached.
- Exit Forms: 0.0 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Forms: The awardee said that patients voiced concern that some questions did not seem relevant to their care, such as education level, or were "too personal." Participants worried that their responses were being sent to the government and could have consequences. The awardee observed that most women who answered that they did not drink or use drugs skipped over the other questions related to alcohol or substance use, because they believed they did not apply and should be skipped. The awardee also said that participants who did consume alcohol, use drugs, or had family who used drugs skipped these questions because they did not want to disclose the information.
- Exit Forms: The awardee said that they would not be able to provide the participant's weight before delivery for women who transferred care because the women likely transferred to non-Strong Start sites. Strong Start pregnancy outcomes were missing for 15.6 of participants.[144]

MAIN FINDINGS:

The following tables summarize characteristics and outcomes for USA participants. Highlights include:

- Most USA participants (73.5 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 12.4 percent of participants were 18 or 19 years old.
- Most participants were either black (59.5 percent) or white (35.0 percent).
- The largest share of USA participants was in a relationship but not living with a partner (31.1 percent), although 16.0 percent were married and 25.1 percent were not in a relationship.
- Among the risk factors collected in the PLPE data, 16.2 percent of USA participants reported having experienced intimate partner violence, 36.5 percent of participants with a prior birth had a prior preterm birth, and 82.5 percent of participants had not planned their Strong Start pregnancy.

TABLE 370: DEMOGRAPHICS, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.1	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1431**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	8.5	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	12.4	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	73.5	81.7	72.9	75.1	75.8
35 Years and Older	%	5.6	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	0.8	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1421**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	1.8	25.4	37.1	28.0	29.7

[144] Among participants with missing data on pregnancy outcome, 98.7% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 0.3% were missing for other reasons.

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Non-Hispanic White	%	35.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	59.5	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	3.7	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	20.9	19.6	12.8	11.3	13.3
Not in Universe	%	77.3	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**26**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	50.0	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1431**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.2	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	2.8	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1393**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	35.0	36.6	30.8	35.3	34.5
In School, Not Employed	%	14.0	8.7	12.6	11.9	11.5
Employed and in School	%	5.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	45.4	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	4.5	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1368**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	28.9	15.4	27.8	29.1	26.4
High School Graduate or GED	%	59.2	57.5	58.3	57.9	57.9
Associate's Degree	%	6.4	8.2	5.2	4.6	5.4
Bachelor's Degree	%	1.9	14.5	4.5	3.7	5.8
Other College Degree	%	3.5	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	4.1	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1374**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	16.0	42.1	20.4	20.8	24.5
Living with a Partner	%	27.7	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	31.1	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	25.1	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 371: PSYCHOSOCIAL, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	1.3	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,414**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	51.7	51.8	51.8	59.7	56.5
No	%	40.1	44.6	42.3	37.4	39.8
Unsure	%	8.2	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	1.3	17.0	6.6	3.4	6.8
Not in Universe	%	47.7	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**731**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	69.4	61.1	72.6	79.9	75.3
Other	%	19.3	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	11.4	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	6.4	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,341**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	20.7	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	13.1	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,245**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	21.3	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	2.8	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,393**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	25.6	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	10.5	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,282**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	34.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	4.3	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,371**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	60.5	67.9	59.0	65.5	64.5
Mild	%	22.9	21.4	23.8	20.2	21.2
Moderate	%	9.8	6.8	10.3	8.5	8.6
Severe	%	6.2	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	**1,405**	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	16.2	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	**1,405**	20.7	17.4	19.8	19.4

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	2.6	18.3	16.3	7.7	11.8
Not in Universe	%	6.3	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,306**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.1	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.1	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,431**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	66.4	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	26.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	6.8	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	63.0	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	7.9	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	18.1	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	18.3	24.6	17.1	15.4	17.2
Childcare Challenges	%	8.3	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	8.7	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 372: PREGNANCY HISTORY AND INTENTIONS, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,433**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	66.5	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	33.5	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	3.1	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**908**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	36.1	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	3.5	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**903**	**6,291**	**5,038**	**15,554**	**26,883**

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	9.5	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	9.3	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**820**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	3.9	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	24.4	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**603**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	19.4	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	30.3	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**519**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	6.0	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	32.0	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**495**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	32.0	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**495**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	31.1	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**507**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	3.7	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 373: PRIOR BIRTH OUTCOMES, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.3	1.7	1.5	0.6	1.0
Not in Universe	%	33.5	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**948**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	89.9	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	11.4	23.5	18.9	15.2	17.7
Not in Universe	%	40.5	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**690**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	32.6	34.6	24.3	27.1	28.1
>= 18 months	%	67.4	65.4	75.7	72.9	71.9

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.1	0.1	2.5	1.4	1.4
Not in Universe	%	40.5	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**851**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	36.5	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	4.9	1.3	20.8	13.1	12.6
Not in Universe	%	40.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**782**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	23.0	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 374: PRE-PREGNANCY MEDICAL CONDITIONS, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	4.5	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,368**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	17.5	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	70.6	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	4.3	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.6	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	4.3	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**1,371**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	2.8	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	4.5	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,369**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	11.2	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	1.0	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**1,419**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	3.6	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	28.7	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	20.1	25.6	27.3	25.8	26.0

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Obese (=>30 BMI < 40)	%	33.7	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	14.0	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 375: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	19.9	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,148**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	13.0	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	19.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,151**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	6.8	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	19.8	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,149**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	5.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	20.1	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,145**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	20.0	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**1,146**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	20.2	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,144**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	1.0	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	21.6	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,123**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	2.6	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	24.5	0.8	28.0	23.1	19.9

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,082**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	20.7	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 376: TREATMENTS DURING PREGNANCY, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	25.8	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**1,064**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	5.2	0.8	10.0	5.1	5.4
Not in Universe	%	78.3	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**236**	**680**	**654**	**2,585**	**3,919**
Yes	%	8.5	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	25.8	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**1,064**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	4.9	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	25.6	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**1,066**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	2.4	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 377: PRENATAL CARE, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	2.4	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,399**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	53.8	4.7	29.5	64.5	43.3
Licensed Professional Midwife[145]	%	-	18.8	2.3	1.0	5.4
Nurse Practitioner	%	26.7	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	19.1	74.6	37.5	18.3	35.2

[145] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,433**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	98.0	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	8.2	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,433**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	9.6	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	5.3	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	1.7	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,409**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	75.9	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	2.1	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	2.9	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,392**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	2.7	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,394**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	2.7	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,395**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	-	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	-	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	2.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,393**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	-	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	-	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	2.7	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**1,395**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Nutrition Counseling						
Missing Data	%	1.5	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,412**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	63.2	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	1.1	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	2.4	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,399**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	2.5	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**1,397**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	37.4	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	1.1	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	99.2	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	2.9	-	6.4	6.9	6.8
Other	%	3.9	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 378: DELIVERY INFORMATION, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	1.6	1.4	25.3	23.3	19.5
Not in Universe	%	32.2	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**948**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	33.8	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.0	0.3	7.8	2.9	3.5
Not in Universe	%	77.7	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**320**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	86.3	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	0.5	4.6	11.5	7.3	7.7
Not in Universe	%	23.2	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,093**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.8	51.8	99.4	99.5	90.6

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	0.6	0.7	12.0	5.6	6.1
Not in Universe	%	23.2	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,092**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	67.9	87.1	70.1	69.5	73.1
C-Section	%	32.1	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.1	0.4	8.7	2.3	3.4
Not in Universe	%	73.6	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**377**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	77.2	83.3	72.9	74.7	75.9
C-Section	%	22.8	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	0.6	4.7	12.5	6.3	7.4
Not in Universe	%	75.6	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**342**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	37.7	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.0	0.1	6.2	0.7	1.9
Not in Universe	%	84.8	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**218**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	9.6	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 379:BIRTH OUTCOMES, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	15.6	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,210**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	90.1	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	8.8	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	3.4	0.7	15.4	5.8	7.0
Not in Universe	%	23.9	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,041**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	5.0	1.0	3.5	4.3	3.5

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preterm (34 =< EGA < 37)	%	9.9	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	84.6	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	0.7	2.1	14.3	8.0	8.3
Not in Universe	%	23.9	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,080**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	2.4	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	9.3	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	82.0	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.3	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 380: SATISFACTION, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	57.8	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**605**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	4.8	3.3	4.4	7.8	6.2
Very Satisfied	%	39.2	25.6	35.6	46.1	39.8
Extremely Satisfied	%	53.9	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	57.7	46.5	65.3	48.8	52.2
Women with Non-Missing Data	**N**	**606**	46.5	65.2	48.7	52.1
Not at All Satisfied	%	3.3	**4,698**	**3,615**	**13,114**	**21,427**
Slightly Satisfied	%	3.1	2.0	3.1	2.3	2.4
Moderately Satisfied	%	9.7	3.0	4.0	2.9	3.1
Very Satisfied	%	39.1	10.4	11.6	12.8	12.1
Extremely Satisfied	%	44.7	29.1	42.6	46.6	42.1

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 381: BREASTFEEDING, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	41.0	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**846**	**5,376**	**5,351**	**15,042**	**25,769**

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeed Only	%	20.0	80.4	47.5	40.5	50.3
Formula Feed Only	%	29.9	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	40.5	10.8	31.9	32.5	27.8
I Haven't Decided	%	9.6	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	59.7	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**578**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	63.8	91.5	76.6	72.6	77.3
No	%	35.6	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 382: FAMILY PLANNING, USA

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	59.7	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**577**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	96.0	77.0	77.5	82.2	80.3
No	%	3.6	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	59.9	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**574**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	88.7	84.2	70.8	74.0	75.5
No	%	10.1	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	44.2	41.5	42.9	38.6	40.2
Not in Universe	%	20.2	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**509**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	10.6	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC - Implant	%	5.9	2.8	11.4	10.9	9.2
LARC - IUD	%	3.5	10.8	11.9	12.3	11.9
Pills	%	20.4	8.6	11.9	13.0	11.8
Injection	%	18.7	5.9	16.2	20.2	16.2
Condoms	%	23.6	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-

Data Elements	N or %	USA (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Other Method	%	11.6	16.7	8.1	9.5	10.9
Method Not Indicated	%	2.4	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Alabama

Initial Contact: In March 2015, the evaluation team spoke with officials from the Alabama Medicaid Agency and the Alabama Department of Public Health (ADPH) to learn about the state's willingness to participate in the Strong Start evaluation and process for releasing state Medicaid and birth certificate data. State officials were receptive to supporting the evaluation, but said they would prefer that Urban link the Medicaid and birth certificate data.

Data Acquisition Process: Following approval to access Medicaid data from the Alabama Medicaid agency in June 2015, Urban sought approval from the Alabama Department of Public Health (ADPH) to access birth certificate data. Urban received a fully executed data use agreement from ADPH in July 2016, and in August 2016, Urban received 2014 and 2015 birth certificate data from ADPH. The Medicaid agency provided sample data to Urban in August 2016 including aggregated expenditure data. In October 2016, the Medicaid agency submitted 2014 and 2015 data files. Following this submission, the Urban evaluation team began merging the datasets. However, the match rate for the merge was very low, requiring additional back and forth with the Medicaid agency to resolve the problem. In March 2017, Medicaid approved submission of additional variables to help with the matching process. In May 2017, ADPH submitted 2016 birth certificate data. Urban received the final Medicaid claims data in November 2017.

Final Result: Urban completed the merge of all years of birth certificate, Medicaid eligibility and Medicaid claims data, which were included in the final year's impact analysis.

(This summary is identical to that appearing for the University of Alabama at Birmingham.)

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The University of South Alabama (USA) awardee, which implemented the Maternity Care Home model, delivered care at six sites included in the impact analysis: the Center for Women's Health; USA OB/GYN Clinic; Mostellar Medical Clinic; Kendal Foster, MD; Jean A. Sansarica, PC; and Mobile County Health

Department, the Women's Center (Table 383). This section presents the evaluation's impacts results for the awardee as a whole (Table 383).[146]

TABLE 383: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR USA

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out-of-County Comparison Group
University of South Alabama			
Center for Women's Health	Yes	No	No
USA OB/GYN Clinic	Yes	No	No
Mostellar Medical Clinic	Yes	No	No
Kendal Foster, MD	Yes	No	No
Jean A. Sansarica, PC	Yes	No	No
Mobile County Health Department, The Women's Center-Maternity Care Home	Yes	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [147]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we drew the comparison group outside the county (alternative specification #1) for USA.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3

[146] Women in Strong Start without IRB consent were excluded from the Strong Start sample and included in the control group.
[147] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables. For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 384 reports the birth and process outcome findings for this Maternity Care Home model awardee.

- Infants born to Strong Start women are 1.0 percentage points more likely to be of very low-birthweight compared to infants in the comparison group (3.0 percent versus 2.0 percent). However, this finding is only marginally significant (p-value<0.1) and is not statistically significant in the alternative specification models.
- Rates of cesarean section are 3.1 percentage points lower for women who enroll in Strong Start and receive care at USA (31.9 percent) than for women in the comparison group (35.0 percent). This finding is only marginally significant (p-value<0.1) and is not statistically significant in the alternative specification models.
- Consistent with lower rates of planned inductions, 18.8 percent of women who enroll in Strong Start have weekend deliveries compared to 15.6 percent of women in the comparison group. This finding holds when we limit the sample to the 2014-2015 claims sample (alternative specification #2) and when we add diagnosis controls to the claims sample (alternative specification #3).

TABLE 384: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT USA

Outcomes	Main Model: 2014 - 2016, Strong Start (N=865)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=20185)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=464, N=10369)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=464, N=10369)
Birth Outcomes						
Clinical gestational age (weeks)	38.1	38.2	-0.1	N/A	-0.1	0.0
Preterm birth rate	14.1%	12.8%	1.4	N/A	0.6	-0.9
Very preterm birth rate	4.9%	3.8%	1.1	N/A	0.7	0.1
Birthweight (grams)	3,093.3	3,117.2	-23.9	N/A	-21.5	1.3
Low birthweight rate	12.9%	12.3%	0.7	N/A	0.9	-0.4
Very low birthweight rate	3.0%	2.0%	**1.0^**	N/A	0.3	0.2
Rate of Apgar score greater than or equal to 7	97.9%	97.5%	0.4	N/A	-0.6	-0.5
Process Outcomes						
C-section rate	31.9%	35.0%	**-3.1^**	N/A	-1.5	-1.9
VBAC rate[1]	6.1%	9.0%	-2.9	N/A	-0.6	0.2
Weekend delivery rate	18.8%	15.6%	**3.3***	N/A	**4.8***	**4.6***

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 99 Strong Start women and 2486 comparison group women.

Table 385 reports the expenditure and utilization outcome findings for USA awardee.

- Delivery expenditures for women who enroll in Strong Start at USA and their infants are $12,966, on average, which is $2,386 higher than expenditures for women in the comparison group and their infants.
- Total expenditures from delivery until the infant's first birthday for women who enroll in Strong Start at USA and their infants are $17,196, on average, which is $3,003 higher than expenditures for women and infants in the comparison group.
- Women who enroll in Strong Start at USA have 0.13 fewer emergency department visits in the prenatal period than women in the comparison group (0.64 versus 0.77 visits).
- Women who enroll in Strong Start and receive care at USA have 0.08 fewer emergency department visits and 0.01 fewer hospitalizations in the post-delivery period than women in the comparison group (0.17 versus 0.25 visits and 0.02 versus 0.03 hospitalizations). However, the difference in hospitalizations is only marginally significant (p-value<0.1)
- Infants born to women who enroll in Strong Start visit the emergency department more often than infants of women in the comparison group (1.28 versus 1.12 visits).

TABLE 385: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATION OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT USA

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=464)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=10369)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,586	$1,558	$29	N/A
Total expenditures during delivery period	$12,966	$10,580	**$2,386****	N/A
Total delivery and postdelivery expenditures[2]	$17,196	$14,194	**$3,003****	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.64	0.77	**-0.13****	N/A
Number of hospitalizations 8 months before delivery month	0.14	0.13	0.01	N/A
Number of days in NICU	2.25	2.02	0.23	N/A
Number of ED visits for mother 11 months after delivery month	0.17	0.25	**-0.08****	N/A
Number of hospitalizations for mother 11 months after delivery month	0.02	0.03	**-0.01^**	N/A
Number of ED visits for infant in the first year of life	1.28	1.12	**0.16***	N/A
Number of hospitalizations for infant in the first year of life	0.16	0.13	0.03	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The University of South Alabama implemented the Group Prenatal Care and Maternity Care Home models under Strong Start. For Group Prenatal Care, the awardee adopted *CenteringPregnancy* at one site, but discontinued the program in Year 2 because of limited participation, attrition, and financial concerns. Most participants, therefore, were enrolled in a Maternity Care Home, under which USA provided a single risk assessment encounter with phone follow-up as needed and—for some women—a nutrition education session with a registered dietician. Data indicate that 63 percent of USA participants received nutritional counseling compared to an average of 24 percent among all Strong Start participants. Many of the characteristics possessed by women enrolled at USA put them at high risk for poor birth outcomes. USA participants had higher rates of cigarette smoking, depression, anxiety, and unintended pregnancy than Strong Start participants on average. They also had especially high rates of risk factors from prior pregnancies, including preterm birth, low birth weight, and short interpregnancy interval. Impact analysis found infants of women enrolled in Strong Start at USA had higher rates of very low birthweight than infants of women in the comparison group, a marginally significant difference (p-value<0.10). Impact analysis also found Strong Start participants had

marginally lower C-section rates (p-value<0.10) and higher weekend delivery rates than women in the comparison group. This latter finding may be suggestive of lower rates of planned inductions or scheduled C-sections. During the case studies, key informants pointed to other factors, such as the state's MOM Care Program (case management for pregnant Medicaid beneficiaries) and the USA system's Baby Friendly initiative (which supports breastfeeding), as likely contributing to improvements in maternal and newborn outcomes for women in the comparison group as well as for Strong Start participants. Strong Start participants and their infants had higher average expenditures during the delivery period and for combined delivery and post-delivery expenditures, than women and their infants in the comparison group. In addition, women who enrolled in Strong Start at USA had fewer ED visits in the prenatal period, fewer ED visits in the post-delivery period, and marginally fewer hospitalizations in the post-delivery period (p-value<0.10) than women in the comparison group. Infants born to women who enrolled in Strong Start visited the ED more often than infants of women in the comparison group.

University of Tennessee Health Sciences Center

GROUP PRENATAL CARE

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components
732	• Multi-site health system, including a large teaching hospital, the Regional One Medical Center (now branded as "Regional One"), along with an extended care hospital, a rehabilitation hospital, an outpatient surgery center, and many outpatient centers in the Memphis area	• Two sites, an outpatient center in North Memphis, TN, and a high-risk referral clinic for pregnant women in the Memphis area	• Intervention categorized as UTHSC's intervention was of "low intensity" for offering 8 group sessions (in contrast to *CenteringPregnancy*'s 10 sessions) • Used a modified version of the *CenteringPregnancy* (Centering) curriculum • Specialized Centering group for women with pre-gestational diabetes receiving care at the Outpatient Center, co-facilitated by a diabetes educator • Care coordination and management for patients in the pre-gestational diabetes group via Strong Start High-Risk Coordinator

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Improved health and social outcomes (e.g., breastfeeding rates) among participants by way of patient education, connection to resources, and the provision of psychosocial support
- Increased confidence among some participants that they could make decisions that would contribute to healthier and safer lives for themselves and their newborns
- Bettered patient-provider relations, and created helpful bond between participants

CHALLENGES

- Challenges maintaining buy-in from both administrators and prenatal care providers
- Difficulties complying with Strong Start data collection requirements
- Lack of space for hosting group care sessions limited the size of the prenatal care groups

PARTIALLY SUSTAINED

- Planned to sustain Group Prenatal Care at one or more sites, but targeting only medically low-risk women
- Sought funding to continue Strong Start program components for high-risk populations

KEY FINDINGS: PARTICIPANT-LEVEL DATA[148]

PARTICIPANT-LEVEL DATA QUALITY

- 0.8% rate of missing intake forms; 2.6% rate of missing exit forms
- 27.4% rate of item nonresponse on intake forms; 28.7% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 32.3% of women were teens (under age 20); 2.9% were 35 years or older
- 96.7% of women were black; 1.2% were Hispanic; 1.8% were white
- 8.2% of women were married; 26.7% were living with a partner; 21.9% were not in a relationship
- 26.1%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 30.3%: C-section rate among women with a delivery
- The rate of missing data is too high to preterm birth rate or low birthweight rate

KEY FINDINGS: IMPACT ANALYSIS

- Not provided here because of concerns about opt-in enrollment strategies and low acceptance rates – see the Awardee-Level Estimates of the Impact of Strong Start on Birth Outcomes section for an explanation and descriptive findings
- Valid estimates are available for the Med Hollywood Health Loop – which served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible – are in the Site-Specific Estimates section

[148] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

Prior to implementing Strong Start, both University of Tennessee Health Sciences Center (UTHSC) sites – Hollywood Primary Care (Hollywood Health) and Regional One Health Outpatient Center (Outpatient Center) – offered some Centering groups for women with low-risk pregnancies.[149] The awardee's experience with Centering began around 2003, when, with an infant mortality rate of 14.9 deaths per 1,000 live births, Shelby County, TN (which includes Memphis) ranked highest in the state and stood at more than double the national average of 6.9 deaths per 1,000 live births.[150] In response, several coalitions were created with a goal of improving birth outcomes. The awardee received county funding in 2005 to implement Centering across its sites. According to informants, there were some initial challenges in implementing Centering, particularly in obtaining provider buy-in and folding Centering into the workflow of the clinics.

Before Strong Start, high-risk patients at the Outpatient Center site were not offered Centering because providers believed the model was not "structured for high-risk pregnancies." Even during Strong Start the only patients with high levels of medical risk who were permitted to participate in Centering were those with gestational diabetes. Patients with other high medical risks and women who declined to participate in Centering received standard prenatal care in which patients met with a doctor or resident for approximately 15 minutes at each individual visit. Some patients (those at the highest levels of social risk) were offered additional support via the BLUES Project[151] during pregnancy and throughout their child's first two years of life.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Under Strong Start, UTHSC implemented Group Prenatal Care per the *CenteringPregnancy* (Centering) model. Though the awardee followed the evidence-based Centering Health Institute (CHI) approach, the program staff customized the curriculum to accommodate their clinic volume and patients. Rather than meeting ten times throughout pregnancy as prescribed by CHI, Centering groups at UTHSC met

[149] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.
[150] See "Figure 2" in: http://www.urbanchildinstitute.org/sites/all/files/databooks/TUCI_Data_Book_VII_2012.04_health.pdf.
[151] The Blues Project (BLUES) is a collaborative effort with researchers at the University of Tennessee Health Science Center and BlueCross BlueShield of Tennessee to impact the high infant mortality rate in Memphis, TN, and offers: (a) immediate access to prenatal and continued care for mom and baby for the insured and uninsured; (b) prenatal and postnatal education; (c) individualized care management; (d) support and empowerment; (e) family planning services; and (f) referrals to community resources and services. For more information, see: https://www.uthsc.edu/CHEER/documents/The%20Blues%20Project.pdf.

for eight sessions over a seven-month period. This allowed the clinics to run more Centering groups, and consequently enroll more patients in group prenatal care throughout the year.[152]

> "This is my second, but I feel like this is my first baby. I didn't do Centering with my first pregnancy and I've learned more now than when I had my first baby."
>
> *- Strong Start participant*

Patients with low-risk pregnancies at both sites were assigned to Centering groups based on their estimated due date. If a woman was unable to make the group to which she was assigned based on her due date, facilitators allowed her to attend a different group that may have been further along in the Centering curriculum. The average group size ranged from 10-12 women, and partners, family members, and friends, were strongly encouraged to accompany patients to group sessions. Two CHI-trained facilitators led each group, one of whom was a clinician (either an obstetrics and gynecology (OB/GYN) physician or resident, or a nurse midwife). Medical assistants and community outreach workers served as co-facilitators for the group sessions. Historically, Centering at the Outpatient Center was facilitated by nurse practitioners. However, early on in implementation, three nurse practitioners were let go and some new providers – including residents and certified nurse midwives (CNMs) – stepped in to facilitate Centering. Thus, program participants may have experienced some inconsistency with respect to the practitioners who facilitated their Centering sessions.

Every participant was given a CHI Centering notebook—described by one key informant as the "pregnancy bible"—as a supplement for information provided during the groups, and as a way to keep track of their personal health information (e.g., weight, blood pressure) between group sessions.

Group sessions were scheduled for 1.5 hours, and took place in a private space with circular seating. Sessions began with time for socialization and healthy snacks (whose purchase was not funded through Strong Start), while individual health assessments occurred in a screened-off area. During this time, women were encouraged to discuss any questions or concerns with their provider that they may have been uncomfortable sharing with others in the group.

In addition to the traditional Centering curriculum, the awardee used Strong Start funding to implement a specialized Centering group for women with pre-gestational diabetes who were receiving care at the Outpatient Center. This group was co-facilitated by a diabetes educator. A Strong Start High-Risk Coordinator also co-facilitated the specialized group and was responsible for managing care for these high-risk patients and coordinating their other health care appointments.

Finally, administrative coordinators provided basic case management beyond the group sessions. This included referrals to services such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Supplemental Nutritional Assistance Program (SNAP), housing, and assistance with utility bills. WIC registration was available to patients at the hospital.

[152] UTMG is a Centering approved site. The Centering Health Institute allows sites to modify the Centering curriculum based on the site's needs, as long as the state maintains the 13 essential elements.

OUTREACH AND ENROLLMENT

The awardee placed a large emphasis on outreach to promote the Centering program. Indeed, the High-Risk Coordinator regularly attended outreach events at health fairs, provider conferences, school events, and breastfeeding and childcare events. In addition, the awardee had flyers and a poster that they displayed, and posted information about Centering on UTHSC's Facebook page. Key informants noted that women who approached them during community outreach events were generally already receiving care at one of the Regional One Health sites. This allowed coordinators to take patient information, check the system's records for the next clinic appointment, and follow up with interested women in-person at that appointment.

> "Since this was my first pregnancy, I wanted to learn everything from swaddling the baby to measuring the milk. I came to [Centering] to see what it was like and it worked out."
>
> *- Strong Start participant*

The enrollment processes for Centering at Hollywood Health and the Outpatient Center differed slightly because of their patient populations, volume, and staffing models. At Hollywood Health, providers relied on an opt-out enrollment approach, where all women were enrolled in Strong Start by default unless they actively chose to opt out of the intervention. After assessing risk during the first prenatal appointment using medical and obstetrical history, providers were responsible for explaining the Centering program and placing women into a group based on their estimated due date. At the Outpatient Center, the volume of high-risk patients inhibited such a process. Instead, after assessing a woman's risk level during the first appointment, providers and residents referred women to Centering if they felt it was appropriate. Women had to actively choose to participate. As a result of the stark difference in risk levels among pregnant women and the different enrollment processes, informants believed that almost 80 percent of patients at Hollywood Health were enrolled in Centering, while only 20 percent of patients at the Outpatient Center participated.

Despite the awardee's efforts to promote the program and educate patients about the model, some patients still opted out or refused to try Centering. Such patients were thought to be difficult if not impossible to engage—they were described by key informants as "women that aren't interested in anything." Additionally, patients who specifically sought out midwifery care at Hollywood Health commonly refused Centering because they were looking for individual care with a midwife, believing they could build a stronger personal relationship with their provider.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

There was consensus among key informants that the Strong Start improved participants' health and social outcomes through education (which all key informants singled out as the key factor responsible for improving outcomes), connections to resources, and psychosocial support. The most significant change observed by key informants was greater confidence among some participants that they could make decisions that would contribute to healthier and safer lives for themselves and their newborns. For example, key informants perceived that Strong Start participants adopted breastfeeding practices at greater rates compared to women receiving standard care, showed greater willingness to ask for help

to overcome barriers such as lack of transportation to appointments, and were more likely to discuss domestic and personal problems with facilitators.

STRONG START PARTICIPANT PERSPECTIVES

Many of the evaluation's focus group participants had come to UTHSC for care (and participated in Centering) during previous pregnancies, some of whom returned specifically for Centering. Others chose their prenatal care site because it was convenient or because they were referred there by friends or family. Women reported hearing about Centering at their first prenatal appointment and having an option to participate. Most were excited about the model because it involved increased education, group support, and refreshments; only one participant was hesitant to participate, but once she tried group prenatal care she enjoyed it.

> *I chose to do group prenatal care [because standard one-on-one care] takes too long and is too slow.*
>
> *It's good because it gives [partners] the opportunity to hear what we learn.*

Strong Start patients were very satisfied with Centering, particularly with the education and support they received from the facilitators and other women in the group. In general, participants reported positive experiences with group prenatal care. Many developed close relationships with their facilitators, whom they often contacted outside of the group with questions about their pregnancy, personal issues, or for referrals to community resources. In addition, women liked that they were able to come straight to the Centering room without waiting in the waiting room and appreciated being able to bring support people to the sessions.

> *[The facilitators] help you with a lot of things outside of your pregnancy. They are like my second moms.*
>
> *They taught me about true contractions and false contractions. Otherwise I would have come here [to the emergency room]. Now I know when I need to come in.*

All of the focus group participants said they would recommend Centering to friends and family. The biggest suggestion participants had for improving the model was to have the same provider at each session at the Outpatient Center, and to allow women to meet the providers that might attend their delivery during one of the sessions.

> *You don't want a new person right when you're about to deliver and you don't know them. Since we are coming to Centering, it's nice to see the same person. We don't know who is delivering us. I wish we did.*
>
> *I don't want a different person touching my body every time, especially students.*

PROGRAM STRENGTHS

Key informants believed the single factor that had the biggest impact on how well their Strong Start program worked was their previous experience with *CenteringPregnancy*. As they had been conducting Centering on a smaller scale since 2005, providers and non-clinical staff already had experience with the model. Furthermore, many patients were already familiar with Centering and thus more likely to opt to join and remain in group prenatal care.

> "[A facilitator] calls me every Friday to ask how I'm doing. She checks in on us and calls to see how the baby is and how my other kids are."
>
> *- Strong Start participant*

Key informants were most proud of the champions at UTHSC who ensured that Strong Start was run as effectively as possible. They commended staff who bought water and snacks for women during the sessions using their own money (CHI recommends providing snacks, but Strong Start funds could not be used for this). They noted that facilitators' connections to patients helped the program be successful; for instance, staff went "above and beyond" what their positions required by bringing women Christmas presents and throwing them baby showers. Having champions of the Strong Start model within the organization helped UTHSC overcome internal opposition to group prenatal care from providers, residents, and others who initially viewed Centering as separate from, rather than a form of, prenatal care. (It was further reported in evaluation Year 2 that "most providers were not enthusiastic about expanding group prenatal care to a broader patient population.") Moreover, having champions of the Strong Start model within the organization facilitated provider buy-in, which staff believed was critical to the program's success.

Key informants overwhelmingly agreed that the education obtained by participants at group prenatal care sessions was influential as it improved "patients' buy in to their own health," bettered patient-provider relations, and created helpful bonds between participants. Key informants identified connections to social services, or what they often referred to as "case management," as the one vital factor that would be missing if Strong Start enhancements ended after the award period. One point several key informants made was that the program empowered participants to look for and identify things that they would like to bring up in their appointments and discuss with providers.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

UTHSC staff struggled with administration changes within their system during the Strong Start award,[153] including the untimely death of the program coordinator—leading to challenges in maintaining buy-in from both administrators and prenatal care providers, and delays associated with data collection. Staff also struggled to comply with the Strong Start data collection requirements. However, they overcame most of these challenges through flexibility and dedication to the model. Rather than adding more staff, UTHSC adapted existing positions to meet new requirements. For

[153] In October 2014, UTHSC merged with the Regional One Medical Center and the University of Tennessee Medical Group (the original Strong Start awardee) became defunct. Strong Start-involved OB providers and administrative coordinators transitioned into roles as employees of Regional One Health, and some Strong Start staff titles changed. Key informants noted a temporary decrease in enrollment in the month following the change.

instance, UTHSC's clinic managers and other administrative staff took over some of the Strong Start data collection tasks in addition to their other responsibilities.

Key informants suggested that it would be helpful to create a "toolkit" or guide for implementing Group Prenatal Care (not necessarily the *CenteringPregnancy* approach but a group care model more generally) that included potential modifications accounting for varying characteristics and needs of health centers or systems. For instance, the guide might lay out how a site could determine the ideal number of group sessions to include in cycle or what criteria could be used to form group cohorts. Similarly, it was important to take the time to educate all staff (e.g., clinic administrative staff and providers) about the model of care so that they fully understood its purpose of the model and benefits. In addition to facilitating implementation, key informants believed that staff education would improve patient satisfaction.

> "I delivered at 34 weeks [with my last pregnancy]. They told me to walk and drink more water and eat better. I am eating healthier this time to prevent that."
>
> *- Strong Start participant*

Having a suitable space in the health center to conduct the group prenatal care sessions was also understood by key informants to be essential; staff noted that if they had a bigger space, they could have made groups larger. Additionally, key informants shared that adequate patient volume was essential to ensure that the program was financially sustainable. For this reason, staff believed that group prenatal care sessions could be harder to replicate in small practices.

While key informants believed that all types of providers had the ability to be effective facilitators, they stated that because of logistical reasons, midwives are likely the best facilitators. Using midwives posed fewer clinic workflow challenges because residents' hectic schedules prevented them from attending all sessions, and patient no-show rates imposed greater financial burden for doctors (i.e., because reimbursement rates were greater for physicians than midwives).

Finally, key informants stressed that when serving women with high-risk pregnancies, the education received during group prenatal sessions was important but must be supplemented by assistance from a high-risk coordinator. With this extra support, women could more fully comprehend the immense amount of information they were given, both through group prenatal care sessions and other (e.g., specialist) visits.

SUSTAINABILITY

UTHSC has had Centering in place since 2005 and planned to sustain group prenatal care at one or more sites. However, at the time of the final case study interviews (October 2016) key informants were not yet sure whether they would continue the enhancements added with Strong Start funding, which included expanding group prenatal care groups to a high-risk population (i.e., women with pre-gestational diabetes) and hiring a High-Risk Coordinator. Key informants also expected the scope of their group prenatal care program would be different in the future; in particular, UTHSC will no longer group women by gestational age and, at least until they secure additional funding, will target medically low-risk women. No sites intended to continue the data collection that was required for the Strong Start Initiative because they found it burdensome and instead planned to use their electronic medical record for any data collection.

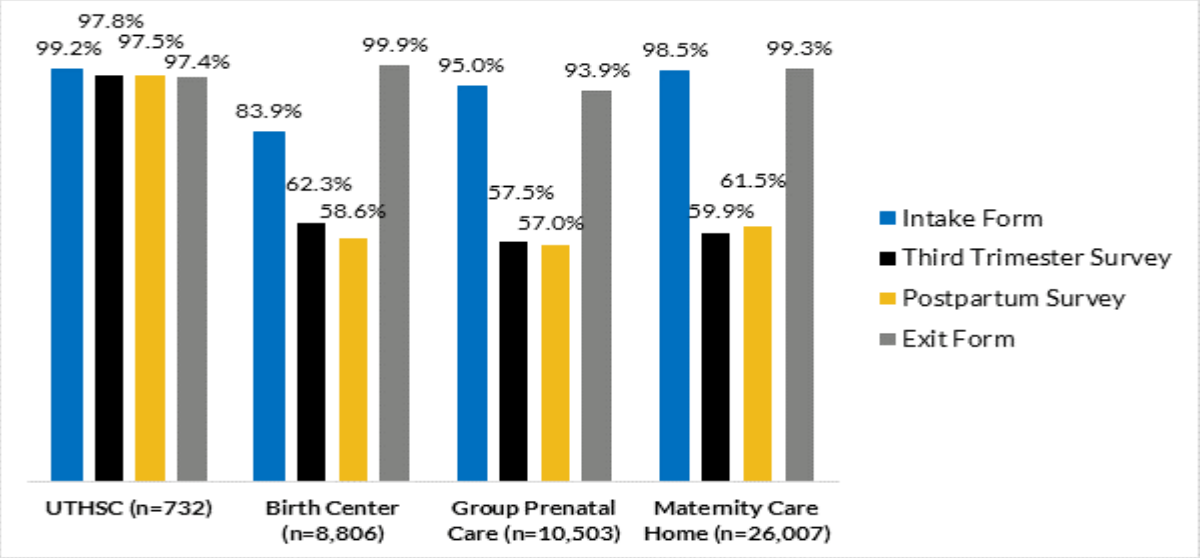
While UTHSC has not secured long-term funding for its modified version of *CenteringPregnancy*, key informants identified potential avenues of funding, including their affiliated health system Regional One, the March of Dimes, and TennCare (Tennessee's Medicaid program). One key informant believed that TennCare was working to establish enhanced reimbursement rates for providers of group prenatal care.

PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for UTHSC, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for UTHSC to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 2 UTHSC participants). In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 25: SUBMISSION FORM RATES, UTHSC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 691
- Study IDs represented: 732 (Suggests that PLPE data was submitted for 41 extra patients; see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- All forms were completed by participants on paper; If participants had difficulty understanding the forms, staff would assist them by administering in interview format.
- In rare cases, when the participant was very young (15 or 16 years old) and the parent was present for the Intake Form, the parent often assisted with form completion.
- Strong Start staff reviewed the forms while entering the responses in the awardee's database. If answers were skipped, staff attempted to the participant at their next appointment, but some of participants were lost to follow-up, so the information was permanently missing.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate any notable site-specific concerns or differences.

MISSING FORMS:

- Intake Forms: 0.8 percent of Study IDs were missing Intake Forms for unknown reasons.
- Third Trimester or Postpartum Surveys: About 2 percent of Study IDs were missing the Third Trimester Survey and 3 percent were missing the Postpartum Survey.
- Exit Forms: 2.6 percent of Study IDs were missing Exit Forms. The awardee said that participants with missing Exit Forms may not have been enrolled in Strong Start.

ITEM NONRESPONSE:

- While UTMG had high rates of form submission, many data points were missing throughout all the forms. The awardee provided little information about why data was incomplete.
- Intake Forms: When the Intake Form was implemented, the awardee created their own version of the form. Their version did not match the evaluation team's version exactly, so this led to some missing responses. The awardee said that participants were offended by the questions related to alcohol and drugs, noting that the questions did not establish whether the participant ever drank alcohol or used drugs. The awardee also said that some information might have been skipped or inaccurate because the participant was afraid to report this or thought it was "too personal", such as intimate partner violence. A high percent of participants, 53.7 percent, were missing responses related to depressive symptoms. The awardee thought that participants were also afraid to report this.

- Exit Forms: There were high rates of missing responses in the Exit Forms. Strong Start pregnancy outcomes are missing for 38.4 of participants.[154]

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for UTHSC participants. Some highlights include:

- The majority (64.8 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though a high proportion of participants were teens (18.4 percent of participants were 18 or 19 years old and 13.9 percent were less than 18 years old).
- Nearly all participants were black (96.7 percent).
- UTHSC participants had high rates of missing data (greater than 20 percent) for relationship status, intimate partner violence, and pregnancy intent.
- Among the risk factors collected in the PLPE data that can be reported confidently, 26.1 percent of UTHSC participants with a prior birth had a prior preterm birth.

TABLE 386: DEMOGRAPHICS, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	1.5	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**719**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	13.9	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	18.4	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	64.8	81.7	72.9	75.1	75.8
35 Years and Older	%	2.9	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	8.5	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**668**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	-	25.4	37.1	28.0	29.7
Non-Hispanic White	%	1.8	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	96.7	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	-	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	8.5	19.6	12.8	11.3	13.3
Not in Universe	%	90.4	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**-**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	-	52.6	36.3	55.8	49.7
Puerto Rican	%	-	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	-	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3

[154] Among participants with missing data on pregnancy outcome, 6.8% were missing because they did not have an exit form, 34.6% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 58.6% were missing for other reasons.

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Living in Shelter or Homeless at Intake						
Missing Data	%	0.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**724**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	-	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	11.0	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**650**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	20.6	36.6	30.8	35.3	34.5
In School, Not Employed	%	18.6	8.7	12.6	11.9	11.5
Employed and in School	%	4.8	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	56.0	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	8.5	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**668**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	28.0	15.4	27.8	29.1	26.4
High School Graduate or GED	%	68.9	57.5	58.3	57.9	57.9
Associate's Degree	%	1.8	8.2	5.2	4.6	5.4
Bachelor's Degree	%	-	14.5	4.5	3.7	5.8
Other College Degree	%	-	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	51.8	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**352**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	8.2	42.1	20.4	20.8	24.5
Living with a Partner	%	26.7	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	43.2	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	21.9	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 387: PSYCHOSOCIAL, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**724**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	97.5	51.8	51.8	59.7	56.5
No	%	2.5	44.6	42.3	37.4	39.8
Unsure	%	-	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.8	17.0	6.6	3.4	6.8
Not in Universe	%	2.5	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**706**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	93.2	61.1	72.6	79.9	75.3
Other	%	-	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	5.5	8.9	8.8	6.6	7.4

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Smokes Cigarettes at Intake						
Missing Data	%	81.4	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**136**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	14.0	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	52.1	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**350**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	17.4	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	11.4	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**647**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	65.8	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	53.7	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**338**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	32.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	50.1	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**364**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	64.0	67.9	59.0	65.5	64.5
Mild	%	24.2	21.4	23.8	20.2	21.2
Moderate	%	7.7	6.8	10.3	8.5	8.6
Severe	%	-	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	-	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	48.4	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**377**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	11.1	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	49.9	18.3	16.3	7.7	11.8
Not in Universe	%	0.4	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**363**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	-	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**724**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	78.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	17.1	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	4.8	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	69.8	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	10.1	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	12.6	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	11.9	24.6	17.1	15.4	17.2
Childcare Challenges	%	-	19.8	9.8	7.9	10.1

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	17.6	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 388: PREGNANCY HISTORY AND INTENTIONS, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.7	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**725**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	99.2	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	-	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	60.7	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**280**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	7.9	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	59.7	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**287**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	13.6	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	64.7	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**251**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	-	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	86.3	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**93**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	18.3	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	88.2	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**79**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	-	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	88.6	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**76**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Placenta Abnormalities						
Missing Data	%	88.6	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**76**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	88.6	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**76**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (e.g., mother's age <1 or >60). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 389: PRIOR BIRTH OUTCOMES, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	1.0	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**719**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	47.6	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	47.4	23.5	18.9	15.2	17.7
Not in Universe	%	52.5	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**-**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	-	34.6	24.3	27.1	28.1
>= 18 months	%	-	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	18.5	0.1	2.5	1.4	1.4
Not in Universe	%	52.6	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**211**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	26.1	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	23.2	1.3	20.8	13.1	12.6
Not in Universe	%	51.5	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**185**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	16.2	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 390: PRE-PREGNANCY MEDICAL CONDITIONS, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	49.2	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**371**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	12.9	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	80.1	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	-	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	-	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	50.5	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**361**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	16.3	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	53.4	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**340**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	12.9	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	44.7	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**404**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	-	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	31.2	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	25.5	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	30.4	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	10.9	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 391: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	53.0	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**343**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	9.9	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	52.7	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**345**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	16.2	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	52.1	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**350**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	-	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	53.7	0.8	32.7	22.4	20.6

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**338**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	53.6	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**339**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	53.8	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**337**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	52.6	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**346**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	56.2	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**320**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	4.1	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 392: TREATMENT DURING PREGNANCY, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	68.1	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**233**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	7.1	0.8	10.0	5.1	5.4
Not in Universe	%	90.1	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**20**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	67.4	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**238**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	-	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	67.8	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**235**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	-	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 393: PRENATAL CARE, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	47.9	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**380**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	30.5	4.7	29.5	64.5	43.3
Licensed Professional Midwife[155]	%	7.1	18.8	2.3	1.0	5.4
Nurse Practitioner	%	22.1	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	38.7	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	2.6	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**711**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	-	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	-	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	2.6	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**711**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	-	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	-	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	54.7	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**331**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	20.8	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	3.2	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	55.3	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**326**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	-	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	-	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	53.7	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**338**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	-	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	-	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	55.2	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**327**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	5.8	16.9	13.4	30.9	26.1

[155] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Average Number of Health Education Sessions	Mean	2.5	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	54.8	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**330**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	3.6	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.7	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	55.8	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**323**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	55.2	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**327**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	17.1	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	2.4	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	54.9	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**329**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	55.2	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**327**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	4.0	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	2.0	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 394: DELIVERY INFORMATION, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	26.2	1.4	25.3	23.3	19.5
Not in Universe	%	40.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**247**	**6,242**	**5,511**	**12,897**	**24,650**

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	43.7	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	2.9	0.3	7.8	2.9	3.5
Not in Universe	%	82.6	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**106**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	97.2	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	9.0	4.6	11.5	7.3	7.7
Not in Universe	%	36.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**395**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	100.0	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	16.2	0.7	12.0	5.6	6.1
Not in Universe	%	36.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**343**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	69.7	87.1	70.1	69.5	73.1
C-Section	%	30.3	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	9.5	0.4	8.7	2.3	3.4
Not in Universe	%	69.9	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**151**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	74.8	83.3	72.9	74.7	75.9
C-Section	%	25.2	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	7.7	4.7	12.5	6.3	7.4
Not in Universe	%	83.2	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**67**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	34.3	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	2.6	0.1	6.2	0.7	1.9
Not in Universe	%	92.1	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**39**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	-	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 395: BIRTH OUTCOMES, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	38.4	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**450**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	98.0	96.2	97.6	94.4	95.5
Stillbirth	%	-	0.3	0.9	0.8	0.7

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	-	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	21.2	0.7	15.4	5.8	7.0
Not in Universe	%	37.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**305**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	6.9	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	15.7	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	75.1	93.4	86.7	85.7	87.4
Post-Term (42+)	%	-	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	24.9	2.1	14.3	8.0	8.3
Not in Universe	%	37.0	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**278**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	-	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	12.9	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	78.4	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	5.8	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 396: SATISFACTION, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	80.7	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**141**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	-	0.4	1.0	1.3	1.0
Moderately Satisfied	%	1.4	3.3	4.4	7.8	6.2
Very Satisfied	%	28.4	25.6	35.6	46.1	39.8
Extremely Satisfied	%	70.2	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	80.8	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**140**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	-	2.0	3.1	2.3	2.4
Slightly Satisfied	%	-	3.0	4.0	2.9	3.1
Moderately Satisfied	%	8.6	10.4	11.6	12.8	12.1
Very Satisfied	%	57.1	29.1	42.6	46.6	42.1
Extremely Satisfied	%	29.3	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 397: BREASTFEEDING, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	56.0	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**321**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	28.3	80.4	47.5	40.5	50.3
Formula Feed Only	%	24.6	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	30.8	10.8	31.9	32.5	27.8
I Haven't Decided	%	16.2	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	80.4	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**143**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	69.9	91.5	76.6	72.6	77.3
No	%	29.4	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	-	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 398: FAMILY PLANNING, UTHSC

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	81.6	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**134**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	97.0	77.0	77.5	82.2	80.3
No	%	-	20.0	14.0	14.2	15.3
Unsure	%	-	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	80.4	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**143**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	93.7	84.2	70.8	74.0	75.5
No	%	-	13.2	17.7	21.5	19.1
Unsure	%	-	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	2.5	41.5	42.9	38.6	40.2
Not in Universe	%	79.2	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**134**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	12.7	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	23.9	2.8	11.4	10.9	9.2
LARC – IUD	%	9.0	10.8	11.9	12.3	11.9
Pills	%	13.4	8.6	11.9	13.0	11.8
Injection	%	20.1	5.9	16.2	20.2	16.2
Condoms	%	10.4	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8

Data Elements	N or %	UTHSC (Group Prenatal Care)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	-	16.7	8.1	9.5	10.9
Method Not Indicated	%	-	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Birth Certificate, Medicaid Eligibility, and Medicaid Claims data were obtained from Tennessee

Initial Contact: In April 2015, the evaluation team spoke with the Division of Policy, Planning, and Assessment within the Tennessee Department of Health (TDH) to learn about the state's willingness to participate in the Strong Start evaluation and the process for releasing state Medicaid, CHIP, and birth certificate data to Urban for its impact analysis. State officials were receptive to supporting the evaluation, and the Office of Vital Records said that it would be able to link Medicaid and birth certificate data on our behalf.

Data Acquisition Process: The evaluation team submitted a data request form to Vital Records in June 2015 and submitted an IRB application to the TDH in January 2016. After the standard 12-week review process, the IRB office requested revisions to the application in May 2016, which were submitted in August 2016. Following IRB approval, an official data request application was completed in October 2016. In December 2016, the Medicaid Agency shared its claims file for Urban to review. At that time, the evaluation team also learned that an IRB application with the Medicaid agency would not be necessary. In January 2017, all parties agreed on a process of sharing, merging, and submitting the requested data files, with Vital Records submitting the merged files to Urban.

Final Result: Urban received the merged file in August 2017. Unfortunately, the file did not contain CHIP data. Urban reiterated its request for CHIP data; however, it was determined that receiving CHIP data was not feasible in the remaining timeframe of the evaluation. Urban included Medicaid eligibility and claims data and birth certificate data in the final year's impact analysis.

(This summary is identical to that appearing for United Neighborhood Health Services.)

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The University of Tennessee awardee, which implemented the Group Prenatal Care model, delivered care at two sites included in the impacts analysis: The Med Hollywood Health Loop and The Med Outpatient Center. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the Med Hollywood Health Loop site served a large enough number of women enrolled in Strong Start that a site-level estimate was also feasible (Table 399).

As described in the Impact Analysis chapter of Volume 1, low acceptance rates among women offered enrollment in Strong Start by Group Prenatal Care awardees may create selection bias in the results for these awardees. Sites that used an opt-in enrollment procedure and where the acceptance of group prenatal care was low (less than 75 percent) were of particular concern. Within the University of Tennessee awardee, 1 of the 2 sites (Med Outpatient Center) raised selection bias concerns. For this site, women who enrolled in group prenatal care may be systematically different from those who choose not to enroll and estimates of the impact of enrolling in Strong Start may be biased by selection even after adjusting for differences in observable characteristics. The other site, Med Hollywood Health Loop, did not raise these specific concerns because they used an opt-out approach to enrollment and achieved an acceptance rate above 75 percent. While awardee-level estimates are presented here, they ***should not be interpreted as impact estimates*** because the Med Outpatient Center used an opt-in procedure and had a low acceptance rate.

TABLE 399: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR THE UNIVERSITY OF TENNESSEE MEDICAL GROUP

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out of County Comparison Group
University of Tennessee Medical Group			
The Med Hollywood Health Loop	Yes	No	No
The Med Outpatient Center	No	No	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [156]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- Because the comparison group could be pulled from the same counties where Strong Start participants reside, we did not estimate models where we drew the comparison group outside the county (alternative specification #1) for this awardee.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative

[156] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).

- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 400 reports the birth and process outcome findings for this awardee. However, these estimates should not be interpreted as an impact of Strong Start because the Med Outpatient Center used an opt-in strategy and had a low acceptance rate:

- Infants born to Strong Start women are 4.4 percentage points more likely to be of low birthweight compared to infants in the comparison group (16.3 percent versus 11.9 percent).
- Women in Strong Start have a VBAC rater that is 11.1 percentage points higher than the rate for women in the comparison group (24.1 versus 12.9 percent). However, this finding is only marginally significant (p-value<0.1).
- There are no other statistically significant findings for the birth and process outcomes associated with enrolling in Strong Start at this awardee.

TABLE 400: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNIVERISTY OF TENNESSEE MEDICAL GROUP (SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=461)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=28291)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=287, N=15222)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=287, N=15222)
Birth Outcomes						
Clinical gestational age (weeks)	38.1	38.3	-0.2	N/A	-0.2	-0.2
Preterm birth rate	15.4%	13.1%	2.3	N/A	3.5	3.0
Very preterm birth rate	5.2%	3.8%	1.4	N/A	1.8	1.6
Birthweight (grams)	3,033.8	3,070.9	-37.1	N/A	-23.8	-28.3
Low birthweight rate	16.3%	11.9%	**4.4***	N/A	3.1	2.7
Very low birthweight rate	2.8%	2.2%	0.6	N/A	0.3	0.2
Rate of Apgar score greater than or equal to 7	96.7%	96.5%	0.2	N/A	-0.8	-1.0
Process Outcomes						
C-section rate	30.4%	34.0%	-3.6	N/A	**-4.8^**	**-6.2***
VBAC rate[1]	24.1%	12.9%	**11.1^**	N/A	11.2	11.9
Weekend delivery rate	21.7%	22.6%	-0.9	N/A	1.0	1.4

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 54 Strong Start women and 4569 comparison group women.

Both the low birthweight and VBAC findings are no longer statistically significant in the alternative specification models. Adding diagnoses controls to the 2014-2015 claims sample suggests that Strong Start is associated with a 6.2 percentage point reduction in caesarean section rates at UTMG.

Table 401 reports the expenditure and utilization outcome findings for the awardee:

- There are no significant associations between Strong Start and any of the expenditure outcomes.
- However, women enrolled in Strong Start have 0.50 more emergency department visits and 0.03 fewer hospitalizations in the prenatal period than women in the comparison group (2.42 versus 1.92 visits and 0.05 versus 0.08 hospitalizations).
- Infants born to women in Strong Start have 0.27 more emergency department visits than infants born to women in the comparison group (2.11 vs. 1.84 visits). These estimates should not be interpreted as an impact of Strong Start due to selection bias concerns.

TABLE 401: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT UNIVERISTY OF TENNESSEE MEDICAL GROUP (SHOULD NOT BE INTERPRETED AS IMPACTS)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=287)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=15222)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,639	$2,740	-$102	N/A
Total expenditures during delivery period	$12,262	$10,639	$1,623	N/A
Total delivery and postdelivery expenditures[2]	$18,399	$17,129	$1,270	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	2.42	1.92	**0.50****	N/A
Number of hospitalizations 8 months before delivery month	0.05	0.08	**-0.03***	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.34	1.34	-0.01	N/A
Number of hospitalizations for mother 11 months after delivery month	0.08	0.09	0.0	N/A
Number of ED visits for infant in the first year of life	2.11	1.84	**0.27***	N/A
Number of hospitalizations for infant in the first year of life	0.10	0.09	0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

SITE-SPECIFIC ESTIMATES

Table 402 includes site-specific birth and process outcome findings for Med Hollywood. There is only one finding that is statistically significant: Infants born to Strong Start women are 4.0 percentage points more likely to be preterm compared to infants in the comparison group (14.8 percent versus 10.8 percent). However, this difference is only marginally significant (p-value<0.10).

TABLE 402: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MED HOLLWOOD (SITE-SPECIFIC)

Outcomes	Main Model: 2014 - 2016, Strong Start (N=223)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=24227)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=957, N=26570)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=149, N=12594)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=149, N=12594)
Birth Outcomes						
Clinical gestational age (weeks)	38.3	38.4	-0.1	N/A	-0.1	-0.1
Preterm birth rate	14.8%	10.8%	**4.0^**	N/A	4.6	**4.9^**
Very preterm birth rate	3.6%	2.8%	0.8	N/A	0.3	0.4
Birthweight (grams)	3,011.1	3,069.2	-58.1	N/A	-41.6	-41.3
Low birthweight rate	14.3%	11.4%	2.9	N/A	1.6	1.6
Very low birthweight rate	2.2%	1.7%	0.6	N/A	0.0	0.0
Rate of Apgar score greater than or equal to 7	96.4%	97.1%	-0.7	N/A	-0.9	-1.1
Process Outcomes						
C-section rate	26.5%	31.1%	-4.6	N/A	-2.5	-3.2
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	20.6%	22.4%	-1.8	N/A	-0.6	-0.1

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 20 Strong Start women and 3563 comparison group women.

Table 403 includes site-specific expenditure and utilization outcomes for Med Hollywood. These findings are generally consistent with the awardee-level estimates, with two minor caveats. First, women enrolled in Strong Start at Med Hollywood have fewer hospitalizations 11 months after the delivery month than women in the comparison group (0.03 versus 0.07 hospitalizations). Second, the awardee-level finding that infants of women enrolled in Strong Start have more emergency department visits than infants in the comparison group is only marginally significant (p-value<0.10) in the site-level model.

TABLE 403: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT MED HOLLYWOOD (SITE-SPECIFIC)

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=149)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=12594)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,280	$2,528	-$248	N/A
Total expenditures during delivery period	$10,082	$8,672	$1,409	N/A
Total delivery and postdelivery expenditures[2]	$15,151	$14,764	$387	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	2.30	1.87	**0.44***	N/A
Number of hospitalizations 8 months before delivery month	0.01	0.07	**-0.05****	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.20	1.32	-0.11	N/A
Number of hospitalizations for mother 11 months after delivery month	0.03	0.07	**-0.05****	N/A
Number of ED visits for infant in the first year of life	2.19	1.84	**0.35^**	N/A
Number of hospitalizations for infant in the first year of life	0.07	0.09	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

The University of Tennessee Health Sciences Center implemented the Group Prenatal Care model under Strong Start. Nearly all UTHSC participants were black and UTHSC had the highest rate of teen participants among all awardees., UTHSC participants had high rates of missing data (greater than 20 percent) for a number of characteristics and risk factors. Among the risk factors collected in the PLPE data that can be reported confidently, 26.1 percent of UTHSC participants with a prior birth had a prior preterm birth compared to 21.1 percent for all Strong Start participants. UTHSC implemented the *CenteringPregnanc*y (Centering) model, though customized the curriculum to conduct 8 group sessions, instead of the 10 prescribed by *CenteringPregnancy*, to accommodate more groups and enroll more patients. UTHSC also developed a specialized Centering group, co-facilitated by a diabetes educator, for women with pre-gestational diabetes. Women enrolled in this specialized group received care coordination and care management services through a Strong Start High-Risk Coordinator. In addition, administrative coordinators provided basic case management beyond the group sessions to all Strong Start participants, including referrals to services to address participants' psychosocial needs. The

awardee-level impact analysis findings for UTHSC should not be interpreted as impacts of Strong Start because one of the two sites used an opt-in enrollment strategy and had low acceptance of Centering. They reported that the site served a large number of medically high-risk patients whom they preferred to serve through standard prenatal care. The infants of Strong Start participants at Med Hollywood Health Loop, a site that used an opt-out approach as most patients were of average risk, were more likely to be of low birthweight compared to infants in the comparison group, a marginally significant finding (p-value<0.10). Participants had more ED visits but fewer hospitalizations before delivery and fewer hospitalizations after delivery than women in the comparison group. But, infants born to women in Strong Start had more ED visits than those born to women in the comparison group (p-value<0.10).

Virginia Commonwealth University

GROUP PRENATAL CARE AND MATERNITY CARE HOME

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

1,629	• Academic medical center and university in Richmond, VA	• Seven highly-varied sites in central and northern Virginia, ranging from academic clinics to community-based organizations and a midwifery clinic
		• Six sites implemented Group Prenatal Care and five sites were Maternity Care Homes (with four sites implementing both models)
			• Group Prenatal Care intervention categorized as "medium intensity" for implementing the *CenteringPregnancy* curriculum with no additional enhanced services
			  • Added outreach to and enrollment of women with Medicaid in pre-existing Group Prenatal Care Program
			  • Fidelity to *CenteringPregnancy* curriculum varied across sites
			  • Included initial risk/prenatal assessment, facilitated group education, skill-building, and support
			• Maternity Care Home model categorized as "low intensity" for providing no standard number of encounters (compared to four encounters offered by most awardees) and no direct services
			  • Implemented midway through Strong Start award, model varied by site and could include care navigation, care coordination, outreach in housing projects to hard-to-reach women, connection to classes and community services, social worker visits, and consultation with a nutritionist
			  • Evaluation team could not identify how services differed from typical care provided to non-Strong Start participants

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Improved equity in care delivered to Strong Start participants and other patients
- Increased participation in *CenteringPregnancy* model by women enrolled in Medicaid and enabled midwives to provide what they believed to be high-quality, empowering care
- Improved continuity of care throughout pregnancy
- Strengthened awardee partnerships with the Medicaid agency, the Department of Health, and the March of Dimes

CHALLENGES

- Variation in leadership support for Group Prenatal Care and high provider turnover led to a significant contraction in the *CenteringPregnancy* program
- Institutional skepticism about Group Prenatal Care's return on investment posed challenges at one site

- Lack of child care was a common reason women declined *CenteringPregnancy*
- Social services coordination and mental health services were extremely understaffed both at Strong Start sites and in the community, resulting in access problems

SUSTAINED

- Centering and the Maternity Care Home enhancements, which generally existed prior to Strong Start, were sustained, although for fewer people and with less outreach to Medicaid enrollees

KEY FINDINGS: PARTICIPANT-LEVEL DATA[157]

PARTICIPANT-LEVEL DATA QUALITY

- 0.2% rate of missing intake forms; 0.2% rate of missing exit forms
- 14.5% rate of item nonresponse on intake forms; 6.7% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 16.9% of women were teens (under age 20); 9.5% were 35 years or older
- 52.1% of women were black; 23.1% were Hispanic; 15.0% were white
- 25.6% of women were married; 28.1% were living with a partner; 22.0% were not in a relationship
- 17.3%: prior preterm birth rate among women with a prior birth

DESCRIPTIVE OUTCOMES

- 24.8%: C-section rate among women with a delivery
- 11.6%: preterm birth rate among women with a live birth
- 9.8%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

- Not conducted because we did not obtain birth certificate and Medicaid data for Virginia

[157] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

QUALITATIVE CASE STUDY

PRE-STRONG START MODEL OF PRENATAL CARE

All of Virginia Commonwealth University's (VCU's) Strong Start Group Prenatal Care sites operated a Centering program prior to implementing Strong Start.[158] Sponsored by the March of Dimes, Centering was in place since 2011 and was based on the CHI model and curriculum. Centering at the VCU Health System (referred to locally as the Medical College of Virginia or MCV) was primarily regarded as a "boutique option" for pregnancy care for privately-insured patients. At the Richmond Health District (RHD) and a Manassas birth center that participated early in the program, Centering developed as a robust alternative to standard care.

> "Labor and delivery is awesome…They tell you all the steps to take if you're in early labor, if you're in labor in general, they always break down the steps to make sure that you're calm, they make sure you have somebody to take you there. And they always make sure that all your questions are answered before you get off the phone."
>
> *- Strong Start participant*

Standard care (for non-Centering patients) generally consisted of individual visits and assessments lasting approximately ten minutes (though visits for patients with high medical risk could be a little longer).[159] During this individual visit, the patient was expected to raise issues, regarding social service needs such as food, housing, or domestic violence as well as mental health issues, or the clinician might detect these issues. Any pointers regarding nutrition and breastfeeding were provided during the ten-minute visit. Medically complex high-risk patients in standard care at MCV were treated in the high-risk obstetric (OB) clinic by residents under the supervision of a maternal fetal medicine specialist.

RHD included home visits as needed for women in its standard model and Group Prenatal Care. As a public health department, it placed a stronger emphasis than other sites on community health and connection to available social services. Accordingly, RHD strove to have all prenatal patients meet with a social worker three times during pregnancy. RHD placed additional emphasis on long-acting reversible contraception (LARC) uptake using a grant they obtained in program Year 3. The site revised its educational materials to ensure that they were up to date on all family planning options and supported a staff member in charge of family planning education who met with pregnant patients to discuss their options, highlighting LARC. Other providers in the community also sent patients interested in LARC to RHD. RHD referred medically-complex patients to MCV's high-risk OB clinic.

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[158] Under the *CenteringPregnancy* approach, prenatal care cohorts (typically grouped by gestational age) meet ten times over a seven-month period. Two trained facilitators lead each session, which are scheduled for two hours and take place in a private space large enough to accommodate patient members and support people in the proscribed circular seating arrangement. Sessions begin with time for socialization while individual health assessments occur in a screened-off area in the corner of the room. Group members also participate in self-care activities like weighing themselves and taking their own blood pressure, which they record in their own charts. The second half of the Centering session involves a facilitated discussion about a particular topic. Centering materials available through the Centering Healthcare Institute include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.

[159] At Manassas, the midwives' standard of care was to provide 30 to 40-minute visits, but this site closed in part way through the program.

Healthy Hearts Plus II, described further below, provided social services and health education weekly in local housing projects for hard-to-reach women, as well as for women who came to their site.

DESCRIPTION OF ENHANCED STRONG START SERVICES

As of the end of the intervention period, most VCU sites offered both Group Prenatal Care and Maternity Care Home models. These included MCV, operating out of the Nelson Clinic; Greater Prince William Community Health Center; the Centra Medical Group Women's Center in Lynchburg, a nurse midwifery clinic; and RHD, a public health clinic staffed primarily by nurses. Healthy Hearts Plus II, a community-based organization, operated a Maternity Care Home model that provided health, social services, and pregnancy-related supportive services onsite at local housing projects as well as at its site. Two other sites that participated for a portion of the award period—Manassas Midwifery and Women's Health Center and Shenandoah Women's Healthcare—and provided only Group Prenatal Care.

Group Prenatal Care: Strong Start functioned primarily as a vehicle to enroll Medicaid enrollees into Group Prenatal Care. VCU based its program on the CHI *CenteringPregnancy* Group Prenatal Care model and curriculum, although implementation varied substantially among the sites, including in the number of group visits (six for some patients at MCV in the first year versus the ten sessions prescribed by Centering[160]), facilitators (nurse practitioners or nurse midwives vs. physicians), and degree to which staff identified psychosocial and socioeconomic issues and linked patients to needed services. Sites modified the Centering approach to fit their particular settings, reflecting the adaptability of the model; however, these adaptations also reduced model fidelity to CHI's standard curriculum by reducing the number of visits.

> "It was good having other mothers to talk to, because with my first one…you just go in and sit in the waiting room, you sit there for hours until they finally call you, just dragging out, versus the Centering you sit in the room, the entire time you're there you're talking, discussing stuff, it goes by really fast. It was really informative I think – I would really suggest it to first-time mothers more than anything, because it's a really good learning experience."
>
> *- Strong Start participant*

Strong Start funding supported Centering facilitator training for medical residents at MCV. MCV emphasized that Centering groups intentionally placed women with high-risk medical conditions and lower-risk women in the same groups to "normalize" the high-risk pregnancy experience. In addition, VCU strongly favored the integration of Medicaid patients with privately-insured and uninsured patients to emphasize the universal pregnancy experience. Two of the three sites visited by the evaluation team included Spanish-language groups. All group sessions included an initial risk/prenatal care assessment, facilitated group education, skill-building, and support. Women were encouraged to achieve self-efficacy through self-monitoring and reporting of blood pressure and weight at the beginning of each Centering session, which was intended to improve motivation for healthy behaviors and actively engage women in their own care.

Groups were meant to include eight to ten women at similar stages in their pregnancies, although in practice there was significant variation in group size (e.g., a birth center that closed early in the Strong

[160] Six sessions were used only at MCV during the first year of implementation, primarily for higher-risk women who would have also had outside appointments with their MFM specialists and others. Average-risk women had the option during that year to enroll in the six-session model that devoted less time to the covered topics.

Start program had groups with as few as three members). Each group session lasted about 90 minutes after the initial health assessment, so the total time commitment by the patient was approximately two hours per visit. Care was designed to be delivered by multi-disciplinary teams including doctors, certified nurse midwives, nurse practitioners, nurses, social workers, and medical assistants, although the composition of the teams varied by site. Each group discussion had a theme such as nutrition, staying safe, breastfeeding, post-delivery contraceptive use, exercise and relaxation, recognition of preterm labor and steps to maintain pregnancy, smoking cessation, infant care, labor and birth, and postpartum depression. These topics typically followed the numbered sessions in the CHI curriculum, though sites adapted the topics and schedule to varying degrees.

Tools to assist Centering included the CHI Centering Notebook that provides the meeting schedule for each group, sections for patients to enter progress notes and information such as blood pressure measurements, and key information for each topic; informational videos for viewing during individual assessments at the beginning of a session; and guest/peer speakers on specific topics such as nutrition or contraception. RHD included home visits as needed in its model (predating Strong Start implementation). Social service support such as connections to food stamps, housing, and substance abuse treatment varied significantly by site.

> "It was good to be around 'the ladies;' I learned a lot and they did too. It was fun—everyone participated."
>
> *- Strong Start participant*

Maternity Care Home: Key informants reported that beginning in the second year of the program, women who entered prenatal care after a gestational age of 20 to 28 weeks (depending on the site and year) or who declined participating in Group Prenatal Care could receive enhanced services through the Maternity Care Home model at most sites. Women were eligible to enroll in the Strong Start Maternity Care Home model up to 29 weeks, and key informants reported that more than half of new Strong Start participants enrolled in the Maternity Care Home.

Each site determined the specific Maternity Care Home enhancements to offer, potentially including care navigation, connection to "Baby Basics" classes or other services in the community, social worker visits, or nutritionist consultation. In addition, enhanced services generally available to Strong Start participants (regardless of whether they participated in Centering) included dental services, care navigation, social service coordination, and referrals to Healthy Start, which provided home visits. The number of Strong Start encounters varied by site. The clinical sites typically had a care coordinator who tracked patients and followed up on missed appointments, assisted with Medicaid enrollment, and facilitated referrals to social workers or other behavioral health providers. However, key informants and focus group participants indicated that these services were universally provided to all prenatal patients. Strong Start Maternity Care Home staff also worked as regular clinic staff and were not dedicated solely to Strong Start, with their staffing positions jointly funded by Strong Start and clinic revenues. On the basis of its observations and interviews, the evaluation team could not identify any differences between Maternity Care Home care for Strong Start participants and the typical care provided to non-Strong Start participants.

VCU employed an approach at Healthy Hearts Plus II that differed significantly from other Maternity Care Home models. While the clinics used care coordinators, Healthy Hearts Plus II staff provided social services and health education weekly in each housing project in their catchment area for

hard-to-reach women, as well as for women who came to their site. Operating on a parallel track with obstetrical clinics, Healthy Hearts Plus II typically had little contact with and did not directly share information with maternity care providers. Most of their clients received maternity care from MCV or RHD. Many were teens; key informants estimated that the average age of clients was 17 or 18. Healthy Hearts Plus II served between 80 and 86 Strong Start enrollees between April and December of 2016. Its services for all clients in and outside Strong Start included: early pregnancy outreach; Medicaid enrollment assistance; nutritional education, grocery bags and meals, and access to a food pantry; diapers and life skills classes; maternity community health worker and doulas; unlimited "sister circles" group classes providing health education and emotional support; 24/7 access to a care manager by phone; class and support meeting reminders; breastfeeding support and education; referrals to behavioral health services and pediatricians; transportation; and, referrals to educational resources (including assistance enrolling in a local community college that offered childcare). The evaluation team did not discern any services uniquely provided to Strong Start participants, although Strong Start may have enabled Healthy Hearts Plus II to serve more people.

OUTREACH AND ENROLLMENT

> "I definitely like the fact that when you go to Centering you see the same person every time."
>
> *- Strong Start participant*

Care navigators or nurses recruited patients to participate in Centering regardless of insurance status— they discussed group care with patients and asked whether they would like to participate, using an opt-in approach, meaning that women actively chose between enrollment in a Strong Start model or participation in the standard care model. VCU's "in-reach" was conducted through direct contact and provision of written information at the medical encounter, after confirmation of pregnancy. All Medicaid enrollees who opted for Centering were enrolled in Strong Start (i.e., they were not asked separately to consent to Strong Start enrollment), and they were not specifically screened for risk of preterm birth apart from the screening for medical risk generally. All Centering patients with Medicaid coverage were enrolled in Strong Start during the first group visit unless patient frustration with the evaluation's Intake Form prevented enrollment. While key informants did not estimate the number of times this level of frustration occurred, they consistently cited the complexity of the Intake Form as a barrier to enrollment. Typically, nurses and administrative staff assisted with the forms when literacy limitations or other frustrations interfered with successful Strong Start enrollment.

> "They taught us how to do the blood pressure ourselves… I mean the first time you do it, they do it with you and show you, and then you do it on your own. You've got your own book…and you record everything in your book, so if it's something you want to know, all you gotta do is look back in your book, you don't even have to ask them."
>
> *- Strong Start participant*

All the sites expressed a need for more funding for administrative and enrollment staff. Sites had common criteria for excluding women from Centering: untreated current substance use disorder, serious mental illness or mental health condition that was not being treated or would be disruptive to the group, and entry into prenatal care after 20 weeks gestation. MCV included women who were medically high-risk in Centering, while the other sites instead provided standard care to those women, sometimes with an option to also continue Centering as a supplement to individual prenatal visits. After

CMMI relaxed Strong Start eligibility criteria[161] in June 2014, VCU sought to enroll all pregnant Medicaid patients in Strong Start. While CHI recommends enrollment by 16-18 weeks, inclusion in Centering was generally not available to women more than 20 to 28 weeks pregnant (varying by site) because of the difficulties of integrating new women in the group dynamic and providing the entire CHI curriculum, so they were offered enrollment in the Maternity Care Home.

As the Strong Start program progressed, sites generally increased their external outreach. VCU Strong Start partnered with the Department of Medical Assistance Services (DMAS), the Medicaid agency, to attract more direct enrollment from Medicaid managed care plans and use the Medicaid program as a conduit for sending recruiting information to eligible women in their Medicaid enrollment welcome packets. Sites developed more active and formal partnerships with other organizations and programs such as Baby Basics; the Healthy Families home visiting program; dental providers; and Access Now, which facilitated any needed specialist care. RHD developed a formal partnership for cross-referrals with the Cross-Over Clinic, which provided care to migrant populations. Meanwhile, MCV coordinated with its trauma department so that women who were identified as experiencing Intimate Partner Violence would be referred for Centering; that site also collaborated with VCU departments in arts, communication, and media to enhance messaging in its outreach materials. This increase in outreach and the addition of the Maternity Care Home led to dramatic increases in enrollment.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants reported that Strong Start improved outcomes including fewer preterm deliveries, higher birthweights, and higher breastfeeding rates, but data available to support these perceptions had limitations. MCV conducted an internal assessment indicating lower rates of preterm births and low birthweight among patients in Centering compared to typical care, but a small sample size meant the results were not statistically significant and caution should be exercised in interpreting them. Based on a separate study of characteristics of women enrolled in Strong Start, women in standard care presented with more risk factors than women in Centering, including previous preterm deliveries, medically high-risk pregnancies, complications in previous pregnancies, and higher smoking rates. Key informants believed there were Strong Start-associated savings from avoiding negative birth outcomes, improving birth spacing, supporting smoking cessation, and increasing breastfeeding.

Key informants also believed that family planning improved, reporting increased LARC use and healthier spacing between births among Strong Start participants. RHD and surrounding hospitals participated in a non-Strong Start initiative to reduce C-sections that involved joint consultations to evaluate medical necessity before any non-emergency C-section was authorized. Key informants reported that this program (rather than Strong Start specifically) was helping to reduce unnecessary C-sections.

[161] In June 2014, CMMI allowed awardees to adjust certain eligibility criteria so that more women could enroll in Strong Start. Specifically, it eliminated the requirement that women be identified with an additional risk factor for preterm birth beyond their Medicaid status, and it allowed awardees to enroll women past 28 weeks gestation. After another revision to criteria in 2015, women were allowed to enroll up to 29 weeks gestation, with some exceptions made for later enrollment in special circumstances.

Healthy Hearts Plus II reported that there were only two to three premature births since it joined Strong Start in April 2016, including one infant death related to very early premature birth. RHD noted that there had been no infant deaths in Strong Start over the duration of its program; premature infants were born at sufficiently high birthweights that neonatal intensive care units (NICU) or other care produced good outcomes. It was difficult for key informants to identify specific effects of Strong Start on these outcomes, though they generally believed that Strong Start contributed to fewer preterm deliveries and higher birthweights.

STRONG START PARTICIPANT PERSPECTIVES

All focus group participants in both models of care reported being very satisfied with their care and noted the thoroughness and attention devoted to them based on their individual needs. Mothers with more than one child found their experience under Strong Start to be superior to prior maternity care experiences. Participants reported that they valued Centering; felt that they learned from the sessions; appreciated having time to ask questions; and praised the facilitators' support, patience, responsiveness, and follow up if they missed a session. They expressed that all staff were caring and seemed excited about participants' pregnancies, and they valued the support of the other women in the Centering groups. Several mentioned that they had been referred for postpartum depression, either to the maternity department social worker or to outside resources, and that their issues had been addressed. The teenage participants agreed that Centering was helpful and enjoyed meeting others their age with similar experiences. Most said they would recommend Centering to a friend. One described a group facilitator as her "second mom."

> *You'll tell [the Centering facilitator] something and it's done – doctors don't respond for months. She always texts back.*
>
> *[Centering] is helpful. I think it's more in-depth [than standard care].*
>
> *I missed one appointment [to pick up another child who was sick at school]. [The facilitator] called me to make sure everything was okay, and then…three people from my Centering group texted to make sure I was okay.*

Women in the six-session model (which was facilitated by physicians and were more medically focused, and was discontinued after the first year) felt that they had missed out on some of the topics and were generally somewhat less satisfied compared to those who received the ten-session model. In one case, they expressed that a male physician facilitator was less able to relate to them in Centering and there was less discussion of psychosocial and other non-medical issues in his sessions. This suggested that fidelity to the model and coverage of all the relevant topics while accommodating the group's direction of the discussion was important. Women were particularly interested in discussions related to the childbirth experience and contraception.

While the two-hour time commitment per session was substantial and an initial barrier to recruitment, most women felt that the total commitment was not greater than that required for conventional care, which they described as having longer periods in the waiting room and sitting unattended in exam rooms. By contrast, they felt that all of their time in Centering was productively engaged.

> *The point was there's no waiting. You ask any questions you have, and they're always answered. [Facilitators are] always consistent, so you feel comfortable. It's a great amount of time.*

None of the Maternity Care Home participants were aware of any care enhancements they received specifically because they were enrolled in Strong Start, and they believed their care was consistent with the clinics' standard model of care. They generally seemed confused by questions related to enhancements in care or additional services they may have received. One participant received prenatal care previously at MCV and could not identify differences between the care provided then and for this pregnancy. Participants recalled filling out surveys, in some cases every trimester, and noted their length but did not feel they were overly burdensome.

PROGRAM STRENGTHS

Key informants were most proud of the improved equity in care delivered to Medicaid/Strong Start participants and other patients and of their partnerships formed with the Medicaid agency, the Department of Health, and the March of Dimes. Key informants also were proud that they could increase participation in the Centering model by women enrolled in Medicaid, believing that Centering provides high-quality care that is responsive to patients' needs. They believed that the comprehensiveness of the care empowered patients and improved outcomes.

Key informants regarded continuity of care as the key factor in program success but noted that while continuity of prenatal care was achieved, continuity through delivery was rarely provided, including in Centering. Key informants and focus group participants mentioned that continuity with the delivering provider would be ideal because that person would already be familiar with participants and their preferences. Nevertheless, they believed intra-team communication led to both better care outcomes and sustainability because it promoted collaboration and provider buy-in.

Key informants reported another strength was that social service providers reached out and delivered services where people lived rather than expecting patients to come to them. Healthy Hearts Plus II delivered services on-site in housing projects, and RHD provided home visits. Providers must be "unafraid," according to key informants, to deliver services where patients are most available. The ability to provide home visits, either directly or through a partner organization, promoted engagement and helped identify and address problems early to optimize potential to improve birth outcomes.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The importance of leadership and provider support in the viability and operation of Centering was the most significant lesson of Strong Start. Informants identified several challenges over the course of the Centering program at MCV, but the need for clinician champions and buy-in emerged as the most critical. The loss of the director of the program, a number of facilitating physicians, facilitating midwives and midwives generally led to a significant contraction in the Centering program. While informants at the awardee level insisted that physician support had remained the same, they noted that the loss of providers significantly reduced the capacity of the program. The loss of support noted by site-level key informants was attributed to changes in hospital leadership. Key informants also reported leadership concerns about Centering's impact on medical/surgical training opportunities for residents and on revenue at the OB clinic. They reported skepticism about Centering's return on investment for MCV.

Lack of child care was a barrier for some participants and a common reason women declined Centering. To address this, VCU allowed Centering groups to vote on whether children could accompany their mothers to sessions, which helped some women attend. Social services coordination and mental health services were extremely understaffed both at Strong Start sites and in the community, resulting in access problems.

SUSTAINABILITY

All sites sustained their Centering and/or Maternity Care Home services after Strong Start funding ended, although informants expected fewer Medicaid participants in Centering because they no longer had Strong Start funding to conduct outreach to Medicaid enrollees. The awardee was already doing Centering and providing Maternity Care Home enhancements before Strong Start began and had intentionally used joint funding from both Strong Start and clinic revenue to support staffing. This enabled the sites to continue the enhanced services after Strong Start funding ended, though they were reducing the number of women in Medicaid served by Centering. In addition, key informants reported that Virginia Medicaid paid an enhanced rate for Group Prenatal Care visits, addressing one of the potential financial challenges associated with Group Prenatal Care—though information provided by key informants was inconsistent and the research team did not verify it with the state. Key informants from RHD, in particular, described strong leadership support, confidence in improved outcomes, and certainty about continuing the Centering program after funding ended. Overall, VCU appeared to have sustained most of their Strong Start program.

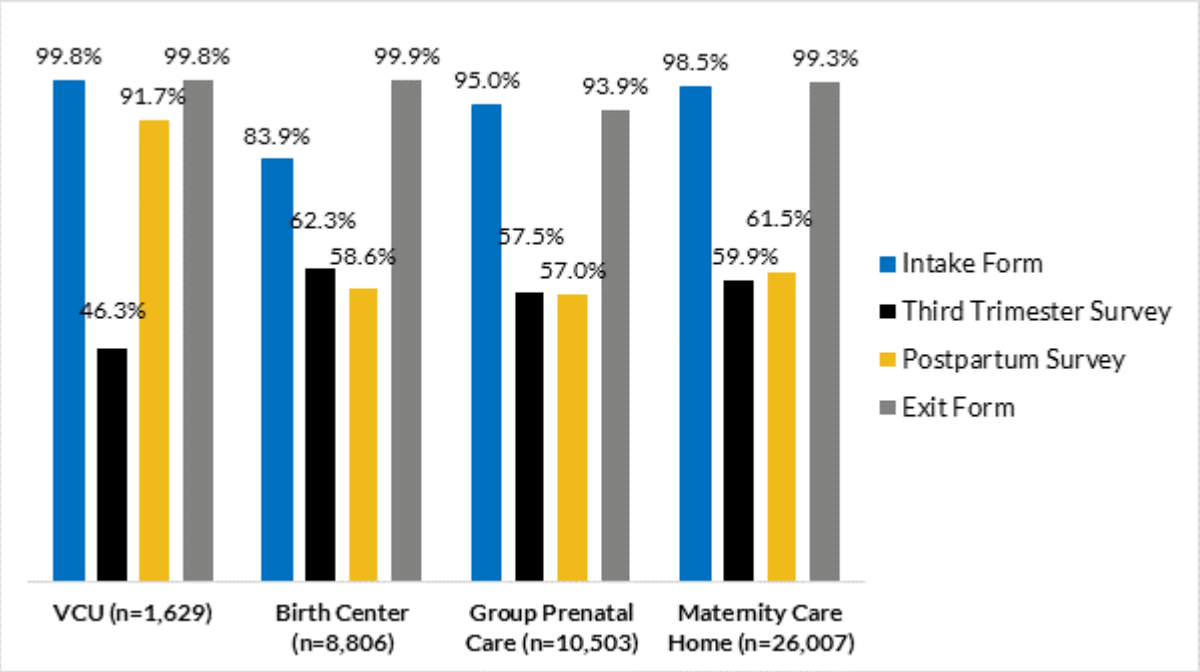
PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for VCU, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for VCU to estimates for each model and Strong Start participants overall.

- Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse).
- In cases for which the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe.
- Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below.
- Cells representing fewer than 11 women are censored using a dash (-).
- The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 20 VCU participants).

In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 26: FORM SUBMISSION RATES, VCU



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 1,639
- Study IDs represented: 1,629 (Suggests that PLPE data was not submitted for 10 participants; see information on program report data in Appendix F in Volume 1)

HOW FORMS WERE ADMINISTERED:

- Participants filled out paper forms created by the awardee. These modified forms included additional questions that the awardee used when populating their Quarterly Program Monitoring Reports for CMMI. If participants had difficulty understanding the forms, staff would assist them by administering forms in an interview format. Data were submitted electronically.
- Some participants had difficulty finishing the Intake Form during their first visit, so staff attempted to have them finish completing it during the second visit.
- If participants were resistant to sharing information on the forms, the staff explained the purpose of Strong Start and how it would benefit others. Providing this information to participants helped to improve the number of skipped questions. However, there were some cases where participants refused to complete the forms. In these cases, staff pulled relevant information from the medical chart to complete some questions.
- If participants did not return for a postpartum visit, staff attempted to contact them by phone to complete the Postpartum Survey. If the participant could not be reached, staff completed the survey using data they found in the medical record.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- The awardee did not indicate there were any notable site-specific concerns or difference.

MISSING FORMS:

- Intake Forms: 0.2 percent of Study IDs were missing Intake Forms. The awardee said these patients did not complete the Intake Form before they dropped out of Strong Start.
- Third Trimester or Postpartum Surveys: About 54 percent of Study IDs were missing the Third Trimester Survey and eight percent were missing the Postpartum Survey. The awardee indicated that loss to follow-up was responsible for many missing Third Trimester Forms. Also, as noted previously, if a participant did not return for a postpartum visit and could not be reached over the phone, staff extracted information from the medical record to complete the Postpartum Survey. This is why only 9 percent of Postpartum Surveys were missing, though many of these patients were lost to follow-up prior to delivery.
- Exit Forms: 0.2 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake Forms: The awardee reported that many participants said the Intake Form was too personal, and they did not feel comfortable sharing that information. As noted previously, staff would explain the benefits that Strong Start could have for other women, which helped improve the rates of skipped questions. The awardee also said that some participants were not able to complete the form in the allotted time; staff attempted to follow up with these women at their next appointment. The awardee found that participants skipped questions related to alcohol

and substance use because they did not feel it applied to them. The awardee also observed that some patients accidentally picked two options instead of one while answering questions about depression, so the awardee had to set this ambiguous response to "missing". Symptoms of depression were missing for 36.2 percent of participants.

- Exit Forms: In 2015, the awardee learned that the participant's weight was often missing and worked with sites to get this information for new participants. They did not think it would be possible to retrospectively get pre-pregnancy weight for women who enrolled before that time. In the end, BMI was missing for about 94 percent of participants. The awardee worked to collect missing birth outcomes and the percentages of missing Exit Form data improved. Remaining missing birth outcomes were due to a combination of loss to follow-up and deliveries at non-affiliated facilities because the Strong Start site did not offer delivery. The awardee attempted to obtain delivery information directly from the patient, if necessary. In the final dataset Strong Start pregnancy outcomes are missing for 12.6 percent of participants.[162]

MAIN FINDINGS:

The tables that follow summarize characteristics and outcomes for VCU participants. Some highlights include:

- The majority of VCU participants (73.6 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 11.2 percent of participants were 18 or 19 years old.
- Most participants were either black (52.1 percent) or Hispanic (23.1 percent).
- Similar to Strong Start participants overall, the largest share of VCU participants was in a relationship and living with a partner (28.1 percent), although 25.6 percent were married and 22.0 percent were not in a relationship.
- VCU participants had high rates of missing data (greater than 20 percent) for intimate partner violence and pregnancy intent. Among the risk factors collected in the PLPE data that can be reported confidently, 17.3 percent of VCU participants of participants with a prior birth had a prior preterm birth.

TABLE 404: DEMOGRAPHICS, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	0.4	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**1,603**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	5.7	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	11.2	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	73.6	81.7	72.9	75.1	75.8
35 Years and Older	%	9.5	9.1	7.6	9.5	9.0

[162] Among participants with missing data on pregnancy outcome, 2.0% were missing because they did not have an exit form, 45.1% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 53.0% were missing for other reasons.

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Race and Ethnicity						
Missing Data	%	5.9	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**1,514**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	23.1	25.4	37.1	28.0	29.7
Non-Hispanic White	%	15.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	52.1	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	9.8	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	8.3	19.6	12.8	11.3	13.3
Not in Universe	%	69.9	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**350**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	20.9	52.6	36.3	55.8	49.7
Puerto Rican	%	9.4	12.5	29.9	3.3	12.4
Cuban	%	-	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	67.4	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	-	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	0.2	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,606**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	1.3	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	13.5	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**1,392**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	33.3	36.6	30.8	35.3	34.5
In School, Not Employed	%	11.7	8.7	12.6	11.9	11.5
Employed and in School	%	4.6	5.7	5.5	5.4	5.5
Neither Employed nor in School	%	50.4	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	23.4	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**1,232**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	26.3	15.4	27.8	29.1	26.4
High School Graduate or GED	%	59.0	57.5	58.3	57.9	57.9
Associate's Degree	%	5.3	8.2	5.2	4.6	5.4
Bachelor's Degree	%	5.9	14.5	4.5	3.7	5.8
Other College Degree	%	3.5	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	16.7	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**1,340**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	25.6	42.1	20.4	20.8	24.5
Living with a Partner	%	28.1	33.2	34.8	31.1	32.3

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
In a Relationship but Not Living Together	%	24.3	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	22.0	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 405: PSYCHOSOCIAL, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	0.2	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**1,606**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	38.1	51.8	51.8	59.7	56.5
No	%	46.0	44.6	42.3	37.4	39.8
Unsure	%	15.9	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	0.2	17.0	6.6	3.4	6.8
Not in Universe	%	61.8	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**612**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	71.9	61.1	72.6	79.9	75.3
Other	%	19.1	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	9.0	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	32.1	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**1,092**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	14.0	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	26.2	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**1,188**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	30.3	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	12.2	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**1,413**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	53.7	42.2	57.2	46.4	48.1
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	36.2	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**1,027**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	40.1	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	28.8	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**1,146**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	55.2	67.9	59.0	65.5	64.5

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mild	%	26.0	21.4	23.8	20.2	21.2
Moderate	%	11.7	6.8	10.3	8.5	8.6
Severe	%	5.1	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	1.9	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	23.6	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**1,229**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	15.9	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	20.8	18.3	16.3	7.7	11.8
Not in Universe	%	12.8	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**1,068**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	3.1	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	0.2	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**1,606**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	70.0	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	18.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	11.2	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	73.2	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	16.8	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	25.9	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	14.5	24.6	17.1	15.4	17.2
Childcare Challenges	%	10.4	19.8	9.8	7.9	10.1
Partner Objections	%	-	0.6	0.7	0.7	0.7
Other	%	7.3	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 406: PREGNANCY HISTORY AND INTENTIONS, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	10.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**1,448**	**8,785**	**10,156**	**25,427**	**44,368**

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	71.1	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	35.7	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	15.4	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**787**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	27.6	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	15.7	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**782**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	22.8	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	26.5	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**607**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	2.1	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	26.3	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**611**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	10.3	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	28.5	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**575**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	5.0	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	28.2	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**581**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	6.0	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	29.3	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**562**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	-	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	29.8	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**554**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	-	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 407: PRIOR BIRTH OUTCOMES, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	0.5	1.7	1.5	0.6	1.0
Not in Universe	%	35.8	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**1,025**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	85.5	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	10.8	23.5	18.9	15.2	17.7
Not in Universe	%	45.4	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**705**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	24.8	34.6	24.3	27.1	28.1
>= 18 months	%	75.2	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	6.7	0.1	2.5	1.4	1.4
Not in Universe	%	45.4	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**771**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	17.3	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	13.7	1.3	20.8	13.1	12.6
Not in Universe	%	45.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**660**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	11.4	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 408: PRE-PREGNANCY MEDICAL CONDITIONS, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	21.6	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**1,261**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	22.0	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	69.8	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	1.0	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	7.2	6.8	7.4	9.6	8.6

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Diabetes Pre-Pregnancy						
Missing Data	%	99.3	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**12**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	100.0	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	34.4	0.4	22.4	13.7	13.1
Women with Non-Missing Data	**N**	**1,056**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	6.5	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	94.2	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**93**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	-	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	35.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	21.5	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	25.8	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	-	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 409: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	27.5	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**1,166**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	5.1	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	27.5	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**1,166**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	6.9	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	27.5	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**1,166**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	4.3	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	27.5	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**1,166**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	27.5	0.8	26.2	22.2	18.9

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**1,166**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	-	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	27.5	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**1,166**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	-	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	27.5	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**1,166**	**8,737**	**6,974**	**19,854**	**35,565**
Yes	%	-	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	27.5	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**1,166**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	9.1	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 410: TREATMENTS DURING PREGNANCY, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	44.4	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**894**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	-	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	3.0	0.8	10.0	5.1	5.4
Not in Universe	%	91.5	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**88**	**680**	**654**	**2,585**	**3,919**
Yes	%	-	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	43.9	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**902**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	3.2	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	43.8	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**905**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	2.8	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 411: PRENATAL CARE, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	15.3	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**1,363**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	30.9	4.7	29.5	64.5	43.3
Licensed Professional Midwife[163]	%	20.4	18.8	2.3	1.0	5.4
Nurse Practitioner	%	28.6	-	26.5	5.7	8.9
Certified Nurse Midwife/Certified Midwife	%	19.7	74.6	37.5	18.3	35.2
Family Medicine Physician	%	-	1.7	2.5	1.4	1.7
Other Provider	%	-	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.2	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,605**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	85.6	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	7.7	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.2	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**1,605**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	74.2	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	4.8	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	35.2	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**1,042**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	31.8	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	2.0	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	36.7	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**1,019**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	5.4	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	2.7	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	37.2	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**1,011**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	4.1	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	4.2	2.2	1.0	2.7	2.4

[163] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only authorized to practice in 28 states, and no states allow LPMs to practice in hospitals. It is likely in most cases that this option was selected in error (with the exception of the AABC awardee).

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Health Education						
Missing Data	%	12.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**1,416**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	2.9	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	N/A	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	12.0	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**1,416**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	1.6	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	N/A	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	100.0	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**-**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5
Nutrition Counseling						
Missing Data	%	12.0	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**1,416**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	24.2	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	N/A	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	12.0	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**1,416**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	3.4	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	N/A	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	49.8	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**807**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	15.0	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	4.9	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	76.5	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	30.6	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 412:DELIVERY INFORMATION, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	19.4	1.4	25.3	23.3	19.5
Not in Universe	%	15.8	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**1,042**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	24.4	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	4.5	0.3	7.8	2.9	3.5
Not in Universe	%	84.0	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**186**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	70.4	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	14.6	4.6	11.5	7.3	7.7
Not in Universe	%	15.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,119**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	99.6	51.8	99.4	99.5	90.6
Birth center	%	-	43.4	-	0.1	8.2
Home birth	%	-	4.3	-	0.2	0.9
Other	%	-	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	5.1	0.7	12.0	5.6	6.1
Not in Universe	%	15.8	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**1,272**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	75.2	87.1	70.1	69.5	73.1
C-Section	%	24.8	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	2.9	0.4	8.7	2.3	3.4
Not in Universe	%	66.4	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**495**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	77.6	83.3	72.9	74.7	75.9
C-Section	%	22.4	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	19.8	4.7	12.5	6.3	7.4
Not in Universe	%	80.2	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**-**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	-	34.3	38.1	45.6	43.0

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.2	0.1	6.2	0.7	1.9
Not in Universe	%	87.4	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**198**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	30.3	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 413: BIRTH OUTCOMES, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	12.6	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**1,407**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	95.0	96.2	97.6	94.4	95.5
Stillbirth	%	1.0	0.3	0.9	0.8	0.7
Termination	%	-	0.3	0.2	0.6	0.5
Miscarriage	%	3.3	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	17.0	0.7	15.4	5.8	7.0
Not in Universe	%	16.7	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,067**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	3.6	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	8.1	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	85.3	93.4	86.7	85.7	87.4
Post-Term (42+)	%	3.1	2.0	1.4	1.3	1.5
Birth Weight (Among Women with Live Births)						
Missing Data	%	7.1	2.1	14.3	8.0	8.3
Not in Universe	%	16.7	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**1,226**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	1.5	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	8.2	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	83.8	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	6.4	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 414: SATISFACTION, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	77.4	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**364**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	3.6	-	1.0	0.6	0.6
Slightly Satisfied	%	5.2	0.4	1.0	1.3	1.0
Moderately Satisfied	%	30.2	3.3	4.4	7.8	6.2
Very Satisfied	%	29.1	25.6	35.6	46.1	39.8
Extremely Satisfied	%	31.9	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	75.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**394**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	9.4	2.0	3.1	2.3	2.4
Slightly Satisfied	%	6.6	3.0	4.0	2.9	3.1
Moderately Satisfied	%	32.7	10.4	11.6	12.8	12.1
Very Satisfied	%	25.4	29.1	42.6	46.6	42.1
Extremely Satisfied	%	25.9	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 415:BREASTFEEDING, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	54.6	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**730**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	31.8	80.4	47.5	40.5	50.3
Formula Feed Only	%	9.9	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	26.4	10.8	31.9	32.5	27.8
I Haven't Decided	%	31.9	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	9.4	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**1,458**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	51.6	91.5	76.6	72.6	77.3
No	%	20.0	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	28.4	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 416: FAMILY PLANNING, VCU

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	9.4	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**1,458**	**4,642**	**4,384**	**13,636**	**22,662**

Data Elements	N or %	VCU (Group Prenatal Care and Maternity Care Home)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	69.2	77.0	77.5	82.2	80.3
No	%	2.5	20.0	14.0	14.2	15.3
Unsure	%	28.3	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	9.4	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**1,458**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	56.2	84.2	70.8	74.0	75.5
No	%	6.0	13.2	17.7	21.5	19.1
Unsure	%	37.7	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	8.4	41.5	42.9	38.6	40.2
Not in Universe	%	40.6	14.0	27.4	21.7	21.5
Women with Non-Missing Data	**N**	**820**	**3,912**	**3,086**	**10,138**	**17,136**
Female Sterilization	%	11.5	3.2	12.6	12.1	10.2
Male Sterilization	%	-	3.6	0.7	0.7	1.4
LARC – Implant	%	12.2	2.8	11.4	10.9	9.2
LARC – IUD	%	18.2	10.8	11.9	12.3	11.9
Pills	%	14.9	8.6	11.9	13.0	11.8
Injection	%	23.9	5.9	16.2	20.2	16.2
Condoms	%	10.1	26.6	19.8	13.9	17.9
Breastfeeding	%	-	12.8	2.9	3.1	5.3
Rhythm or Safe Period	%	-	2.6	0.5	0.2	0.8
Withdrawal or Pulling Out	%	-	2.6	1.2	1.7	1.8
Spermicide	%	-	-	-	-	-
Other Method	%	3.4	16.7	8.1	9.5	10.9
Method Not Indicated	%	3.0	3.8	3.0	2.2	2.7

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

No Birth Certificate or Medicaid data were obtained from Virginia

Initial Contact: In May 2015, the evaluation team spoke with the Virginia Department of Medical Assistance Services (DMAS) and the Virginia Office of Vital Records about the Strong Start evaluation and Urban's desire to obtain linked data. The agencies were receptive to supporting the evaluation, but suggested that the team should coordinate its data request with the Strong Start awardee in Virginia, Virginia Commonwealth University (VCU), which was conducting its own evaluation using similar data. VCU agreed to this role, and explored whether Urban's data request could fall under its existing agreement with the state or whether a separate data sharing agreement would be required.

Data Acquisition Process: It was determined that a new agreement would be needed, and the team completed and submitted its application in November 2015 to the Virginia Department of Health (DOH). Urban received a fully executed data sharing agreement in April 2016, and then received 2014 birth certificate data in May 2016. Following the execution of the DUA, however, there were a series of delays related to sharing of data between DOH and Medicaid. In April 2017, the DUA was amended to reflect that Urban would receive linked birth certificate and Medicaid data directly from VDH, rather than having to go through VCU, and discussions with state agency officials appeared to pave the way for the smooth linking and sharing of data. However, many months passed where the evaluation was unsuccessful in communicating with VDH officials.

Final Result: By September 2017, Urban was forced to let all parties – VDH, DMAS, and VCU – know that there was insufficient remaining time in the evaluation contract to receive and analyze Virginia's birth certificate and Medicaid data. Therefore, no analysis of the impact of Virginia's Strong Start awardee is included in the final report.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START

There are no awardee-level estimates for Virginia Commonwealth University.

CROSS-CUTTING SUMMARY

Virginia Commonwealth University implemented the Group Prenatal Care and Maternity Care Home models under Strong Start. The awardee's Group Prenatal Care intervention added outreach to and enrollment of women with Medicaid to sites' pre-existing *CenteringPregnancy* programs. Group Prenatal Care participants received an initial risk assessment, facilitated group education on a range of topics, skill-building, and social-emotional support. VCU's Maternity Care Home model varied by site and could include care navigation and coordination, outreach in housing projects to hard-to-reach women, connection to community resources, home visits, and nutritionist consultations. During case studies, the evaluation team could not identify how Strong Start Maternity Care Home services differed from the care provided to non-Strong Start participants. VCU participants had high rates of missing data (greater than 20 percent) for a number of risk factors. VCU participants with a prior birth did, however, have lower rates of short inter-pregnancy interval and lower rates of prior preterm birth than Strong Start participants overall, and a similar rate of prior low birth weight. Impact analysis was not conducted for VCU because we were unable to obtain birth certificate and Medicaid data from Virginia state agencies. Descriptively, however, VCU participants had lower rates of C-section and higher rates of VBAC than Strong Start participants overall, while their rates of preterm birth and low birth weight track similarly to the rest of Strong Start.

American Association of Birth Centers

BIRTH CENTER

Enrollment[1]	Awardee	Location and Provider Sites	Key Program Components

8,426	• National trade association for birth centers in the United States
	• Mission to support and promote birth centers as a model of maternity care
		• Operated largest number of Strong Start sites and all but one of the sites implementing the Birth Center model
		• 46 sites were active at some point during the award period, with 36 active sites at the end of the program (see Table 1 at the end of this chapter for a list of participating sites)
		• Sites were located in 22 states across the country
			• Peer counseling services, comprising four encounters with a peer counselor during pregnancy and postpartum for care coordination, referrals, and psychosocial and health education support
			• Of the 23 AABC Birth Center sites included in the evaluation's intervention classification:
			  • Two were categorized as "low intensity" for offering fewer than four encounters with peer counselors to Strong Start participants
			  • Fourteen were categorized as "medium intensity" for offering four peer counselor encounters, with no other enhancements beyond the midwifery model of care
			  • Seven were categorized as "high intensity" for providing four or more peer counselor encounters, as well as additional enhancements that included *CenteringPregnancy* groups, additional education classes, or an "Are You Ready?" visit at 36 weeks gestation
			  • Midwifery model of care
			  • Pre-existing and not funded through Strong Start, but considered essential component of care provided to program participants

Notes: [1] Enrollment includes all women for whom at least one Participant Level Program Evaluation data form was submitted.

KEY FINDINGS: QUALITATIVE CASE STUDY

SUCCESSES

- Midwives provided highly-individualized care and enhanced education
- Peer counselor component improved care experience for women with social and/or medical risk factors
- Improved access to Birth Center care for Medicaid and CHIP beneficiaries
- Data collection process, including use of the Perinatal Data Registry (PDR, the pre-existing system used by AABC members to collect patient-level data) to collect data from multiple sites spread across the country
- Program staff and providers' commitment to the program

CHALLENGES

- Awardee-level
  - Making midcourse changes (particularly related to data collection) and working with multiple sites
- Site-level
  - Establishing effective Strong Start enrollment process
  - Incorporating peer counselor services into birth center's patient workflow
  - Program and evaluation data collection requirements
  - Low third-party reimbursement for birth center services (especially under Medicaid)
  - Birth center licensure laws and other business-related challenges

PARTIALLY SUSTAINED

- All AABC sites included in the final round of case studies (10 sites) were continuing pre-Strong Start midwifery model of care (standard for birth centers)
- Most sites also continuing peer counseling in some shape or form, although most could only sustain some components because of financial constraints
- Expected to keep some elements from evaluation data collection forms in the PDR

KEY FINDINGS: PARTICIPANT-LEVEL DATA[164]

PARTICIPANT-LEVEL DATA QUALITY

- 16.8% rate of missing intake forms; 0.1% rate of missing exit forms
- 2.6% rate of item nonresponse on intake forms; 11.8% rate of item nonresponse on exit forms

PARTICIPANT CHARACTERISTICS AND RISK FACTORS

- 8.9% of women were teens (under age 20); 9.2% were 35 years or older
- 12.2% of women were black; 26.4% were Hispanic; 56.0% were white
- 43.7% of women were married; 33.6% were living with a partner; 9.1% were not in a relationship
- 13.2%: prior preterm birth rate among women with a prior birth

[164] Participant Characteristics and Risk Factors and Descriptive Outcomes are limited to women with singleton gestations.

DESCRIPTIVE OUTCOMES

- 12.4%: C-section rate among women with a delivery
- 4.4%: preterm birth rate among women with a live birth
- 3.5%: low birthweight rate among women with a live birth

KEY FINDINGS: IMPACT ANALYSIS

BIRTH AND PROCESS OUTCOMES

- Higher average gestational ages, higher average birthweights, lower rates of preterm birth, and marginally lower rates of low birthweight (p-value<0.10) than the comparison group
- Lower C-section rates, higher VBAC rates, and higher weekend delivery rates than the comparison group – higher weekend delivery rates among Strong Start participants may be suggestive of a reduction in planned inductions or scheduled C-sections
- Findings from state-level estimates for Florida and Tennessee and site-level estimates for Agape Midwifery Services, The Birth Place, Lisa Ross, and Infinity Birthing Wellness Center – which served a large enough number of women enrolled in Strong Start that state-level and site-level estimates were also feasible – are in the Site-Specific Estimates section

EXPENDITURE AND UTILIZATION OUTCOMES

- Lower average expenditures during the delivery period and lower average delivery and postdelivery expenditures than the comparison group
- Fewer infant ED visits and hospitalizations in the first year of life than the comparison group – the hospitalizations findings is marginally significant (p-value<0.10).
- Findings from state-level estimates for Florida and Tennessee and site-level estimates for Agape Midwifery Services, The Birth Place, Lisa Ross, and Infinity Birthing Wellness Center – which served a large enough number of women enrolled in Strong Start that state-level and site-level estimates were also feasible – are in the Site-Specific Estimates section

QUALITATIVE CASE STUDY

During the Strong Start award period, the American Association of Birth Centers (AABC) operated 46 active Birth Center sites in 22 states; an additional nine sites agreed to implement the program but never enrolled any participants. All 55 AABC sites and their location are listed in Table 1 at the end of this summary.

The Strong Start evaluation team included 24 AABC sites in the case studies. Site-level case study findings for those sites follow this summary, including 12 individual case study summaries for AABC sites studied more intensively during the evaluation (including site visits with participant focus groups) and a cross-site table highlighting key features of 12 AABC sites studied less intensively during the evaluation. We begin with the awardee overview, but the awardee did not provide direct health services. The care site case studies of the care sites follow.

PRE-STRONG START MODEL OF PRENATAL CARE

Prior to implementing Strong Start, all AABC sites offered comprehensive maternity care provided by midwives. Two sites (in Knoxville and Madisonville, TN) had robust community health worker programs and were models for AABC's Strong Start peer support program, but the majority of birth centers did not offer peer support or similar services before Strong Start. AABC pursued the Strong Start award because they viewed it as an opportunity both to demonstrate the quality of care already provided at birth centers and to improve outcomes for all the populations the centers serve.

DESCRIPTION OF ENHANCED STRONG START SERVICES

AABC's Strong Start model had two key components—the midwifery model of care and peer support. The midwifery model of care, an inherent feature of birth centers, involves a holistic and wellness approach to pregnancy and birth. At Strong Start Birth Center sites, midwives practiced collaboratively with care teams involving nurses, obstetricians, pediatricians, doulas, lactation consultants, and other specialists as needed. In describing midwifery care, one key informant highlighted its emphasis on "listening to women." Since Birth Center prenatal visits were generally at least 30 minutes (compared to 10 or 15 minutes for a typical prenatal care visit at an obstetrics/gynecology [OB/GYN] practice) midwives were able to build relationships with patients and could spend more time identifying and addressing their medical, psychosocial, or and educational needs.

AABC's Strong Start enrollees also received peer support services. A peer counselor met regularly with participants, almost always one-on-one, to provide social and emotional support and supplemental education on topics such as nutrition, stress management, and breastfeeding (areas typically covered by midwives as well). The peer counselor also linked participants with outside services, ranging from transportation to childcare to General Education Diploma (GED) courses. Sites were directed to provide a minimum of four peer counselor encounters per Strong Start enrollee, including at least one per trimester and a final postpartum encounter. AABC developed tools for peer counselors to use, including a care plan template, checklists, a risk screening tool, and the consent form.

AABC designed the peer counselor position with flexibility in mind—there was not a standard definition of "peer," though the role was meant to be distinct from the participant's prenatal care provider. The awardee encouraged sites to consider former birth center clients for the peer counselor role but designed the position so that it could be filled by staff already working at the center and interacting with patients in a narrower function, such as doulas or childbirth educators. Peer counselors completed a series of web-based training modules (developed by AABC with the help of a consultant) before services were initiated., The awardee also offered ongoing trainings in-person at AABC's annual conference and via webinar.

Strong Start funds supported the addition of peer counselor services at AABC sites. Medicaid mandates reimbursement for care by midwives, so maternity care provided by a midwife was not technically a Strong Start enhanced service (which by definition is a service not already covered by Medicaid or CHIP). However, key informants considered the midwifery model of care, not just care from a midwife, to be an essential component of the care provided to AABC's Strong Start enrollees. The midwifery model of care includes services such as longer visits that could be considered "enhanced" but are still reimbursed at the rate of a typical visit. As one key informant explained, "At the center of it all is the prenatal care provided by the midwives and the health care team. The peer counselors provide enhanced support and another continuous relationship. Due to the time-intensive prenatal visits, women have a good chance to form a positive relationship with their midwives. But with Strong Start they now also have a chance to have a strong relationship with a peer."

AABC's Strong Start sites were required to use the Perinatal Data Registry or PDR. The PDR (originally called the Uniform Data Set or UDS) was developed by AABC a few decades ago and includes patient demographic, utilization and health outcome data. AABC modified the PDR to include data necessary for the Strong Start quarterly monitoring reports and the national evaluation. Slightly more than half of the Strong Start sites had used the PDR before implementing Strong Start—for sites new to the registry, Strong Start training included a much larger focus on data capacity and analysis.

OUTREACH AND ENROLLMENT

AABC sites followed the same general steps to enroll patients into Strong Start. The prenatal care provider typically introduced the program to patients during the initial prenatal care visit, completed the AABC-provided risk assessment form, and then referred the patient to the peer counselor for program enrollment. Some sites integrated Strong Start into their prenatal intake process so that it was routinely offered as part of the birth center's standard of care for Medicaid enrollees, and eligible women were enrolled by default unless they explicitly opted out. AABC encouraged all sites to adopt this type of opt-out approach, suggesting it was instrumental to improving program participation. Ultimately, however, most sites used an opt-in enrollment approach, whereby the peer counselor described Strong Start as an enhanced service and offered women an opportunity to enroll. These sites preferred to give women an active choice about enrolling in Strong Start.

Many sites struggled with enrollment during the implementation period (described more below), especially in the program's first year. CMMI's relaxation of Strong Start eligibility criteria in June 2014 led to increased enrollment among AABC sites; sites were permitted to use Medicaid participation as the single qualifying risk factor for Strong Start (i.e., the requirement for a second risk factor was

removed), which key informants said made the enrollment process simpler. Program enrollment increased greatly in AABC's second year of Strong Start, from roughly 900 participants at the end of evaluation Year 1 to more than 3,900 a year later.

AABC created a set of branded program materials (with an AABC Strong Start logo) in both English and Spanish, including glossy flyers and brochures. Some sites conducted community-based outreach to boost Strong Start enrollment (e.g., attending health fairs or posting materials in public spaces) but others were already serving a substantial Medicaid population and felt outreach was unnecessary. Overall, AABC did not invest significantly in marketing and outreach for Strong Start.

AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

AABC awardee staff were generally proud that AABC's outcomes related to preterm birth, low birthweight, breastfeeding, and C-sections were better than national outcomes and pointed to the Birth Center and midwifery models of care, which minimizes interventions and emphasizes "the philosophy that women are considered healthy until proven otherwise," as the reason for their strong outcomes. Interestingly, nearly all of the AABC sites studied in evaluation Year 3 (when outcomes data were reviewed in detail during the case studies) felt that their own birth center's Strong Start outcomes were likely higher than the AABC averages shared by the evaluation team.

Staff were divided on the role that the peer counselor played in influencing program outcomes. Some felt that the extra attention participants got from the counselor made a difference and improved outcomes, while others were uncertain about the influence of the peer counselor's services. AABC staff agreed, however, that Strong Start participants were satisfied with their care and felt supported and well cared for by midwives and peer counselors. One key informant explained: "Midwives are able to relate to patients well…but it is impossible not to feel a little bit of 'hierarchy' in that relationship. The added support of a peer-type person they can relate to really helps…and [the peer counselor] is an equal collaborator in their care."

Strong Start reportedly benefited participating sites as well. With the addition of a peer counselor, the program increased participating birth centers' capacity to provide comprehensive care that met a patient's physical and psychosocial needs. The program also increased sites' capacity for reporting and analyzing data related to patient outcomes, particularly among sites that did not use the PDR prior to joining Strong Start. Finally, ABC staff felt Strong Start increased knowledge of the Birth Center model of care among Medicaid beneficiaries and community partners, demonstrated that Medicaid-covered women are interested in birth centers, and—for some sites—increased birth center use among Medicaid beneficiaries.

STRONG START PARTICIPANT PERSPECTIVES

Focus groups were not conducted at the awardee level for AABC. The following site-level summaries for twelve AABC sites include perspectives from participants at specific sites enrolled in the AABC Strong Start program.

PROGRAM STRENGTHS

AABC program staff were proud of the highly-individualized care and enhanced education that midwives provided under the Birth Center model, which they felt were major contributors to Strong Start's outcomes of interest. The peer counselor component varied across sites both in how well it was integrated into the Birth Center model and in the intensity of the intervention, but key informants also praised the addition of these services. One observed that though birth centers have always provided high-quality care, program staff have been surprised by how much Strong Start improved the care experience for women with social and/or medical risk factors. She explained, "One thing that really struck me is that we sit back on our laurels because we know the [Birth Center] model is great, but every model of care can be improved. We can't just say 'We've got it.' We have to continue looking for ways to improve care if we're going to do the best we can."

The awardee also felt that participation in Strong Start improved access to the Birth Center model of care for Medicaid and CHIP beneficiaries. Key informants highlighted the racial and ethnic diversity of Strong Start participants as a program success. Twelve percent of Strong Start participants are African American, and 27 percent are Hispanic, which reflects a more diverse population than "the usual" birth center patients, who are primarily white. The awardee expected to use their experience with the program to leverage more research funding on maternity care for the Medicaid/CHIP population.

Finally, AABC staff cited their data collection process as a major program strength. The PDR allowed AABC to collect data easily across many sites spread across the country, though some sites who had never used the system before (and/or who were more generally unfamiliar with routine data collection) faced a steep learning curve. Over time, the awardee improved its processes for collecting Strong Start program and evaluation data, including a midcourse change to its reimbursement methods that made payment of sites' Strong Start invoices contingent upon being up-to-date with data collection. This change improved data timeliness and completeness, and sites reportedly appreciated being notified of which participants' forms and surveys were outstanding each month.

Along with the PDR, commitment to the program was highlighted as the factor that had the biggest impact on implementation success.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

At the awardee level, the most challenging aspects of AABC's program were making midcourse changes (particularly related to data collection) and working with multiple sites. AABC operated far more sites than any other awardee, and the sites were scattered across about two dozen states. Because many birth centers are small, this was a necessary aspect of program design as many sites' patients need to be pooled to achieve a large enough group to study. In retrospect, awardee staff felt it would have been helpful to give sites more structured guidance on establishing peer counseling. While it was beneficial to provide flexibility in setting peer counselor qualifications and whether new or existing staff could fill the role, some birth centers struggled to work within the loose structure. One key informant summarized, "If I had to do it over again, I would implement peer counseling in a more uniform way. It's caused some confusion for sites to just provide an outline and ask them to tailor it to their own birth center. They would have appreciated being given more structure about exactly what services to provide."

The awardee also described several site-level challenges experienced by Strong Start-participating birth centers over the course of the evaluation. These included:

- ***Enrollment:*** Some sites struggled to incorporate the Strong Start enrollment process into the workflow of their birth center. Midwives were key to capturing as many eligible patients as possible, but sites encountered problems when midwives failed to screen for or make referrals to Strong Start. AABC held a Strong Start introductory webinar for providers in the first program year, which they associated with an increase in enrollment. Some sites with part-time peer counselors had trouble establishing an effective enrollment process, so AABC encouraged them to train other full-time, onsite staff (e.g., a medical assistant) as peer counselors—therefore increasing overall peer counselor availability to patients—as one way to address this issue. It was also difficult to attract patients to Strong Start at some sites. The most common reasons patients declined enrollment were because they were hesitant to enroll in a program that required additional demands on their time, they did not feel they needed extra support, or they had concerns about privacy and data sharing. AABC collaborated with sites to develop talking points addressing these concerns. One recruitment message that was effective for several sites involved emphasizing Strong Start's potential benefit to birth centers and the midwifery model.
- ***Peer Counselors:*** AABC also faced challenges establishing peer counselor services. Hiring was a barrier for some, and key informants felt that the per-enrollee payment structure might have been a factor (making it hard to attract or retain individuals for the position). Some sites had to replace unreliable peer counselors. More commonly, sites encountered problems with scheduling peer counselor encounters. Patients were usually reluctant to make a separate trip to the birth center to meet with their peer counselor. Sites tried to schedule peer counselor sessions either just before or after the Strong Start participant's prenatal visit, but coordinating the two services was not always possible, depending on the peer counselor and patient's availability. As a solution, some sites adopted alternatives to an in-person peer counselor encounter such as meetings by phone.

- ***Data and Documentation Requirements:*** AABC conducted a survey in the program's first year in which many sites named Strong Start "paperwork" as their biggest challenge. They noted difficulties involved with digesting the large amount of information about Strong Start, training (and retraining) staff on Strong Start requirements and processes, incorporating Strong Start forms into workflow (particularly given changes and additional forms introduced during the implementation period), and timely entry of Strong Start data by staff. AABC used carryover funds from its first year to increase the per-enrollee payment to sites by $50; the additional payment was meant to support data collection required for the Strong Start evaluation.
- ***Low Third-Party Reimbursement:*** Some birth centers faced notable financial challenges related to low reimbursement from insurance carriers. Birth centers are typically reimbursed by Medicaid at rates that are much lower than reimbursement for hospital-based births. In data collected via a 2014-15 survey of AABC members (including but not limited to Strong Start sites), birth centers reported average Medicaid reimbursement for the care provided during labor and delivery. Fee-for-service Medicaid reimbursement for professional fees ranged from $895 to $3,525, and facility service fees ranged from $325 to $2,673. Reimbursement by Medicaid Managed Care Organizations (MCOs) ranged from $1,380 to $2,500 for professional fees and from $790 to $5,500 for facility fees.[165]
- ***Birth Center Licensure Laws and other Business Challenges:*** State and local licensure laws vary, but many limit birth center coverage and access. For instance, some states require birth centers to have hospital-based physician medical directors, a role that does not appeal to many physicians because it increases their malpractice insurance without providing sufficient additional income. Health plans may place additional restrictions on birth center coverage, even in states that don't have restrictive licensure laws. Though freestanding birth center services are a mandatory covered benefit under Medicaid, there are reportedly many birth centers that cannot get contracts with the Medicaid MCOs that provide the bulk of Medicaid services to pregnant beneficiaries.

SUSTAINABILITY

Ten active AABC sites were selected for the Year 4 case studies—which included a discussion of sustainability—and key informants at each of these sites indicated that they continued to offer the midwifery model of prenatal care as they had prior to and throughout Strong Start. AABC awardee staff reported that all sites (including those not selected for Year 4 case studies) would sustain the midwifery model.

Eight of the ten Year 4 study sites had also sustained the peer counseling services added under Strong Start, although most could do so only with reduced intensity after Strong Start funding ended. For instance, one site kept the peer counselor, but instead of one-on-one encounters counseling occurs in group sessions with a personal "check-in" during the third trimester. In a 2016 survey of AABC sites conducted by the awardee and the evaluation team, about a third (12 of 37) of respondents said their

[165] This can be compared to the following 2014 Medicare data, which represents more than 3,000 U.S. hospitals that receive Medicare Inpatient Prospective Payment System (IPPS) payments for discharges: for vaginal delivery without complicating diagnosis, the average covered charges were $14,970 and the average Medicare payment was $4,889. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Inpatient2014.html.

birth center would not continue to provide peer counseling services post-award. Another third (13 of 37) said they were unsure, and 10 respondents said their center would continue peer counseling.

Awardee staff observed that sites planning to sustain peer counseling were those that tended to have higher patient volume and a larger staff. One key informant observed that sites were better able to implement and sustain peer counseling if they used existing birth center staff who had duties to fill in addition to the peer counselor role. Turnover was reportedly higher for peer counselors if that was their sole duty, and sites had more trouble integrating those counselors into birth center operations. Sites not sustaining (or likely not sustaining) peer counseling cited a lack of an ongoing payment mechanism, such as Medicaid reimbursement, for the services.

Though no decisions had been made at the time of the final round of case study interviews, AABC indicated that some of the psychosocial measures added to the PDR for the Strong Start evaluation would be retained. These measures might be added to the PDR dataset for all participating centers, including those not a part of Strong Start.

TABLE 417: BIRTH CENTERS THAT PARTICIPATED IN AABC'S STRONG START AWARD

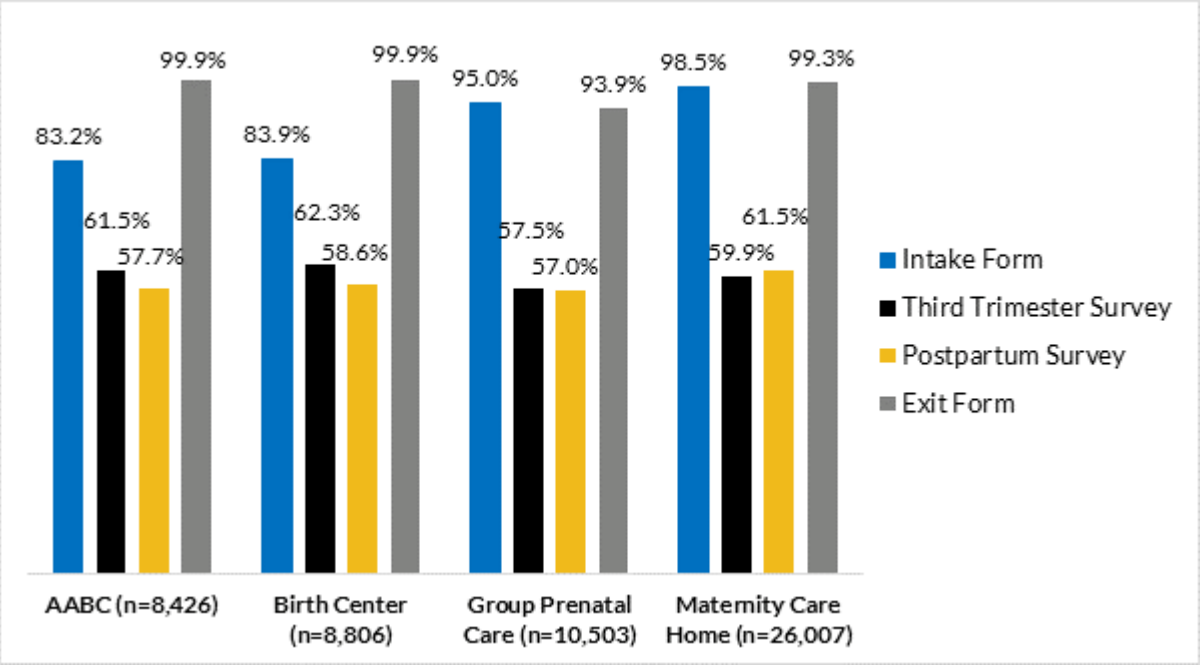
Birth Center	Location	Period of Participation	Included in Evaluation Case Studies
Midwifery and Women's Health Care at Geneva Woods	Anchorage, AK	2013-2016	Yes
Alaska Family Health & Birth Center	Fairbanks, AK	2013-2016	No
Juneau Family Health & Birth Center	Juneau, AK	2013-2016	Yes
Mat-Su Midwifery & Family Health	Wasilla, AK	2013-2017	Yes
El Rio Birth & Women's Health Center	Tucson, AZ	2013-2017	Yes
Baby Buddies Birth Center at Harmony Health	Marysville, CA	2013-2017	No
Inland Midwife Services	Redlands, CA	2013-2017	No
Best Start Birth Center	San Diego, CA	2013-2017	Yes
UC San Diego Health System, Community Women's Health Program	San Diego, CA	Never active	No
Women's Health & Birth Center	Santa Rosa, CA	2013-2017	Yes
Connecticut Childbirth & Women's Center	Danbury, CT	2015-2017	No
Agape Birth and Wellness Center	Daytona Beach, FL	2014-2017	No
Tree of Life Birth & Gynecology Center	Deland, FL	2013-2017	Yes
Bundle of Joy Birth & Wellness Center	Fernandina Beach, FL	Never active	No
Birth & Beyond	Grandin, FL	2013-2017	Yes
Breath of Life Women's Health & Birth Center	Largo, FL	2013-2017	Yes
NU Season Birth & Wellness Center	Ocala, FL	Never active	No
Tree of Life Birth & Gynecology Center	Orlando, FL	2015-2017	No
Heart 2 Heart Birth Center	Sanford, FL	2013-2017	No
Birthways Family Birth Center	Sarasota, FL	2013-2017	No
Rosemary Birthing Home	Sarasota, FL	2013-2017	Yes
Childbirth Options Birth and Wellness Center	Wesley Chapel, FL	2014-2016	No
The Birth Place	Winter Garden, FL	2014-2017	No
Boise Women's Health and Birth Center	Boise, ID	2015-2017	No
PCC Community Wellness Center	Oak Park, IL	2013-2017	No
New Birth Company	Overland Park, KS	2013-2017	Yes
Special Beginnings Birth and Women's Center	Arnold, MD	2014-2017	No
Morning Star Women's Health & Birth Center	Duluth, MN	2014-2017	No
Alisha's Care Center	Eagle Bend, MN	Never active	No
Morning Star Women's Health & Birth Center	St. Louis Park, MN	2013-2016	Yes
Health Foundations Family Health & Birth Center	St. Paul, MN	Never active	No

Birth Center	Location	Period of Participation	Included in Evaluation Case Studies
River Valley Birth Center	St. Peter, MN	Never active	No
Birth & Wellness Center	O'Fallon, MO	2015-2017	No
The Midwife's Place	Bellevue, NE	2013-2016	Yes
Women's Birth & Wellness Center	Chapel Hill, NC	2013-2017	Yes
Dar a Luz Birth & Health Center	Los Ranchos, NM	2013-2017	Yes
Northern New Mexico Birth Center	Taos, NM	2013-2016	No
The Birth Center at Women's Health Institute	Taos, NM	Never active	No
Brooklyn Birthing Center	Brooklyn, NY	2013-2016	Yes
Klamath Women's Clinic & Birth Center	Klamath Falls, OR	2015-2017	No
Trillium Waterbirth Center	Medford, OR	2013-2016	No
PeaceHealth Nurse Midwifery Birth Center	Springfield, OR	2013-2017	Yes
Valley Birthplace Birth Center & Woman Care	Huntingdon Valley, PA	Never active	No
The Midwife Center for Birth & Women's Health	Pittsburgh, PA	2013-2017	Yes
Reading Birth & Women's Center	Reading, PA	2013-2017	Yes
Charleston Birth Place	North Charleston, SC	2013-2017	Yes
Infinity Birthing & Wellness Center	Cookeville, TN	2013-2017	No
Lisa Ross Birth & Women's Center	Knoxville, TN	2013-2017	Yes
Women's Wellness & Maternity Center	Madisonville, TN	2013-2017	No
North Houston Birth Center	Houston, TX	2013-2017	Yes
Rite of Passage Women's Health & Birth Center	Pearland, TX	2013-2017	No
Holy Family Services Birth Center	Weslaco, TX	2013-2017	No
NOVA Natural Birth Center	Chantilly, VA	Never active	No
Footprints in Time Midwifery and Birth Center	Black River Falls, WI	2013-2016	Yes
FamilyCare Women's Health & Birth Center	Hurricane, WV	2013-2017	Yes

PARTICIPANT-LEVEL PROCESS EVALUATION

The tables and figures presented in this section summarize findings from the PLPE dataset for AABC, as well as findings by model and overall (across all three Strong Start models). These tables allow the reader to compare specific estimates for AABC to estimates for each model and Strong Start participants overall. Rates of missing data reported in these tables include data that are missing because a form was not submitted and data that are missing because the measure was left blank on a submitted form (item nonresponse). In cases where the relevant population represents a subgroup of participants (e.g., women with a prior birth are the only group that could have had a prior preterm birth), we restrict the N to only those women in the universe. Women with non-missing data (and if relevant, in the universe) are the denominator used for calculating all percentages presented in the tables below. Cells representing fewer than 11 women are censored using a dash (-). The figure presenting form submission rates includes all Strong Start participants for whom we have any PLPE forms. All subsequent tables are limited to women with a single gestation (excluding N=607 women with multiple gestations across all awardees, and 18 AABC participants). In addition, we briefly summarize the quality of the data submitted. This information draws on conversations with individual awardees throughout the evaluation.

FIGURE 27: FORM SUBMISSION RATES, AABC



Notes: Denominators for form submission rates are based on the total number of women for whom we have any form.

ENROLLMENT AND PLPE ALIGNMENT:

- Final enrollment total: 8,470
- Study IDs represented: 8,426 Study IDs. In follow-up conversations, the awardee said that the PLPE data are reflective of the final enrollment counts: see information on program report data in Appendix F in Volume 1.

HOW FORMS WERE ADMINISTERED:

- Intake: Paper forms, mostly self-administered by patients, unless they asked for the assistance of an interpreter. Sites typically asked the patients to complete the Intake after meeting with them at least once.
- Third Trimester and Postpartum Survey: Paper, more likely to be completed by the provider or the peer counselor, who administered the questionnaires orally.
- Exit Form: Data were submitted electronically, collected in the awardee's perinatal data registry (PDR), an electronic database. All surveys were reviewed for completeness by the site before sending to the awardee, where they were reviewed for completeness again. AABC contacted sites regarding potential Exit Form data issues on a rolling basis throughout the project.

SITE-SPECIFIC CONCERNS OR DIFFERENCES:

- AABC coordinated 46 sites.
- The awardee did not indicate that there were any concerns in the availability of completeness of data by site, but there are variations by site, some of which has to do with sites that dropped out of the program early on.

MISSING FORMS:

- Intake Form: About 17 percent of AABC Study IDs were missing Intake Forms. Some of these may include surveys that the awardee submitted but the evaluation team did not receive, and for which copies did not exist. Some of the missing Intake Forms were from the beginning of the project, when completion rates were low. To ensure this rate improved, AABC created a policy to hold payment until the Intake Form and Mother ID form were received at the awardee office.
- Third Trimester or Postpartum Survey: About 39 percent of Study IDs were missing the Third Trimester Survey and 42 percent were missing the Postpartum Survey. These forms were missing in most cases because the patients withdrew from the program or were lost to follow up and, but a small number were forms that were submitted to the awardee but not received by the evaluation team.
- Exit Form: Only 0.1 percent of Study IDs were missing Exit Forms.

ITEM NONRESPONSE:

- Intake: AABC's sites said that patients viewed some questions on the Intake Form, such as those about substance use and intimate partner violence, as "invasive," particularly for a first visit, and patients declined to answer them. The sites also reported that finding time during the first or second visit was challenging because of all the other paperwork that needed to be completed for a new patient.
- Exit: AABC began to build and collect data in their PDR before the Exit Form was final and as a result, some early participants are missing select data points. This is because some health history variables, such as history of placental abruption, were not in the older version of the PDR. In September 2015, AABC stated that these risk factors were rare in their population, and they did not have the resources to review charts for all previous clients to fill in these gaps. The awardee said that the number of visits for some services (e.g., dental, MFM, nutritionist, smoking cessation, etc.) might not be reported because they were not required for the PDR. Some women transferred care during pregnancy, so delivery and birth outcomes were not available. Data on participants' Strong Start pregnancy outcomes are missing for 23.8 percent of enrollees.[166]

[166] Among participants with missing data on pregnancy outcome,0.4 % were missing because they did not have an exit form, 28.5% were missing because they stopped receiving Strong Start services prior to delivery for reasons other than miscarriage or termination, and the remaining 71.1% were missing for other reasons.

MAIN FINDINGS:

When considering the characteristics of AABC participants, the majority (81.9 percent) were between 20 and 34 years old—the healthiest age range for pregnancy—though 9.2 percent of participants were 35 or older. Most participants were white (56.0 percent), followed by 26.4 percent Hispanic and 12.2 percent black. Unlike Strong Start participants overall, the largest share of AABC participants were married (43.7 percent), while 33.6 percent were living with their partner and 9.1 percent were not in a relationship. Among the risk factors collected in the PLPE data, 20.4 percent of AABC participants reported having experienced intimate partner violence, 13.2 percent of participants with a prior birth had a prior preterm birth, and 60.7 percent of participants had not planned their Strong Start pregnancy.

TABLE 418: DEMOGRAPHICS, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Mother's Age at Intake						
Missing Data	%	16.9	16.2	5.5	1.6	5.4
Women with Non-Missing Data	**N**	**6,986**	**7,364**	**9,805**	**25,128**	**42,297**
Less than 18 Years of Age	%	2.6	2.7	6.9	5.6	5.4
18 and 19 Years of Age	%	6.3	6.5	12.7	9.7	9.8
20 Through 34 Years of Age	%	81.9	81.7	72.9	75.1	75.8
35 Years and Older	%	9.2	9.1	7.6	9.5	9.0
Race and Ethnicity						
Missing Data	%	17.5	16.8	7.1	2.9	6.6
Women with Non-Missing Data	**N**	**6,938**	**7,313**	**9,645**	**24,804**	**41,762**
Hispanic	%	26.4	25.4	37.1	28.0	29.7
Non-Hispanic White	%	56.0	53.2	12.7	22.5	25.6
Non-Hispanic Black	%	12.2	16.1	45.0	44.8	39.8
Other Race/Multiple Races	%	5.4	5.4	5.1	4.7	4.9
Ethnicity (Among Hispanic Women)						
Missing Data	%	20.2	19.6	12.8	11.3	13.3
Not in Universe	%	58.1	59.3	52.6	61.5	59.0
Women with Non-Missing Data	**N**	**1,831**	**1,854**	**3,583**	**6,951**	**12,388**
Mexican, Mexican American, Chicana	%	53.1	52.6	36.3	55.8	49.7
Puerto Rican	%	12.3	12.5	29.9	3.3	12.4
Cuban	%	1.3	1.3	1.1	1.0	1.1
Other Hispanic, Latina, or Spanish Origin	%	30.4	30.7	31.8	38.8	35.6
Multiple Hispanic, Latina, or Spanish Origins	%	2.9	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake						
Missing Data	%	16.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**6,996**	**7,374**	**9,864**	**25,160**	**42,398**
Yes	%	0.9	1.2	1.8	1.5	1.5
Employment and School Status at Intake						
Missing Data	%	18.2	17.5	10.4	4.8	8.6
Women with Non-Missing Data	**N**	**6,876**	**7,248**	**9,301**	**24,313**	**40,862**
Employed, Not in School	%	36.9	36.6	30.8	35.3	34.5
In School, Not Employed	%	8.2	8.7	12.6	11.9	11.5
Employed and in School	%	5.7	5.7	5.5	5.4	5.5

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Neither Employed nor in School	%	49.2	48.9	51.0	47.4	48.5
Education Level at Intake						
Missing Data	%	19.9	19.2	16.5	8.6	12.5
Women with Non-Missing Data	**N**	**6,734**	**7,101**	**8,668**	**23,353**	**39,122**
Less than High School	%	15.0	15.4	27.8	29.1	26.4
High School Graduate or GED	%	57.5	57.5	58.3	57.9	57.9
Associate's Degree	%	8.4	8.2	5.2	4.6	5.4
Bachelor's Degree	%	14.8	14.5	4.5	3.7	5.8
Other College Degree	%	4.3	4.3	4.2	4.7	4.5
Relationship Status at Intake						
Missing Data	%	17.8	17.2	14.1	5.0	9.5
Women with Non-Missing Data	**N**	**6,910**	**7,277**	**8,916**	**24,262**	**40,455**
Married	%	43.7	42.1	20.4	20.8	24.5
Living with a Partner	%	33.6	33.2	34.8	31.1	32.3
In a Relationship but Not Living Together	%	13.6	14.7	25.9	29.7	26.1
Not in a Relationship Right Now	%	9.1	10.0	18.9	18.4	17.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (mother's age). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 419: PSYCHOSOCIAL, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Insured When Became Pregnant						
Missing Data	%	17.7	17.0	6.6	3.4	6.8
Women with Non-Missing Data	**N**	**6,916**	**7,291**	**9,696**	**24,677**	**41,664**
Yes	%	50.2	51.8	51.8	59.7	56.5
No	%	46.2	44.6	42.3	37.4	39.8
Unsure	%	3.6	3.5	5.9	2.8	3.7
Type of Insurance (Among Women Who Were Insured When They Became Pregnant)						
Missing Data	%	17.7	17.0	6.6	3.4	6.8
Not in Universe	%	41.0	40.0	45.0	38.9	40.5
Women with Non-Missing Data	**N**	**3,471**	**3,778**	**5,026**	**14,735**	**23,539**
Medicaid	%	59.5	61.1	72.6	79.9	75.3
Other	%	31.9	30.0	18.6	13.5	17.2
Both Medicaid and Other Health Insurance	%	8.6	8.9	8.8	6.6	7.4
Smokes Cigarettes at Intake						
Missing Data	%	24.4	23.9	24.3	8.4	15.1
Women with Non-Missing Data	**N**	**6,353**	**6,687**	**7,859**	**23,400**	**37,946**
Yes	%	10.6	10.7	10.1	13.2	12.1
Food Insecure at Intake						
Missing Data	%	21.1	20.4	19.2	10.1	14.3
Women with Non-Missing Data	**N**	**6,635**	**6,996**	**8,383**	**22,953**	**38,332**
Yes	%	17.9	19.1	24.4	19.2	20.3
WIC at Intake						
Missing Data	%	19.0	18.4	9.6	5.5	9.0
Women with Non-Missing Data	**N**	**6,808**	**7,165**	**9,387**	**24,145**	**40,697**
Yes	%	42.8	42.2	57.2	46.4	48.1

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Exhibiting Depressive Symptoms at Intake[1]						
Missing Data	%	24.1	23.5	23.9	11.6	16.8
Women with Non-Missing Data	**N**	**6,381**	**6,721**	**7,896**	**22,573**	**37,190**
Yes	%	23.8	24.7	34.0	26.0	27.5
Exhibiting Anxiety Symptoms at Intake[2]						
Missing Data	%	20.0	19.3	16.5	7.8	12.1
Women with Non-Missing Data	**N**	**6,724**	**7,090**	**8,664**	**23,549**	**39,303**
None	%	68.8	67.9	59.0	65.5	64.5
Mild	%	20.9	21.4	23.8	20.2	21.2
Moderate	%	6.6	6.8	10.3	8.5	8.6
Severe	%	2.8	3.0	5.3	5.1	4.8
Incomplete Score but Showing Symptoms of Anxiety	%	0.9	0.9	1.7	0.7	1.0
History of Intimate Partner Violence[3]						
Missing Data	%	18.2	17.5	14.0	6.4	10.4
Women with Non-Missing Data	**N**	**6,876**	**7,247**	**8,931**	**23,897**	**40,075**
Yes	%	20.4	20.7	17.4	19.8	19.4
Experiencing Intimate Partner Violence at Intake (Among Women with a Completed Score or Who Report Being in a Relationship)[4]						
Missing Data	%	19.0	18.3	16.3	7.7	11.8
Not in Universe	%	3.5	3.7	7.8	7.4	6.8
Women with Non-Missing Data	**N**	**6,515**	**6,849**	**7,881**	**21,691**	**36,421**
Yes	%	2.2	2.3	3.2	2.5	2.6
Experiencing Prenatal Care Access Barrier						
Missing Data	%	16.8	16.1	5.0	1.5	5.2
Women with Non-Missing Data	**N**	**6,996**	**7,374**	**9,864**	**25,160**	**42,398**
None Reported	%	73.5	72.3	61.3	66.5	66.3
Reported One Access Barrier	%	20.8	21.1	28.1	24.7	24.9
Reported Two or More Access Barriers	%	5.7	6.6	10.6	8.8	8.9
Types of Barriers Reported (Among Women Who Reported Any Barrier)[5]						
No Car	%	46.1	48.3	65.0	60.0	59.7
Public Transportation Challenges	%	11.1	12.1	13.0	14.1	13.5
Not Enough Money for a Ride	%	13.4	16.1	19.9	20.8	19.9
Work Hours Make It Difficult	%	25.3	24.6	17.1	15.4	17.2
Childcare Challenges	%	21.0	19.8	9.8	7.9	10.1
Partner Objections	%	0.7	0.6	0.7	0.7	0.7
Other	%	16.5	15.6	11.2	19.0	16.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. All scales are defined in Appendix E in Volume 1. A dash (-) indicates a censored cell due to small sample size (N<11).

A dash (-) indicates a censored cell due to small sample size (N<11).

[1] Measured by CES-D 10 scale.
[2] Measured by GAD-7 scale.
[3] Measured by STaT scale.
[4] Measured by WEB scale.
[5] Women could report multiple barriers.

TABLE 420: PREGNANCY HISTORY AND INTENTIONS, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Pregnancy						
Missing Data	%	0.0	0.0	2.2	0.5	0.8
Women with Non-Missing Data	**N**	**8,407**	**8,785**	**10,156**	**25,427**	**44,368**
Yes	%	73.7	73.8	68.8	72.8	72.1
Pregnancy History Among Women with a Prior Pregnancy						
Not in Universe (No Prior Pregnancy)	%	26.3	26.1	29.6	27.3	27.6
Prior Miscarriage (<20 weeks EGA)						
Missing Data	%	1.5	2.4	21.9	11.6	12.2
Women with Non-Missing Data	**N**	**6,075**	**6,276**	**5,032**	**15,615**	**26,923**
Yes	%	32.9	33.0	26.4	35.8	33.4
Prior Elective Termination						
Missing Data	%	1.5	2.3	21.8	11.8	12.3
Women with Non-Missing Data	**N**	**6,075**	**6,291**	**5,038**	**15,554**	**26,883**
Yes	%	15.1	16.5	20.1	19.6	19.0
Prior Still Birth (Fetal Death >= 20 Weeks EGA)						
Missing Data	%	12.3	13.9	31.3	23.3	23.3
Women with Non-Missing Data	**N**	**5,162**	**5,267**	**4,051**	**12,614**	**21,932**
Yes	%	0.8	0.9	2.3	4.2	3.1
Prior Preeclampsia						
Missing Data	%	31.5	32.3	41.0	43.1	40.5
Women with Non-Missing Data	**N**	**3,549**	**3,651**	**3,050**	**7,574**	**14,275**
Yes	%	6.2	6.5	11.7	17.9	13.7
Prior Gestational Diabetes						
Missing Data	%	32.4	33.3	42.7	45.4	42.4
Women with Non-Missing Data	**N**	**3,473**	**3,560**	**2,867**	**6,986**	**13,413**
Yes	%	4.1	4.1	6.1	11.0	8.1
Prior Cervical Incompetence						
Missing Data	%	34.0	34.9	43.8	47.4	44.1
Women with Non-Missing Data	**N**	**3,339**	**3,428**	**2,759**	**6,467**	**12,654**
Yes	%	-	0.4	2.4	3.8	2.6
Prior Placenta Abnormalities						
Missing Data	%	33.6	34.5	43.9	47.8	44.3
Women with Non-Missing Data	**N**	**3,372**	**3,457**	**2,748**	**6,371**	**12,576**
Yes	%	1.2	1.2	1.9	2.3	1.9
Prior Congenital Abnormalities of the Fetus						
Missing Data	%	33.2	34.2	43.9	47.5	44.0
Women with Non-Missing Data	**N**	**3,402**	**3,487**	**2,741**	**6,449**	**12,677**
Yes	%	2.1	2.1	2.0	3.5	2.8

Notes: All measures except for prior pregnancy are among women with a prior pregnancy. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who did not have a prior pregnancy. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 421: PRIOR BIRTH OUTCOMES, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Prior Birth (Among Women with a Prior Pregnancy)						
Missing Data	%	1.7	1.7	1.5	0.6	1.0
Not in Universe	%	26.3	26.2	32.4	27.5	28.4
Women with Non-Missing Data	**N**	**6,048**	**6,337**	**6,857**	**18,350**	**31,544**
Yes	%	88.5	88.3	78.6	86.9	85.4
Prior Birth Outcomes Among Women with a Prior Birth						
Inter-Pregnancy Interval with Current Pregnancy Since Last Birth						
Missing Data	%	24.0	23.5	18.9	15.2	17.7
Not in Universe	%	30.1	30.4	45.8	36.9	37.7
Women with Non-Missing Data	**N**	**3,855**	**4,052**	**3,664**	**12,235**	**19,951**
< 18 months	%	35.2	34.6	24.3	27.1	28.1
>= 18 months	%	64.8	65.4	75.7	72.9	71.9
Prior Preterm Birth (=>20 Weeks - < 37 Weeks)						
Missing Data	%	0.0	0.1	2.5	1.4	1.4
Not in Universe	%	36.3	36.3	47.8	37.5	39.7
Women with Non-Missing Data	**N**	**5,351**	**5,588**	**5,150**	**15,608**	**26,346**
Yes	%	13.2	13.2	21.3	23.9	21.1
Prior Low Birthweight Infant (< 2,500 Grams)						
Missing Data	%	0.2	1.3	20.8	13.1	12.6
Not in Universe	%	36.3	36.3	44.3	37.2	38.7
Women with Non-Missing Data	**N**	**5,340**	**5,487**	**3,626**	**12,699**	**21,812**
Yes	%	1.1	1.3	12.4	15.6	11.4

Notes: All measures except for prior birth are among women with a prior birth. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (inter-pregnancy interval). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 422: PRE-PREGNANCY MEDICAL CONDITIONS, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Pregnancy Intention						
Missing Data	%	19.1	18.6	14.5	6.6	10.8
Women with Non-Missing Data	**N**	**6,799**	**7,155**	**8,871**	**23,852**	**39,878**
Trying to Become Pregnant	%	39.3	38.4	28.2	27.1	29.4
Not Trying to Become Pregnant, Not Using Contraception	%	47.2	48.3	60.8	59.6	57.9
Not Trying to Become Pregnant, Sometimes Using Contraception	%	6.8	6.5	3.7	3.6	4.1
Not Trying to Become Pregnant, Using Contraception	%	6.8	6.8	7.4	9.6	8.6
Diabetes Pre-Pregnancy						
Missing Data	%	0.1	0.4	34.9	15.7	17.2
Women with Non-Missing Data	**N**	**8,399**	**8,750**	**6,757**	**21,525**	**37,032**
Yes	%	0.6	0.6	6.8	4.0	3.7
Hypertension Pre-Pregnancy						
Missing Data	%	0.1	0.4	22.4	13.7	13.1

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Women with Non-Missing Data	**N**	**8,400**	**8,752**	**8,059**	**22,046**	**38,857**
Yes	%	0.8	0.8	8.3	7.5	6.1
Mother's BMI at First Prenatal Visit						
Missing Data	%	3.5	3.6	32.1	18.1	18.5
Women with Non-Missing Data	**N**	**8,115**	**8,474**	**7,052**	**20,908**	**36,434**
Underweight (BMI < 18.5)	%	4.3	4.2	3.7	2.8	3.3
Normal Weight (=>18.5 BMI <25)	%	45.5	45.2	33.9	31.0	34.9
Overweight (=>25 BMI < 30)	%	25.6	25.6	27.3	25.8	26.0
Obese (=>30 BMI < 40)	%	20.6	20.8	27.6	29.9	27.3
Very Obese (BMI >= 40)	%	4.0	4.3	7.5	10.5	8.5

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; a response of don't know, unsure, not known, prefer not to answer; or an outlier value (BMI of mother at first prenatal visit). Not in universe includes women for whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 423: PREGNANCY CONDITIONS DEVELOPED DURING STRONG START, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Preeclampsia						
Missing Data	%	0.3	0.7	25.2	21.4	18.2
Women with Non-Missing Data	**N**	**8,382**	**8,722**	**7,767**	**20,070**	**36,559**
Yes	%	1.5	1.5	6.0	5.8	4.9
Pregnancy-Related Hypertension						
Missing Data	%	0.3	0.7	26.5	20.9	18.2
Women with Non-Missing Data	**N**	**8,382**	**8,722**	**7,631**	**20,216**	**36,569**
Yes	%	1.3	1.4	8.1	7.2	6.0
Gestational Diabetes						
Missing Data	%	0.3	0.7	24.9	21.1	17.9
Women with Non-Missing Data	**N**	**8,382**	**8,723**	**7,798**	**20,166**	**36,687**
Yes	%	2.9	2.8	6.0	7.9	6.3
Cervical Incompetence						
Missing Data	%	0.3	0.8	32.7	22.4	20.6
Women with Non-Missing Data	**N**	**8,381**	**8,719**	**6,984**	**19,813**	**35,516**
Yes	%	-	-	0.9	2.0	1.3
Placenta Previa						
Missing Data	%	0.3	0.8	26.2	22.2	18.9
Women with Non-Missing Data	**N**	**8,381**	**8,719**	**7,656**	**19,871**	**36,246**
Yes	%	0.2	0.3	0.9	1.6	1.1
Placental Abruption						
Missing Data	%	0.3	0.8	26.7	23.3	19.7
Women with Non-Missing Data	**N**	**8,382**	**8,720**	**7,610**	**19,584**	**35,914**
Yes	%	0.4	0.4	0.5	0.8	0.6
Congenital Abnormalities of the Fetus						
Missing Data	%	0.1	0.6	32.8	22.3	20.5
Women with Non-Missing Data	**N**	**8,399**	**8,737**	**6,974**	**19,854**	**35,565**

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Yes	%	1.2	1.2	1.5	2.1	1.8
UTI(s) During Last 6 months of Pregnancy						
Missing Data	%	0.3	0.8	28.0	23.1	19.9
Women with Non-Missing Data	**N**	**8,382**	**8,717**	**7,473**	**19,635**	**35,825**
Yes	%	5.1	5.2	11.8	17.3	13.2

Notes: This table is among all women with PLPE data, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 424: TREATMENTS DURING PREGNANCY, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Vaginal Progesterone						
Missing Data	%	5.7	6.6	40.0	40.1	33.5
Women with Non-Missing Data	**N**	**7,930**	**8,204**	**6,230**	**15,309**	**29,743**
Yes	%	0.2	0.2	0.6	1.1	0.8
17P (Progesterone Injections, Among Women with a Prior Preterm Birth)						
Missing Data	%	0.7	0.8	10.0	5.1	5.4
Not in Universe	%	91.5	91.5	83.7	84.8	85.8
Women with Non-Missing Data	**N**	**656**	**680**	**654**	**2,585**	**3,919**
Yes	%	2.0	2.6	10.9	19.2	15.0
Antenatal Steroids						
Missing Data	%	0.1	1.3	43.5	46.0	36.7
Women with Non-Missing Data	**N**	**8,400**	**8,673**	**5,862**	**13,786**	**28,321**
Yes	%	0.3	0.4	2.4	4.1	2.6
Tocolytics						
Missing Data	%	0.3	1.5	43.7	49.1	38.5
Women with Non-Missing Data	**N**	**8,381**	**8,654**	**5,848**	**13,013**	**27,515**
Yes	%	0.2	0.3	1.1	1.8	1.2

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 425: PRENATAL CARE, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Routine Prenatal Care Provider						
Missing Data	%	0.4	0.6	20.4	16.4	14.2
Women with Non-Missing Data	**N**	**8,371**	**8,730**	**8,264**	**21,355**	**38,349**
Obstetrician	%	4.9	4.7	29.5	64.5	43.3
Licensed Professional Midwife[167]	%	19.6	18.8	2.3	1.0	5.4
Nurse Practitioner	%	-	-	26.5	5.7	8.9

[167] A Licensed Professional Midwife, also known as a Certified Professional Midwife is only licensed to practice in 28 states.

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Certified Nurse Midwife/Certified Midwife	%	73.8	74.6	37.5	18.3	35.2
Family Medicine Physician	%	1.6	1.7	2.5	1.4	1.7
Other Provider	%	0.1	0.1	1.6	9.1	5.4
Routine Prenatal Care (Individual Visits)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**8,400**	**8,778**	**9,740**	**25,360**	**43,878**
Received Individual Visits	%	99.8	99.7	72.8	90.0	88.1
Average Number of Individual Prenatal Visits	Mean	9.3	9.3	5.3	8.8	8.3
Routine Prenatal Care (Group Visits)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Women with Non-Missing Data	**N**	**8,400**	**8,778**	**9,740**	**25,360**	**43,878**
Received Group Visits	%	1.6	1.6	79.5	2.3	19.3
Average Number of Group Prenatal Visits	Mean	7.0	7.0	5.7	4.8	5.7
Care Coordinator Encounters						
Missing Data	%	0.5	0.6	31.8	8.6	12.4
Women with Non-Missing Data	**N**	**8,367**	**8,732**	**7,081**	**23,342**	**39,155**
Received Care Coordinator Encounters	%	99.5	99.5	46.1	93.0	86.0
Average Number of Care Coordinator Encounters	Mean	3.1	3.2	2.3	4.6	4.0
Mental Health Encounters						
Missing Data	%	5.1	5.2	35.2	16.4	18.5
Women with Non-Missing Data	**N**	**7,983**	**8,331**	**6,731**	**21,354**	**36,416**
Received Mental Health Encounters	%	0.2	0.7	3.4	8.8	5.9
Average Number of Mental Health Encounters	Mean	N/A	1.9	1.7	2.4	2.3
Doula Encounters						
Missing Data	%	92.6	89.3	36.1	15.7	34.9
Women with Non-Missing Data	**N**	**618**	**939**	**6,635**	**21,542**	**29,116**
Received Doula Encounters	%	100.0	75.0	0.6	1.2	3.4
Average Number of Doula Encounters	Mean	N/A	2.2	1.0	2.7	2.4
Health Education						
Missing Data	%	100.0	98.0	38.9	33.9	47.7
Women with Non-Missing Data	**N**	**0**	**172**	**6,347**	**16,873**	**23,392**
Received Health Education, Not Centering	%	N/A	16.9	13.4	30.9	26.1
Average Number of Health Education Sessions	Mean	N/A	1.5	1.4	2.5	2.4
Home Visits						
Missing Data	%	63.3	62.9	42.9	27.8	38.2
Women with Non-Missing Data	**N**	**3,082**	**3,258**	**5,925**	**18,445**	**27,628**
Received Home Visits	%	58.7	55.6	2.5	7.7	12.3
Average Number of Home Visits	Mean	1.4	1.4	1.4	1.6	1.5
Self-Care, not Centering						
Missing Data	%	100.0	98.2	49.4	36.8	51.8
Women with Non-Missing Data	**N**	**-**	**157**	**5,257**	**16,146**	**21,560**
Received Self-Care, Not Centering	%	-	-	8.8	9.8	9.5
Average Number of Self-Care Sessions	Mean	-	-	1.2	3.9	3.5

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Nutrition Counseling						
Missing Data	%	5.1	7.2	38.7	30.7	27.9
Women with Non-Missing Data	**N**	**7,983**	**8,151**	**6,361**	**17,701**	**32,213**
Received Nutrition Counseling	%	-	0.3	28.6	32.7	23.7
Average Number of Nutrition Counseling Sessions	Mean	-	1.0	1.5	2.1	2.0
Substance Abuse Services						
Missing Data	%	5.1	7.2	37.3	31.6	28.1
Women with Non-Missing Data	**N**	**7,983**	**8,152**	**6,511**	**17,470**	**32,133**
Received Substance Abuse Services	%	-	-	2.6	3.2	2.3
Average Number of Substance Abuse Services	Mean	-	-	4.0	2.2	2.4
Referrals for High Risk Medical Services						
Missing Data	%	5.1	5.3	37.8	17.1	19.6
Women with Non-Missing Data	**N**	**7,983**	**8,322**	**6,457**	**21,163**	**35,942**
Received Referrals for High Risk Medical Services	%	-	0.3	24.5	25.8	19.7
Average Number of Referrals for High Risk Medical Services	Mean	-	1.8	1.7	1.6	1.6
Types of Referrals for High Risk Medical Services (Among Women with Services)						
Maternal Fetal Specialist	%	-	52.4	70.7	46.7	52.0
Pulmonologist	%	-	-	1.3	1.5	1.4
Endocrinologist	%	-	-	4.1	5.1	4.8
Cardiologist	%	-	-	6.4	6.9	6.8
Other	%	-	-	32.8	60.8	54.6

Notes: This table is among all women, but we note that 23 percent of women are reported to have left Strong Start prior to delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. All reported means are among women with a visit or encounter. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 426: DELIVERY INFORMATION, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Induction of Labor (Among Women Who Delivered, Excluding Planned C-sections)						
Missing Data	%	0.9	1.4	25.3	23.3	19.5
Not in Universe	%	28.0	27.5	21.6	26.2	25.4
Women with Non-Missing Data	**N**	**5,977**	**6,242**	**5,511**	**12,897**	**24,650**
Yes	%	20.7	20.5	37.4	35.5	32.1
Induction of Labor with Pitocin (Among Women Who Were Induced)						
Missing Data	%	0.1	0.3	7.8	2.9	3.5
Not in Universe	%	85.2	85.3	74.0	81.4	80.4
Women with Non-Missing Data	**N**	**1,237**	**1,263**	**1,894**	**4,031**	**7,188**
Yes	%	55.4	56.1	89.9	90.7	84.4
Place of Delivery (Among Women with a Delivery)						
Missing Data	%	4.6	4.6	11.5	7.3	7.7
Not in Universe	%	26.3	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**5,804**	**6,114**	**7,551**	**19,027**	**32,692**
Hospital	%	49.5	51.8	99.4	99.5	90.6
Birth center	%	45.5	43.4	-	0.1	8.2

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Home birth	%	4.5	4.3	-	0.2	0.9
Other	%	0.5	0.5	0.4	0.2	0.3
Delivery Method (Among Women with a Delivery)						
Missing Data	%	0.6	0.7	12.0	5.6	6.1
Not in Universe	%	26.3	25.8	15.8	18.2	19.2
Women with Non-Missing Data	**N**	**6,147**	**6,454**	**7,497**	**19,466**	**33,417**
Vaginal	%	87.6	87.1	70.1	69.5	73.1
C-Section	%	12.4	12.9	29.9	30.5	26.9
Delivery Method (Among Low Risk Women with a Delivery)[1]						
Missing Data	%	0.4	0.4	8.7	2.3	3.4
Not in Universe	%	74.2	74.1	61.4	73.0	70.5
Women with Non-Missing Data	**N**	**2,133**	**2,239**	**3,100**	**6,298**	**11,637**
Vaginal	%	83.8	83.3	72.9	74.7	75.9
C-Section	%	16.2	16.7	27.1	25.3	24.1
Scheduled C-Section (Among Women with a C-Section)						
Missing Data	%	4.5	4.7	12.5	6.3	7.4
Not in Universe	%	90.8	90.5	72.2	76.1	78.0
Women with Non-Missing Data	**N**	**394**	**429**	**1,586**	**4,495**	**6,510**
Yes	%	35.0	34.3	38.1	45.6	43.0
VBAC (Among Women with a Prior C-Section)						
Missing Data	%	0.1	0.1	6.2	0.7	1.9
Not in Universe	%	96.2	96.0	82.7	85.9	87.1
Women with Non-Missing Data	**N**	**315**	**343**	**1,160**	**3,426**	**4,929**
Yes	%	27.3	29.4	21.7	17.5	19.3

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or a response of don't know, unsure, not known, prefer not to answer. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).
[1] Low risk is defined as women with nulliparous, singleton, term births.

TABLE 427: BIRTH OUTCOMES, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Outcomes of Strong Start Pregnancy						
Missing Data	%	23.8	23.2	20.7	14.9	17.9
Women with Non-Missing Data	**N**	**6,407**	**6,745**	**8,227**	**21,734**	**36,706**
Live Birth	%	96.3	96.2	97.6	94.4	95.5
Stillbirth	%	0.3	0.3	0.9	0.8	0.7
Termination	%	0.2	0.3	0.2	0.6	0.5
Miscarriage	%	3.2	3.2	1.3	4.1	3.3
Estimated Gestational Age (EGA, Among Women with Live Births)						
Missing Data	%	0.6	0.7	15.4	5.8	7.0
Not in Universe	%	26.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**6,127**	**6,433**	**7,078**	**19,229**	**32,740**
Very Preterm (20 =< EGA < 34)	%	1.0	1.0	3.5	4.3	3.5
Preterm (34 =< EGA < 37)	%	3.4	3.5	8.4	8.6	7.6
Term (37 =< EGA < 42)	%	93.5	93.4	86.7	85.7	87.4
Post-Term (42+)	%	2.0	2.0	1.4	1.3	1.5

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Birth Weight (Among Women with Live Births)						
Missing Data	%	2.0	2.1	14.3	8.0	8.3
Not in Universe	%	26.5	26.1	16.4	18.9	19.8
Women with Non-Missing Data	**N**	**6,006**	**6,312**	**7,189**	**18,672**	**32,173**
Very Low Birthweight (< 1,500g)	%	0.5	0.5	1.3	1.8	1.5
Low Birthweight (=>1,500g < 2500g)	%	3.0	3.1	8.7	8.7	7.6
Normal Birthweight (=>2,500 < 4,000g)	%	85.4	85.5	84.9	83.4	84.2
Macrosomic Birthweight (=> 4,000g)	%	11.1	10.9	5.2	6.0	6.8

Notes: All measures are among women with a delivery. Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn; item nonresponse; or an outlier value (estimated gestational age and birth weight). Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 428: SATISFACTION, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Satisfaction with Prenatal Care						
Missing Data	%	47.4	46.4	64.9	48.7	52.0
Women with Non-Missing Data	**N**	**4,425**	**4,712**	**3,648**	**13,095**	**21,455**
Not at All Satisfied	%	-	-	1.0	0.6	0.6
Slightly Satisfied	%	0.4	0.4	1.0	1.3	1.0
Moderately Satisfied	%	3.3	3.3	4.4	7.8	6.2
Very Satisfied	%	24.7	25.6	35.6	46.1	39.8
Extremely Satisfied	%	71.6	70.6	58.1	44.2	52.3
Satisfaction with Delivery Experience						
Missing Data	%	47.5	46.5	65.2	48.7	52.1
Women with Non-Missing Data	**N**	**4,411**	**4,698**	**3,615**	**13,114**	**21,427**
Not at All Satisfied	%	1.9	2.0	3.1	2.3	2.4
Slightly Satisfied	%	2.9	3.0	4.0	2.9	3.1
Moderately Satisfied	%	10.3	10.4	11.6	12.8	12.1
Very Satisfied	%	28.2	29.1	42.6	46.6	42.1
Extremely Satisfied	%	56.6	55.7	38.7	35.4	40.4

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 429: BREASTFEEDING, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Breastfeeding Intention at Third Trimester						
Missing Data	%	39.6	38.8	48.4	41.1	42.4
Women with Non-Missing Data	**N**	**5,078**	**5,376**	**5,351**	**15,042**	**25,769**
Breastfeed Only	%	82.3	80.4	47.5	40.5	50.3
Formula Feed Only	%	3.7	4.0	10.1	15.3	11.9
Both Breast and Formula Feed	%	9.7	10.8	31.9	32.5	27.8

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
I Haven't Decided	%	4.4	4.8	10.5	11.8	10.1
Breastfeeding Initiation After Delivery						
Missing Data	%	47.5	46.6	57.4	46.1	48.8
Women with Non-Missing Data	**N**	**4,413**	**4,694**	**4,418**	**13,780**	**22,892**
Yes	%	91.8	91.5	76.6	72.6	77.3
No	%	7.4	7.6	14.9	23.8	18.8
Prefer Not to Answer	%	0.9	0.8	8.5	3.6	4.0

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. A dash (-) indicates a censored cell due to small sample size (N<11).

TABLE 430: FAMILY PLANNING, AABC

Data Elements	N or %	AABC (Birth Center)	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Received Family Planning Counseling After Delivery						
Missing Data	%	48.1	47.2	57.8	46.6	49.3
Women with Non-Missing Data	**N**	**4,361**	**4,642**	**4,384**	**13,636**	**22,662**
Yes	%	76.2	77.0	77.5	82.2	80.3
No	%	20.7	20.0	14.0	14.2	15.3
Unsure	%	3.1	3.0	8.4	3.6	4.4
Reported Doing Something to Keep from Getting Pregnant Postpartum						
Missing Data	%	48.1	47.1	58.0	46.4	49.2
Women with Non-Missing Data	**N**	**4,365**	**4,645**	**4,356**	**13,701**	**22,702**
Yes	%	83.7	84.2	70.8	74.0	75.5
No	%	13.6	13.2	17.7	21.5	19.1
Unsure	%	2.7	2.6	11.5	4.5	5.4
Reported Using Contraception Postpartum (Among All Women Who Report Doing Something to Keep from Getting Pregnant)						
Missing Data	%	42.3	41.5	43.1	38.8	40.3
Not in Universe	%	14.2	14.0	27.3	21.6	21.4
Women with Non-Missing Data	**N**	**3,655**	**3,912**	**3,088**	**10,139**	**17,139**
Female Sterilization	%	3.2	41.5	42.9	38.6	40.2
Male Sterilization	%	3.9	14.0	27.4	21.7	21.5
LARC - Implant	%	2.8	**3,912**	**3,086**	**10,138**	**17,136**
LARC - IUD	%	11.0	3.2	12.6	12.1	10.2
Pills	%	8.7	3.6	0.7	0.7	1.4
Injection	%	4.6	2.8	11.4	10.9	9.2
Condoms	%	27.2	10.8	11.9	12.3	11.9
Breastfeeding	%	12.5	8.6	11.9	13.0	11.8
Rhythm or Safe Period	%	2.7	5.9	16.2	20.2	16.2
Withdrawal or Pulling Out	%	2.7	26.6	19.8	13.9	17.9
Spermicide	%	-	12.8	2.9	3.1	5.3
Other Method	%	17.0	2.6	0.5	0.2	0.8
Method Not Indicated	%	3.7	2.6	1.2	1.7	1.8

Notes: Women with multiple gestations (N=607) have been excluded from these results. Rates of missing data and not in universe are reported based on the share of Strong Start participants with PLPE data. Data may be missing due to a missing form from which a measure is drawn or item nonresponse. Not in universe includes women who whom a measure does not apply, and is defined separately for each measure. A dash (-) indicates a censored cell due to small sample size (N<11).

TECHNICAL ASSISTANCE AND DATA ACQUISITION

Of the 20 states from which the Technical Assistance and Data Acquisition team sought data, AABC had sites in the following 10 states: Arizona, California, Florida, Illinois, Maryland, Missouri, Pennsylvania, South Carolina, Tennessee, and Texas. Ultimately, data was obtained from seven of these states: Arizona, Florida, Maryland, Missouri, Pennsylvania, South Carolina, and Tennessee. Please see the following awardee sections for more information on our efforts to obtain birth certificate and Medicaid data in these states: Maricopa Special Health Care District (AZ); Los Angeles Department of Health Services (CA); Florida Association of Healthy Start Coalitions (FL); Access Community Health Network (IL); Johns Hopkins University (MD); Signature Medical Group (MO); Albert Einstein Healthcare Network (PA); Medical University of South Carolina (SC); University of Tennessee Health Sciences Center (TN); and Harris County Hospital District (TX). Enrollment in Birth Centers in other states was too low to make pursuing data in these states a reasonable option.

AWARDEE-LEVEL ESTIMATES OF THE IMPACT OF STRONG START ON BIRTH OUTCOMES, EXPENDITURES, AND UTILIZATION

The American Association of Birth Centers (AABC) awardee, which implemented the Birth Center model, delivered care at 20 sites (in seven states) included in the impacts analysis, as shown in Table 431. This section presents the evaluation's impacts results for the awardee as a whole. In addition, the AABC sites in Florida and Tennessee served large enough number of women enrolled in Strong Start that state-level estimates are also feasible. We also present site-level estimates for two AABC sites in Florida (Agape Midwifery Services and the Birth Place) and two in Tennessee (Lisa Ross and Infinity Birthing Wellness Center).

TABLE 431: STRONG START AWARDEE AND SITE-LEVEL ANALYSES FOR AABC

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out of County Comparison Group
American Association of Birth Centers			
Florida			
The Birth Place	Yes	Yes	No
Agape Midwifery Services	Yes	Yes	No
Childbirth Options Birth and Wellness Center	Yes	No	No
Birth & Beyond	Yes	No	Yes
Breath of Life Women's Health & Birth Center	Yes	No	No
Heart 2 Heart Birth Center	Yes	No	No
Rosemary Birthing Home	Yes	No	No
Tree of Life Birth and Gynecology Center	Yes	No	Yes
Birthways Family Birth Center	Yes	No	No
Tree of Life Orlando	Yes	No	No
Arizona			
El Rio Birth & Women's Health Center	Yes	No	No
Maryland			
Special Beginnings Birth and Women's Center	Yes	No	No
Missouri			
Birth and Wellness	Yes	No	No
New Birth Company	Yes	No	No

Data Elements	Included in Model Level Analysis	Site Specific Estimate	Out of County Comparison Group
Pennsylvania			
Reading Birth and Women's Center	Yes	No	No
Midwife Center for Birth & Women's Health	Yes	No	No
South Carolina			
Charleston Birth Place	Yes	No	No
Tennessee			
Women's Wellness & Maternity Center	Yes	No	No
Lisa Ross Birth and Women's Center	Yes	Yes	No
Infinity Birthing & Wellness Center	Yes	Yes	No

We present estimates of the impact of Strong Start on the following birth outcomes:

- Clinical estimate of gestational age (in weeks);
- Whether the infant is born preterm (<37 weeks) or very preterm (<34 weeks);
- Infant's weight at birth (in grams);
- Whether the infant is born at low birthweight (<2500 grams) or very low birthweight (<1500 grams); and
- Whether the infant's Apgar score is greater than or equal to 7 five minutes after birth.

We also present estimates of the impact of Strong Start on the following process outcomes:

- Whether the delivery is by Cesarean section;
- Whether the delivery is a vaginal birth after a Cesarean section (VBAC); and
- Whether the delivery occurred over the weekend. [168]

All birth outcome estimates for the main model include data on births in 2014, 2015, and 2016. We also present estimates on the impact of Strong Start on birth outcomes using alternative model specifications as described in the Limitations of the Design and Enhancements to the Approach section of the Impact Analysis chapter of Volume 1:

- In alternative specification #1, we used an out-of-county comparison group for sites where we determined this is necessary.
- In alternative specification #3, we added diagnoses reported in the claims data to better control for health status differences that were not available on the birth certificates. This alternative model specification was limited to the subset of cases where claims data are available (years 2014 and 2015).
- In alternative specification #2, we estimated our main model (with birth certificate controls only) limited to the subset of cases matched to claims data to provide a bridge between the main specification and alternative specification #3. This model allowed us to examine whether any differences in treatment effects between the main model and alternative specification #3 were attributed to the inclusion of additional control variables from the claims data or to differences in estimation samples.

[168] Weekend delivery is a proxy for the extent of elective deliveries. Higher rates of weekend delivery may be due to lower rates of planned inductions or scheduled C-sections.

We present estimates of the impact of Strong Start on the following cost and utilization outcomes:

- Prenatal care expenditures during the 8 months before the delivery period;
- Total expenditures for mother and infant during the delivery period;
- Total delivery and post-delivery expenditures, defined as the sum of expenditures during the delivery period, infant's total expenditures during the 11 months after the delivery period, and mother's total expenditures during the 11 months after the delivery period;
- Number of ED visits for the mother in the 8 months before the delivery month;
- Number of hospitalizations for the mother in the 8 months before the delivery month;
- Number of days the infant was in the NICU;
- Number of ED visits for the in the 11 months after the delivery month;
- Number of hospitalizations for the mother in the 11 months after the delivery month;
- Number of ED visits for the infant after delivery; and
- Number of hospitalizations for the infant after delivery.

For these cost and utilization models, we present estimates for the main claims model specification, which corresponds to alternative specification #3 in the birth outcomes tables.

For all estimates below, we highlight statistically significant differences between Strong Start women and women in the comparison groups at the p-value <0.01 and p-value <0.05 levels. We specifically note the p-value when findings are only marginally significant (p-value<.10). An overview of the data and methods can be found in the Impact Analysis chapter of Volume 1.

AWARDEE-LEVEL ESTIMATES

Table 432 reports the birth and process outcome findings for the AABC awardee as a whole.

Across most birth outcomes, women who enroll in Strong Start and receive care in birth centers have more positive outcomes than women in the comparison group.

- Infants born to women who enroll in Strong Start and receive care at a birth center have an average clinical estimate of gestation of 39.0 weeks, which is almost half a week (0.4 weeks) longer than that of infants born to women in the comparison group.
- Infants born to Strong Start enrolled women are also 2.1 percentage points less likely to be preterm than infants born to comparison group women (6.4 percent versus 8.5 percent). There are no significant differences between the two groups of infants in the rate of being born very preterm.
- Consistent with the lower rates of preterm births, infants born to women participating in Strong Start and receiving care in a birth center on average weigh 3348 grams, which is 76.0 grams more than infants born to women in the comparison group.
- Infants born to Strong Start women are also 1.3 percentage points less likely to be of low-birthweight compared to infants in the comparison group (5.9 percent versus 7.4 percent, respectively). However, this finding is only marginally significant (p-value<0.10).
- There are no significant differences between infants born to women who enroll in Strong Start and women in the comparison group in the rate of very low-birthweight and in the share of infants with an Apgar score of seven or above.

- Rates of cesarean section are 11.8 percentage points lower for women who enroll in Strong Start and receive care in a birth center (17.2 percent) than for women in the comparison group (29.0 percent).
- Similarly, rates of VBAC are 11.5 percentage points higher for women who enroll in Strong Start (23.3 percent) compared to women in the comparison group (11.8 percent).
- Consistent with lower rates of planned inductions, 23.5 percent of women who enroll in Strong Start have weekend deliveries compared to 19.3 percent of women in the comparison group, a significant difference of 4.2 percentage points.

TABLE 432: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABC

Outcomes	Main Model: 2014 - 2016, Strong Start (N=3175)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=314479)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Claims Sample, Birth Certificate Controls Only, Difference† (N=1704, N=108507)	Alternative Specification 2: Claims Sample, Claims Controls, Difference† (N=1704, N=108507)
Birth Outcomes					
Clinical gestational age (weeks)	39.0	38.6	**0.4****	**0.5****	**0.4****
Preterm birth rate	6.4%	8.5%	**-2.1****	**-2.8****	**-2.5****
Very preterm birth rate	1.8%	2.1%	-0.3	-0.5	-0.4
Birthweight (grams)	3,348.3	3,272.3	**76.0****	**75.4****	**66.3****
Low birthweight rate	5.9%	7.2%	**-1.3^**	**-1.4***	-1.0
Very low birthweight rate	1.0%	1.0%	0.0	-0.1	-0.1
Rate of Apgar score greater than or equal to 7	98.1%	98.2%	-0.1	-0.1	-0.2
Process Outcomes					
C-section rate	17.2%	29.0%	**-11.8****	**-12.0****	**-11.5****
VBAC rate[1]	23.3%	11.8%	**11.5****	**10.7****	**10.3****
Weekend delivery rate	23.5%	19.3%	**4.2****	**4.2****	**4.0****

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively. All standard errors in the model-level analysis are clustered at the county-level.

[1] Estimates are among women with a previous C-section. The sample sizes are 219 Strong Start women and 45777 comparison group women.

Table 432 also shows that these birth outcome results are consistent across the alternative specifications where we subset our analysis to observations that we have claims for in 2014 and 2015 (alternate specification #1) and then we employ controls for diagnoses captured on the claims (alternative specification #2). For all outcomes in these alternative specifications, the direction, magnitude, and significance level are nearly identical to those in the main model specification.

Table 433 reports expenditure and utilization findings for women who enroll in Strong Start and receive care in AABC birth centers for the 2014-2015 claims sample. To better understand what may be driving observed expenditure differences, we examine three potential cost drivers—emergency

room visits and hospital stays for mothers and infants, and NICU days. Birth centers in Maryland and Pennsylvania are excluded from this analysis because we were unable obtain Medicaid claims data in these states.

- Delivery expenditures for women who enroll in Strong Start and their infants are $6,336, on average, which is $1,936 less than expenditures for women in the comparison group and their infants.
- Total expenditures for the mother and infant from delivery until the infant's first birthday are $10,435 for women who enroll in Strong Start and their infants and $12,586 for women and infants in the comparison group, a difference of $2,150.
- Strong Start infants have 0.80 emergency room visits in the year after their birth compared to 0.93 visits for infants born to women in the comparison group.
- Strong Start infants have 0.07 hospitalizations in the year after their birth compared to 0.08 hospitalizations for infants born to women in the comparison group. However, the difference between these estimates is only marginally significant (p-value<0.10).

TABLE 433: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABC

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=1704)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=108507)	Main Model: 2014 - 2015 Difference
Expenditure Outcomes (Means)			
Prenatal care expenditures[1]	$2,274	$2,243	$31
Total expenditures during delivery period	$6,336	$8,272	**-$1,936****
Total delivery and postdelivery expenditures[2]	$10,435	$12,586	**-$2,150****
Utilization Outcomes (Means)			
Number of ED visits 8 months before delivery month	1.20	1.15	0.05
Number of hospitalizations 8 months before delivery month	0.03	0.03	0.0
Number of days in NICU	0.71	0.95	-0.24
Number of ED visits for mother 11 months after delivery month	0.61	0.64	-0.03
Number of hospitalizations for mother 11 months after delivery month	0.04	0.03	0.01
Number of ED visits for infant in the first year of life	0.80	0.93	**-0.13****
Number of hospitalizations for infant in the first year of life	0.07	0.08	**-0.01^**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. All standard errors in the model-level analysis are clustered at the county level.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Florida State-Level and Site-Specific Estimates

The AABC awardee in Florida delivered care at ten sites included in the impacts analysis: Birth & Beyond, The Birth Place, Rosemary Birthing Home, Breath of Life Women's Health & Birth Center, Heart 2 Heart Birth Center, Birthways Family Birth Center, Tree of Life Birth and Gynecology Center, Childbirth Options Birth and Wellness Center, Agape Midwifery Services, and Tree of Life Orlando. This section presents the evaluation's impacts results for the state as a whole and for two sites— Agape Midwifery Services and The Birth Place—that served a large enough number of women enrolled in Strong Start that a site level estimate was also feasible. Because the comparison group could be pulled from the same counties where Strong Start participants reside, we do not estimate models where we draw the comparison group outside the county (alternative specification #1) for these two sites.

Table 434 reports the birth outcome findings for these AABC sites in Florida:

- Women enrolled in AABC Strong Start sites in Florida have an average gestational age of 39.1 weeks which a half a week (0.5) longer than women in the propensity-score reweighted comparison group (38.7 weeks).
- 5.5 percent of women enrolled in Strong Start had a pre-term birth, which is 2.2 percentage points lower than the rate for women in the comparison group (7.7 percent).
- Infants born to women enrolled in Strong Start (3,368 grams, on average) are 83.6 grams heavier than those born to women in the comparison group (3,284 grams, on average).
- C-section rates for women enrolled in Strong Start are 12.3 percentage points lower and vaginal births after cesarean are 11.1 percentage points higher than those for women in the comparison group (19.1 percent vs. 31.4 percent and 19.8 percent vs. 8.7 percent among Strong Start women vs. the comparison group for C-sections and VBAC, respectively)
- Women enrolled in Strong Start (25.6 percent) are also 5.3 percentage points more likely to have a weekend delivery than women in the comparison group (20.3 percent).

Table 434 also shows how the main model estimates are robust to using a comparison group outside of the county where some of the FL AABC sites are located (alternative specification #1). For all outcomes in this alternative specification, the direction, magnitude, and significance level are nearly identical to those in the main model specification. This result is not surprising since we drew the comparison group from outside the county in only two of the ten FL AABC sites.

We also find that the main model estimates are robust to using the 2014-2015 claims sample (alternative specification #2) and to adding diagnosis controls to the claims sample (alternative specification #3). This suggests that the main model findings for the FL AABC sites are not primarily driven by differences in health status between Strong Start enrollees and women in the comparison group.

TABLE 434: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABC SITES IN FLORIDA

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1563)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=162334)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference† (N=1563, N=159539)	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=1028, N=80773)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=1028, N=80773)
Birth Outcomes						
Clinical gestational age (weeks)	39.1	38.7	**0.5****	**0.4****	**0.5****	**0.4****
Preterm birth rate	5.5%	7.7%	**-2.2****	**-2.1****	**-3.1****	**-2.7****
Very preterm birth rate	1.5%	1.9%	-0.4	-0.4	-0.3	-0.3
Birthweight (grams)	3,367.5	3,283.8	**83.6****	**72.1****	**83.8****	**75.1****
Low birthweight rate	6.0%	6.7%	-0.7	-0.4	**-1.3^**	-0.9
Very low birthweight rate	0.8%	0.9%	-0.1	0.0	-0.1	-0.1
Rate of Apgar score greater than or equal to 7	98.3%	98.1%	0.2	0.3	0.1	0.0
Process Outcomes						
C-section rate	19.1%	31.4%	**-12.3****	**-11.9****	**-12.9****	**-12.1****
VBAC rate[1]	19.8%	8.7%	**11.1****	**11.1****	**11.8***	**11.4***
Weekend delivery rate	25.6%	20.3%	**5.3****	**5.3****	**5.6****	**5.4****

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 101 Strong Start women and 22207 comparison group women.

Table 435 reports the expenditure and utilization outcome findings for the AABC awardee in Florida as a whole. Overall, we find:

- Strong Start, relative to the comparison group, is associated with $2,033 lower delivery period expenditures ($5,777 vs. $7,810) and $2,517 lower delivery and post-delivery expenditures ($9,055 vs. $11,572).
- Strong Start is associated with 0.13 more emergency department visits eight months prior to the delivery month (1.47 vs. 1.34 visits).
- Even though Strong Start is associated with lower delivery and post-delivery expenditures, we generally do not find an association between Strong Start and utilization. The one expectation is that Strong Start is associated with 0.10 fewer emergency department visits for the infant in the first year of life (0.67 vs. 0.77).

Similar results are found for the expenditure and utilization outcomes are found when the out-of-county comparison group is employed (alternative specification #1).

TABLE 435: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABIC SITES IN FLORIDA

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=1028)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=80773)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference (N=1028, N=82518)
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,529	$2,474	$54	$120
Total expenditures during delivery period	$5,777	$7,810	**-$2,033****	**-$1,729****
Total delivery and postdelivery expenditures[2]	$9,055	$11,572	**-$2,517****	**-$2,139****
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.47	1.34	**0.13***	**0.13***
Number of hospitalizations 8 months before delivery month	0.03	0.03	0.0	0.0
Number of days in NICU	0.77	0.97	-0.19	-0.14
Number of ED visits for mother 11 months after delivery month	0.54	0.53	0.01	-0.01
Number of hospitalizations for mother 11 months after delivery month	0.04	0.03	0.01	0.01
Number of ED visits for infant in the first year of life	0.67	0.77	**-0.10***	**-0.09***
Number of hospitalizations for infant in the first year of life	0.07	0.08	-0.01	-0.01

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Table 436 reports the birth and process outcome findings for the Agape Midwifery Services AABC site in Florida:

- Women enrolled in Strong Start at Agape have an average gestational age of 39.0 weeks which is close to a half a week (0.4) longer than women in the propensity-score reweighted comparison group (38.6 weeks).
- Infants born to women enrolled in Strong Start (3,326 grams, on average) are 80.5 grams heavier than those born to women in the comparison group.
- The C-section rate for women enrolled in Strong Start at Agape are 6.2 percentage points lower than the rate for women in the comparison group (26.8 percent versus 33.0 percent).
- Consistent with lower rates of planned inductions, women enrolled in Strong Start (25.5 percent) are also 5.1 percentage points more likely to have a weekend delivery than women in the comparison group.

TABLE 436: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AGAPE IN FLORIDA

Outcomes	Main Model: 2014 - 2016, Strong Start (N=302)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=63901)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=177, N=26786)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=177, N=26786)
Birth Outcomes						
Clinical gestational age (weeks)	39.0	38.6	**0.4****	N/A	**0.5****	**0.4****
Preterm birth rate	7.3%	8.4%	-1.1	N/A	**-4.5****	**-3.8***
Very preterm birth rate	1.7%	1.6%	0.0	N/A	-0.1	0.0
Birthweight (grams)	3,326.4	3,245.9	**80.5***	N/A	68.9	51.7
Low birthweight rate	6.6%	7.6%	-0.9	N/A	-0.9	-0.2
Very low birthweight rate	0.7%	0.8%	-0.2	N/A	-0.4	-0.2
Rate of Apgar score greater than or equal to 7	98.0%	97.2%	0.8	N/A	-0.5	-0.7
Process Outcomes						
C-section rate	26.8%	33.0%	**-6.2***	N/A	**-7.7***	**-7.6***
VBAC rate[2]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.5%	20.4%	**5.1***	N/A	**5.9^**	**6.5^**

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] Difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[2] Estimates are among women with a previous C-section. The sample sizes are 33 Strong Start women and 8733 comparison group women.

We also find that the main model estimates are consistent with findings from the 2014-2015 claims sample (alternative specification #2) and findings from the model that adds diagnosis controls to the claims sample (alternative specification #3). In both alternative specification models, we also find that infants of women enrolled in Strong Start at Agape have preterm birth rates that are around 4 percentage points lower than the rates for infants born to women in the comparison group. The robustness of the results in alternative specification #3 suggests that the main model findings for Agape are not primarily driven by differences in health status between Strong Start enrollees and women in the comparison group.

Table 437 reports the expenditure and utilization outcome findings for the Agape site. Overall, we find:

- Strong Start is associated with $330 lower prenatal expenditures, relative to the comparison group ($2,266 vs. $2,596).
- Women enrolled in Strong Start at Agape also average $6,879 in delivery period expenditures and $10,351 in delivery and post-delivery expenditures, which are $1,399 and $1,637 less than the averages for women in the comparison group, respectively. The total expenditure difference is marginally significant (p-value<0.10).
- Strong Start is associated with 0.30 more emergency departments visits eight months prior to the delivery month (1.97 versus 1.67 visits). This finding is marginally significant (p-value<0.10).
- Even though Strong Start is associated with lower delivery and post-delivery expenditures, we do not find any significant associations between Strong Start and the other utilization measures.

TABLE 437: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AGAPE IN FLORIDA

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=177)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=26786)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,266	$2,596	**-$330***	N/A
Total expenditures during delivery period	$6,879	$8,278	**-$1,399***	N/A
Total delivery and postdelivery expenditures[2]	$10,351	$11,988	**-$1,637^**	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.97	1.67	**0.30^**	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.03	-0.01	N/A
Number of days in NICU	1.08	0.79	0.29	N/A
Number of ED visits for mother 11 months after delivery month	0.71	0.65	0.07	N/A
Number of hospitalizations for mother 11 months after delivery month	0.05	0.03	0.02	N/A
Number of ED visits for infant in the first year of life	0.88	0.99	-0.11	N/A
Number of hospitalizations for infant in the first year of life	0.07	0.06	0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Table 438 reports the birth and process outcome findings for The Birth Place AABC site in Florida:

- Women enrolled in Strong Start at The Birth Place have an average gestational age of 39.0 weeks which is more than half a week (0.6) longer than women in the propensity-score reweighted comparison group.
- Among women enrolled in Strong Start at The Birth Place, 5.5 percent had a pre-term birth, which is 4.7 percentage points lower than the rate for women in the comparison group. They were also 1.4 percentage points less likely to have a very preterm birth, a difference that is marginally significant (p-value<0.10)
- Infants born to women enrolled in Strong Start (3,279 grams, on average) are 65.8 grams heavier than those born to women in the comparison group.
- The C-section rate for women enrolled in Strong Start is 9.4 percentage points lower than the rate for women in the comparison group (24.1 percent vs. 33.4 percent)

TABLE 438: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT THE BIRTH PLACE IN FLORIDA

Outcomes	Main Model: 2014 - 2016, Strong Start (N=291)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=117918)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=208, N=53578)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=208, N=53573)
Birth Outcomes						
Clinical gestational age (weeks)	39.0	38.4	**0.6****	N/A	**0.6****	**0.6****
Preterm birth rate	5.5%	10.2%	**-4.7****	N/A	**-4.4****	**-4.0***
Very preterm birth rate	1.7%	3.1%	**-1.4^**	N/A	**-2.1****	**-1.9****
Birthweight (grams)	3,278.8	3,213.0	**65.8***	N/A	**70.3***	**59.6^**
Low birthweight rate	7.2%	9.1%	-1.9	N/A	**-2.9^**	-2.6
Very low birthweight rate	1.0%	1.7%	-0.6	N/A	**-1.1***	**-1.0^**
Rate of Apgar score greater than or equal to 7	97.9%	98.1%	-0.2	N/A	**1.4****	**1.4****
Process Outcomes						
C-section rate	24.1%	33.4%	**-9.4****	N/A	**-9.2****	**-8.9****
VBAC rate[2]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.1%	22.6%	2.5	N/A	1.9	1.7

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.
Estimates are among women with a previous C-section. The sample sizes are 27 Strong Start women and 15437 comparison group women.

We also find that these main model estimates are robust to adding diagnosis controls to the claims sample (alternative specification #3). This suggests that the main model findings for The Birth Place site are not primarily driven by differences in health status between Strong Start enrollees and women in

the comparison group. In addition, we find that Strong Start is associated with lower rates of low birthweight and very low birthweight in both 2014-2015 claims sample alternative specification models.

Table 439 reports the expenditure and utilization outcome findings for The Birth Place site. Overall, we find:

- Women enrolled in Strong Start at The Birth Place average $6,974 in delivery period expenditures and $10,809 in delivery and post-delivery expenditures, which are $1,991 and $2,375 less than the averages for women in the comparison group, respectively.
- Strong Start women at The Birth Place average 0.02 hospitalizations in the eight months prior to the delivery month, which is 0.03 fewer hospitalizations than for women in the comparison group.
- Infants born to women who enroll in Strong Start at The Birth Place spend 0.33 days in the NICU, which is nearly one day less than infants in the comparison group.
- There are no other significant differences in expenditure and utilization outcomes between the two groups.

TABLE 439:EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT THE BIRTH PLACE IN FLORIDA

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=208)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=53573)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,826	$2,914	-$89	N/A
Total expenditures during delivery period	$6,974	$8,966	**-$1,991****	N/A
Total delivery and postdelivery expenditures[2]	$10,809	$13,185	**-$2,375***	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	1.90	1.66	0.25	N/A
Number of hospitalizations 8 months before delivery month	0.02	0.05	**-0.03***	N/A
Number of days in NICU	0.33	1.26	**-0.94****	N/A
Number of ED visits for mother 11 months after delivery month	0.67	0.53	0.14	N/A
Number of hospitalizations for mother 11 months after delivery month	0.06	0.04	0.02	N/A
Number of ED visits for infant in the first year of life	0.73	0.83	-0.10	N/A
Number of hospitalizations for infant in the first year of life	0.06	0.09	-0.02	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

TENNESSEE STATE-LEVEL AND SITE-SPECIFIC ESTIMATES

AABC delivered care at three sites in Tennessee that are included in the impacts analysis: Women's Wellness & Maternity Center, Lisa Ross Birth and Women's Center, and Infinity Birthing & Wellness Center. This section presents the evaluation's impact results for the state as a whole and for Lisa Ross and Infinity Birthing Wellness Center, which serve large enough numbers of women enrolled in Strong Start that site level estimates were feasible. Because the comparison group could be pulled from the same counties where Strong Start participants reside, we do not estimate models where we draw the comparison group outside the county (alternative specification #1) for these two sites.

Table 440 reports the birth outcome findings for these AABC sites in Tennessee:

- Women enrolled in AABC Strong Start sites in Tennessee have an average gestational age of 38.6 weeks which is 0.3 weeks longer than women in the propensity-score reweighted comparison group (38.3 weeks).
- Consistent with the longer gestational age, the average birthweight for infants born to women enrolled in Strong Start is 3,275 grams, which is 41.9 grams more than that of infants born to women in the comparison group.
- Infants born to women enrolled in Strong Start sites are 0.8 percentage point less likely to have an Apgar score greater than or equal to seven than infants born to women in the comparison group (97.4 vs. 98.3 percent). However, this finding is only marginally significant (p-value<0.10).
- The C-section rate for women enrolled in Strong Start is 10.2 percentage points lower than the rate for women in the comparison group (17.3 percent vs. 27.5 percent)
- Consistent with this finding, women enrolled in Strong Start (20.6 percent) are 4.1 percentage points more likely to have a weekend delivery than women in the comparison group (16.5 percent).

The main model estimates for gestational age and C-section rates are robust to using the 2014-2015 claims sample (alternative specification #2) and to adding diagnosis controls to the claims sample (alternative specification #3), whereas the birthweight, Agpar score, and weekend delivery rate findings are more sensitivity to the model specification. In general, however, these results suggest that the main model findings for the TN AABC sites are not primarily driven by differences in health status between Strong Start enrollees and women in the comparison group.

TABLE 440: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABC SITES IN TN

Outcomes	Main Model: 2014 - 2016, Strong Start (N=1060)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=49975)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=545, N=17748)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=545, N=17748)
Birth Outcomes						
Clinical gestational age (weeks)	38.6	38.3	**0.3****	N/A	**0.3****	**0.3****
Preterm birth rate	9.7%	10.6%	-0.9	N/A	-2.0	-1.8
Very preterm birth rate	3.1%	2.8%	0.3	N/A	-0.3	-0.1
Birthweight (grams)	3,274.9	3,233.0	**41.9***	N/A	**43.6^**	33.9
Low birthweight rate	7.5%	8.7%	-1.3	N/A	-1.0	-0.7
Very low birthweight rate	1.8%	1.3%	0.5	N/A	0.1	0.2
Rate of Apgar score greater than or equal to 7	97.4%	98.3%	**-0.8^**	N/A	-0.6	-0.7
Process Outcomes						
C-section rate	17.3%	27.5%	**-10.2****	N/A	**-10.3****	**-9.7****
VBAC rate[1]	23.9%	16.6%	7.3	N/A	6.7	5.7
Weekend delivery rate	20.6%	16.5%	**4.1****	N/A	1.9	1.8

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.
Estimates are among women with a previous C-section. The sample sizes are 71 Strong Start women and 7532 comparison group women.

Table 441 reports the expenditure and utilization outcome findings for the AABC awardee in Tennessee as a whole. Overall, we find:

- Women enrolled in AABC Strong Start sites in TN average $7,776 in delivery period expenditures, which is $1,611 less than the average for women in the comparison group. This different is only marginally significant (p-value<0.10)
- Strong Start at AABC sites in TN, relative to the comparison group, is associated with 0.13 fewer emergency department visits for the infant after delivery (1.14 vs. 1.28 visits). This difference is only marginally significant (p-value<0.10).

TABLE 441: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT AABC SITES IN TENNESSEE

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=545)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=17748)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,861	$1,843	$18	N/A
Total expenditures during delivery period	$7,776	$9,387	**-$1,611^**	N/A
Total delivery and postdelivery expenditures[2]	$13,649	$14,790	-$1,140	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.85	0.93	-0.08	N/A
Number of hospitalizations 8 months before delivery month	0.04	0.03	0.01	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.85	0.91	-0.06	N/A
Number of hospitalizations for mother 11 months after delivery month	0.05	0.04	0.01	N/A
Number of ED visits for infant in the first year of life	1.14	1.28	**-0.13^**	N/A
Number of hospitalizations for infant in the first year of life	0.08	0.08	-0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Table 442 reports the birth and process outcome findings for the Lisa Ross site in Tennessee:

- Infants of Strong Start women enrolled in the Lisa Ross site have an average gestational age of 38.8 weeks, which is 0.4 weeks longer than the average age for infants of women in the propensity-score reweighted comparison group.
- 6.5 percent of infants born to women enrolled in Strong Start had a pre-term birth, which is 3.3 percentage points lower than the rate for infants of women in the comparison group.
- The rate of very preterm birth among infants born to women enrolled in Strong Start (1.6 percent) is also 1.2 percentage points lower than the rate for those born to women in the comparison group. This finding is only marginally significant (p-value<0.1).
- Infants born to women enrolled in Strong Start at Lisa Ross (3,342 grams, on average) are 104.3 grams heavier than those born to women in the comparison group.
- Consistent with this finding, infants born to women enrolled in Strong Start at Lisa Ross (4.7 percent) are 3.5 percentage points less likely to have a low birthweight than infants in the comparison group.

- The C-section rate for women enrolled in Strong Start is 13.0 percentage points lower than the rate for women in the comparison group (13.0 percent vs. 26.0 percent)
- Consistent with lower rates of planned inductions, 25.8 percent of women who enroll in Strong Start have weekend deliveries compared to 18.6 percent of women in the comparison group.

TABLE 442:EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT LISA ROSS IN TN

Outcomes	Main Model: 2014 - 2016, Strong Start (N=507)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=18838)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=292, N=10196)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=292, N=10196)
Birth Outcomes						
Clinical gestational age (weeks)	38.8	38.4	**0.4****	N/A	**0.6****	**0.5****
Preterm birth rate	6.5%	9.8%	**-3.3****	N/A	**-4.5****	**-4.2****
Very preterm birth rate	1.6%	2.8%	**-1.2^**	N/A	**-1.6***	**-1.4^**
Birthweight (grams)	3,341.8	3,237.5	**104.3****	N/A	**113.6****	**98.5****
Low birthweight rate	4.7%	8.2%	**-3.5****	N/A	**-4.6****	**-4.1****
Very low birthweight rate	1.0%	1.5%	-0.5	N/A	-0.7	-0.5
Rate of Apgar score greater than or equal to 7	98.6%	98.3%	0.3	N/A	0.6	0.2
Process Outcomes						
C-section rate	13.0%	26.0%	**-13.0****	N/A	**-12.9****	**-11.6****
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	25.8%	18.6%	**7.3****	N/A	**5.7***	**5.5***

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 20 Strong Start women and 2601 comparison group women.

The main model estimates are robust to using the 2014-2015 claims sample (alternative specification #2) and to adding diagnosis controls to the claims sample (alternative specification #3). This suggests that the main model findings for the Lisa Ross site in TN are not primarily driven by differences in health status between Strong Start enrollees and women in the comparison group.

Table 443 reports the expenditure and utilization outcome findings for the Lisa Ross site. Overall, we find:

- Women enrolled in Strong Start at Lisa Ross average $5,770 in delivery period expenditures and $11,668 in delivery and post-delivery expenditures, which are $3,469 and $2,582 less than the averages for women in the comparison group, respectively.
- There are no other significant differences in expenditure and utilization outcomes between the two groups for this site-level analysis.

TABLE 443: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT LISA ROSS IN TENNESSEE

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=292)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=10196)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$1,536	$1,615	-$79	N/A
Total expenditures during delivery period	$5,770	$9,239	**-$3,469****	N/A
Total delivery and postdelivery expenditures[2]	$11,668	$14,250	**-$2,582^**	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.75	0.75	0.0	N/A
Number of hospitalizations 8 months before delivery month	0.03	0.03	0.0	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	0.68	0.70	-0.01	N/A
Number of hospitalizations for mother 11 months after delivery month	0.04	0.03	0.01	N/A
Number of ED visits for infant in the first year of life	1.23	1.28	-0.05	N/A
Number of hospitalizations for infant in the first year of life	0.10	0.09	0.01	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

Table 444 reports the birth and process outcome findings for the Infinity Birthing Wellness Center site in Tennessee. Overall, Strong Start enrollment at this site is associated with worse infant birth outcomes but lower C-section rates relative to the comparison group:

- Infants born to women enrolled in Strong Start at have an average gestational age of 38.2 weeks, which is 0.2 weeks shorter than for infants born to women in the propensity-score reweighted comparison group. This finding is only marginally significant (p-value<0.1).

- Consistent with this finding, infants born to women enrolled in Strong Start at Infinity are 4.6 and 3.0 percentage points more likely to have a preterm and very preterm birth, respectively, than infants born to women in the comparison group (13.6 percent versus 9.0 percent for preterm birth and 5.4 percent versus 2.4 percent for very preterm birth).
- Infants born to women enrolled in Strong Start at Infinity are 2.4 percentage points more likely to be of low birthweight (3.3 percent) than infants in the comparison group.
- Among infants born to women enrolled in Strong Start at Infinity, 95.6 percent have an Apgar score greater than or equal to seven, which is 2.9 percentage points lower than that of infants born to women in the propensity-score reweighted comparison group.
- The C-section rate for women enrolled in Strong Start is 8.2 percentage points lower than the rate for women in the comparison group (19.2 percent vs. 27.4 percent)

TABLE 444: EFFECT OF STRONG START ON MATERNAL AND INFANT BIRTH OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT INFINITY BIRTHING IN TN

Outcomes	Main Model: 2014 - 2016, Strong Start (N=391)	Main Model: 2014 - 2016, Comparison Group Reweighted (N=28740)	Main Model: 2014 - 2016, Difference†	Alternative Specification 1: Comparison Group Outside County, Difference†	Alternative Specification 2: Claims Sample, Birth Certificate Controls Only, Difference† (N=152, N=5702)	Alternative Specification 3: Claims Sample, Claims Controls, Difference† (N=152, N=5702)
Birth Outcomes						
Clinical gestational age (weeks)	38.2	38.4	**-0.2^**	N/A	-0.1	-0.1
Preterm birth rate	13.6%	9.0%	**4.6***	N/A	2.2	2.3
Very preterm birth rate	5.4%	2.4%	**3.0***	N/A	1.6	1.5
Birthweight (grams)	3,181.0	3,234.8	-53.8	N/A	**-87.4^**	-84.2
Low birthweight rate	10.2%	7.8%	2.4	N/A	3.4	3.2
Very low birthweight rate	3.3%	0.9%	**2.4****	N/A	1.9	1.8
Rate of Apgar score greater than or equal to 7	95.6%	98.5%	**-2.9****	N/A	**-4.2***	**-4.0***
Process Outcomes						
C-section rate	19.2%	27.4%	**-8.2****	N/A	**-7.1***	**-6.1^**
VBAC rate[1]	N/A	N/A	N/A	N/A	N/A	N/A
Weekend delivery rate	13.6%	13.7%	-0.1	N/A	-3.7	-3.7

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: VBAC = vaginal birth after C-section. Claims sample excludes 2016 births, multiples births, and births with missing delivery claims. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county. All columns marked with a dagger symbol (†) indicate that the difference is a percentage point change in the rate between Strong Start and comparison group women for all outcomes except for clinical gestational age and birthweight, for which the difference is measured in weeks or grams, respectively.

[1] Estimates are among women with a previous C-section. The sample sizes are 39 Strong Start women and 4561 comparison group women.

Many of the main model estimates (clinical gestational age, preterm birth, very preterm birth, and very low birthweight) are no longer statistically significant when we use the 2014-2015 claims sample (alternative specification #2). Adding diagnosis controls to the claims sample (alternative specification #3) does very little to alter the magnitude and precision of these estimates.

Table 445 reports the expenditure and utilization outcome findings for the Infinity Birthing site. Overall, we find that Strong Start enrollment at this site does not have a significant impact on expenditure and utilization outcomes. The one exception is that Strong Start women have 0.05 more hospitalizations 11 months after the delivery month (0.10 hospitalizations) than women in the comparison group. However, this finding is only marginally significant (p-value<0.1).

TABLE 445: EFFECT OF STRONG START ON MATERNAL AND INFANT EXPENDITURE AND UTILIZATON OUTCOMES, DIFFERENCES BETWEEN STRONG START AND COMPARISON GROUP, AT INFINITY BIRTHING IN TENNESSEE

Outcomes	Main Model: 2014 - 2015 Births, Strong Start (N=152)	Main Model: 2014 - 2015 Births, Comparison Group Reweighted (N=5702)	Main Model: 2014 - 2015 Difference	Alternative Specification, Comparison Group Outside County, Difference
Expenditure Outcomes (Means)				
Prenatal care expenditures[1]	$2,517	$2,355	$162	N/A
Total expenditures during delivery period	$10,550	$9,268	$1,283	N/A
Total delivery and postdelivery expenditures[2]	$17,311	$15,225	$2,086	N/A
Utilization Outcomes (Means)				
Number of ED visits 8 months before delivery month	0.99	1.02	-0.04	N/A
Number of hospitalizations 8 months before delivery month	0.07	0.05	0.02	N/A
Number of days in NICU	N/A	N/A	N/A	N/A
Number of ED visits for mother 11 months after delivery month	1.11	1.25	-0.15	N/A
Number of hospitalizations for mother 11 months after delivery month	0.10	0.05	**0.05^**	N/A
Number of ED visits for infant in the first year of life	1.16	1.25	-0.09	N/A
Number of hospitalizations for infant in the first year of life	0.05	0.05	0.0	N/A

Sources: Urban Institute analysis of merged birth certificate and Medicaid data.

Notes: ED = emergency department; NICU = neonatal intensive care unit. Reported sample sizes refer to the number of cases for which gestational age and birthweight are reported. Sample sizes for other outcomes may slightly vary due to differences in item non-response rates. Sample sizes listed for the alternative specification models are for Strong Start and comparison group women, respectively. For cells that contain asterisks or carets, the Strong Start estimate differs significantly from the comparison group using two-tailed tests. Cells that contain two asterisks (**) indicate significance at the 0.01 level; cells that contain one asterisk (*) indicate significance at the 0.05 level; and cells that contain a caret (^) indicate marginal significance at the 0.10 level. N/A indicates estimate was not calculated due to insufficient data or no determined need for a control group from outside the county.

[1] During the 8 months before birth.

[2] Includes expenditures during the delivery period; infant expenditures during the 11 months after the delivery month; and mother expenditures during the 11 months after the delivery month.

CROSS-CUTTING SUMMARY

AABC operated the largest number of Strong Start sites and all but one of the sites implemented the Birth Center model. The awardee's sites provided peer counseling services (involving care coordination, referrals, and psychosocial and health education support) during pregnancy and postpartum, which supplemented the birth center's midwifery model of care. Midwifery care delivered through the midwifery model was pre-existing at the sites and not funded through Strong Start, but the awardee considered it an essential component of the care provided to program participants. AABC participants comprised a lower-risk population than Strong Start enrollees overall. More than half of AABC participants were white and they were more likely to be married and to have a college education than

the average Strong Start participant. While AABC participants had higher than average rates of short inter-pregnancy interval, they had lower rates of prior preterm birth and very few had a prior low birth weight infant. AABC participants also had fewer pre-pregnancy medical risk factors such as diabetes, hypertension, and obesity as compared to Strong Start participants overall. These characteristics suggest that Birth Centers naturally attracted or screened for a healthier population than the other Strong Start interventions. Case studies confirmed that many birth centers referred higher-risk women elsewhere for their prenatal care. Birth Center midwives provided highly-individualized care and enhanced education, with prenatal visits that were generally at least twice the length of a typical OB/GYN prenatal visit (at least 30 minutes for the former, compared to 10 or 15 minutes for the latter). This additional time allowed midwives to build relationships with patients and spend more time identifying and addressing their medical, psychosocial, or and educational needs. Impact analysis found infants of women enrolled in Strong Start at AABC had higher average gestational ages and birth weights, lower rates of preterm birth, and marginally lower rates of giving birth to low birthweight infants (p-value<0.10) than women in the comparison group. Strong Start participants at AABC also had lower C-section rates, higher VBAC rates, and higher weekend delivery rates than women in the comparison group. Higher weekend delivery rates among Strong Start participants may be suggestive of a reduction in planned inductions or scheduled C-sections. When discussing outcomes as part of the case study interviews, program staff highlighted that the Birth Center and midwifery models of care minimized interventions and emphasized "the philosophy that women are considered healthy until proven otherwise." Finally, Strong Start participants and their infants at AABC had lower average expenditures during the delivery period and lower average delivery and post-delivery expenditures than women in the comparison group and their infants. Infants born to women enrolled at AABC sites also had fewer ED visits and marginally fewer hospitalizations (p-value<0.10) in the first year of life than infants born to women in the comparison group. Most birth centers did not enroll enough women to support a site-level analysis. Though only one birth center with a large enough population to analyze at the site level showed worse outcomes among its participants than among women in the comparison group, this case indicates that while birth center care overall appears to have a positive impact on outcomes, there is potentially substantial variation by birth center site.

AABC Site: Best Start Birth Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

San Diego, CA	• Certified Nurse Midwives
	• Licensed Midwives
		• Around 40 – 50% have Medicaid coverage
		• Diverse mix of educational, socioeconomic backgrounds (majority Caucasian, with significant African American and Hispanic populations)
			• 250 births annually
			• Delivery options include:
			  • Birth center (~ 85 % of births)
			  • Hospital (~ 15 % of births)
				• Referrals to community resources
				• Optional group prenatal care
				• Classes
				• Doula support

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A peer counselor met with Strong Start participants three to four times prenatally and twice postpartum. Most encounters were in person either before or after appointments with the midwife, though some encounters occurred over the phone, particularly postpartum. Topics covered during the encounters varied based on the needs of the patient and included both pregnancy-related health education and referrals to community resources such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and La Leche League.

> "[Strong Start is supposed] to support women in their pregnancy. [The peer counselor] is somewhere you can go if you needed help on anything."
>
> *- Strong Start participant*

> "It's been an awesome extra support. You wouldn't feel burdened if you were having an issue meeting your food needs. It's nice to know the peer counselor is there for anything. It's not just come in, come out. If you are having a situation with your finances, you know you're covered in different areas. We've met with [the peer counselor] three times."
>
> *- Strong Start participant*

The birth center employed one peer counselor. She was trained as a Medical Assistant and was previously working in the birth center in a more clinical role before transferring to the role of peer counselor. In addition to the in-person and phone encounters described above, the peer counselor was available via phone and email to all Strong Start enrollees in between visits.

According to the evaluation's participant level data, Best Start participants had 3.0 encounters with the peer counselor on average.[169]

In addition to Strong Start enhancements, birth center staff encouraged all patients to enroll in group prenatal care, which was similar to the *CenteringPregnancy* model, beginning at 16 weeks. Women were placed in groups according to their gestational age, and group sizes ranged from three to eight women. An estimated 75 percent of women participated in group prenatal care. Patients also had

[169] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

access to other enhanced care that existed prior to Strong Start, such as a variety of classes that were free of charge for Medicaid patients (newborn education, breastfeeding support, and postpartum support) and had access to doulas free of charge through a volunteer doula program.

OUTREACH AND ENROLLMENT

> "It's more informative I think with the Strong Start. I'm sure you can get the resources through the midwife, but [the peer counselor] can focus more on the resources. With the midwife, you're doing the physical check."
>
> *- Strong Start participant*

Best Start used an opt-in enrollment approach, meaning eligible women had to actively choose to participate in Strong Start by signing AABC's Strong Start consent form. The peer counselor met with each potential enrollee at the first prenatal appointment to describe the benefits of the program (the peer counselor said she would act as a "personal assistant" during pregnancy). Although the program was opt-in, it was described as the standard of care at the birth center and women were strongly encouraged to participate. Over the course of the project, a very small number of women declined to participate.

In terms of outreach, representatives from the birth center attended health fairs and placed flyers at the local health departments to promote the birth center. The peer counselor also worked with representatives from the Nurse Family Partnership home visiting program to create more referrals between the two programs. Additionally, the birth center's website linked to AABC's Strong Start website.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Overall, Best Start staff felt the additional support provided by the Strong Start peer counselor was helpful in meeting the psychosocial needs of the center's Medicaid population. Key informants reported that Best Start's rates on key outcomes were either similar to or better than outcomes for the overall AABC Strong Start population on every measure. Key informants reported that the relationships developed between the peer counselor and patients were a major strength of the birth center's Strong Start program. They asserted that while the midwives had always emphasized holistic care in their approach, having an additional person to support Medi-Cal (California's Medicaid program) patients specifically helped clinic staff "cover all the bases."

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees who participated in the evaluation's focus groups chose the birth center as their maternity care provider because they wanted a natural birth experience, the option of a water birth, to avoid unnecessary intervention, and because of the birth center's strong reputation. Focus group participants recalled learning about Strong Start and completing the Intake Form at different points during their pregnancy. Although they believed it was optional, they also thought that the peer counseling was part of the standard of care at the birth center.

It was a quick conversation. If you need help, email me. We have the Strong Start, do you want to enroll? We didn't discuss more.

Several of the participants received additional education (to supplement what they learned from their midwives), information, and referrals from the peer counselor. Most often the peer counselor met with women in person before or after their prenatal care appointments, but several women had also reached out to her via phone or email.

She has been really accessible for me. She is always right there, and wants to do her job. I just see her after my appointments.

Some women participated in the optional group prenatal care or the childbirth education classes offered by the center and spoke highly of both experiences.

We went to [childbirth education] classes. It was seven weeks long, one day a week for 2 ½ hours at night. We loved them. It was so nice being with other couples…It's an addition [to individual prenatal care appointments]. Each week is something different. We focused on vaccines, the stages of labor and pregnancy, gestational stuff that happens. It was everything you need to know about pregnancy and birth and postpartum.

Many women recommended the Strong Start program because it had helped them access resources they otherwise would not have known about, and deal with issues outside of their pregnancy that were causing them stress. Overall, women were very positive about their experiences with the birth center and said they would recommend it highly to family and friends.

PROGRAM STRENGTHS

Program staff asserted that the individualized care they offered women resulted in the positive maternal and infant outcomes, as well as reduced patient stress and improved team-based care. They were proud of robust enrollment and thought that presenting Strong Start as part of the standard of care at the birth center allowed them to reach more women. Key informants felt the honest and trusting relationship developed between patients and the peer counselor and midwives had the biggest impact on patient satisfaction and overall wellbeing. However, informants emphasized that the birth center had been offering Strong Start-like services for many years through its midwifery model of care and felt it would be difficult to distinguish between the benefits of the birth center model and those specifically added by Strong Start.

> "I always tell people this is the best place."
>
> *- Strong Start participant*

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Key informants generally agreed that the Strong Start program was successful at Best Start. However, several birth center staff commented that learning and meeting program reporting requirements were burdensome at times and took away from time staff could be spending with patients. However, informants also acknowledged that the Strong Start requirements were less burdensome than some other demonstrations and programs that the birth center had implemented in the past. Additionally,

when the birth center staff identified duplication between the CPSP (California's Comprehensive Perinatal Services Program) and Strong Start forms, they worked directly with the state to streamline some of the CPSP data collection processes.

SUSTAINABILITY

Birth center staff planned to sustain some elements of their Strong Start program. For example, the peer counselor remained in her role, although she took on some additional duties. Additionally, the birth center planned to sustain some of the optional classes and group prenatal care structures they had implemented as part of Strong Start.

AABC Site: Birth and Beyond

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Grandin, FL	• Certified Nurse Midwives
	• Certified Midwives
		• High rates of poverty and low education levels
		• 85% are covered by Medicaid
		• 90% are white
			• Delivery options include:
			  • Birth center (2 births/month)
			  • Planned hospital birth (5-10 births/month)
			• Many patients give birth at the Orange Park Medical Center, attended by the birth centers' nurse-midwives
				• Various free classes:
				  • Birthing
				  • Breastfeeding
				• Resources available through a learning library
				• Strong connections to community resources
				• Co-located methadone clinic

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A peer counselor met with Strong Start participants at least once per trimester and once postpartum via in-person encounters either before or after the patient's prenatal appointment. Topics covered during the encounters varied based on the needs of the patient, but discussions were often structured around the information obtained from the Strong Start evaluation forms (i.e., Intake Form and the third trimester and postpartum surveys).

For the first two years of Birth and Beyond's Strong Start program, the peer counselor role was filled by a Licensed Clinical Social Worker (LCSW), who was hired specifically for Strong Start. When the LCSW peer counselor went on maternity leave midway through the award period, the center hired a Licensed Midwife (LM), who was also a licensed nurse, to provide peer counseling services as well as clinical support. The peer counselor was on-site for a total of 20 hours per week.

> Here I get more time with the peer counselor. The prior doctor seemed more rushed because the waiting room was filled with women…Here I definitely have more room to call and ask a question; their having late hours is nice, to call and ask random questions, though I've been fortunate that I haven't needed to.
>
> *- Strong Start participant*

Encounters with the peer counselor typically lasted about 20 minutes. According to the evaluation's participant level data, Birth and Beyond participants had 2.4 encounters with the peer counselor on average.[170] Women met with the peer counselor at least once per trimester, though the counselor made an effort to hold a fourth visit during the third trimester, and once postpartum. During one-on-one encounters, which were typically in person at the center, the peer counselor performed an assessment of social risks and family issues that affect pregnancy, answered questions about care, provided

[170] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

connections to resources, and acted as a trusted source of support. Common referrals included food assistance, substance abuse resources,[171] domestic violence resources, and housing.

OUTREACH AND ENROLLMENT

Birth and Beyond used an opt-out enrollment approach, meaning all women were enrolled into Strong Start by default, unless they actively chose to opt out of the intervention. This was a change in the second year of the program, as the site started Strong Start using an opt-in approach whereby women were asked to choose between enrollment in Strong Start or the standard model of birth center care. However, since the center was already able to enroll most women into Strong Start, the change did not result in a substantial enrollment increase, but was instead a reflection of a different framing of Strong Start as part of the model of care. Key informants reported that presenting Strong Start as the center's usual mode of care resulted in very few women declining participation. Birth and Beyond provided peer counselor services to its entire prenatal population, including the small number of patients not enrolled in Strong Start.

The center relied on word of mouth and its reputation in the community to draw in new patients. Key informants noted that no additional outreach was necessary to reach their full recruiting and enrollment capacity.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Birth and Beyond key informants reported that the birth center had always focused on bringing births to full term and reducing C-section rates, but they perceived that Strong Start helped to improve those and other outcomes by allowing staff to spend more time providing education and case management to participants. The high level of need among the center's very poor, rural patient population made Strong Start enhancements particularly important.

While it was difficult for key informants to distinguish Strong Start's impact on outcomes from that of the center's standard of care, they reported that Strong Start's focus on nutrition and education encouraged women to make healthier and more informed choices, which may have improved rates of preterm birth, low birthweight, breastfeeding, and vaginal births. In addition, the peer counselor's psychosocial support was believed to have helped participants reduce or cope with stress related to relationships, domestic violence, homelessness, food insecurity, substance abuse, past traumas, and other issues.

[171] Despite consistent reports of high need for substance use disorder (SUD) treatment among Strong Start participants throughout the evaluation, data from the Strong Start Participant-Level Process Evaluation shows that no women were referred or treated for SUD. This discrepancy is likely due to data quality and reporting issues.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees selected Birth and Beyond because it was convenient, it was their source of primary care, and/or it was recommended by family or friends. Women generally joined the program because they thought it would benefit their babies.

> *They told me that it was going to be something to help me be strong while I had my pregnancy, and they're going to walk me through my care, and tell me how my baby and stuff was going to go. It was fun.*

Participants' satisfaction with their prenatal care experience varied. Women reported very long wait times to see the peer counselor (up to 1 ½ hours), but acknowledged that this resulted in the counselor spending a long time with each patient. Two participants would have liked to get more information, both through one-on-one discussions and classes, as well as pamphlets or information sheets explaining what was discussed during the visit. However, women generally appreciated the amount of time the peer counselor spent with them and her personalized approach.

> *[The peer counselor] herself – she cares, I know she sees a lot of patients but she seems to remember the conversations we have, I appreciate the one-on-one – I'm not just a number, I'm a name.*

Women who had previous prenatal experiences in a typical obstetric setting felt that the birth center provided more access to the provider but that overall the care was "about the same."

PROGRAM STRENGTHS

Key informants were most proud of enhancing education and formalizing the teaching process, and increasing participants' inquisitiveness and involvement in the birth process and their bodies. They highlighted the peer counselor's knowledge, enthusiasm, and compassion as the biggest program strength. The site would have liked for the peer counselor (who was only part-time) to have even more dedicated time for participants given the high prevalence of psychosocial issues among their patient population.

> "I liked the care I received because it was very detailed and the staff always answered questions and would follow up with me if they didn't have the answer during my visit."
>
> *- Strong Start participant*

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The primary challenges faced by Birth and Beyond's Strong Start program were mostly related to their very high-need, high-risk patient population. Challenges included a high no-show rate, difficulty reaching women when they were not at the center, and insufficient peer counselor time to address patients' varied and complex psychosocial and economic needs. The center also struggled with "losing" about a third of their prenatal patients during the course of the pregnancy because of a relatively high transfer rate among high-risk patients (though some were co-managed with an obstetrician), families moving out of the area, and some patients just "disappearing" and thus lost to follow up. For the women

who did continue at the birth center, there was a need to consider and assist patients with tools for parenthood and life.

Other challenges involved the bureaucratic demands, including the required evaluation Intake Form that key informants felt was invasive and discouraged women from engaging (rather than encouraging the sharing of sensitive information). Paying for the elements of the program, which apparently involved costs beyond the Strong Start payments, was a challenge that was addressed by reducing the owner/Certified Nurse Midwife's salary, according to one key informant.

SUSTAINABILITY

Birth and Beyond planned to continue a certain level of enhanced prenatal care through the one-on-one meetings with the licensed midwife (former Strong Start peer counselor) and weekly classes (lactation, birth control, child care) led by her or others (lactation, birth control, child care). The site was considering ending birth center deliveries because they were not financially viable while continuing to provide prenatal care through the family practice.

AABC Site: Breath of Life Women's Health and Birth Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Largo, FL	• Certified Nurse Midwives	• A25 to 30 % have Medicaid coverage
		• Most are Caucasian with private insurance
			• ~ 20 births/month
			• Delivery options include:
			  • Birth center
			  • Home birth
			• Around 14% of births result in hospital transfers
				• Risk screening at intake
				• Substantial educational component to prenatal visits
				• Referrals to community-based resources
				• Child birth classes
				• Support groups
				• Prayer groups
				• Lactation support services

DESCRIPTION OF ENHANCED STRONG START SERVICES

> "All [the midwives] have a long list of resources, the maternity handbook online, which has pediatricians, chiropractors, and they can say who they recommend."
>
> *- Strong Start participant*

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A Strong Start peer counselor met with Strong Start participants at least once per trimester and once postpartum via in-person encounters before the patient's prenatal appointment. Topics covered during the encounters varied based on the needs of the patient.

Through Strong Start, Breath of Life's "peer counseling" sessions were provided by existing midwife assistants and a Registered Nurse (RN). In addition to the initial Strong Start assessment, the peer counselor met with each Strong Start participant at 28 weeks, 36 weeks, and 30 days postpartum. The peer counseling sessions immediately preceded prenatal appointments and provided an opportunity to identify issues that the peer counselor addressed directly or communicated to the midwives, who might have either expedited a referral/service or planned to address the issue during the next prenatal appointment. Peer counselor discussions centered on nutritional education; the types of classes participants were attending; and any related questions about breastfeeding, doulas, and the birth experience. The peer counselor and Strong Start participant also discussed what to expect during the next stage of pregnancy (or postpartum), and risk changes or indications for transfer to a different level of (medical) care, as might occur for conditions such as preeclampsia. The peer counselor was aware of services in the community that expanded the birth center's effectiveness.

Breath of Life is a Christian-based center and as such, Strong Start participants were counseled about natural family planning and offered barrier methods of contraception as the only acceptable

alternative. However, the center established a relationship with a local obstetrics/gynecology (OB/GYN) practice where women who wanted hormonal birth control or long-acting reversible contraception were referred.

According to the evaluation's participant level data, Breath of Life participants had 2.6 encounters with the peer counselor on average.[172]

OUTREACH AND ENROLLMENT

In the first year of the evaluation, Breath of Life used an opt-in approach, in which women were asked to choose between enrollment in Strong Start or participation in standard care. As part of the initial prenatal care visit, the nurse met with each Medicaid-eligible patient and performed an assessment to gather background information and identify any pregnancy-related risks. If the assessment showed the patient was eligible for Strong Start, she got a tour of the birth center and met a midwife. The nurse presented Strong Start to all Medicaid-eligible women as an additional set of resources for them – an "extra tool in your toolkit."

Breath of Life changed to an opt-out approach in the second program year, meaning all women were enrolled into Strong Start by default, unless they actively chose to opt out of the intervention. This resulted in few women declining to participate. Those who declined were deterred by the fact that Strong Start was a government-funded program and stated that they preferred to be "off the grid," according to a key informant. The opt-out approach reportedly helped ensure that women did not feel singled out as needing extra care. In contrast to some other AABC sites, Breath of Life's key informants reported that the additional data gathering required for the Strong Start evaluation appealed to some women who wanted to share information about themselves.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Staff felt that preterm birth, low birthweight, breastfeeding, and family planning rates were better for Breath of Life Strong Start participants than average rates for AABC birth centers participating in Strong Start, and that these positive outcomes could be tied to the midwifery model of care and additional support and education provided through the Strong Start peer counseling component. C-section rates were in line with other AABC Strong Start birth centers, though they were highly dependent on the destination hospital of clients that required transfers for delivery. Key informants reported that the below-average C-section rates in birth centers in general were a major driver of lower health care costs. Key informants also stated that the Strong Start services provided by the peer counselors increased the efficiency of the midwives in the center.

> "[The midwife said], 'Just so you know, we will talk about birth control, however we don't offer hormonal here. But we can counsel with you, or refer you to someone else.'"
>
> *- Strong Start participant*

[172] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

STRONG START PARTICIPANT PERSPECTIVES

Participants chose Breath of Life because they were seeking an alternative to hospital birth and liked the atmosphere at the center. Although the initial concept for the birth center was to receive referrals through an adjacent crisis pregnancy center, these referrals were minimal and most patients learned of the center through word of mouth, internet searches, and social media. Some participants also noted that they acted on the recommendations of family or friends. Participants were not immediately aware of what Strong Start was, and confused it with Healthy Start (a state program that provides wrap-around services for mothers, babies and families). When Strong Start services were described, women agreed that these services were helpful and made a difference. When probed regarding their appointments with the peer counselors (RN or midwife assistants), women reported that they were provided with a lot of helpful resources, in terms of additional maternity care information and referrals to other providers.

> *The first appointment with the RN, she asks a bunch of questions, about nutrition, recording three days of meals… the prenatal vitamins I was using… It impacts your pregnancy a lot, especially at the beginning when it can make the biggest impact.*

Compared to prior pregnancies at Breath of Life, participants noted that involvement in Strong Start improved communication and provided greater access to resources or referrals.

> *It seems like maybe the nurses are a little more involved [compared to my previous pregnancy here], ask more questions from the get-go and pass that along to the midwife, which helps move the visit along a bit. They start the conversation, ask questions, and midwives already know where it's going to go, and can get it going.*

Participants reported that they were pleased with their birth center care and the positive feelings it gave them.

> *I feel proud to be pregnant when I come here. At the OB, I felt like something was wrong with me. It's beautiful, it's an extension of my life.*

PROGRAM STRENGTHS

Key informants were most proud of the healthy moms and healthy babies born at the center. During Strong Start, there was only one unexpected preterm birth, but even then, the outcome for the mother was very good. (It is important to note that, as is the case with most birth centers, only women with medically low-risk pregnancies are eligible for care at Breath of Life). The single factor that key informants thought had the biggest impact on how well Strong Start was implemented and operationalized at Breath of Life was the general willingness and enthusiasm with which staff and providers embraced the program and made it work. The approach of using an RN and midwife assistants

> "With my OB/GYN, there's more alarm and anxiety that made me on edge. Here I feel relaxed, comforted, more personal… Here, it's nice, they're on the same page. If you have questions, you don't have to be afraid to ask. They want to talk to you as a woman, in all aspects, rather than just wanting to micromanage your birth."
>
> *- Strong Start participant*

to fulfill the peer counselor role was a strength of the program, as it allowed women to discuss their questions with medically-trained staff with whom they developed rapport and a trusting relationship.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Administrative requirements of the program were the most challenging aspect of Strong Start implementation. Breath of Life appointed a staff member to oversee the administrative side of Strong Start, which helped the center manage the program with more ease.

SUSTAINABILITY

The peer counseling sessions have become well-integrated into the standard model of care at Breath of Life and continue to be offered by center RNs to all patients. Since Strong Start ended, Breath of Life opted to offer peer counseling to all patients, not just those with Medicaid coverage. Apart from that, no changes have been made to the peer counseling structure.

Key informants noted that the center has not been successful in raising additional funding to provide enhanced services such as support groups and additional classes, but the growth in the patient population has allowed them to hire additional RN staff and to continue providing peer counseling going forward.

AABC Site: Charleston Birth Place

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Charleston, SC	• Certified Nurse Midwives	• Charleston Birth Place stopped accepting Medicaid insurance on January 1, 2017, because of low reimbursement rates; prior to that ~30% of patients had Medicaid coverage
		• Diverse mix of educational, socioeconomic backgrounds
			• 300 births each year
			• Delivery options include:
			  • Birth center (~80% of births)
			  • Planned hospital birth (~20% of births)
				• Referrals to community-based resources
				• Gestational diabetes education program
				• Lending library
				• Lactation support services
				• Support groups
				• Water births

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A peer counselor met with Strong Start participants at least once per trimester via in-person encounters either before or after the patient's prenatal appointment and once postpartum by phone. Topics covered during the encounters varied based on the needs of the patient, but discussions were often structured around the information obtained from the Strong Start evaluation forms (i.e., the Intake Form and the third trimester and postpartum surveys).

The birth center hired its Strong Start peer counselor internally, assigning the role to a part-time Registered Nurse (RN) who had been assisting with deliveries and data collection for AABC's Perinatal Data Registry (a data collection system that existed prior to Strong Start, but that was adapted for Strong Start data needs). In year two of the evaluation, she became a full-time employee at the birth center, working as a staff RN and the Strong Start peer counselor. The peer counselor used phone, email, and texting to follow-up or check in with participants between in-person encounters. According to the evaluation's participant level data, Charleston participants had 3.8 encounters with the peer counselor on average.[173]

The peer counselor provided participants with referrals and information about community resources. Some of the most common included: information about Medicaid benefits such as transportation and chiropractic services; referrals for dental care, most often to a free clinic in the area;[174] and, insurance counseling. Strong Start participants also had access to free or discounted classes and services that were arranged by the peer

> "[The peer counselor] sat me down and said, 'Tell me about your life.' … Whenever I said, 'I don't have it because we can't afford it,' she turned around with list of numbers for food, dental care, a ride service, help if you need a cell phone."
>
> *- Strong Start participant*

[173] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.
[174] South Carolina Medicaid covers emergency dental care only.

counselor. These included classes on newborn care, infant massage, and childbirth education, as well as a sibling 'boot camp' and free or reduced-rate doula services. Some health education was standardized for all Strong Start participants. For example, all women received training on car seat installation. However, the peer counselor also developed educational materials geared toward a subset of participants, particularly chronically hypertensive patients. These materials included information on nutrition and exercise.

OUTREACH AND ENROLLMENT

> "I asked what it was about, she mentioned Medicaid, and I said that my husband and I were struggling financially. She's been one-on-one asking what's going on financially and throwing everything she can at me to help me out."
>
> *- Strong Start participant*

Charleston Birth Place used an opt-in enrollment approach, meaning women were asked to choose between enrollment in Strong Start or participation in the standard care model. Enrolling women in Strong Start became "easier" over time for the birth center, as the peer counselor refined the way she introduced the program. When introducing Strong Start to new patients, the peer counselor encouraged enrollment but also emphasized that patients could dis-enroll at any time. While few dropped out of the program, this change in emphasis reportedly made patients feel more comfortable enrolling and led to an increase in participation rates. In the third year of the evaluation, the peer counselor estimated that nine out of 10 women chose to enroll in the program.

In the first three years of the Strong Start evaluation, Charleston limited the number of Medicaid patients it accepted because of low Medicaid reimbursement. The birth center reported receiving about $800 for prenatal care and an additional $800 facility fee for birth services from the Medicaid managed care program, when the actual cost of care was approximately $3,000.Because of these financial considerations, Strong Start staff purposefully did not conduct any external outreach efforts and as of January 2017, the birth center stopped enrolling Medicaid patients entirely.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

> "I was homeless when I had my first appointment.... [The peer counselor] came in with this large packet with information about probably literally every organization in this area for housing or rental assistance."
>
> *- Strong Start participant*

Key informants observed that Charleston Birth Place already had low rates of both preterm and low birthweight births and high rates of breastfeeding and family planning counseling before Strong Start, and rates remained steady throughout the project. They felt that in general Charleston out-performed the AABC site average on key outcome measures including rates of preterm birth, low birthweight, and C-sections. Though they perceived the Strong Start peer counselor positively influenced outcomes, they largely attributed their success to the midwifery model of care and other factors that pre-dated Strong Start.

STRONG START PARTICIPANT PERSPECTIVES

Participants came to the birth center because they were interested in natural and/or water birth, or because they heard positive things about it through word of mouth. Focus group participants recalled learning about Strong Start during their first prenatal visit and reported that they had a choice about whether or not to enroll. Some were immediately receptive to the peer counselor and the concept of receiving additional services and resources, but others were unsure that they needed the extra support.

> *The things she was offering at first didn't benefit me in any way. Once she found out my personal needs, that's when she started going out of her way to help me specifically.*

Most participants felt that Strong Start was helping them maintain a healthier pregnancy. They emphasized its positive influence on their stress level and emotional wellbeing.

> *You can't ignore stress. My blood pressure was down 20 points today.... I felt so much better. That's a sign of the emotional support I'm getting and how it's affecting my physical health.*

Participants expressed high satisfaction with their care at Charleston Birth Place and did not offer any suggestions for improvement. They appreciated the midwives, who they felt "worked with them" rather than telling them what to do. They also liked the books and DVDs made available to patients. Focus group participants liked the peer counselor's personality and thought her support had made a difference in their pregnancy.

> *I think [the peer counselor] has made a huge difference in my life. I was at a point where I was just there in the office when I was pregnant with her, and I was just crying, and she looked at me and said, 'You can't keep on going like this.' There were so many things I couldn't say. It ended up being some bad stuff in my marriage, like domestic violence...I would've went on like I was if [the peer counselor] hadn't kept after me.*

PROGRAM STRENGTHS

Key informants were most proud of the community resources they identified and how successful they were in connecting patients with services they needed. Because of Strong Start, the peer counselor was able to form relationships with local agencies that could provide a variety of non-medical resources to birth center patients. Key informants also felt that Strong Start's key strength was in providing individualized care, and not treating a patient as a number or a "bunch of risk factors." Overall, key informants emphasized the midwifery model of care as the program's most influential aspect, though they also praised the addition of a peer counselor.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

A challenging component of Strong Start was determining how the program should be structured in the context of the birth center's diverse Medicaid population. One key informant emphasized that Strong Start participants had varying needs, with some having no obvious needs outside of medical prenatal

care. Over time, the peer counselor addressed this challenge by taking a more flexible approach to implementation and making herself available to patients at whatever level of interaction they felt was appropriate. The peer counselor believed that Strong Start should not present any additional burden for patients.

Key informants agreed that the paperwork required to participate in Strong Start and to receive reimbursement for Medicaid patients was burdensome and compromised time and energy they could otherwise spend with patients, although they acknowledged that both Medicaid and Strong Start paperwork processes were streamlined over time. With additional resources, key informants would have liked to hire more staff to help support the Strong Start program. Key informants also agreed that the Strong Start intervention was similar to what they were already providing under their existing midwifery model of care (though with a focus on Medicaid beneficiaries) and thought that Strong Start might have a more measurable impact in a typical prenatal care setting where the enhanced prenatal care services would represent a more significant change.

SUSTAINABILITY

The Charleston Birth Place was continuing to provide peer counseling as a standard component of its birth center model of care but stopped accepting Medicaid-enrolled individuals entirely on January 1, 2017, the same day they ended Strong Start enrollment. The birth center faced many challenges with Medicaid reimbursement (including slow processing and billing errors), which – paired with low reimbursement rates – created an untenable financial situation. Strong Start provided funding to help support the Medicaid population within the clinic until the start of 2017, but at the conclusion of the program funding, birth center staff had not identified a suitable funding stream. The individual who was serving as a peer counselor under Strong Start also shifted from a full-time to a part-time employee.

AABC Site: Dar a Luz Birth and Health Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Albuquerque, NM	• Certified Nurse Midwives	• Majority are Caucasian, with relatively high socio-economic status
		• Around 30 to 35% of have Medicaid coverage
			• 110-120 births annually
			• Delivery options:
			  • Birth center (~ 89 % of births)
			• Around 11% of patients are transferred to the hospital for delivery because of complications and are attended by physicians
				• Classes and support groups, including:
				  • Breastfeeding
				  • Car seat safety
				  • Transferring to the hospital during delivery
				  • Water births
				• Referrals to community-based resources

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A peer counselor met with Strong Start participants at least once per trimester and once postpartum via in-person encounters either before or after the patient's prenatal appointment. Topics covered during the encounters varied based on the needs of the patient, and discussions were often structured around the information obtained from the Strong Start evaluation forms.

One of the existing registered nurses (RN) at Dar a Luz, a former Medicaid beneficiary herself, served as the designated Strong Start peer counselor. Most sessions lasted ten to 20 minutes ("some moms are very talkative and others are not," said a key informant) and took place in the waiting area where generally there were no other people, allowing for a private conversation. According to the evaluation's participant level data, Dar a Luz participants had 2.9 encounters with the peer counselor on average.[175]

The peer counselor provided educational materials and resources and made referrals to classes provided by the birth center and outside community agencies. The counselor asked the participants how the pregnancy was going, whether they had any concerns, how things were with their other children and partner, and whether they needed assistance with food or

> "The birth class was good for my husband too so he can learn how to help. It's given him so many tools for what to do during labor."
>
> *- Strong Start participant*

[175] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

anything for the baby. She signed the women up for birth classes and discussed such topics as breastfeeding, issues that arose in prior sessions, past labor and birth experiences, nutrition and exercise. The Strong Start counselor often provided information about the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and helped women find the closest WIC office, and/or referred them to a food bank or food stamps.

The peer counselor documented all peer counseling sessions, including referrals made and resources provided, in the center's electronic health record (EHR) and followed up on referrals in subsequent peer counseling sessions.

OUTREACH AND ENROLLMENT

In Year 1 of the evaluation Dar a Luz used an opt-in enrollment approach, meaning women were asked to choose between enrollment in Strong Start or participation in standard care. Starting in Year 2, Dar a Luz switched to an opt-out enrollment approach where all women were enrolled into Strong Start by default, unless they actively chose to opt out of the intervention. After adopting the opt-out enrollment approach, key informants reported that enrollment increased by nearly 50 percent in the next year. The peer counselor also increased her availability to four days a week from two to three days as a result of the increased enrollment.

> "I was told that Strong Start is a group for Medicaid moms…we were more at risk because we're on Medicaid."
>
> *- Strong Start participant*

The center waited until women were enrolled in Medicaid before they enrolled them in Strong Start. Eligible patients were flagged in the birth center's EHR for the receptionist to provide them with Strong Start Intake and consent forms; the peer counselor then followed up with eligible patients to make sure they were enrolled in the program. In the infrequent cases where women declined to enroll in Strong Start, it was usually because they felt they did not need the extra support.

Patient learned about the birth center generally through word of mouth, and occasionally through the center's website, health fairs, or referrals from other service providers. The birth center also held events with other local businesses, for example, a "Big Latch On" to promote breastfeeding, and a ceremony for stillborn and infant loss that was open to the community.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Key informants felt relatively confident making general assessments of the impact of Strong Start across outcomes and perceived that the initiative was having positive effects on both the physical and psychosocial health of mothers and babies. They believed that Strong Start was likely contributing to positive outcomes by helping to decrease enrollees' stress and anxiety about their pregnancies and by providing referrals, including to childbirth and breastfeeding classes at the center, support groups, and outside resources such as WIC. The center had a very high rate of breastfeeding—about 94 percent per 2015 participant level data collected by the evaluation—which key informants believed was primarily because of non-Strong Start services, such as the meeting every client has with the staff lactation consultant, as well as optional breastfeeding classes at no cost to participants. Dar a Luz also had its

own milk bank of donated breastmilk. Key informants also reported that the peer counselor reduced providers' workloads by helping to answer patients' questions.

STRONG START PARTICIPANT PERSPECTIVES

Women reported choosing Dar a Luz birth center for maternity care because they had negative prior experiences with hospital births, wanted to avoid unnecessary interventions, and/or wanted to know the person delivering their baby. All the women recalled that the nurse who was the Strong Start counselor told them about the program and they took a survey about their pregnancy. They were told that Strong Start provided extra support to women on Medicaid, and it was part of a study to help patients at the center avoid preterm labor as well as to determine the impact of birth center care on preterm labor as compared to other sites. They chose to participate because they thought the extra support could be helpful and wanted to help the birth center prove it was a good, safe option.

> *I chose to join because I wanted to help gather information, and that little extra support is not a bad thing! [The Strong Start counselor] is trying to assess what type of services we might need, and if something comes up she'll help us.*

The focus group participants said they met with the Strong Start counselor after "most" of their prenatal appointments or "if needed," and they talked for "as long as needed." They discussed the woman's concerns and possible solutions, and the counselor provided information, referrals, and emotional support.

> *Usually after my appointment, if [the Strong Start counselor] is around she'll just pop up a seat, and we'll kind of chat about whatever is going on, any concerns. For me, breastfeeding was a challenge in my first pregnancy, and [the Strong Start counselor] is also a lactation consultant…we start to talk about any concerns, start to look for solutions for those concerns and start to be proactive about it.*

PROGRAM STRENGTHS

Key informants believed that Strong Start helped address enrollees' stress and anxiety by connecting them to important resources such as WIC. Administratively, Strong Start appeared to run smoothly, and it was not difficult to fit peer counseling appointments into the flow of routine prenatal care visits. Furthermore, the counselor's ability to add encounter notes directly into a Strong Start section of the EHR promoted communication among staff about participants.

Strong Start allowed an existing member of the center's staff who previously only spent time with patients in a clinical capacity to take on a different (peer counselor) role and get to know participants, which was perceived as a benefit to both parties. This enhanced relationship improved the connection women felt with the birth center, especially when the peer counselor, an RN, was present for a Strong Start participant's delivery. Strong Start increased awareness among birth center staff regarding the importance of having patience and listening to their patients as well as being non-judgmental.

> "[The Strong Start counselor] is great, she really cares about what you have to say. When she asks how are you doing, she really wants to know…it's not just like a survey."
>
> *- Strong Start participant*

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

A persistent challenge was that some clients were not interested in Strong Start because they felt they did not need it. This was a very difficult attitude to change, though very few women ultimately "opted out" of participation.

SUSTAINABILITY

This site was not studied in the final round (Year 4) case studies when sustainability plans were discussed in most detail. In Year 3 of the evaluation, it was unclear whether Strong Start would be sustained; key informants had not participated in sustainability planning but were hopeful that elements of Strong Start would be incorporated into the existing model of care, which already emphasized education and support. They added that any opportunity to take time to listen to and address client concerns was beneficial to any type of care, including but not limited to prenatal care.

AABC Site: El Rio Birth and Women's Health Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Tucson, AZ	• Certified Nurse Midwives	• 20-25% are enrolled in Medicaid
		• Majority are white, highly-educated, and English-speaking.
			• 513-544 births annually
			• Delivery options include:
			  • Birth center (~50% of births)
			  • Planned hospital delivery at the Tucson Medical Center (~50% of births)
			  • Patients in need of additional intervention are transferred to Tucson Medical Center under care of birth center midwives
				• Childbirth Classes
				• Lactation consultant(s) on staff
				• Group Prenatal Care (Centering Pregnancy model)
				• Postpartum play group meetings
				• Referrals to community resources, such as the free car seat program, for families in need.

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the El Rio Birth and Women's Health Center (ERBWHC) added peer counselor services to its existing midwifery model of care. A peer counselor met in-person with Strong Start participants at least once per trimester and once postpartum either before or after the patient's prenatal appointment. Peer counselors based the discussions on information obtained from the evaluation forms such as issues at home, housing, food, education, and support during birth. Peer counselors also connected participants with resources in the community. Overall, the discussion topics covered during the visits varied based on the needs of the patient.

> "I received a lot of handouts about healthy eating and when I expressed to [peer counselor] that I wasn't eating well because I am not really into vegetables. But I like fruits a lot. She gave me some easy suggestions for incorporating vegetables that I had not really thought about that made me feel like I was doing better."
>
> *- Strong Start participant*

There were four core components to the peer counselor services: social support, health education, connection to community resources, and acting as a liaison between the patient and midwife. Specifically, the peer counselors:

- Provided emotional and social support to Strong Start participants to help them manage any stress or anxiety they were experiencing;
- Educated Strong Start participants about various health topics such as nutrition, exercise, and hydration;

- Connected Strong Start participants to community and social services such as the local Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); and,
- Shared patient information learned through the peer counseling visits with prenatal care providers via phone calls so that midwives could better tailor care.

During the first two years of the program (2013 – 2015), ERBWHC had three peer counselors; two of the three peer counselors were certified doulas. By Year 3 of the program, two of the original peer counselors left the role to pursue other opportunities and ERBWHC was able to only replace one peer counselor by the time of the site's final round of data collection. Of the remaining two peer counselors, one was a certified doula and the other was a former Strong Start patient.

During the first program year, peer counselors met patients at their preferred location (e.g., ERBWHC, in their homes, and/or at restaurants) and reported an average of four meetings per patient. By the second year, the average number of meetings had grown to nine per patient. Key informants reported that having a visible office space for peer counselors and having a peer counselor available every day of the week contributed to an increase in patient engagement in Year 2 and thus an overall increase in the number of peer counselor visits. During the final program year, both peer counselors worked part time and were only available to meet with Strong Start patients at ERBWHC two days a week, with an average of four meetings per patient. According to the evaluation's participant level data, ERBWHC participants had 3.3 encounters with the peer counselor on average.[176]

OUTREACH AND ENROLLMENT

Initially, ERBWHC reported being at capacity for patients and thus did not actively recruit new patients or Strong Start eligible patients. By the program's end, ERBWHC reported low overall enrollment and was recruiting new patients. During all three years, only patients seeking prenatal care at ERBWHC were asked to participate in the Strong Start program, and ERBWHC did not conduct any outreach outside of their birth center.

> "That's why I wanted to go to midwives. They believe in women…I wasn't very pleased with my whole experience with my first daughter. I realized all of it was just because I was doing what the doctor said and she wasn't listening to me. She wasn't listening to me. I was listening to her. I chose midwives because they listen to us, and they believe in us and I like that."
>
> *- Strong Start participant*

During Year 1, office staff flagged new Medicaid patients receiving obstetric care in the electronic medical record (EMR). This alerted the midwives to complete a Strong Start risk assessment with the patient and if patients agreed to participate (most did), the midwife obtained consent and collected patient contact information in a form for the peer counselors. During Years 2 and 3, peer counselors received a list of all patients scheduled for the day from front office staff, identified which women are on Medicaid or uninsured and not currently enrolled in Strong Start, and approached these women to introduce themselves and describe Strong Start. Additionally, to address low program enrollment in Year 3, ERBWHC added Strong Start to the list of teaching topics in the EMR system. This way midwives had an extra reminder to present the program to all eligible patients. Key informants reported that this solution was an

[176] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

effective way for midwives to target eligible patients that may have not been previously identified by peer counselors during Year 3.

ERBWHC used an opt-in enrollment approach, where staff asked eligible patients to choose between enrolling in Strong Start or receiving the birth center's standard care. The site considered an opt-out model for enrollment, but ultimately decided against it because its general care model emphasized choice.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Overall, ERBWHC staff felt Strong Start was a positive addition to the care provided at the birth center and that peer counseling provided a support system for first-time mothers or mothers seeking additional social support. Key informants generally felt that breastfeeding and family planning rates at ERBWHC were higher than AABC's overall Strong Start rates. Program staff also indicated that preterm birth and C-section rates at ERBWHC were lower than AABC's overall Strong Start rates. Midwives were supportive of the Strong Start program, stating that the peer counselor support added value to their prenatal care delivery. At the same time, they felt that the program did not influence the way ERBWHC delivered prenatal care.

STRONG START PARTICIPANT PERSPECTIVES

> "It was nice to have [the peer counselor] help me out a little bit and have that extra support."
>
> *- Strong Start participant*

Focus group participants expressed satisfaction with Strong Start services, especially the peer counselor support. They also felt that the care at ERBWHC was more compassionate than at other sites offering typical obstetrical care. In addition to the standard midwifery prenatal care, ERBWHC had been offering group prenatal care using the Centering Pregnancy model since 2003. All the midwives and two of the nurses served as facilitators for the Centering Pregnancy groups. There was one group for each due date month and the Center limited each group to nine women. Those who also participated in group prenatal care appreciated how other group members provided an added support during their pregnancy. Participants said the Strong Start program's education and social support had a positive effect on their ability to manage their pregnancy, labor, and delivery.

> *A lot of the things that [peer counselor] and I talked about, I pulled from during my labor. And a lot of the empowering things she had told me, those were able to come up and remind me, 'Oh yeah. I can do this.' It helped me physically and emotionally through the labor.*

Participants choose the birth center because they sought an alternative to traditional maternity care available in the area. Most participants mentioned seeking care at the birth center because they wanted births with minimal medical intervention. Participants appreciated the birth center environment and felt it was a calmer and more comfortable heath care setting, compared to a hospital. Some had already had children at the ERBWHC.

With my first pregnancy I didn't know anything, that I had options and choices. The person that delivered baby, I didn't know who it was. I wanted something more familiar, not being herded in and out. That's one of the reasons I came here. They want you to meet everybody before you give birth. I like that because when it comes to the birth I won't wonder 'who is this person.'

Participants gave a variety of reasons for why they decided to participate in the Strong Start program. Some saw it as an extension of the services offered by ERBWHC and were happy to take advantage of it. Others knew that it was a research study and wanted to participate to help ERBWHC reach its goals. A couple of participants were hesitant because they were not sure that they needed the help, but decided to participate anyway.

Established ERBWHC patients felt their prenatal care under Strong Start care was no different than the care they received during previous pregnancies at the center. The new ERBWHC patients did report that they felt the prenatal care at ERBWHC was better than the care they received during previous pregnancies at other prenatal care practices. They tended to speak very favorably of the peer counselors, both for the support they provided and their availability. Established patients said that while they felt the care ERBWHC currently provided continued to be as good as the care they received during their previous pregnancy, the peer counselors added more personal interaction and emotional support.

It makes you feel like someone does care about the emotional standpoint – it's not just about the baby, it's about the mom.

PROGRAM STRENGTHS

ERBWHC provided care that was tailored and personalized to the individual needs of Strong Start participants. Key informants attributed much of the program's success to the dedication of the peer counselors. The peer counselor support helped ERBWHC accomplish outreach, enrollment, and retention tasks for Strong Start. In addition, peer counselors worked persistently to connect Strong Start participants with community resources such as Milk and Honey, a local breastfeeding support group. In the focus groups, participants spoke highly of the support they received from peer counselors. Participants discussed how they appreciated the way peer counselors assisted them with a variety of issues, such as helping them access free car seats and providing them with additional breastfeeding resources.

> "I have met with [peer counselor] at least twice now and we have also had some communication over the phone because of questions that I have had about something I think might be a risk or general worries…It was very not rushed, lots of information. She would give me the resources, and in fact she mailed some to me."
>
> *- Strong Start participant*

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

During the program's final year, key informants reported that ERBWHC faced overall low program enrollment. Reflecting on three years of program experience, key informants said one of the main reasons for low enrollment was because the midwives' task list during a first prenatal visit was so extensive that it was common for them to forget to ask eligible patients if they would like to participate. To solve this problem, ERBWHC added Strong Start to the list of teaching topics in the EMR system in Year 3. According to key informants, this solution helped the midwives present the Strong Start program to all eligible participants.

SUSTAINABILITY

ERBWHC staff indicated that they did not explore options to sustain Strong Start. They noted that ERBWHC provided group prenatal care for Strong Start and non-Strong Start participants and is expected to continue at ERBWHC after the end of the Strong Start award. However, key informants indicated that after examining the current birth center funding, they were aware that they could not afford to keep the peer counselors on staff after the Strong Start award was over. Awardee key informants felt that the Strong Start program was not sustainable at their site, primarily because they believed the peer counselor salary did not reflect the extensive time and effort that peer counselors dedicated to each participant and ERBWHC did not have the funds to support that.

AABC Site: Mat-Su Midwifery and Family Health

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Wasilla, AK	• Certified Direct Entry Midwives
	• Certified Nurse Midwives
		• Diverse mix of educational, socioeconomic backgrounds
		• Around 35 to 40 % of patients have Medicaid
			• 120-150 births annually
			• Delivery options include:
			  • Birth center (~ 80 % of births)
			  • Home birth (~ 5 % of births)
			• Around 15 % of patients give birth at nearby Mat-Su Regional Hospital because they "risk out" of a birth center or home birth
				• Various free classes:
				  • Prenatal nutrition
				  • Childbirth preparation
				  • What to expect postpartum
				• Referrals to community-based resources

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. A peer counselor met with Strong Start participants at least once per trimester and once postpartum via in-person encounters either before or after the patient's prenatal appointment. Topics covered during the encounters varied based on the needs of the patient, but discussions were often structured around the information obtained from the Strong Start evaluation forms (i.e., an Intake Form and the third trimester and postpartum surveys).

> "The [Strong Start encounters] only last about 10-15 minutes. We talk about the security at home, basic questions that you would fill out for Medicaid or WIC [Special Supplemental Nutrition Program for Women, Infants, and Children]. They want to know how stable you feel with your income, how much food is in your fridge."
>
> *- Strong Start participant*

> "[The Strong Start peer counselor] gave me a flyer for a place…called Heart Reach. We were running low on diapers and didn't have the money at the time, so we went to Heart Reach Pregnancy Center and they gave us diapers and wipes."
>
> *- Strong Start participant*

Initially, the birth center hired a new staff member to serve as the peer counselor. The midwives identified her because she had received prenatal care and delivered her own children at the birth center and because she was a trained doula. However, the peer counselor was reportedly "not a good fit" and left the position early on. The site then expanded the responsibilities of the (existing) office manager to include peer counseling. Key informants felt she would be a good fit because she was pregnant with her first child at the time and receiving prenatal care at the birth center, so she would relate well to patients.

Encounters with the peer counselor typically lasted between 10 and 15 minutes, depending on the needs of the patient. According to the evaluation's participant level data, women had 2.6 encounters with the peer counselor on average.[177] At the first encounter, the peer counselor completed the Intake Form with the participant and took time to explain how different risk factors relate to maternal and fetal health, as well as the availability of resources that the patient might need. During the second trimester encounter, discussions focused on what was being learned in the mandatory childbirth education classes, and the peer counselor followed up on referrals provided during the first encounter. At the third encounter, participants completed the Third Trimester Survey (with the assistance of the peer counselor) and discussed birth and postpartum plans, including maternity leave and employment, childcare, and preparations for the baby. The postpartum encounter was focused on completing the Postpartum Survey (again, with the assistance of the counselor) and any issues identified from the survey responses. Throughout all four encounters, the peer counselor provided referrals to a variety of community services. The most common referral was to the Heart Reach Crisis Pregnancy Center.[178]

OUTREACH AND ENROLLMENT

> "[Compared to typical birth center care], I think Strong Start is more emotional support."
>
> *- Strong Start participant*

Mat-Su used an opt-in enrollment approach, meaning eligible women had to actively choose to participate in Strong Start by signing AABC's Strong Start consent form. Enrollment lagged behind original targets, but key informants agreed program staff had been successful in offering Strong Start to every woman who met the program's eligibility requirements since they brought on a full-time peer counselor in 2014. Program staff felt having a peer counselor on-site during all business hours, rather than part-time, was key to robust program enrollment. The full-time front desk staff often identified eligible patients and scheduled them to meet with the peer counselor, which was also helpful.

Mat-Su did not conduct outreach for Strong Start specifically. Key informants felt the initiative was "not well-funded enough" to cover the additional costs of outreach.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

> "They offer information about how breastfeeding is the best option."
>
> *- Strong Start participant*

Overall, Mat-Su staff felt Strong Start was a positive addition to the care provided at the birth center and peer counselor support was helpful to the Medicaid population. In general, breastfeeding and delivery outcomes were the two key measures staff felt Strong Start impacted the most. Program staff indicated that

[177] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.
[178] The Heart Reach Crisis Pregnancy Center is a "life-affirming Family Resource Center" that was established in 1985 to help women and their partners with unplanned pregnancies. The center offers a variety of free services to anyone in need. These include a mentoring program where clients meet with mentors once a week for up to an hour; pregnancy testing; prenatal care education; the Embracing Parenthood Program which incentivizes attendance at group classes and doctor's appointments with money that can be used at an on-site "market" of new and gently-used baby and children's supplies; a diaper bank; prenatal education through a DVD series; and referrals to social services. Heart Reach's mentoring and incentive program involve watching and discussing video segments from DVDs developed by religious and socially conservative organizations, including Focus on the Family and Heritage House. In addition, as a faith-based organization, Heart Reach does not make referrals for abortion services (an "abortion recovery group" is offered). The organization does make adoption service referrals for clients who are unsure about parenting.

breastfeeding rates at Mat-Su were higher than AABC's overall Strong Start rate. The one-on-one breastfeeding support offered by the peer counselor was deemed helpful, particularly for women who lack exposure to information on breastfeeding prior to pregnancy. In addition, according to key informants, the Strong Start Intake Form helped staff identify depression in their patients more consistently, and peer counselors at the site have helped address depression by identifying community resources for treatment.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees who participated in the evaluation's focus groups chose the birth center as their maternity care provider because they wanted a natural birth experience and a personal relationship with their provider. Focus group participants recalled learning about Strong Start from a midwife or a peer counselor during one of their first prenatal visits. Many were told their participation in Strong Start would benefit birth centers by showing the efficacy of care provided by midwives.

> *I was told by [a midwife]. She said it was to help make midwifery care more accepted in other states.*

Several participants also recalled being told about the peer counselor and extra additional services and resources they would receive. The women in the focus group were enthusiastic about participating.

> *I was excited, especially because I think there is a huge need for cultural awareness [about birth centers and the midwifery model].*

Focus group participants felt prepared for birth, though several were nervous. Two participants planned to have home births, but the majority planned to deliver at the birth center, and most had created a birth plan outlining their desires.

> *I feel nervous because it's my first, but at the same time I feel like I've done enough research that I'm confident in my choice coming here and will be comfortable here.*

Participants felt knowledgeable about breastfeeding and family planning.

> *They ask you what you want, and then they provide different pills, IUD, natural birth planning. They really cater to what you are comfortable with.*

All participants planned to breastfeed. In addition to their appointments with midwives, all patients at the birth center were also encouraged to attend free classes offered by the birth center.

While some participants were grateful for the extra support and referrals they had received through Strong Start, others who had come to the birth center for a previous non-Strong Start enrolled pregnancy did not notice a difference in care. Participants would overwhelmingly recommend the birth center to other pregnant women.

PROGRAM STRENGTHS

Key informants universally reported that having a peer counselor at the birth center enabled them to better identify and serve patients who needed additional support and assistance. All key informants attributed positive outcomes to the staff and patients' strong commitment to the birth center model and the enhanced patient engagement and education that is built into their standard of care.

> "They want to know if you intend to have a water birth, how many people you want present, how involved you want to be in your own delivery. They ask you if you want music or candles. They ask if you are a touchy-feely person, and religious desires. They talk to you about pain tolerance and options for pain management. It's pretty much everything."
>
> *- Strong Start participant*

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Key informants generally agreed that the Strong Start program was successful at Mat-Su. However, several key informants felt the data requirements necessary to secure Strong Start funds from AABC each billing cycle could be difficult to coordinate. Different individuals were responsible for program monitoring and evaluation data entry, both of which are required for payment. Staff noted challenges ensuring both data sets contain information for the exact same set of women.

SUSTAINABILITY

Key informants all agreed that the peer counselor was the most important component of their Strong Start program, and the site planned to continue the position at Mat-Su after the grant period ended. Key informants suggested that sustaining the role will not place burden on finances or staff workload; the peer counselor was a Mat-Su employee and could complete peer counselor duties in addition to her pre-Strong Start responsibilities as a medical receptionist.

AABC Site: New Birth Company

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Overland Park, KS	• Certified Nurse Midwives	• Around 15% of patients have Medicaid
		• On average, patients are white, college-educated, and of middle or high socioeconomic status
			• ~ 360 births annually
			• Delivery options include:
			  • Birth center
			  • Water birth
			• Less than 10% of patients receive transfers to local hospitals for complications prior to, or during, labor
				• Free classes:
				  • Childbirth education
				  • Breastfeeding
				  • Nutrition counseling
				• Support groups for breastfeeding and parenting

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, New Birth Company (NBC) added peer counseling services to its existing midwifery model of care. A peer counselor met with Strong Start participants at least once per trimester and once postpartum via in-person encounters either before or after patients' prenatal appointments. The peer counselor was available by phone for more help if needed. According to the evaluation's participant-level data, NBC participants had 3.0 encounters with the peer counselor on average.[179]

NBC chose an existing staff member to serve as the peer counselor. This staff member was a trained midwifery, nursing, and medical assistant with three years of experience working at NBC. According to key informants, this staff member was a natural fit for the role of peer counselor because she was good at building relationships with patients. Key informants also thought that Strong Start participants could relate to this staff person since she was a young, single mother. She ran the mother's support group and taught some of the classes offered at the center, so she had many opportunities for interaction with Strong Start participants. To prepare for her expanded role, the peer counselor completed AABC web-based trainings and took classes to become a breastfeeding educator and a child passenger safety technician.

Encounters with the peer counselor usually lasted between 5 and 20 minutes, depending on the needs of the patient. Typically, the peer counselor asked participants how they were feeling and inquired about the need for services or support. She directed them to resources such as: counseling services for postpartum depression; applications for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)program; and breastfeeding support. At postpartum visits, the peer counselor asked participants about family planning goals and reviewed family planning options.

[179] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

The peer counselor provided counseling services for the duration of the program. She left when the Strong Start award period concluded, because in addition to the end of program funding, the center lacked the financial resources to pay her salary as a medical assistant.

OUTREACH AND ENROLLMENT

NBC began enrollment with an opt-in approach, meaning NBC asked eligible women to choose between enrollment in Strong Start or participation in the standard care model (which is described in the first section above). During evaluation Year 2, the center changed to an opt-out approach, meaning NBC enrolled all eligible women into Strong Start by default unless they actively chose to opt out of the intervention. Key informants viewed the adjusted approach as a positive change that facilitated enrollment in Strong Start. NBC offered peer counseling to all clients, although only Medicaid-eligible patients opted to receive it.

NBC recruited for Strong Start within its existing patient population only. They did not conduct external outreach primarily because the birth center consistently operated at or near capacity and thus could not absorb additional patients.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Overall, NBC staff felt that one-on-one peer counseling services through the Strong Start program were a valuable addition to the birth center's existing services. They said the program enhanced the psychosocial aspects of care by providing patients with opportunities to have more relaxed conversations with the peer counselor than they had with their providers. Participants reportedly appreciated being able to have a consistent relationship with the sole peer counselor, in contrast to the NBC midwifery prenatal care model, which involved seeing different midwives during pregnancy so that patients would be familiar with whichever midwife was on call at the time of their birth. Key informants also noted that the peer counselor could spend additional time with participants, above and beyond the time they could spend with their midwife.

Key informants said peer counseling was helpful for connecting participants with resources like nutrition counseling and breastfeeding support, and at reinforcing messages from providers. NBC's breastfeeding classes, maternity classes, and mothers' group were popular among Strong Start participants. In addition, key informants noted that the Strong Start Intake Form helped staff better identify issues that Strong Start participants did not always raise with their providers, such as depression.

Key informants did not perceive any differences in birth outcomes before versus after the introduction of the peer counseling program.

STRONG START PARTICIPANT PERSPECTIVES

The Strong Start evaluation team did not conduct focus groups with Strong Start participants at NBC.

PROGRAM STRENGTHS

All key informants agreed that NBC had found a peer counselor who was a good fit for the Strong Start program. The sole peer counselor at the center, she built strong relationships with Strong Start participants through regular meetings and classes. Key informants attributed the peer counselor's success to her relatability to Strong Start participants and her health-related training and certifications. Her background as a nursing and medical assistant prepared her to answer participants' questions but also helped her recognize when to refer participants to a midwife at the center.

Key informants also identified the regular communication between the peer counselor and prenatal care providers as a strength. Providers alerted the peer counselor to issues that they thought participants would be more comfortable discussing with the peer counselor. In turn, the peer counselor updated providers about issues that participants had not mentioned during their prenatal care appointments.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Key informants generally agreed that the Strong Start program was successful at NBC. Despite the center's success with Strong Start implementation, all key informants expressed frustration with the program's paperwork requirements. They also noted that their enrollment numbers were small because the birth center's Medicaid patient volume was low. Medicaid beneficiaries (and clients with low income more generally) tended to be unfamiliar with NBC and the services it provides, and the center does not conduct outreach because it operates at or near capacity.

SUSTAINABILITY

NBC has not sustained the peer counseling component of Strong Start because they do not have financial resources to do so. NBC continues to offer breastfeeding and nutrition classes to clients with Medicaid at no cost. Prior to Strong Start, the center had offered these classes to all patients for a fee, but began offering the classes free of charge to clients with Medicaid.

AABC Site: North Houston Birth Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Houston, TX	• Certified Nurse Midwife	• Around 90% of patients have Medicaid/CHIP
		• Patients tend to be of a higher socioeconomic status, more educated and less food insecure than the average Medicaid population
			• Approximately 150 births annually
			• Delivery options include:
			  • Birth center (80% or more, 10-15 women per month)
			  • Hospital – planned or unexpected/emergency transfer (~20%)
				• Childbirth classes
				• Visits from WIC staff to discuss breastfeeding

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the birth center added peer counselor services to its existing midwifery model of care. The first "peer counseling" session was conducted by the midwife as part of the initial prenatal visit, and generally focused on smoking cessation, as well as completion of the risk assessment using the evaluation's Intake Form. Three additional face-to-face sessions were conducted by a peer counselor (i.e., at least once during each of the second and third trimesters and once postpartum) immediately following the patient's appointment with the midwife. In the encounters with the peer counselor, topics generally focused on any identified issues in the Strong Start Intake Form, as well as general education on a healthy lifestyle, including nutrition and exercise, comfort measures to prepare for labor, and breastfeeding, using both AABC materials and additional materials compiled by the peer counselor. At the postpartum visit, newborn care and colic were generally discussed.

> "[The peer counselor] says, 'let me talk to you a second.' A second turns into an hour."
>
> - *Strong Start participant*

Initially, peer counseling sessions (after the initial visit conducted by the midwife) were provided by a birth center doula/health educator. Strong Start participants' appointments were scheduled on a single day of the week, which enabled the peer counselor to work just one day of the week and "catch" the participant for an in-person session after her visit with the midwife. The peer counselor reported that she met with patients for anywhere from five to twenty minutes, while focus group participants mentioned that encounters with the peer counselor lasted up to an hour.

Midway through the grant, the site replaced the peer counselor in a reportedly seamless transition with a similarly-trained woman (i.e., doula and health educator) who had worked periodically at the

birth center over the course of several years. According to focus group participants, the new peer counselor met with them more formally (describing the prior peer counselor's sessions as "in the hallway") to delve deeper into issues covered by the midwife and reinforce general education for the stage of the pregnancy. Topics covered included hygiene, nutrition, stress, intercourse, sleep patterns, their life situations, concerns, pains, and laboring positions. Breastfeeding was discussed and strongly encouraged, while family planning conversations were brief and occurred only postpartum. Peer counseling sessions often "blended together" into small group sessions, with one family staying and continuing a discussion when a new family entered. According to the evaluation's participant level data, North Houston participants had 2.4 encounters with the peer counselor on average.[180]

OUTREACH AND ENROLLMENT

North Houston used an opt-in approach, wherein women were provided with information on Strong Start, given the option to enroll in the program or not, and encouraged to participate by front desk staff. For the few women who were initially hesitant to participate, the midwife further discussed Strong Start during the first prenatal appointment, describing it as part of the birth center's standard of care. The doula then conducted the intake. Through this approach, nearly every eligible woman agreed to participate.

> "The first [topic] was nutrition. We went over nutrition – make sure you're eating healthy. Second was right before I had [my baby], talking about being prepared for labor, relaxing and stuff like that. The last one was postpartum, and just chatting like friends asking what was going on.
>
> *- Strong Start participant*

The birth center did not conduct outreach specifically for the Strong Start program, but staff discussed the program with existing and new patients.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

> "[The peer counselor is] pretty strong on that, the breastfeeding."
>
> *- Strong Start participant*

North Houston staff generally perceived that women who consciously selected out-of-hospital births were highly motivated, had different expectations for their birth experience, and were "healthier, more engaged and more educated" than most other women with Medicaid coverage. They believed that it was these differences, rather than the impact of Strong Start, the drove better birth outcomes. However, they also suggested that the Strong Start counseling and nutrition education "opens the door" to understanding and making choices to improve their health, thereby contributing to better birth outcomes, including those related to preterm birth and low birthweight. The more dedicated time for breastfeeding education may have positively impacted breastfeeding rates, particularly among women who had not been successful in breastfeeding a previous child. Strong Start education may also have contributed to the center's already-low C-section rate, since the Strong Start peer counselor strengthened the center's relationship with the family, and a family that is educated on the birth and labor process has a "better sense of patience and letting things happen."

[180] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

STRONG START PARTICIPANT PERSPECTIVES

Many of the Strong Start enrollees who participated in the evaluation's focus groups chose the birth center as an alternative to typical maternity care after they or people they knew had a negative experience with hospital birth or the health care system in general. While most women recalled being asked to participate in Strong Start, few could clearly recall what they were told about the program, and some felt it was to gather data on the outcomes associated with the birth center's care.

> *They asked everyone to get some statistical data to help out.*

Participants offered mixed experiences in terms of how often they met with the peer counselor, and described stark differences between the first peer counselor whom they met "informally" and the second peer counselor, who conducted more structured sessions. When participants were able to meet with the counselor, they reported that it was helpful and informative.

> *[The peer counselor is] very well informed… She gives you the papers and websites, information about stuff you're not even thinking about… we're able to pick and choose.*

Focus group participants reported that a broad range of educational topics were covered, with a strong emphasis on breastfeeding. All participants were breastfeeding or were planning to. In contrast, participants agreed that discussions of family planning were brief and not very informative. These discussions typically occurred with the midwife at the postpartum visit, not with the peer counselor. Women had a range of responses to use of family planning: that they were using a contraceptive, "still deciding," or not intending to use any method.

> "If you have an appointment with [the midwife] on Wednesday, you can generally meet with [the peer counselor] right after your appointment since she is here all day. The peer counselor talks about similar things, but mentions a little more."
>
> *- Strong Start participant*

> *Honestly, I feel [the family planning discussion] was brief and not a lot of information, and I'm still not on any type of birth control. I wish there was more [information].*

Overall, participants reported positive experiences with the prenatal care they received, noting that it was personalized, natural and informative.

PROGRAM STRENGTHS

> "[On the purposes of Strong Start], it was to help babies and mothers with nutrition."
>
> *- Strong Start participant*

Key informants reported that Strong Start closely aligned with the care and education that was already provided to birth center clients, but additional communication with the peer counselor strengthened women's connection to the center, reinforced the messages delivered by the nurse midwife in the prenatal care appointments, and provided more in-depth education and greater opportunity for dialogue. Informants noted that women need to hear information multiple times to absorb and incorporate it into their lives, and Strong Start provided additional opportunity for this to happen.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Strong Start's administrative requirements at implementation posed the greatest challenges, particularly until the changes became routinized into workflow. AABC staff support was critical in overcoming implementation challenges.

Informants noted that providing peer counselor services on a single day of the week limited the amount of time that she could spend counseling each woman and created scheduling difficulties. It is not clear that all women in Strong Start actually received formal peer counseling services; some women reported very casual interactions, particularly with the first peer counselor. Many of these conversations were focused on comfort measures during labor rather than Strong Start outcomes. Family planning counseling did not appear to be robust nor did women have easy access to a full range of contraceptive care at the birth center (while the center began offering intrauterine devices (IUDs) toward the end of the Strong Start program, it did not provide Nexplanon implants or diaphragm fittings). Also, while women were highly satisfied with the prenatal care that they received, they expressed dissatisfaction with postpartum care.

SUSTAINABILITY

The birth center is sustaining the peer counseling services on the same basis as provided under Strong Start. The consistent availability of the peer counselor on the same day each week (despite limiting the time the peer counselor could spend with each participant) and the ability of the staff to work as a team, providing consistent education and reinforcing each other's messages, reportedly had the greatest impact on North Houston Birth Center's success and motivated the center to continue the program.

AABC Site: Rosemary Birthing Home

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Sarasota, FL	• Licensed Midwives (LM)/Certified Professional Midwives (CPMs)	• About two-thirds of clients have Medicaid coverage
		• Clients are mostly white, interested in holistic health, and relatively healthy because FL law prevents birth centers from caring for women with high-risk pregnancies
			• Five to 14 births per month
			• Delivery options include:
			  • Birth center (~50%)
			  • Home (~50%)
			• About 12-17% of clients are transferred to typical obstetrical (OB) care and hospital delivery because they become high risk
				• Long sessions with midwives to build relationships, educate and empower clients
				• Nine-week childbirth class
				• Lactation consulting
				• Assistance accessing food, housing, clothing, home visiting, smoking cessation, other services

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the Rosemary Birthing Home (Rosemary) added peer counseling services to its existing midwifery model of care. A peer counselor conducted up to four one-on-one sessions with Strong Start participants before or after prenatal visits, and two postpartum meetings (in person or by phone). These encounters focused on education, emotional support and providing connections to social supports and resources as needs were identified. For example, the peer counselor worked closely with the Florida Healthy Start program to connect women with home visiting nurses, the community food bank, and SNAP benefits. Education targeted health behaviors and conditions (such as obesity) that potentially lead to a high-risk pregnancy and thus transfer out of birth center care.

The peer counselor was a Licensed Practical Nurse (LPN), a certified lactation counselor and a certified childbirth educator who had filled multiple roles at the birth center since it opened in 2003. When the award started, she took on additional responsibilities for outreach, recruitment, and individualized support for Strong Start enrollees. Citing participants' lack of cooking skills and a dearth of affordable fresh food, the peer counselor also began a small cooking class for Strong Start participants, created menus, and provided referrals to food banks and community gardens. According to the evaluation's participant level data, Rosemary participants had 4.2 encounters with the peer counselor on average.[181]

> "When our youngest was a few days old, and I hadn't come for the five-day visit yet, [the peer counselor] came right there on the phone ready to help when I had trouble with breastfeeding."
>
> *- Strong Start participant*

[181] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

OUTREACH AND ENROLLMENT

> "Everyone wants to help out [the peer counselor]. It's nice to have research with…out-of-hospital care. Out-of-hospital care gets a bad rap sometimes…"
>
> *- Strong Start participant*

Rosemary used an opt-in approach, whereby the women were asked to voluntarily consent to participate in Strong Start. Medicaid enrollment was flagged in the chart at the initial visit and the midwife provided the Strong Start forms. The peer counselor then met with each Medicaid-enrolled woman to explain that Strong Start would gather data to support birth centers, review the forms, and ask for her consent to participate. Strong Start was described as part of the center's standard of care, and women never declined to participate. When some women expressed concerns about the additional time required, the peer counselor would accommodate these concerns by conducting phone sessions when needed.

Women came to Rosemary Birthing Home based on friend and family recommendations, social media marketing, and brochures distributed by the Department of Health and the Healthy Start program. In addition, the LPN conducted outreach to the local crisis pregnancy center.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

> "I have a few needs [the peer counselor] helped out with – she told me about food banks in town when my husband lost his job. She had it quicker than I could blink…."
>
> *- Strong Start participant*

Key informants noted that the services provided by Strong Start were already essentially provided as part of Rosemary's midwifery model of care that included education, support, and "empowerment" during 11 to 12 lengthy prenatal care visits with one of the birth center's three midwives (beginning with a two-hour initial visit). However, key informants believed that the peer counselor sessions encouraged more women to discuss personal situations and reveal areas where they needed additional support. They highlighted the prevalence of food insecurity and nutritional needs among Strong Start participants, noting that some women were "feeding their kids and not themselves," resulting in frequent nutrition-related referrals to Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), Supplemental Nutrition Assistance Program (SNAP), and food banks. Key informants believed that enhanced nutrition education and referrals contributed to low preterm birth and low birthweight rates at their birth center.

Strong Start also influenced the content of the center's childbirth classes by identifying unmet needs including nutrition, postpartum stress, and smoking cessation support for family members as well as clients. These topics were added to classes, and a volunteer mental health counselor began addressing postpartum stress and depression with a weekly postpartum support group.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees who participated in the evaluation's focus groups chose the birth center as their maternity care provider because of the quality of care, a perception that they would be more in control of their birthing experience, and aversion to typical OB and/or hospital care because of previous bad experiences. Most were willing to participate in Strong Start because they felt personally connected

with the peer counselor, and they wanted to contribute to research that would prove the value of birth center care.

> *I wanted to contribute to research and the statistics around home births, birthing centers. There's such little research in comparison to hospital births, and it was something I could easily do to contribute to that.*

> *My first reaction was "how long is this going to take?" But then I was happy to help. When you have more than one child, time is a commodity. She did the questionnaire over the phone, which helped out.*

Focus group participants agreed that breastfeeding was discussed regularly at the center, but they made their decision to breastfeed prior to coming to Rosemary. Participants reported that family planning and inter-pregnancy spacing were discussed at the last few visits, but were not "pushed." They would be referred elsewhere if they wanted prescription contraception because it is not within the CPMs' scope of practice to prescribe contraceptives.

> *There's never anything pushed on you – [which is] yet another thing different from OB/GYN [care]. This is much more based on the individual… it's much more relaxed.*

The participants agreed that compared to prior experiences, Strong Start connected them to more resources, and this was a positive change.

> *It's easier [getting connected to services], more available. Not that it wasn't available before, but it's easier with [the peer counselor] being part of the program. It's more of an upfront thing. Before you had to go through a process to ask, and a midwife would have to research it; now it's just a part of it.*

> *[The peer counselor] is approaching it from a more strength [based approach] …and more assured she can pull together the resources we need. She always cared about the moms, but now is more assertive about "let's dig in and get you what you need" and more proactive.*

Focus group participants universally reported high satisfaction with the prenatal care they received at Rosemary, noting that the care empowered them to make healthy choices and become informed consumers not only in their pregnancy, but also in other aspects of health care and their lives.

> *They set reasonable expectations for you to be successful. So, they're very much in tune to building the positive in you here.*

> *I didn't come in here this way, they made me this way… my initial experience opened my eyes not just in the birth world, but medically in general. She encouraged informed consent, do my own research, put me on a path to who I am today at 30. I look into things, don't just take someone's word for it. A huge part of who I am is being a Rosemary mom.*

PROGRAM STRENGTHS

Key informants felt that having one-on-one peer counseling sessions with participants was the greatest strength of the Strong Start program. These encounters addressed "you as a person, rather than you as a pregnant woman," and increased clients' comfort in reaching out for services that they needed. Key informants noted that the strong prenatal care from the midwives coupled with the extra peer counseling support led to transformations in clients, giving a woman the "best tools in the beginning for how she raises that child…It's all about the future. Lift up the mom, and this will lift up her kids, and they will lift up the community."

> "There is no negative impact of Strong Start, only positive. The more availability – networking, resources, the better we can be served, the healthier the child. Just children born in certain economic situations are more at risk for certain scenarios. I believe it takes a village, so why deny that resource."
>
> *- Strong Start participant*

Another strength of Rosemary's Strong Start program was increasing postpartum support for clients–from one to two postpartum sessions–after learning that this was a significant unmet need. Additionally, the peer counselor's nursing background and her passion for the Birth Center model of pregnancy care were considered major assets to the program.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

The most challenging aspect of Strong Start implementation was making sure food needs were met, given a lack of evening hours at food banks and reportedly inadequate public transportation. A key informant suggested that a food bank gathering at the birth center once a month could help alleviate this challenge.

Family planning was also a challenge for the center, as it is not within a CPM's scope to prescribe contraceptives (e.g., CPMs cannot prescribe hormonal methods or insert intrauterine devices (IUDs) or implants). Rosemary made referrals to other providers who could prescribe contraception, but lack of close connections with other providers, lack of patient follow-through on referrals, and apathy or religious objections toward family planning were common barriers. Most providers in the greater community showed little support for the midwifery model of care and birth centers, and the lack of relationships made transfers to other providers challenging.

SUSTAINABILITY

With the end of Strong Start funding and Medicaid reimbursement getting "worse and worse," (i.e., it is increasingly difficult for Rosemary to cover costs), Rosemary was no longer able to support separate one-on-one sessions with the peer counselor. The peer counselor offered evening childbirth education classes to all clients, covering much of the same information about nutrition, healthy lifestyles, breastfeeding, and other issues that she had provided in the individual sessions. In addition, based on a desire to explore group prenatal care, the center began using a "module" approach for an hour group session in which the peer counselor covered childbirth preparation topics, and then each woman would meet individually with the midwife for the prenatal exam and the peer counselor to cover other issues

as needed. While this approach still allowed for individual peer counseling, it was not to the extent the peer counselor was able to provide under Strong Start. The center was looking into getting additional funding to fully implement a formal Group Prenatal Care model (such as *CenteringPregnancy*), both because they believe in the model's benefits, and because they viewed it as a potential way to remain financially viable.

AABC Site: The Midwife Center for Birth and Women's Health

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Pittsburgh, PA	• Certified Nurse Midwives
	• Midwifery Fellows
		• Predominantly Caucasian, some African-Americans
		• Around 15 to 20 % have Medicaid coverage
			• ~ 450 births annually
			• Delivery options include:
			  • Birth center (50 - 70 % of births)
			  • Planned hospital delivery (30 – 50 % of births, usually because of health risks)
				• Classes:
				  • Childbirth
				  • Newborn care
				  • Breastfeeding
				  • Hypno-birthing (available to Medicaid enrollees through an outside grant)
				• Referrals to community resources
				• Social worker support

DESCRIPTION OF ENHANCED STRONG START SERVICES

Per AABC's standard Strong Start approach, the Midwife Center for Birth and Women's Health (The Midwife Center) added peer counselor services to its existing midwifery model of care. Initially, the peer counselor met with Strong Start participants for an hour-long intake session, followed by three small group sessions during the pregnancy, a home visit before delivery, and a postpartum group session. About seven months into the intervention, the home visits and group care sessions were discontinued because of scheduling challenges and because some women were not interested in home visits. After that programmatic change, the peer counselor met with participants three times during pregnancy –either before or after a prenatal appointment- and once postpartum. The peer counselor has a list of topics to cover in each trimester based on AABC materials, and also uses resources from the American Pregnancy Association. In the second year of Strong Start implementation, the peer counselor re-introduced optional group visits both for prenatal and postpartum groups of participants.

Initially, a Registered Nurse (RN) who was already on staff at the birth center served as the Strong Start program coordinator and peer counselor. When she was on maternity leave, another RN who was training to be a lactation consultant served as the peer counselor. A key informant described the transition as smooth, particularly because the peer counselor trained her substitute and because both were mothers of young children, which the informant considered important to effective peer counseling.

> "The [peer counselor] has an ability to relate to you on a personal level which is an experience that is very unique…feeling like you're important, like your needs really matter. The emotional component of it was a huge rock for me."
>
> *- Strong Start participant*

Typically, the first encounter with the peer counselor lasted one hour and subsequent encounters lasted between 20 and 40 minutes, depending on the needs of the patient. According to the evaluation's participant level data, Midwife Center for Birth and Women's Health participants had 2.3 encounters with the peer counselor on average.[182] In addition to the in-person encounters, the peer counselor operated a Facebook page for all Strong Start participants. She posted to the group at least three times a day, and many Strong Start participants participated regularly in discussions, casual information sharing, and to stay in touch with each other.

OUTREACH AND ENROLLMENT

> "I check it [the Facebook group] like every day. I get a notification on my phone and I'm like "Oh, it's [the peer counselor]!" So, I try and keep up with whatever she's posting, just to make sure that I'm in the loop because I haven't really been in the evening group meetings, but I do find that the extra support from her is really, really helpful.
>
> *- Strong Start participant*

The Midwife Center used an opt-out approach, meaning that eligible women would be enrolled by default if they did not decline the intervention. Initially, an intake coordinator introduced Strong Start at women's first visit to the birth center or in a follow-up call if she identified a potentially eligible individual whom she did not meet. The intake coordinator described the first Strong Start visit to women as an "early pregnancy visit" during which the peer counselor could also help with their Medicaid application, and said she would schedule the visit for them unless they declined to participate. The approach seemed to work well at first, but there were some delays when the peer counselor went on maternity leave, and the intake counselor seemed not to identify all potentially eligible women. In the second year of implementation, the intake counselor was replaced, and this person was not comfortable presenting Strong Start as opt-out, and instead presented it as opt-in (i.e., providing a choice between enrolling in Strong Start and receiving the birth center's standard care), which apparently slowed enrollment. Later that year, the birth center changed their enrollment strategy so that front desk staff identified potentially eligible women and then referred them to the peer counselor, who then took the steps to enroll them in the program. This change in strategy resulted in higher enrollment, which key informants attributed to the peer counselor's "enthusiastic" approach to recruitment. The birth center did not do any external outreach for the program.

SITE PERSPECTIVES ON PROGRAM OUTCOMES

Overall, birth center staff felt Strong Start had positive effects on both physical and psychosocial outcomes including improved breastfeeding rates, improved psychosocial health, reduced C-section rates, and maintaining low preterm birth and low birthweight rates. Additionally, key informants noted that Strong Start participants had a high prevalence of life stressors and past or current abuse, and that the peer counselor dedicated significant time and attention for counseling and referrals for participants with depression and other behavioral health needs. Birth center staff thought the peer counselor could have had a positive effect on health and psychosocial outcomes by helping to ensure that participants took advantage of the enhanced services offered by the local Medicaid managed care plan and by the

[182] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

birth center itself. The peer counselor also offered a sense of continuity since women saw a different one of the Birth Center's eight midwives at each visit. Finally, despite lack of data on costs, they believed that Strong Start had a positive return on investment.

STRONG START PARTICIPANT PERSPECTIVES

Strong Start enrollees who participated in the evaluation's focus groups chose the birth center as their maternity care provider for a variety of reasons including negative previous experiences with more typical prenatal care and hospital births, and because they wanted to avoid medically-intensive management of their pregnancy and birth. A small subset of women planned to give birth at a local hospital because of medical reasons but preferred the birth center for prenatal care because of the more personal approach and the time spent in appointments.

> *[When I was pregnant] I started at West Penn [hospital] and I felt that we were not on the same page in regards to what I wanted out of my birth plan, and they had made a couple mistakes in regards to my records and confusing them with other patients, and with lab results and things like that, and I felt they weren't able to provide the level of personal attention that I was hoping for. Because of that, and the fact that I don't like medication and I wanted a natural option, this was the obvious choice.*

Strong Start services, specifically the skills of the peer counselor, received universal praise. Participants appreciated the peer counselor's emotional and practical support. Participants appreciated the Strong Start Facebook group, checked it regularly and felt that the resources posted were valuable.

> *It's lonely, I find that, and a lot of my girlfriends don't have kids, so I don't know where to reach out, and [the peer counselor] she was that revolving door to come to and talk to. [The peer counselor] is my savior… Because I was in a predicament with my issues with the father, and she was open with her experience.*

Participants described a strong emphasis on breastfeeding both in Strong Start and by the midwives and other staff of the birth center, including follow-up calls from lactation consultants. Breastfeeding was encouraged, but participants noted that discussion was open-ended and they did not feel that breastfeeding was being "forced on" them.

> *I think [breastfeeding] was definitely encouraged, but nothing is forced on you, is the good thing about the midwife center. They give you all the options, they tell you all the pros and cons, you make the decision and then they help you from there, it's really what you would expect but I don't think everywhere is like that. It's what you would hope for, not what you would expect*

Overall, participants were pleased with the birth center experience, especially the extra support from the peer counselor. Women had varied opinions about seeing a different midwife at each appointment; some felt it would be better to have continuity, while others appreciated a variety of perspectives and the opportunity to meet the midwife who would eventually attend the birth.

PROGRAM STRENGTHS

Key informants were proud of the fact that they could recruit and engage women who were new to the birth center, especially Medicaid-eligible women and women of color. Informants also felt that the peer counselor was successful in building trusting relationships with women and making them comfortable talking about potentially sensitive topics such as nutrition, obesity, domestic abuse, and smoking. Finally, birth center staff were confident that the peer counselor was helping encourage Strong Start participants to take advantage of services offered to them through their Medicaid coverage and through the birth center.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

Key informants stated that their birth center struggled with enrollment. Specifically, they described a breakdown in internal communications that occurred when front desk staff failed to flag new Medicaid patients as eligible for Strong Start. They found that the most important factor in Strong Start program success was having a peer counselor who was enthusiastic.

> "It was all women. [Birth center staff are like] families or like your best friends, instead of like a doctor. It's not clinical—obviously there are clinical aspects to it—they don't treat you like a patient, they treat you like a person who's going through something significant."
>
> *- Strong Start participant*

SUSTAINABILITY

The Strong Start peer counseling service ceased when the award ended, but birth center staff recognized the value of providing additional support to vulnerable patients and decided to build on the social support component of the peer counseling service by creating the Information and Referrals program to provide referrals to resources and services to all patients, not just those on Medicaid.

AABC Site: Women's Birth and Wellness Center

PRE-STRONG START MODEL OF CARE

Location	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start

Chapel Hill, NC	• Certified Nurse Midwives	• 25% are enrolled in Medicaid
		• 81% are Caucasian
		• Small proportions are Black (7%) and Hispanic (4%)
			• 500 births annually
			• Delivery options include:
			  • Birth center (72%)
			  • Transfers to the local hospital (where WBWC midwives have privileges) if labor fails to progress, patients desire an epidural, or for emergency situations
				• Classes:
				  • Breastfeeding basics (free)
				  • Cloth diapering (free)
				  • Babywearing (free)
				  • Pumping and breast milk expression (small fee)
				  • "Hugs" reading baby cues (small fee)
				• Support groups
				• Lactation support services
				• Referrals to community-based resources

DESCRIPTION OF ENHANCED SS SERVICES

Per AABC's standard Strong Start approach, Women's Birth and Wellness Center (WBWC) added peer counselor services to its existing midwifery model of care. WBWC filled the peer counselor role internally with two existing birth center staff: a bilingual administrative assistant and a lab technician.

Peer counselors first met with patients soon after program enrollment, at least three other times during the pregnancy, and once after delivery. The initial encounter lasted around an hour, with subsequent encounters lasting about 10 to 15 minutes. Most peer counseling sessions occurred in-person, either before or after the patient's prenatal appointment, although some occurred by telephone. According to the evaluation's participant level data, WBWC participants had 2.6 encounters with the peer counselor on average.[183]

The encounters covered a range of topics based on the patient's needs, but peer counselors often structured discussions around the information obtained from the Strong Start evaluation forms including: issues at home, housing, food, education, support during birth, and connecting participants with resources in the community.

[183] Data is from the Strong Start Participant-Level Process Evaluation Exit Form and is from all evaluation years.

OUTREACH AND ENROLLMENT

WBWC initially used an opt-in enrollment process for Strong Start, whereby WBWC offered eligible women a choice between enrolling in the program or receiving the birth center's standard care. In evaluation Year 2, the center transitioned to an opt-out approach, meaning WBWC enrolled all women into Strong Start by default, unless they actively chose to opt out of the intervention. Key informants at the center noted that patients rarely declined to participate. One key informant explained, "We've had people who have moved or risked out. Those are the main ones [who decline or are not enrolled]. We don't have people who don't want to participate in the care after they start."

Women typically made their first contact with WBWC by telephone to inquire about maternity care services. During that telephone call women completed a brief risk assessment to determine if they were potentially eligible for birth center services and Strong Start. If so, WBWC sent women an enrollment packet, including the Intake Form, by email or mail. Staff encouraged women to complete the forms prior to their first visit at the center.

In year 3, WBWC did not actively recruit new patients for Strong Start as it was already at maximum capacity for births. However, they introduced Strong Start to all eligible patients and offered three incentives: free registration to two classes and a breastfeeding pillow. Although WBWC did not use targeted outreach, the center posted a link to the Strong Start program website on its own website, and "liked" the AABC Strong Start Facebook page on their Facebook account.

A SITE PERSPECTIVES ON PROGRAM OUTCOMES

All key informants felt that peer counseling was beneficial to Strong Start patients because the peer counselors reinforced messages conveyed by providers. However, they also felt it was difficult to separate the effects of peer counseling from the effects of the birth center's pre-existing care. In general, they viewed the Strong Start program as a reinforcement of the birth center approach. Therefore, when the key informants spoke about outcomes, they tended to focus on the influence of the birth center model rather than the peer counselor services specifically. For example, when discussing their perceptions of Strong Start's impact on preterm birth and low birthweight, key informants noted that WBWC does not differentiate by Strong Start enrollment status when tracking these outcomes. However, they noted that overall, it is rare for WBWC patients to deliver prior to 37 weeks of gestation or for their infants to have low birthweight.

One key informant hypothesized that although WBWC's breastfeeding rates were already "good," they probably improved because staff encouraged Strong Start participants to attend breastfeeding classes, some of which were offered at no cost. One key informant explained, "My hypothesis would be that more women were in the [Strong Start] program and stuck with breastfeeding because they were pushed to go to these classes. I know our breastfeeding rates are good, so it could have made a difference making sure the Medicaid moms had access to that breastfeeding class." Specifically, key informants stated that over 90 percent of WBWC clients breastfeed after delivery and 85 percent are still breastfeeding at 6 months postpartum. WBWC clients generally intend to breastfeed, and it is rare for a woman to express the intention to bottle feed prior to delivery. In addition, one key informant mentioned that staff knowledge about how to help patients enroll in specific services (e.g., the Special

Supplemental Nutrition Program for Women, Infants, and Children or WIC) improved because of Strong Start.

STRONG START PARTICIPANT PERSPECTIVES

The Strong Start evaluation team did not conduct focus groups with Strong Start participants at WBWC.

PROGRAM STRENGTHS

Key informants were proud of their work as a birth center and indicated that peer counseling became a valuable addition to their approach. They felt that peer counseling empowered women to make informed decisions about their care and made it easier for Strong Start participants to experience the benefits of receiving birth center care such as longer prenatal visits, the ability to receive more attention and assistance for issues such as depression, and an environment that felt more family-centered than a doctor's office. For example, peer counselors often developed trusting relationships with Strong Start participants, and patients shared information with the counselors that they may not have discussed with their care providers. The peer counselor reported an instance when she identified a postpartum participant who was having difficulty coping and "crying all the time." The peer counselor raised this issue with a midwife who followed up with the participant and ultimately prescribed a medication to treat her symptoms.

Overall, key informants felt that the center enrolled most eligible participants into Strong Start and that participation rates were high among those who were eligible.

IMPLEMENTATION CHALLENGES AND LESSONS LEARNED

All key informants noted that the Strong Start paperwork was the most challenging and burdensome aspect of program implementation. However, a peer counselor created an organized and consolidated process that helped to reduce the burden. The peer counselor handled all invoicing and reconciling data forms for the project. She became the central person for the project, including communicating with AABC and ensuring the site completed all the evaluation forms. Key informants were proud of both peer counselors and specifically mentioned the counselors' ability to relate to patients, the value they added to the care team, and their ability to create an environment where women felt "heard" and comfortable sharing personal information. One Strong Start staff stated she was most proud of "the relationships we formed with some of the patients… [we] really got to know them. I believe with some of them I was really able to assist. We go above and beyond what other places do for patients and Strong Start enabled me to do that more than I could without."

SUSTAINABILITY

WBWC is not formally sustaining the Strong Start program as there is no funding to continue the peer counselor services.

Some aspects of peer counseling will continue at WBWC, however. For example, one of the peer counselors, who is also a lab technician, continues to have conversations with patients during lab encounters as an informal peer counselor and informs the midwives if there is important information to share about the patient's background (e.g., depression, presence of stressors, family issues). The other peer counselor, who is also an administrative assistant, meets with new patients during their birth center tour if the patient is potentially eligible for Medicaid and needs assistance with the application process. Specifically, she provides women with information about income eligibility and what to bring with them to apply for benefits at the Medicaid office. In addition, she continues to help women get any needed services that come up during the application process such as WIC. WBWC gave both peer counselors a 5 percent raise to accommodate their extra role and responsibilities.

AABC Other Sites

The twelve AABC sites included in Table 446 were studied less intensively than the twelve sites that have full written Volume 2 summaries.

TABLE 446: AABC OTHER SITES

Site (Location Urban/Rural)	Pre Strong Start Model of Care				Strong Start Implementation				
	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start	Peer Counselor Qualifications and Peer Counselor Hiring	Avg. Number of Peer Counselor Encounters	Enrollment Approach	Most Significant Implementation Success	Most Significant Implementation Challenge

Geneva Woods (Anchorage AK – Urban)	• Certified Nurse Midwives
	• Certified Direct Entry Midwives
		• Medicaid limited to 17% of patient population	• 220 births annually
			• New patients must plan birth center delivery
			• Women who risk out of birth center delivery give birth at one of two nearby hospitals
				• International Board-Certified Lactation Consultant (IBCLC) on staff
				• Referral system to supportive services
				• Risk screening
				• Childbirth education and support groups
					• Assigned role to existing staff
					• Qualifications
					  • Birth assistant
					  • Training to be IBCLC
					  • Recently gave birth at the center
						3.0	Opt-in	• Program not successfully implemented	• Low enrollment attributed to:
									  • Limited Medicaid population
									  • Early Strong Start program requirement that women have a second preterm risk factor (later eliminated)
									  • Lack of support from midwives

Juneau Family Health & Birth (Juneau AK – Urban)	• Certified Nurse Midwives • Certified Direct Entry Midwives	• Mix of socioeconomic and educational backgrounds • 30% have Medicaid	• 80 births annually • Patients deliver at birth center (~75%) or at home (~5%) • 20% deliver at nearby hospital because they "risk out"	• Doula services • Case management • Lactation support • Risk screening • Group classes for: childbirth, new parents, perinatal mood disorder	• Assigned role to existing staff • Qualifications • Doula or midwife	9.1	Opt-out	• Developed an effective process for identifying and enrolling eligible women	• Lack of support from midwives and front desk staff • Staff turnover required reassignment of peer counselor duties
Women's Health & Birth Center (Santa Rosa CA – Urban)	• Certified Nurse Midwives	• 90% have Medicaid • Most have high school or vocational degree	• 80% give birth at center • Remaining 20% plan or are transferred to hospital for delivery	• Comprehensive family planning and infertility services • Childbirth, breastfeeding, and infant care classes • Doula and health educator services • Marriage and family therapy	• Assigned role to existing staff • Qualifications • Health educator or doula	2.5	Opt-out	• Positive relationships between health educators and patients created culture of trust	• Retention of Strong Start patients
Tree of Life (Deland FL – Urban)	• Certified Nurse Midwives	• 50% have Medicaid	• 40-45 deliveries per month • Most give birth at birth center or at home • Can also plan hospital delivery	• Risk screening • Referrals to supportive services	• Assigned role to existing staff • Qualifications • Midwife or licensed practical nurse	6.4	Opt-in	• Program encouraged follow up, referrals, and "finding solutions" to patient needs; this approach was incorporated into center's model of care	• Lack support from other providers outside birth center • Low Medicaid reimbursement

Site (Location Urban/Rural)	Pre Strong Start Model of Care				Strong Start Implementation				
	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start	Peer Counselor Qualifications and Peer Counselor Hiring	Avg. Number of Peer Counselor Encounters	Enrollment Approach	Most Significant Implementation Success	Most Significant Implementation Challenge

Morning Star (MN – Rural)	• Certified Professional Midwives	• Mix of socioeconomic and educational backgrounds
		• 25% have Medicaid
			• Most give birth at the center
			• Care may be transferred to nearby hospital
				• Doula services
				• Risk screening
				• Education about: nutrition, exercise, breastfeeding, newborn care, complications during delivery
				• Frequent postpartum visits, homes visits, and phone calls
					• Hired new part time peer counselors
					• Qualifications
					  • Doula training
					  • Birth assistant
					  • Personal characteristics most important
						2.3	Opt-out	• Peer counselor encounters appreciated by participants and "boost morale"
								• Participants praised extra support they received
									• Familiarizing staff with goals of Strong Start and required paperwork
									• Low enrollment because of low patient volume
									• Delayed implementation related to staff turnover

Midwife's Place (NE – Rural)	• Certified Nurse Midwives	• Less than 10% have Medicaid	• Patients with Medicaid must plan hospital birth (too-low reimbursement for birth center delivery)	• Information not available	• Never implemented peer counselor services	3.3	Information not available	• Program not successfully implemented	• Medicaid reimbursement too low to cover cost of care
Brooklyn Birthing Center (Brooklyn NY – Urban)	• Certified Nurse Midwives • Certified Midwives	• 30-40% have Medicaid	• Around 50% give birth at center • Remainder choose planned hospital delivery or are transferred to hospital during labor	• Postpartum home visits • Lactation services and breastfeeding education • Family planning and gynecological services • Childbirth and newborn care classes • Social worker on-site • Risk screening	• Hired new peer counselors (though familiar to center) • Worked part time on per client basis • Qualifications • Licensed social workers	3.0	Information not available	• Helpful to have peer counselors on-site for in-person encounters	• Administrative burden and paperwork requirements, especially eligibility screening process • Scheduling encounters and keeping participants engaged
Reading Birth & Women's (Reading PA – Urban)	• Certified Nurse Midwives	• 40% have Medicaid	• 400 births annually • About 25% of patients give birth at center or at home • Can also plan delivery at Reading Hospital	• Risk screening • Required childbirth education and early home care classes • Referrals for behavioral health and dental care • Referrals to public assistance resources	• Initially hired birth center patients as peer counselors • Switched to existing staff • Qualifications • Registered Nurse (RN)	2.3	Opt-in	• Peer counselor encounters introduced more provider continuity to the model of care	• Administrative burden of completing paperwork and data entry • Patients hesitant to enroll in Strong Start
Peacehealth (OR – Rural)	• Certified Nurse Midwives	• 30-40% have Medicaid	• 300 births annually • 30% give birth at center • Remainder deliver at Peacehealth Hospital	• All birth control methods offered on-site • Bus tickets, gas vouchers, grocery store gift cards available • Childbirth and breastfeeding classes • 24/7 lactation consultant support and home visits	• Assigned role to existing staff • Qualifications • RN	2.5	Opt-out	• Program reinforced strengths of birth center model • Provided additional opportunity to identify patient needs	• Early challenges determining how to staff program and structure peer counseling sessions

Site (Location Urban/Rural)	Pre Strong Start Model of Care				Strong Start Implementation				
	Type of Midwives on Staff	Patient Demographics	Birth Volume and Options for Delivery	Enhanced Services Prior to Strong Start	Peer Counselor Qualifications and Peer Counselor Hiring	Avg. Number of Peer Counselor Encounters	Enrollment Approach	Most Significant Implementation Success	Most Significant Implementation Challenge
Lisa Ross (Knoxville TN – Urban)	• Certified Nurse Midwives	• 70% have Medicaid	• 85% give birth at center • Remainder "risk out" of a birth center delivery and are transferred to hospital	• Breastfeeding center staffed by lactation consultants • Pediatric and well-baby program • *CenteringPregnancy* • Smoking cessation services • Spanish interpreters on staff	• Hired new peer counselors • Qualifications • Master's level peer counselor	2.8	Opt-out	• Increased psychosocial support for low-income single mothers • High enrollment and retention rates	• Initial resistance from midwives due to misconception that better outcomes would be attributed to peer counselors rather than midwifery care • Lack of support in creating peer counseling structure and educational materials
Footprints in Time (WI – Urban)	• Certified Nurse Midwife	• ~30% have Medicaid • Patients generally healthy	• ~3 births per month • Options to give birth at the center or at home • High-risk pregnancies referred to hospital	• Doula services • Water birth • Childbirth and breastfeeding classes • Postpartum care • Risk screening	• Assigned role to existing staff • Qualifications • RN	3.0	Opt-in	• Provides valuable information, especially to first-time mothers • Program reinforces strengths of midwifery care	• Administrative burden from data collection and paperwork • Low Medicaid reimbursement

Family Care (WV – Rural)	• Certified Nurse Midwives	• ~30% have Medicaid	• 700 births annually
			• ~10% give birth at center
			• ~90% plan hospital delivery
				• Comprehensive obstetric/gynecological care with risk screening
				• Nutritionist and diabetes specialist
				• Substance abuse detoxification program
				• Referrals
				• Social workers on staff
				• Lactation support and IBCLC
					• Hired two new part time peer counselors
					• Qualifications
					  • Experience with center in "non-clinical way"
					  • Received prenatal care at center
						3.4	Opt-out	• Opt-out enrollment approach led to high program participation
								• Felt peer counselor's additional support benefitted patients
									• Loss of a peer counselor increased burden on the other
									• Staff turnover resulted in loss of program's midwife champion

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