Strong Start for Mothers and Newborns Evaluation:

YEAR 3 ANNUAL REPORT

Volume 1 – Cross-cutting Findings

Prepared for:
Caitlin Cross-Barnet and William Clark
Center for Medicare and Medicaid Innovation, DHHS
Contract No.: HHSM-500-T0004
Deliverable No.: 4.1

Prepared by:
Ian Hill (Project Director), Sarah Benatar, Brigette Courtot, Lisa Dubay, Fred Blavin, Bowen Garrett, Embry Howell, Morgan Cheeks, Nikhil Holla, Sarah Thornburgh, Jenny Markell, and Justin Morgan —
Urban Institute
Sharon Silow-Carroll, Diana Rodin, Marci Eads and Robyn Odendahl –*Health Management Associates*
Lee Thompson, Kirsten Firminger and Kathryn Paez—*American Institutes for Research*
Mark Rouse and Benita Sinnarajah–*Briljent*

April 2017

URBAN INSTITUTE

HEALTH MANAGEMENT ASSOCIATES

AIR® AMERICAN INSTITUTES FOR RESEARCH®

briljent

Acknowledgments

The authors would like to thank the many Strong Start awardee staff and providers across the nation who gave so freely of their time and insights during our case studies, and who diligently collected and submitted the process evaluation data needed for this study. We also want to express our sincere gratitude to the hundreds of pregnant and postpartum women who participated in our focus groups. Without their honest and heartfelt input regarding their experiences with Strong Start, our report would be much less rich and informative.

Many evaluation team members who contributed to the Strong Start evaluation throughout the year also deserve thanks, including Eva Allen, Sarah Coquillat, Sarah Gadsden, Stewart Hundley, Amanda Napoles, Becky Peters, Patricia Solleveld, and Divvy Upadhyay from the Urban Institute; Jodi Bitterman, Brooke Ehrenpreis, Eileen Ellis, Linda Follenweider, Lindsey Gibson, Rebecca Kellenberg, Margaret Kirkegaard, and Barbara Smith from Health Management Associates; Graciela Castillo, Jazmine Cavazos, Lori Downing, Brandy Farrar, Deepa Ganachari, Jennifer Lucado, Manshu Yang, Heather Ma, Melissa Mannon, Kathryn Manson, Ushma Patel, and Charis Yousefian from American Institutes for Research; and, Lynn Paquin from Briljent.

Finally, we are grateful to our federal contract officer at CMMI/DHHS—Caitlin Cross-Barnet—as well as CMMI's Director of the Research and Rapid Cycle Evaluation Group—Renee Mentnech—and Director of the Division of Special Populations Research—William Clark—for their thoughtful guidance, assistance, advice, and support throughout the conduct of this evaluation.

Cover image from Shutterstock.com.

Contents

Figures

Tables

Exhibits

Executive Summary

The United States has among the worst maternal and infant birth outcomes in the developed world despite very high levels of spending. The Strong Start for Mothers and Newborns initiative,[1] funded under Section 3021 of the Affordable Care Act, aims to improve these outcomes for pregnancies covered by Medicaid and the Children's Health Insurance Program (CHIP) by field testing enhanced prenatal care offered through three evidence-based, alternative care approaches: Group Prenatal Care, Maternity Care Homes, and Birth Centers. Strong Start is currently supporting the delivery of these enhanced services through 27 awardees and more than 200 provider sites[2] across 32 states, the District of Columbia, and Puerto Rico. Four-year cooperative agreements, funded from a budget of $41.4 million, were awarded on February 15, 2013 by the Center for Medicare and Medicaid Innovation (CMMI) of the Centers for Medicare and Medicaid Services. Most awards received no cost extensions to prolong service provision but are winding down during calendar 2016, with 10 awardees continuing into early 2017.

CMMI has contracted with the Urban Institute and its partners, the American Institutes for Research (AIR), Health Management Associates (HMA), and Briljent, to conduct an independent evaluation of Strong Start. This five-year study is charged with evaluating the implementation and impacts of Strong Start on health care delivery, health outcomes, and cost of care. To answer these questions, the evaluation includes three primary components:

- Qualitative case studies, to develop an in-depth understanding of how Strong Start approaches are designed and implemented, document challenges awardees encounter during implementation, describe perceived success and factors that contribute to success, and understand participant experiences;
- Participant-level process evaluation, to collect detailed information on the demographic and risk characteristics, service use, and outcomes of all Strong Start participants; and
- Impact analysis, to assess whether and to what extent Strong Start has had an impact on rates of premature births, low birthweight births, and Medicaid/CHIP costs through pregnancy and the first year after birth. The impact analysis will also assess whether these outcomes vary by model type, awardee, and type of services offered and received.

[1] Strong Start II, which is the subject of this report, is one of two initiatives to improve birth outcomes that have been funded by CMS. The other initiative, Strong Start I, is designed to reduce early elective deliveries. In addition, the Mother and Infant Home Visiting Program (MIHOPE) has a Strong Start component involving sites that provide care beginning in the prenatal period. The Strong Start II and MIHOPE-Strong Start programs are being evaluated separately. For the remainder of this document, references to Strong Start refer to Strong Start II.

[2] The total numbers of sites are reported by awardees in the program monitoring reports, collected quarterly by the CMMI program team. Inconsistencies in reporting may occur, particularly for sites that have dropped out or recently begun offering Strong Start services.

The purpose of this third annual report is to present interim emerging findings from the evaluation, summarize the status of the evaluation's research efforts, and present a plan for the next year of work.

THE STRONG START AWARDEES AND SITES

The 27 Strong Start awardees each provide enhanced services through one or more of the Strong Start approaches of care. Specifically, 17 are implementing the Maternity Care Home approach (in 116 individual provider sites), 14 are implementing Group Prenatal Care (in 56 sites), and two are implementing Birth Center care (in 55 sites). Included in these counts are five awardees that are implementing (or have implemented) more than one approach. During the second year of implementation, many awardees began offering Strong Start at new sites, but several sites also dropped out, causing a decrease from 213 sites in Year 1 to 199 sites in Year 2.[3] However, in Year 3, the number of sites increased again to 228, as awardees worked toward increasing overall enrollment in the program and expanding the reach of Strong Start.

All awardees are working to achieve the common goals of reducing rates of preterm birth and low birthweight among Strong Start participants and their newborns, and in so doing, reduce the costs associated with maternity care. Initially, Strong Start had a goal of reaching up to 80,000 women over a three-year period, and awardee-specific enrollment goals varied, with nearly all awardees aiming to enroll between 1,500 and 3,000 women. However, because of delayed implementation and challenges with enrollment, in Year 2, most Strong Start awardees revised their enrollment targets (CMS/CMMI, 2014) to between 1,000 and 2,000 women over the entire period of program operation (three to four years depending on whether the awardee received a no-cost extension of up to one year). In Year 3, these enrollment goals remained stable, with a majority of awardees planning to enroll between 1,000 and 2,000 women and an overall enrollment goal of 52,448.

CROSS-CUTTING ANALYSIS AND CONCLUSIONS

Syntheses of findings through the third year of data collection allow us to make a number of cross-cutting observations about awardees' experiences implementing Strong Start, promising practices they have adopted to overcome common challenges, and preliminary outcomes among Strong Start participants. With more complete PLPE data and another full round of case studies at the end of Year 3 of the evaluation, and with some early birth certificate and Medicaid data, we make the following interim observations:

[3] In addition, in the Year 1 Annual Report, we reported that Meridian Health Plan had 48 total sites. However, given that the intervention is centered on one site, they reported only one participating site for the Year 3 Annual Report.

1. ***Strong Start awardees generally made progress towards meeting revised enrollment goals, but many continued to struggle with enrollment-related challenges even as the program approaches the final stages of implementation.*** Lagging enrollment stems from a variety of factors and has stymied program success for a limited number of awardees. By the end of Q1 2016, Strong Start awardees had enrolled a total of 42,138 women in the program, representing 80 percent of the revised Strong Start enrollment goal of 52,448. A majority of Maternity Care Home awardees and several Group Prenatal Care awardees and Birth Center sites reported that enrollment had improved. They largely attributed improvements to better integration of Strong Start into clinical settings, which makes prenatal care providers feel more comfortable referring patients to the program. Other factors include growing familiarity with the program, expanded eligibility requirements implemented in 2014, and more effective enrollment procedures.

   At the same time, about half of Strong Start Group Prenatal Care awardees and many Birth Center sites highlighted enrollment as a major, ongoing challenge. A common recruitment problem for group care awardees is lack of support from prenatal care providers, who limit the number of referrals they make to the programs. For Birth Centers, recruitment problems more often stem from low Medicaid patient volume (with some centers deliberately limiting the number of Medicaid patients they serve because of low reimbursement) or challenges integrating the program into the workflow of a busy, leanly-staffed Birth Center. Regardless of the root cause, enrollment challenges limit Strong Start's reach and success for some awardees that, with only a small number of enrollees in the program at one time, have not benefited from economies of scale nor had sufficient opportunities to establish Strong Start as an important part of their sites' prenatal care approach. In an effort to address chronic low enrollment, some Group Prenatal Care awardees added the Maternity Care Home model to their program, which has improved their overall program enrollment.

2. ***Awardees have expressed healthy skepticism with regard to the ability of specific Strong Start enhanced services to affect preterm deliveries and low birthweight births; however, they are confident that Strong Start is impacting the well-being of pregnant women through cultivating trusting relationships that allow programs to better address the psychosocial needs of their clients***. Awardee staff recognize that reducing preterm deliveries and increasing the number of babies born at a healthy weight are challenging goals that may be difficult to accomplish during a relatively short intervention with a high-risk population. Furthermore, a major concern recognized by both the evaluation team and CMMI has been that each of the three Strong Start approaches appears to attract women with different risk profiles, skewing findings from the PLPE descriptive analyses, which indicate preterm deliveries and rates of low birthweight babies are particularly low among Birth Center participants when compared with the other two models.

However, with this year's addition of multivariate regression-adjusted analyses of these data that control for a variety of demographic, psychosocial and medical risk factors, we observe that Birth Center and Group Prenatal Care participants, whose care departs more from a traditional medical model of prenatal care than that of Maternity Care Homes, are significantly less likely to have a preterm birth or low birthweight baby compared to Maternity Care Home participants. Maternity Care Home participants are more likely to have had a previous preterm birth, which is significantly associated with having a subsequent preterm birth. Though this risk factor is controlled for in the regressions, as are other primary drivers of preterm birth such as hypertension, there could be unobservable factors related to previous preterm births that we are unable to operationalize.

While we are unable, at this point, to draw any conclusions about how Strong Start participants are faring compared with similar women who receive traditional prenatal care, future analyses conducted for the Impacts Analysis will use propensity-score-reweighted comparison groups to more precisely determine the overall impacts of Strong Start on birth outcomes.

3. ***C-Section rates among Strong Start participants are lower than those reported nationally, and many awardees perceive Strong Start enhancements to be a contributing factor.*** Descriptive PLPE data show that C-section rates are particularly low among Birth Center enrollees, consistent with expectations, but we also observe that rates among Group Prenatal Care participants are lower than benchmarks, and that Maternity Care Home rates are no higher than what is observed nationally despite Strong Start enrolling particularly high risk participants. Most awardees indicate that they are promoting full term deliveries and discouraging elective C-sections and C-sections performed before 39 weeks. Regression results provide supporting evidence that Birth Center participants are least likely to have a C-section, even after controlling for demographic and risk factors, but again there may be unobservable factors at play that we are unable to account for. These trends, coupled with VBAC rates of 19.2 percent, that are substantially higher than the eight percent reported nationally, paint an encouraging picture regarding strategies to reduce medically unnecessary Cesareans. As discussed above, key informants and focus group participants believe that Strong Start's intense focus on patient activation and education related to childbirth preparation and goals may be having a direct effect on these outcomes.

   Though these results are promising, until the Impact Analyses are complete, we will be unable to conclude whether the Strong Start intervention is reducing C-section deliveries compared to women who do not receive Strong Start services.

4. ***Recognizing the high level of psychosocial need among Strong Start participants, awardees have worked hard to support women and reduce stressors in their lives and to link women with mental health services in the community.*** At intake, Strong Start enrollees demonstrate high levels of depressive symptoms and generalized anxiety compared with the population as a whole, as well as a host of other challenges ranging from unemployment and housing instability to food insecurity and a lack of social support. Specifically, nearly 26 percent of women enrolled in Strong Start present with symptoms of depression and 14 percent display moderate or severe anxiety. Multivariate analyses conducted for this Year 3 Annual Report suggest there is a significant association between depression and preterm birth, as well as depression and delivery of a low birthweight infant, providing further evidence that this issue, in particular, is worthy of attention and could be critical in addressing poor birth outcomes among a low-income population.

   Importantly, all three of Strong Start's approaches to enhanced prenatal care emphasize relationship-centered care and are designed to provide more psychosocial support to pregnant women, though peer counselors, care managers, or facilitators and participants in Group Prenatal Care classes. As described in the case study section of this report, and highlighted in previous Annual Reports, key informants and focus group participants consistently point to this aspect of Strong Start as particularly important in contributing to better perinatal health and well-being, and potentially improved outcomes.

   However, many challenges still confront awardees in their efforts to address client's psychosocial needs. For example, awardees continue to indicate that the availability of mental health providers to treat pregnant Medicaid beneficiaries is inadequate in most settings—influenced in part by the limited number of psychologists and psychiatrists willing to see Medicaid patients, and also by hesitancy among many psychiatrists and other physicians to prescribe medications during pregnancy. Focus group and key informant data indicate that stress and anxiety are further exacerbated by chronic challenges related to reliable and timely transportation to appointments and affordable childcare options. Despite efforts to link women with Medicaid-provided transportation, requirements regarding advanced notice and restrictions related to accompanying children make it hard for Strong Start enrollees to rely on these services, and few childcare options are available if the woman does not have available friends or relatives and is discouraged from bringing children to her appointments.

5. ***Strong Start awardees have focused considerable attention on nutritional counseling and support, believing that they can improve outcomes by doing so.*** PLPE data indicate that rates of gestational diabetes among Strong Start participants are substantially lower than those reported for comparable populations. Rates of gestational diabetes among participants are around 5 percent, while rates of 10 percent among Medicaid-enrolled

women have been cited in the literature. Awardees have emphasized that the personal relationships Strong Start staff form with participants may help them to convey effective messages about health and well-being during pregnancy, and these data suggest that their efforts are paying off. Birth Center and Group Prenatal Care models explicitly integrate education and counseling on nutrition and physical activity during pregnancy into their routine care, while Maternity Care Home awardees address nutrition in varying ways, such as making referrals to nutritionists or revisiting personal nutrition-related goals during their meetings with enrollees. PLPE encounter data suggest that about 1/3 of women enrolled are getting supplemental nutrition counseling in addition to routine care.

Unfortunately, rates of hypertension appear to be higher among Strong Start participants than observed in other low-income populations. This risk factor may also be harder to affect through the interventions employed by Strong Start models. Pregnancy-induced hypertension can be caused by a multitude of factors, including pre-existing medical conditions such as hypertension or being overweight or obese. Six percent of women enrolled in Strong Start have pre-pregnancy diagnoses of hypertension and more than 60 percent of enrollees are overweight or obese at their first prenatal care visit. Thus, rates of pregnancy-induced hypertension may even be lower than would be expected given the risk profile of enrollees. Both diabetes and hypertension have implications for early term and C-section deliveries as well as the postpartum health of the mother.

6. ***Nearly 80 percent of Strong Start participants report initiating breastfeeding. Some awardees feel that their efforts have influenced participants' decision to breastfeed, and some credit interventions outside of Strong Start, while others acknowledge that this is an area that needs continued improvement.*** According to data from the PLPE Postpartum Survey, breastfeeding rates among Strong Start enrollees are on par with national estimates and higher than those reported among WIC recipients (68%), a more comparable population. These results may be positively skewed, however, if breastfeeding moms are more likely to return for a postpartum visit where they complete a Postpartum Survey. Birth Center and Group Prenatal Care awardees specifically address breastfeeding as part of routine care, either through group education and counseling sessions focused on breastfeeding or as a standard part of midwifery and Birth Center care. Maternity Care Home awardees' approaches and commitment to breastfeeding are more varied, and fewer women enrolled in that approach report breastfeeding for any period of time. Many Strong Start sites are affiliated with delivery hospitals that are Baby Friendly or are moving toward becoming Baby Friendly, suggesting that an environment more broadly supportive of breastfeeding is being established, reinforcing Strong Start's efforts within the health care system.

7. ***Family planning is an important component of Strong Start enhanced services for many awardees, who believe that—compared to traditional prenatal care—their approach to care offers a more effective way to delivery family planning services and counseling.*** Strong Start's approach to providing family planning care varies across models and awardees, but overall, it represents a common feature of the Strong Start intervention. Group Prenatal Care awardees appear to place the most emphasis on family planning, as all programs dedicate one full group session to the topic and most also discuss family planning during other sessions and again at the postpartum visit. Group care awardees emphasized the value of group discussions about birth control methods and child spacing, where participants can share and learn from one another's experiences. Most (though not all) Maternity Care Home and Birth Center Strong Start staff also incorporate family planning discussions into their one-on-one encounters with participants, reinforcing and expanding on the birth control counseling provided by prenatal providers. According to PLPE data submitted through Q1 2016, 69 percent of Strong Start participants reported that they had received family planning counseling after delivery. Though the evaluation is not collecting PLPE data on family planning counseling in the prenatal period, this proportion would likely be considerably higher than the postpartum finding as Strong Start awardees indicated that much of their family planning counseling occurs prenatally.

   Awardees across the approaches shared some common barriers to the receipt of family planning services, including (but not limited to) low postpartum visit attendance rates, loss of Medicaid or CHIP coverage postpartum, religious affiliations of institutions or providers, and discontinuity with delivery hospitals. Many awardees encourage the use of highly-effective long-acting reversible contraceptives (LARCs), but reported several access barriers that are specific to these methods such as persistent myths about IUDs, particularly among teens; complaints about LARC side effects that lead to removals after a short time; provider preferences or resistance, including concerns about inserting an IUD at the time of delivery; MCO reimbursement policies that prevent LARC placement before the 6-week postpartum visit; inadequate Medicaid reimbursement; and maintaining a steady supply of LARCs.

8. ***The vast majority of Strong Start awardees hope to sustain their Strong Start intervention to some degree once the award period has ended. In most cases, however, ongoing funding or support for the enhancements had not yet been identified or secured.*** The widespread finding that awardees want to sustain their programs is a reflection of their perception that Strong Start represents an improvement over traditional prenatal care and has resulted in tangible benefits for both mothers and newborns. Awardees' optimism in this regard was likely bolstered by the considerable technical assistance they received from The Lewin Group, CMMI's Learning & "Diffusion contractor, on sustainability strategies. However, during the Year 3 case studies, we learned that awardees were at different stages of exploring potential funding sources. These sources most commonly include grants

(foundation, federal, and state-based), enhanced reimbursement from Medicaid MCOs, and funding from their own institutions. Notable sustainability efforts include two maternity care awardees that had identified funding to continue Strong Start as a distinct program, two group prenatal care awardees that indicated the model would continue as their "preferred" or standard model of care for all pregnant patients at Strong Start sites, and another (Medicaid MCO) group prenatal care awardee that received approval from its state Medicaid agency to provide enhanced reimbursement for group care to providers in its plan network. Many awardees across models emphasized that data capturing the effectiveness, and cost-effectiveness, of Strong Start will be fundamental to promoting future sustainability.

Among awardees that did not expect to sustain the program or where sustainability seemed most uncertain, general lack of funding was the most common challenge identified, along with factors such as lack of support from providers and administrators or limited 'bandwidth' and advance planning by Strong Start staff related to sustainability efforts. Some awardees felt encouraged by delivery system reforms that are taking place across the country (such as the proliferation of Patient-Centered Medical Home models) because they present potential funding opportunities for sustaining Strong Start programs, while others felt that the changing delivery landscape created uncertainties about the circumstances under which enhanced prenatal care services might be covered and how sustainability planning should proceed.

9. ***During Year 3 the evaluation team made significant progress in pursuing and obtaining birth certificate and Medicaid data from states with Strong Start awards.*** The Data Linkage Technical Assistance task succeeded in gaining approval of data requests from 11 Vital Records agencies and 14 Medicaid agencies, and received 2014 and/or 2015 data files from 7 states. Meanwhile, negotiations continue with an additional 12 state agencies, the majority of which appear very likely to approve our requests and deliver data. Only in Illinois have our efforts been stymied because of state statutes that prohibit the sharing of individual level birth certificates without women's consent. It now appears that the Impacts Analysis team will have a significant amount of data to work with from up to 19 states as it attempts to measure Strong Start's effects on birth outcomes.

10. ***Applying for and obtaining state data has required concerted, ongoing and persistent work with Medicaid and Vital Records agencies that face many competing demands.*** No state agencies ultimately requested technical assistance from the evaluation team during Year 3. Instead, in the face of constrained resources, they graciously work with the evaluation to review and process our various applications for birth certificate and Medicaid data. For the TA Team, this task required persistence, including building and maintaining relationships with state officials through regular contacts, sharing of information, and

facilitating cross-agency communications. In several cases, it also required the creative application of pressure to gently prod the process forward when it was at risk of being derailed by bureaucratic inertia and competing demands. As described in the Technical Assistance and Data Acquisition Section, when faced with resistance to participation, we employed a series of incremental steps that have proven largely effective, starting with accommodating states' needs to postpone participation and following up by reminding state officials of their prior commitments to support the evaluation; offering small financial incentives to support state efforts; drawing on personal and professional relationships; and as a last resort, calling upon senior state and federal officials to spur action. Most of all, the team has had to embrace that every state, and state agency, is different and that we have to be nimble in our efforts to work through varying application processes and state-specific challenges to succeed.

11. ***In Year 3, the evaluation team finalized a method to select comparison groups and developed a decision rule to reduce state data burden. With an increasing amount of birth certificate and Medicaid data being received, we are poised to launch concerted impact analysis efforts in Year 4.*** The statistical method designed by the evaluation team will use propensity score reweighting to construct a group of observably similar women from the same county where Strong Start participants reside when possible. For 14 awardees, however, we will draw comparison groups from different counties because: (1) Strong Start has saturated the area and there are few women not being served by the program, or (2) Strong Start is the only source of care for high risk pregnant women in the county, making it difficult to identify comparison group women with similar risk profiles within the same area. To determine comparison counties, we use a statistical matching method—Mahalanobis Distance—to match counties that are most similar based on observable measures related to geography and population, socioeconomic factors, provider supply, and infant health. With a system in place to select counties, the evaluation team also worked to reduce the burden on states by decreasing the total number of counties from which we would have to obtain data. To do so, the evaluation team is excluding Strong Start participants using the following decision rule: for each site, we include any county where more than 5 percent of the site's population resides, and if this aggregate is greater than 90 percent of the sites population, the remaining counties are excluded. If not, other counties are added one at a time, based on who has the highest number of enrollees, until 90 percent is achieved. This allows us to exclude many counties, while keeping approximately 96 percent of enrollees in our analysis. Overall, the excluded participants had a similar health risk profile to the participants included.

    Building on this methodological foundation, Year 4 will see the evaluation's Impact Analysis compare the impact of Strong Start with that of traditional Medicaid prenatal care on several key maternal and infant outcomes, including rates of pre-term births, low

birthweight births, very low birthweight births, C-sections, and VBACs, as well as additional analysis of claims and encounter data to assess Strong Start's impact on expenditures for the mother and infant for up to one year post-delivery. We will also analyze whether the impacts of Strong Start differ across awardees or approach.

Introduction

The Strong Start for Mothers and Newborns initiative (Strong Start II),[4] funded under Section 3021 of the Affordable Care Act, aims to improve maternal and infant outcomes for pregnancies covered by Medicaid and the Children's Health Insurance Program (CHIP). The initiative funds services through three evidence-based prenatal care models—Maternity Care Homes, Group Prenatal Care, and Birth Centers—and is currently supporting the delivery of enhanced services through 27 awardees and more than 200 provider sites,[5] across 32 states, the District of Columbia, and Puerto Rico. Four-year cooperative agreements, funded from a budget of $41.4 million, were awarded on February 15, 2013 by the Center for Medicare and Medicaid Innovation (CMMI) of the Centers for Medicare and Medicaid Services. Most awards received no cost extensions to prolong service provision but are winding down during calendar 2016, with 10 awardees continuing into early 2017.

CMMI has contracted with the Urban Institute and its partners, the American Institutes for Research (AIR), Health Management Associates (HMA), and Briljent, to conduct an independent evaluation of Strong Start. This five-year study is charged with evaluating the implementation and impacts of Strong Start on health care delivery, health outcomes, and cost of care; key research questions are displayed in Exhibit 1. To answer these questions, the evaluation includes three primary components: qualitative case studies; a participant-level process evaluation; and an impact analysis. In addition, the evaluation scope of work includes the analysis of numerous program monitoring measures collected by CMMI to support the oversight of Strong Start implementation and also includes a technical assistance and data acquisition task that aims to collect birth certificate and Medicaid data from states with Strong Start awards.

The purpose of this third annual report is to present interim findings from the evaluation, summarize the status of the evaluation's research efforts, and present a plan for the next year of work. The remainder of this section offers background on the three enhanced models of care supported by Strong Start; provides a brief overview of the characteristics of the Strong Start awardees and sites; and summarizes the evaluation design, its research components, and progress to date.

[4] Strong Start II, which is the subject of this report, is one of two initiatives to improve birth outcomes that have been funded by CMS. The other initiative, Strong Start I, was designed to reduce early elective deliveries. In addition, the Mother and Infant Home Visiting Program (MIHOPE) has a Strong Start component involving sites that provide care beginning in the prenatal period. The Strong Start II and MIHOPE-Strong Start programs are being evaluated separately. For the remainder of this document, references to Strong Start refer to Strong Start II.

[5] The total numbers of sites are reported by awardees in the program monitoring reports, collected quarterly by the CMMI program team. Inconsistencies in reporting may occur, particularly for sites that have dropped out or recently begun offering Strong Start services.

EXHIBIT 1: EVALUATION QUESTIONS BY EVALUATION COMPONENT

Qualitative Case Studies

1. What are the features of the Strong Start models operated by the study sites? To what extent are features common, or different, across sites? Are the models being implemented as designed? How has implementation varied? How similar (or dissimilar) are the content and delivery of prenatal care in the Maternity Care Home, Group Prenatal Care, and Birth Center models?
2. How do prenatal care and delivery in Strong Start sites differ from usual Medicaid or CHIP prenatal/delivery care in the same geographic areas? How does care in Strong Start sites differ from care provided in the same sites prior to the program's implementation?
3. What are stakeholders' (e.g., awardee, state, provider, beneficiary) views of how Strong Start demonstrations are being implemented? What works best for patients and providers, and what are the most challenging aspects of implementation? What are the most important factors in successful implementation of Strong Start demonstrations, both within each model and across models?
4. How generalizable are the Strong Start models to other Medicaid and CHIP care settings across the country? What features are critical for successful replication and scaling up of Strong Start?

Participant-Level Process Evaluation

1. What are the characteristics of Strong Start participants by model, site, time period, demographic characteristics (age, race/ethnicity, family composition, income), eligibility group, risk characteristics (physical, behavioral, and socio-emotional), and prior pregnancy status?
2. How many Strong Start services are provided to participating women, of what type, by time period, site/approach, and participant characteristics?
3. What are participant outcomes (e.g. mode of delivery, gestational age, and birth weight), how do they change over time, and how do they compare across Strong Start models?

Impact analysis

1. What is the impact of Strong Start on gestational age, birth weight, rate of Cesarean Section births, and cost for women and infants during pregnancy and over the first year of life?
2. Does the impact differ across awardees and across the three Strong Start models? Does it vary by characteristics of mothers (e.g., race/ethnicity, health risks)? If so, how?
3. How does the implementation analysis explain the impact findings? For example, which features of the models led to the greatest impact of the program?

OVERVIEW OF STRONG START ENHANCED PRENATAL CARE MODELS

MATERNITY CARE HOMES

Maternity Care Homes are designed to provide continuity of care for pregnant women and their infants during pregnancy, childbirth, and postpartum. Nationally, the Maternity Care Home approach builds on the similar concept of the patient centered medical home (PCMH). The PCMH was first defined for pediatric care in the late 1960s, has evolved to cover other forms of primary care, and has recently become a major focus of health care delivery system reforms in both the Medicaid and Medicare programs. According to Childbirth Connection, the various components of the Maternity Care Home model may include a single clinician providing or coordinating care; continuous quality improvement; patient-centeredness; and timely access to care (Romano, 2012). In November 2010, North Carolina began to develop a list of core competencies for a Medicaid Maternity Care Home (North Carolina Department of Health and Human Services, 2010). These competencies include providing all eligible pregnant women with a medical home and, for those identified as high-risk, with case management services to help improve birth outcomes and continuity of care. It builds on a program begun in the state in 1987 called Baby Love, which provides care coordination services to Medicaid-eligible pregnant women (HCPHA, 2006).

Because the Maternity Care Home model is relatively new and not consistently implemented, there is little evaluation research documenting its effectiveness. Several studies from the 1990s showed a positive impact of similar programs on birth outcomes, such as the probability of having a low birth weight infant (Heins et al., 1990). Particularly relevant is an early evaluation of North Carolina's Baby Love program suggesting that the program reduced low birthweight rates and Medicaid costs (Buescher et al., 1991). However, a recent comprehensive review of the literature on enhanced prenatal care services for Medicaid women found mixed results across settings (Anum et al., 2010). The national data from the Strong Start evaluation will further policy makers' understanding of the impact of Maternity Care Home models on Medicaid birth outcomes.

GROUP PRENATAL CARE

In place of individual appointments with a provider, Group Prenatal Care offers pregnant women the opportunity to receive care in a group setting, meeting together as a cohort to have prenatal care appointments that include additional time for education and support from other pregnant women. This prenatal care model provides health assessment, education, and support for pregnant women through a series of group visits to promote healthy behaviors and optimize birth outcomes. The most well-known Group Prenatal Care model is "CenteringPregnancy," which was formalized in 1998 through the Centering HealthCare Institute. Under Centering, groups of 8-12 pregnant women are brought together about 10 times, beginning mid-pregnancy, to have their prenatal care appointments, which also include discussions about health, nutrition, childbirth preparation, stress reduction, family planning, parenting and personal relationships (among other topics). Strong Start

awardees implementing Group Prenatal Care are not required to adopt a particular curriculum, but most use Centering or have modeled their approach after Centering.

One review of the literature on the effect of Group Prenatal Care on birth outcomes identified 11 studies that report its impact on birth weight and/or gestational age (Howell et al. 2014).[6] Four of these studies found a statistically significant reduction in the rate of preterm birth and three showed a positive impact on birth weight. A more recent study in South Carolina compared the outcomes of Medicaid enrollees participating in CenteringPregnancy to those of Medicaid women receiving traditional, individual prenatal care. The study estimated that CenteringPregnancy participation reduced the risk of premature birth by 36 percent and that, for every premature birth prevented, there was an average savings of $22,667 in health expenditures. Participation in CenteringPregnancy also reduced the incidence of delivering an infant that was LBW by 44 percent, for an average saving of $29,627 per avoided LBW birth. Finally, the study found that infants of CenteringPregnancy participants had a reduced risk of a NICU stay (28 percent), saving $27,249 per avoided stay (Gareau et al. 2016). The current evaluation will further analysis of the impacts of group prenatal care by considering a range of sites, states, and implementation stages simultaneously.

ENHANCED BIRTH CENTER CARE

Freestanding Birth Centers are facilities, usually directed by midwives, which provide comprehensive prenatal, delivery, and postpartum care. While women receive their prenatal and postpartum care at a Birth Center, they deliver their infants either at the Birth Center (attended by a midwife) or at a hospital, where deliveries may be attended by midwives, physicians, or a mixed team. Many Birth Centers are accredited by the Commission for the Accreditation of Birth Centers. Until recently not all states covered Birth Center care under Medicaid (Ranji et al., 2009). Although coverage of Birth Centers is now required by the ACA, many Birth Centers still have difficulties with reimbursement because specific insurance carriers, particularly MCOs, may not include Birth Centers in their networks.

Birth Centers, which follow the midwifery model of prenatal care,[7] are characterized as providing substantial education and psychosocial support along with low rates of medical intervention. For example, a study of three types of prenatal care (one offered through a Birth Center, one offered through a teaching hospital, and one offered through a safety net clinic) found that midwives in Birth Centers offered longer prenatal care visits than their counterparts in the other settings. Birth Centers in this study, like those in Strong Start, also offered peer counseling in addition to individual education sessions with the midwife (Palmer et al., 2009). Induced labor and continuous electronic fetal monitoring are generally not used at Birth Centers (Stapleton et al.,

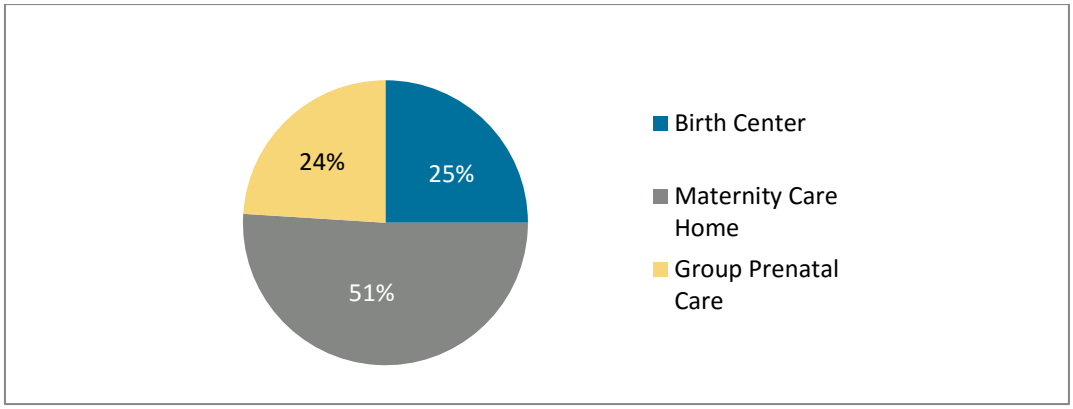
[6] See Table A-1 in Appendix A for the final Strong Start Design Plan for detail on the 11 studies.
[7] American College of Nurse Midwives, http://www.midwife.org/Our-Philosophy-of-Care

2013). For Strong Start, the Birth Center model is further enhanced by the addition of support provided by "peer counselors" or "perinatal navigators" who meeting with women several times over the course of their pregnancies. While research on the impact of Birth Centers is limited, there is substantial research on midwife provided prenatal care in both Birth Centers and other settings, though results vary across studies. For example, across nine studies (including one review) of the impact of prenatal midwifery care on birth outcomes, three found a significant reduction in preterm birth rates and four found a significant increase in birth weight (Howell et al. 2014; Sandall et al. 2015).[8] However, none of these studies focused only on Medicaid-enrolled women. Thus, the current evaluation will contribute substantial additional information concerning the impact of Birth Center-provided prenatal care for Medicaid-enrolled women and their infants.

THE STRONG START AWARDEES AND SITES

The 27 Strong Start awardees are each adopting one or more of the Strong Start models of care. Specifically, 17 are implementing the Maternity Care Home approach, 14 are implementing Group Prenatal Care, and two are implementing Birth Center care. Included in these counts are five awardees that are implementing (or have implemented) more than one model. During the second year of implementation, many awardees began implementing Strong Start in new sites, but several sites also dropped out, causing a decrease from 213 sites in Year 1 to 199 sites in Year 2.[9] However, in Year 3, the number of sites increased again to 228 as awardees continued to launch new Strong Start sites, generally with the goal of increasing overall enrollment in the program and expanding the reach of Strong Start. As shown in Exhibit 2, fifty-one percent of Strong Start's provider sites are implementing Maternity Care Homes (116 sites), twenty-four percent offer Group Prenatal Care (55 sites), and twenty-five percent provide Strong Start services in a Birth Center setting (56 sites).[10]

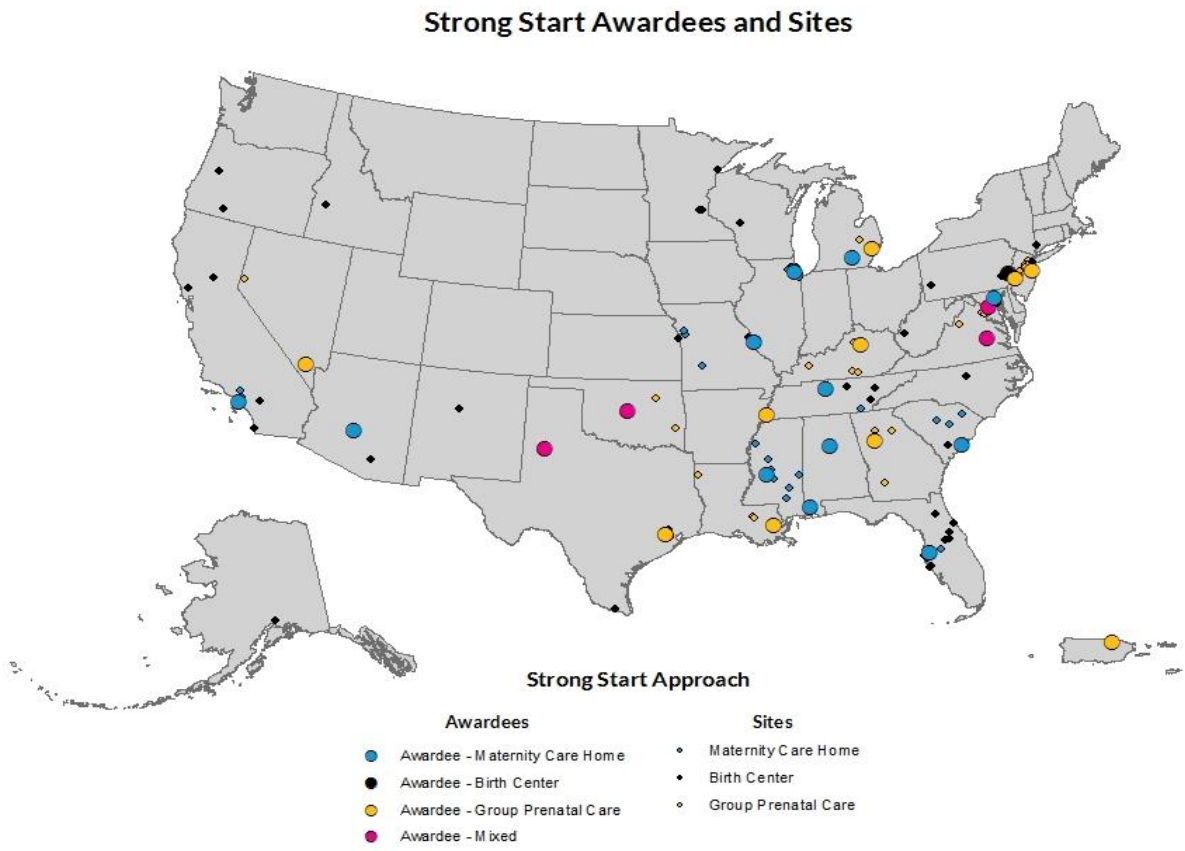
EXHIBIT 2: STRONG START SITES, BY MODEL



[8] More detail of the nine studies is contained in Table 2, Appendix A of the final Strong Start Design Plan.
[9] In addition, in the Year 1 Annual Report, we reported that Meridian Health Plan had 48 total sites. However, given that the intervention is centered on one site, they reported only one participating site for the Year 3 Annual Report.
[10] One awardee has implemented more than one Strong Start model at the same provider site. For our analysis however, we use their primary Strong Start model.

The awardees and sites are spread widely across 32 states, the District of Columbia, and Puerto Rico. The geographic distribution of Strong Start sites is illustrated in Exhibit 3. The South and the Midwest regions of the U.S. have the largest number of sites, an intentional result of CMMI's desire to target areas with the highest rates of preterm birth. As seen in Exhibit 4, the number of Strong Start provider sites per state/territory ranges from just one (Puerto Rico) to 32 sites (Illinois).

EXHIBIT 3: STRONG START SITES, BY GEOGRAPHIC DISTRIBUTION



The awardees are housed in a wide variety of organizations and health care settings, including hospital and health systems, health plans, and community-based organizations. There is similar diversity among the Strong Start provider sites; more than half of the sites are either Federally Qualified Health Centers (FQHCs) or clinics associated with a hospital or health center. The remaining sites include nationally-certified Birth Centers, tribal health clinics, local health departments, and physician group.

EXHIBIT 4: DISTRIBUTION OF STRONG START SITES, BY STATE

Awardee Name	State	Strong Start Model	Sites
Access Community Health Network (ACCESS)	Illinois	Maternity Care Home	32
Albert Einstein Healthcare Network (Einstein)	Pennsylvania	Group Prenatal Care	2
American Association of Birth Centers (AABC)	23 States	Birth Center	54
Amerigroup Corporation (Amerigroup)	Louisiana	Group Prenatal Care	7
Central Jersey Family Health Consortium, Inc. (Central Jersey)	New Jersey	Group Prenatal Care	8
Florida Association of Healthy Start Coalitions (FASHC)	Florida	Maternity Care Home	8
Grady Memorial Hospital Corporation DBA Grady Health System (Grady)	Georgia	Group Prenatal Care	5
Harris County Hospital District (Harris)	Texas	Group Prenatal Care	7
HealthInsight of Nevada (HealthInsight)	Nevada	Group Prenatal Care	5
Johns Hopkins University (Hopkins)	Maryland	Maternity Care Home	5
Los Angeles County Department of Health Services (LADHS)	California	Maternity Care Home	6
Maricopa Special Health Care District (Maricopa)	Arizona	Maternity Care Home	5
Medical University of South Carolina (MUSC)	South Carolina	Maternity Care Home	7
Meridian Health Plan (Meridian)	Michigan	Maternity Care Home	1
Mississippi Primary Health Care Association, Inc. (MPHCA)	Mississippi	Maternity Care Home	8
Oklahoma Health Care Authority (OKHCA)	Oklahoma	Group Prenatal Care, Maternity Care Home	6
Providence Health Foundation of Providence Hospital (Providence)	Washington, D.C.	Birth Center, Maternity Care Home, Group Prenatal Care	6
Signature Medical Group (Signature)	Missouri	Maternity Care Home	9
St. John Community Health Investment Corp. (St. John)	Michigan	Group Prenatal Care, Maternity Care Home	6
Texas Tech University Health Sciences Center (Texas Tech)	Texas	Maternity Care Home, Group Prenatal Care	3
United Neighborhood Health Services, Inc. (United)	Tennessee	Maternity Care Home	9
University of Alabama at Birmingham (UAB)	Alabama	Maternity Care Home	4
University of Kentucky Research Foundation (UKRF)	Kentucky	Group Prenatal Care	7
University of Puerto Rico Medical Sciences Campus (UPR)	Puerto Rico	Group Prenatal Care	1
University of South Alabama (USA)	Alabama	Maternity Care Home	10
University of Tennessee Health Sciences Center (UTHSC)	Tennessee	Group Prenatal Care	2
Virginia Commonwealth University (VCU)	Virginia	Group Prenatal Care, Maternity Care Home	5

Note: AABC has sites in Alaska, Arizona, California, Connecticut, Florida, Idaho, Illinois, Kansas, Maryland, Minnesota, Missouri, Nebraska, New Mexico, New York, North Carolina, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia Wisconsin, and West Virginia

Initially, Strong Start had a goal of reaching up to 80,000 women over a three-year period, and awardee-specific enrollment goals varied greatly (though nearly all aimed to enroll between 1,500 and 3,000 women). However, because of delayed implementation and challenges with enrollment, in Year 2, most Strong Start awardees revised their enrollment targets (CMS/CMMI, 2014). A majority of new enrollment goals were between 1,000 and 2,000 women over the entire period of

program operation (three to four years depending on whether the awardee received a no-cost extension of up to one year), with total enrollment aiming for approximately 50,000 women across all 27 awardees. In Year 3, these enrollment goals remained stable, with a majority of awardees planning to enroll between 1,000 and 2,000 women and an overall enrollment goal of 52,448.

The state and local context within which Strong Start awardees are providing care is likely to affect their operations and, potentially, their success. In particular, Medicaid and CHIP eligibility and coverage policies vary considerably across the 32 states (and the District of Columbia and Puerto Rico) where Strong Start awardees are situated and include some of the most, as well as least, generous income eligibility limits and benefits packages in the country. As shown in Appendix A, the combined upper Medicaid/CHIP[11] income eligibility limit for pregnant women in April 2016 in the Strong Start states ranged from the minimum federally-required level of 133 percent of the federal poverty level (FPL) in Louisiana, Oklahoma, and Idaho, to 278 percent of the FPL in Minnesota. A table summarizing this information is presented in Appendix A.

Implementation of the ACA has changed the coverage landscape in every state. Starting in 2014, half of the Strong Start states (13 states and the District of Columbia) had elected to expand Medicaid coverage to all adults with incomes up to 138 percent of poverty[12] regardless of pregnancy or parenting status.[13] By July 2016, this total had increased to 14 states and D.C. (For detailed information regarding each Strong Start states' income eligibility threshold by coverage authority, please see Table A.2. in Appendix A.)

EVALUATION DESIGN AND DATA COLLECTION PROGRESS THROUGH YEAR 3

The Strong Start evaluation employs a mixed-methods research design, comprising case studies of implementation, the collection and analysis of participant-level process evaluation indicators, and a quantitative analysis of the impacts of Strong Start on birth outcomes and costs of care. There is also a large technical assistance component designed to acquire birth certificate and Medicaid data and/or support states in developing their capacity to link these data so that the evaluation can assess program impacts. Finally, the evaluation's scope of work includes the analysis of certain program monitoring data collected from the Strong Start awardees and CMMI to support the oversight of awardee implementation. This section provides brief summaries of these research methods and our progress through Year 3 of the evaluation; additional detail can be found in the evaluation's Design Plan (Howell et al. 2014) and Comparison Group Feasibility Study (Dubay et al., 2014).

[11] Pregnant women themselves are eligible for CHIP in just three of the Strong Start states – Missouri, New Jersey, and Virginia. However, the following states have adopted the CHIP "unborn child" option, which permits states to consider a fetus a "targeted low-income child" for the purposes of CHIP coverage: CA, IL, LA, MI, MN, MO, NE, NJ, OK, OR, TN, TX, VA, WI.

[12] The ACA establishes a minimum income eligibility level of 133 percent of FPL for states that opt to expand Medicaid, and also establishes a standard 5 percent income disregard. Taken together, this means that the ACA's minimum income eligibility level for Medicaid expansion is 138 percent of FPL.

[13] This includes states (e.g. Michigan and Pennsylvania) that have expanded Medicaid through a Section 1115 waiver.

CASE STUDIES OF IMPLEMENTATION

The evaluation's case studies occur during the first four years of the evaluation. They provide an in-depth understanding of how Strong Start models are designed, implemented, and evolve over time; document barriers or challenges awardees encounter during implementation; and, describe perceived successes and factors that contribute to success. Our case studies include four components: document review, key informant interviews, focus groups with participating pregnant and postpartum women (as well as some groups with similar non-participants), and observations of care and care settings. Because of resource limitations that preclude studying all service delivery sites, we are collecting case study data from all awardees and approximately one-third of the sites they operate. Some visits are conducted by phone only. The intensity of qualitative data collection varies based on whether a site is included in the evaluation's impact analysis.

The first two case study rounds focused on early Strong Start implementation and understanding how programs were evolving over time to better meet the needs of participants and provider sites. The Year 1 case studies involved all four data collection components (in-person or phone-based interviews, focus groups, observations, and document reviews); between March and November 2014, we conducted 35 site visits and 8 sets of telephone interviews with Strong Start awardees and select AABC sites. This entailed 211 key informant interviews with 314 key informants, 65 focus groups with roughly 440 pregnant and postpartum women, and nearly three dozen structured observations of enhanced service delivery. Year 2 qualitative data collection was smaller in scope. Between March and June 2014, we conducted 40 "virtual site visits" with Strong Start awardees and select AABC sites by completing more than 150 telephone interviews with key informants.[14]

The third round of case study data collection had two primary goals: (1) to understand which Strong Start services and strategies are having the biggest influence on maternal and newborn outcomes; and (2) to learn more about whether and how Strong Start might be sustained and replicated once the award period is over. In Year 3, the case study team once again used all data collection components and a combination of in-person site visits and telephone interviews. Specifically, we conducted 29 in-person site visits (a majority which involved focus groups and/or structured observations) and 15 "virtual site visits" with all Strong Start awardees and select AABC sites. This entailed a total of 211 interviews with 314 key informants, 65 focus groups with 438 pregnant and postpartum Strong Start participants and 13 structured observations of enhanced service delivery.

[14] In addition, a site visit involving in-person interviews and focus groups was conducted with one awardee, the University of Puerto Rico, in Y2.

PARTICIPANT-LEVEL PROCESS EVALUATION

The participant-level process evaluation is designed to give timely feedback to CMMI, the evaluation team, and Strong Start awardees and sites on key indicators of performance and interim outcomes. Detailed information is collected on the demographic and risk characteristics, service use, and outcomes of all Strong Start participants using four data-gathering instruments: an Intake Form, Third Trimester and Postpartum Surveys (all completed by participants, with or without assistance), and an Exit Form, which is completed by awardee staff. Strong Start awardees are required to collect participant-level data from their sites and transmit these data to the evaluation team on a quarterly basis. These data are being used to identify and track risk factors for preterm birth among participants, complications experienced by participants during pregnancy, enhanced and routine services provided during pregnancy and postpartum, and birth processes and outcomes for mothers and infants. Individual-level data are summarized in quarterly reports.

In Year 1, participant-level data were collected through Quarter 1 2014 (March 31, 2014), using three of the four data collection instruments: the Intake Form and Third Trimester and Postpartum Surveys. (The fourth and final form, the Exit Form, was not launched until September 2014.) During this Year 1 time period, 22 awardees submitted data, including 3,777 Intake Forms, 569 Third Trimester Surveys and 346 Postpartum Surveys. In Year 2, 26 of 27 awardees submitted participant-level process evaluation data through Quarter 1 2015. At that point cumulative data collected totaled, 155 Intake Forms, 8,704 Third Trimester Surveys, 6,949 Postpartum Surveys, and 6,669 Exit Forms. This Year 3 Annual Report summarizes data received through Quarter 1 2016. All awardees are now submitting data. Cumulatively, the evaluation team has received 38,149 Intake Forms, 20,387 Third Trimester Surveys, 18,049 Postpartum Surveys, and 24,951 Exit Forms.

IMPACT ANALYSIS

The impact analysis is designed to assess whether and to what extent Strong Start had an impact on three key outcomes: rates of preterm birth; rates of low birthweight births, and Medicaid/CHIP costs through pregnancy and the first year after birth. This analysis will also assess whether these impacts vary by enhanced prenatal care model, awardee, site (where feasible), and type of services offered and received. The Impacts and Technical Assistance and Data Acquisition teams spent the first two evaluation years planning their data collection and analysis approach and began submitting requests to state agencies to obtain the data necessary for the impact analysis. During Year 1, it was decided that the evaluation would focus on measuring the effects of Strong Start in comparison to standard Medicaid maternity care practices, which requires the selection of comparison groups of women who do not receive services in Maternity Care Homes, Group Prenatal Care, or Birth Centers. In Year 2 the evaluation team began to engage with states and refined the process for requesting matched birth certificate and Medicaid eligibility and claims data. During Year 3, the Impacts and Technical Assistance and Data Acquisition teams worked closely together to request birth certificate and Medicaid data from 20 states. There were two major tasks that the impacts

team finalized to move the data acquisition process forward: selecting comparison groups, and establishing a decision rule for excluding a relatively small number of cases for which an accurate comparison group could not be drawn (described in more detail in the Year 3 Findings section). After obtaining merged birth certificate and Medicaid data from states, a propensity score re-weighting method (described in more detail in the Findings section and in Appendix G) will be used to select a well-matched comparison group of Medicaid women who deliver during the same period, who reside in roughly the same geographic area as Strong Start participants, and who have similar risk characteristics.

PROJECT REPORTS

Numerous reports are produced from each evaluation component. For example, for each case study, we produce an analytical profile addressing implementation, programmatic adaptations, and staff and participant experiences. . The participant-level process analysis is included in quarterly reports and addresses key findings related to participant risk factors, service use, outcomes and satisfaction, among other measures. And at the conclusion of each project year, our annual report summarizes and synthesizes findings across awardees and enhanced prenatal care model, using data from all evaluation components.

KEY FINDINGS FROM YEARS 1 AND 2

During the first program year, Strong Start enrollment was lower than expected at 7,568, though it steadily increased throughout the year. It took some awardees considerable time to establish intake and enrollment procedures and to hire staff; other awardees faced difficulties integrating eligibility screening and enrollment into the clinic workflow. Some awardees struggled with low take-up rates among eligible patients or experienced considerable attrition from the program. During the second program year, however, Strong Start enrollment accelerated and surpassed 23,000 women by the end of Quarter 1, 2015. In June of 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. Awardees reported that these changes facilitated accelerated enrollment as intended.

In Year 1, across all three models, awardees faced common implementation challenges, including establishing a consistent and effective process for identifying and enrolling eligible patients; integrating enhanced services into existing care models; retaining women in the Strong Start program; and complying with Strong Start data collection and submission requirements. At the same time, many awardees shared common promising practices, including the development of “opt out” enrollment procedures that resulted in higher rates of enrollment; improved targeted messaging for patients to promote higher enrollment; strategies to improve relationships between Strong Start program staff and prenatal care providers; more flexible adaptation to the needs of the

patient population; and the development and retention of dedicated, skilled and resourceful program staff.

Also in Year 1 we found that participants enrolled in Strong Start had high levels of emotional and psychosocial needs, including food insecurity, unemployment, unstable housing, and lack of reliable transportation, unmet behavioral needs, and low health literacy. All three enhanced prenatal care models are designed to address such needs, particularly through emphasizing relationship-centered care. The Maternity Care Home model typically makes care coordinators the focal point of these relationships, while Birth Centers emphasize the relationship between participants and midwives and peer counselors (many of whom have social work, nursing, or other training). The Group Prenatal Care model emphasizes both peer relationships and relationships with the group providers and facilitators. These relationships reportedly provide valuable social and emotional support for Strong Start participants and were described as important vehicles for providing education on pregnancy, preterm risks, and self-care, and for facilitating connections to external resources in the community.

By Year 2, a larger number of awardees and sites had moved to "opt out" enrollment so that Strong Start participation became the default option in more prenatal practices. Awardees also increasingly encouraged sites to enroll women with "pending" Medicaid eligibility, since most women with this status are ultimately enrolled in Medicaid. Finally, according to key informants, awardee staff simply got better at identifying potential participants and enrolling them into Strong Start as programs matured. These changes helped Strong Start reach nearly half of its revised total enrollment goal of 50,000 women.

In Year 2, having a larger data pool revealed that women enrolled in Strong Start exhibited rates of depression that were substantially higher than those of the general pregnant population. Similar proportions of depression among Strong Start participants were observed within each of the Strong Start models – 25 percent in Group Prenatal Care, 23 percent in Maternity Care Homes, and 22 percent among Birth Center enrollees – and key informants from all model types reported seeking to address participants' mental health needs. Across all models, Strong Start staff reported that they often made referrals to mental health services and supports; however, most also reported that such resources are often in short supply in their communities.

Preliminary data from Year 1 suggested some positive trends in Strong Start's effects. Participants receiving care at Birth Centers and Group Prenatal Care sites experienced lower preterm birth rates than the national average, and Birth Centers also reported rates of very low and low birthweight significantly below the national average. Furthermore, participant breastfeeding rates were at least as high as the national average, and potentially much higher for Birth Center participants.

In Year 2, the addition of Exit Form data to our analyses permitted us to characterize participants' medical risk factors for preterm birth and low birth weight. We found that Strong Start

enrollees exhibited rates of gestational diabetes and hypertension that are comparable to other low-income women of childbearing age. We also found that Strong Start participants were more likely to have had a previous preterm birth than women generally. Even though a prior preterm birth is the strongest predictor of having another preterm delivery, we found Strong Start participants with a prior preterm birth seem to be no more likely to receive 17P injections, which is the standard of care for preventing repeat preterm deliveries. Rates of having had a previous low birth weight baby were lower than observed in the general population, but approximately 20 percent of participants with previous pregnancies reported short inter-pregnancy intervals (less than 18 months), another strong predictor of poor birth outcomes.

In both Years 1 and 2 Strong Start participants expressed overwhelming satisfaction with their prenatal care, with 90 percent of participants reporting that they are either "very satisfied" or "extremely satisfied" with the care they received. Satisfaction with delivery was slightly lower than satisfaction with prenatal care for all Strong Start models, but particularly among participants enrolled in Group Prenatal Care and Maternity Care Homes. Data through Quarter 1 2015 also suggested that C-Section prevalence among women receiving care at Strong Start sites may be lower than the national average, though there is substantial variation both across and within the three models, and on average group care and maternity care home awardees had more than 23 percent missing data on this measure. Reported rates of induced deliveries are lower than national benchmarks, which is particularly notable as inductions are thought to be under-reported on birth certificates, but most data on this measure from Strong Start women comes from medical charts and is likely more accurate (Martin et al. 2013). Both findings indicate that women enrolled in Strong Start may be avoiding interventions that are not medically indicated. Subgroup analyses indicated that black women in Strong Start are more likely to have preterm deliveries and low birthweight babies than other racial and ethnic subgroups enrolled in Strong Start, a finding consistent with national data.

By the end of Year 2 we found that most Strong Start awardees hoped to sustain their programs after the conclusion of the initiative and were beginning to plan for the future. Most awardees expected that they would continue Strong Start enhancements in some form after program funding ended. Some said they plan to identify and transition to other forms of financial support while others intend to adapt their models to better attract funding within or outside their organizations. Given the potential shown by Strong Start interventions to reduce costs associated with poor birth outcomes, these awardees expressed hope to use Strong Start (and related) data to spur payment reforms at the state level.

ORGANIZATION OF THE YEAR 3 ANNUAL REPORT

This Year 3 Annual Report presents findings from the third year of the Strong Start evaluation and concentrates on information gathered through participant-level data collected through Quarter 1 2016 and case studies conducted in-person and by phone from March to July of 2016. Volume 1 of

the Annual Report presents cross-cutting findings across awardees and enhanced prenatal care models, while Volume II presents awardee-specific findings.

Year 3 Findings

A summary of findings from Year 3 of the evaluation is presented below. Findings from the participant-level program evaluation component of the study come first, followed by case study findings from the third round of data collection. The evaluation team's efforts to work with state agencies to acquire birth certificate and Medicaid data are then summarized, followed by a discussion of the Impacts Team's preparation for the coming year's analyses of the effects of Strong Start on maternal and infant outcomes and costs. This chapter concludes with a presentation of our cross-cutting analysis and conclusions drawn from the evaluation's three years of findings.

PARTICIPANT-LEVEL PROCESS EVALUATION

INTRODUCTION

Participant-level process evaluation data are used to track several process indicators including the number of prenatal and enhanced visits a patient has over the course of her care, patient demographic and risk characteristics, satisfaction with care received. Participant-level process data are being collected at four points as women progress through the Strong Start program:

1. Program intake (Intake Form);
2. Third trimester (Third Trimester Survey);
3. Postpartum (Postpartum Survey); and
4. Program discharge (Exit Form).

The first three sources of data are participant reported—sometimes with assistance— and instruments are available in both English and Spanish. The Exit Form, first rolled out in September 2014, is also available in both English and Spanish to accommodate providers in Puerto Rico who are more comfortable in Spanish. These participant data provide important information on

EXHIBIT 5: PARTICIPANT-LEVEL PROCESS EVALUATION DATA

Intake Form. The Strong Start Intake Form was developed by CMMI and implemented with Strong Start awardees prior to the launch of the evaluation. The form, which is six pages in length, includes questions pertaining to the participant's socio-demographics, pregnancy history, delivery intentions, and risk factors for premature birth. Screening tools for depression, anxiety, intimate partner violence, substance abuse, and food security are included on the form. As of January 2014, Intake Forms can be submitted electronically or on a scannable paper form.

***Third Trimester and Postpartum Surveys*.** Each two-page survey, designed by the evaluation team, captures information on select measures of health and well-being (e.g., smoking and depression), as well as delivery and postpartum intentions and client satisfaction. Some measures were included to be consistent with the Intake Form so that participants can be tracked over time. Surveys were developed and piloted during the fall of 2013 and launched along with scannable Intake Forms in January 2014. These surveys can be submitted on scannable paper forms only.

***Exit Form*.** This form documents clinical and program data from the medical chart or the Strong Start program record following discharge. These data are being completed for participants who are followed through delivery as well as for those who disenroll from Strong Start prior to delivery. Data will be used to quantify clinical pregnancy risks, clinical outcomes, and the intensity of the intervention. Awardees were polled prior to development to determine what data would be available. An initial version was piloted with four awardees in January 2014. Additional revisions were made in the spring of 2014 based on feedback from awardees and CMMI program and evaluation staff. Exit Forms can be submitted electronically or via scannable paper forms.

Strong Start enrollees, some of which is not reliably reported in administrative data sources or readily available elsewhere. Brief summaries of each form are presented in Exhibit 5. Final versions of all four instruments are available in Annual Reports I and II.[15]

With the exception of the Exit Form, the participant-level process evaluation data collection system was rolled out in January 2014. Data included in this Year 3 Annual Report includes all Intake Forms, Third Trimester Surveys, Postpartum Surveys, and Exit Forms submitted through March 31, 2016 (Quarter 1 2016). These data are presented in this chapter as well as in Appendix C.

DATA THROUGH QUARTER 1 2016

Tremendous gains in data collection have been made during this this third year of implementation, including substantial increases in the amount and proportion of PLPE data submitted over prior years. According to quarterly program monitoring data submitted to CMMI, a total of 42,138 women were enrolled in Strong Start from the program's inception through Quarter 1 2016. Intake Forms were submitted through Quarter 1 2016 for 38,149 of these participants, or 91 percent of women enrolled. Across awardees, the proportion of Intake Forms submitted for enrollees ranges from 54 percent to just over 100 percent[16] (three awardees submitted forms for slightly more women than they reported enrolling through Quarter 1 2016). Along with other program requirements implemented mid-2014, initiation of the Intake Form became a requirement for enrollment.

Submission rates of the other forms are also robust, though submission rates are harder to describe at this point. Precise estimates will not be feasible until programs have discharged all Strong Start enrollees and wrapped up data collection for the evaluation. For now, submission rates for the Third Trimesters Survey, Postpartum Form and Exit Form are overestimated, as they use reported deliveries as the denominator for expected submissions, and do not account for participants who may have been lost to follow up, dropped out of Strong Start, or reached their third trimester but have not delivered. Once all data are collected these rates will use enrollment figures as the denominator.[17] Figure 1 shows awardee compliance with participant-level process evaluation form submission by model and overall.

Data submission is now adequately robust so that, in addition to presenting descriptive characterizations, we are able to conduct a limited number of multivariate regression analyses that examine the relationship between Strong Start model and three primary outcomes (preterm birth,

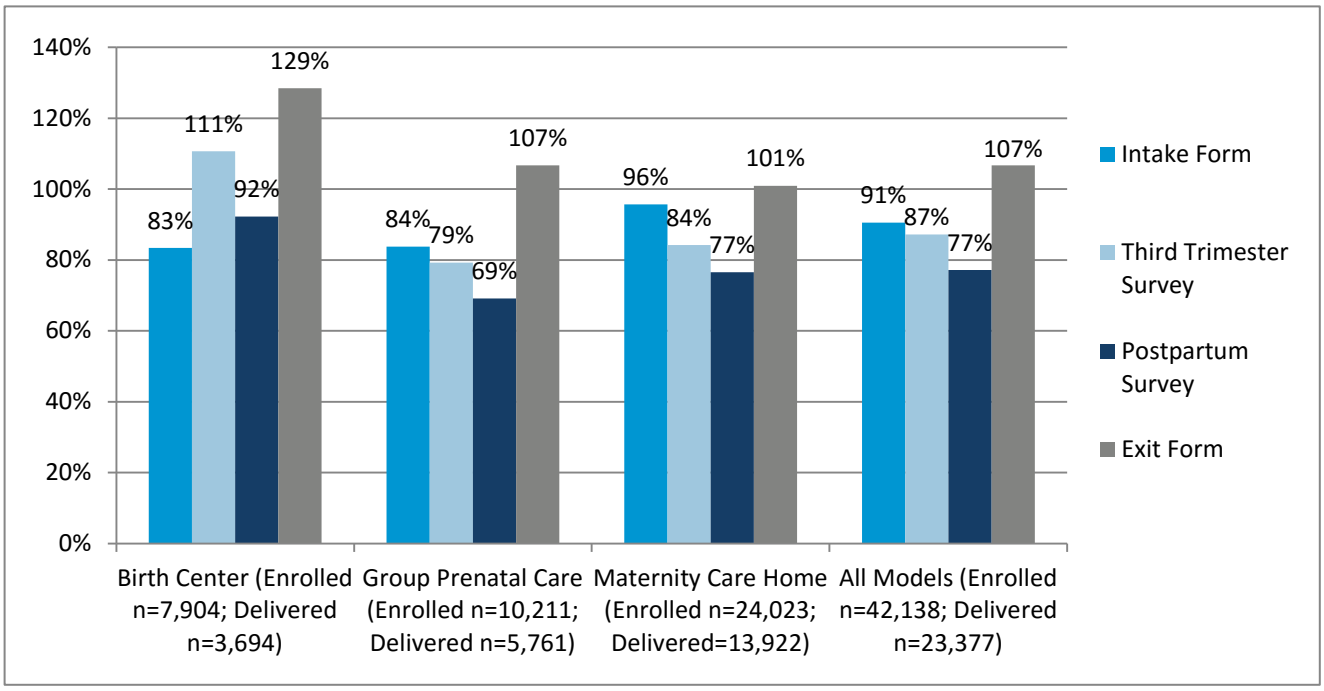
[15] https://innovation.cms.gov/Files/reports/strongstart-enhancedprenatal-yr1evalrpt.pdf; https://downloads.cms.gov/files/cmmi/strongstart-enhancedprenatalcare_evalrptyr2v1.pdf

[16] Enrollment totals are based on awardee reports in their Quarterly Program Progress Reports.

[17] Estimates of submission for Third Trimester, Postpartum, and Exit Form data are based on awardee reports of the number of women who had delivered through the end of Quarter 1 2016 in Quarterly Program Progress Reports. Submission rates greater than 100 percent for Third Trimester Surveys are likely due to more women having reached their third trimester than delivered. Submission rates greater than 100 percent for Postpartum Surveys and Exit Forms could be due to delays in reported number of deliveries in Quarterly Program Progress Reports.

low birthweight and C-section) while controlling for a host of demographic variables and pertinent risk factors.

FIGURE 1: ESTIMATED RATES OF FORM SUBMISSION, BY MODEL AND OVERALL



Notes: -Estimated rates of submission are calculated from the number of forms processed divided by the expected number of forms. -The denominator for expected Intake Forms is enrollment through Q1 2016 as reported on awardees' Quarterly Program Progress Reports; the denominators for expected Third Trimester and Postpartum Surveys and Exit Forms are deliveries through Q1 2016 as reported on awardees' Quarterly Program Progress Reports.

In this chapter we first describe the Strong Start population as we have in previous reports—readers should note that relevant demographic and risk factors have stayed largely consistent with what we reported in Annual Reports I and II. This year's descriptive presentation does differ in one important way. In the past we have included missing data in our tabulations, to highlight where there were substantial data quality concerns. Now that we have more data and the data quality is improving, we have excluded missing data from these calculations to make them more interpretable when comparing them across models and to national benchmarks. A table presenting the rates of missing data for each measure is included in Appendix B.

A brief presentation of the regression analyses follows the descriptive work. There is no control group of non-enrollees for these analyses, so analyses should not be interpreted as impacts of Strong Start, but rather as regression-adjusted comparisons of outcomes for Strong Start models. Impact Analyses of Strong Start using a propensity score reweighting of a control group sample drawn from Medicaid and birth certificate data will be available in the later years of the evaluation.

PARTICIPANT RISK PROFILES

Strong Start participants have been targeted for participation in this program specifically because they are at increased risk for preterm birth and delivering low birthweight babies. Mounting evidence suggests that lower-income women who qualify for Medicaid often experience significant social, economic, and health challenges that may affect their pregnancies and birth outcomes (Chen et al. 2011). Descriptive analyses from the first and second years of Strong Start implementation indicate that Strong Start enrollees struggle with a variety of social, emotional and physical stressors. These findings hold true in this third year of the evaluation, as the demographic and psychosocial risk profiles of women enrolled in the program have remained overwhelmingly steady from year to year. Additional data, however, allows detection of more uncommon risks and outcomes and allows for subgroup considerations.

Demographic Characteristics:

Demographic characteristics of Strong Start participants, as reported on participant Intake Forms, provide an understanding of who is receiving Strong Start services and any ways in which those trends may differ by model. These elements help us understand whether Strong Start is targeting women who may be at greater risk of experiencing poor birth outcomes, as evidence indicates that certain demographic characteristics are associated with increased risk. In this section we present the racial and ethnic make-up of the sample, the educational background of women enrolled, and women's relationship status.

Compared with pregnant Medicaid beneficiaries nationally, the racial and ethnic makeup of Strong Start enrollees continues to be disproportionately non-Hispanic black (40 percent). According to the Centers for Disease Control and Prevention's (CDC) 2014 National Health Interview Survey (NHIS), just under one-quarter of pregnant women receiving Medicaid are black (22 percent). Approximately 26 percent of Strong Start enrollees are Non-Hispanic white, a proportion slightly lower than we have observed in previous years, and 30 percent identify as Hispanic. The remaining five percent report being either Asian, mixed race, or "other."[18,19] The over-representation of black women in the Strong Start population is relevant given evidence that black women of all income levels are more likely to experience adverse pregnancy outcomes than comparable white or Hispanic pregnant women (Zhang, Cardarelli, Shim, Ye, Booker, & Rust, 2013, Martin et al. 2015).[20]

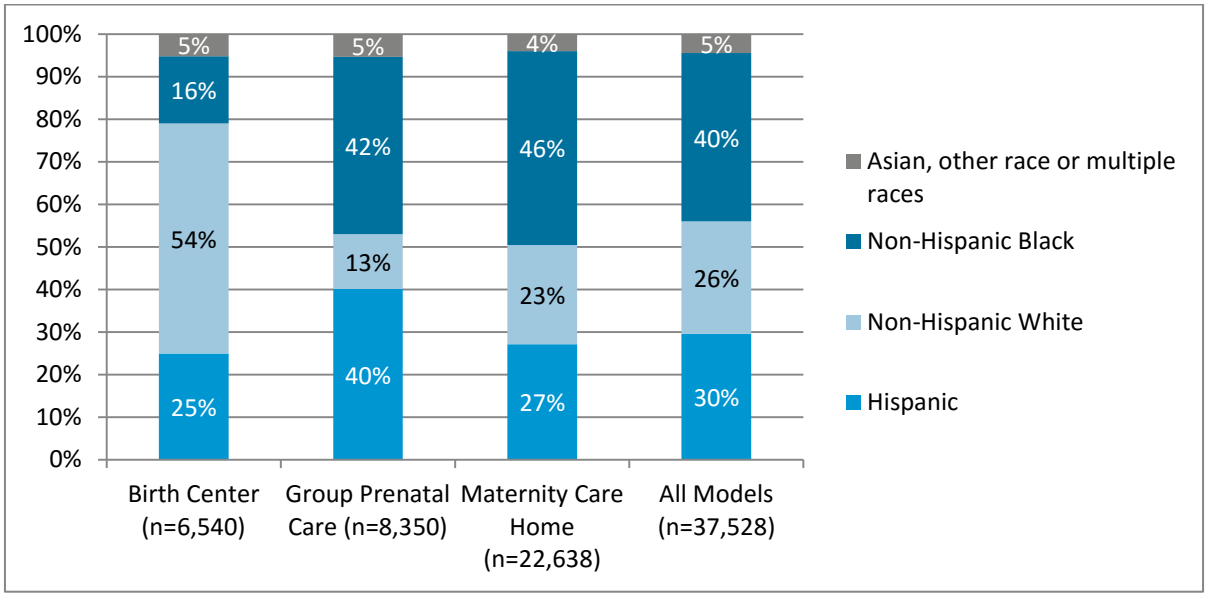
[18] Race and ethnicity data are collected through two separate questions on the Intake Forms, but combined categories have been created for reporting purposes

[19] Some participants did not report a race, but did report an ethnicity, and vice versa. For the purposes of this analysis, all women who indicated they were Hispanic were included in the Hispanic race/ethnicity category. Thus, Hispanic participants can be any race. Among participants who indicated a race, some of these did not indicate an ethnicity. In these cases, the women were assumed to be non-Hispanic and were assigned to the non-Hispanic category for the indicated race.

[20] One awardee considers being African American a risk factor that qualifies women for Strong Start. This could contribute to the larger proportion of black women enrolled in Strong Start.

Racial breakdowns do differ significantly by model—with significantly more white women being served in Birth Center settings than the other two models ($p<0.001$), significantly more Hispanic women being served by Group Prenatal Care sites ($p<0.001$), and significantly more black women receiving care in Maternity Care Homes ($p<0.001$). When the University of Puerto Rico (UPR), a Group Prenatal Care awardee in which nearly all women identify as Hispanic, is excluded from this analysis, the proportion of Hispanic women in the Group Prenatal Care model dips below that in Maternity Care Homes to 24 percent. These data (retaining UPR) are shown in Figure 2.

FIGURE 2: COMBINED RACE AND ETHNICITY OF STRONG START PARTICIPANTS, BY MODEL AND OVERALL



Note: Missing data are excluded from these calculations. Rates of missing for race and ethnicity by model are as follows: 0.8 percent for Birth Centers, 2.4 percent for Group Prenatal Care and 1.6 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B. Ns are based on women for whom Intake Forms were submitted and had non-missing data for race and/or ethnicity.

Three-quarters of women enrolled in Strong Start are 20 to 34 years old. Ten percent are of advanced maternal age (35 and older), and about 15 percent are teens. There are few very young teens in Strong Start;65 percent of teens enrolled are 18-19 years old, which is consistent with other data on teen pregnancy. As presented in a 2016 report by the Guttmacher Institute, while 18-19 year olds represented only 40 percent of teens (15-19) in 2011 overall, they accounted for 70 percent of all teen pregnancies (Kost and Maddow-Zimet, 2016). Age breakdowns are summarized in Table 1.

TABLE 1: MOTHER'S AGE AT INTAKE, BY MODEL AND OVERALL

Data Element	N or %	Birth Center	Group Prenatal Care	Maternity Care Home	All Models
Mother's Age at Intake	N	6556	8379	22738	37673
Less than 18 years of age	%	2.8	6.9	5.7	5.5
18 and 19 years of age	%	6.6	12.4	9.7	9.7
Greater than or equal to 20 and less than 35 years of age	%	81.5	72.7	75.3	75.8
35 years of age or older	%	9.0	8.0	9.4	9.0

Note: -Missing data are excluded from these calculations. Rates of missing for mother's age at intake by model are as follows: 0.6 for Birth Centers, 2.1 percent for Group Prenatal Care and 1.1 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B. Ns are based on women for whom Intake Forms were submitted and had non-missing data for birth date on the crosswalk and date of entry into care on the Intake Form.

Socioeconomic Profile of Strong Start Participants:

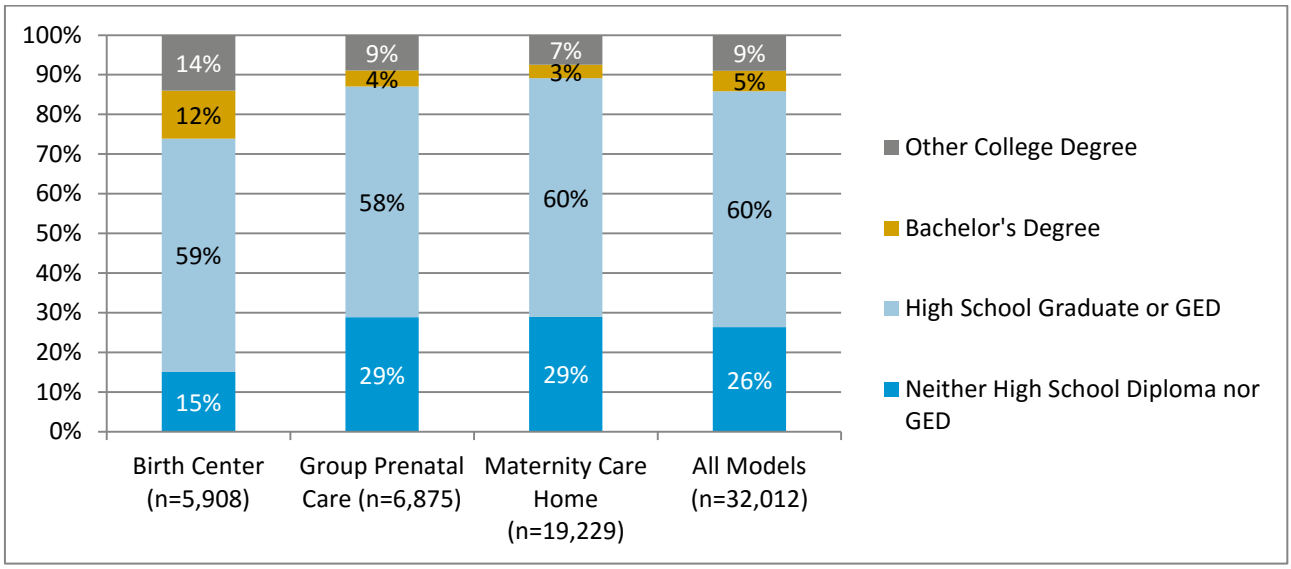
Consistent with the case study analyses, which indicate that Strong Start enrollees experience high levels of need (Hill et al., 2014, Hill et al. 2015), Intake Form data through Quarter 1 2016 continue to show that enrollees have low levels of educational attainment, high rates of unemployment and experience persistent food insecurity.

More than a quarter of Strong Start participants did not complete high school an additional 60 percent have completed high school or received a GED). Low educational attainment is a risk factor for poor birth outcomes, including low birthweight and preterm birth, and is likely to operate through a number of complex mechanisms (Institute of Medicine, 2007). Five percent of women have a Bachelor's degree, and another nine percent have completed some other form of college (such as an Associate's Degree). When we limit the sample to women 25 and older, rates do increase such that nearly 20 percent of women have either a Bachelor's degree or other college degree.

As illustrated in Figure 3, educational attainment rates do vary significantly by model, with Birth Center enrollees being significantly ($p<0.001$) more likely to have a Bachelor's degree than women enrolled in either of the other two models.[21] Though rates are low across models generally, 12 percent of Birth Center enrollees have a Bachelor's degree compared with four percent of women enrolled in Group Prenatal Care and 3.4 percent of women enrolled in Maternity Care Homes. Corresponding differences exist among women without a high school education (15 percent of

[21] Significant differences were established using t-tests (P<=.001).

FIGURE 3: HIGHEST LEVEL OF EDUCATION COMPLETED BY STRONG START PARTICIPANTS, BY MODEL AND OVERALL

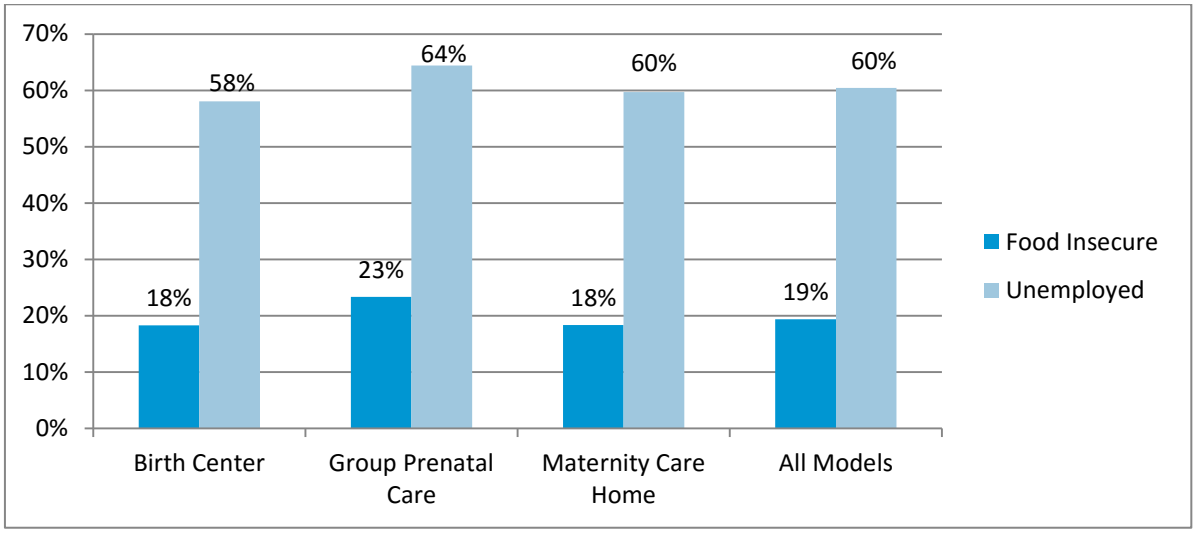


Note: -Missing data are excluded from these calculations. Rates of missing for education level by model are as follows: 10.4 percent for Birth Centers, 19.7 percent for Group Prenatal Care and 16.4 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.; Ns are based on women for whom Intake Forms were submitted and had non-missing data for these measures.

women enrolled in Birth Center care compared with 29 percent of Group Prenatal Care participants and 29 percent of Maternity Care Home enrollees). These differences are larger than they were in years past, but the direction is the same and the trend remains consistent with general perceptions that Birth Centers serve a larger proportion of more highly educated women (Walsh & Downe, 2004). Again, we observe that a sizable number of participants choose not to answer this question (16 percent overall); though reasons for this high rate of missing responses are unknown, case study informants have indicated that some women find the question offensive or did not understand how it related to their prenatal care.

As we've observed in past annual reports, more than half of women (60 percent) enrolled in Strong Start report not having a job at intake. Nearly 20 percent of women in the sample who do not have a job are in school, but 80 percent are not. While these high rates of unemployment could indicate underlying health concerns that could increase women's risk of poor birth outcomes or that multiparous women are caring for young children, we do not have the information to fully understand the cause of joblessness among Strong Start enrollees. As shown in Figure 4, joblessness rates are relatively similar across Strong Start models, though Group Prenatal Care enrollees are significantly less likely to be employed than women enrolled in the other two models.

FIGURE 4: RATES OF UNEMPLOYMENT AND FOOD INSECURITY AT INTAKE, BY MODEL AND OVERALL



Note: -Missing data are excluded from these calculations. Rates of missing for unemployment by model are as follows: 1.3 percent for Birth Centers, 3.7 percent for Group Prenatal Care and 1.8 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B Ns are based on women for whom Intake Forms were submitted and had non-missing data for these measures.

Employment rates among Strong start participants are low, and all have incomes low enough to qualify for Medicaid or CHIP coverage. Even though all women enrolled in Strong Start are eligible for WIC and most are also eligible for the Supplemental Nutrition Assistance Program (SNAP) approximately 20 percent of participants report experiencing food insecurity. That rates of food security are still this high may indicate that available food assistance is inadequate, or that take-up of food assistance is lower than it could be. Group Prenatal Care participants are significantly more likely to report experiencing food insecurity than other Strong Start participants. We know from the case studies peer counselors and care coordinators frequently refer participants to food pantries among other resources, to help address persistent needs.

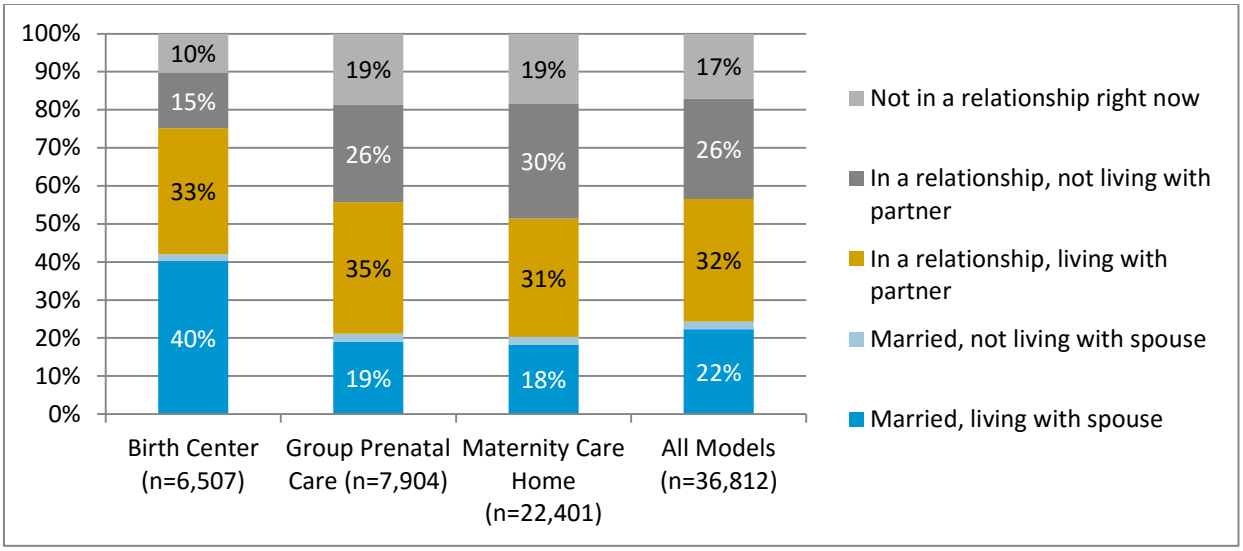
Marriage rates among Strong Start enrollees remain remarkably low. Just 22 percent of all Strong Start participants report living with a spouse, a rate lower than indicated in other studies of low-income mothers. Marital births reported in the literature range widely even among low-income earnings brackets (from 30 percent to 70 percent) but remain notably higher than the Strong Start rate (Shattuck & Krieder, 2013).[22] Although being unmarried was a risk factor that a small number of awardees used initially for Strong Start eligibility and we might expect, therefore, that more unmarried women were enrolled in the early years of Strong Start, after the requirement for a risk factor in addition to Medicaid eligibility was removed in 2014, the PLPE data indicate that these rates remained steady.

[22] An analysis for National Health Interview Survey (NHIS) data run by the Urban Institute finds that 40 percent of pregnant Medicaid beneficiaries were married in 2014

While marriage rates are low, most Strong Start enrollees do report having a partner. Thirty two percent of Strong Start participants are living with a partner, and another 26 percent of participants are in a relationship but not living with their partners. Only 17 percent_ indicate that they are not in a relationship at all at the time of intake. Relationship status and stability can contribute to healthy pregnancy and positive birth outcomes. Several studies have demonstrated that both the type and quality of a relationship can have bearing on maternal and infant outcomes around pregnancy (Bloch et al. 2010; Fairley & Leyland, 2006; Butler & Behrman, 2007). Research also indicates that many low-income women who are partnered at the time of their child's birth do have plans to marry but delay marriage because of financial instability (Gibson-Davis et al. 2005).

By model, there is substantial variation in the share of enrollees who are married. In particular, Birth Center participants are more than twice as likely to be married and living with a spouse than women enrolled in Group Prenatal Care or Maternity Care Homes (40 percent compared with 19 percent and 18 percent, respectively). Similarly, women enrolled in Group Prenatal Care or Maternity Care Homes are more likely to have a non-resident partner than Birth Center participants (26 percent and 30 percent, respectively, compared with 15 percent of Birth Center participants). Fairly equal numbers of women across models are living with a partner (approximately a third of women enrolled in each model of care). These differences are presented in Figure 5.

FIGURE 5: RELATIONSHIP STATUS OF STRONG START PARTICIPANTS AT INTAKE, BY MODEL AND OVERALL



Notes: -Values of three percent and less are not labeled; Missing data are excluded from these calculations. Rates of missing for relationship status by model are as follows: 1.3 percent for Birth Centers, 7.7 percent for Group Prenatal Care and 2.6 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B. Ns are based on women for whom Intake Forms were submitted and had non-missing data for these measures.

Overall, we observe that Birth Center participants depart somewhat from the average demographic profile of other Strong Start participants, with a larger proportion of white, married, and college-educated women than women enrolled in either Group Prenatal Care of Maternity Care

Homes. This suggests that Birth Center participants may benefit from some social and institutional circumstances that put them at lower risk for poor birth outcomes. Observable characteristics are controlled for in our preliminary regressions and will be controlled for in our impact analyses, but there may be unobservable factors associated with these characteristics that we cannot operationalize.

Psychosocial and Behavioral Risk Factors:

A variety of psychosocial and behavioral health conditions can also put women at risk for experiencing poor birth outcomes. In this section we present data on Strong Start enrollees' experiences with intimate partner violence, smoking, depression and anxiety.

The prevalence of intimate partner violence (IPV) during pregnancy is challenging to measure. IPV has been associated with poor pregnancy outcomes including low birthweight and preterm labor, though it may be the subsequent stress, depression and stress-related behaviors resulting from abusive situations(e.g. smoking) that are ultimately the cause of these outcomes (Bailey 2010, Rosen 2010). Twenty percent of enrollees report having experienced IPV as measured by the Slapped, Threatened and Throw screener, which measures lifetime exposure to IPV (Paranjape and Liebschutz 2004). Current experience with IPV appears to be considerably less common, with only 2.5 percent of women reporting they are currently in abusive situations as measured by the Women's Experience of Battery scale. There is relatively little variation between the different Strong Start models on either of these measures.

Thirteen percent of all Strong Start participants report smoking at the time of intake. Maternity Care Home enrollees were the most likely to smoke (14 percent), compared with 11 percent of Birth Center participants and 10 percent of Group Prenatal Care participants. Rates of missing data on smoking measures range from 6 percent among Maternity Care Home participants, to 10 percent for Birth centers to 18 percent among Group Prenatal Care participants. Both Maternity Care Home and Birth Center participants are significantly ($p<0.001$) more likely to smoke than Group Prenatal Care enrollees. Overall, however, these rates are considerably lower than CMS estimates, which suggest that approximately 20 percent of pregnant Medicaid beneficiaries overall smoke during pregnancy, with at least one other study reporting rates as high as 26 percent (Adams et al. 2004/2005, Holtrop et al. 2010). While it is fairly likely that smoking is underreported on the Intake Form, as it is on other self-administered surveys, given the program's intent to target women at greater risk of delivering low birthweight and preterm babies we might actually expect to see higher rates of smoking than we observe in these data.

Depression, a mental health condition many pregnant women face, has been associated with poor birth outcomes independent of concomitant unhealthy behaviors. As presented in Figure 6, 26 percent of Strong Start participants exhibited depressive symptoms at intake through Quarter 1

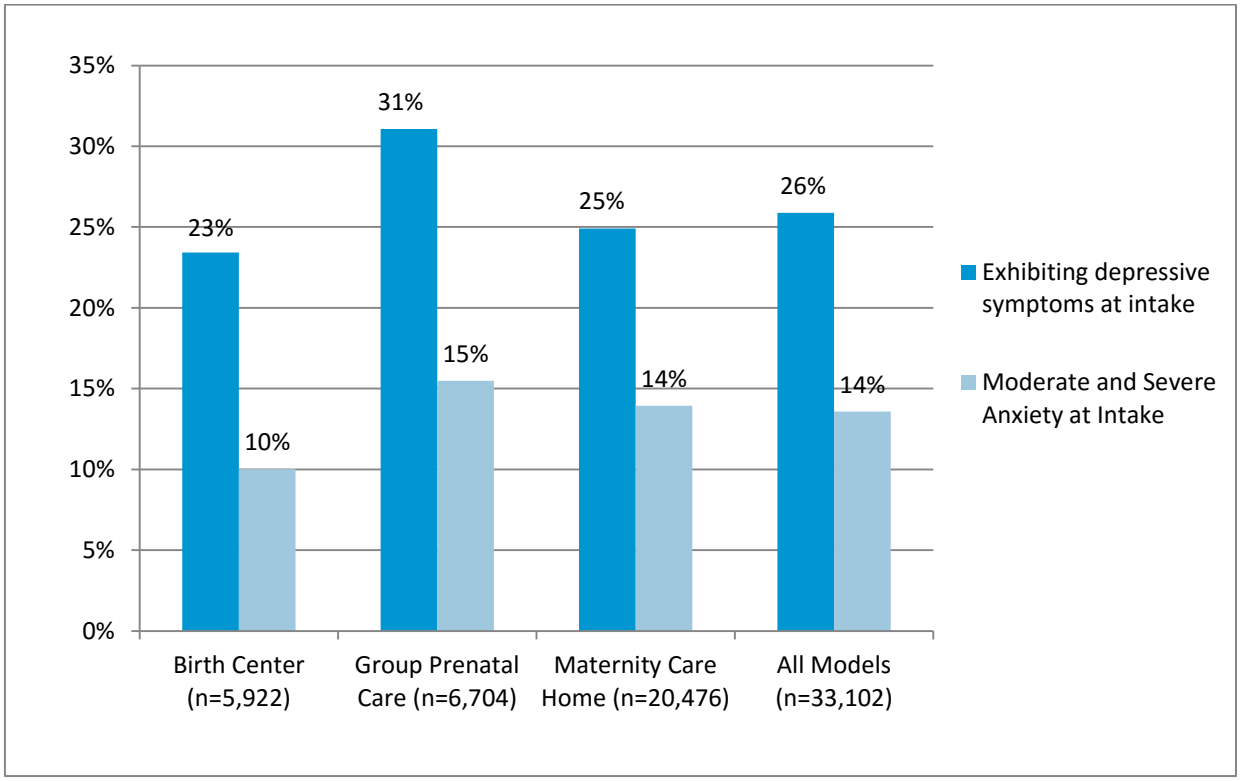
2016, as measured by a shortened 10-item version of the CES-D scale.[23] Individuals who score eight or higher (out of 10 items) are categorized as exhibiting depressive symptoms. Group Prenatal Care participants are significantly more likely to exhibit depressive symptoms (31 percent) than either Maternity Care Home (25 percent) or Birth Center participants (23 percent). The expression of depressive symptoms among Strong Start participants appears to be substantially higher than what has been cited in the peer-reviewed literature, where prevalence rates of antenatal depression are estimated to range from about seven percent to 16 percent among pregnant women of all incomes, but are generally measured using a different screener (PHQ-9) (Bennett et al. 2004; Katon et al. 2011, Leight et al. 2010) An earlier look at low-income pregnant women found perinatal depression rates to be in the twenties (Hobfall et al. 1995).

Perinatal anxiety, which is less commonly assessed during pregnancy, has been linked to poor birth outcomes as well as longer-term child development consequences (Dunket-Schetter & Tanner 2012, Beigers et al. 2010). Precise estimates of anxiety during pregnancy do not exist, but there is considerable evidence many women experience stress during their pregnancies (Ross et al. 2006, Woods et al. 2010). A 2012 review of the literature on perinatal anxiety distinguishes between "state" anxiety and stress—which may be attributed life circumstances such as unemployment, institutionalized racism, and over-crowded residences—and pregnancy-specific anxiety—which is tied to the current pregnancy and may pertain to the baby's growth, loss of the baby, hard during delivery among other concerns (Dunkel -Schetter & Tanner 2012). State anxiety has been associated with shorter gestation and low birthweight, but the strongest evidence links anxiety during pregnancy with attention regulation, cognitive and motor development, and infant temperament during the first year of life (Beijers et al. 2010).

Approximately 14 percent of Strong Start participants are experiencing moderate or severe anxiety at program enrollment according to data collected on the Intake Form. Anxiety rates are highest for Group Prenatal Care participants, and lowest among Birth Center participants. Anxiety by model and overall is presented in Figure 6 along with depression. Anxiety among Strong Start enrollees is measured using the Generalized Anxiety Disorder(GAD)-7 item scale (Spitzer et al. 2006), and was selected for inclusion on the Intake Form since it is also being used in the MIHOPE Strong Start evaluation and is validated for use in pregnancy. Lifetime prevalence of anxiety has been estimated to be around 29 percent in the general population (Kessler et al. 2005). One study that quantifies lifetime prevalence of GAD—characterized by a six-month period of uncontrollable worry—reports anxiety occurs at a rate of 5.7 percent (Fricchione 2004). A meta-analysis of anxiety disorder prevalence during pregnancy found that reported antenatal GAD rates range from 0 percent to 10.5 percent (Goodman et al. 2014).

[23] The CES-D used on the Intake Form is a hybrid of two validated shortened versions of the scale, and is referred to as the MIHOPE-10. This version is also being utilized in the MIHOPE-Strong
Start evaluation.

FIGURE 6: PROPORTION OF STRONG START PARTICIPANTS EXHIBITING DEPRESSIVE SYMPTOMS OR ANXIETY AT INTAKE, BY MODEL AND OVERALL



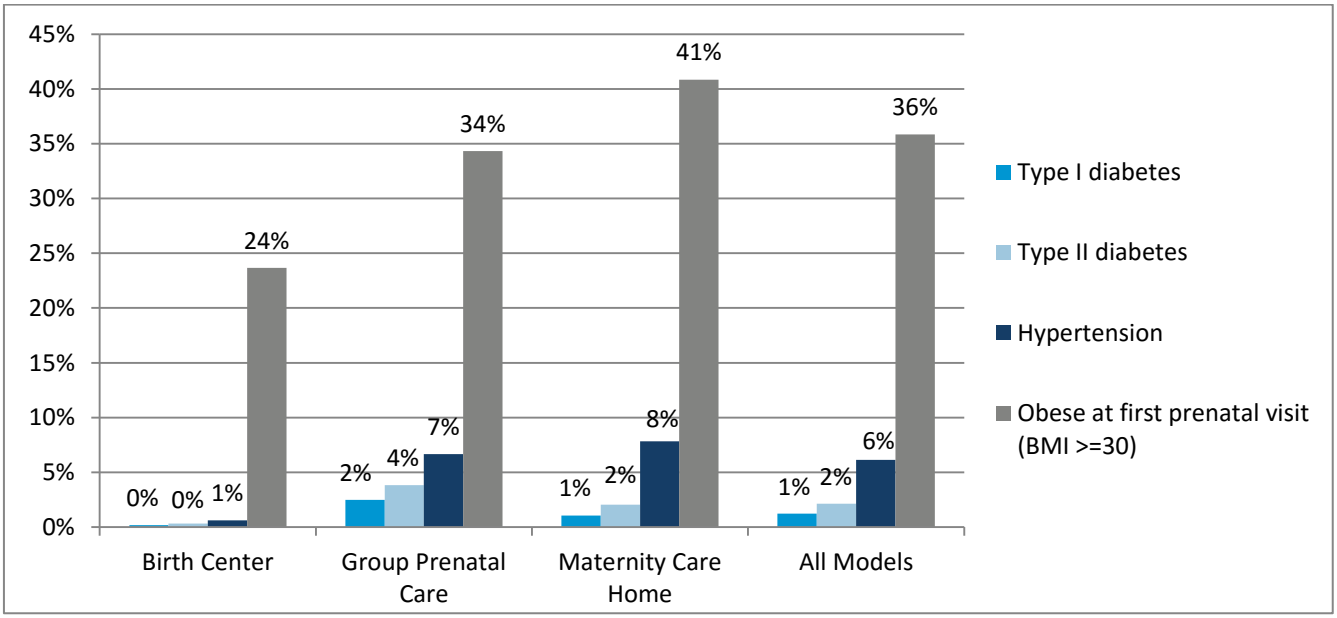
Note: -Missing data are excluded from these calculations. Rates of missing for depression by model are as follows: 1.5 percent for Birth Centers, 7.3 percent for Group Prenatal Care and 3.7 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.; Ns are based on women for whom Intake Forms were submitted and had non-missing data for these measures

Pre-Pregnancy Medical Risk Factors:

A number of medical risk factors can put women at greater risk for experiencing poor birth outcomes. Having had a prior preterm birth is the most significant predictor of preterm birth, but other medical conditions such as having a pre-pregnancy diagnosis of diabetes or hypertension, or high BMI is also associated with poor birth outcomes (see for example Siega-Riz & Laraia 2006).

Rates of pre-pregnancy diagnosis of type I diabetes, type II diabetes, and hypertension are relatively low overall among Strong Start participants, compared to those cited in the literature. Across all models, 1.2 percent of women have type I diabetes, 2.1 percent have type II diabetes, and 6.1 percent have hypertension, as reported on participant Exit Forms. Proportions of Strong Start women with these medical risk factors are presented by model and overall in Figure 7. A recent study of low-income women of reproductive age (18-44) suggests that these conditions are more common than we see reported for the Strong Start population—with approximately three percent having diabetes, and 12 percent being hypertensive (Robbins et al., 2013).

FIGURE 7: PRE-PREGNANCY DIAGNOSIS OF DIABETES, HYPERTENSION & OBESITY, BY MODEL AND OVERALL



Note: -Missing data are excluded from these calculations. Rates of missing for pre-pregnancy diagnosis of type I diabetes by model are as follows: 0.2 percent for Birth Centers, 4.4 percent for Group Prenatal Care and 3.0 percent for Maternity Care Homes. Rates of missing for pre-pregnancy diagnosis of type II diabetes by model are as follows: 0.2 percent for Birth Centers, 4.7 percent for Group Prenatal Care and 3.2 percent for Maternity Care Homes. Rates of missing for pre-pregnancy diagnosis of hypertension by model are as follows: 0.2 percent for Birth Centers, 4.5 percent for Group Prenatal Care and 3.0 percent for Maternity Care Homes. Rates of missing for pre-pregnancy diagnosis of obesity by model are as follows: 5.3 percent for Birth Centers, 27.4 percent for Group Prenatal Care and 12.4 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B; Ns is based on women for whom Exit Forms were submitted and had non-missing data for these measures.

Though the data show relatively low rates of chronic conditions that are highly correlated with weight, obesity rates among Strong Start participants are high, with 36 percent of Strong Start enrollees being overweight or obese at their first prenatal care visit. Specifically, 26 percent are overweight (BMI 25-29), 27 percent are obese (BMI 30-39), and another nine percent are very obese (BMI>=40). Higher maternal weight has been associated with increased risk of diabetes (gestational and pregestational), hypertension, C-section delivery—as well as reduced success of VBAC attempts—macrosomic infants, and increased risk of having a baby with neural tube defects (Leddy et al. 2008, Bloomberg and Kallen 2009, Yu et al. 2013,). Being underweight has also been linked to preterm birth and other pregnancy complications (Girsen et al., 2016), but only three percent of Strong Start participants are underweight at their first prenatal visit.

More than half of women for whom Exit Forms were submitted through Quarter 1 2016 had had a previous birth (N=14,784 out of 24,951). Fifteen percent of multiparous participants have given birth to a preterm baby—which is the most significant predictor of having a subsequent preterm birth. According to CDC final birth data for 2014, the overall preterm birth rate was 9.6 percent, down from 11.6 percent in 2012 (Martin et al., 2015). Importantly, at least some of the change in this rate is likely due to changes in the way estimated gestational age is assessed. These

rates are notably lower than those reported by Strong Start participants, signaling that this is likely a group of women at higher risk of preterm birth than the general population. Rates of preterm birth, however, have declined since 2007 and we do not know the timing of the previous preterm births being reported on the Exit Form and research indicates that low-income women are at greater risk of having a preterm birth (prior and subsequent).

Rates of previous preterm birth vary somewhat by model: 19 percent of Maternity Care Home enrollees with a prior birth (multiparous women) had delivered preterm, while 12 percent of multiparous women enrolled in Group Prenatal Care and 10 percent of multiparous women enrolled in Birth Center care had a prior preterm birth.

Though we might expect reported rates of previous low birthweight babies to closely track with rates of preterm delivery, overall rates of having had a previous low birthweight baby are lower than rates of previous preterm. By model the trends are mixed—some are lower and some are higher than previous preterm birth: 15 percent of Maternity Care Home participants, 10 percent of Group Prenatal Care participants, and two percent of Birth Center participants had prior low birthweight babies.

Slightly more than a quarter of women (27 percent) who had previously given birth had an interpregnancy interval of less than 18 months. Short interpregnancy intervals are associated with poor birth outcomes. Potential associated risks include low birthweight, preterm birth, and neonatal death (Copen e t al, 2015). Women enrolled at Birth Centers were the most likely to have a short interpregnancy interval, while Group Prenatal Care participants were the least likely. Data on select medical risk factors present in multiparous Strong Start participants is presented in Figure 8.

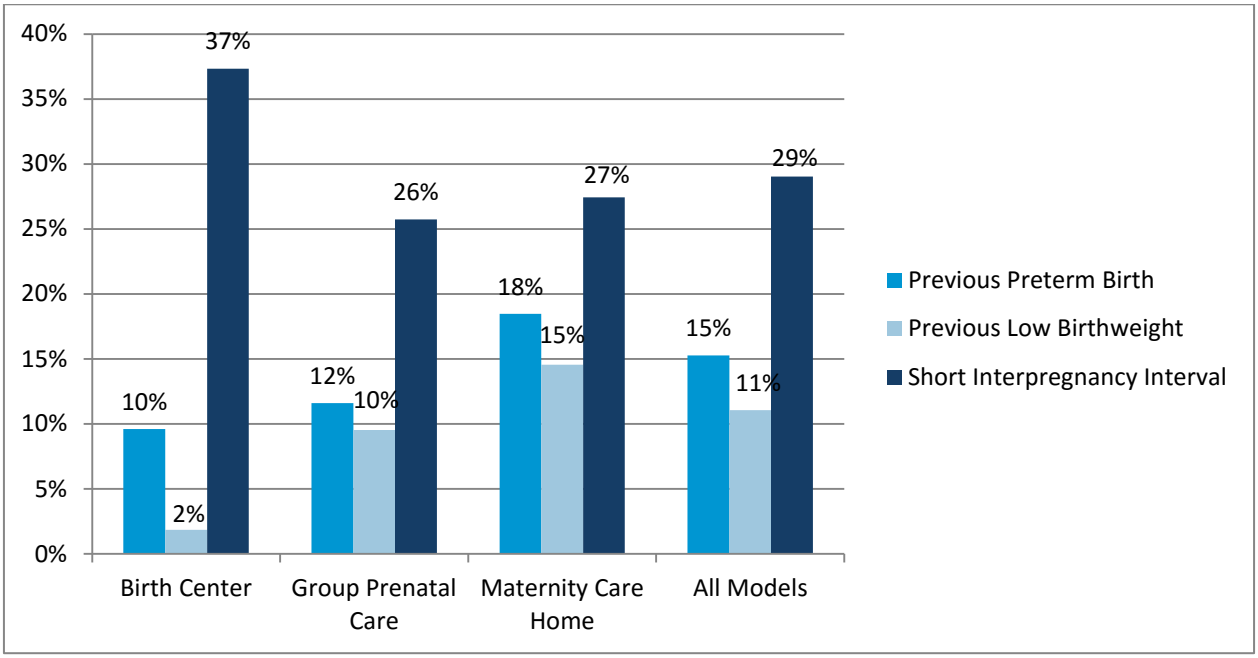
PREGNANCY INTERVENTIONS & DIAGNOSES

Pregnancy Interventions:

Progesterone injections, also referred to as 17P, are indicated for women with singleton pregnancies who have a history of spontaneous preterm birth. As discussed above, about 15 percent of multiparous Strong Start participants have had a previous preterm birth, or 11 percent of Strong Start participants overall. We do not know, however, if participants' preterm births were spontaneous or medically indicated, which likely places some restriction on the proportion of eligible women.

Administration of 17P is weekly, starting in early to mid-second trimester, and often requires gaining pre-approval from managed care plans. Case study analyses indicate that managed care approval can be arduous at times and rigid eligibility. Nonetheless, very few women (374 participants) have received 17P according to Exit Form data, accounting for about 14 percent of women with a prior preterm birth. These represent slightly lower rates of administration than reported in years' past, but may still be higher than typical utilization rates, which may be as low as

FIGURE 8: MEDICAL RISK FACTORS IN MULTIPAROUS WOMEN, BY MODEL AND OVERALL

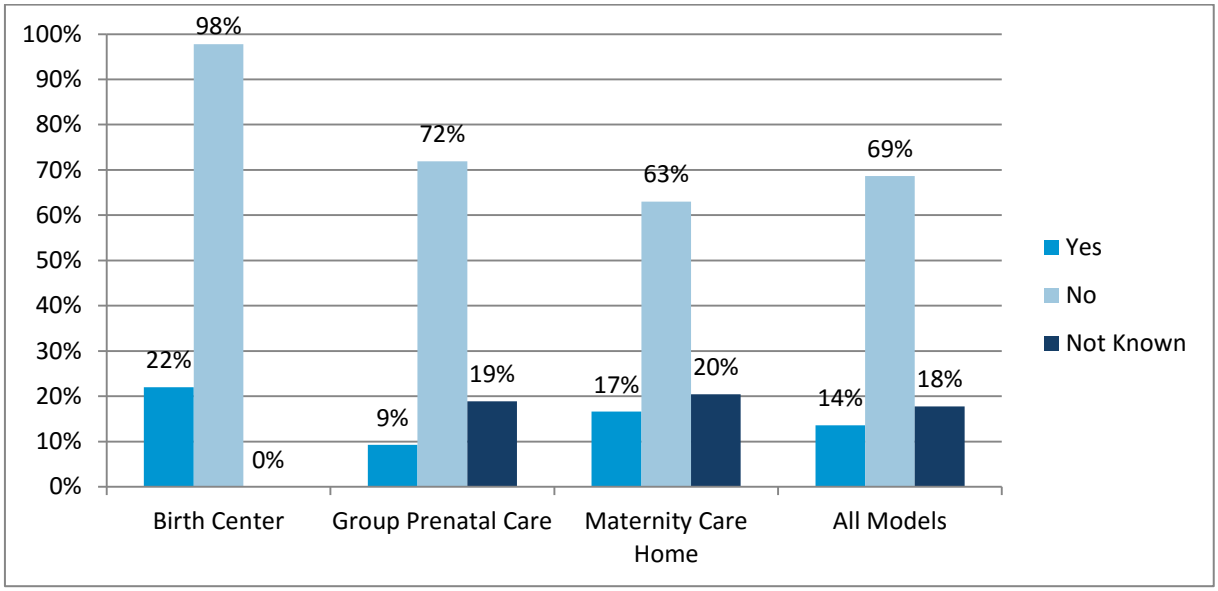


Note: -Missing data are excluded from these calculations. Rates of missing for previous preterm birth by model are as follows: 0.4 percent for Birth Centers, 3.5 percent for Group Prenatal Care and 3.8 percent for Maternity Care Homes. Rates of missing for previous low birthweight by model are as follows: 0.7 percent for Birth Centers, 13.2 percent for Group Prenatal Care and 4.5 percent for Maternity Care Homes. Rates of missing for short interpregnancy interval by model are as follows: 22.1 percent for Birth Centers, 29.9 percent for Group Prenatal Care and 25.1 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B. Ns are based on women for whom Exit Forms were submitted , indicated on the Intake OR the Exit Form that they'd had a previous birth, and had non-missing data for these measures.

5 percent in some states (ASTHO 2015), which suggest that only 5 to 10 percent of eligible women receive 17P (Norwitz & Caughey, 2011). During case study interview discussions about 17P treatment, some key informants described the use of vaginal progesterone to prevent recurrent preterm birth, though vaginal progesterone is primarily indicated for short cervix and thus does not have the same indicators as 17P.

Fifty seven percent of women who did receive 17P are black, while 22 percent are Hispanic and 20 percent are white. This is largely a function of the fact more black enrollees had prior preterm births upon entering the program—47 percent of Strong Start enrollees with a previous preterm birth are non-Hispanic black while approximately one quarter are white and another quarter are Hispanic (22 percent and 27 percent respectively). The proportions of women who received 17P as a percentage of women who are potentially eligible for the intervention are displayed by model and overall in Figure 9.

FIGURE 9: 17P ADMINISTRATION AS A PERCENTAGE OF WOMEN WITH A PREVIOUS PRETERM BIRTH, BY MODEL AND OVERALL



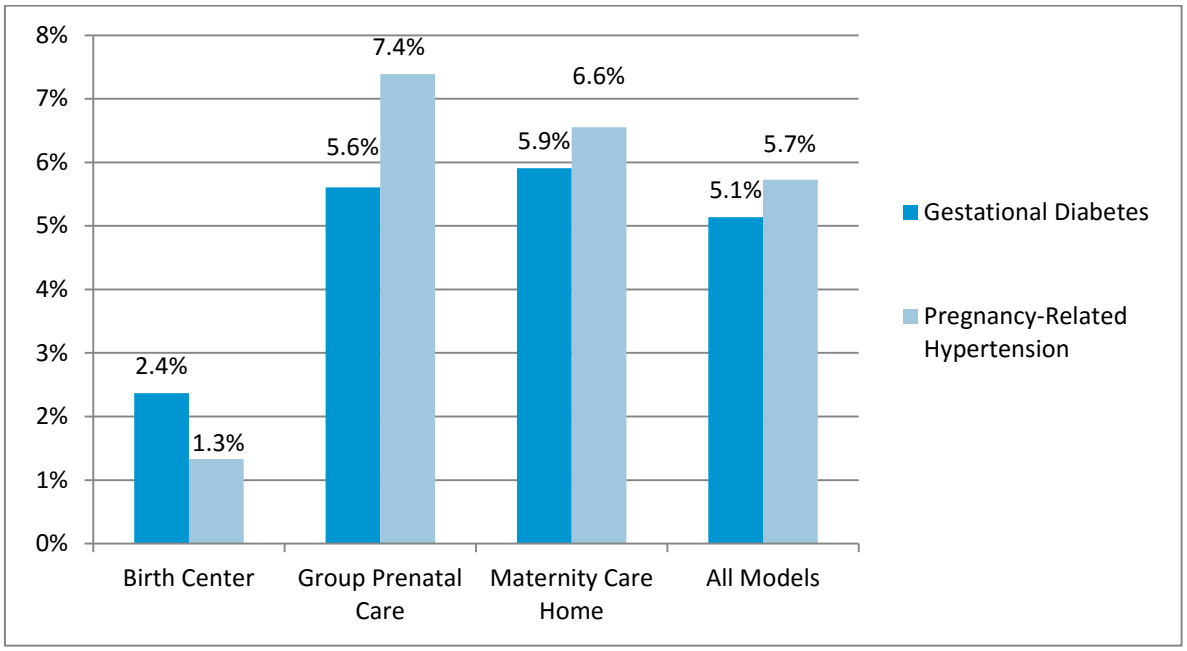
Note: -Missing data are excluded from these calculations. Rates of missing for previous preterm birth by model are as follows: 0.4 percent for Birth Centers, 3.5 percent for Group Prenatal Care and 3.8 percent for Maternity Care Homes. Rates of missing for progesterone injections by model are as follows: 10.7 percent for Birth Centers, 16 percent for Group Prenatal Care and 11.4 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

Pregnancy Conditions:

A small proportion of Strong Start participants (5 percent) reportedly developed gestational diabetes during their Strong Start pregnancy according to Exit Form submissions. This is lower than reported rates of gestational diabetes in a comparable population. Findings from a study using the Pregnancy Risk Assessment Monitoring System (PRAMS) data and birth certificates suggests that the incidence of gestational diabetes among women enrolled in Medicaid is nearly 10 percent (DeSisto, Kim, & Sharma, 2014). Other studies report lower incidence, consistent with that observed among Strong Start participants (Kim et al., 2010). Some Strong Start awardees are enrolling women specifically because they have developed gestational diabetes during their pregnancy or are at risk of developing gestational diabetes based on their medical history. In contrast to gestational diabetes rates, pregnancy-related hypertension rates for Strong Start participants are about six percent—higher than those reported in the literature for low-income women, which hover around three percent (Bateman et al., 2012). The underlying causes and mechanisms for preventing pregnancy-induced hypertension are largely elusive, and therefore pose a particular challenge to prenatal care providers. Though we do not know for certain why diabetes rates are considerably lower and hypertension rates are higher than national benchmarks, case study interviews indicate that Strong Start awardees are focused on providing nutrition counseling, guidance and referrals, and perhaps those efforts are translating into reductions in gestational diabetes in this high-risk

group. Strong Start rates of gestational diabetes and pregnancy-induced hypertension, which have not changed much from prior years, are presented in Figure 10.

FIGURE 10: RATES OF GESTATIONAL DIABETES AND PREGNANCY-RELATED HYPERTENSION, BY MODEL AND OVERALL



Note: -Missing data are excluded from these calculations. Rates of missing for gestational diabetes by model are as follows: 0.3 percent for Birth Centers, 5.1 percent for Group Prenatal Care and 4.0 percent for Maternity Care Homes. Rates of missing for prepregnancy-related hypertension by model are as follows: 0.3 percent for Birth Centers, 5.1 percent for Group Prenatal Care and 4.0 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B; Ns are based on women for whom Exit Forms were submitted and had non-missing data for these measures.

STRONG START SERVICE USE

Exit Form data allow us to quantify prenatal care and enhanced service use, providing an important data element. In conjunction with Case Study analyses, these data support the evaluation team's effort to characterize the nature and intensity of each of the Strong Start models.

Consistent with the PLPE data collected previously, Exit Forms submitted through Quarter 1 2016 indicate that Birth Center and Maternity Care Home participants received approximately 10 routine individual prenatal care visits during their pregnancies on average (slightly more for Birth Center participants, slightly fewer for Maternity Care Home participants). Group Prenatal Care participants received an average of five individual prenatal care visits, in addition to six Group Prenatal Care visits, during their pregnancies, summing to slightly more routine visits overall than the other two models. These data indicate that while the content of the prenatal care administered across models may vary substantially, the frequency is fairly consistent across all three models of care (See Table 2).

TABLE 2: ROUTINE PRENATAL CARE VISIT TYPE AND FREQUENCY, BY MODEL AND OVERALL

Data Elements	Data Measure	Birth Center	Group Prenatal Care	Maternity Care Home	All Models
Prenatal Visits					
Received Individual Prenatal Visits	N[1]	4722	5116	12010	21848
Yes	%	99.9	92.2	95.7	93.3
No	Mean	11.0	5.0	10.0	9.0
Received Group Prenatal Visits	N[2]	4722	5116	12010	21848
Yes	%	2.4	81.7	1.1	20.2
No	Mean	7.0	6.0	5.0	6.0

Notes: -Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix B.
Number of women for whom a number of individual prenatal visit information was reported. [2] Number of women form whom a number of group prenatal visits was reported.

In addition to routine, model-specific prenatal care visits, many women received "enhanced encounters" with a care coordinator, peer counselor, doula or mental health professional. The vast majority of women enrolled at Birth Centers and Maternity Care Homes received at least one care coordinator/peer counselor encounter (98 percent and 90 percent respectively). Birth Center enrollees met with a peer counselor, on average, four times throughout their pregnancies and Maternity Care Home participants had an encounter with a care coordinator an average of nearly five times during their Strong Start pregnancy. Group Prenatal Care participants were less likely to meet with a care coordinator or peer counselor during their pregnancy (only 40 percent had this type of encounter) and those who did met less often (about twice during the course of their pregnancy). This is consistentwith the design of the Group Prenatal Care, as the intervention is centered on the provision of enhanced prenatal care services in a group setting, while additional encounters with a care manager are integral to the Maternity Care Home model and to the Strong Start Birth Center model. As presented in Table 3, few other types of enhanced encounters are regularly reported. The one exception is for Doula encounters, which are utilized by 80 percent of Birth Center participants. Doula care has been associated with fostering healthier birth outcomes and reducing C-section rates, particularly among Medicaid beneficiaries (Gruber et al. 2013, Kozhimannil et al. 2013).

TABLE 3: ENHANCED PRENATAL CARE ENCOUNTER TYPE AND FREQUENCY, BY MODEL AND OVERALL

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Enhanced Encounters					
Enhanced encounters overall, average and median number per participant	N[1]	4287	2178	11889	18354
	Mean	4.0	2.4	4.8	4.3
	Median	3.0	2.0	3.0	3.0
Received Care Coordinator Encounters	N[2]	4737	5898	13691	24326
Yes No	%	97.6	39.0	90.6	79.4
	Mean	3.9	2.3	4.6	4.2
Received Mental Health Encounters	N[2]	4723	5870	13350	23943
Yes No	%	0.6	3.0	8.4	5.6
	Mean	2.4	1.7	2.3	2.2
Received Doula Encounters	N[2]	679	5859	13295	19833
Yes No	%	80.6	0.3	0.9	3.4
	Mean	2.4	1.2	2.5	2.4

[1]Number of women for whom valid enhanced encounter information was reported.

[2]Number of women for whom this question was not skipped.

Enhanced services—which include health education, home visits, and nutrition and substance abuse services—are reported with far less frequency than enhanced encounters. This is likely because they are happening less frequently, but also because enhanced encounters may have included these services, and awardees have been asked not to duplicate these reports. Importantly, awardees were instructed to fill out this section only if there were additional services provided to participants that were not captured in enhanced encounters. Approximately one-third of all participants received any enhanced service (7606 out of 24130). Women who received an enhanced service received services an average of 3.5 times during their pregnancy. These data are presented in Table 4.

TABLE 4: ENHANCED SERVICE TYPE AND FREQUENCY, BY MODEL AND OVERALL

Data Elements	Data Measure	Birth Center	Group Prenatal Care	Maternity Care Home	Total
Enhanced Services					
Number of women who received an enhanced service	N	1354	1018	4312	6684
Average and Median Number of Enhanced Services per Participant	Mean	1.5	2.2	4.4	3.5
	Median	1.0	1.0	2.0	2.0

[1].

A tally of whether Strong Start participants were provided with referrals to medical and non-medical services are also requested on the Exit Form. Table 5 summarizes these data by model and overall. Reportedly 35 percent of Strong Start participants received a referral to non-medical services, which could include WIC, housing services, home visiting or other social or community programs. Just over 15 percent of women received a referral to a high risk doctor (40 percent of whom were referred to a maternal fetal medicine specialist) to evaluate and/or treat them during their pregnancy. These findings should be interpreted cautiously. There are a multitude of reasons that may prompt a high risk referral. The actual number of women with a high risk medical condition could be higher or lower—as many women may already be in the care of a specialist or may be evaluated by a specialist and ultimately deemed not to be high risk.

TABLE 5: PROPORTION OF WOMEN REFERRED OUT FOR NON-MEDICAL AND HIGH RISK MEDICAL SERVICES

Data Elements	N or %	Birth Center	Group Prenatal Care	Maternity Care Home	All Models
Referrals					
Referrals for Nonmedical Services Outside of the Strong Start Program	N[1]	4736	5849	13545	24130
Yes	%	3.4	26.9	49.0	34.7
No	%	89.9	57.4	39.9	53.9
Not Known	%	6.7	15.7	11.1	11.3
Referrals for High Risk Medical Services	N[1]	4721	5867	13201	23789
Yes	%	0.4	18.9	20.7	16.2
No	%	92.8	55.2	73.3	72.7
Not Known	%	6.8	25.9	6.1	11.1

Note: -Missing data are excluded from these calculations. Rates of missing for referrals for nonmedical services by model are as follows: 0.2 percent for Birth Centers, 4.9 percent for Group Prenatal Care and 3.6 percent for Maternity Care Homes. Rates of missing for high risk medical services by model are as follows: 0.5 percent for Birth Centers, 4.6 percent for Group Prenatal Care and 6.1 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

[1]Number of women for whom this field on the Exit Form was completed.

STRONG START OUTCOMES

Strong Start has the potential to impact a variety of pregnancy and birth outcomes, including reducing preventable pregnancy complications such as gestational diabetes and hypertension through nutrition counseling or behavioral health interventions; proactive management of pregnancy complications such as administration of progesterone injections and vaginal progesterone administration to reduce the risk of preterm birth; and outcomes directly tied to the program's ultimate goals of preventing preterm birth and low birth weight overall. Some of these intermediate outcomes have been presented earlier in the report. Descriptive findings related to

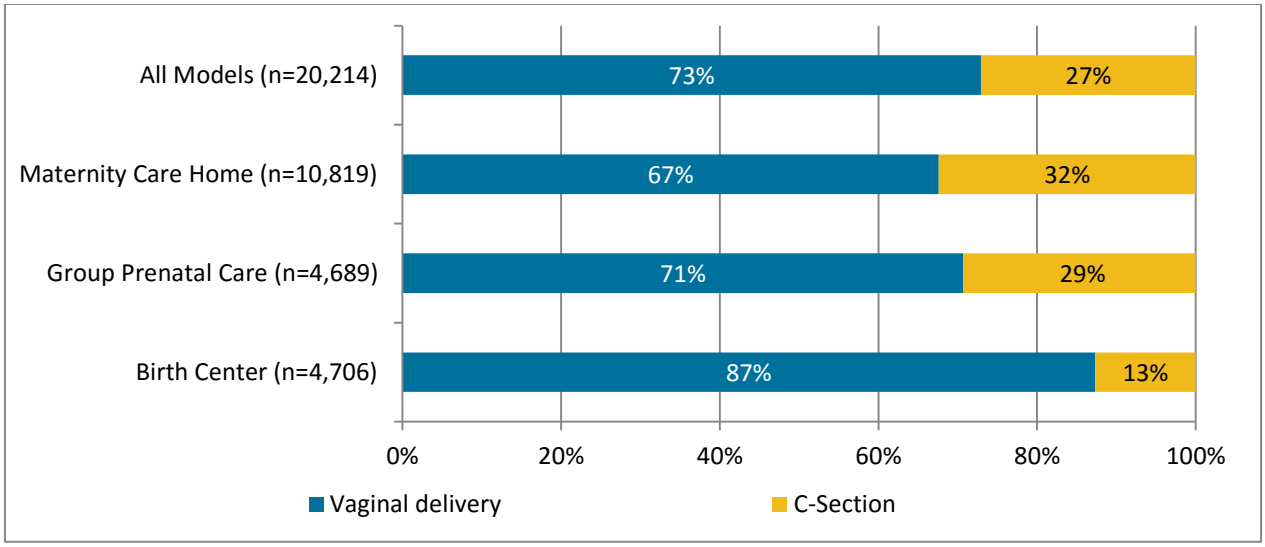
Strong Start's effects on participants' birth outcomes are summarized below. Descriptive tables are followed by a multivariate regression analysis that looks at these final outcomes while controlling for a host of observable characteristics that are associated with poor birth outcomes, most of which have been presented descriptively above.

Delivery Method:

The C-Section rate for Strong Start participants overall was 27 percent—lower than the national average of nearly 32 percent (Hamilton et al., 2016). This appears to be largely driven by particularly low rates of Cesarean among women enrolled in Birth Center care (13 percent), but Group Prenatal Care participants also have rates of C-Section that are lower than those reported for the nation as a whole (29 percent). Maternity Care Home participant C-section rates are on par with the national average (32 percent). A recent World Health Organization release suggests Cesarean rates exceeding 10 percent do not result in maternal and child health improvements (World Health Organization, 2015). A scholarly review conducted within the last decade finds that C-section rates above 10 percent have been associated with an increase in maternal and neonatal mortality and morbidity, (Althabe, Sosa, Belizán, Gibbons, Jacquerioz, & Bergel, 2006), and another study has suggested ideal C-section rates should hover around 19 percent (Molina et al. 2015). Data on delivery method of Strong Start participants are presented by model in Figure 11.

Among women who did have C-sections, approximately 32 percent were scheduled prior to delivery. The Exit Form did not ask for an indicator for scheduled C-section, but the vast majority (79 percent) of those who reported having scheduled C-sections had a prior C-section.

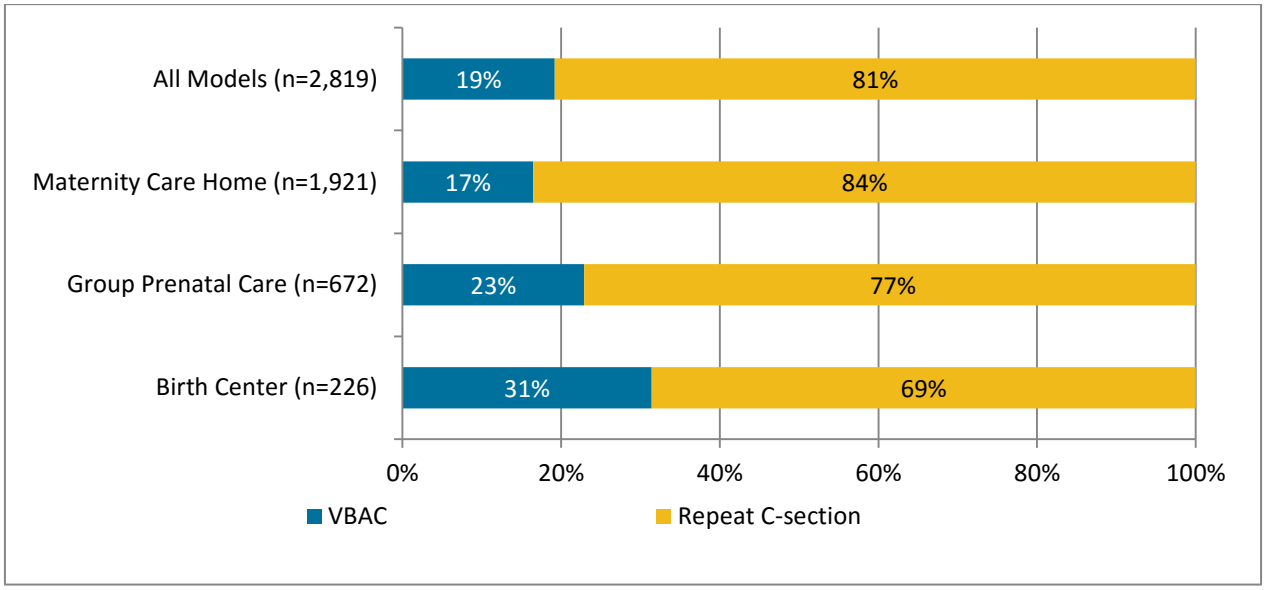
FIGURE 11: DELIVERY METHOD AMONG STRONG START PARTICIPANTS, BY MODEL AND OVERALL



Notes:-Delivery method was assessed through the Exit Form; -Missing data are excluded from these calculations. Rates of missing for delivery method by model are as follows: 0.9 percent for Birth Centers, 23.7 percent for Group Prenatal Care and 23.0 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B; Ns are based on women for whom Exit Form data were submitted and had non-missing values for delivery method.

Participants who, prior to Strong Start, had delivered babies via C-section could have either a repeat C-section or a vaginal birth after Cesarean (VBAC). Based on data from the Exit Form, 81 percent of these women had repeat C-sections, and 19 percent had VBACs. VBACs were notably higher among Birth Center participants (31 percent), than Group Prenatal Care enrollees (23 percent) or Maternity Care Home participants (17 percent). Some women may specifically seek out Birth Center care because they are interested in having a VBAC, contributing to this discrepancy. On the other hand, some Birth Centers screen out women who have previously had a C-section and refer them elsewhere for care. Regardless of overall cesarean rates, VBAC rates for all models are much higher than the national rate, which hovers around eight percent (ACOG & SMFM, 2014). These rates, which are even higher than reported in the Year 2 Strong Start Annual Report, are presented in Figure 12.

FIGURE 12: VBAC VERSUS REPEAT C-SECTION AMONG STRONG START PARTICIPANTS, BY MODEL AND OVERALL



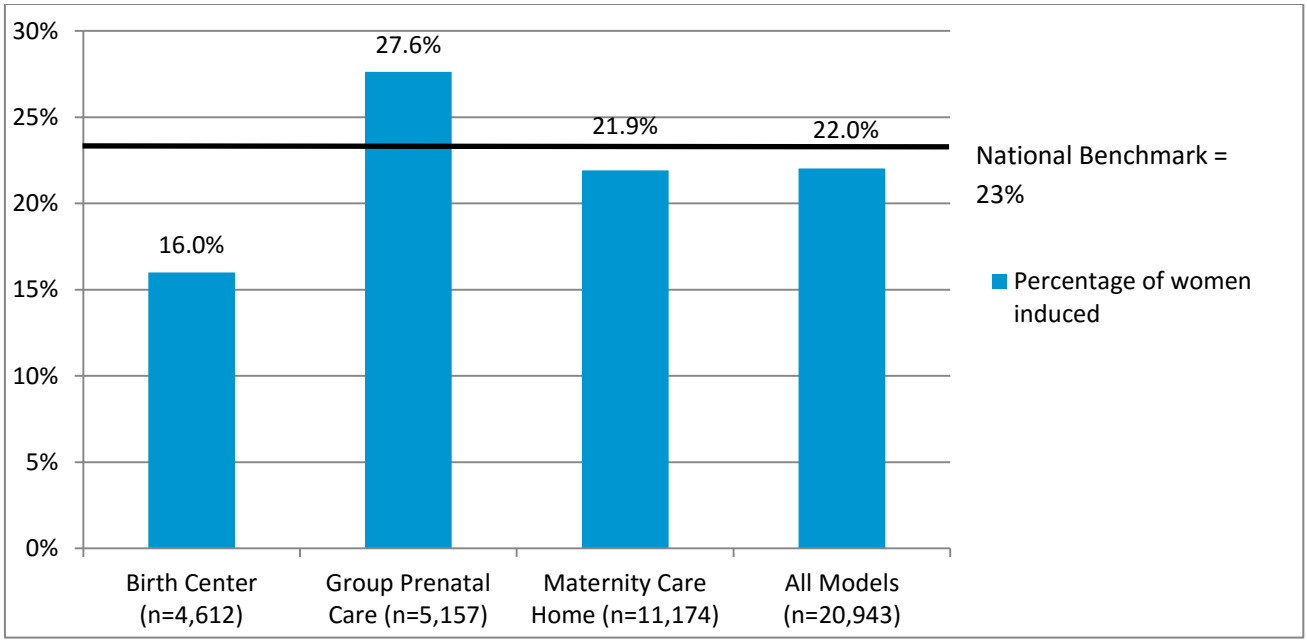
Notes:-VBAC and repeat C-Section were assessed through the Exit Form; Ns are based on women who had either a VBAC or a repeat C-section.

Overall rates of induced labor (means of induction not specified for this measure) for Strong Start participants are approximately 22 percent—slightly higher than we've reported in past years.[24] National rates of induction are estimated to be between 23 and 43 percent—depending on parity (Osterman & Martin, 2014, Laughon et al. 2012). Furthermore, national data derived from birth certificates, and are likely underreported, suggesting that Strong Start induction rates may be far lower than the national average (Martin et al., 2013), but other data based on chart reviews (Laughon et al. 2012) may be more comparable to the data we've collected on Strong Start

[24] Women with scheduled C-sections were excluded from this calculation.

participants. Rates do vary by model, with Birth Center rates being the lowest (16 percent) and Group Prenatal Care rates exceeding the national benchmark (28 percent). Twenty two percent of Maternity Care Home participants were induced. There are no notable racial and ethnic differences in induction rate—roughly 20 percent of women in each racial/ethnic category were induced. In addition, racial breakdowns of induction are roughly proportional to overall racial make-up within model. Data on induction, by model and overall, are presented in Figure 13.

FIGURE 13: INDUCTION OF LABOR, BY MODEL AND OVERALL



Note: -Missing data are excluded from these calculations. Rates of missing for induction of labor by model are as follows: 4.8 percent for Birth Centers, 21.4 percent for Group Prenatal Care and 26.0 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

Pregnancy Outcomes:

Through Quarter 1 2016 the evaluation team received Exit Forms with valid birth information for 21,494 women who delivered 20,680 babies. Some women had miscarriages or terminated their pregnancies prior to delivery. (The vast majority of these babies were born alive (nearly 99 percent), with a small number of still births (1.3 percent). As presented in Table 6, some slight variations in birth status occur by model.

As shown in Figure 14, 12 percent of Strong Start participants across all models delivered infants prior to 37 weeks, suggesting that the rate of preterm delivery may be slightly higher among Strong Start participants than the national preterm birth rate of approximately 11 percent for all births (Hamilton et al., 2016). Five percent of Birth Center participants had a preterm birth, compared with 12 percent of Group Prenatal Care enrollees and 16 percent of Maternity Care Home participants. Most preterm deliveries are "late preterm"—between 34 and 37 weeks (eight percent)—with four

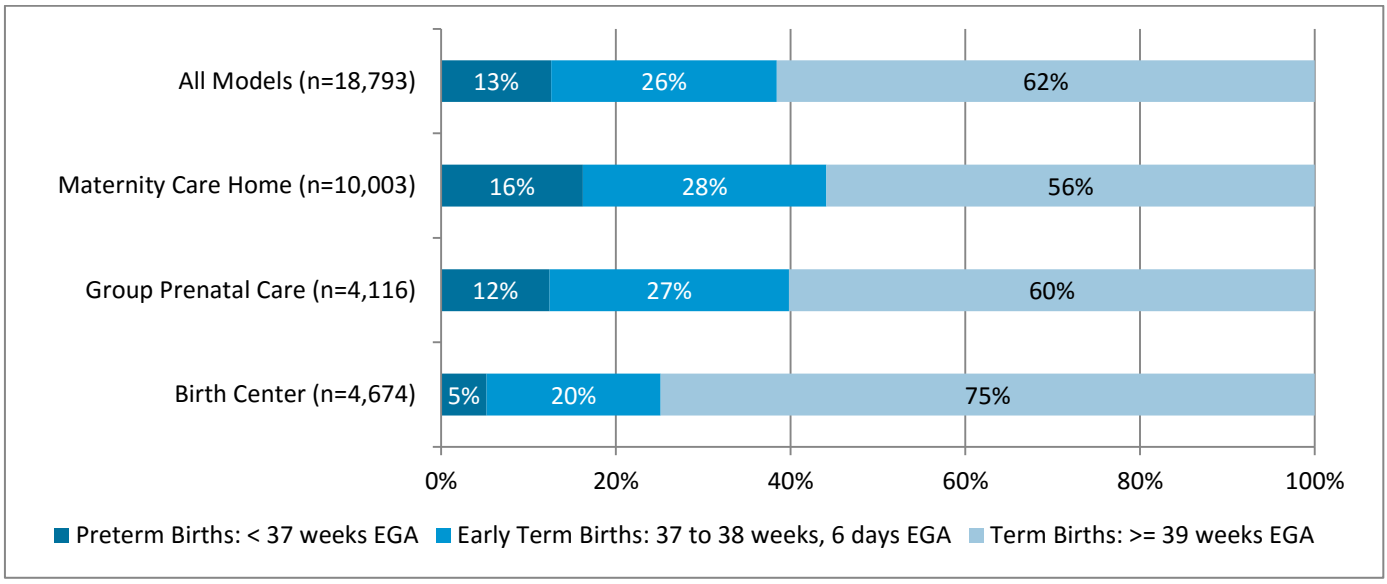
percent occurring "very preterm"—prior to 34 weeks. Nationally, very preterm births occur at a rate of 2.75 percent (Hamilton et al. 2016).

TABLE 6: STRONG START PARTICIPANT BIRTH STATUS

Births				
Data Elements	**Birth Center % (N)**	**Group Prenatal Care (N)**	**Maternity Care Home % (N)**	**Total % (N)**
Live births	99.6 (4,695)	98.4 (4720)	98.5 (11006)	98.7 (20,241)
Stillborn infants	0.4 (18)	1.6 (79)	1.5 (162)	1.3 (259)

Note: -Missing data are excluded from these calculations. Rates of missing for birth status by model are as follows: 0.3 percent for Birth Centers, 3.6 percent for Group Prenatal Care and 8.0 percent for Maternity Care Homes. Rates of missing by measure can be found in Appendix B.; Ns are based on women for whom Exit Form data were submitted and had non-missing values for birth status.

FIGURE 14: INFANT ESTIMATED GESTATIONAL AGE (EGA) AT BIRTH, BY MODEL AND OVERALL



Notes:-EGA is calculated using the infant birthdate reported in the crosswalk file and the estimated due date reported in the Exit Form. If either of those dates is missing,-EGA is missing. Rates of missing for EGA by model are as follows: 0.4 percent for Birth Centers, 12.8 percent for Group Prenatal Care and 9.1 percent for Maternity Care Homes. Missing rates for EGA by model can also be found in Appendix B; -Values of two percent and less are not labeled.

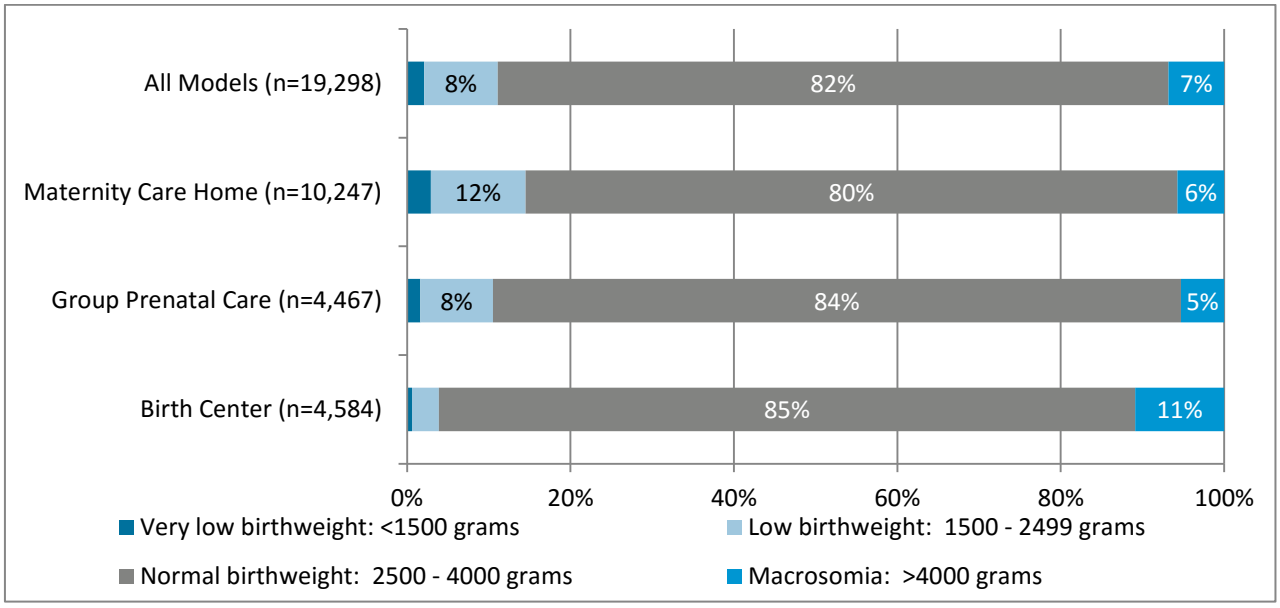
Rates of preterm birth do vary by race. More than 15 percent of Black women enrolled in Strong Start delivered prior to 37 weeks, while 11.3 percent of Hispanic women and 9.7 percent of white women delivered preterm. Nationally, 13.4 percent of black infants are born preterm compared with 9.1 percent of Hispanic and 8.9 percent of white infants.

Early term deliveries, which occur between 37 and 39 weeks gestational age, account for more than one-quarter of all births to Strong Start participants. Deliveries that spontaneously occur after 37 weeks are normal, but we do not have consistent information about whether these are spontaneous for the Strong Start population, and can only compare them with typical rates to

discern if they depart from overall trends. These rates are consistent with the baseline rates of other studies that have investigated early term delivery (Donovan et al., 2010) (Oshiro et al., 2009). Rates are lowest for Birth Center participants (20 percent), while 28 percent of Group Prenatal Care and Maternity Care Home enrollees delivered between 37 and 39 weeks. We are not able to discern whether these are early elective or medically indicated early term deliveries. We do, however, know that 29 percent of Strong Start participants who had an early term delivery were either induced or had a scheduled C-section.

As shown in Figure 15, 11 percent of Strong Start participants delivered infants who were low birthweight (1500-2500g) or very low birthweight (<1500g). The percentage of low birthweight infants nationally is lower than observed in the Strong Start population—with approximately eight percent of infants born less than 2500g. Of the 8 percent who were low birthweight, 1.4 percent are very low birthweight babies (Hamilton et al., 2016). When looking at different racial and ethnic subgroups, CDC reports that the prevalence of low birthweight babies among black women nationally is over 13 percent. Among Strong Start participants, we observe more low birthweight babies are being born to black women (14.6 percent) than nationally, and similar trends for other ethnic/racial subgroups: 8.2 percent and 7.7 percent of Hispanic and white Strong Start enrollees compared with 7.1 and 6.9 percent of Hispanic and white babies nationally. These benchmarks reported by the CDC do not account for income, insurance status, or medical or psychosocial risks.

FIGURE 15: INFANT BIRTHWEIGHT, BY MODEL AND OVERALL



Note:-Values of three percent and less are not labeled. -Missing data are excluded from these calculations. Rates of missing for birthweight by model are as follows: 2.4 percent for Birth Centers, 5.4 percent for Group Prenatal Care and 6.9 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

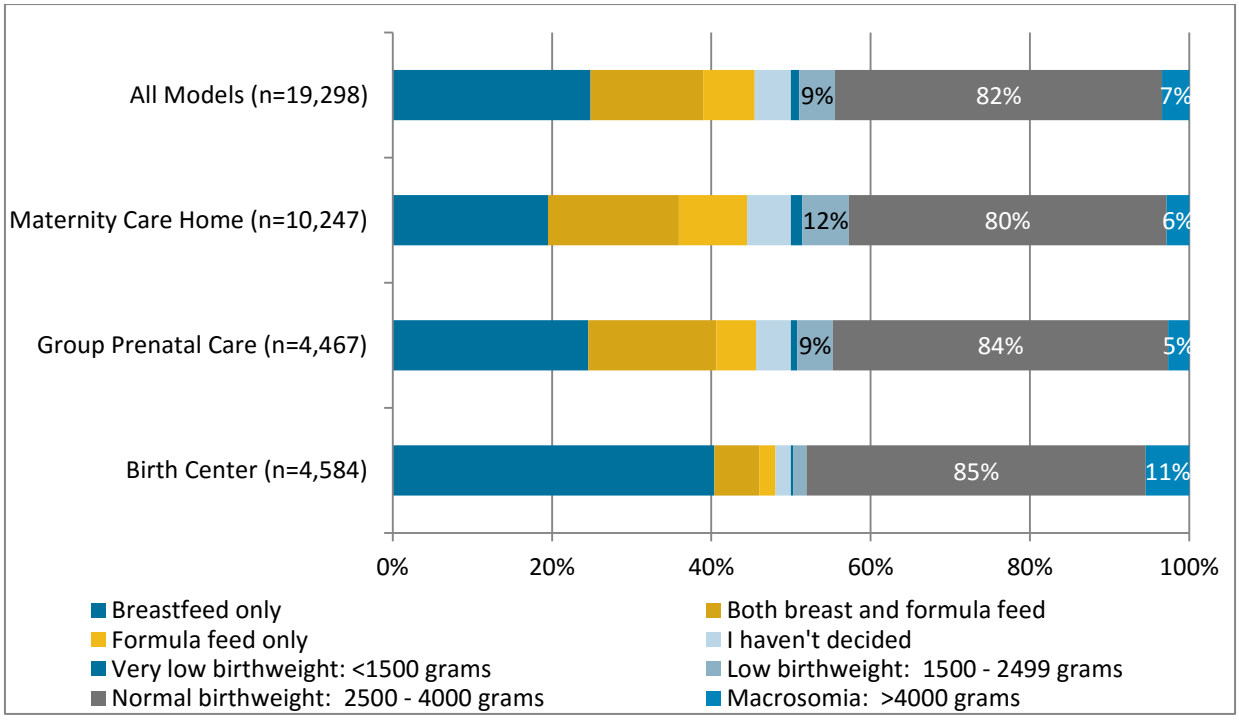
Among the Strong Start population, rates of low birthweight varied by model, and track with rates of preterm delivery—with Maternity Care Homes reporting the highest rate of low birthweight

babies (15 percent), and Birth Centers reporting the lowest rate (four percent). Group Prenatal Care models report that 11 percent of babies delivered were low birthweight.

Postpartum Outcomes:

Breastfeeding. Over three-quarters of women indicate on their Third Trimester Surveys that they plan to breastfeed their babies. This is consistent with the rates breastfeeding intentions we've observed previously among Strong Start enrollees. Approximately half plan to breastfeed exclusively and another 28 percent plan to breastfeed and supplement with formula. Intentions to breastfeed are particularly high among Birth Center participants, where 81 percent plan to breastfeed exclusively. About half of Group Prenatal Care participants planned to breastfeed exclusively and close to 40 percent of Maternity Care Home enrollees planned to breastfeed exclusively. These data are presented in Figure 16.

FIGURE 16: STRONG START PARTICIPANT FEEDING INTENTION DURING THIRD TRIMESTER, BY MODEL AND OVERALL



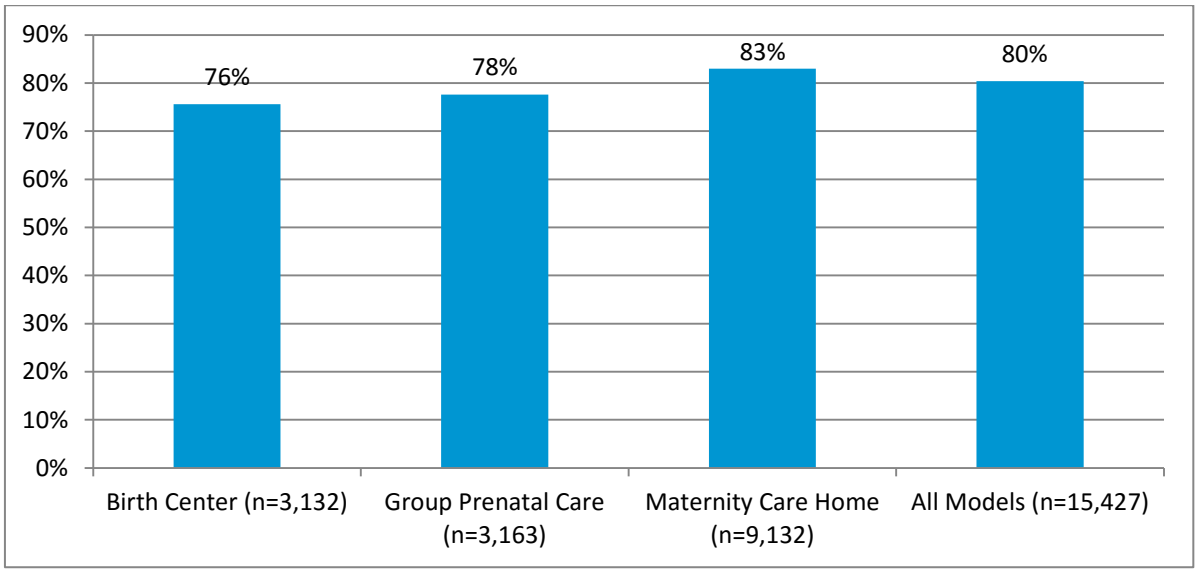
Note: -Missing data are excluded from these calculations. Rates of missing for feeding intention by model are as follows: 1.8 percent for Birth Centers, 4.2 percent for Group Prenatal Care and 1.8 percent for Maternity Care Homes .Rates of missing by measure can also be found in Appendix B. Ns are based on women for whom Third Trimester Surveys were submitted and had non-missing values for feeding intention.

Post-delivery, among those who completed both the Third Trimester and the Postpartum Surveys, the proportion of women that report actually breastfeeding is equal to the proportion of women who intended to breastfeed (78 percent overall for both reported and intended breastfeeding), tracking closely with national rates of women reporting that they breastfed their

babies for some amount of time (75 percent), and higher than breastfeeding rates among WIC recipients (approximately 68 percent),which may is a more accurate comparison population for Strong Start enrollees (Centers for Disease Control and Prevention, 2011; Hartmann et al., 2012). Some awardees have established increased breastfeeding as one the goals of their award and several are affiliated with hospitals that have adopted Baby Friendly USA initiatives, designed to promote breastfeeding.[25]

Reports of having received birth control counseling after delivery increased compared to previous years, with just over 80 percent reporting that someone spoke with them about using birth control. But we've learned over time that these data may not adequately capture the extent to which family planning is being discussed since the question is focused on the postpartum period and many Strong Start programs have put a substantial emphasis on discussing birth control early and often so that by the time a baby is born family planning decisions may have already been made. Nonetheless, these data are presented below in Figure 17.

FIGURE 17: PERCENT OF STRONG START PARTICIPANTS WHO RECEIVED BIRTH CONTROL COUNSELING, BY MODEL AND OVERALL



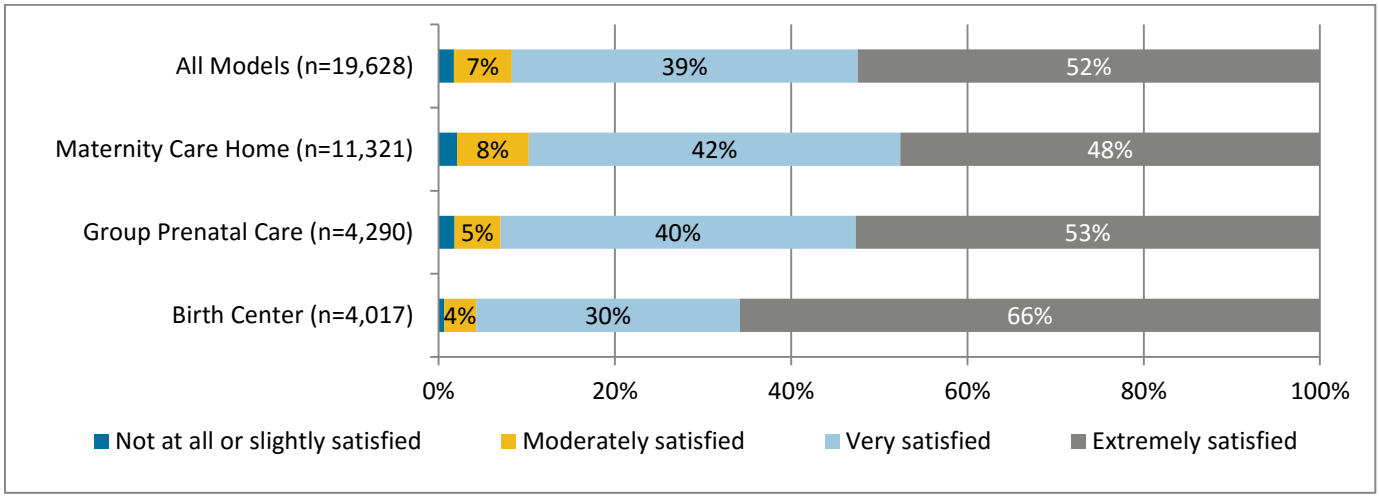
Note:-Receipt of birth control counseling was reported by Strong Start participants through the Postpartum Survey.
-Missing data are excluded from these calculations. Rates of missing for birth control counseling by model are as follows: 8.1 percent for Birth Centers, 20.6 percent for Group Prenatal Care and 14.3 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

Client Satisfaction:

[25] Baby Friendly Hospitals is an initiative that encourages hospital providers to embrace policies and practices that promote breast feeding by new mothers and providers who complete the following steps can become certified as "Baby Friendly"

Satisfaction with prenatal care is high overall, with 92 percent of participants indicating they were either very satisfied or extremely satisfied with their prenatal care. As displayed in Figure 18, satisfaction is highest among Birth Center participants, with 96 percent indicating they were very

FIGURE 18: PERCENTAGE OF STRONG START PARTICIPANTS SATISFIED WITH PRENATAL CARE, BY MODEL AND OVERALL

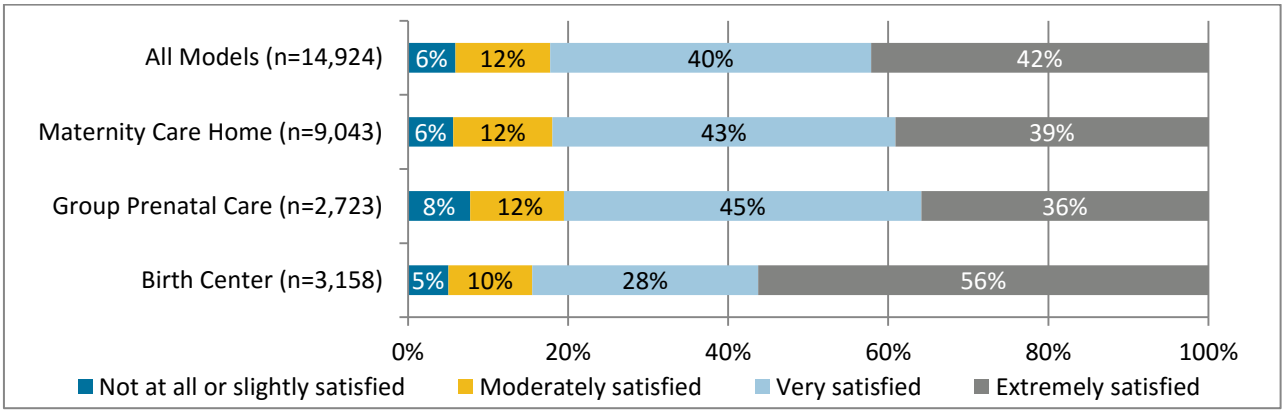


Notes:-Satisfaction with prenatal care was reported by Strong Start participants through the Third Trimester Survey. Missing data are excluded in these calculations. Rates of missing for satisfaction with prenatal care by model are as follows: 1.7 percent for Birth Centers, 6.1 percent for Group Prenatal Care and 3.5 percent for Maternity Care Homes. Rates of missing are also presented in Appendix B; -Values of less than four percent are not labeled.

satisfied or extremely satisfied with the prenatal care they received, compared with 93 percent of Group Prenatal Care participants and 90 percent of Maternity Care Home participants. The research literature suggests that satisfaction surveys pertaining to maternity care services may be of limited reliability and that there tends to be a strong bias toward high ratings (van Teijlingen, Hundley, Rennie, Graham, and Fitzmaurice, 2003), but focus group data presented later in the report do corroborate these results.

Satisfaction with delivery experience is also relatively high overall, but lower than rates of satisfaction with prenatal care. Among participants for whom Postpartum Surveys were submitted, approximately 82 percent report that they were either very satisfied or extremely satisfied with their delivery experience. Again, satisfaction levels are highest among participants enrolled in Birth Center care (84 percent are very or extremely satisfied), followed closely by Maternity Care Home participants (82 percent) and Group Prenatal Care (81 percent) participants. These satisfaction data are presented in Figure 19.

FIGURE 19: PERCENTAGE OF STRONG START PARTICIPANTS SATISFIED WITH DELIVERY EXPERIENCE, BY MODEL AND OVERALL



Notes:-Satisfaction with delivery experience was reported by Strong Start participants through the Postpartum Survey.
-Missing data are excluded from these calculations. Rates of missing for satisfaction with delivery experience by model are as follows: 7.3 percent for Birth Centers, 31.6 percent for Group Prenatal Care and 15.2 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix B.

MULTIVARIATE REGESSION ANALYSES

Data collected through Quarter 1 2016 represent a new milestone, whereby the sample sizes are now adequate for conducting multivariate analyses than can elicit greater understanding regarding how the Strong Start models are having an effect on the main outcomes of interest (preterm delivery, low birthweight and C-sections). To this end we have conducted unadjusted and regression-adjusted analyses in which we compare Birth Center and Group Prenatal Care models to Maternity Care Homes, while controlling for a variety of demographic, psychosocial, and medical risk factors that have previously been associated with poor birth outcomes. The Maternity Care Home model was selected as the reference category because it has the largest enrollment to date and also is most similar to traditional prenatal care.

To make comparisons that adjust for differences by prenatal care model, we estimate regression models on each outcome that control for race, age, education, previous preterm birth (preterm), previous low birthweight baby (low birthweight), previous C-section (C-section), depression, pregnancy intention, pregnancy-induced hypertension and diabetes, smoking behaviors, food insecurity, intimate partner violence and referral to high risk medical service during pregnancy. Because the data are collected only for enrollees, we have no comparison group of women not enrolled in Strong Start for these analyses. Instead, we compare women who are enrolled in each of the Strong Start models. Descriptive analyses of the PLPE data suggest that there may be differences in the risk profile of enrollees among the three models—with Birth Centers attracting the healthiest and most stable group, while Maternity Care Homes are enrolling a sicker and more challenging population. Group Prenatal Care models fall somewhere in between. Although we have accounted for observable differences in risk by including a variety of controls in our models, there will always be unobservable factors that we cannot account for that could affect our findings.

Furthermore, while there have been reductions in the amount of missing data over the past year, much is still missing—particularly on certain measures, including education and depression, which are often missing or incomplete on the Intake Form. The evaluation team has worked with awardees to support them in ensuring Intake Forms are filled out completely. Some data elements such as gestational age rely on multiple variables from multiple forms, and are critical to determining outcomes for the Strong Start population as well as matching efforts for the Impacts analyses. Additional effort is being invested in retrieving these data whenever possible. . The multiple regression analysis sample includes 12,725 women out of a possible 24,951 women for whom Exit Form data were submitted. Approximately 1,000 women were dropped because they were missing outcome measures, and another 2,000 were dropped because they were missing an Intake Form. The remaining cases were dropped because of missing covariates. In certain cases where the missing rate was particularly high, we included a missing category in the regression (such as depression status-unknown and smoking status-unknown). We performed t-tests to compare those we removed from the analysis for missing covariates with those who remained and did not find any evidence that would suggest that there are systematic differences between the two groups. In addition, we compared the means for each of our outcome variables and found no significant differences between those we removed from the analysis and those who remained. Steps involved in constructing the analytic sample are presented in Table 7.

TABLE 7: CONSTRUCTING THE ANALYTIC SAMPLE

Logic for dropping observations	# Excluded	# of remaining observations
Starting Sample: # of Participants who have completed exit forms	-	24,951
Dropping those who have not completed intake forms*	2,273	22,678
Dropping those who are missing ANY covariates	5,590	17,088
Main Analytic Sample: Dropping those who are missing ANY outcome variables	4,363	12,725

Summary statistics for the sample included in the regression are presented in Table 8. This table includes means for all outcome measures and covariates included in the models. We conducted pairwise statistical tests to compare means across models. We observe that the populations enrolled in each model do vary significantly in most cases, though Group Prenatal Care and Maternity Care Home participants are more alike than either is to Birth Center participants. In particular, Maternity Care Home and Group Prenatal Care participants are more likely to be younger and less educated that Birth Center participants. They are also more likely to have had a previous preterm birth, particularly Maternity Care Home participants (some birth centers and group care

sites risk out clients with a prior preterm birth). Group Prenatal Care participants are more likely to be pregnant with their first child than women enrolled in either of the other two models. Birth Center participants are less likely than Maternity Care Home or Groups Prenatal Care enrollees to be depressed, have pregnancy-induced hypertension or gestational diabetes, and less likely to be referred for high risk medical care.

Given the binary nature of the outcome variables and in order to report comparisons as odds ratios (which is more common in the medical literature, whereas marginal effects on probabilities is often preferred in the economics literature), we estimate logistic (or logit) regression models. Regression results are presented in Appendix B Controlling for the factors specified above , we find that Birth Center and Group Prenatal Care participants are significantly less likely to have a preterm delivery (OR: 0.45 and 0.77 respectively) when compared with Maternity Care Home participants. They are also significantly less likely to have a low birthweight baby (OR: 0.39 and 0.69 respectively). Birth Center participants are less likely to have a C-section than women enrolled in Maternity Care Homes (OR: 0.44).

A number of covariates have statistically significant effects on these outcomes. For preterm, advanced maternal age is significantly and positively associated with increased preterm rates, as is having had a previous preterm birth. Women with a previous preterm birth are more than 2.5 times as likely to have a subsequent preterm birth. Depression and depression-status unknown are both associated with an increase in preterm delivery which may suggest that those with missing data on this measure are more similar to women who have depressive symptoms than women who do not, which was commonly suggested by program staff during qualitative interviews. Hypertension is also significantly associated with preterm delivery—which is to be expected as women who present with hypertension are often delivered early for the safety of mother and baby. Finally, having been referred to a specialist for a potential high risk medical condition during pregnancy is associated with preterm delivery. Based on the current literature on preterm birth risks, all of these outcomes are to be expected.

Findings regarding low birthweight are also consistent with the scientific literature on birth outcomes. Being over 35 years old and being black are both associated with increased rates of delivering a low birthweight infant. Women who previously delivered a low birthweight baby are nearly two times more likely to deliver a subsequent low birthweight baby. On the other hand, women who previously delivered healthy weight babies (or macrosomic babies) are less significantly less likely to deliver a small baby. Depression and smoking are positively and significantly associated with low birthweight babies, and gestational diabetes is predictably associated with a reduced risk of delivering a low birthweight baby. Having been referred to a specialist for a potential high risk medical condition is significantly associated with having a low birthweight infant.

TABLE 8: SUMMARY STATISTICS FOR BIRTH OUTCOMES AND COVARIATES, BY MODEL

Data Elements	Model		
	Maternity Care Homes	Birth Centers	Group Prenatal Care
OUTCOMES[3]	MEANS[1,2]		
Preterm	0.15	0.05 ***	0.11 *** ^^^
Low Birthweight	0.14	0.04 ***	0.10 *** ^^^
C-section	0.32	0.12 ***	0.30 *** ^^^
DEMOGRAPHIC CHARACTERISTICS			
AGE			
Less than 15 years old	0.01	0.00 **	0.00
15 to 17 years of age	0.06	0.02 ***	0.07 ^^^
18 to 19 years of age	0.10	0.06 ***	0.12 ** ^^^
20 to 24 years of age	0.35	0.30 ***	0.36 ^^^
25 to 29 years of age	0.26	0.33 ***	0.22 *** ^^^
30 to 34 years of age	0.15	0.20 ***	0.14 ^^^
more than 35 years old	0.08	0.09 *	0.08
RACE/ETHNICITY			
White	0.21	0.56 ***	0.11 *** ^^^
Hispanic	0.20	0.25 ***	0.51 *** ^^^
Black	0.56	0.14 ***	0.34 *** ^^^
Other	0.03	0.05 ***	0.05 ***
EDUCATION			
Less than High School	0.26	0.12 ***	0.31 *** ^^^
High School Graduate / GED	0.53	0.53	0.46 *** ^^^
Bachelor's Degree	0.02	0.12 ***	0.03 ^^^
Other Degree	0.06	0.11 ***	0.06 ^^^
Multiple Degrees	0.00	0.03 ***	0.01 ^^^
Education Unknown	0.12	0.09 ***	0.13 ^^^
MEDICAL RISK FACTORS			
Previous Preterm Birth			
No Previous Birth	0.36	0.38 *	0.50 *** ^^^
Previous Full Term Birth	0.48	0.54 ***	0.41 *** ^^^
Previous Preterm Birth	0.16	0.08 ***	0.09 ***
Previous Low Birth Weight			

Data Elements	Model		
	Maternity Care Homes	Birth Centers	Group Prenatal Care
No Previous Birth	0.36	0.38 *	0.50 *** ^^^
Previous Healthy Birth Weight	0.47	0.61 ***	0.40 *** ^^^
Previous Low Birth Weight	0.10	0.01 ***	0.04 *** ^^^
Previous Birth Weight Unknown	0.07	0.00 ***	0.06 ^^^
Previous C-section			
No Previous Birth	0.36	0.38 *	0.50 *** ^^^
Previous Vaginal Birth	0.46	0.57 ***	0.36 *** ^^^
Previous C-section	0.18	0.05 ***	0.14 *** ^^^
Interpregnancy Interval			
No Previous Birth	0.36	0.38 *	0.50 *** ^^^
Normal Interpregnancy Interval	0.41	0.36 ***	0.32 *** ^^
Short Interpregnancy Interval	0.15	0.21 ***	0.10 *** ^^^
Interpregnancy Interval Unknown	0.09	0.06 ***	0.08 ^^^
Gestational Diabetes			
No Gestational Diabetes	0.86	0.98 ***	0.88 ** ^^^
Gestational Diabetes	0.07	0.02 ***	0.08 * ^^^
Diabetic Status Unknown	0.08	0.00 ***	0.05 *** ^^^
Pregnancy-related Hypertension			
No Pregnancy-related Hypertension	0.86	0.99 ***	0.85 ^^^
Pregnancy-related Hypertension	0.08	0.01 ***	0.10 *** ^^^
Hypertensive Status Unknown	0.07	0.00 ***	0.05 *** ^^^
Referral for High Risk Medical Services			
No Referral for High Risk Medical Services	0.75	0.92 ***	0.64 *** ^^^
Referral for High Risk Medical Services	0.23	0.00 ***	0.22 ^^^
Referral Status Unknown	0.03	0.08 ***	0.13 *** ^^^
SOCIAL & BEHAVIORAL RISK FACTORS			
Employment			
Employed	0.40	0.42 **	0.35 *** ^^^
Unemployed	0.60	0.58 **	0.65 *** ^^^
Marital Status			
Married	0.17	0.45 ***	0.21 *** ^^^
Unmarried	0.83	0.55 ***	0.79 *** ^^^

Data Elements	Model		
	Maternity Care Homes	Birth Centers	Group Prenatal Care
History of Intimate Partner Violence			
No History of Intimate Partner Violence	0.81	0.79 *	0.82 ^^^
History of Intimate Partner Violence	0.19	0.20	0.17 * ^^^
Intimate Partner Violence Score Incomplete	0.00	0.01 *	0.01 ***
Smoking			
Did not Smoke at Intake	0.86	0.91 ***	0.93 *** ^^^
Smoked at Intake	0.14	0.09 ***	0.07 *** ^^^
Food Insecurity			
Not Food Insecure at Intake	0.79	0.80	0.75 *** ^^^
Food Insecure at Intake	0.17	0.17	0.19 *** ^^
Food Insecurity Score Incomplete	0.05	0.04 **	0.05 ^^^
Intendedness of Pregnancy			
Unintentional Pregnancy	0.77	0.61 ***	0.70 *** ^^^
Intentional Pregnancy	0.23	0.39 ***	0.30 *** ^^^
Depression			
Not Depressed at Intake	0.68	0.73 ***	0.64 *** ^^^
Depressed at Intake	0.25	0.20 ***	0.24 ^^^
Depression Score Incomplete	0.07	0.07	0.13 *** ^^^
Year			
2013	0.02	0.01 ***	0.01 ***
2014	0.38	0.35 ***	0.38 ^^^
2015	0.56	0.56	0.59 ** ^^
2016	0.04	0.08 ***	0.02 *** ^^^

1. Significance calculated using pairwise comparison of means test
2. * Indicates significance at the .1 level, ** at the .05 level, and *** at the .01 level for the difference in means from Maternity Care Homes. Carets are used to represent the difference in means from Birth Centers
3. Outcomes are defined as follows:
Preterm birth- A clinically estimated gestational age of < 37 weeks
Low Birth weight - Infant weight bless than 2500 grams at birth
C-section - Final route of delivery is a cesarean section

Consistent with national data on C-section rates, Hispanic women in Strong Start are significantly less likely to have a C-section than women of other racial/ethnic backgrounds. College educated women are also less likely to have a C-section. Previous C-section is highly predictive of having a C-section (OR: 13.11) while having had a previous vaginal birth is protective (OR: 0.39)

Hypertension and gestational diabetes are positively associated with C-section deliveries. Many physicians are cautious about attending vaginal deliveries for diabetic women because their babies are at higher risk for macrosomia (weighing more than 4000 grams), although ACOG does not recommend prophylactic cesarean for diabetic women unless the fetal weight estimate is at least 4500 grams (just under 10 pounds). Women with hypertension are likely to be induced early, which can be an important intervention to prevent complications including catastrophic seizures in the woman; however early inductions often lead to subsequent interventions including C-section because the woman's body is not ready for labor. As for the other outcomes, having been referred to a specialist for a potential high risk medical condition is significantly associated with having a Cesarean delivery.

TABLE 9: LOGISTIC REGRESSION ANALYSIS OF BIRTH OUTCOMES[1]

N=12,745	Birth Outcomes[2]		
Covariates	**Preterm**	**Low Birthweight**	**C-section**
STRONG START MODEL	**Odds Ratios**		
Maternity	-	-	-
Birth Center	0.45***	0.39***	0.44***
Group	0.77***	0.69***	0.93
RACE			
White	-	-	-
Hispanic	0.97	1.05	0.81**
Black	1.10	1.40***	1.12
Other	0.91	1.11	0.90
AGE			
20-24	-	-	-
< 15	1.30	0.25	0.64
15-17	1.03	0.91	0.60***
18-19	0.85	0.89	0.61***
25-29	1.12	1.06	1.24***
30-34	1.16	1.19	1.41***
>= 35	1.42**	1.33*	1.87***
EDUCATION			
High School / GED	-	-	-
Less than High School	0.96	0.96	0.91
Bachelor's Degree	0.78	0.72	0.75*
Other Degree	0.95	0.88	1.09
Multiple Degrees	0.48	1.26	1.16
Education Status Unknown	1.08	0.89	1.02

N=12,745	Birth Outcomes[2]		
Covariates	**Preterm**	**Low Birthweight**	**C-section**
RISK FACTORS RELATED TO PREVIOUS BIRTH			
No Previous Birth	-	-	-
Previous Preterm Birth	2.52***	-	-
Previous Full-term Birth	0.95	-	-
Previous Low Birth Weight	-	1.98***	-
Previous Healthy Birth Weight	-	0.68**	-
Previous Birth Weight Unknown	-	1.32	-
Previous C-section	-	-	13.11***
Previous Birth Not C-Section	-	-	0.39***
Normal Interpregnancy Interval	0.85	0.85	0.67***
Short Interpregnancy Interval	0.93	0.91	0.64***
Interpregnancy Interval Unknown	1.00	1.00	1.00
OTHER RISK FACTORS			
Depression	1.17*	1.23**	1.07
Depression Unknown	1.35**	1.36**	1.05
Intention of Pregnancy was planned	0.88	0.93	1.02
Pregnancy Related Hypertension	1.66***	1.67***	1.70***
Gestational Diabetes	1.08	0.64**	1.35**
Disease Status Unknown	1.58***	0.95	1.32*
Smoked	1.11	1.41***	1.20*
Smoking Status Unknown	1.00	1.00	1.00
Food Insecure	-	0.94	-
Food Insecurity Unknown	-	0.97	-
History of Intimate Partner Violence	0.96	1.03	1.05
Intimate Partner Violence History Unknown	0.61	0.70	1.15
High Risk Medical Service Referral	1.79***	1.80***	1.48***
Referral Status Unknown	1.42**	1.45**	1.23
YEAR			
2014	-	-	-
2013	1.96***	1.54*	1.09
2015	0.86**	0.97	0.90*
2016	0.58**	0.52**	0.76*

1. Odds ratios reported.

2. Outcomes are defined as follows:

Preterm birth rate - A clinically estimated gestational age of <= 37 weeks

Low Birth weight - Weight less than 2500 grams at birth

C-section - Final route of delivery is a cesarean section

* Indicates significance at the .1 level, ** at the .05 level, and *** at the .01 level

SUMMARY OF FINDINGS

The data reported in this section present a cumulative look at the characteristics of Strong Start participants, their service use, and their outcomes.

Participant-level data submitted through Quarter 1 2016 continue to indicate that Strong Start enrolled women have high levels of psychosocial need, with a particularly striking incidence of depression across the board. There are, however, notable variations with regard to the demographic and risk characteristics of participants by model. Specifically, Birth Center clients tend to have demographic profiles that are less likely to be associated with poor birth outcomes, and Maternity Care Home enrollees tend to have more medical factors that put them at risk for poor birth outcomes. When we control for these differences in the regression analyses presented, however, we continue to find that Birth Center outcomes appear to be better when compared to Maternity Care Home participants, though there could be remaining observable or unobservable characteristics that we have not adequately controlled for.

Findings through Quarter 1 2016 suggest that C-Section prevalence among women receiving care at Strong Start sites may be lower than the national average, though there is substantial variation across the three models, as well as by awardee (see Appendix B). Moreover, induction rates appear to be lower than national benchmarks for two of the three models. Both findings indicate that women enrolled in Strong Start may be avoiding interventions that are not medically indicated.

Rates of preterm delivery and low birth weight also seem to vary by model, and while they are higher than national benchmarks in several cases—benchmarks that do not take into account income or insurance status—there is clear evidence that the Strong Start population is one at great risk and of high need. Data also continue to indicate that women enrolled in Strong Start are more likely to attempt breastfeeding than low-income women generally, as evidenced by WIC recipient rates of breastfeeding, and are having a good deal of success in following through with their intentions. Importantly, participants enrolled in Strong Start are indicating that they are pleased with the services they are receiving, with particular enthusiasm among women enrolled in Birth Center care.

The early regression analyses presented here provide an interesting cross-model comparison, but, they are unable to tell us how Strong Start women fare compared with similar women who receive traditional prenatal care. Analyses that are conducted as part of the Impacts Evaluation will have a propensity-score-reweighted comparison group that will help tease out the overall impacts of Strong Start. These PLPE data give us some hints about where we might expect to see effects associated with these enhanced services, and which models might be likely to drive those effects when controlling for information that is not readily or reliably available through vital statistics and administrative data sets. However, the findings are not generalizable

CASE STUDIES

The case study analysis provides a comprehensive summary of awardees' experiences implementing the Strong Start program. More specifically, it examines their perceptions of how Strong Start enhanced prenatal care is influencing maternal and newborn outcomes (as well as other program impacts) and describes key features of their Strong Start interventions, common barriers to care, the successes and challenges they have experienced, and their plans for program sustainability. The analysis includes data collected across all 27 Strong Start awardees and about a third of their provider sites as part of the third round of case studies, which occurred between November 2015 and June 2016. Findings are presented by model type and in the following order: Maternity Care Home; Group Prenatal Care; and Birth Center care.

MATERNITY CARE HOME MODEL

Strong Start Maternity Care Homes build on the concept of a patient-centered medical home, aiming to provide women with high-quality, coordinated prenatal and postpartum care for themselves and their infants. CMMI's Strong Start guidelines for the enhanced prenatal care package provided by Maternity Care Home awardees include services that 1) expand access and provide continuity; 2) assure care coordination; and 3) provide enhanced content of care during visits.

Description of Awardees:

The number of awardees implementing the Maternity Care Home model under Strong Start grew from fourteen[26] in Year 2 to seventeen in Year 3 (See Exhibit 6).

Three awardees that initially intended to implement Group Prenatal Care – OKHCA, St. John, and VCU – augmented or replaced it with the Maternity Care Home model during Year 3. These decisions were influenced by eligibility, enrollment, and retention challenges in Years 1 and 2 and were specifically designed to spur enrollment growth. OKHCA implemented the Maternity Care Home model at three sites while maintaining existing Group Prenatal Care at one site. St. John implemented the Maternity Care Home model at its major OB clinic, and offers individual follow up to group participants at two sites if necessary. VCU formally added the maternity health home to its model while retaining Group Prenatal Care.[27] These awardees experienced much of their Year 3 enrollment growth among Maternity Care Home participants.

[26] Two of fourteen awardees listed as using the Maternity Care Home model in the Y2 annual report were employing multiple models during Y2: University of South Alabama (USA) used the Maternity Care Home and Group Prenatal Care in Y2 and is employing only Maternity Care Home in Y3; Providence Health Foundation of Providence Hospital (Providence) employs all three models. Providence's Maternity Care Home experience is not included in this analysis.

[27] VCU had begun providing some enhanced services to women late-to-care and therefore ineligible for Group Prenatal Care in Y2. It expanded its Maternity Care Home approach in Y3, but key informants were not yet able to speak to outcomes and lessons; the VCU

EXHIBIT 6: MATERNITY CARE HOME AWARDEES, YEAR 3

Awardee Name	State	Total Enrollment through Quarter 2, 2016
Access Community Health Network (ACCESS)	Illinois	2661
Florida Association of Healthy Start Coalitions (FAHSC)	Florida	1343
Johns Hopkins University (Hopkins)	Maryland	1602
Los Angeles County Department of Health Services (LADHS)	California	3097
Maricopa Special Health Care District (Maricopa)	Arizona	958
Medical University of South Carolina (MUSC)	South Carolina	1203
Meridian Health Plan (Meridian)	Michigan	1809
Mississippi Primary Health Care Association, Inc. (MPHCA)	Mississippi	2628
Oklahoma Health Care Authority (OKHCA)	Oklahoma	664
Providence Health Foundation of Providence Hospital (Providence)	Washington, DC	2492
Signature Medical Group (Signature)	Missouri	1809
St. John Community Health Investment Corp. (St. John)	Michigan	80
Texas Tech University Health Sciences Center (Texas Tech)	Texas	961
United Neighborhood Health Services, Inc. (United)	Tennessee	1207
University of Alabama at Birmingham (UAB)	Alabama	1289
University of South Alabama (USA)[1]	Alabama	1307
Virginia Commonwealth University (VCU)	Virginia	280

Source: Program monitoring reports for maternity care homes

A few Maternity Care Home awardees added sites during Year 3,[28] but many awardee sites began phasing down enrollment[29] or ceasing Strong Start involvement by the end of Year 3,[30] in preparation for the end of the Strong Start cooperative agreement.

The Maternity Care Home sites are outpatient entities with one exception: at the end of Year 2, Hopkins incorporated Strong Start into its Center for Addiction in Pregnancy (CAP), a residential

Richmond Health District site uses only the Group Prenatal Care model, and the focus of the Y3 evaluation was on its group approach. Therefore VCU's Maternity Care Home experience is not included in this analysis.

[28] LADHS, OKHCA, St. John

[29] Meridian, Maricopa

[30] MPHCA

substance abuse treatment program serving a very high-need group of pregnant Medicaid beneficiaries.

Year 3 case study analyses demonstrate that while Maternity Care Home awardees comprise different types of providers (e.g., large hospital systems, community health centers, private physician practices) with unique program designs, a common key feature across awardees continues to be the addition of staff to provide care coordination and support for eligible pregnant women. Maternity Care Home awardees use different job titles for the people fulfilling this Strong Start-funded role, but the role itself is consistent across the projects: individuals in these positions provide appointment attendance tracking and follow-up, care coordination and referrals, education, and personal support. For simplicity, we use the single term "care manager" to refer to these individuals.

Program Outcomes:

The Maternity Care Home awardees described a wide range of maternal and newborn outcomes among their Strong Start participants. The next sections summarize the outcomes in various measures (using the evaluation's PLPE data) and the level of awardee satisfaction with their outcomes.[31]

Preterm Birth and Low Birthweight: Among Maternity Care Home awardees, preterm birth rates ranged from 7 percent[32] to 25 percent[33] in 2015.[34] Low birthweight rates ranged from 6 percent[35] to 23 percent.[36] The majority of Maternity Care Home awardees[37] reported that they believe Strong Start is improving rates of preterm birth and consequently low birthweight. Key informants associated with just six Maternity Care Homes[38] felt that Strong Start was either having no impact or its impact was indistinguishable from that of other services, though some key informants felt that there was a marginal positive impact.

Among awardees with positive views of Strong Start's effectiveness, four[39] highlighted data showing that these outcomes are better among Strong Start participants compared to historical rates for women in Medicaid or overall rates for their city or state, while the remainder believe

[31] Outcomes for the Providence awardee are not included in this analysis, as the outcomes discussed during Providence interviews were compiled for participants enrolled in the awardee's three different Strong Start approaches to care, and do not reflect outcomes for Maternity Care Home participants only.
[32] Texas Tech, OKHCA
[33] MUSC
[34] The rates described in this section reflect the most recent PLPE data that was available at the time of an awardee's Y3 interviews, but is generally for participants ever enrolled through the third quarter of 2015.
[35] Maricopa
[36] UAB
[37] Hopkins, Meridian, Signature, Texas Tech, MUSC, United, MPHSC, St. John
[38] UAB, Maricopa, FAHSC, ACCESS, OKHCA, USA
[39] Signature, Texas Tech, MUSC, St. John

rates have improved but do not have supporting data. Hopkins conducted a small, internal study of the impact of the "dosage" of Strong Start services and found that participants who had three encounters with a care manager (i.e., the full program) had a preterm birth rate of about 10 percent, while Strong Start participants overall had a preterm birth rate of about 14 percent.[40] Meridian reported improvement in preterm birth rates compared to its experience before Strong Start began, though the rate slightly worsened from 2014 to 2015 when a key care manager went on maternity leave. Even with positive views of their progress, many awardees generally felt that rates could and must improve further.

Common perceptions about which services could be reducing preterm births and low birth weight encompassed the full range of enhancements offered in Strong Start, including:

- Earlier entry into prenatal care as a result of Strong Start outreach, leading to faster referrals to WIC, social workers, and other community resources;
- Better administrative follow-up that increased women's attendance at prenatal visits;
- Home visits;
- Education and support to improve nutrition;
- Reductions in smoking and substance use; and
- Screening and referrals to provide support for women with depression, stress and other behavioral health conditions.

Several awardees mentioned the value of the trust built between patients and staff delivering Strong Start enhancements and the emotional support the program provides, which they believe can lead to greater engagement with prenatal care and increased self-efficacy and wellbeing.

Some awardees with high rates of preterm birth[41] reported that it is very difficult for them to improve outcomes because their population is extremely high risk with complex underlying medical conditions. Awardees in a number of states view lack of Medicaid coverage between pregnancies as a key barrier to improving outcomes. Many women enter care (some quite late in pregnancy) with serious, untreated health conditions that neither standard care nor enhanced Strong Start care can fully address. Examples include diabetes, sickle cell anemia, cystic fibrosis, severe and persistent mental illness requiring daily day-care, history of multiple miscarriages, and serious traumatic injury.

[40] Outcomes data described by awardees often consisted of comparisons to the broader population served by that provider or to the Medicaid population in general, rather than pre-post data. These data, therefore, may be confounded by selection bias for Strong Start enrollment and influenced by the impact of other programs with the same goals.
[41] UAB, FAHSC, ACCESS, MUSC

Conversely, there are a variety of programs similar to Strong Start in place in many states that may be contributing to improvements in preterm birth and low birth weight, and awardees reported that it is challenging to distinguish the impact of these programs from those of Strong Start. Programs such as Early Head Start (which may include home visiting during pregnancy and early childhood, even before preschool age), Healthy Start, or state-based efforts to provide case management or home visiting to improve perinatal outcomes were often mentioned as complementary efforts. Women can become eligible for these wraparound services while pregnant. In some cases, Medicaid managed care plans provide case management services or incentive programs that offer free car seats or cribs when women attend prenatal care appointments, but key informants could not easily assess how intensive or effective these are. Maryland (where the Hopkins awardee operates) recently launched a value-based purchasing program that provides financial incentives for reducing low birth weight rates.

Breastfeeding: Rates of breastfeeding after delivery ranged from 42 percent (Hopkins)[42] to 83 percent (LADHS) among the Maternity Care Home awardees in 2015, with rates distributed widely across this range. Awardees generally had positive views of their breastfeeding rates, and while some felt Strong Start played a major role in improving breastfeeding,[43] most listed a variety of other programs or strategies they believe have a comparable or larger impact. Several awardees with rates at the lower end of the range (e.g., FAHSC, MUSC, MPHCA, and USA all had rates in the 40s-50s) still felt their breastfeeding rates were substantially higher for Strong Start participants than rates for women in their region overall and view Strong Start and other efforts to promote breastfeeding as successful.

Because increasing breastfeeding has been a focus of many of the awardees both within and outside of their Strong Start programs, key informants felt it was difficult to isolate the impact of Strong Start. About half of awardees highlighted that hospitals where Strong Start participants typically deliver have achieved Baby Friendly certification in recent years or are pursuing it, noting this as a major contributor to their successes.[44] Other efforts that key informants believe support breastfeeding include more aggressive promotion by prenatal care providers, WIC referrals, and the availability of lactation consultants (which are explicitly part of Strong Start at some awardees but not others, and are typically available to all pregnant patients), breastfeeding classes, Healthy Start, Early Head Start or other enhanced prenatal/postpartum care programs, and incentive programs by

[42] PLPE data through Quarter 3 2015 indicated that St. John had a lower rate of 15.7%; however, 74.3% of the data was missing, and the awardee reported a breastfeeding rate of 60%.
[43] MUSC, St. John
[44] 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.

Medicaid managed care organizations. Common barriers for women initiating or continuing breastfeeding, according to key informants, include perceptions that breastfeeding is difficult or not appealing; problems with latching and pain; difficulty finding space and time to pump when mothers return to work; or Medicaid coverage restrictions on breast pumps. At one site,[45] Medicaid began covering breast pumps in 2015, which reportedly succeeded in increasing access to pumps. Focus group participants shared both positive and negative experiences with breastfeeding, for instance:

> *"[The care manager] gave me resources for everything. I had more support from her than any pregnancy ever…If I didn't know about breast milk, I wouldn't have done it. This is first time I've ever breastfed." (Signature)*

> *"I breastfed my son for a week. A lady had to force him on me. I said I want a bottle. I know I got on her nerves. She ignored me and tried to get him to latch on." (Hopkins)*

> *"[The case coordinator] has made me want to try breastfeeding, even though I wasn't planning on doing it." (ACCESS)*

Method of Delivery: Rates of C-section delivery varied between 12.2 percent (Maricopa, which had a fair amount of missing data for the quarter)[46] and 36.3 percent (Meridian). Some awardees[47] reported that their C-section rate could be further improved, noting that women may not be aware that vaginal birth after C-section (VBAC) is an option or that some providers may be resistant to it. They viewed Strong Start as an opportunity for further education. However, many others believe that C-section rates are influenced most strongly by the varying policies of hospitals where Strong Start patients deliver and by the underlying levels of risk among patients, and less so by patient education or other Strong Start enhancements.

A small number of awardees reported that Strong Start may be reducing unnecessary C-sections[48] through nutritional counseling to manage weight and potentially decrease the need for C-sections, or education about the benefits of attempting a vaginal delivery at full term. Other awardees pointed to a variety of influences. For example, some hospitals and health plans are reportedly focused on reducing medically unnecessary C-sections among all pregnant patients through changes in hospital-wide clinical policies.[49] Some awardees explained that more hospitals now allow or encourage VBAC, while others' approach is less clear. Some awardees attributed

[45] Meridian
[46] The case study team discussed data from Q3 2015 with Maricopa key informants, and about a third (30.1 percent) of delivery method data was missing for that quarter. A slightly lower proportion of data (27.5 percent) of data on delivery method was missing for Q1 2016 and in that quarter, 12.2 percent of deliveries were by C-section.
[47] MUSC, St. John
[48] Signature, USA, possibly Texas Tech
[49] MIHS, Texas Tech, Meridian, MPHCA

higher C-section rates to the risk profile of their patient populations,[50] confounding the potential influence of Strong Start. In addition, a number of city or state programs intended to reduce medically unnecessary C-sections have operated in areas where Strong Start enrollees deliver,[51] which may be contributing to increases in the rate of vaginal deliveries. At least one state[52] has incorporated health plans' punitive early elective C-section rates into its pay-for-performance incentive program, and Detroit has a city-wide campaign called "Make Your Date" that encourages women to make it to their due date and educates them about their right to a vaginal delivery.

Health Care Costs: Most awardees believed that Strong Start is, or may be, reducing enrollees' health care costs. They most often highlighted reductions in emergency room visits as a result of enhanced support from care managers and potential reductions in neonatal intensive care unit (NICU) costs associated with improved birth outcomes. Reduction in duplicate lab tests because care managers improved entry of test results into the medical record was another potential source of savings.

Few awardees had concrete data quantifying savings, though one[53] estimated that care managers prevented four to five emergency room visits per month, and another[54] estimated prevention of 18 to 20 emergency room visits per quarter and a NICU utilization rate among Strong Start participants that is about three percentage points lower than the statewide rate. Several awardees[55] stated that it is unclear whether costs are lower among the Strong Start population. One awardee[56] noted that perverse incentives may operate in the hospital setting when NICU stays are viewed as a source of revenue and suggested that health plans may be more enthusiastic than some providers about efforts to reduce such costs. Another awardee[57] posited that Strong Start has not affected C-section rates, a major driver of cost reductions, even though the program aimed to target reduction in C-sections and used primary and repeat C-section rates as key measures in their operational plan.

Depression: Rates of depression among Strong Start participants at intake ranged between 8 percent[58] and 46 percent[59] among Maternity Care Homes, with most awardees reporting rates between 20 and 30 percent. Key informants observed that Strong Start increased screening for depression, creating opportunities for providers, Strong Start care coordinators, social workers, or nurses to better address the condition through referrals and by offering psychosocial support during

[50] Hopkins, UAB, LADHS, MPHCA
[51] Meridian, OKHCA, FAHSC
[52] Michigan, where the Meridian awardee operates
[53] MUSC
[54] Signature
[55] Including OKHCA, USA
[56] LADHS
[57] FAHSC
[58] Meridian
[59] St. John

regular appointments with Strong Start contacts. Some awardees reported that trusting relationships formed between enrollees and Strong Start staff were key to better identification of depression and other mental health conditions, allowing providers to "normalize" and more appropriately address stressors and trauma.[60] Depression screening better informed providers about enrollees' risks and enhanced coordination of follow-up care. The MUSC Strong Start team has a strong referral connection to a perinatal psychiatrist on the university campus (a rarity in prenatal settings) that runs a free walk-in clinic for prenatal patients. Over the past several years, the availability of this clinic has helped increase depression screening and treatment independent of Strong Start. While availability of mental health providers, particularly psychiatrists, remains a challenge in most areas and can discourage some prenatal providers from screening because there are not adequate resources to offer a referral for treatment), awardees still believed that increased screening was valuable. Focus group participants also described how Strong Start had helped both address behavioral health concerns while providing psychosocial support, and expressed the following:

> *"[The care manager] 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. " (Signature)*

> *"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." (MUSC)*

> *"The lady I spoke to said if I had home issues and things like that that I needed to discuss, that I could always call and discuss them, and not to be stressing myself out over situations that I could easily get help for." (UAB)*

> *"What made me talk to [the care manager] was when she asked me about personal stuff I was going through…my blood pressure was always high, and her saying I could talk to her about anything really stuck with me. I needed to talk to someone so I could feel better, and I felt comfortable with her. She had a good personality, she could be trusted, and you could tell she really cared." (Providence)*

Other Outcomes: Several awardees were proud of improved care coordination,[61] higher retention of patients throughout prenatal care and the postpartum visit[62] and increased clinical integration of Strong Start care management into the workflow of providers.[63] Key informants at

[60] Signature, Texas Tech
[61] Maricopa, Hopkins, MUSC
[62] ACCESS, Signature, MUSC, MPHCA
[63] FAHSC, Maricopa

Signature highlighted that 80 percent of Strong Start enrollees get the recommended 12 or more prenatal visits, compared to the national average of only 60 percent. Signature's Strong Start patients also have a higher rate of completing a postpartum care visit than the national average (84 percent in Strong Start versus 64 percent nationally). Several awardees also described improvements in nutrition education and/or referrals to nutritionists and WIC.[64]

Strong Start Services and Program Features:

The Maternity Care Home awardees have both similar and distinct program features. The next sections summarize commonalities and differences in various program components.

Outreach and enrollment: Nearly all Maternity Care Home awardees reported progress toward meeting their (usually revised) enrollment goals. At the end of Year 3, most had ceased or were close to ending new enrollment as part of plans to wind down the program. Enrollment efforts generally targeted women who come to the clinical site for prenatal care ("in-reach"), with a few exceptions. MPHCA, for example, engaged in substantial community-based outreach that increased early entry to care and reportedly improved outcomes. St. John's enrollment increased in Year 3 following changes to its IRB, which permit the program to produce flyers, attend outreach events, and conduct other recruitment activities. Signature staff attended community events and proactively reached out to potential community agency partners.

Higher enrollment during Year 3 is largely attributed to improved integration of Strong Start staff into clinical settings and better relationships with clinical staff. At FAHSC, clinic staff came to accept and rely more on Strong Start care managers to meet the needs of high-risk patients, resulting in better coordination to identify and refer potential enrollees. A few awardees attributed higher enrollment to using the opt-out approach, making Strong Start enrollment the default option for all eligible women. One awardee, Meridian, benefited from both multiple data sources to identify pregnant members and an opt-out approach, enabling it to identify eligible women early, ensure early entry into prenatal care, and thus improve the chance of positive outcomes.

The most successful Strong Start recruitment techniques varied by population and patient circumstances. At LADHS, care managers found that taking cues from the patient and tailoring the description of the program was key to enrollment success. When recruiting women with fewermedical, economic, and psychosocial needs, awardees generally described Strong Start as a way to contribute to research and help other pregnant women. UAB also found this approach successful with women who had prior pregnancies and felt confident that they could handle the current pregnancy. In contrast, for women with greater needs and/or less confidence, a better approach was to emphasize how the program could improve their prenatal experience, connect

[64] MPHCA, UAB, Hopkins

them to resources, and help their baby. One Strong Start focus group participant described her enrollment decision: "they told me if I need anything for my baby, they will help connect you to the resources to get them."

Partnerships with Medicaid and other programs contributed to Strong Start enrollment. Signature developed a strong working relationship with the state Medicaid office, which allowed them to assist in the application process for Medicaid benefits. This expedited the Medicaid approval process and thereby allowed women to begin prenatal care sooner and benefit more fully from Strong Start services.

Family planning: Strong Start's role in providing family planning services and counseling varied across Maternity Care Home awardees. A couple of Strong Start programs did not engage in family planning care because that was considered solely the role of the providers. One awardee, St. John, did not include family planning because it is part of a Catholic health system that does not permit discussion of contraception other than natural methods. But most Strong Start Maternity Care Home awardees played a significant role, reinforcing and expanding on the birth control counseling provided by the prenatal providers. A key feature of most awardees' family planning counseling is that it occurs early and often. Care managers typically begin discussing contraception at intake, at least once during the third trimester, and again postpartum. The text box includes a more detailed look at one awardee's (LADHS) approach to family planning services Strong Start care managers at Texas Tech found that a promising approach is to try to get the woman's partner involved in family planning decisions.

***Family Planning*:** Los Angeles Department of Health Services (LADHS)

LADHS is a large public health care system that treats over 800,000 patients each year at 19 community-based clinics and four hospitals located throughout Los Angeles County. LADHS has invested substantial resources in family planning, and its Strong Start program reflects this. Each of the program's care managers is certified as a family planning health worker.[1] Care managers first raise the issue of family planning at intake and then revisit it during the third trimester and postpartum assessments. The care managers indicate that "the [Strong Start evaluation] surveys are a good opportunity for us to check in with patients [about family planning]." Family planning is also discussed in health education classes and raised by physicians during pregnancy—a "sea change" from prior practices whereby family planning discussions occurred only at the postpartum visit.

Strong Start focus group participants at LADHS felt they were well equipped to make decisions about their postpartum contraception plans and cited information provided by care managers as instrumental to that readiness. One participant noted that information from her care manager helped her decide to get an effective form of birth control. "The first time I was asked [about birth control] was by [the care coordinator] from MAMA's neighborhood. I said I thought about it but I didn't know what to do. She described them to me and gave me a sheet. My next appointment, my 32 week, the doctor asked if I'd thought about it. I said I want a 5 year IUD." Though not reflected in the PLPE data, which asks only about postpartum discussions of family planning, key informants reported that almost 100 percent of women say someone has spoken with them about contraception, and most leave the hospital after delivery with an implant or IUD.

Despite progress, however, many Strong Start Maternity Care Home awardees continue to struggle with providing effective family planning care. A major barrier is that women frequently do

not return for postpartum visits, a key opportunity for birth control counseling and selection of a method.[65]

Long-acting reversible contraceptives (LARCs) are emphasized by Strong Start care managers, as well as many providers, and their use appears to be increasing. However, challenges remain. At UAB, providers rely on Depo Provera because it is convenient to provide after delivery, but poor attendance at appointments for follow up injections reportedly results in high rates of repeat unplanned pregnancies. Myths about IUDs are persistent, particularly among teens. One provider at MUSC noted, for example, that she has been asked whether the IUD can travel out of the uterus and "block a woman's heart." Some awardees reported that women fear or complain about LARC side effects, and sometimes opt to have a LARC removed after a short time. Also, provider preference or resistance can be a barrier. Physician concern about inserting an IUD at the time of delivery reportedly has affected take-up rates,[66] and the Meridian provider community's continued skepticism about LARCs—even after its prior authorization policy was removed—have reduced LARC take-up. Despite improved Medicaid coverage for LARCs, MUSC found that inadequate reimbursement and problems obtaining a steady supply of LARCs are particular challenges, especially at smaller hospitals in rural areas.[67]

In general, Medicaid covers all or most contraceptives, but in many states coverage ends a short time after delivery (generally at 60 days postpartum). This abrupt cutoff affects birth control selection and continuity. For example, IUDs are encouraged because they do not require ongoing actions or costs, though a woman who wants to remove an IUD or implant may incur costs associated with that procedure if she is not insured at the time. At FAHSC, the women's relationship with Strong Start care managers helps them get started with contraception, but once that relationship is over (and is not replaced through other support programs), that "extra advocate" is no longer there to help women stay on top of their birth control plans. The MUSC Strong Start team helps women losing Medicaid coverage to apply for a state program that covers family planning.

Use of 17P Treatment: Provision of "17P,"[68] a series of injections used to prevent preterm birth for women with at least one prior spontaneous singleton preterm birth, plays a major role in MUSC's Strong Start program. Among most Maternity Care Home awardees, however, 17P is

[65] Johns Hopkins has begun a reportedly successful program to insert an IUD immediately after delivery to address the postpartum no-show problem and allow a pain-free insertion (if under the influence of an epidural). However, one key informant reported that "often" there is an expulsion when an IUD is inserted at delivery. This is partly a matter of perception, as studies show that while expulsion rates are higher with IUD placement at time of birth, overall they are still low.
[66] Texas Tech
[67] A 2015 study, by Moniz et al., of Medicaid coverage in 40 states found that 15 states provided separate or increased bundled payment for immediate postpartum LARC, and nine states were considering providing enhanced payment.
[68] 17-alpha-hydroxyprogesterone caproate.

managed by the participants' OB provider and is not directly part of Strong Start. Key informants noted many barriers to its use, which vary widely among awardees and sites. [69]

As noted above, 17P is an important part of MUSC's Strong Start intervention, where 45 percent of Strong Start participants with a previous preterm birth received the treatment in 2015. This is the highest rate of treatment among Maternity Care Home awardees. 17P is well established and accepted as the standard of care at MUSC, and Strong Start care managers (who are experienced RNs) feel comfortable starting the referral process themselves if they notice during their initial review of risk factors that 17P may be appropriate.

Hopkins has faced several barriers to achieving its goal of ensuring that all eligible women receive 17P. For instance, some women do not present for prenatal care until the window to initiate 17P treatment has passed; according to medical recommendations the injections can be started at 16-20 weeks' gestation, but insurance companies reportedly require that initiation begin by 16 weeks. Often, the prior authorization process for 17P takes long enough that by the time it is completed the insurance carrier's requirement to begin the injections by 16 weeks' gestation cannot be met. Another barrier is that the home health agency that provides the injections often has difficulty reaching eligible women.

Additional barriers to 17P treatment cited by other awardees include: women's aversion to weekly injections and lack of concern about preterm delivery; delays getting Medicaid coverage that result in missing the cutoff to start 17P treatment; lack of home health agencies that will administer the injections at the patients' homes; difficulty sustaining home visits when patients move frequently or otherwise experience housing instability; transportation issues that prevent women from getting to clinics for injections; and financial risk to providers.[70] One awardee[71] found that training family members to deliver injections at home using mail delivery of 17P (part of usual care rather than Strong Start) addressed some of these barriers and improved 17P follow through, resulting in particularly high 17P use at UAB.

Use of Electronic Medical Records (EMRs): The majority of Maternity Care Home awardees use the EMR to identify women eligible for Strong Start for targeted recruitment, though access to EMRs varied across sites. Many Strong Start staff also use the EMR to document encounters with patients, track referrals, and monitor patient progress. While some awardees did not think providers reviewed Strong Start notes in the EMR, there were exceptions. A provider at MUSC, for example,

[69] PLPE data through Q3 2015 indicate the rate of 17P treatment for women with prior preterm births among Maternity Care Home awardees ranged from zero (Texas Tech) to 45 percent (MUSC).
[70] For instance, Signature reported that the drug comes in a five-dose vial with a shelf life of about a month. The provider's office purchases the five-dose vial for a patient, and then claims Medicaid reimbursement for the administration fee and the drug itself as each dose is administered. If a patient does not show up for the 17P injection appointment, the providers office cannot claim reimbursement, and must "eat the cost" of that dose, creating a disincentive for providing 17P treatment.
[71] UAB

reported using the EMR as a collaborative tool and explained, "It's very helpful to follow the narrative [in the EMR] and follow up with a patient. Often they don't volunteer the information to us. They say they're fine but we can see in the notes that this patient called last night with contractions or questions about bleeding."

Social Media: Social media does not play a significant role in Strong Start programs specifically, though the MUSC Strong Start program coordinator maintains a Facebook page for the program and regularly updates the site with educational materials. A small minority of Maternity Care Home awardees recently began social media initiatives more broadly. UAB launched an app intended to make educational material, including Strong Start videos, more easily accessible to all prenatal patients. LADHS, whose Strong Start program is called MAMA's (Maternity Assessment, Management, Access and Service) Neighborhood, has received approval to pilot social media use for the County, and ultimately hopes to have a smart phone application, Facebook page, Twitter account and private online support groups. In addition, LADHS has developed a text-based "check-in" program called "Mobile MAMA." When a patient visits a community referral site, she is prompted to send a text to MAMA's Neighborhood. This cross-brands MAMA's and allows MAMA's staff to track whether women have followed up with a referral. It is exclusively patient-driven, so while some participants take no part, LADHS has also received new MAMA's enrollees through these channels. Mobile MAMA was recognized by the California Department of Public Health as a finalist in a competition to identify promising innovations that take a broad approach to the health delivery system. The application is still relatively new, but gaining traction as MAMA's reaches out to additional community partners.

Strong Start Staffing: The Maternity Care Homes were generally pleased with their choice of nurses, social workers, community health workers, or a combination of these to serve as their Strong Start care managers. UAB found patients are more likely to communicate about depression and substance abuse issues with nurses than with social workers, while Signature and Meridian preferred social workers as their care managers. Maricopa, Providence, and MUSC found that having a mix of clinical and nonclinical Strong Start staff allowed it to be responsive to the diverse needs of their population. Some awardees found that regardless of credentials, the care manager's personality, flexibility, and "tenacity" are paramount. Specific types of staff training, such as motivational interviewing and goal setting, were deemed valuable by several awardees. Additional training would be helpful in responding to patients' mental health needs and severe psychosocial risk factors, and in establishing boundaries to avoid burnout. Staff who speak the language of the non-English speaking patient population or who have access to a qualified interpreter are critical. MPHCA felt that previous experience and training in community health centers proved to be an important criterion in staff selection.

About half of the awardees experienced staff turnover that often temporarily disrupted Strong Start enrollment or continuity of care. Maricopa was able to respond to staffing changes and

successfully resume its program because staff members were cross-trained and were able to conduct multiple program activities.

***Addressing Barriers to Care*:**

The evaluation team identified a few key barriers to care that were common across many Strong Start awardees in the first two years of the evaluation and explored these barriers in more depth in the third round of case studies with Maternity Care Home awardees.

Transportation: With few exceptions, awardees described transportation as a significant barrier to prenatal care. For a few awardees in larger metropolitan areas, such as Providence, transportation is not problematic because of extensive public transportation options. But generally cumbersome application processes for Medicaid-covered transportation, unreliable transportation vendors, the need to schedule rides days or weeks in advance, and rules (in some states) against bringing children on Medicaid transport vehicles are common obstacles for Strong Start participants. Lack of personal options compound the Medicaid transportation issues. Focus group participants relayed the following:

> *"Our car was down and we had to take the Medicaid van. It was awful, they were 3 hours late, but still nonchalant and didn't care." (MUSC)*

> *"It's a lot, being pregnant and walking, and some bus stops are far. I have to take three buses to get to my appointment." (Signature)*

Awardees have adopted a number of strategies to address transportation barriers, and some state Medicaid policies support better transportation access. Strong Start staff in Maricopa help enrollees sign up for Medicaid transportation, and others remind participants to schedule in advance. Meridian offers vouchers for public transportation, as well as mileage reimbursement to family members who drive women to appointments. South Carolina (where the MUSC awardee operates) hired a mediator to interact with providers (not patients) and transportation vendors to improve performance based on provider feedback. However, awardees generally did not believe that they had the power to improve Medicaid transportation services. Informants suggested adding targeted funding for transportation to Strong Start enhancements.

Childcare: The majority of awardees also described childcare as a significant barrier to care that is often intertwined with transportation challenges. Lack of options for affordable childcare and limitations on whether children can be included in Medicaid transportation and at appointments are common issues. To address this issue, Maricopa and UAB Strong Start staff work with participants to set up prenatal appointments during school hours for those with school-aged children. Maricopa and MUSC have also encouraged participants with younger children to bring another adult to their

prenatal appointments so that children can wait elsewhere under the supervision of a trusted adult during the appointment. Two awardees[72] reported offering childcare at some sites. A few others occasionally did so unofficially. Meridian informants reported that offering on-site childcare did not address challenges because enrollees were not comfortable leaving their children with unfamiliar adults. Other promising strategies include allowing children to come to appointments or referrals to Early Head Start or to churches or local organizations that provide childcare, though it is not clear how often these are available and affordable. Strong Start participants noted:

"If I don't have childcare, I don't come. They say you can bring your kids, but if you have smaller kids, like my younger ones are 7, 4, 3…you might not want to go [to your appointment]." (MUSC)

"I've missed appointments a lot because I can't find someone to care for my twins." (Signature)

"[My four-year-old] comes to every appointment, he likes to be here. This is his baby, to hear him tell it!"(UAB)

Communication: Most awardees reported challenges in sustaining contact with Strong Start enrollees; they have tried a variety of strategies to improve this, with varying success. Frequent moves and changing phone numbers were the most commonly highlighted issues. Strategies to maintain up-to-date contact information include: asking for emergency contacts and updated contact information at each appointment, calling early in the month when participants are more likely to have minutes left on their phones, texting (including using Google phone numbers to allow texting from a centralized online source rather than staff's personal numbers), use of patient portals to allow enrollees to email their providers, providing print-outs of all future appointments at every visit, and searching claims for visits with other providers or the emergency department to locate updated contact information. Trusting relationships with Strong Start care managers—including through home visits when necessary—also fostered better communication, making women more likely to reach out to providers with questions and to share updated contact information.[73] Focus group participants expressed:

"I did miss one [appointment], since they didn't call and remind me of it, early in my pregnancy. They rescheduled it." (UAB)

"I thought that was too good to be true, someone calling up to check up on you and ask if you need anything. " (MUSC)

[72] LADHS, MPHCA
[73] FAHSC, Hopkins, Meridian, Providence

"[The Strong Start care manager] has always been supportive. She says I can call her any time, day or night, to keep her informed." (Signature)

Common Implementation Challenges:

During the third year of implementation, Maternity Care Home awardees made much progress, and most were no longer struggling significantly with Strong Start enrollment and retention. Many Maternity Care Home awardees faced challenges, however, in fully engaging Strong Start participants and providers, and some sought better technology to track referrals, collect data, or use social media. Individual awardees reported various additional areas in need of improvement.

Lack of Participant Engagement: A majority of Maternity Care Home awardees face challenges fully engaging some participants. Areas for improvement include: better integrating the participant's partner and family in prenatal care,[74] promoting attendance at classes,[75] and maintaining contact with women who have inconsistent phone access or "disappear".[76] Key informants observed that the Strong Start interventions did not fully achieve desired outcomes because some women miss their appointments, are not adherent to care instructions, or are unwilling to learn about recommended changes in health behaviors. In other cases, lack of evening and weekend hours posed a barrier for women who work. Most care managers attempt to follow up with patients who do not show up for visits and, if unsuccessful, wait until the woman's next prenatal appointment to make contact. Many awardees have found that it helps for care managers to meet with participants before or after their appointments with providers rather than on separate days.

Gaps in Provider Support: While provider buy-in to Strong Start continued to improve during Year 3, a few Maternity Care Home awardees still lack optimal provider support and engagement.[77] This translates into fewer referrals to Strong Start, as well as little coordination of Strong Start services with medical services. Awardees associated with academic medical centers reported that they do not have adequate time to familiarize residents cycling through OB clinics with Strong Start to get buy-in from them. St. John continues to lack physician support; key informants felt that providers need more education about the challenges that Medicaid-covered and low-income prenatal patients face and their potential impact on infant and maternal outcomes.

Need for Tools: Maternity Care Home awardees noted gaps in technical tools that would promote Strong Start effectiveness. While most awardees had access to EMRs, this was not universal across sites. Care managers at certain FAHSC clinics, for example, do not have access to the EMR. They obtain a print out of the day's schedule from clinic staff to help them identify

[74] ACCESS
[75] Hopkins, United
[76] USA, Texas Tech, St. John, FAHSC, Signature
[77] Meridian, MUSC, OKHCA, UAB, St. John

potential new enrollees and existing Strong Start patients. Maricopa key informants would like funding for technology to use social media for outreach and implementation. Other awardees noted that they need mechanisms to track referrals, follow up on care,[78] and collect data for women who deliver with other providers and do not return to the awardee health system for follow up.[79]

Other Areas for Improvement: Lack of community resources, such as affordable housing and mental health services, continues to frustrate many Strong Start care managers across awardees. Hopkins noted that mechanisms for regular communication across sites would promote consistency in the interventions and enable staff to learn from each other.

Common Promising Practices:

The strengths of the Strong Start programs among Maternity Care Home awardees during Year 3 include the personal touch of the care managers, improved integration into clinics with provider support, universal screening, use of the EMR, and adoption of enhanced services as the standard of care throughout the site.

Personal Touch: Informants attribute the success of the Maternity Care Home model to the care manager's "personal touch." Meeting with Strong Start participants and potential participants face to face is the best way to engage, establish trusted relationships, and educate women about prenatal care. As one key informant at FAHSC put it, Strong Start care managers are "warm, personable women," who have been successful in communicating with participants, connecting them with resources, and providing guidance on their options and what to ask of their OB providers. An ACCESS key informant emphasized that care managers "make people feel like they matter and that they're important," and Hopkins patient navigation staff provide a sense of consistency that is otherwise lacking at large OB clinics where patients are served by many different prenatal care providers. Informants viewed round-the-clock availability of Signature and MUSC care managers as particularly valuable (though not necessarily sustainable), and MPHCA's home visiting component was cited as having a particularly significant impact on NICU stays and maternal hospitalizations.

Integration and Provider Support: Despite need for greater provider support at some sites, overall integration into medical care and provider engagement have improved significantly at most sites since Strong Start was first implemented. Strategies that fostered this improvement include: demonstrating that Strong Start reduces burden on providers; accommodating and working within existing clinic workflow; nurturing physician champions; and continually educating providers. UAB, Hopkins, Providence, and FAHSC Strong Start staff improved relationships with clinicians and integrated Strong Start into the clinic workflow by being flexible and accommodating provider

[78] UAB
[79] MPHCA

schedules (e.g., conducting program intake and sessions before and/or after their OB visit). Provider support for Strong Start programs at Maricopa, Hopkins and FAHSC grew over time as clinic staff witnessed how Strong Start benefitted their patients and provided physicians more time for clinical patient care. Care managers have become a relied-upon resource in the clinics. At LADHS, provider education has helped foster support for the program. According to one key informant, "You have to find your physician champions…to communicate that message to the rest of the staff." At Meridian, Strong Start staff shared "Baby Basics" materials (educational booklets and planners purchased from the What to Expect Foundation and provided to Strong Start enrollees) with providers, which helped ensure that participants were getting consistent information and messages from both their Strong Start care manager and their prenatal care providers.

Standard of Care: Using the opt-out enrollment approach and incorporating Strong Start enhancements into the standard practice of care demonstrate the successful impact of the program. A key informant at United noted, "Instead of asking people if they wanted to be part [of Strong Start], we said this is our program. You are here for care and this is what you get." At MUSC and MPHCA, providers are reportedly incorporating some of Strong Start's elements (e.g. education and encouraging staff to engage in multiple "touches" with the patient at each visit) into their traditional models of care.

Universal Screening: Multiple awardees[80] found that Strong Start's universal screening at intake has been the greatest contribution of the program. They noted that the intake form – particularly because of its ability to identify symptoms – served as a successful screening tool for depression, nutritional challenges, and untreated mental health and substance abuse issues. At USA, key informants expect that screening for depression and substance use and

Identifying and Addressing Depression: University of Alabama at Birmingham (UAB)

UAB is an academic health system in Birmingham operating a maternity home model within its Department of Obstetrics and Gynecology. UAB's Strong Start intervention focuses on universal screening for depression using the Strong Start intake form as a screening tool, screening for nutritional needs, and providing educational content through videos. Key informants reported that many more enrollees were identified as suffering from depression (41 percent according to PLPE data through Q3 of 2015) compared to those patients not enrolled in Strong Start. They attributed this higher identification rate to the detail and specificity of the Strong Start intake form, as well as its administration by nurses rather than social workers. Participants reportedly were less willing to disclose depression to social workers, fearing that such disclosures might threaten their custody of children. Key informants believed that the increased referral rates have resulted in more participants being treated and experiencing better mental health. Patients with mental health issues were referred to outside community-based providers rather than to UAB providers, so tracking of referral use and effectiveness did not occur on a systematic basis. Based on contact with participants in the waiting areas before their routine provider appointments, key informants believed that women visually appeared to be in better frames of mind and have benefitted from services received.

Key informants noted the value of universal, in-depth symptom-driven behavioral health screening, contrasting it with the reportedly brief or self-assessment based screening that providers or social workers are likely to administer. At the time of Year 3 interviews, the OB/GYN department was "exploring ways" to adopt universal behavioral health screening, although there appeared to be no specific efforts to continue to use the Strong Start intake form itself.

[80] UAB, FAHSC, USA, and others

related interventions will result in the program's strongest effects on outcomes and morbidity. Physicians at USA are reportedly supportive of the screenings and will likely continue their use after Strong Start has ended.

Electronic Medical Records (EMR): A few awardees emphasized the value of the EMR (discussed above) in Strong Start enhanced services. Key informants at Maricopa reported that embedding the Strong Start program in their EMR was essential to tracking health care and Strong Start service use among participants, identifying eligible participants for targeted enrollment, and facilitating the awardee's ability to generate reports on Strong Start data that could be used for program improvement.

Other Promising Strategies: Individual awardees demonstrated other promising strategies, including using multiple data sources to identify pregnant members and begin prenatal care early;[81] having a care manager integrated in the community who could visit women in their homes;[82] partnerships with Medicaid and ability to expedite enrollment;[83] cross training staff to enable them to conduct several program activities during times of staff turnover;[84] persistent follow up with participants;[85] and telephonic and text-based communication that allows for more regular contact with participants who may have many competing demands for their time or who may live in rural or isolated areas.[86]

Sustainability:

Most awardees are exploring sustainability plans for elements of Strong Start or the entire program,[87] including several that expect to transition enrollees into other similar programs.[88] Awardees whose programs are being folded into broader care coordination initiatives expressed concern that these more general programs would not maintain the level of support for pregnant patients that was the goal of Strong Start. LADHS and FAHSC expect to sustain Strong Start as a distinct program and have identified funding to do so. UAB developed a mobile app with other funding that will incorporate educational materials developed as part of Strong Start and make them more widely available to pregnant patients.

Among awardees who did not expect to sustain the program, lack of funding was the most common challenge along with factors such as lack of support from the obstetrical department,[89] lack

[81] Meridian
[82] Meridian
[83] Signature
[84] Maricopa
[85] St. John
[86] MUSC
[87] UAB, Maricopa, MPHCA, Hopkins, LADHS, FAHSC, ACCESS, Meridian, Signature, OKHCA, USA
[88] Hopkins, Maricopa, MPHCA, Meridian
[89] Texas Tech. It did plan to continue its Group Prenatal Care model at a neighborhood clinic.

of Medicaid reimbursement for the enhancements,[90] or ongoing opposition from the Medicaid program because of the program's association with the Affordable Care Act.[91] One university-based awardee that often works with short-term program grants such as Strong Start acknowledged that it had not done much advance planning to garner internal support, and that service enhancements might only be revived in the future if another grant opportunity like Strong Start arose.[92] MUSC and United noted that managed care plans were not interested in supporting the enhancements because they believe doing so would replicate their own care management efforts.

Potential Sources of Funding: At the time of the Year 3 interviews, awardees that hoped to sustain Strong Start were at different stages of exploring alternative funding sources. LADHS and FAHSC have identified funding to sustain—and expand—Strong Start. At LADHS, Strong Start was planned as a pilot program with the expectation that it could become the standard model of care for pregnant women served by county health system. Strong Start was perceived as successful, so the awardee has begun expanding staff that provide Strong Start services with funding from the county. FAHSC is negotiating with the state to expand Strong Start statewide through a Healthy Start waiver that is funded by the Medicaid program and the Maternal and Child Health block grant.

Other awardees are considering pursuing outside grant funding,[93] partnerships with Medicaid managed care organizations,[94] or funding from their own institutions.[95] Hopkins plans to sustain its Baby Basics class using an outside grant from the March of Dimes because this is a relatively low-cost and valuable component, although many women in Strong Start did not take advantage of this program. Hopkins also noted that distribution of responsibility for the program across its health system posed a challenge for sustainability planning since each department involved had a fixed budget without much flexibility. In Alabama (where the USA awardee operates) key informants reported that upcoming delivery system reforms in Medicaid have created uncertainty about whether and how enhanced services might be covered and how sustainability planning should proceed.

Role of Strong Start Data: Many awardees noted that data capturing the effectiveness—and cost-effectiveness—of Strong Start is key to promoting sustainability. They felt that additional data on outcomes and cost savings would be extremely useful, especially in discussions with outside payers. Maricopa and MPHCA noted that cost data are indispensable in exploring collaboration with Medicaid managed care plans to sustain elements of Strong Start. FAHSC would like to use data to demonstrate the impact of the model particularly on racial disparities experienced by predominately African American women in the state. Signature highlighted active efforts to publicly

[90] Texas Tech
[91] MUSC
[92] MUSC
[93] Hopkins, Signature, USA
[94] Maricopa, Hopkins, Signature
[95] ACCESS, Hopkins, Signature, OKHCA

disseminate data about its Strong Start program, presenting at conferences and noting Strong Start's success in media interviews.

GROUP PRENATAL CARE MODEL

The Strong Start initiative's model of Group Prenatal Care is a model whereby patients receive prenatal care from health care providers in a group setting with other women of (typically) similar gestational age. The model emphasizes the building of supportive peer relationships and involves a series of facilitated, face-to-face sessions covering three components: health assessment, education, and support.

Description of Awardees:

Fourteen Strong Start awardees are implementing the Group Prenatal Care model (Exhibit 7). Nearly all are using the Centering Healthcare Institute's (CHI) approach, called CenteringPregnancy®(Centering)[96] or a modified version of it. The majority of Strong Start sites are following the Centering content and standards closely, though as described in the evaluation's Year 2 annual report, individual sites affiliated with about one-third of the awardees are using a modified version. St. John's approach represents the most significant departure: after unsuccessful attempts to implement Centering, the awardee was only able to offer "Group Prenatal Care support sessions" that supplement rather than substitute for individual prenatal visits with physicians.

The awardees are operating between one[97] and seven[98] Group Prenatal Care sites. Several experienced changes to the number of group care sites, either because sites dropped out[99] or were added,[100] or because sites began implementing a different Strong Start care model.[101] Sites either dropping out or being added to awardees' programs was the most common type of change in Year 3, though a handful of Group Prenatal Care awardees also made changes to their Strong Start intervention. Three awardees started specialized groups targeting specific populations of pregnant women: UKRF launched a group for opioid-addicted women, VCU began a group for teens, and UPR started groups for women infected with the Zika virus and for women with diabetes.

[96] Under the CenteringPregnancy approach, groups 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 CHI include facilitator guides with suggested session content and activities, discussion aides, and notebooks that patients use throughout pregnancy.
[97] OKHCA, Providence, Texas Tech, UPR
[98] CJFHC, Harris
[99] Amerigroup, CJFHC, OKHCA, UKRF
[100] Einstein, CJFHC, VCU, UKRF
[101] OKHCA

EXHIBIT 7: GROUP PRENATAL CARE AWARDEES, YEAR 3

Awardee	State or Territory	Total Enrollment through Quarter 2, 2016
Albert Einstein Healthcare Network (Einstein)	Pennsylvania	1512
Amerigroup	Louisiana	861
Central Jersey Family Health Consortium, Inc. (CJFHC)	New Jersey	1158
Grady Memorial Hospital (Grady)	Georgia	1121
Harris County Hospital District (Harris)	Texas	1275
HealthInsight of Nevada (HealthInsight)	Nevada	896
Oklahoma Health Care Authority (OKHCA)	Oklahoma	119
Providence Health Foundation (Providence)	Washington, DC	357
St. John Community Health Investment Corp. (St. John)	Michigan	164
Texas Tech University Health Centers (Texas Tech)	Texas	29
University of Kentucky Research Foundation (UKRF)	Kentucky	693
University of Puerto Rico (UPR)	Puerto Rico	928
University of Tennessee Health Sciences Center (UTHSC)	Tennessee	679
Virginia Commonwealth University (VCU)	Virginia	1111

* One awardee—the University of South Alabama or USA—implemented Group Prenatal Care in the first two years of the award period but discontinued group care near the start of evaluation Y3 and continued implementing only the Maternity Care Home model instead. Consequently, USA is not included in this analysis.
Source: Program monitoring reports for group prenatal care

Program Outcomes:

The Group Prenatal Care awardees described how their approach may have affected a wide range of maternal and newborn outcomes. The next sections summarize these outcomes in various measures (using the evaluation's PLPE data) and the level of awardee satisfaction with their outcomes.[102]

Preterm Birth and Low Birthweight: Preterm birth rates ranged from 7percent[103] to 21 percent[104] among the Group Prenatal Care awardees in 2015 and early 2016.[105] Low birthweight

[102] Outcomes for the Providence awardee are not included in this analysis, as the outcomes discussed during Providence interviews were compiled for participants enrolled in the awardee's three different Strong Start approaches to care, and do not reflect outcomes for Group Prenatal Care participants only.
[103] CJFHC
[104] UPR
[105] The rates described in this section reflect the most recent PLPE data that was available at the time of an awardee's Y3 interviews, but it is generally for participants ever enrolled through the third quarter of 2015.

rates ranged from 6 percent[106] to 21 percent.[107] Nearly all awardees expressed satisfaction with their preterm and low birthweight rates and felt that the Strong Start program was positively influencing these measures.[108] Several indicated that preterm and low birthweight outcomes for Strong Start participants were better than either their state average or historical rates for similar populations of women.[109] For instance, UPR compared its 20 percent preterm rate for group care enrollees to a preterm rate of 34 percent among patients receiving traditional prenatal care. Amerigroup compared its Strong Start preterm rate of 9.7 percent to the rate for its overall Medicaid population, which was 15 percent when the awardee was developing its Strong Start proposal.

The Group Prenatal Care model includes a number of features that awardees felt were contributing to improved birth outcomes. Many suggested that the model's emphasis on education was most influential, specifically the educational components addressing normal/abnormal signs during pregnancy, healthy behaviors, gestational development, and childbirth preparation.[110] Some also mentioned that group prenatal improves providers' ability to identify, address, and monitor a range of patient needs which ultimately leads to healthier pregnancies and better outcomes.[111] As compared to traditional (one-on-one) prenatal care, group care providers spend more time with patients and get to know them better, making it easier to identify health or social service needs and make referrals to resources.

Other awardees felt that increased psychosocial support from providers and peers in the group care setting was improving preterm and low birthweight rates,[112] and some attributed better outcomes to improved visit attendance rates under Group Prenatal Care.[113]

Though a majority of awardees were confident that any observable preterm and low birthweight rate improvements could be attributed to Strong Start, a small number was unsure whether Strong Start was the driving factor behind better outcomes.[114] For instance, OKHCA noted that many of its Strong Start participants are also enrolled in Eagle's Nest, a home visiting program with goals similar to Strong Start but which might have a more significant impact because it is more intensive.

Breastfeeding: Among Group Prenatal Care awardees, rates of breastfeeding after delivery ranged from 31 percent[115] to 89 percent[116] in 2015 and early 2016. Some awardees expressed

[106] Harris
[107] UPR
[108] VCU, CJFHC, Texas Tech, UPR, Amerigroup, UKRF, UTHSC, Einstein, Harris, OKHCA
[109] VCU, UPR, Amerigroup, UKRF, Einstein, OKHCA
[110] VCU, CJFHC, Grady, UKRF, St. John, UTHSC, Einstein
[111] HealthInsight, UKRF, UTHSC, VCU, Harris, Texas Tech
[112] St. John, UTHSC
[113] HealthInsight, UKRF
[114] Amerigroup, OKHCA, St. John
[115] Einstein. Over 60 percent of Einstein's data on breastfeeding after delivery was missing for the data point discussed during the Y3 interviews (which was for participants ever enrolled through Q3 of 2015).

satisfaction with these rates and noted that they were better than rates for comparable populations.[117] Others acknowledged that there was significant room for improvement, and spoke of ongoing efforts to increase breastfeeding among low-income populations.[118] One awardee noted that, while pleased with the rate of breastfeeding initiation among Strong Start enrollees, sustaining the practice is a challenge and that rates at six weeks postpartum are often quite low.[119]

Regardless of whether they were satisfied with Strong Start breastfeeding rates, awardees felt the Group Prenatal Care model offers plenty of breastfeeding education and support. All have a dedicated group session on breastfeeding, which typically includes a hands-on demonstration of proper latching and positioning as well as a discussion of benefits for mother and child. Often lactation consultants participate in the sessions as guest speakers, dispelling myths and addressing patient concerns about the practice while encouraging group members to share their breastfeeding experiences with one another. In addition to the dedicated group session, some awardees refer Strong Start participants to breastfeeding resources available through WIC or to community-based lactation consultants.[120] Others provide assistance with obtaining breast pumps.[121] Many focus group participants found the breastfeeding education and support helpful, including those who ultimately did not breastfeed:

> *"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." (Harris)*

> *"[We] talked about what was the difference between breastfeeding and formula, what were the pros and cons. It was very helpful in talking about how to latch, they showed us films on different ways to latch, there wasn't just one way." (VCU)*

> *"In your [traditional 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." (Einstein)*

Group Prenatal Care awardees identified barriers to both initiating and sustaining breastfeeding. In addition to myths and misperceptions, challenges include early difficulties with latching that prompt a new mother to "give up" on breastfeeding in the first few days at home, concerns about breastfeeding in public, and anxiety about being solely responsible for infant feeding and nutritional needs. Some awardees noted that young and/or African American participants had the most

---

[116] HealthInsight
[117] UKRF, UPR
[118] St. John, UTHSC, Amerigroup
[119] UKRF
[120] Harris, Texas Tech
[121] UKRF, UTHSC

concerns about and were least likely to breastfeed.[122] These awardees felt that Group Prenatal Care had been successful in "changing minds" and encouraging women to try breastfeeding.

Other programs and initiatives in many Strong Start states and localities have had a positive influence on breastfeeding rates. Most commonly, awardees mentioned the national Baby Friendly Hospital Initiative.[123] Some also spoke of state-based programs similar to Baby Friendly including the GIFT program run by the Louisiana Department of Health[124] or the Keystone 10 program run by the Pennsylvania Department of Health.[125] Other efforts that promote breastfeeding in Strong Start communities include home visiting programs,[126] programs sponsored by Medicaid MCOs,[127] and hospital-based initiatives and practices like rooming-in[128] and availability of lactation consultants.[129]

Delivery Method: Strong Start participant C-section rates for Group Prenatal Care awardees ranged from 19 percent[130] to 44 percent[131] in 2015 and early 2016. Some awardees were satisfied with their C-section rate[132] (UKRF, UTHSC, CJFHC, Texas Tech) while others expressed dissatisfaction and desire to reduce their rate.[133] Two suggested that their Strong Start C-section rate was lower than historical rates or the rate of their general prenatal population.[134]

Most awardees felt that the Group Prenatal Care model was having a positive influence on C-section rates. Women are better prepared for childbirth because of session content and facilitated group discussions about labor signs and stages, pain control during labor, interventions, and the importance of carrying a pregnancy to full term.[135]These discussions are typically accompanied by videos and other educational materials, and may include a guest speaker such as a doula or labor and delivery nurse. Some awardees also include a robust discussion of VBAC options in their group sessions.[136] Focus group participants shared how group discussions had helped them prepare for labor and delivery:

"I was in active labor for eight hours, and there was pressure to have a C-section; I said no and kept going." (VCU)

"I felt like they were very encouraging of vaginal [birth] after cesarean." (Health Insight)

[122] Amerigroup, Einstein, UKRF
[123] UKRF, Amerigroup, Einstein, Harris
[124] Amerigroup
[125] Einstein
[126] UKRF
[127] VCU
[128] UPR
[129] CJFHC
[130] Harris, UTHSC, VCU
[131] UPR
[132] UKRF, UTHSC, CJFHC, Texas Tech
[133] UPR, Amerigroup, St. John, Grady
[134] UKRF, UTHSC
[135] UKRF, Amerigroup, Einstein, Harris, Texas Tech
[136] UKRF, UPR, Amerigroup, Harris

"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." (Central Jersey)

There are a number of external efforts in Strong Start communities that are also contributing to a lower C-section rate, according to awardee staff. Three awardees described good or improving hospital policies towards VBACs[137] and another mentioned hospital-based efforts to eliminate early elective deliveries.[138] Two highlighted public campaigns to educate women about the benefits of staying pregnant for at least 39 weeks, including a "Make Your Date" campaign in St. John's service area and the national March of Dimes campaign (mentioned by UTHSC).

Health Care Costs: Though Group Prenatal Care awardees generally had no specific information about the model's impact on health care costs, a majority speculated that Strong Start had reaped cost savings for Medicaid and CHIP. Harris completed a basic cost analysis showing that Strong Start saved Texas' Medicaid and CHIP programs between $1-$2 million total, based on the finding that each avoided preterm birth results in a savings of $40,000.

Awardees commonly described how, under the group care model, women are educated about the signs and symptoms of pregnancy and labor, which leads them to access more appropriate care, which in turn reduces triage and ER visits.[139] On the other hand, an Amerigroup site completed an analysis of ER visits and found no discernible difference in rates between group and traditional prenatal care patients.

A few awardees also reasoned that Group Prenatal Care participants' lower preterm birth rates result in reduced NICU use and costs,[140] and that participants' healthier pregnancies mean fewer interventions and—subsequently—lower delivery and postpartum stay costs.[141] Finally, UKRF described cost savings related to decreased rates of neonatal abstinence syndrome among Strong Start enrollees in its specialized group targeting opioid-addicted women.

Among a small number of awardees, there is concern about Group Prenatal Care's cost-effectiveness and return on investment.[142] In brief, providers at some Strong Start sites have contended that the group care model costs more, per patient, than the traditional care model, particularly if group cohort size is small or groups suffer from chronic low attendance. Some key informants associated with the Amerigroup awardee, for instance, contend that it is not financially viable to continue the Group Prenatal Care model in high-volume clinics that use medical residents, where no-show rates are high and traditional visits are short (i.e., more patients could be seen

[137] UKRF, UPR, Harris
[138] Amerigroup
[139] Texas Tech, St. John, UTHSC, Einstein, Harris, UKRF
[140] CJFHC, Grady, UKRF
[141] Grady, UKRF
[142] CJFHC, Amerigroup

during two hours of short traditional visits as compared to a poorly-attended two hour Group Prenatal Care session). Provider concerns about cost-effectiveness typically do not account for cost-savings associated with improved birth outcomes, as in a traditional health care delivery system these savings would benefit health care payers rather than the providers themselves.

Depression: For most group care awardees somewhere between one-quarter and one-third of Strong Start participants reported depression symptoms when they joined the program in 2015 or early 2016 (ranging from 13 percent for Harris[143] to 46 percent for St. John). Awardees were not surprised by the prevalence of depression symptoms given the presence of multiple social risk factors among their patient population (e.g., poverty, chronic unemployment, food insecurity, housing instability, and experience with domestic violence). They described several ways Group Prenatal Care helps identify and address depression. Most commonly, group facilitators make referrals to behavioral health counselors based on intake findings or information a participant shares during group discussions or the individual health assessment.[144] One awardee added that making referrals could be very challenging for Strong Start participants because it is difficult to find behavioral health providers who will accept Medicaid.[145]

Four awardees felt that the psychosocial support offered by peers and facilitators helps address depression.[146] Two suggested that discussing mood disorders and prenatal and postpartum depression within a safe group space helped make the topic "less taboo" so that group members are more comfortable expressing feelings.[147] At the same time, another awardee indicated that women with more serious depression would be less likely to participate in Group Prenatal Care because of uneasiness with the group setting.

Focus group participants enrolled in Group Prenatal Care shared positive experiences related to the psychosocial support they received at their sessions:

> *"[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." (Einstein)*

> *"They do a good job at preparing you. It's been 10 times better than doing it alone. I feel like my morale has been so much higher this time around." (Central Jersey)*

> *"We had a social worker come in, and she could help us with anything 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." (Harris)*

[143] PLPE data through Quarter 3 2015 indicated that UTHSC had a lower rate of depressive symptoms at 9.9 percent. However, nearly two-thirds (65.2 percent) of UTHSC data was missing for the quarter.
[144] Grady, Texas Tech, St. John, UTHSC, Einstein, Harris, Amerigroup, UKRF
[145] UKRF
[146] Harris, Einstein, UTHSC, Amerigroup
[147] Einstein, UKRF

Other Outcomes: Group Prenatal Care awardees associated a variety of other positive outcomes with Strong Start. These include better attendance at prenatal visits;[148] better nutrition and general health;[149] more effective parenting;[150] and longer inter-pregnancy intervals.[151]

Some awardees described advantages for prenatal care providers, including the benefit of more open communication with their patients[152] or the ability to focus more holistically on patients and be a more effective provider because group care addresses psychosocial as well as clinical risk factors.[153] At the same time, another awardee suggested that providers might worry that the group format could cause them to miss important cues or signs about a patient's pregnancy that would be more obvious if they were meeting with her one-on-one.[154]

Strong Start Services and Program Features:

The Y3 case study team explored a range of services and program features that played a key role in Strong Start implementation. The next sections summarize commonalities and differences in various program components among Group Prenatal Care awardees. In addition, Exhibit 8 provides an overview of select aspects of group prenatal care awardees' programs in the third year of the evaluation.

Outreach and Enrollment: Some awardees reported that enrollment had improved in evaluation Year 3[155] which they attributed to a variety of factors, including partnerships with Medicaid agencies or other community organizations,[156] adding a new site,[157] or recruitment by a community health worker that is a "true peer".[158] On the other hand, lagging enrollment has been a challenge for more than

***Enrollment*:** Albert Einstein Healthcare Network (Einstein)

Einstein is a private, nonprofit health system with three acute-care hospitals and many outpatient centers throughout the greater Philadelphia region. Einstein operates three Strong Start sites that have implemented the Centering Pregnancy (Centering) model of group prenatal care, and has made a concerted effort to improve program outreach and enrollment. It has done so by (1) using an opt-out enrollment approach, (2) creating a video, which plays in the waiting rooms of the Strong Start sites, featuring two Centering patients and two providers describing what occurs in a Centering session, and (3) establishing a new intake process ("Introduction to Centering" groups) whereby the awardee schedules several of their Strong Start patients' initial prenatal care visits simultaneously and introduces women together to the group prenatal care approach and meeting room, rather than individually.

Key informants agree that opt-out has helped increase enrollment, but a few think that opt-out results in enrolling women who don't really want to attend or engage in the groups. They are overwhelmingly positive about the new group intake process, and stated that the strategy has been successful in its goal of increasing enrollment. One noted, *"Bringing patients together in the Centering room for their first visit has been effective because patients "love" the approach and connect to the program once they experience it."* Allowing the women to experience the Centering room and sit down together as a group appears to make the women more comfortable with the Centering approach and reduces the number of women who opt not to sign up for group care.

[148] HealthInsight, UKRF
[149] Amerigroup
[150] Einstein
[151] UKRF
[152] VCU
[153] Harris
[154] Amerigroup
[155] VCU, St. John, UTHSC, Einstein, Harris
[156] VCU, Grady
[157] Einstein
[158] Harris

half of the Group Prenatal Care awardees, which is described in more depth in the "Lessons Learned" section of this analysis.

EXHIBIT 8: FEATURES OF GROUP PRENATAL CARE AWARDEES

Awardee	Number of Sessions	Average Group Size (number of women)	Targeted Groups (population targeted)
Albert Einstein	10	12-14	None
Amerigroup	10	6-12	None
Central Jersey	10	10	Women with gestational diabetes, Black women
Grady Health System	10	8-12	None
Harris Health	10	10	None
HealthInsight	10 (1 site); 8 (1 site); 6 (1 site)	8-10	None
Oklahoma Health Care Authority	8	3-5	None
Providence	10	8-12	None
St. John[1]	10	8-10	None
Texas Tech	10	14-16	None
University of Kentucky	10 (biweekly for opioid addictions group)	6-10	Women with opioid addiction, women with psychosocial issues, women with gestational diabetes or obesity, Hispanic women
University of Puerto Rico	12	10-12	Women with HIV, women with gestational diabetes, women infected with Zika virus
University of Tennessee Health Sciences	8	10-12	Women at risk for gestational diabetes
Virginia Commonwealth University	10	5-10	Women with high-risk pregnancies, teens

1. St. John offers a series of 10 "group prenatal care support sessions" that supplement rather than substitute for individual prenatal visits with physicians.

In evaluation Years 1 and 2, Group Prenatal Care awardees sometimes reported that a significant proportion of eligible patients declined the program. This enrollment challenge seems to have waned as programs matured and both awardees and their patient populations became more familiar with the Group Prenatal Care model. Indeed, most awardees noted several reasons why the group care model appealed to patients, including increased opportunities for education, sharing experiences with other pregnant women, predictable meeting times, and not having to spend time in a clinic waiting room prior to the prenatal care visit. Strong Start participants echoed these features when discussing the advantages of Group Prenatal Care in our focus groups:

> *"The point was there's no waiting. You ask questions you have, and they're always answered. [Facilitators are] always consistent, so you feel comfortable. It's a great amount of time." (VCU)*

> *"I liked the fact that it was the same day of the week, same time – that made it a lot easier." (UKRF)*

"I thought it was a waste of my time. But the first time I come I really like it and found it was really important so I kept going." (UKRF)

Some eligible patients do still decline the program, and the primary reasons for this have not changed from previous evaluation report findings. Namely, women who choose not to participate most often cite conflicts with work or school schedules, don't want to change providers or want to see a specific provider who doesn't participate in group care, see less value in the program because they are multiparous, are averse to group participation, or (most rarely) see group care as substandard to traditional care.

Strong Start outreach is mostly internal among group care awardees, and typically involves Strong Start brochures, posters, and videos about the Group Prenatal Care model that awardees display in clinic waiting rooms.[159] Rarely, awardees have conducted external advertising on buses and in magazines,[160] or have distributed flyers via community partners. St. John began recruiting participants during home visits for a different program in evaluation Year 3.

Social Media: Only three Group Prenatal Care awardees have used social media as part of their Strong Start program. OKHCA, CJFHC, and Harris all have sites that have used Facebook pages in the past to either recruit or engage Group Prenatal Care participants, though none appeared to be actively using Facebook for Strong Start at the time of Year 3 data collection and did not report any notable advantages of using Facebook. A few awardees explained why they do not use more social media. For example, Texas Tech and UKRF, both large health systems, have system-wide policies that limit social media use and tightly manage communications. Grady also suggested that awardee and site staff had little capacity to keep social media websites updated.

Some awardees included the Text4baby™ application in their descriptions of social media use. Text4Baby is a free text messaging program for pregnant women and new mothers that provides health and safety tips, as well as prenatal care appointment reminders. Three awardees have encouraged Strong Start participants to enroll in the Text4Baby program[161] though two indicated that they stopped promoting the program so heavily when patients complained that the volume of texts was overwhelming and required too much of their data plan allowance.

Use of 17P: Group Prenatal Care awardees' 17P treatment rates vary considerably. According to PLPE data from 2015 and early 2016, 24 percent of Einstein participants with a prior preterm birth received 17P, which was the highest rate (by far) among group care awardees. UKRF had the second-highest rate, at 13 percent, and several awardees did not have any Strong Start participants who had received 17P.[162]

[159] UTHSC, Amerigroup, Einstein
[160] OKHCA
[161] Einstein, Amerigroup, HealthInsight
[162] Grady, HealthInsight, OKHCA, Texas Tech, UTHSC

Though some confirmed low 17P use among the Strong Start population,[163] a number of awardees expressed surprise at the evaluation data and felt it did not accurately reflect the true number of eligible participants receiving 17P.[164] Several described the treatment as a well-accepted component of standard prenatal care at their sites, and were confident that eligible patients were getting 17P.[165] Some Group Prenatal Care sites refer women in need of 17P to a specialist, such as a Maternal Fetal Medicine physician.[166]

Group Prenatal Care awardees highlighted several factors that may contribute to low 17P treatment rates among Strong Start participants. For example, some participants enter prenatal care too late to begin 17P injections, which must be initiated prior to 16 weeks gestation.[167] One awardee suggested that prenatal care providers who had been practicing for a long time are not getting adequate training on 17P and could "revert back to old methods" and miss potential opportunities to prescribe the treatment.[168] Though all awardees indicated that the treatment is covered by Medicaid and CHIP, one noted reimbursement is low[169] while another described how MCOs' prior authorization processes for 17P are onerous and it might take up to four weeks to obtain the medication.[170] Finally, storing and administering the injections can be challenging.[171]

Electronic Medical Records: Nearly all Group Prenatal Care awardees use electronic medical records or EMRs, though two reported that some sites still use paper records to document patient care.[172] EMRs play significant roles in Strong Start interventions for just a few awardees. Three use the EMR system to identify eligible patients for Strong Start recruitment[173] and another uses the EMR for scheduling group care appointments and to flag enrollment in Strong Start, which helps with reporting.[174] Two others have modified the EMR to incorporate Group Prenatal Care elements.[175] For instance a Texas Tech site added a template to the EMR to document the information provided at each group session. The awardees generally do not use the EMR as a way to communicate between providers about patient care.

Incentives: About half the Group Prenatal Care awardees use incentives as part of their Strong Start model. These include gift cards and other small baby items that participants receive at the completion of intake and certain sessions,[176] baby showers where participants receive baby

[163] Grady, OKHCA, Providence
[164] Einstein, VCU, UPR, UKRF
[165] HealthInsight, UKRF, UTHSC, Einstein
[166] VCU, CJFHC, St. John
[167] Amerigroup
[168] Providence
[169] Harris
[170] UKRF
[171] Harris
[172] UPR, VCU
[173] UTHSC, Harris, UKRF
[174] UTHSC
[175] Texas Tech, HealthInsight
[176] St. John

supplies,[177] tokens that can be used to purchase items at an on-site thrift store[178] or community-based store,[179] car seat giveaways,[180] and raffles that are held at the end of sessions or the end of a group care cycle.[181] Incentives are donated by community non-profits, obtained through other grants, or purchased by staff using their personal funds (and not supported by Strong Start). Group Prenatal Care awardees using incentives feel that they are effective, both because they encourage attendance and because they help participants feel celebrated. One awardee added that Strong Start staff encourage participants to sign up for Medicaid MCOs' incentive programs for pregnant enrollees.[182]

Family Planning: Family planning care is a key part of the Group Prenatal Care model. Most awardees indicated that improving education and access to family planning services and counseling was a priority for their Strong Start sites. All include a session dedicated to family planning in their Group Prenatal Care curriculum, though most also discuss family planning at other sessions and during the postpartum visit. Some routinely refer Group Prenatal Care participants to programs that will provide family planning care when Medicaid or CHIP pregnancy coverage ends (e.g., Medicaid family planning programs or health system financial assistance programs).

The dedicated group sessions typically include hands-on activities (such as passing around samples of the various birth control methods), a "frank" discussion of the pros and cons of different methods, and selection by participants of one or two methods that they plan to use after delivery. Participants share their experiences with birth control, and facilitators address myths and common misperceptions. Some awardees encourage the use of long-acting reversible contraceptives or LARCs[183] though others suggested that they provide complete and accurate information on safety and effectiveness but do not encourage any particular methods. Two awardees mentioned statewide initiatives to improve LARC use that have also influenced take-up of these methods among Strong Start participants.[184]

Group Prenatal Care is considered by awardees to be much more comprehensive than traditional one-on-one care when it comes to family planning services and counseling. Texas Tech described its approach as "more than a didactic conversation" and Grady similarly noted that Group Prenatal Care goes "far beyond the routine discussion." Another awardee suggested that the robust discussions around family planning within the group setting encourage reluctant participants to consider all their options and may help overcome the "family planning taboos" in place because of

[177] UTHSC
[178] OKHCA
[179] Amerigroup
[180] OKHCA
[181] St. John, UKRF
[182] UKRF
[183] Texas Tech, UTHSC, UKRF
[184] UTHSC, OKHCA

cultural or religious preferences.[185] Focus group participants valued the comprehensive information they received:

> *"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." (UKRF)*

> *"One thing I learned I didn't know, I thought if I got the shot I couldn't breastfeed, that my milk would dry. But the nurse said, no, you can get the shot, and I didn't know that." (Harris County)*

> *"They talked about [whether the birth control method must be administered] monthly, daily, or every 5 years. They talked about the risks, the pros, the cons, the benefits, and the risks of scarring on your uterus walls." (Central Jersey)*

Though they agreed that Group Prenatal Care offers a superior model (compared to traditional prenatal care) for providing family planning education and counseling, awardees also described ongoing challenges associated with providing this type of care. These include low attendance at postpartum visits,[186] lack of continuous health coverage in the postpartum period,[187] and disruptions in care continuity when participants transfer to another provider for delivery.[188] In addition, three awardees have one or more sites that limit access to family planning because of their religious affiliations. For example, St. John providers may only discuss natural family planning options like the rhythm method, and providers at Catholic sites with Amerigroup and Providence typically discuss all methods but refer patients who request non-natural methods to another provider.

A number of the challenges awardees raised were related to LARCs in particular. These were generally related to the reimbursement policies of the Medicaid program or MCOs. Three awardees suggested that LARC placement could not occur at the hospital post-delivery because of prohibitive reimbursement policies such as global delivery fees that do not account for LARC supplies or insertion.[189] At UPR, LARCs cannot be placed until the second postpartum visit, only after the method is requested at the first postpartum visit and once PAP and STD testing is done; this policy was being revised at the time of Y3 data collection. Though awardees generally reported that LARCs are covered by and available under Medicaid, UPR indicated that it was difficult to obtain LARCs, particularly in light of high demand related to the Zika virus.

[185] Harris
[186] Einstein
[187] Harris
[188] UKRF, OKHCA
[189] Einstein, UKRF, UTHSC

Addressing Barriers to Care:

The evaluation team identified a few key barriers to care that were common across many Strong Start awardees in the first two years of the evaluation, and explored these barriers in more depth in the third round of case studies.

Transportation: A large majority of Group Prenatal Care awardees described transportation as a major barrier to care for some patients at all or some Strong Start sites.[190] Many patients do not have a personal vehicle, or have a vehicle that is unreliable or shared among multiple family members. Non-emergency transportation to health care services is a covered benefit under Medicaid, but some awardees suggested that Strong Start participants are unaware of this option[191] or do not understand the requirements—such as advance scheduling—well enough to make use of the benefit.[192] Even when patients know about and understand Medicaid-covered transportation, however, there are often problems related to the service's reliability and convenience. These include requirements that that rides be scheduled several days in advance, long waits for pick-up, long rides while other beneficiaries are also picked up and dropped off, unreliable service, prohibitions on bringing children (unless they are the ones receiving the medical service), and stigma associated with riding Medicaid transport vehicles. One awardee noted that transportation problems are magnified in the postpartum period when a woman must also consider how to travel with a newborn in tow.[193] Focus group participants described challenges related to transportation, though most also described ways around these problems:

> *"I had transportation issues when I was pregnant. I moved here, and – my luck – my car broke. So I had a few little issues but I kept making it. And there is a bus that takes you back and forth if you needed that." (Amerigroup)*

> *"My husband works far away and sometimes doesn't have time to drive me. I may have to reschedule my appointment but that's easy." (UKRF)*

> *"The language [difference] makes it hard to learn which bus to take." (UKRF, Spanish-speaking participant)*

> *"Einstein will help you get transportation if you're having trouble –or you can get a pass through insurance." (Einstein)*

Group Prenatal Care awardees offered a number of solutions to transportation barriers. UKRF educates patients about the transportation available through Medicaid and offers to assist with setting up rides. CHJFHC encourages women in the same group cohort to consider carpooling to and

[190] Amerigroup, St. John, UTHSC, UKRF, Harris, OKHCA, CJFHC, Texas Tech, Grady
[191] St. John
[192] Texas Tech
[193] UKRF

from sessions, and a provider at a rural Amerigroup site with no nearby public transportation drives patients to the nearest bus stop. A Texas Tech site has its own transportation service for patients. Several awardees have bus passes or taxi vouchers for patients with no other means of transportation, but these are often donated or grant-funded and may not be consistently available.[194] Finally, two awardees felt that providers should be flexible with patients who show up late for appointments, given the prevalence of transportation problems among the populations they serve.[195] Another felt it was important to offer care at multiple sites, including in rural areas, to minimize travel time and related transportation barriers for patients.[196]

Childcare: More than half of awardees indicated that lack of childcare was a barrier to care for some of their Strong Start participants.[197] As noted earlier, most group care awardees follow the Centering model which stipulates that children not be allowed in group sessions. Accordingly, awardees generally reported that they discourage participants from bringing children to appointments. However, many are flexible about this rule, and several awardees suggested that they would rather have a woman attend with her children than skip the session because of lack of childcare. They acknowledged that this is not ideal, since having children present raises confidentiality issues and also distracts group members' attention away from learning and discussion. Focus group participants described a range of experiences related to bringing their children to group sessions:

"I have a three year old, and I talked to them and they said he needs a babysitter." (UKRF)

"For Centering, we couldn't bring the other children. For me, it was my sister or the landlord [who would provide childcare]. She takes care of kids." (CJFHC)

"It is maybe not permitted, but when we don't have any other options we just bring [our children]." (UKRF)

"My older children came with me to every appointment." (VCU)

Other strategies for addressing childcare barriers include: providing the group session schedule at the beginning of pregnancy so women can plan well in advance;[198] scheduling groups at times when more women have childcare(e.g., mornings because toddlers go to Head Start); [199] encouraging women who live near each other to share childcare arrangements;[200] creating a child-friendly area at the site where older children can safely wait;[201] and encouraging women to bring a

[194] Texas Tech, UKRF, HealthInsight, Grady
[195] UKRF, HealthInsight
[196] Grady
[197] VCU, CJFHC, Texas Tech, HealthInsight, Grady, St. John, UPR, Amerigroup
[198] Grady
[199] UPR
[200] CJFHC
[201] Grady

partner or support person to the group to watch children during group sessions.[202] Two awardees provide information about childcare assistance from churches and other local agencies, though neither was certain that these referrals solved the problem.[203] St. John is the only awardee that provides childcare onsite as part of its Strong Start initiative. Another awardee noted that it would like to offer childcare for group members but liability and regulatory issues prohibit this.[204]

Communicating with Patients: Nearly all Group Prenatal Care awardees reported challenges related to keeping in touch with Strong Start participants.[205] Contact information changes often because patients move frequently or use prepaid, temporary phones that run out of minutes and are replaced.[206] Speaking on the telephone is not a preferred mode of communication for some patients, who do not answer their phone or set up and use their voicemail.[207]

Using text messaging is an especially promising strategy for addressing communication problems, according to Group Prenatal Care awardees. Five reported that they used text messaging explaining that issues with sustaining contact "vanished" once texting was introduced.[208] UKRF noted that while texting is a very effective way of keeping in touch, it is limited to check-ins about attendance and appointment reminders; in keeping with their health system rules, providers do not discuss health-related issues with patients over text.

Other strategies for keeping in touch with Strong Start participants include providing personal phone contact information for group facilitators and nurses, as participants reportedly feel more comfortable calling them than a clinic's front desk;[209] having group facilitators and Strong Start coordinators call participants directly to remind them about sessions;[210] having group members sign an attendance book at each session that includes space for updating their address and phone number;[211] establishing a formal protocol for contacting a patient when she misses a session(e.g., three calls and then a certified letter);[212] and, encouraging group members to share contact information and keep in touch with one another.[213] Focus group participants described the extra effort that Strong Start facilitators and group members make to stay in touch:

> *"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 like three people from my Centering group texted to make sure I was okay." (VCU)*

[202] Grady
[203] Texas Tech, UTHSC
[204] Einstein
[205] Amerigroup, UKRF, UTHSC, Einstein, Harris, VCU, Texas Tech, HealthInsight, Grady
[206] Amerigroup, St. John, UTHSC, Harris
[207] UKRF
[208] Einstein, VCU, UKRF, St. John, Texas Tech
[209] VCU
[210] Harris
[211] UKRF
[212] CJFHC
[213] UKRF

Common Implementation Challenges:

The challenges Group Prenatal Care awardees experienced in Year 3 are not new, but reflect implementation barriers that awardees have struggled with over the course of Strong Start. These challenges are still common among many group care awardees and have been difficult to overcome.

Lack of Provider Support: Ten of the fourteen Group Prenatal Care awardees reported challenges related to obtaining support from prenatal care providers and administrative leadership.[214] For some awardees, certain providers are supportive while others are not. For instance, Harris and Providence noted that OB/GYNs involved in the residency clinics are not very supportive of the group care model while nurse-midwives generally are, and UPR reported that prenatal clinic nurses are reluctant to support the program while OB/GYNs and hospital leadership are generally very supportive.

Awardees shared a variety of reasons why providers and administrators withhold support for Group Prenatal Care. They have concerns, for instance, about the model's cost-effectiveness, potential negative impact on revenue, and—to a lesser degree—its clinical value.[215] Some awardees described unsupportive OB/GYNs as those who were worried about "losing patients" to Group Prenatal Care, either because patients may leave a practice if they find group care unappealing or because the OB/GYN is not a group facilitator and would be required to refer an eligible, interested patient to another (group care) provider. Providers and administrators might also perceive that the group care model is not compatible with their organization's teaching mission or residency program.[216] A third reason that providers, in particular, may not support Group Prenatal Care is because they are resistant to systems-level change and do not want to disrupt the traditional clinic workflow or learn new skills like facilitating group care.[217]

Awardees identified a number of strategies they have tried to engage providers and administrators during the Strong Start award period—including but not limited to inviting them to observe sessions and participate in trainings, asking them to serve on steering committees, and providing regular updates on Strong Start during staff meetings. However, these efforts have not been sufficient to address the underlying causes described above. One awardee noted that provider engagement and buy-in may have been more successful if efforts had been initiated earlier.[218]

Lagging Enrollment: More than half the awardees described ongoing struggles with recruitment, and subsequent low enrollment, in Year 3.[219] Most awardees' recruitment problems relate to the Strong Start-eligible population in general, though one noted that it was particularly difficult to

[214] VCU, HealthInsight, St. John, UTHSC, Einstein, Harris, UKRF, UPR, Amerigroup, Providence
[215] VCU, UKRF
[216] Amerigroup, VCU
[217] UKRF, UPR
[218] UKRF
[219] CJFHC, HealthInsight, Grady, Einstein, Harris, OKHCA, UKRF, Amerigroup

recruit African American patients into Group Prenatal Care. For some awardees, enrollment has been successful at some sites but not at others. OKHCA, for instance, experienced severe flooding at some sites in Y3, which closed clinics and hurt enrollment.

At least two awardees felt that enrollment targets were unrealistic from the start and should have accounted for more factors that influenced eligibility and take-up of Strong Start such as presumptive or pending vs. actual Medicaid enrollment.[220] Others described enrollment problems that stem from program implementation issues. These include lack of provider support and referrals,[221] Strong Start's gestational age limit (UPR, which has many patients who transfer into care late in pregnancy), and lack of a Spanish-speaking facilitator, which limits appeal for Latina patients.[222]

Low Attendance Rates: Four awardees identified low patient attendance at group sessions as a major challenge for their Group Prenatal Care program.[223] These awardees attributed low attendance rates to the some of the barriers described above—lack of childcare and transportation, and trouble sustaining contact—and also to inconvenient clinic hours for women who are in school or working. Some also felt that patients don't prioritize prenatal care appointments over life stressors.[224] Prenatal visit attendance is important for any clinic, but has unique implications for group prenatal care sites since group sessions cannot be "double-booked" to guard against no-shows, and poor turnout (e.g., just 2 or 3 women) works against a main purpose of the model which is to encourage peer-to-peer experience sharing and support. In addition, participants who miss sessions do not also complete the full group prenatal care curriculum—awardees indicated that the individual health assessment portion of the visit is typically rescheduled (i.e., as a traditional prenatal visit) but the session content is typically not made up.

Medicaid and CHIP Policies: Several awardees also identified Medicaid or CHIP policies as a Strong Start implementation challenge. Specific issues include: lack of continuous Medicaid and CHIP health coverage in the postpartum period (once pregnancy-related coverage expires), problems with implementing Group Prenatal Care within the global fee structure that Medicaid MCOs use to reimburse for prenatal care,[225] and the restrictions on non-emergency Medicaid transportation services.[226]

Other Challenges: Though not as common, Group Prenatal Care awardees mentioned various other challenges related to their Strong Star programs. These include: lack of community resources

[220] UKRF, CJFHC
[221] Amerigroup, HealthInsight, UTHSC
[222] Texas Tech
[223] Texas Tech, St. John, Einstein, Amerigroup
[224] Texas Tech, Einstein
[225] UTHSC
[226] Texas Tech

such as housing, mental health services or public transportation;[227] staff turnover;[228] lack of funding for snacks and other group supplies;[229] the time-consuming nature of Strong Start program and evaluation data collection requirements;[230] and securing space that is appropriate for Group Prenatal Care sessions.[231]

Common Promising Practices:

Awardees generally agreed that the key strengths of the Group Prenatal Care model are education and psychosocial support. Other common promising practices identified by the Group Prenatal Care awardees include forming partnerships with various health and social services organizations in Strong Start communities, and implementing specialized groups for target populations. While the group care awardees mentioned a host of other successful practices, they are generally very individualized (perhaps reflecting the various stages of implementation progress represented by this set of awardees) and difficult to categorize.

Enhanced Education and Psychosocial Support: Group Prenatal Care awardees felt that their model was superior to traditional prenatal care because it offers enhanced education and psychosocial support. Group Prenatal Care's educational component was the most commonly-mentioned program strength among awardees, and enhanced education was also cited by focus group participants as a key reason for their high levels of satisfaction with the model. For all awardees, Group Prenatal Care session content is based on the Centering curriculum, which is tailored to the gestational age of participants. Facilitators often invite guest speakers—such as pediatricians, labor and delivery nurses, doulas, WIC staff, and representatives from home visiting or other maternal and child health programs—to attend groups and participate in the discussion. Many of the group care educational topics (already mentioned above) include breastfeeding, mood disorders and behavioral health during pregnancy and postpartum, delivery methods and childbirth preparation, and family planning. Other topics include stress, newborn care, social services (like the WIC program), domestic violence, nutrition, preterm birth prevention, oral hygiene, infant safety, and smoking. As part of the Group Prenatal Care educational component, Strong Start awardees make referrals, increase patient awareness of, and facilitate access to community resources including other health and social service programs.

Awardees and focus group participants also highlighted the importance of peer-to-peer psychosocial support, noting that group cohorts respect and learn from one another's experiences, and that they feel both supported by and accountable to one another. Though awardees emphasized the support between peers within the same cohort as particularly unique to the group care model, many also noted that Group Prenatal Care also facilitates stronger relationships

[227] VCU, Texas Tech, OKHCA
[228] CJFHC, UKRF
[229] UKRF
[230] UTHSC
[231] UKRF

between patients and the providers that facilitate group care sessions. Facilitators are generally consistent throughout the prenatal period, as opposed to the traditional care model where patients often see different providers throughout their pregnancy. Facilitators also spend more time with participants, since sessions are two hours long, and much of that time is spent in discussions that both participants and facilitators find valuable and enjoyable. Awardees noted that facilitators "get to know" group care participants in a way that would be virtually impossible in a traditional setting.

Community Partnerships: Many Group Prenatal Care awardees have developed partnerships with other organizations in their communities, as part of Strong Start implementation. Most commonly these mutually beneficial relationships involve having staff from a partner organization attend sessions as a "guest speaker" but some may also involve referrals between the Strong Start site and the partnering organization. VCU, for instance, has partnered with the Virginia Medicaid agency, which sends information to Medicaid-enrolled pregnant women encouraging them to participate in Strong Start. The awardee also works with other programs (e.g., a trauma center, migrant care centers) to direct pregnant women to Strong Start. UKRF has partnered with a well-established statewide home visiting program called HANDS that provides education, resource referrals, and supportive services to first-time and at-risk parents prenatally and during the first two years of a child's life. HANDS staff attend the second or third group care session to explain their services and enroll interested participants, and the HANDS program also refers pregnant women to UKRF's Group Prenatal Care program.

Amerigroup's Strong Start program highlighted a different type of partnership success—the awardee hosts regular "learning collaboratives" for sites implementing Group Prenatal Care (as well as other partners in the community). The awardee felt that the collaborative had facilitated learning and information sharing between sites that belong to different health systems and are otherwise competitors.

Specialized Groups for Target Populations: Generally, sites assign patients to groups based on gestational age, but there are some notable exceptions. Five awardees have established specialized groups targeting specific populations of pregnant women, including groups for women who share a medical risk factor (e.g., gestational diabetes, substance abuse, HIV, or tobacco/psychosocial issues) and groups for women who share demographic features (e.g., teens, Hispanic or Black women).[232] Two awardees—UPR and UKRF—highlighted these groups as a key program success. UKRF felt that its groups for opioid-addicted women (PATHWAY) and for Hispanic women were especially strong, while UPR noted successes with its groups for women living with HIV and women infected with the Zika virus.

[232] In evaluation Y2, the case study team reported that CJFHC had implemented groups for women with gestational diabetes and Black women; UKRF had implemented groups for opioid-addicted women, women with psychosocial issues or tobacco use, women with gestational diabetes or obesity, and Hispanic women; UPR had implemented groups for women with living with HIV; UTHSC had implemented groups for women at risk for gestational diabetes; and VCU had implemented groups for women with high-risk pregnancies. In Y3, the case study team found that UPR added a group for women infected with the Zika virus and VCU added a group for teens.

These awardees felt that the educational and psychosocial benefits of Group Prenatal Care were even more pronounced in these specialized groups, since women in the groups shared not only the experience of being pregnant but also of having a similar background and/or living with the same disease state or risk status. Specialized groups allow the awardees to tailor Group Prenatal Care content so that it is more valuable for participants, and may help cohort members feel more comfortable in the group setting. UPR and UKRF's specialized groups are described in greater depth in the text box.

Other Promising Practices: Other promising practices that were mentioned by just one or two awardees include: involving midwives in Group Prenatal Care as these providers are usually "champions" of the model;[233] involving group facilitators more directly in program recruitment, since

Specialized Groups for Targeted Populations: University of Puerto Rico (UPR) and University of Kentucky Research Foundation (UKRF)

UPR and UKRF are two awardees that have implemented group prenatal care (and specifically the Centering Pregnancy model) under Strong Start. Within their programs, they both have established groups targeting specific populations of pregnant women and have deemed these specialized groups a key component of their programs' success.

At UPR, key informants highlighted successes in its groups for women living with HIV and women infected with the Zika virus, and noted that to better address those groups UPR has added specialized educational components to the Centering curriculum. For instance, sessions for the HIV group include instructions about administering antiretroviral medication to infants (to prevent maternal to child HIV transmission) and education on vaginal delivery for HIV positive patients." One participant in the HIV-specialized group stated, *"I truly do feel prepared. In my case, this is my third pregnancy and I've learned a lot. I am taking medication and well, people like me who have HIV, before they didn't let them have a vaginal birth. I didn't have HIV in my previous pregnancy. I found out I had HIV in this pregnancy. So now, as long as women are taking their [antiretroviral] medication, you can have a vaginal birth."*

For the Zika groups, key informants noted that they *"[cover] anything related to Zika in the news"* and address misperceptions, as well as conduct additional psychological assessments for Zika patients once a month and provide them with Zika prevention kits. They described the uncertainty in birth outcomes for women infected with Zika, and noted that this is why they are bringing in the psycho-social elements.

UKRF's PATHWAY (with "PATH" standing for Perinatal Assistance and Treatment Home) group enrolls pregnant women who are addicted to opioids and receiving suboxone treatment (most commonly, though methadone treatment is also used). PATHWAY follows the group prenatal care model but unlike UKRF's other groups, it departs significantly from the Centering model. For instance, the physicians that see PATHWAY patients for their individual medical exam do not participate in the group session in any way, and women must attend PATHWAY three times a week to receive treatment. One key informant described the value of PATHWAY by saying, *"These women have never had quality prenatal education. We treat them like regular pregnant women, and the look on their face, they are so relieved… this treatment and these services encourage them to continue pursuing healthcare."* Generally, women in this program felt more comfortable, respected, and cared for in comparison to experiences during previous medical treatment or pregnancies. One participant stated, *"Everyone is really nice here. This is the only place where everyone understands here that you can be a drug addict and pregnant at the same time. [There is no] shameful scorning. They are not judging you. That's a blessing as far as I'm concerned. More than anything else. "* Interestingly, while provider support has been difficult to establish for group prenatal care at UKRF, it has been easier to obtain for specific groups such as PATHWAY. One key informant explained this distinction by saying, *"[Providers] want us to do Centering groups in populations that are painful to them."*

[233] Harris, UTHSC

these staff are especially invested in the program and are good "salespeople";[234] "starting small" and initially implementing just a handful of groups until site-level staff become more adept at assigning patients to group cohorts;[235] providing a significant amount of awardee-level support for sites while encouraging them to develop creative solutions to common barriers to care;[236] and layering enhanced services—in this case Community Health Worker staff—on top of an existing and robust Centering program.[237]

Though not necessarily part of the group care model, per se, implementing the Maternity Care Home model in conjunction with the group model has helped a few awardees by boosting participation in the program and easing enrollment pressures.[238]

Sustainability:

All but one Group Prenatal Care awardee reported interest in—and were generally making concrete plans for—sustaining their group care program after the Strong Start award period ends. Only OKHCA reported that it would not sustain its Group Prenatal Care model but, depending on the extent of state budget shortfalls, it is hoping to sustain its Maternity Care Home program. At least four awardees indicated that Group Prenatal Care would continue at some, but not all, of its Strong Start sites.[239] Not surprisingly the sites planning to sustain the program are those where there is more provider and administrator support and where recruitment and program implementation has been smoother. Two awardees suggested that Group Prenatal Care would continue to be their "preferred" or standard model of care for all pregnant patients at Strong Start sites.[240] UPR explained that participants were so satisfied with the group care model that "there is no way" the awardee's single Strong Start site could return to the less-satisfactory traditional care model.

Though the awardees were generally optimistic about sustaining Group Prenatal Care, they acknowledged a number of uncertainties and weaknesses in their sustainability plans. These included lack of provider and leadership support,[241] and turnover or limited "bandwidth" that hindered staff capacity to focus on sustainability efforts.[242] Most critically, the awardees still needed to identify reliable funding and other resources that would make sustainability plans a reality. Medicaid MCOs were the most-commonly mentioned potential source for such funding, but few awardees had succeeded in reaching firm payment agreements with health plans. For instance, UTHSC needed to identify funding to continue staffing a Group Prenatal Care coordinator for its program and looked to the MCOs as potential funders for this position. St. John received a March of

[234] UKRF
[235] HealthInsight
[236] CJFHC
[237] Harris
[238] St. John, VCU, OKHCA
[239] VCU, Amerigroup, CJFHC, UKRF
[240] UPR, Texas Tech,
[241] St. John, Texas Tech, UKRF
[242] CJFHC, UKRF

Dimes grant in 2016 that will partially fund its group prenatal support sessions, but hoped to obtain the other portion of necessary funding from MCOs. Einstein was in the process of identifying a combination of grants, Medicaid MCO reimbursement and other funding to cover group its prenatal care program needs.

Amerigroup is a notable exception—it is the only group care awardee organization that is Medicaid MCO, and in 2015 received approval from the Louisiana Medicaid agency to provide enhanced reimbursement for Group Prenatal Care (approximately an additional $50 per participant per session) to providers in its MCO network. Though the awardee has been hopeful that the enhancement would improve provider buy-in, support sustainability activities, and improve enrollment numbers in Group Prenatal Care, providers may still be unaware that enhanced reimbursement exists.

BIRTH CENTER MODEL

The Strong Start model of enhanced prenatal care at Birth Centers involves a team of health professionals, including midwives and peer counselors, who provide comprehensive prenatal care to Medicaid and CHIP beneficiaries. According to the American Association of Birth Centers (AABC), the Strong Start awardee operating nearly all sites implementing the Birth Center model, a Birth Center is a homelike facility within a healthcare system and provides family-centered care for healthy women before, during and after normal pregnancy, labor, and birth.

Description of Awardees and Sites:

A total of 18 Birth Centers were included in this analysis (**Error! Reference source not found.** 9). With the exception of one AABC site—Tree of Life in Deland, Florida—all sites included in this round of data collection have been studied in previous evaluation years. All but one of the Strong Start sites participating in the Birth Center model are affiliated with AABC, which is a national membership organization for Birth Centers in the United States. At the time of Y3 case study data collection in spring 2016, AABC was overseeing the operations of 38 Strong Start sites across the country and AABC-affiliated Birth Centers had enrolled 7,417 women in Strong Start—enrollment numbers vary considerably across sites, from a high of 746 women ever enrolled at the Knoxville, TN site to only 7 ever enrolled at the site in Danbury, CT.[243]

[243] Enrollment numbers as of April 2016. Data reported by AABC to the case study team as part of the 2016 awardee-level site visit. Since Strong Start began, a total of 16 Birth Centers have dropped out of AABC's Strong Start program. A few of the 38 remaining sites have enrolled very few women in the program (e.g., fewer than two dozen) over the three year implementation period, but are still engaged with AABC and, therefore, are officially considered "active" sites.

EXHIBIT 9: BIRTH CENTER SITES INCLUDED IN THE YEAR 3 CASE STUDY ANALYSIS

Birth Center	Location (City, State)	Enrollment as of 4/1/2016
Mat-Su Midwifery & Family Health	Wasilla, AK	117
El Rio Birth & Women's Health Center	Tucson, AZ	226
Best Start Birth Center	San Diego, CA	371
Women's Health & Birth Center	Santa Rosa, CA	347
Community of Hope's Family Health and Birth Center (Providence site)	Washington, DC	357
Tree of Life	Deland, FL	159
Birth & Beyond	Grandin, FL	316
Breath of Life	Largo, FL	222
Rosemary Birthing Home	Sarasota, FL	146
New Birth Company	Overland Park, KS	95
Women's Birth & Wellness Center	Chapel Hill, NC	294
Dar a Luz Birth & Health Center	Los Ranchos, NM	109
PeaceHealth Nurse Midwifery Birth Center	Springfield, OR	167
The Midwife Center for Birth & Women's Health	Pittsburgh, PA	124
Charleston Birth Place	Charleston, SC	115
Lisa Ross Birth & Women's Center	Knoxville, TN	746
North Houston Birth Center	Houston, TX	428
Footprints in Time	Black River Falls, WI	24

Source: AABC-provided reports

The Strong Start Birth Center model has two key components—the midwifery model of care and support provided by a peer counselor. Strong Start funds support the addition of peer counselor services at AABC sites (midwifery care is already a mandatory covered service under Medicaid) and thus, this discussion of program implementation focuses on the peer counselor element and how it complements and augments the midwifery model of care. The midwifery model to care, an inherent feature of AABC's Birth Centers, involves a holistic and wellness approach to pregnancy and birth. The model combines medical care with comprehensive education about pregnancy, labor, delivery, and postpartum care using a patient-centered process designed to empower women to take control of their health. Because Birth Center prenatal visits are generally at least 30 minutes in length (compared to 10 or 15 minutes for a typical prenatal care visit at an OB/GYN practice) the midwives who provide care to Strong Start participants are praised as being better able to build a relationship

with patients and for spending more time identifying and addressing their medical, psychosocial, and educational needs. Patients often receive extensive printed materials to supplement and reinforce the education that occurs during prenatal appointments. In addition, midwifery practices often host classes that offer a "deep-dive" into topics such as labor and birth, breastfeeding, newborn care, prenatal yoga, and postpartum support.

AABC noted that there were no major changes to the intervention in Y3, but some sites are continuing to adjust how they provide Strong Start services due to staffing changes. Shifts in responsibilities were observed in a few sites. For example, the Birth and Beyond peer counselor position shifted from a social worker to a licensed midwife. The El Rio Birth and Women's Health Center reduced its number of peer counselors from 3 to 2 because of low enrollment, and the Strong Start coordinator role is now filled by a staff nurse rather than a medical assistant. The Lisa Ross Birth & Women's Center reduced staff as well because of financial challenges. Pittsburgh's Midwife Center for Birth & Women's Health is restarting small group peer counseling sessions for postpartum participants and some prenatal participants. Small group peer counseling sessions were used when Strong Start began, but had been discontinued because of scheduling challenges. Staff at the Santa Rosa Women's Health and Birth Center gained staff privileges at a nearby hospital and can now attend hospital births for their Birth Center patients.

An additional awardee—Providence Health Foundation of Providence Hospital—includes one site that is implementing the Birth Center model. At the Providence Birth Center site, a Perinatal Navigator meets with Strong Start participants and provides enhanced services in the form of education, referrals, care coordination and emotional support. The Perinatal Navigator meets with Strong Start participants in-person (before or after prenatal care visits) or speaks with them by phone at least once a month throughout the course of a client's pregnancy and postpartum. The Providence site also offers Strong Start participants the opportunity to meet with a doula for additional support throughout their pregnancies and postpartum.

Most Birth Centers limit birth services—and often, but not always, prenatal care—to women who are at low medical risk of adverse pregnancy outcomes. Common risk factors that exclude women from care at many Birth Centers include: body mass index greater than 35, hypertension, substance abuse and gestational diabetes (though some Birth Centers accept patients with controlled or non-insulin dependent gestational diabetes). However, midwives do sometimes work in tandem with physicians to screen and monitor higher risk patients so such women can receive care under the Birth Center model.

Program Outcomes:

The next section summarizes key informant perceptions on how the Strong Start Birth Center model is influencing a range of maternal and newborn outcomes. This section focuses only on outcomes

for AABC's Strong Start program, based on case study interviews with AABC awardee staff and key informants at the 17 AABC sites selected for study in Year 3.[244] All AABC interviews involved a discussion about the same set of outcomes from the evaluation's PLPE data, which were for AABC participants overall (not specific to individual sites) as of Quarter 3 2015.

Preterm Birth and Low birthweight: The overall preterm birth and low birthweight rates for AABC were 5 percent and 3percent, respectively. Almost all Birth Centers felt these rates (representing all AABC sites) were higher than their own facility's rates. Most centers could not recall their specific rates of preterm birth and low birth weight, but shared anecdotal recollections that very few babies with low birthweight were born in their facility. Several Birth Centers[245] noted that their preterm rates are low because their clients tend to be healthier than the general population, and a few noted that a history of preterm birth, body mass index greater than 40, past C-section, diabetes controlled with insulin, or twin pregnancy disqualify a client from giving birth at a Birth Center.[246] Interviewees at Rosemary Birthing Home only recalled one preterm birth in the previous year and felt this positive outcome was notable given they serve women with several risk factors associated with poor birth outcomes; including young maternal age, Medicaid coverage, smoking habits, rural residence, and bifurcated uterus.

Most Birth Centers included in this analysis were not sure if Strong Start's peer counseling services influenced preterm and low birthweight rates. Several noted that either their overarching model of Birth Center and midwifery care or services that preceded Strong Start make it difficult to tease out the impact of peer counseling specifically.[247] For example, the Largo, Florida site noted they focused on getting pregnant women to full term for 17 years and it was difficult to know whether implementing Strong Start in the last two years had influenced their preterm rate.

Some Birth Centers, however, thought that it was possible that Strong Start is influencing the preterm birth and low birth weight rates. Several pointed out that participants respond positively to the information, support, additional time, and attention peer counselors provide.[248] Peer counselors provide information on various topics, including how to have a healthy pregnancy, nutrition, hydration, stress, and smoking cessation. They also link clients to resources such as dental care, transportation, nutrition assistance through the Women, Infants, and Children (WIC) program or food stamps, as well as support groups for other issues or stressors they may face.[249]

[244] Outcomes for the Providence awardee are not included in this analysis, as the outcomes discussed during Providence interviews were compiled for participants enrolled in the awardee's three different Strong Start approaches to care, and do not reflect outcomes for Birth Center participants only.
[245] In Kansas, Oregon, Texas, Alaska, and California-San Diego
[246] Sites in California-Santa Rosa, Oregon, and Tennessee
[247] Sites in Florida-Largo, Oregon, South Carolina, and Wisconsin
[248] Sites in Alaska, Arizona, Florida-Largo, Florida-Sarasota, Florida-Deland, Kansas, Texas, Oregon, Pennsylvania, South Carolina, New Mexico, California-San Diego, and the AABC Awardee
[249] Sites in Alaska, Arizona, Florida-Largo, Florida-Sarasota, Florida-Deland, Kansas, Texas, Oregon, Pennsylvania, South Carolina, and New Mexico

A few Birth Centers noted additional factors that may influence their preterm birth and low birth weight rates.[250] For example, the Kansas site does not induce patients at 40 weeks unless it is clinically indicated. In addition, the state's Medicaid program changed its policy on inductions and now requires that Medicaid clients have a medical need for deliveries prior to 39 weeks. In South Carolina, there is a statewide South Carolina Birth Outcomes Initiative that works to eliminate elective inductions for non-medically indicated deliveries prior to 39 weeks gestation and that may be having a positive influence throughout the state on preterm birth rates. At the Santa Rosa, California site, Medicaid recipients also receive services through the California Department of Public Health's Comprehensive Perinatal Services Program (CPSP), which aims to reduce low birth rates and reduce health costs for pregnant women and infants, further confounding potential outcomes.

Breastfeeding: All but two sites included in this analysis said the overall AABC Strong Start breastfeeding rate of 86percent is lower than what they experience at their sites. The remaining two sites[251] indicated that they thought their rate is about the same as the AABC rate. The AABC awardee noted that the Strong Start rate is lower than the rate for Birth Center clients in general, but higher than the rate for their Medicaid population as a whole.

Many of the Birth Center sites[252] stated that they support breastfeeding by embracing the practice as "the norm." This is done through educational campaigns, staff training, and by

Breastfeeding: Women's Health & Birth Center (Santa Rosa, California)

The Santa Rosa birth center in California takes a comprehensive approach to support breastfeeding among its patients. Key informants were confident that virtually all patients breastfed for at least a week after delivery, and that the overall AABC rate of 86 percent initiation through Q3 2015 was lower than the rate in their population. Breastfeeding is a major focus at the birth center and key informants reported that nearly every patient intends to breastfeed. Both providers and peer counselors emphasize the benefits of breastfeeding and find that patients at the birth center already tend to be very amenable to the idea. Toward the beginning of the third trimester, peer counselors help secure breast pumps for interested patients (e.g., from Medicaid or WIC). The peer counselors also follow up after delivery to check on breastfeeding progress and provide assistance if necessary. Also, any patient at the birth center can receive a same-day lactation support appointment with a midwife, as long as the on-call midwife is not attending a birth.

All first-time mothers are required to take the breastfeeding class hosted at the birth center. Others are welcome to take the class, even if they have taken it before. Key informants reported that patients have been eager to participate in this breastfeeding class. Focus group participants cited the classes as a perk of the birth center. One woman detailed, "*The classes were very appealing. I want my older daughter to take them too! I'm around little kids a lot, but I could probably use a refresher."* A majority of the participants enjoyed the group learning approach and especially appreciated that partners are welcome and meaningfully included in the classes. However, the birth center was flexible in their approach, allowing several participants to get the required course content through a one-on-one appointment with a peer counselor instead. One participant explained, "*I took the breastfeeding and infant care courses one-on-one with [the peer counselor], because groups make me nervous."*

[250] Sites in Kansas, South Carolina, and California-Santa Rosa
[251] Florida-Grandin and South Carolina
[252] Sites in Alaska, Florida-Grandin, Florida-largo, Kansas, South Carolina, and Texas

frequently talking with women about breastfeeding. The Birth Centers also provide prenatal and postpartum breastfeeding education and support,[253] with a majority providing lactation consultant services.[254] Lastly, a few talked about providing additional services such as referrals to ENT physicians as needed to address physical conditions that may hinder breastfeeding,[255] vendors providing breast pumps,[256] and milk sharing services.[257]

Most AABC study sites included in this analysis noted that Strong Start participants got extra breastfeeding support from the peer counselors, who provide one-on-one counseling, answer questions, and make referrals to programs such as WIC and Nurse Family Partnership. Additionally, a few sites noted that they waived fees for breastfeeding classes for Strong Start participants.[258] Some Birth Centers explained that this additional support from peer counselors was helpful as women enrolled in Medicaid often have less positive exposure to breastfeeding, less information on breastfeeding, less social support, a harder time managing breastfeeding challenges, or may be the first in their family to breastfeed.[259] Individual sites noted particular challenges. For example, the site in Grandin Florida estimated that about one-third of Strong Start participants stop breastfeeding by six weeks postpartum, primarily those who are young, unmarried, have low education levels, and lack support at home. The site in Pennsylvania noted that attending frequent lactation consultant visits can be difficult without reliable transportation. Lastly, the South Carolina site is unable to provide breastfeeding classes at the center because of space and time constraints, and stated that its transfer hospital was not Baby Friendly certified, unlike many other hospitals in the area.

All Strong Start enrollees who participated in focus groups stated that their Birth Centers encourage and support breastfeeding. While some noted that they had made the decision to breastfeed before coming to the Birth Center, a few felt that the support and resources they received helped them decide to breastfeed. Participants mentioned the information, support, and classes made available to them about breastfeeding. In some cases, peer counselors were specifically mentioned as part of that support.

> "*I knew before I came in that I'd breastfeed…I think they'd be supportive no matter what you did." (AABC South Carolina site)*

> "*It's not forced down your throat. They give you the information.*" (AABC *Largo, Florida site)*

[253] Sites in Alaska, Arizona, Florida-Largo, Florida-Sarasota, Florida-Deland, Kansas, California-Santa Rosa, California-San Diego, North Carolina, South Carolina, Texas, and New Mexico
[254] Sites in Arizona, Florida-Largo, Florida-Deland, Kansas, California-Santa Rosa, California-San Diego, North Carolina, Oregon, Pennsylvania, and New Mexico
[255] Florida-Deland
[256] California-Santa Rosa
[257] Florida-Deland
[258] Sites in Kansas, Pennsylvania, and California-Santa Rosa
[259] Sites in Alaska, Pennsylvania, and Florida-Grandin

"*Their staff openly breastfed, so it was an everyday thing.*" *(AABC Sarasota, Florida site)*

"*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 breastfeeding.*" *(AABC Sarasota, Florida site)*

Delivery Method: The AABC Awardee noted that the 87 percent vaginal delivery rate for Strong Start participants is lower than the average rate (nationally, across AABC members). While 12 percent of Strong Start participants had C-sections through Q3 2015, just 6 to 9 percent of all Birth Center patients undergo a C-section, according to program staff. Strong Start rates may be influenced by women who receive prenatal care at the Birth Center with a planned hospital delivery. Site-based estimates of Birth Centers' individual, overall C-section rate (not specific to Strong Start) vary depending on the denominator (e.g., inclusion or exclusion of women who planned to give birth at the hospital), making it difficult to compare to data for Strong Start participants. However, most sites described a low C-section rate. Some noted that women who come to Birth Centers are often planning a natural childbirth and do not want interventions that can contribute to C-sections, making it difficult to distinguish the influence of Strong Start from the Birth Center model more generally on this particular outcome.[260]

Several sites thought that having admitting privileges and positive relationships with providers at local hospitals play a role in C-section rates for their clients. Good relationships between Birth Center and hospital providers allows for open communication and, in some cases, joint decision-making between the midwives and the obstetricians regarding C-sections.[261]

Multiple Birth Centers stated that Strong Start peer counselors may improve C-section rates by educating women about the birth process and delivery options, and by preparing women to ask questions about their delivery options and advocate for their care.[262] In addition, in Pennsylvania, peer counselors inform women about a free doula service available through the most commonly used Medicaid health plan. Many Strong Start focus group participants noted that they chose a Birth Center for their care because they want to have a natural, low-intervention birth. Multiple participants specifically noted that they were trying to avoid having a C-section:

"*When you intervene it tends to lead to more interventions. I feel like having the midwives as my overseers I didn't have to have a C-section. I really appreciate the midwives' outlook on medical care." (AABC Arizona site)*

[260] Sites in Alaska, Arizona, and Oregon
[261] Sites in Arizona, Florida-Deland, Kansas, California-Santa Rosa, and Wisconsin
[262] Sites in Alaska, Arizona, Florida-Grandin, North Carolina, Pennsylvania, Texas, and California-San Diego

"[I] had [my previous baby] at [hospital] and he was a C-section. When I was looking for maternity care, I was looking for something that I felt was going to be more natural, more supportive of my birth plan. I felt like he ended up an unnecessary C-section, and I wanted somebody that was going to respect that I wanted a more natural childbirth, so I went to the midwife center." (AABC Pennsylvania site)

Birth Centers are challenged to reduce C-section rates when they have no control of deliveries that occur in their affiliated hospitals. Specifically, two Florida Birth Centers noted that they have no influence on delivery method when participants deliver at the hospital.[263] Santa Rosa's Birth Center cited an increase in C-section rate as a result of expanding into a hospital-based practice. Lastly, the South Carolina site observed that more of its Medicaid patients have planned hospital deliveries because Medicaid's reimbursement rate is so low that they must limit the number of Medicaid-funded deliveries allowed at the Birth Center (discussed in more depth below).

Health Care Costs: Multiple sites associate the Birth Center model with reduced health care costs, but not the Strong Start peer counselor intervention. More specifically, Birth Center care is associated with low C-section rates, fewer labor and delivery interventions, fewer NICU stays, and easier access to care (resulting in fewer trips to urgent care or the emergency room) whether or not the client received Strong Start services.

Depression: Some Birth Center sites have taken additional steps to ensure that depression is monitored for all patients, including Strong Start participants. One site in Florida (Grandin) hired a licensed social worker to provide counseling to patients with depressive symptoms, although receiving services is dependent on having an insurance plan that will reimburse for such counseling. Another Florida site (Largo) added an additional visit at four to six months postpartum to further assess depression. This additional visit provides a midpoint assessment between postpartum care and the patient's next annual exam. At the site in Pennsylvania, peer counselors spend significant time on mental health, with the entire second peer counseling session focused on mood disorders. Furthermore, the center has referral relationships with providers who specialize in perinatal mood disorders, and all women are given the number of a hotline run by the local psychiatric hospital. Patients with a history of mental health needs are referred to a therapist, and the health plan that enrolls the majority of Medicaid enrollees connects them with a social worker who can provide counseling. It is usually possible to access a behavioral health provider, though there is a shortage of providers who have both the appropriate experience and accept Medicaid patients, occasionally resulting in appointment wait times of up to two months. The site's expected expansion into a new space will allow on-site behavioral health providers to better address these needs, and the midwives are developing a protocol that would allow them to prescribe medication if need.

[263] Florida-Grandin and Florida-Largo

At least two Birth Center sites noted that the Strong Start Intake Form helps staff identify depression in patients and is a "great way to understand what [clients] are experiencing".[264] The Kansas site has even added depression screenings for Strong Start participants during the third trimester and postpartum. Some sites report that Strong Start participants share information regarding their moods and depression with peer counselors more readily than with other providers, and that peer counselors dedicate more time and attention to the topic.[265]

Other Outcomes: Three sites included in this analysis reported that Strong Start peer counselors increase the efficiency of the midwives in their center.[266] For example, peer counselors are able to identify resources and issues that they can address directly with the patient (or communicate to the midwife to address) before prenatal appointments, which frees up time for the midwife to spend with the patient on clinical care or additional education. By knowing in advance the resources that women will need, midwives can expedite those services.

Strong Start Services and Program Features:

The Birth Center awardees and sites have both similar and distinct program features. The next sections summarize commonalities and differences in various program components.

Outreach and Enrollment: Most Birth Center sites recruit almost exclusively from the pool of women who present at their Birth Center for care rather than conducting external outreach to identify eligible participants (all but two AABC sites included in this analysis, and the Providence site. Since the beginning of Strong Start, AABC has developed marketing materials—including flyers, brochures, and a website—to help Birth Centers recruit for Strong Start. However, this awardee's sites have not made significant use of these materials to recruit participants, according to interviewees.

A few Birth Centers included in this analysis focus on internal recruitment because they are at capacity and unable to accommodate increased patient loads in general, or because their state's low Medicaid reimbursement rate deters them from pushing hard to increase Medicaid patient volume.[267] On the other hand, the AABC site in Deland, Florida noted that Medicaid beneficiaries have few options and are "pushed toward the Birth Center" by the two obstetricians in the area who accept Medicaid but are no longer accepting new patients. Outreach within the Birth Center can encompass a large pool of potential participants. For example, the AABC site in Largo, Florida noted its patient population was expanding because of referrals of newly pregnant women from community health centers and the Health Department. This site also merged with five pregnancy

[264] Sites in Kansas, Alaska, and Florida-Deland
[265] Sites in North Carolina and Pennsylvania
[266] Sites in South Carolina, Florida-Largo, and Texas
[267] AABC sites in North Carolina, South Carolina, and Kansas

crisis centers and a residential complex that provides affordable housing for single parent families, all of whom also make referrals to the Birth Center.

Overall, most Birth Centers continue to use opt-in enrollment for their Strong Start programs. That is, Strong Start is being offered as an option to women seeking prenatal care at the Birth Centers. The typical approach involves describing the Strong Start program and its enhanced peer counseling at the patient's first prenatal visit and asking if she would like to participate. As a strategy to increase enrollment, some Birth Centers[268] switched to an opt-out approach over the course of program implementation, meaning that all Medicaid beneficiaries are enrolled in Strong Start unless they explicitly say they do not want to participate. This shift is consistent with AABC's encouragement to present Strong Start as part of a Birth Center's standard approach of care and "just another helpful service" that it provides to eligible patients. A few Strong Start focus group participants noted that they enrolled to help support research and data collection on the Birth Center experience:

> *"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." (Sarasota, Florida site)*

Regardless of enrollment approaches, most centers noted that few women decline to participate in Strong Start. According to key informants, those who decline generally do so because they feel they do not need the additional support of the peer counselor or are unwilling to make the extra time commitment. Less commonly, patients choose not to enroll because they do not want to participate in, or share personal data with, a government-sponsored program.[269]

Family Planning: Birth Centers vary in terms of how extensively they include family planning in the Strong Start intervention. Some sites noted that peer counselors or providers discuss family planning options with participants prior to delivery[270] while other sites noted that peer counselors do not cover family planning in depth or that the topic is not discussed much until the postpartum visit.[271] This is influenced in some centers by the religious affiliation of the center or the religious beliefs of the patients, but more often peer counselors and Perinatal Navigators do not focus on family planning because it is considered the responsibility of midwives or other staff at the Birth Center. Perinatal Navigators at the Providence site, for instance, refer Strong Start participants to the Birth Center's dedicated Reproductive Health Counselors who have more expertise and training in providing family planning counseling.

[268] AABC sites in Florida-Largo, California, Kansas, New Mexico, Oregon, and Pennsylvania
[269] AABC sites in Alaska, California-Santa Rosa, Kansas, Florida-Deland, Oregon, Texas, and Wisconsin
[270] AABC sites in Florida-Deland, North Carolina, Oregon, Pennsylvania, and California-Santa Rosa
[271] The Providence site, and AABC sites in Arizona, South Carolina, Texas, and Kansas

Several sites noted the benefits of family planning services in relation to the Strong Start intervention.[272] For example, key informants at the Alaska site noted that the Strong Start participant-level forms improve the likelihood that a woman will have a discussion with her provider about family planning and serve as a reminder if the topic has "fallen through the cracks." Two sites noted that the additional time health educators or peer counselors spend with Strong Start participants facilitates more comprehensive family planning discussions and access.[273]

Though this was not always the case, focus group participants were generally satisfied with the information on family planning they had received at the Birth Center, and felt that it met their needs:

> *"[The peer counselor] is the one that introduced me to the Paragard [IUD], and that was the most natural, the closest thing to natural because I wasn't interested in the other way…I wouldn't have had birth control if I didn't know about the Paragard [IUD]. I didn't have birth control before." (AABC Pennsylvania site)*

> *"I didn't get information here and I feel like my options were limited. I wish I got more information on that. I feel like if I hadn't asked about it before, I wouldn't have gotten much information on it. We didn't talk about it until my [postpartum] appointment and that really didn't help me." (AABC Texas site)*

> *"I talked about [family planning] at my very first visit. I knew this baby was going to be the last. [The midwife] gave me all my options." (AABC South Carolina site)*

Family planning education has also influenced spacing between pregnancies.[274] One focus group participant explained:

> *"At my three-week postpartum visit, they talked to me about [birth spacing]. They mentioned that you're supposed to wait 18 months so your attention can really go to your baby. It can be overwhelming to have a baby and a toddler, especially if you're breastfeeding and the baby needs you right then. The toddler is more likely to act out." (AABC Santa Rosa, California site)*

Sites mentioned various challenges related to family planning services. Specifically, some noted issues with Medicaid reimbursement.[275] Another site identified a barrier for Strong Start participants to access prescription-based birth control (such as hormonal birth control or LARCs) requiring

[272] AABC sites in Alaska, California-Santa Rosa, and Wisconsin
[273] AABC sites in California-Santa Rosa and North Carolina
[274] AABC sites in California-Santa Rosa, Kansas, and Wisconsin
[275] AABC sites in Florida-Deland and California-Santa Rosa

follow-up with another prescribing provider[276] because all care is delivered by Certified Professional Midwives—as opposed to Certified Nurse Midwives—and prescribing is outside their scope of practice.

Use of 17P Treatment: Very few Strong Start participants enrolled in the Birth Center model who are eligible for 17P treatment have received it. According to PLPE data, through the third quarter of 2015 less than one percent of AABC Strong Start participants with a history of preterm birth received 17P treatment during their pregnancy. Though some AABC program staff expressed surprise that the 17P rate was so low, they shared several factors that likely contribute to the rate. Providing 17P treatments is within the scope of practice for Certified Nurse Midwives (CNMs) though some states require physician oversight which could be a barrier (i.e., treatments would need to be approved and coordinated with a consulting physician). For Certified Professional Midwives, 17P is not within scope of practice, so patients eligible for the treatment would need to be referred to another provider. Awardee-level program staff from AABC also indicated that the cost of the medication could be a barrier for some Birth Centers, which might struggle to keep the medication in stock. (Initially the cost of the 17P injection from a compounding pharmacy was around $10-15 per injection. When the brand name drug Makena was approved, it came with a price of $1500 per injection, per week.)

Around half of the Birth Center sites indicated that women with a history of preterm birth would likely "risk out" of the Birth Center program altogether, so 17P treatment would not likely ever be provided in these sites.[277] The centers with patients who do receive 17P often do not collect or analyze data on use for the center overall or Strong Start enrollees, specifically. Some Birth Centers refer patients receiving 17P to a specialist for treatment. The Texas site arranges 17P injections to be administered at the woman's home through a home health service approved by her insurance.

Use of Electronic Medical Records (EMRs): Most Birth Centers use an electronic medical record (EMR). [278] Of those that do not,[279] one cited financial constraints and that it was evaluating different EMR systems to see which best fit their site and budget (North Carolina). Another center noted there were no plans to transition to an EMR in the near future, citing that faxing works well for exchanging records with hospitals or specialists (Santa Rosa). The EMR helps the Birth Centers keep track of the services received and follow up with participants. More specifically, centers use the EMR to:

- Identify Medicaid beneficiaries/eligible women,

[276] AABC site in Sarasota, Florida
[277] AABC sites in Arizona, Florida-Grandin, Florida-Largo, Florida-Sarasota, Florida-Deland, Kansas, and California-Santa Rosa
[278] The Providence sites and AABC sites in Alaska, Arizona, Florida-Grandin, Florida-Deland, Kansas, Oregon, South Carolina, Texas, Wisconsin, Tennessee, California-San Diego, and Pennsylvania
[279] AABC sites in North Carolina and California-Santa Rosa

- Identify Strong Start participants,
- Track enrollment in Strong Start,
- Track services received by Strong Start participants,
- Record a participant's number of visits with the peer counselor,
- Record referrals made, and
- Communicate between staff, providers, and the peer counselor about patients, including sending reminder emails to patients about appointments, or sharing resources.

The AABC site in South Carolina is adopting a new EMR system that is tailored to Birth Centers and was created by midwives. Key informants at the site explained that most EMR systems are not ideal for a facility like a Birth Center that has both outpatient and inpatient (labor and delivery) services.

Most Birth Centers with EMRs also have a patient portal. Some couple sites without an EMR mentioned the AABC Maternity Neighborhood Care Guide – an online portal created under Strong Start and through which health educators can communicate and share resources with patients, provide educational materials, surveys, and allow for participants to ask peer counselors or midwives questions about their care.[280] Overall, use of the Maternity Neighborhood patient portal varied among the AABC sites. A few Birth Centers noted their participants use and find the resource useful[281] whereas others noted patients rarely use the portal.[282] There were some complaints about the system, including that too many emails are sent to participants through the portal. Also, in some instances women who have had miscarriages are not removed from the system and continue to get standard pregnancy updates, which causes unnecessary stress and emotional pain.

Use of Social Media: Most Birth Center sites use some form of social media, however, it is not part of the Strong Start intervention or used for recruitment or enrollment. Sites often reported having their own Facebook pages that are typically used to highlight birth announcements, helpful resources, and community events. A few sites also use other social media outlets, such as Pinterest, to share resources on breastfeeding, car seat safety, and parenting resources.[283] Another site uses Twitter and Instagram to connect with patients.[284] The Midwife Center for Birth & Women's Health in Pennsylvania provides a notable example of social media use, as described in the text box on 107.

Strong Start Staffing: There have been minimal changes to study sites' Strong Start staffing approach since Year 2. The AABC peer counselor role continues to be filled by staff with a range of backgrounds, education, and experience. Those who came into the role with training as a nurse or

[280] AABC sites in California-Santa Rosa and Pennsylvania
[281] Sites in Alaska and Pennsylvania
[282] Sites in Florida-Grandin and Oregon
[283] AABC's Arizona site
[284] AABC's South Carolina site

midwife stated that they have the skills needed to perform the peer counseling duties. Skills are also learned "on the job" through their interactions with enrollees.[285] Having a similar background to or being a "peer" of the Strong Start enrollees was noted as an advantage in building rapport by a few of the sites.[286]

Most Birth Center sites felt that they had adequate Strong Start staffing resources and that the peer counselor caseload was appropriate, though some note struggling in this area. For instance, the peer counselor at AABC's South Carolina site expressed a desire for more time to spend on Strong Start, and suggested that the program should fund full-time staff solely dedicated to Strong Start rather than a peer counselor who has other roles, as she and many other AABC peer counselors do. When AABC's Tennessee site reduced staff because of financial challenges, they also made some changes to their Strong Start model because of peer counselor staffing limitations. Although they still orient new patients with the Birth Center model and Strong Start, staff may do so either one-on-one or with groups of women, depending on their availability and the timing of patient appointments. Finally, the Providence Birth Center site has just one Perinatal Navigator, which constrains enrollment and the amount of time spent with each Strong Start participant. The Providence site also noted that there are not enough volunteer doulas available to meet demand (though doulas are not a Strong Start-funded service, they are offered to participants).

Addressing Barriers to Care:

The evaluation team identified a few key barriers to care that were common across many Strong Start awardees in the first two years of the evaluation; we explored these barriers in more depth in the third round of case studies with the Birth Center awardees and sites.

***Social Media*:** Midwife Center for Birth & Women's Health (Pittsburgh, PA)

The Pittsburgh birth center continues to use a Strong Start Facebook page to help keep clients engaged even after they are no longer participants. At enrollment, participants are invited to join the Strong Start Facebook group (including clarification that it is for sharing resources and keeping in touch, rather than specific clinical advice.) The peer counselor posts to the group three times per day, at least three days per week, and includes reminders of upcoming group visits (which the peer counselor has found effective for increasing attendance), pregnancy and parenting tips, as well as photos of children or pregnant bellies. The group now has about 65 members, a third of whom participate regularly. Members ask questions to the group and sometimes ask for recommendations (e.g., for a dentist who accepts a specific Medicaid plan). If the peer counselor posts an article about breastfeeding, group members may discuss it in the comments. Participants may stay in the group after they give birth and continue to participate. For example, the peer counselor mentioned a former Strong Start enrollee posting a photo of her now two-year-old. The group peer counseling sessions that this center offers and Facebook group are intended to be complementary, fostering a sense of community and enabling first-time mothers to learn from more experienced mothers.

The focus group participants from the site noted their appreciation of the Strong Start Facebook group, saying that they check it regularly and feel that the resources posted are valuable. Several expressed that they would not know which resources are best based on their own internet searches, so it is helpful for the peer counselor to post and recommend resources. One participant explained, "*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.*"

[285] AABC sites in Arizona, California-Santa Rosa, and California-San Diego
[286] AABC sites in North Carolina, Oregon, Pennsylvania, and California-San Diego

Transportation: Transportation is a significant issue for about half of the AABC study sites, particularly in rural areas[287] and cities with limited public transportation.[288] Even where public transit is available, key informants reported that taking the bus may cause women to run late for appointments and that navigating public transportation with small children is often a challenge. Some sites noted that women do not have a personal vehicle, or share one with others in the household.

Most sites refer women with transportation problems to their state's Medicaid transportation services, which are not always convenient or reliable. Three common transportation options offered by Medicaid include taxi vouchers, public transportation vouchers, and shuttle services. Taxi vouchers were typically described as more helpful than public transportation vouchers. Sites where Medicaid provides its own shuttle bus service reported that significant advance planning is required and that shuttles often run so late that patients miss appointments. Among sites that did not report issues with transportation, some said that they either require patients to have a regular source of transportation or require attendance at an orientation, which may screen out women who have trouble accessing transportation.

Some sites offer transportation solutions aside from the Medicaid-provided services. One particularly hard-to-reach site reported that peer counselors have provided rides for women with transportation issues.[289] Another refers women to a United Way affiliate that provides transportation for low-income pregnant women's prenatal care visits,[290] while two other sites use other funding, to help pay for patients' transportation costs.[291] Most sites offer flexible scheduling for women with transportation problems and a few are willing to make home visits for prenatal care.[292] One focus group participant spoke about how much she appreciated her site's flexibility:

> *"I was worried I'd lose my care for being late, but they've never said anything like that. They are great. I try to make it on time, but it's not the end of the world if I don't. They know traffic can be a challenge." (AABC's Santa Rosa, California site)*

Childcare: Only one study site reported access to childcare as a significant barrier for patients.[293] All sites either allow women to bring children to their appointments or provide a play area for children in the waiting room. Allowing children in appointments seems to enhance the care experience for many patients, according to focus group participants:

[287] AABC sites in Alaska and Wisconsin
[288] AABC sites in Arizona, Kansas, Pennsylvania, and South Carolina
[289] AABC site in Alaska
[290] AABC site in Pennsylvania
[291] AABC sites in Alaska and Oregon. Funding sources for transportation were not always clear. At one site, a key informant indicated that Strong Start funds were used to support taxi services while another informant working for the same program stated that other (non-Strong Start) funding was used.
[292] AABC sites in Florida-Sarasota and Wisconsin
[293] AABC site in Pennsylvania

"*I bring my other kids. They come in with me. My other baby got to listen to her sister's heartbeat." (AABC's Arizona site)*

"I brought my daughter to every single one of my appointments. She actually knew where the fetal heart rate monitor was and would go take it out of the drawer and climb up on me and put it on my belly." (AABC's Pennsylvania site)

"I always brought my daughter to every visit, and that's what I appreciated. It's so personal, not superficial. She was there for the birth, and it was intense and bonding for all of us. She didn't have to understand why all of a sudden there was a baby there." (AABC's Sarasota, Florida site)

However, some key informants felt that patients are distracted and do not get as much out of appointments when their children are present. The site that reported childcare access as a barrier has plans to create a dedicated childcare space staffed with volunteers so mothers have someone to watch their children during appointments[294] and other sites reported that they already have a similar arrangement set up at their Birth Center.[295]

Communication: About half of Birth Center sites reported that keeping in touch with their clients was a challenge that sometimes interfered with care.[296] Key informants reported challenges with patients who do not return missed phone calls, change their number without notifying the site, or do not have voicemail set up where center staff can leave messages.[297] One site noted they try alternative modes to keep in touch with patients, such as email or postcard reminders, but these strategies have not been effective.[298]

Several sites shared that asking patients to confirm their contact information at each appointment is an effective approach to keeping in touch with patients. One found that some participants have difficulty paying for mobile phone service and now refer them to a local program that provides free mobile phone service for low-income individuals.[299]

[294] AABC site in Pennsylvania
[295] AABC sites in Alaska, Florida-Deland, North Carolina, and Wisconsin
[296] AABC sites in Alaska, California-Santa Rosa, Florida-Largo, Florida-Grandin, Kansas, and Pennsylvania
[297] AABC sites in California-Santa Rosa, Florida-Largo, and Kansas
[298] AABC site in Grandin, Florida
[299] AABC site in South Carolina

Common Implementation Challenges:

Though many Birth Centers' Strong Start programs have become well-established over time, others continue to experience implementation challenges related to the following areas: enrollment, Strong Start program services, Strong Start program and evaluation data collection, working efficiently with high risk patients, and Medicaid policies.

Lagging Enrollment: A number of Birth Centers continue to struggle with low enrollment, although many have also taken steps to address the issue.[300] Some Birth Centers have been able to effectively incorporate the enrollment process into the workflow of their Birth Center and improve enrollment. Others found that even with such changes, their enrollment remains low, typically because of low overall or decreased patient volume; a low proportion of Medicaid or CHIP-enrolled patients; patients who experience a change in insurance status that makes them ineligible for Strong Start, or patients who move out of the area (a particular issue where there is a sizable military population served by the Birth Center).

The Providence site noted that it cannot enroll patients who participate in Group Prenatal Care (which is available at the site, but not part of the Strong Start program) into Strong Start because the awardee wants to avoid "model overlap." This limits enrollment because many prenatal patients opt to join group care, which is generally offered to them first and is a well-advertised and popular program at the Birth Center.

Access to Family Planning Services: A few Birth Centers reportedly face challenges in providing family planning services,[301] and noted women do not have easy access to a full range of contraceptive care at the Birth Center.[302] One site noted its Certified Professional Midwives are unable to prescribe birth control and that they do not have a Nurse Practitioner or Certified Nurse Midwife on staff.[303] As a result, they have to refer out for birth control, resulting in little uptake among clients.

Strong Start Data and Documentation Requirements: The data collection requirements associated with the Strong Start evaluation and program monitoring continue to challenge a few Birth Centers, particularly those that also noted lean staffing models or staff shortages.[304]

Working Effectively with High-Risk Patients. Key informants at some sites reported difficulties working with a "high-need, high-risk patient population."[305] Specifically they mentioned a high no-

[300] The Providence site and AABC sites in Alaska, California-Santa Rosa, Arizona, Florida-Grandin, and Pennsylvania
[301] AABC sites in Texas, Florida-Sarasota, and California-Santa Rosa
[302] AABC sites in Texas and California-Santa Rosa
[303] AABC site in Sarasota, Florida
[304] AABC sites in Alaska, North Carolina, and South Carolina
[305] AABC sites in Florida-Largo, Florida-Grandin, Florida-Deland, Pennsylvania, South Carolina, and Texas

show rate among such patients, needing to improve communication with participants to improve attendance at appointments, insufficient peer counselor time to address complex psychosocial and economic needs, poor patient adherence with care plans and providers' guidance, and challenges with establishing trust between providers and patients. The AABC site in Grandin, Florida noted that they lose about a third of their Strong Start prenatal patients during the course of pregnancy; attrition is related to transfers among high risk patients, families moving out of the area, and others that do not return to the center. The AABC site in Largo, Florida suggested that a more diverse staff that aligns with patient demographics could alleviate some of the barriers it experiences related to serving a high-risk population.

Staff Turnover: Many Strong Start Birth Centers have experienced high staff turnover over the course of the award period, which occurs at the leadership level as well as among midwives and peer counselors. Though turnover among Strong Start-funded staff is occasionally related to the program itself (e.g., the peer counselor's skill set is a "bad fit" or a counselor found a more permanent, non-grant funded position), it is more often because of personal reasons or work factors unrelated to Strong Start. Regardless of the reason, turnover is challenging because enrollment and provision of enhanced services often suffers while new staff are identified, introduced to, and trained on the program.

Medicaid Policies: Current reimbursement policies create barriers and limit Birth Centers' ability to participate in the Medicaid program. Some Birth Centers continue to struggle with low or delayed Medicaid reimbursement.[306] Key informants reported that Medicaid reimbursement does not adequately cover the cost of Birth Center care.[307] One birth center restricts the number of Medicaid patients it serves because demand is greater than the number of women they can serve, and because the Medicaid reimbursement rate is significantly lower than reimbursement from private plans.[308] Another Birth Center noted Medicaid reimbursement is very low for deliveries, and for women who receive prenatal care at the center but deliver elsewhere the reimbursement is even lower.[309] If a patient labors for a time at the Birth Center but is ultimately transferred to a hospital for delivery, the center sometimes does not receive professional or facility fees for the birth (i.e., the care provided during labor is not reimbursed at all). Like "traditional" care, Birth Centers typically receive a global payment from Medicaid for all prenatal services, but Birth Center providers often provide individual patients with more care visits and spend more time with them. For example, an AABC site in Florida noted that its state Medicaid agency limits the number of reimbursable visits to 10, but the Birth Center conducts 14 visits as its standard model of care.[310]

---

[306] AABC sites in Florida-Largo, Florida-Sarasota, Florida-Deland, Kansas, and Wisconsin
[307] AABC sites in California-San Diego, Florida-Sarasota, Florida-Deland, Wisconsin, Kansas, South Carolina, and Tennessee
[308] South Carolina
[309] AABC site in Tennessee
[310] Florida's Medicaid program will pay for extra visits on a case by case basis (if medically indicated). The evaluation team was unable to identify what would be a qualifying circumstance for extra prenatal visits beyond the 10-visit limit.

Additionally, Birth Centers are typically reimbursed 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.[311] 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. In comparison, according to 2013 national statistics, in hospitals the mean charge for vaginal delivery without complicating diagnosis (excluding doctors' fees) was $12,250.[312]

Common Promising Practices:

The AABC awardee and many AABC sites were confident that midwifery and Birth Center care is a successful model for improving the health outcomes of a Medicaid and CHIP-covered population. They emphasized that these aspects of care were key strengths, but also noted that Strong Start had helped them recognize that the midwifery and Birth Center model can still be improved upon. More specifically, multiple sites emphasized that including peer counseling or a Perinatal Navigator as part of the Strong Start program has enhanced quality of care for Birth Center patients.[313] Many key informants appreciate the added time and dedication peer counselors can give to patients, including helping them with specific services such as access to free car seats, breastfeeding, classes or seminars, and enrollment in other enhanced services. In addition, several sites mentioned that peer counselors improve communication and dialogue by reinforcing the messages delivered by providers, or by bringing up topics that patients may not feel comfortable discussing with providers.[314]

Two Birth Center sites noted the specific background of peer counselors as the key strength of their program.[315] Specifically, the Largo, Florida site uses a nurse or midwife assistant to fulfill the peer counselor role, as it allows women to get their questions fully answered by medically-trained staff with whom they have developed rapport and a trusting relationship. Another site noted the value of a peer counselor who is relatable to Strong Start participants, by being a similar age and having shared interests such as popular culture.[316]

---

[311] American Association of Birth Centers. Unpublished data tables showing *AABC States and Average Straight Medicaid Reimbursement to Birth Centers* and *Birth Center Average Reimbursement by Medicaid MCOs by CMS Region.* Data was collected via a 2014-2014 survey of AABC members and was shared with the Strong Start evaluation team during the third round of case studies.
[312] Agency for Healthcare Research and Quality, "2013 National Statistics: Outcomes by 775 Vaginal Delivery without Complicating Diagnosis," http://hcupnet.ahrq.gov/HCUPnet.jsp?Id=E1C73C38B20D995B&Form=DispTab&JS=Y&Action=Accept.
[313] The Providence site and AABC sites in Alaska, California-Santa Rosa, Oregon, South Carolina, and Wisconsin
[314] AABC sites in Kansas, Oregon, Pennsylvania, and Texas
[315] AABC sites in Florida-Largo and Kansas
[316] AABC site in Kansas

Sustainability:

Many of the Birth Center sites included in this analysis are interested in sustaining the peer counseling or Perinatal Navigator components of the Strong Start program.[317] Some AABC sites have more definitive plans for sustaining peer counselors than others, mainly comprising centers whose counselors already worked there before Strong Start was implemented and are not dependent on Strong Start funding. A few sites noted that they will focus on integrating select elements of the Strong Start model that most align with their model to care.[318] For instance, several sites specifically noted the importance of being able to provide greater attention to women's psychosocial risks and referrals to additional supports that women need.[319] Most of the Birth Center sites indicated that they will not continue Strong Start-type data collection because of the increased burden it places on staff. Two AABC sites said they may continue to collect data and that it would be limited to the information for the Perinatal Data Registry.[320]

The sites included in this analysis who noted that they do not have current plans to sustain peer counseling explained that they lack the funding and resources to maintain the peer counselor position.[321] In discussing sustainability, several sites noted concerns about the financial resources needed to maintain their Birth Center generally, including struggles to get properly reimbursed by Medicaid. Birth Centers vary in their ability to pursue additional funding from outside resources themselves, but the AABC awardee is working with a small group of sites to pilot negotiations with Medicare-Medicaid Coordination Offices to incentivize payment to continue Strong Start, focusing on quality outcomes, such as preterm birth weight. To continue to provide Strong Start services for Medicaid patients, the Birth Centers need enhanced payment for enhanced prenatal care.

CROSS-MODEL OBSERVATIONS

Qualitative case studies include three years of in-person visits and telephone interviews conducted with all 27 Strong Start awardees. In-person visits were conducted with most awardees in evaluation years one and three. Many awardees received visits to multiple sites. In particular, the American Association of Birth Centers, which has sites throughout the country, received in-person visits and/or telephone interviews with 25 individual sites. With a full set of data in hand, in Year 3 the evaluation team is able to make several observations about common elements across the three models to Strong Start enhanced prenatal care. The following sections summarize our cross-model

[317] The Providence site and AABC sites in Alaska, Florida-Largo, Florida-Sarasota, California-Santa Rosa, North Carolina, Pennsylvania, and South Carolina
[318] AABC sites in Florida-Deland and Oregon
[319] The Providence site and AABC sites in Florida-Deland, North Carolina, Pennsylvania, and South Carolina
[320] AABC sites in Alaska and Tennessee. AABC's Strong Start sites are required to use the Perinatal Data Registry (originally called the Uniform Data Set) that was developed by AABC a few decades ago and includes patient demographic, utilization and health outcome data. The registry is web-based and comprehensive, including data from a patient's initial prenatal visit until six weeks postpartum. AABC modified the PDR to include data necessary for the Strong Start quarterly monitoring reports and the national evaluation.
[321] AABC sites in Arizona, Kansas, Texas, and Wisconsin

observations by comparing and contrasting awardees' perspectives on program impacts, experiences with implementation, challenges and promising practices, and plans for sustaining Strong Start after the award period ends.

Overview:

Evaluation Year 3 represented a period of stability for most awardees. Some experienced shifts in the number of participating sites, but there were few changes to interventions or implementation approaches. Across models, the awardees continue to focus on three common elements:

- Education related to a range of prenatal, childbirth, and postpartum issues;
- Referrals and connection to community resources intended to further support positive pregnancies and outcomes; and
- Psychosocial support via peers, counselors, care coordinators, and other enhanced patient-provider relationships.

Fourteen maternity care home awardees have enhanced the traditional model of prenatal care by adding staff to provide care coordination and support, which may include appointment attendance tracking and follow-up, care coordination and referrals, education, and personal support. Three awardees that implemented group prenatal care added a maternity care home model during Y3. These decisions were influenced by eligibility, enrollment, and retention challenges for group care in the first two years of the program. A fourth awardee that had operated both maternity care home and group prenatal care models eliminated its group prenatal care program, primarily because of small group size and high attrition.

Fourteen group prenatal care awardees provide prenatal care in a group setting with an emphasis on building supportive peer relationships during a series of facilitated, face-to-face sessions covering three components: health assessment, education, and support.[322] All group prenatal care awardees are implementing the CenteringPregnancy model or a modified version of this model.

Two birth center awardees provide the midwifery model of care augmented by a peer counselor/perinatal navigator who provides additional education, referrals to community services, care coordination, and emotional support via a series of encounters throughout pregnancy and postpartum.

[322] One awardee provides group prenatal support sessions (which supplement traditional prenatal visits) rather than true group prenatal care.

Program Outcomes:

For the Year 3 case study interviews, the evaluation team discussed a range of program outcomes with Strong Start awardees, using the most recent PLPE data that was available at the time of data collection. For most awardees this was data through the third quarter of 2015.

Preterm and Low Birthweight: Most awardees are satisfied with rates of preterm birth and low birthweight among Strong Start enrollees and are confident that Strong Start services are contributing to improvements in these outcomes. Several maternity care home and group prenatal care awardees report that Strong Start outcomes are better than historical rates for a similar population at their sites. When asked to pinpoint the most influential Strong Start services,

- Maternity care home awardees emphasized their model's impact on earlier entry into prenatal care and better prenatal care attendance, facilitating faster screenings and referrals to community resources, and improving access to behavioral health services.
- Group prenatal care awardees emphasized their model's focus on education about healthy pregnancy and childbirth preparation, including recognizing normal/abnormal signs during pregnancy.
- Birth center sites emphasized the midwifery model of care's holistic approach to pregnancy and the amount of time midwives spend with women, while also (in many cases), acknowledging the positive impact that peer counselors have had on women's psychosocial well-being and access to resources.

Breastfeeding: Promoting breastfeeding has been a focus for many awardees both within and outside of the Strong Start award. Some awardees felt positive about their Strong Start breastfeeding rates but others focused more on the need for improvement. Though some maternity care awardees indicated that their care managers provide resources and referrals related to breastfeeding, these awardees were most uncertain (compared to other models) of whether their Strong Start services were having any influence on breastfeeding. Group prenatal care awardees, in contrast, all highlighted the effectiveness of their group session dedicated to breastfeeding, which often involves guest speakers (lactation consultants), hands-on demonstration, and ample opportunity to dispel myths and share experiences with breastfeeding. Birth center sites felt that breastfeeding promotion and education is already a standard part of midwifery and birth center care, but also noted that the Strong Start peer counselor/perinatal navigator was providing extra support for women who need it, and contributing to higher breastfeeding rates among Strong Start participants as compared to Medicaid-enrolled birth center patients in general.

Concurrent programs and initiatives that awardees felt were having a significant impact on breastfeeding rates in their community include: hospitals' Baby Friendly certification and availability of hospital-based lactation consultants, birth center-based breastfeeding education and support groups (typically open to all women in a community, not just birth center patients), Medicaid MCO

incentives, WIC, state-led initiatives like Louisiana's GIFT and Pennsylvania's Keystone 10, and Healthy Start programs.

Common barriers to initiating or continuing breastfeeding that were mentioned across Strong Start models include: perceptions that breastfeeding is difficult or not appealing; problems with latching and pain; lack of support at home; difficulty finding space and time to pump when women return to work or school; concerns about breastfeeding in public; and Medicaid coverage restrictions on breast pumps.

Delivery Method: A number of awardees, particularly those implementing the group prenatal care model, felt that Strong Start enhancements were positively influencing C-section rates. Strong Start staff across the three models emphasize the importance of carrying the pregnancy to full term when working with patients, and provide a variety of services that promote healthy pregnancy (e.g., nutritional counseling). Group prenatal care awardees pointed specifically to session content on the stages of labor, interventions, and childbirth preparation; some also include a discussion of Vaginal Birth after Cesarean (VBAC) in group sessions.

Many factors that influence C-section rates, however, are out of awardees' control. This is especially true for awardees and birth center sites that are responsible for prenatal care but ultimately transfer care to another provider for labor and delivery, which was more common for (though not only limited to) group prenatal care awardees. At the same time, awardees noted a number of external influences that may be improving C-section rates in their communities, including: better hospital policies towards VBACs; initiatives to reduce or eliminate early elective deliveries and campaigns about the importance of delivering at term; and, home visiting programs.

Health Care Costs: Though they lacked substantiating data, most awardees believed that Strong Start was reducing enrollees' health care costs. Maternity care home and group prenatal care awardees most often highlighted reductions in emergency room visits as a result of session content on pregnancy signs and symptoms (for group prenatal care) and enhanced support from care managers (for maternity care home). They also mentioned reductions in NICU costs associated with improved birth outcomes. Birth center sites associate the birth center model in general with cost-savings, including fewer labor and delivery interventions, lower C-section rates, and fewer NICU stays, but did not attribute these savings to the Strong Start intervention in particular.

Addressing Depression: Most Strong Start programs are well-positioned to address depression. This is especially true for maternity care home awardees and birth center sites, which often focus on screening and referrals as well as one-on-one psychosocial support. Group prenatal care awardees also make referrals to behavioral health providers as needed and include session content on mood disorders. Some group care awardees emphasized that peer-to-peer support and group discussions about mental health helped address depression, though others felt that women suffering from depression would be less likely to participate in group prenatal care or—if they did participate—might not be open about symptoms and feelings in a group setting.

Availability of mental health providers, particularly psychiatrists, remains a challenge in most areas and can discourage some prenatal providers from screening (i.e., if they cannot confidently offer a referral for treatment). But awardees and sites across the models still believe increased screening is valuable. Several indicated that the Strong Start intake form has turned out to be very useful for identifying depression and spurring a referral or increased personal support from a care manager or peer counselors/perinatal navigators.

Key Program Features and Services:

The evaluation team explored a number of key program features and services in greater depth with Strong Start awardees during the Year 3 case studies, including (but not limited to) program outreach and enrollment, the use of 17P to prevent preterm births, and the role of family planning care.

Outreach and Enrollment: Awardee progress towards meeting (often revised) enrollment goals continues to be mixed. Maternity care home awardees reported the most progress, in general, which is largely attributed to improved integration of Strong Start staff into clinical settings which makes prenatal care providers feel more comfortable referring patients to the program. About half of group prenatal care awardees highlighted enrollment as a major challenge even in evaluation Year 3; the most common recruitment problem for group prenatal care awardees stems from a lack of support from prenatal care providers which hinders referrals to the group prenatal care program. A number of birth center sites also continue to struggle with enrollment, though their recruitment problems are more likely to stem from low Medicaid patient volume (with some centers deliberately limiting the number because of low Medicaid reimbursement) or challenges integrating the program into the workflow of a busy, leanly-staffed birth center.

Use of 17P: With a few exceptions, 17P treatment generally does not play a major role in awardees' Strong Start interventions. Most maternity care home awardees indicated that 17P treatment is managed by the participant's prenatal care provider without involvement of the care manager (e.g., the care manager was not involved with setting up weekly 17P injection appointments or ensuring that women attended them). Similarly, group prenatal care enrollees eligible for the treatment do not receive 17P within group sessions, but typically attend separate visits with a Maternal Fetal Medicine specialist (or are visited by home health providers) to receive 17P injections. Group prenatal care education does not typically involve information about 17P treatment either. For birth center sites, 17P treatment would most often be given in collaboration with consulting physicians via referrals though these referrals did not appear to be very common, or women eligible for the treatment (by virtue of having had a prior preterm birth) would 'risk out' of the birth center care altogether.

Even though Strong Start enhancements do not generally incorporate 17P treatment, many awardees suggested reasons for low 17P rates among Strong Start participants. Across the models these included: late entry into care (after the window for initiating 17P treatment); delays in getting

prior authorization from Medicaid MCOs for the treatment; low Medicaid reimbursement and financial risk for providers; challenges in storing 17P; barriers related to referrals or coordination among providers; lack of home health agencies that will administer the injections at patients' homes; difficulty sustaining home visits when patients experience housing instability; and, transportation barriers that prevent women from getting to a clinic for injections. Notably, though awardees report their own data on 17P use, some still felt that PLPE data on 17P does not accurately reflect (and is lower than) the actual treatment rate for their Strong Start population.

Role of Family Planning Care: Strong Start's role in providing family planning services and counseling varies across models and awardees. Group prenatal care awardees indicated the most emphasis on family planning, compared to the other two models. All awardees dedicate one group session to the topic, which typically includes interactive group activities, myth-busting and sharing past experiences with methods, passing around samples of various methods, and selection of one or two methods that a participant plans to use after delivery. Most group prenatal care sites also discuss family planning at other points prenatally and during the postpartum visit.

Generally maternity care home care managers and birth center peer counselors also incorporate family planning discussions into Strong Start encounters, reinforcing and expanding on the birth control counseling provided by prenatal providers. Most maternity care home programs provide family planning counseling early in a woman's care and address the topic multiple times throughout the woman's pregnancy. Birth center sites' models are more varied, with some discussing family planning early and often, while others cover the topic less frequently (e.g., once or twice in third trimester and/or postpartum). Though not very common, some maternity care home care managers and birth center peer counselors do not engage in family planning care at all because they consider the topic to be solely within the realm of prenatal care providers.

Across the models, there are a handful of cases where family planning services and counseling are limited because the awardee (or site) is affiliated with a religious organization or church. In these cases, limited methods are discussed, often only natural family planning, though enrollees may be referred to other providers for prescription methods such as birth control pills or LARCs.

Awardees shared some common barriers to receipt of family planning services. General barriers (not specific to any method) include: low postpartum visit attendance rates; loss of Medicaid or CHIP coverage postpartum; discontinuity with delivery hospitals, including Catholic hospitals where the most effective options may be limited or discouraged; and—relevant only for Certified Professional Midwives in birth center settings—limits on providers' prescriptive authority.

Other than poor adherence to quarterly Depo-Provera injections, most method-specific barriers are related to LARCs. These include: persistent myths about IUDs, particularly among teens; complaints about LARC side effects that lead to removals after a short time; provider preferences or resistance, including concerns about inserting an IUD at the time of delivery; MCO reimbursement policies that prevent LARC placement before the post-discharge visit (which usually occurs around 6

weeks postpartum); and, inadequate Medicaid reimbursement and maintaining a steady supply of LARCs.

Addressing Barriers to Care:

The evaluation team explored several barriers to care with Strong Start awardees during the Year 3 case studies. These barriers are common across many Strong Start awardees and sites.

Transportation: Most maternity care home and group prenatal care awardees and about half the birth center sites studied in Y3 described transportation as a significant barrier to prenatal care. Though it is particularly problematic in rural areas, programs operating in metropolitan areas also identified some challenges related to transportation (particularly in cities without a comprehensive or easily accessible public transportation system). Many participants lack a personal vehicle, or have a personal vehicle that is old and unreliable. They may share a vehicle with a family member, or rely mainly on rides provided by family and friends. Though Medicaid programs are required to cover non-emergency transportation to medical services, awardees shared a number of challenges related to this option, including cumbersome application processes for Medicaid-covered transportation, unreliable transportation vendors, requirements to schedule rides days or weeks in advance, and rules against bringing children on Medicaid transport vehicles.

Awardees have adopted a number of strategies to address transportation barriers, including assistance with applying for and scheduling Medicaid transportation; providing vouchers for public transportation, taxis, or mileage reimbursement; providing personal rides to and from patient homes or the nearest bus stop; referrals to nonprofit agencies that offer transportation services; and, encouraging carpooling (useful for group prenatal care enrollees in particular). Awardees also noted that providers should be flexible with patients who show up late to appointments and suggested that access to transportation be a consideration whenever a health care provider is considering expansion to new sites.

Childcare: Most group prenatal care and maternity care home awardees described childcare as another major barrier to care. This barrier is most prevalent for group prenatal care awardees since the CenteringPregnancy model (which most awardees are following) stipulates that children should not be allowed in group sessions. However maternity care home awardees sometimes also discourage patients from bringing children to appointments. Medicaid transportation challenges are intertwined with childcare barriers, since children are typically not allowed on Medicaid transport vehicles. Only one of the birth center sites studied mentioned that access to childcare was a barrier; most birth center sites allow and even welcome children in appointments or provide a play area for children in the waiting room.

Common maternity care home and group prenatal care awardee strategies to address childcare barriers included scheduling appointments or group sessions during school hours; encouraging patients with young children to bring another adult to supervise the children during a session/visit;

offering childcare on-site; referrals to Early Head Start or to churches or local organizations that provide childcare; and, encouraging women who live near each other to share childcare (useful for group prenatal care enrollees in particular). Importantly, most group prenatal care awardees also noted that they allow children to come to group sessions (going against CenteringPregnancy policies), as they would rather have a woman attend with her children than skip the session because of lack of childcare. However, they also acknowledged that this is not ideal.

Communication: Nearly all the maternity care home and group prenatal care awardees, and about half the birth center sites studied, reported challenges in sustaining contact with Strong Start enrollees. The issues usually relate to frequent moves and changing telephone numbers, though some awardees/sites also indicated that women do not answer phone calls, return missed calls, or set up and use their voicemail. The most common strategies for staying in touch with patients are using text messaging to communicate (noting that women seem to prefer this to phone calls); asking for emergency contacts and updates at each appointment; establishing a protocol for contacting patients who miss an appointment or session (e.g., calling three times, then sending a certified letter); and, providing referrals to programs that provide low/no-cost, reliable mobile phone services for low-income individuals. Many awardees felt that texting was a very valuable tool that had largely 'solved' their problems, but some noted that this form of communication was mostly limited to check-ins and appointment reminders and could not be used to discuss health-related issues.

Common Implementation Challenges

Strong Start awardees experienced a range of implementation challenges, as described above and shown in Exhibit 10, which displays reported challenges by Strong Start model. The most common challenge across all three models is low attendance at prenatal visits/sessions and Strong Start encounters. Some described this challenge as a lack of participant engagement. In addition to the common barriers to care discussed above, problems with attendance and engagement are attributed to participants' inability to prioritize prenatal care amidst other life stressors (including difficulties with meeting basic needs), challenges with establishing trust between providers and patients, lack of after-hours care options for women who work or are in school, and housing transience.

EXHIBIT 10: IMPLEMENTATION CHALLENGES REPORTED BY STRONG START AWARDEES IN YEAR 3

Challenge	Number of Awardees Reporting Challenge[1]		
	Maternity Care Home	Group Prenatal Care	Birth Center
Lack of provider and/or administrator support	Medium	High	Low
Lagging enrollment	Low	High	Medium
Lack of community resources (E.g. affordable housing, mental health services)	High	Low	Low
Staff turnover	Low	Low	High
Lack of participant engagement/low attendance	Medium	Medium	Low
Medicaid and CHIP policies (E.g. reimbursement structures)	Low	Medium	Medium
Working effectively with high risk patients	Low	Low	Medium
Need for tools (E.g. access to EMRs, mechanisms to follow up on care)	Low	Low	Low
Access to family planning services	Low	Low	Low
Strong Start data and documentation requirements	Low	Low	Low

[1] A challenge is included in the table if two or more awardees or birth center sites reported it during the Year 3 interviews.
[2] An assignment of "low" indicates that no more than ¼ of awardees or sites studied in Y3 reported the challenge; "medium" indicates that more than ¼ and less than ½ of awardees or sites reported the challenge; and, "high" indicates that over ½ of awardees or sites reported the challenge.

Notably, many of these contributing factors represent issues that the Strong Start models are designed to address—for instance, most Strong Start programs incorporate identification of social service needs and referrals to community services in an attempt to eliminate stressors in a pregnant woman's life. All programs include some element of relationship building that is meant to instill trust between a patient and a provider. The fact that a number of awardees and sites continue to struggle in these areas speaks to the magnitude of these barriers, but also to the varying intensity level of the Strong Start intervention.

Low enrollment is a common barrier for birth center sites and group prenatal care awardees. Though some noted that a more sophisticated or "realistic" approach to setting enrollment targets would have partially mitigated the issue, most associated enrollment problems with the way Strong Start was implemented (e.g., reliance on an opt-in enrollment approach, failure to include a more significant pre-implementation planning period) or with lack of provider and administrator support.

Medicaid and CHIP policies represent another implementation barrier across awardees, but particularly for birth center sites. Birth centers report that Medicaid reimbursement does not

adequately cover the cost of birth center care. For instance, if a patient labors for a time at the birth center but ultimately transfers to a hospital for delivery, the center may not be reimbursed for the labor care they provided. As is the case for traditional prenatal care providers, birth centers typically receive a global payment from Medicaid for all prenatal services, but often see patients more frequently and spend more time with them. While not specific to the birth center model, lack of continuous Medicaid and CHIP health coverage in the postpartum period is another challenge for Strong Start awardees.

Common Promising Practices and Program Strengths:

The awardees also reported a variety of promising practices and program strengths, as reported above and displayed in Exhibit 11, which shows how these practices and strengths compare by Strong Start model type. The most commonly-cited program strength across all three models relates to relationship-building between peers and between providers and patients. Maternity care home awardees attributed the success of their approach to the care manager's "personal touch" and the trusting, consistent relationship that she builds with participants, sometimes bolstered by round-the-clock availability. This consistency is particularly helpful in clinic settings when a patient may see any one of a number of prenatal care providers at her appointments. Similarly, birth center sites felt that adding a peer counselor/perinatal navigator enhanced the quality of care by providing another personal connection to the birth center and by improving communication and dialogue between patients and midwives. Peer counselors, for instance, reinforce the messages delivered by providers or bring up topics that patients may not feel comfortable discussing with providers. Though a different type of relationship, group prenatal care awardees emphasized the peer-to-peer relationships that develop in the group setting as a key strength of their program, noting that group cohorts feel supported and accountable to one another—which helps increase attendance and adoption of healthy behaviors—and that they value and learn from one another's experiences.

Other promising practices and program strengths relevant for all models include tailoring recruitment messages so that they address and reflect patient concerns and priorities, and involving Strong Start service providers (e.g., group prenatal care facilitators, care managers) more directly in recruitment processes. For maternity care home awardees and birth center sites, additional promising practices include successfully integrating Strong Start enhanced services into the site's clinic workflow.

EXHIBIT 11: NUMBER OF AWARDEES IDENTIFYING PROMISING PRACTICES AND PROGRAM STRENGTHS AS REPORTED IN YEAR 3

Promising Practice or Program Strength[1]	Number of Awardees Reporting Practice/Strength[2]		
	Maternity Care Home	Group Prenatal Care	Birth Center
Psychosocial support from peers or providers	Medium	High	Medium
Enhanced education	Low	High	High
Community partnerships	Low	High	Low
Involving midwives in Strong Start intervention	Low	Low	High
Referrals to community resources (e.g., housing or food subsidies, baby supplies, dental or behavioral health care)	Low	Low	High
Integration with prenatal care providers	Medium	Low	Low
Universal risk screening at intake	Medium	Low	Low
Specialized prenatal care groups	N/A	Medium	N/A
Adopting enhanced prenatal care approach as standard of care	Low	Low	Low
Using electronic medical records	Low	Low	Low
Background of the Strong Start service provider (e.g., clinical experience, demographic match)	Low	Low	Low
Involving Strong Start service providers more directly in recruitment processes	Low	Low	Low
Tailoring patient recruitment messages to address and reflect patient concerns	Low	Low	Low
Implementing second Strong Start model (e.g. group prenatal care awardee adding maternity care home services at separate sites)	N/A	Low	Low

[1] A promising practice or program strength is included in the table if two or more awardees or birth center sites reported it during the Year 3 interviews.

[2] An assignment of "low" indicates that no more than ¼ of awardees or sites studied in Y3 reported the practice/strength; "medium" indicates that more than ¼ and less than ½ of awardees or sites reported the practice/strength; and, "high" indicates that over ½ of awardees or sites reported the practice/strength. This analysis included 17 maternity care home awardees, 14 group prenatal care awardees, and 18 birth center sites operated by two birth center awardees.

Planning for Sustainability:

A majority of group prenatal care and maternity care home awardees, as well as most of the birth center sites, are interested in sustaining Strong Start enhancements to some degree. In most cases, however, ongoing funding or support for the enhancements had not yet been identified or secured. At the time of the Y3 interviews, awardees hoping to sustain their enhancements were at different stages of exploring potential funding sources. These sources most commonly include grants (foundation, federal, and state-based), enhanced reimbursement from Medicaid MCOs, and funding from their own institutions. Many awardees across models emphasized that data capturing the effectiveness and cost-effectiveness of Strong Start is key to promoting sustainability.

Among awardees that did not expect to sustain the program or where sustainability seemed most uncertain, general lack of funding was the most common challenge, along with factors such as

lack of support from providers and administrators; lack of 'bandwidth' and advance planning by Strong Start staff related to sustainability efforts; and inability to successfully appeal to Medicaid MCOs because Strong Start enhancements were perceived to replicate their own care management efforts.

Some awardees felt encouraged by the delivery system reforms that are taking place across the country because they present funding opportunities that Strong Start programs could potentially take advantage of (e.g., health home or patient-centered medical home initiatives could incorporate Strong Start maternity care home enhancements), while others felt that the changing delivery landscape created uncertainties about where enhanced services might be covered and how sustainability planning should proceed.

TECHNICAL ASSISTANCE AND DATA ACQUISITION

The ultimate objective of the State Data Linkage Technical Assistance (TA) task of the Strong Start evaluation is to obtain linked birth certificate, Medicaid eligibility, and Medicaid claims and encounter data from states with Strong Start awardees. The data will be used to support the Impact analysis component of the evaluation which will assess whether and to what extent Strong Start has had an impact on preterm births rates, occurrence of low birthweight, and Medicaid costs through pregnancy and the first year after birth. The TA is designed to "meet states where they are," by either facilitating the transmission of these data to the Urban Institute so that they can be linked, or to help states conduct the linkage of these large and complex data sets themselves. During Year 3, we continued to: (1) develop relationships with state officials in agencies responsible for Vital Records and Medicaid data; (2) identify the steps involved in requesting and gaining access to the data; (3) complete the various applications and agreements needed to secure approval to obtain the data; and (4) facilitate the transfer of data from state agencies to Urban. By the end of Year 3, we were successfully working with both the Medicaid and Vital Records agencies in the 20 states that we judged to have sufficient Strong Start enrollment to merit the large investment in time and resources needed to obtain the necessary data. In addition, we are pursuing data from the Children's Health Insurance Program (CHIP) in two states, Tennessee and Texas, which are the only states that have a substantial number of Strong Start enrollees insured through that program.

Good progress has been made over the course of the year. Specifically, we have:

- Submitted 24 data request applications;
- Submitted 9 IRB applications;
- Received approval from 14 Medicaid agencies and 11 Vital Records agencies to access their data; and
- Received data from 7 agencies, including 2 Medicaid and 5 Vital Records agencies.

In addition, as of July 1, 2016:

- 12 applications are pending approval from state agencies; and
- 3 additional data and IRB applications and 8 data use agreements with state agencies are in the process of being completed

About two-thirds of the states are linking or plan to link birth certificate and Medicaid eligibility and claims/encounter data themselves – rather than sending personally identifiable information (PII) to Urban to link – to ensure the confidentiality and privacy of their data. To ensure the privacy and security of PII from the one-third of states that are not performing the linkage, Urban has

requested that PII and protected health information (PHI) be sent separately with unique study IDs that will allow the Impact analysis team to merge the files upon receipt.[323] Exhibit 12 identifies the 13 states that have decided to link Medicaid eligibility and claims/encounter data with birth certificate data and the 6 states that are deferring this task to Urban. One state, Maryland, has not decided who will be performing the data linkage. Exhibit 13 lists the PII that is being requested of the states.

EXHIBIT 12: RESPONSIBILITY FOR DATA LINKAGE

State	State	Urban Institute	Undecided
1. Alabama		X	
2. Arizona*	X		
3. California	X		
4. District of Columbia	X		
5. Florida		X	
6. Georgia		X	
7. Kentucky	X		
8. Illinois	X		
9. Louisiana		X	
10. Maryland			X
11. Michigan	X		
12. Mississippi	X		
13. Missouri		X	
14. Nevada		X	
15. New Jersey	X		
16. Pennsylvania	X		
17. South Carolina	X		
18. Tennessee	X		
19. Texas	X		
20. Virginia	X		

* Arizona State University Center for Health Information & Research (CHiR) is a contractor that will link the data.

EXHIBIT 13: PERSONALLY IDENTIFIABLE INFORMATION (PII) REQUESTED

PII	State Conducts the Linkage	Urban Institute Conducts the Linkage
Infant's Date of Birth	X	X
Census Tract, Zipcode, County*	X	X
Mother's Date of Birth		X
Infant's Date of Birth		X
Mother's First Name		X
Mother's Last Name		X
Infant's First Name		X
Infant's Last Name		X

*Census tract, zip code, and/or county from geo-coded match with mother's address

[323] The analysis files developed will remove any identifying information, and replaced with the Urban-created study ID number.

In Year 2, we offered to provide hands-on technical assistance to state officials who wanted to build their internal capacity to perform birth certificate/Medicaid data linkage. As of July 1, 2016, none of the state agencies have specifically requested technical assistance (e.g., training); however, Alabama Vital Records officials have indicated that they may need help pulling the birth certificate data,[324] and Kentucky Medicaid has indicated that they may need help linking the Medicaid and birth certificate data.

As noted above, significant progress was made in Year 3. Particularly noteworthy are two states, Maryland and Missouri, which had previously declined to participate in the evaluation because of limited resources, but have now agreed to share their data. The next year will see the evaluation team working to gain approval from and finalize data sharing agreements with the remaining state agencies, as well as working with state officials to successfully prepare, link and transfer data to Urban.

The remainder of this chapter provides additional detail on the process we have followed during Year 3, the progress we have made, the challenges we have encountered, and the lessons we have learned while carrying out the TA task.

PROCESS FOR GAINING APPROVAL TO ACCESS MEDICAID AND VITAL RECORDS DATA

To develop and sustain positive working relationship with the states, Urban and its subcontractors divided up the workload and worked with specific states, as follows:

- *American Institutes for Research (12 states)* – Alabama, Illinois, Kentucky, Maryland, Michigan, Mississippi, Missouri, Nevada, Pennsylvania, Tennessee, Virginia, and Washington, DC
- *Health Management Associates (6 states*) – Arizona, Florida, Georgia, Louisiana, New Jersey, and Texas
- *Urban Institute (2 states)* – California and South Carolina

Within each organization, a TA Liaison serves as the primary point of contact for the state agencies. In Year 3, the TA Liaisons engaged in several major activities to gain approval to access Medicaid and birth certificate data, including:

- Maintaining regular and ongoing contact with staff at state agencies to help facilitate the application and approval process;
- Educating new staff at state agencies about the Strong Start for Mothers and Newborns Evaluation and, in particular, the impact analysis and data request; and

[324] Alabama Medicaid and Vital Records are sending their data separately to the Urban Institute which will perform the linkage.

- Implementing a range of alternative approaches to engage state agency officials who had been less responsive to our requests with the objective of gaining their participation.

Below we describe these activities in more detail, including our processes and tools to manage the large volume of interactions with state officials, and the completion, review, and submission of states' various data applications and agreements.

Maintaining regular contact with state agencies: During Year 3, TA Liaisons contacted the following state agencies on a regular basis to inquire about the status of our request and/or submitted applications: Alabama Vital Records, Arizona Medicaid and Vital Records, District of Columbia Medicaid and Vital Records, Florida Medicaid and Vital Records, Georgia Medicaid and Vital Records, Illinois Vital Records, Kentucky Medicaid and Vital Records, Louisiana Medicaid and Vital Records, Michigan Medicaid and Vital Records,[325] Missouri Medicaid and Vital Records, Nevada Vital Records, New Jersey Medicaid, Pennsylvania Medicaid, Tennessee Vital Records,[326] Texas Medicaid, and Virginia Medicaid and Vital Records.[327] During these interactions, we provided additional information and/or participated in conference calls with state staff as needed to answer questions about the evaluation, the impact analysis, the specific data variables requested, and/or the process to be used when linking and transferring data. As needed, we re-sent technical assistance materials that had been developed and shared in Year 2, including our *Overview of Information Needs for the Impact analysis* (The Urban Institute, 2015) document, which provides a state-specific summary of the Strong Start initiative and evaluation, a description of the linkage process, and the list of Medicaid and birth certificate variables needed for the impact analysis. We also reminded the states about the stipend that is available to states to support their participation.

These communications, carried out via phone and/or email, occurred on a monthly basis with most state agencies and were designed to check-in and learn about the status of our request and/or application. In a few states, contact was more frequently needed to answer questions or to keep the process moving forward. Additionally, TA Liaisons copied the Urban Principal Investigator (PI) on emails to select state agencies, including those in DC Medicaid, so that staff could contact him directly with any questions or concerns. We let state agencies know that we appreciated an update, even if there was not any new information since the previous communication. This regular communication was an effective strategy for encouraging state officials to push the applications through their own, often slow, internal processes.

[325] Michigan Medicaid and Vital Records are housed in the same agency Michigan Department of Health and Human Services, and therefore, we submitted one application to access both Medicaid and birth certificate data.
[326] We do not need to submit an application to Tennessee Medicaid (TennCare) because Tennessee Vital Records has an agreement with TennCare to access their data.
[327] After much discussion, it was decided in the spring of 2016 that the Urban Institute will access de-identified, linked Medicaid and birth certificate data from the Strong Start awardee, Virginia Commonwealth University (VCU). VCU has agreements with both Medicaid and Vital Records to access their data for its own evaluation of Strong Start in Virginia.

In Kentucky, Missouri, and Texas, for example, we scheduled and hosted multiple joint conference calls that included both state agencies to facilitate conversations regarding how they would share and link the Medicaid and birth certificate data. These calls provided valuable information about states' data sharing processes and timelines for linking and transferring the data to Urban. As needed, we also answered questions and provided additional information to the state agencies about the specific variables requested, the years for which data were needed, and the data needed for comparison groups. In addition, Kentucky Medicaid asked for examples of executed data use agreements from other states.

For those state agencies that had indicated they could not participate due to limited resources or competing priorities, we maintained contact, but less frequently. These agencies included Maryland Medicaid and Vital Records, Missouri Medicaid and Vital Records, and Mississippi Medicaid. For example, while completing our applications to Missouri Medicaid and Vital Records in September of 2015, state staff let us know 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 situations had improved; fortunately it did. After contacting both agencies in January 2016, reminding them of the available stipend, and 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. Medicaid has since approved our application and Vital Records is in the process of preparing a cost estimate for the required data pulls in advance of approving our application. Similarly, in Maryland, after submitting our application to Vital Records in the spring of 2015, the agency said that it did not have the resources to participate. However, when re-contacted in November of 2015 and presented with a copy of the agency's original Letter of Support, state officials agreed to participate.

Continuing to educate new state staff: For a handful of state agencies, including Florida Vital Records, Illinois Vital Records, Kentucky Medicaid, Nevada Vital Records, Texas Vital Records, and Virginia Vital Records, our primary contacts left the agencies, requiring the team to educate new staff about the Strong Start for Mothers and Newborns evaluation and the impact analysis. Fortunately, we had already submitted data request applications to all of these state agencies and, therefore, did not need to start from scratch.

In Michigan, the Department of Health and Human Services (which contains both Medicaid and Vital Records), our primary contact, asked that we work with other members of her team. While this has helped to move the process along in these state agencies, it did require an additional investment of time to educate our new contacts about the evaluation and our data request, and to develop a positive working relationship that supported ongoing communication about the status of the application.

Testing alternative approaches to engagement: In a handful of states, we needed to be creative and test new approaches to garner interest in supporting the study and/or gain approval to access

the data. These alternative approaches employed more assertive strategies, including (as mentioned above) sending copies of the formal Letters of Support that were submitted by the state agency as part of the Strong Start awardee's application to CMS, and calling on colleagues with existing relationships with state officials to make contact and ask for help on our behalf. For example, in August of 2015 Mississippi Medicaid had expressed support for participating in the evaluation; however, in November our contact notified us that they no longer had the resources to participate because of numerous competing demands. After several months and numerous failed attempts to communicate with our contact, including sending the Letter of Support for Strong Start from the Director of the Division of Medicaid, we decided to leverage an existing relationship between a colleague at HMA—who was a former Medicaid Director himself—and the Mississippi Medicaid Director. Our HMA colleague was immediately successful in reaching the state official in May 2016, set up and facilitated a conference call between him and the evaluation team, and persuaded him to share his agency's data with the evaluation (as of August 2016, the team is still waiting for a formal approval letter and data sharing agreement).

Similarly, despite regular communication with DC Medicaid, progress has been slow; the agency has spent more than nine months reviewing our request, discussing the feasibility of linking its data with birth certificate data from DC Vital Records, and drafting a data use agreement. Throughout this process, we have offered and provided additional information when needed to help clarify any questions or concerns. We have also copied DC Vital Records on our emails with DC Medicaid to gently remind Medicaid that Vital Records had approved our request and had shared its birth certificate data with Urban. To help move the process along, the evaluation Principal Investigator has been communicating with a former colleague who now works at DC Medicaid to apply additional pressure on the agency. As of August 2016, however, we are still waiting for a data use agreement.

Finally, after experiencing nearly six months of delays with the Louisiana Medicaid program, and after attempting several approaches for increasing pressure (including citing previous Letters of Support), the Urban PI directly contacted the state's Medical Director of the Medicaid agency, who happens to be a nationally-known champion of the Centering Pregnancy model of Group Prenatal Care. In this contact, we explained the goals of our evaluation, the pertinence to Louisiana (where Amerigroup has implemented the Group Prenatal Care model), and the persistent delays we had encountered with obtaining her state Medicaid agency's IRB approval. Once contacted, we immediately received an affirmative reply saying that the IRB would prioritize our application; less than two weeks later, IRB approval was received.

Management: The TA Team has implemented a number of procedures to effectively and efficiently manage the large volume of interactions with state officials, as well as the completion, review, and submission of states' various data applications and agreements. Specifically, the team meets biweekly to discuss progress, successes, challenges, and strategies to overcome identified challenges. We also use a "TA Tracker" spreadsheet that is updated biweekly to systematically

record information about our communication with state agencies and our progress-to-date. All applications and agreements are initially drafted by TA Liaisons in each firm who then share these drafts with experts from the Impacts Analysis team at Urban to ensure accuracy, completeness, consistency, before they are submitted to states. Finally, all documents are stored in a shareable web-based storage system, *OwnCloud*, to ensure that all organizations have access to and are providing the most recent information to the states.

PROCESS FOR TRANSFERRING MEDICAID AND BIRTH CERTIFICATE DATA TO THE URBAN INSTITUTE

At the end of Year 3 we had received formal approval to access data from 18 agencies, and had received the requested data from 7 agencies (for more detailed information for the formal process with each agency see Appendix G). The process to transfer data from state agencies to Urban includes three major steps described below.

1. ***Developing relationships with new staff at the state agencies, including data analysts and IT staff.*** Once agreements are fully executed, it is necessary to bring new staff into the process—including those at Urban (e.g., staff from the Impact analysis team and Urban's IT department) and the state agencies (e.g., data analysts and IT staff)—to ensure that the requested data are transferred securely and in the appropriate format. At the same time, it is important to maintain existing relationships to help ensure that the state agency is working in a timely manner to prepare and send the data.

2. ***Setting up secure FTP sites that both Urban and state agencies can use to transfer Personally Identifiable Information (PII) and Protected Health Information (PHI).*** The Urban Institute worked with IT staff in the following state agencies and organizations to set up secure FTP sites: Alabama, Arizona's third party contractor (the Center for Health Information and Research at Arizona State University), DC Vital Records, Florida Medicaid, Louisiana Vital Records, Nevada Medicaid and Vital Records, New Jersey Medicaid and Vital Records, Pennsylvania Medicaid, South Carolina Medicaid and Vital Records, and Virginia Vital Records. At times, this required troubleshooting to ensure that the state officials could access and use the site. For example, Nevada Medicaid experienced difficulty using Urban's FTP site, so we agreed that it would be most efficient to use Nevada's FTP site.

3. ***Sending lists of variables, Strong Start enrollees, and counties for comparison groups (as appropriate).*** Before any data were transferred, we verified with state officials the lists of variables that are needed for the study by sending copies of previously shared documentation (see Exhibits 14 and 15 below). For two states, Michigan and Virginia, we reviewed the birth layout file to identify the specific variables needed so that we would not need to request additional variables at a later time. For states that are performing the linkage of birth certificate and Medicaid data, we also sent lists of Strong Start enrollees

through the FTP site, as well as lists of identifiers to use when linking Medicaid and birth certificate data (including, most importantly, Medicaid ID and mother's name and date of birth only if Medicaid ID fails). Finally, we also sent lists of counties from which we need data to develop comparison groups.

EXHIBIT 14: BIRTH CERTIFICATE VARIABLES

Variable	Specification
Demographic Risk Factors	
Mother's Age	Actual age (1 year increments)
Mother's Race	White non-Hispanic, Black non-Hispanic, Puerto Rican, other Hispanic, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, Asian, mixed race, other
Mother's Education	Eighth grade or less, no high school degree (age related), no high school degree, GED (if available), high school degree, some college no degree, associate's degree, bachelor's degree, master's degree, doctorate or professional degree
Marital Status	Married, not married and paternity acknowledgement signed, not married and paternity acknowledgement not signed
Behavioral Risk Factors	
Smoking	Number of cigarettes smoked in three months prior to pregnancy
Source of payment for delivery	Based on reported information on birth certificate (Medicaid, private insurance, etc.)
Prenatal Care Initiation	Date of prenatal care initiation
Medical Risk Factors	
Plurality	Single, twin, triplet, four or more
Previous Live Births	First birth, second birth, third birth, etc.
Previous Preterm birth	Mother has had a previous pre-term birth
Previous Other Poor Pregnancy Outcome	Mother has had previous perinatal death, or small for gestational age birth)
Inter-pregnancy interval (live birth)	Time since last live birth less than 6 months, 6 to 17 months, 18 to 23 months, 24 months or more
Inter-pregnancy interval (other pregnancy outcome)	Time since last other birth outcome less than 6 months, 6 to 17 months, 18 to 23 months, 24 months or more
Pre-pregnancy Diabetes	Mother had diabetes prior to pregnancy
Pre-pregnancy Hypertension	Mother had hypertension prior to pregnancy
Mother's BMI pre-pregnancy	Underweight, normal weight, overweight, obese
Hospital is participating in Hospital Engagement Network (HEN)	Delivery hospital is in HEN network
Key Outcomes	
Birth weight	Infants weight at birth in grams
Calculated Gestational Age	Infant's gestational age at birth in weeks; determined by subtracting last menses date from date of birth
Clinical Gestational Age	Clinical estimate of gestation in weeks

Variable	Specification
Process Outcomes	
Weekend Delivery	Based on day of delivery
Early Term Delivery	Based on Gestational Age
Cesarean Section	= 1 if Delivery by Cesarean Section = 0 if Vaginal Delivery
Vaginal Birth After Cesarean	= 1 if Cesarean Section = 0 & Previous Cesarean Section = 1 = 0 if Cesarean Section = 1 & Previous Cesarean Section = 1 Only defined for those with Previous Cesarean Section = 1
Apgar Score	= 1 if Apgar score at 5 minutes <7 = 0 if Apgar score at 5 minutes >= 7

EXHIBIT 15: MEDICAID VARIABLES

Variable	Specification
Demographic Risk Factors	
Basis of Medicaid Eligibility	Disabled, receiving cash assistance, Section 1931 eligibility, ACA expansion
Managed Care Enrollment	Whether the mother or infant was enrolled in a risk-based managed care plan
Other Insurance Status	Private, self-pay, other
Medicaid Expenditures	
Total Cost for Mother in the Year Preceding Birth	Continuous variable that equals total Medicaid payments for mother from one year prior to delivery up to the admission date for the delivery episode. This variable would be calculated by evaluator based on payment fields over the time period.
Total Cost for Mother in First Year of Infant's Life	Continuous variable that equals total Medicaid payments for mother and infant from delivery to first birthday. This variable would be calculated by evaluator based on payment fields over the time period.
Total Cost for Infant Care in First Year of Infant's Life	Continuous variable that equals total Medicaid payments for mother and infant from delivery to first birthday. This variable would be calculated by evaluator based on payment fields over the time period.
Utilization Variables (Alternative to Cost Variables)	
Hospital Days for Mother	Number of hospital days for mother at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.
Hospital Days for Infant	Number of hospital days for infant at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.
Neonatal ICU Days for Infant	Number of neonatal ICU days for infant at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.
Number of MD/clinic/outpatient visits in first year of life for infant	Number of MD/clinic/outpatient visits for infant in first year after birth. This variable would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.

PROGRESS, CHALLENGES, AND LESSONS LEARNED

Overall, states have been supportive of the Strong Start evaluation and have been willing to share data for the Impact analysis. This positive response suggests that states are interested and invested

in improving maternal and child health outcomes and participating in an evaluation that is designed to support this goal.

During Year 3, processes to obtain the data were underway with all 20 selected states. Only one state, Illinois, warned us that they might not be able to participate due to a state statute that prevents its Vital Records agency from sharing individual-level birth certificate data without the mother's consent. Illinois officials remained interested in participating and explored alternative strategies for working around the consent statute, but unfortunately, in August 2016, the evaluation team was notified that Illinois would not be able to provide birth certificate data. By extension, we will not be able to receive Medicaid data either.

Although a number of states indicated that they have limited resources to support their participation, thirteen states plan to perform the linkage of birth certificates and Medicaid data themselves (rather than sending data to Urban to link), to ensure the confidentiality and privacy of their data.[328] The agencies likely to perform these linkages are equally divided between Vital Records agencies and Medicaid agencies.

Progress toward obtaining data is noted in Exhibit 16 below. Data have been obtained from seven states/state agencies: Alabama Vital Records, District of Columbia Vital Records, Florida Medicaid, Louisiana Vital Records, Nevada Vital Records, South Carolina (linked birth certificates and Medicaid data), and Virginia Vital Records.

Challenges and Lessons Learned:

While each state is unique in its structure and processes, many of the challenges and lessons the evaluation team has learned are consistent across the states.

Staff turnover at state agencies can lead to delays in securing data use agreements: For example, staff turnover at Florida Vital Records resulted in the pursuit of a process that was not appropriate. Specifically, new staff who were less familiar with the process directed us to pursue IRB approval as an initial step. However, the correct process is to first receive an approved and signed DUA from Vital Records, and then to request review from the Department's IRB, which we learned once we brought the approved IRB to Vital Records, where veteran staff let us know we needed to first secure the DUA. Similarly, as described previously, staff turnover in some agencies required us to develop relationships with new contacts; while this did not create confusion about the appropriate steps as it did with Florida Vital Records, it did slow down progress as new staff was brought up to speed.

[328] The evaluation does offer states a modest stipend to help offset some of the costs of sharing and/or linking of data.

EXHIBIT 16: PROGRESS WITH EACH STATE AGENCY

State	Agency	Medicaid	Vital Records
Alabama	Medicaid Agency*	Yes	-
	Center for Health Statistics*	-	Yes
Arizona	Arizona Health Care Cost Containment System*	Yes	-
	Department of Health Services*	-	Yes
	Arizona State University Center for Health Information and Research ("CHiR")* **Other: Data Linkage Contractor**	-	-
California	Department of Healthcare Services**	Yes	-
	Committee for the Protection of Human Subjects** **Other: State IRB**	-	-
	Department of Public Health Vital Statistics Advisory Committee**	-	Yes
District of Columbia	Department of Health Care Finance**	Yes	-
	Department of Health*	-	Yes
Florida	Agency for Health Care Administration*	Yes	-
	Department of Health Bureau of Vital Statistics**	-	Yes
Georgia	Department of Community Health**	Yes	-
	Department of Public Health**	-	Yes
Illinois	Department of Human Services**	Yes	-
	Department of Public Health***	-	Yes
Kentucky	Cabinet for Health and Family Services, Department for Medicaid Services**	Yes	-
	Cabinet for Health and Family Services, Vital Records and Genealogy Information**	-	Yes
Louisiana	Department of Health**	Yes	-
	Department of Health, Vital Records and Statistics*	-	Yes
Maryland	Department of Health and Mental Hygiene, Medicaid Office of Planning**	Yes	-
	Department of Health and Mental Hygiene, Division of Vital Records**	-	Yes
Michigan	Department of Health and Human Services**	Yes	Yes
Mississippi	Division of Medicaid***	Yes	-
	Department of Health**	-	Yes
Missouri	Department of Social Services**	Yes	-
	Department of Health and Senior Services**	-	Yes
Nevada	Department of Health and Human Services**	Yes	-
	Division of Public and Behavioral Health*	-	Yes
New Jersey	Department of Human Services*	Yes	-
	Department of Health*	-	Yes
Pennsylvania	Department of Human Services**	Yes	-
	Department of Health**	-	Yes
South Carolina	Revenue and Fiscal Affairs Office*	Yes	Yes
Tennessee	TennCare**	Yes	-
	Department of Health**	-	Yes
Texas	Health and Human Services Commission**	Yes	-
	Department of State Health Services**	-	Yes
Virginia	Department of Medical Assistance Services**	Yes	-
	Department of Health*	-	Yes

Notes: * States colored green are states where data have been received, or will be received soon.

**States colored yellow are states where progress is being made.

***States colored red have refused to share data (IL) or are non-responsive to communications (MS).

- Indicates No or not applicable.

Staff turnover should be expected and, when possible, planned for. Therefore, it is critical to have multiple state staff within agencies that are supportive of and knowledgeable about the project so that if one staff member leaves, the entire education process does not have to start over. Additionally, having a "warm handoff" from departing to new staff is helpful, particularly if at least one call can occur with Strong Start project staff and both the departing and new state staff.

- *Lack of clarity within agencies about data approval processes can significantly slow down progress:* Because projects like this might represent a new endeavor for a state (or for the state staff working on it), there can be a lack of familiarity with processes for applying for and releasing state data. For example, state staff may not know whether an IRB is required instead of a simpler a DUA, and they may not know how to partner effectively with their sister agencies. For example, initial discussions with our contacts at the Texas Vital Records and Medicaid agencies indicated that the agencies had shared data before and that our request would simply require a common DUA specific to the Strong Start data request and signed by both agencies. However, as the TA team finished the DUA we were instructed to complete, we were told that our project would first require IRB approval from both agencies, as well as individual DUAs with each agency. This understanding became clear as more officials in the agencies became aware of the data request, requiring new approval elements.

  Strategies that we have found helpful in managing this lack of clarity include:

  - Educating state staff about how the process has worked in other states so they are aware of all of the possibilities, and in some cases, sharing examples of data use agreements (e.g., Kentucky Medicaid officials, having not completed a data use agreement with an outside agency before, asked Urban to provide examples of DUA executed by other state agencies);
  - Bringing in multiple staff from the state agency early on, to build/increase the internal knowledge about the various processes;
  - Hosting joint conference calls that include staff from both state agencies to promote information sharing and coordination (e.g., Missouri, Kentucky); and
  - Including staff at both agencies on emails to keep the entire team in the loop and to encourage agencies to move forward, particularly if only one of the agencies has signed the agreement (e.g., District of Columbia).

- *Differing state organizational structures inhibit having a standardized approach to acquiring state data:* In some states, the agency responsible for vital records data is closely associated with the agency managing Medicaid eligibility and claims data. However, in many states, the agencies are not closely affiliated and staff do not know one another, much less know each other's processes for reviewing data requests and sharing data with outside organizations. In other cases, the structure is even more complex. For example, in Florida, a separate agency—the Department of Children and Families—maintains Medicaid eligibility data, so the Medicaid agency had to request and obtain eligibility data from that agency before sharing them with Urban. And in three states – Michigan, South Carolina, and Tennessee – we are working with a single agency to gain approval for the release of both Medicaid and birth certificate data. In some states, such as Arizona and Missouri, an outside contractor manages data requests and/or data linking. To manage these varying structures, the evaluation has found it helpful to use, as much as possible, standardized materials that were developed by the project. However, we have also learned that it is critical to adapt these materials to each state's specific situation.

  In addition, each state, and each agency within a state, has its own data approval process. Each state agency requires a different process to access their data. Some agencies require a completed data request application, others require a signed agreement, and several states (e.g., Kentucky Vital Records, Maryland Medicaid, Michigan Medicaid and Vital Records, Tennessee Vital Records) require additional approval from state IRBs.

  Because of this variation, the FAQ document[329] (The Urban Institute, 2015) and TA Trackers (described above) were helpful tools to meet the needs and requirements of each state agency and develop strong relationships.

- *Data lags are common:* Typical and expected lag times between when the data collection year ends and when data are available for public release have cause delays in obtaining data. For example, birth certificates for a given year are not routinely available until at least six months after the end of a calendar year, and Medicaid data are often not available for a full year or more after the close of a calendar year. However, one state had even longer

[329] The evaluation team created an internal "Frequently Asked Questions" document that assembled common facts, figures, variables, and answers to questions so that all subsequent applications could be completed more quickly, easily, and consistently. This document was updated as we received additional applications with new questions and information requests. Common components across applications that the FAQ document addresses included descriptions of the project, the specific data request, data security protocols, and prior IRB approval.

delays because of a database conversion. New Jersey Vital Records transferred all of its birth certificate data to a new database in 2016. During the time of the conversion, they were unable to accept or process any data requests. It is anticipated, however, that data will be obtained from New Jersey in the coming year, after a lengthy delay. To manage challenges like this, the project has worked closely with states to generate timelines for data submission that are in alignment with their typical lag times or, in the case of New Jersey, in alignment with their conversion project.

- *State staff, and state agencies, face competing demands for their time and support, requiring the need for ongoing communication (and often gentle pressure) to both gain approval for and receive the data:* While many state staff have been very supportive of this evaluation, they have also faced heavy workloads associated with their day-to-day responsibilities and have lacked resources. Similarly, while agency leadership have been supportive of the project as well, they often have multiple initiatives and priorities to juggle that also require their support and focus. Managing this challenge requires both patience and persistence on the part of evaluation's TA team, and an ability to both understand and accommodate state officials' constraints, and also to gently apply pressure when needed. As described above, we have used multiple levers, including reminding officials of their agencies' prior commitment to support the evaluation (by sharing state's Letter of Support), enlisting the additional support of internal leaders, leveraging relationships between technical assistance staff and senior staff at the state, and reiterating to state staff the importance of the project for improving health within their state.

  Additionally, because a state agency's resources and/or priorities can change at any time, it is important to stay in regular contact with state staff. For example, as described above, Maryland Vital Records and Missouri Medicaid and Vital Records initially said they could participate, then said that they could not due to limited resources and competing priorities, but recently committed to participating after circumstances evolved.

  Finally, we have learned that the work is not over once a data use agreement is fully executed. In addition to building relationships with new staff at the state agency, including data analysts and IT staff, it is imperative to communicate with these staff on a regular about the various steps and timelines involved in the technical transaction of receiving the data.

- *Data transfer challenges can occur even with clear instructions and training:* States that are unaccustomed to sharing data with external entities can struggle with how to ensure HIPAA- and IRB-compliant data transfers. To manage this challenge, the evaluation's TA team reiterates these requirements at multiple points in the process, emphasizing that PII and PHI

be transferred in two separate files.

- *States' experiences sharing and linking data vary:* State agencies generally fall into two categories, we have learned, with respect to experience in sharing and linking data. More experienced states, including those that are participating in the MIHOPE Strong Start evaluation, tend to have existing and productive relationships between Vital Records and Medicaid agencies, and have prior experience sharing and/or linking data for evaluation purposes. These states typically have data request applications, established data request processes, and a specified lead staff who handles such requests and/or performs data linkages. Less experienced states, on the other hand, tend to have more difficulty understanding data requests and require more resources and supports, including multiple conversations and printed materials, such as the *Overview of Information Needs for the Impact analysis* document (The Urban Institute 2015). Additionally, these states had less established processes for sharing and linking data, all of which means that pursuing and obtaining data takes considerably more time.

State Medicaid Agencies and the Vital Records Agencies may not have existing relationships: In some states, it may be necessary to facilitate new relationships between the state Medicaid agency and Vital Records, particularly if one of the agencies is performing the data linkage. For example, Urban staff have participated in multiple joint conference calls with Vital Records and Medicaid agencies in Kentucky, Missouri, and Texas, where existing relationships between the agencies were not well formed. In states like this, we have found it helpful to include staff of both agencies on emails regarding the process and progress toward sharing the data.

IMPACT ANALYSIS

The impact analysis will compare outcomes for Strong Start participants to outcomes for non-participating eligible women and infants with similar risk profiles. This assessment relies on the best available data and quantitative methods to account for possible confounding factors that may be driving changes in outcomes that might otherwise be incorrectly attributed to Strong Start.

The impact analysis aims to answer the following three broad evaluation questions:

- What are the impacts of the care approaches and enhanced services supported by Strong Start relative to traditional Medicaid care on gestational age, birth weight, and cost?
- Do impacts differ across awardees and across the three Strong Start models? If so, how?
- How does the implementation analysis explain the impact findings? For example, which features of the models (such as services offered and intensity of services) lead to the greatest impact of the program?

During Year 3, the impacts and TA teams worked closely together to request birth certificate and Medicaid data from 20 states (as described in the previous section). This section describes the two major tasks that the impacts team finalized to move the data acquisition process forward: selecting comparison groups and establishing a decision rule for excluding a relatively small number of cases for the benefit of reducing state data collection burden.

WORK COMPLETED IN YEAR 3

Selecting Comparison Groups:

One of the most challenging issues for the evaluation is the selection of a comparison group that will serve as a counterfactual to determine what would have occurred had Strong Start care models not been in place. We therefore must select a comparison group that allows us to estimate the impact of Strong Start, *in combination* with one of the three alternative models of care (Maternity Care Homes, Group Prenatal Care, or Birth Centers) as compared to standard Medicaid maternity care practices. The ideal comparison group would consist of women who receive services in standard Medicaid maternity care practices, such as private providers, community health centers, public health department clinics, and hospital outpatient departments, that do not offer prenatal care through any of the Strong Start models.

During Year 3, the evaluation's impacts team finalized a method to select a comparison group for each Strong Start site. Ideally, comparison group cases would come from the same county or parish where Strong Start participants reside so that treatment and comparison group cases are exposed to the same contextual factors. We would then use the propensity score reweighting

approach to construct a group of observably similar women in the same county who are enrolled in Medicaid but do not participate in Strong Start. We choose propensity score reweighting as our primary estimation method because it yields statistically efficient estimates (Hirano, Imbens, and Ridder, 2003) and because Monte Carlo evidence has shown it to perform very well among alternative propensity-score-based methods (Busso, DiNardo, and McCrary, 2014). Because the Strong Start impacts analyses will estimate treatment effects at the site level (many of which involve a modest number of treated cases), a statistically efficient method that makes full use of available data will have the best chance of detecting true treatment effects. (We discuss our selection of propensity score reweighting over matching methods in more detail in Appendix H.) The propensity score reweighting approach has been used previously by Urban Institute researchers to evaluate the impact of birth center care on birth outcomes (Benatar et al. 2013). The approach is also currently being used in CMMI evaluations of the Multi-Payer Advanced Primary Care Practice Demonstration (Smith 2013) and the FQHC Advanced Primary Care Practice Demonstration (Timbie 2013).

However, our comparison groups must include similar women who receive care from a standard Medicaid maternity practice, *not* from settings that fit the approach for Strong Start sites. The impacts team has identified two scenarios that necessitate drawing the comparison group from a different county than that where Strong Start sites or participants are located:

1. *The demonstration (through a single site or multiple demonstration sites) "saturates" the area.* In this case, we would have difficulty identifying women who are not being served by Strong Start. If there are no (or only limited) standard Medicaid maternity care options in the county, we will select a similar but different county in the state to draw the comparison group.
2. *There are some standard Medicaid maternity practices in the local area, but the Strong Start site is the only source of care for high risk pregnant women on Medicaid in the area*. In this case, it would be difficult to match women with similar risk profiles within the same area due to differences in observable and unobservable factors. That is, all high risk pregnancies would be referred to the site implementing Strong Start, leaving only lower risk women in the local area. This scenario is especially concerning because the birth certificate data do not allow us to completely control for risk factors or allow us to identify all high risk women. Therefore, under this scenario, we will also need to select a different area to draw the comparison group.

To determine which Strong Start sites fall under either of these categories, the impact analysis team reviewed Year One and Year Two case study memos and followed up with site visit teams to gather information. In addition, we also geocoded/mapped the most recent crosswalk enrollment data and analyzed the location of Strong Start enrollees relative to the each site location.

Exhibit 17 summarizes our findings regarding whether comparison groups can be obtained from the local area surrounding each Strong Start site or whether matched comparison counties need to

be identified. Overall, we find that for 9 awardees, our comparison group can be pulled from the same counties where Strong Start participants reside. For 14 awardees, we will need to find matched counties to select the comparison group for at least one of the sites associated with the awardee. For all but two awardees this is due to criteria #1 above. For The University of Alabama-Birmingham (UAB) and the Medical University of South Carolina (MUSC), we need to find matched counties to address scenario #2. For three awardees (Central Jersey, Johns Hopkins, and St. John), because of some local market uncertainty (e.g., among Strong Start "saturation"), we requested comparison group data from both the same counties where Strong Start participants reside and from matched counties.

For UAB and MUSC, one of the Strong Start sites is the only source of care for high risk pregnant women on Medicaid in the local area and much of the state.[1] Both of these sites are academic medical hubs and therefore also attract high risk women throughout their respective states. Moreover, they are in the larger metropolitan areas that are quite different from other communities in the state. Because of this combination of factors, we are concerned that we may not be able to find a similar county from which to draw a comparison group. To address these unique situations, for each of these awardees, we will draw women for the comparison groups from the local area and from the best comparison county we can identify and test the sensitivity of our results to the choice of comparison group.

Data and Methods: We finalized a statistical approach for matching counties for sites where a local comparison group does not appear feasible. For each case where we need to go outside the local area to find a comparison group, we used a statistical matching technique, Mahalanobis Distance[2], to find the most similar county within the same state, based on observable characteristics of the county. We used this method to pair treatment counties with Strong Start participants to the closest matched county in the state without Strong Start participants. Ultimately, we will draw the comparison group from Medicaid covered births in the counties identified through this process. The statistical details of this method can be found in the final memo submitted to CMMI on April 8, 2016.

EXHIBIT 17: SUMMARY OF COMPARISON GROUP COUNTY DECISIONS

Awardee/AABC Site	Decision on Comparison Group Location			Reason for Using Matched Counties	
	Use Same Counties for All Sites	Use Matched Counties for All Sites	Use a Combination of Same and Matched Counties	Only Medicaid Maternity Provider in the Area	High Risk Sites
ACCESS Community Health Network	✓	-	-	-	-
Albert Einstein Healthcare Network	-	-	✓	X	-
American Association of Birth Centers	-	-	✓	-	-
Amerigroup Corporation	✓	-	-	-	-
Central Jersey Family Health Consortium	*	*	*	*	*
Florida Association of Healthy Start Coalition	-	✓	-	X	-
Grady Memorial Hospital Association	-	-	✓	X	-
Harris Health System	✓	-	-	-	-
Health insight of Nevada	-	-	✓	-	-
John Hopkins University School of Medicine	*	*	*	*	*
Los Angeles County Department of Health Services	-	-	✓	X	-
Maricopa Integrated Health System	✓	-	-	-	-
Medical University of South Carolina	-	✓	-	X	X
Meridian Health Plan	-	✓	-	X	-
Mississippi Primary Health Care Association	-	✓	-	X	-
National Capital Strong Start	✓	-	-	-	-
Rosemary Birthing Home	-	✓	-	X	-
Signature Medical Group	-	-	✓	X	-
St. John Providence Health	*	*	*	*	*
Texas Tech Health Science Center	-	✓	-	X	-
United Neighborhood Health Services	✓	-	-	-	-
University of Alabama, Birmingham	-	✓	-	X	X
University of Kentucky	-	-	✓	-	-
University of South Alabama	✓	-	-	X	-
University of Tennessee Health Science Center	✓	-	-	-	-
Virginia Commonwealth University	✓	-	-	-	-

Notes: * For these three awardees, due to some uncertainty, we requested comparison group data from both the same counties where Strong Start participants reside and from matched counties. ✓ Checkmark symbols indicate that the decision applies. **X** symbols indicate the reason applies. Dash symbols indicate not applicable.

For each state where we needed to match counties, we estimated an "expanded model" with the full set of possible 21 covariates we had identified and a ***parsimonious model*** that uses fewer variables but still includes variables from all categories. We used county-level data from the Area Health Resource File (AHRF) to match counties on observable county characteristics. The variables in the expanded model and the ***parsimonious model*** (in bold and italics) included:

- Geographic and population measures
    - Total area (in square miles)
    - ***Urban-rural continuum***
    - Population density (number of people per square mile)
    - Latitude
    - Longitude
- Socioeconomic measures
    - ***Personal income per capita***
    - ***Percent in poverty***
    - ***Percent black***
    - ***Percent Hispanic***
    - Percent of population covered by Medicaid
    - ***Percent of children covered by Medicaid***
- Provider supply
    - Number of hospitals
    - Number of hospitals with neonatal intensive care (detailed level not available)
    - Number of hospitals with obstetric care
    - Number of neonatal intensive/intermediate care beds set up in short term hospitals per capita
    - Number of obstetric beds set up in short term hospitals per capita
    - ***Number of doctors per capita***
    - Number of OB-GYNs per capita
    - ***Number of certified nurse midwives and certified midwives per capita***
    - ***Number of hospital beds per capita***
- ***Percent of births with low birth weight*** (captures general level of infant health)

Two primary reasons drove our use of the parsimonious specification as our final version of the model:

1. We were unable to estimate the expanded model in states that had few counties (e.g., Nevada) because we did not have enough degrees of freedom. We would therefore not be

able to use the expanded model specification in all states in our sample and we thought it was important to have a consistent strategy across all states.

2. The parsimonious model did a better job matching on characteristics we considered more important (i.e., socioeconomic measures), whereas by including more characteristics, the expanded model would often fit substantially worse on socioeconomic measures in its attempt to also match on several additional characteristics. In many instances, we found that the fully specified and parsimonious models yielded similar matched counties. However, when differences arose, the parsimonious model generally yielded more intuitive matches between the original county and its matched county.

To summarize, we select the comparison county that is most similar to the treated county on the vector of matching variables, as measured by the Mahalanobis distance. Visually, we confirm the method is working as intended by examining how close the chosen comparison county is to the treatment county on each matching variable in comparison to other counties. Careful inspection, using both expanded and parsimonious models, demonstrates the closeness achieved for each matching variable. Inspection provides a reality check on the process that confirms our comparison and treatment counties are indeed well matched on included factors. From this process we are able to confirm that there are no other candidate counties that are clearly dominant matches in the sense of being closer on each matching variable.

Decision Rule for Excluding a Small Number of Cases to Substantially Reduce State Data Burden:

As the TA and impacts analysis teams move forward processing data requests, we will continue to provide states with a list of Strong Start participants and counties (where participants reside) for the comparison group selection. While most Strong Start participants for a given site are concentrated in a few counties, there are a few participants that live in counties that account for a small share of a site's overall enrollment. Having only a few treated cases within a county presents a challenge for data collection burden when 1) matching birth certificate data and Medicaid data requires additional effort when additional counties are involved; and 2) each additional county associated with treatment group cases further involves collection of data from an additional matched county.

The impacts team, I consultation with CMMI, determined that it would be inefficient from the perspective of data processing burden on states to require birth certificate and Medicaid data from additional counties for the sole purpose of accommodating a small fraction of enrollees. Accordingly, we sought to specify a decision rule that would make an appropriate tradeoff between maximizing the number of cases used in the analysis and minimizing data burden on states.

During the past year, the impacts team developed the decision rule ("Rule A") to determine which counties we should collect data from and which counties we should exclude, and a summary of these decisions is presented in Exhibit 17. The team also conducted analyses to determine how many participants this decision would affect and whether or not those potentially excluded from the

analysis differ from the rest of the Strong Start population. Under the Rule A decision rule, we choose counties until we have included 90 percent of the site's population, and no more than 5 percent of the site's population exists in any other one county we have not chosen. We used the following steps to implement the decision rule:

1. For a specific site, we pool together all counties in the state in which more than 5 percent of enrollment resides.
2. If this aggregate percent adds up to over 90 percent, we exclude any remaining counties that have enrollees.
3. If the aggregate percent does not add up to 90 percent, we include other counties with the highest number of enrollees (even if the county itself may be less than 5 percent) until we reach 90 percent.

For the tables described in the final memo[3], we merged the Q3 2015 crosswalk and PLPE data files to compare the characteristics of Strong Start enrollees included and excluded from the sample because of Rule A. We needed to merge these files because the crosswalk file includes variables from the geocoding/Rule A analysis and the PLPE contains information on the characteristics of Strong Start participants. Overall, we excluded observations that were missing from either file (2,594 women out of 30,639). The data for this analysis was limited to the 20 states where we are collecting data for the impact analysis.

Below is a summary of key findings from this analysis:

- Even after imposing Rule A, we included approximately 96 percent of all Strong Start enrollees in our analysis, capturing at least 92 percent of enrollment in each state.
- Based on data from the PLPE exit forms, there are no statistically significant differences in pre-pregnancy diabetes and hypertension rates between those excluded and included in the sample based on the Rule A decision rule.
- Based on data form the intake forms (for which we currently have more observations than for exit form data), women in the excluded group are more likely to have any prior preterm birth (16.5 percent vs. 12.9 percent) and are more likely to be smokers (16.8 percent vs. 13.2 percent) than those in the included group. Those excluded from the sample are also more likely to be white non-Hispanic, married, and have higher education levels compared to the larger included sample. The magnitudes of these differences are smaller after adjusting for differences across all sites.
- We compared the characteristics of these groups in the three sites where there were at least 50 women excluded from the sample based on Rule A. These are the only sites where we have enough sample size to compare the excluded sample with the included sample.

- We would exclude 76 Strong Start participants (7.5 percent of the site's total enrollment) at the Central Mississippi Civic Improvement site in Jackson based on the Rule A decision rule. There are no statistically significant differences in the health risk measures between the included and excluded groups. However, those excluded from the sample are more likely to be white non-Hispanic, married, and have higher education levels compared to the larger included sample.
- We would exclude 52 participants (9.8 percent) at the Obstetrics Complication Clinic at UAB. Again, there are no statistically significant differences in the health risk measures between the included and excluded groups, but those excluded from the sample are more likely to be white non-Hispanic and less likely to be black non-Hispanic.
- We would exclude 72 participants (10.0 percent) at the MUSC downtown site. These participants are more likely to be white non-Hispanic and less likely to be black non-Hispanic compared to the larger included sample. There are no other statistically significant differences between the groups.

Based on these findings, the impacts analysis team and CMMI agreed to exclude the 4 percent of Strong Start enrollees that do not meet the Rule A criteria. Overall, the participants that we exclude have a similar health risk profile as other women in Strong Start. While there are some overall differences in socio-economic characteristics between the excluded and included groups, these differences have very little impact on the representativeness of the included sample, because at least 90 percent of cases are retained. Excluding these few enrollees reduces the number of counties that we would request data for by approximately 50 percent. Hence, the decision rule will substantially reduce the data processing burden for states with minimal consequences on the composition of our sample of enrollees.

Cross-Cutting Analysis and Conclusions

Syntheses of findings through the third year of data collection allow us to make a number of cross-cutting observations about awardees' experiences implementing Strong Start, promising practices they have adopted to overcome common challenges, and preliminary outcomes among Strong Start participants. With more complete PLPE data and another full round of case studies at the end of Year 3 of the evaluation, and with some early birth certificate and Medicaid data, we make the following interim observations:

Strong Start awardees generally made progress towards meeting revised enrollment goals, but many continued to struggle with enrollment-related challenges even as the program approaches the final stages of implementation. Lagging enrollment stems from a variety of factors and has stymied program success for a limited number of awardees. By the end of Q1 2016, Strong Start awardees had enrolled a total of 42,138 women in the program, representing 80 percent of the Strong Start enrollment goal of 52,448. A majority of Maternity Care Home awardees and several Group Prenatal Care awardees and Birth Center sites reported that enrollment had improved. They largely attributed improvements to better integration of Strong Start into clinical settings, which makes prenatal care providers feel more comfortable referring patients to the program. Other factors include growing familiarity with the program, expanded eligibility requirements implemented in 2014, and more effective enrollment procedures.

At the same time, about half of Strong Start Group Prenatal Care awardees and many Birth Center sites highlighted enrollment as a major, ongoing challenge. A common recruitment problem for group care awardees is lack of support from prenatal care providers, who limit the number of referrals they make to the programs. For Birth Centers, recruitment problems more often stem from low Medicaid patient volume (with some centers deliberately limiting the number of Medicaid patients they serve because of low reimbursement) or challenges integrating the program into the workflow of a busy, leanly-staffed Birth Center. Regardless of the root cause, enrollment challenges limit Strong Start's reach and success for some awardees who, with only a small number of enrollees in the program at one time, have not benefited from economies of scale nor had sufficient opportunities to establish Strong Start as an important part of their sites' prenatal care approach. In an effort to address chronic low enrollment, some Group Prenatal Care awardees added the Maternity Care Home model to their program, which has improved their overall program enrollment.

Awardees have expressed healthy skepticism with regard to the ability of specific Strong Start enhanced services to affect preterm deliveries and low birthweight births; however they are confident that Strong Start is impacting the well-being of pregnant women through cultivating trusting relationships that allow programs to better address the psychosocial needs of their clients. Awardee staff recognize that reducing preterm deliveries and increasing the number of babies born at a healthy weight are challenging goals that may be difficult to accomplish during a

relatively short intervention with a high-risk population. Furthermore, a major concern recognized by both the evaluation team and CMMI has been that each of the three Strong Start approaches appears to attract women with different risk profiles, skewing findings from the PLPE descriptive analyses which indicate preterm deliveries and rates of low birthweight babies are particularly low among Birth Center participants when compared with the other two models.

However, with this year's addition of multivariate regression-adjusted analyses of these data that control for a variety of demographic, psychosocial and medical risk factors, we observe that Birth Center and Group Prenatal Care participants, whose care departs more from a traditional medical model of prenatal care than that of Maternity Care Homes, are significantly less likely to have a preterm birth or low birthweight baby compared to Maternity Care Home participants. Maternity Care Home participants are more likely to have had a previous preterm birth, which is significantly associated with having a subsequent preterm birth. Though this risk factor is controlled for in the regressions, as are other primary drivers of preterm birth such as hypertension, there could be unobservable factors related to previous preterm births that we are unable to operationalize.

While we are unable, at this point, to draw any conclusions about how Strong Start participants are faring compared with similar women who receive traditional prenatal care, future analyses conducted for the Impacts Analysis will use propensity-score-reweighted comparison groups to more precisely determine the overall impacts of Strong Start on birth outcomes.

Cesarean-Section rates among Strong Start participants are lower than those reported nationally, and many awardees perceive Strong Start enhancements to be a contributing factor. Descriptive PLPE data show that C-section rates are particularly low among Birth Center enrollees, consistent with expectations, but we also observe that rates among Group Prenatal Care participants are lower than benchmarks, and that Maternity Care Home rates are no higher than what is observed nationally despite Strong Start enrolling particularly high risk participants. Most awardees indicate that they are promoting full term deliveries and discouraging elective C-sections and C-sections performed before 39 weeks. Regression results provide supporting evidence that Birth Center participants are least likely to have a C-section, even after controlling for demographic and risk factors, but again there may be unobservable factors at play that we are unable to account for. These trends, coupled with VBAC rates of 19.2 percent, that are substantially higher than the eight percent reported nationally, paint an encouraging picture regarding strategies to reduce medically unnecessary Cesareans. As discussed above, key informants and focus group participants believe that Strong Start's intense focus on patient activation and education related to childbirth preparation and goals may be having a direct effect on these outcomes.

Though these results are promising, until the Impact Analyses are complete, we will be unable to conclude whether the Strong Start intervention is reducing C-section deliveries compared to women who do not receive Strong Start services.

Recognizing the high level of psychosocial need among Strong Start participants, awardees have worked hard to support women and reduce stressors in their lives, and link women with mental health services in the community. At intake, Strong Start enrollees demonstrate high levels of depressive symptoms and generalized anxiety compared with the population as a whole, as well as a host of other challenges ranging from unemployment and housing instability to food insecurity and a lack of social support. Specifically, nearly 26 percent of women enrolled in Strong Start present with depression and 14 percent display moderate or severe anxiety. Multivariate analyses conducted for this Year 3 Annual Report suggest there is a significant association between depression and preterm birth, as well as depression and delivery of a low birthweight infant, providing further evidence that this issue, in particular, is worthy of attention and could be critical in addressing poor birth outcomes among a low-income population.

Importantly, all three of Strong Start's approaches to enhanced prenatal care emphasize relationship-centered care and are designed to provide more psychosocial support to pregnant women, though peer counselors, care managers, or facilitators and participants in Group Prenatal Care classes. As described in the case study section of this report, and highlighted in previous Annual Reports, key informants and focus group participants consistently point to this aspect of Strong Start as particularly important in contributing to better perinatal health and well-being, and potentially improved outcomes.

However, many challenges still confront awardees in their efforts to address client's psychosocial needs. For example, awardees continue to indicate that the availability of mental health providers to treat pregnant Medicaid beneficiaries remains a challenge in most settings—influenced in part by the limited number of psychologists and psychiatrists willing to see Medicaid patients, and also by a hesitancy among psychiatrists and other physicians to prescribe anti-depressant and anti-anxiety medications during pregnancy. Focus group and key informant data indicate that stress and anxiety are further exacerbated by chronic challenges related to reliable and timely transportation to appointments and affordable childcare options. Despite efforts to link women with Medicaid-provided transportation, requirements regarding advanced notice and restrictions related to accompanying children make it hard for Strong Start enrollees to rely on these services, and few childcare options are available if the woman does not have available friends or relatives and is discouraged from bringing children to her appointments.

Strong Start awardees have focused considerable attention on nutritional counseling and support, believing that they can improve outcomes by doing so. PLPE data indicate that rates of gestational diabetes among Strong Start participants are substantially lower than those reported for comparable populations. Rates of gestational diabetes among participants are around 5 percent, while rates of 10 percent among Medicaid-enrolled women have been cited in the literature. Awardees have emphasized that the personal relationships Strong Start staff form with participants may help them to convey effective messages about health and well-being during pregnancy, and these data suggest that their efforts are paying off. Birth Center and Group Prenatal Care models explicitly integrate education and counseling on nutrition and physical activity during pregnancy into

their routine care, while Maternity Care Home awardees address nutrition in varying ways, such as making referrals to nutritionists or revisiting personal nutrition-related goals during their meetings with enrollees. PLPE encounter data suggest that about 1/3 of women enrolled are getting supplemental nutrition counseling in addition to routine care.

Unfortunately, rates of hypertension appear to be higher among Strong Start participants than observed in other low-income populations. This risk factor may also be harder to affect through the interventions employed by Strong Start models. Pregnancy-induced hypertension can be caused by a multitude of factors, including pre-existing medical conditions such as hypertension or being overweight or obese. Six percent of women enrolled in Strong Start have pre-pregnancy diagnoses of hypertension and more than 60 percent of enrollees are overweight or obese at their first prenatal care visit. Thus, rates of pregnancy-induced hypertension may even be lower than would be expected given the risk profile of enrollees. Both diabetes and hypertension have implications for early term and C-section deliveries as well as the postpartum health of the mother.

Nearly 80 percent of Strong Start participants report initiating breastfeeding. Some awardees feel that their efforts have influenced participants' decision to breastfeed, and some credit interventions outside of Strong Start, while others acknowledge that this is an area that needs continued improvement. According to data from the PLPE Postpartum Survey, breastfeeding rates among Strong Start enrollees are on par with national estimates and higher than those reported among WIC recipients (68%), a more comparable population. These results may be positively skewed, however, if breastfeeding moms are more likely to return for a postpartum visit where they complete a Postpartum Survey. Birth Center and Group Prenatal Care awardees specifically address breastfeeding as part of routine care, either through group education and counseling sessions focused on breastfeeding or as a standard part of midwifery and Birth Center care. Maternity Care Home awardees' approaches and commitment to breastfeeding are more varied, and fewer women enrolled in that approach report breastfeeding for any period of time. Many Strong Start sites are affiliated with delivery hospitals that are Baby Friendly or are moving toward becoming Baby Friendly, suggesting that an environment more broadly supportive of breastfeeding is being established, reinforcing Strong Start's efforts within the health care system.

Family planning is an important component of Strong Start enhanced services for many awardees, who believe that – compared to traditional prenatal care – their approach to care offers a more effective way to deliver family planning services and counseling. Strong Start's approach to providing family planning care varies across models and awardees, but overall, it represents a common feature of the Strong Start intervention. Group Prenatal Care awardees appear to place the most emphasis on family planning, as all programs dedicate one full group session to the topic and most also discuss family planning during other sessions and again at the postpartum visit. Group care awardees emphasized the value of group discussions about birth control methods and child spacing, where participants can share and learn from one another's experiences. Most (though not all) Maternity Care Home and Birth Center Strong Start staff also incorporate family planning discussions into their one-on-one encounters with participants, reinforcing and expanding on the

birth control counseling provided by prenatal providers. According to PLPE data submitted through Q1 2016, 69 percent of Strong Start participants reported that they had received family planning counseling after delivery. Though the evaluation is not collecting PLPE data on family planning counseling in the prenatal period, this proportion would likely be considerably higher than the postpartum finding as Strong Start awardees indicated that much of their family planning counseling occurs prenatally.

Awardees across the approaches shared some common barriers to the receipt of family planning services, including (but not limited to) low postpartum visit attendance rates, loss of Medicaid or CHIP coverage postpartum, religious affiliations of institutions or providers, and discontinuity with delivery hospitals. Many awardees encourage the use of highly-effective long-acting reversible contraceptives (LARCs), but reported several access barriers that are specific to these methods such as persistent myths about IUDs, particularly among teens; complaints about LARC side effects that lead to removals after a short time; provider preferences or resistance, including concerns about inserting an IUD at the time of delivery; MCO reimbursement policies that prevent LARC placement before the 6-week postpartum visit; inadequate Medicaid reimbursement; and maintaining a steady supply of LARCs.

The vast majority of Strong Start awardees hope to sustain their Strong Start intervention to some degree once the award period has ended. In most cases, however, ongoing funding or support for the enhancements had not yet been identified or secured. The widespread finding that awardees want to sustain their programs is a reflection of their perception that Strong Start represents an improvement over traditional prenatal care and has resulted in tangible benefits for both mothers and newborns. Awardees' optimism in this regard was likely bolstered by the considerable technical assistance they received from The Lewin Group, CMMI's Learning & Diffusion contractor on sustainability strategies. However, during the Year 3 case studies, we learned that awardees were at different stages of exploring potential funding sources. These sources most commonly include grants (foundation, federal, and state-based), enhanced reimbursement from Medicaid MCOs, and funding from their own institutions. Notable sustainability efforts include two maternity care awardees that had identified funding to continue Strong Start as a distinct program, two group prenatal care awardees that indicated the model would continue as their "preferred" or standard model of care for all pregnant patients at Strong Start sites, and another (Medicaid MCO) group prenatal care awardee that received approval from its state Medicaid agency to provide enhanced reimbursement for group care to providers in its plan network. Many awardees across models emphasized that data capturing the effectiveness, and cost-effectiveness, of Strong Start will be fundamental to promoting future sustainability.

Among awardees that did not expect to sustain the program or where sustainability seemed most uncertain, general lack of funding was the most common challenge identified, along with factors such as lack of support from providers and administrators or limited 'bandwidth' and advance planning by Strong Start staff related to sustainability efforts. Some awardees felt encouraged by delivery system reforms that are taking place across the country (such as the

proliferation of Patient-Centered Medical Home models) because they present potential funding opportunities for sustaining Strong Start programs , while others felt that the changing delivery landscape created uncertainties about the circumstances under which enhanced prenatal care services might be covered and how sustainability planning should proceed.

During Year 3 the evaluation team made significant progress in pursuing and obtaining birth certificate and Medicaid data from states with Strong Start awards. The Data Linkage Technical Assistance task succeeded in gaining approval of data requests from 11 Vital Records agencies and 14 Medicaid agencies, and received 2014 and/or 2015 data files from 7 states. Meanwhile, negotiations continue with an additional 12 state agencies, the majority of which appear very likely to approve our requests and deliver data. Only in Illinois have our efforts been stymied because of state statutes that prohibit the sharing of individual level birth certificates without women's consent. It now appears that the Impacts Analysis team will have a significant amount of data to work with from up to 19 states as it attempts to measure Strong Start's effects on birth outcomes.

Applying for and obtaining state data has required concerted, ongoing and persistent work with Medicaid and Vital Records agencies that face many competing demands. No state agencies ultimately requested technical assistance from the evaluation team during Year 3. Instead, in the face of constrained resources, they graciously work with the evaluation to review and process our various applications for birth certificate and Medicaid data. For the TA Team, this task required persistence, including building and maintaining relationships with state officials through regular contacts, sharing of information, and facilitating cross-agency communications. In several cases, it also required the creative application of pressure to gently prod the process forward when it was at risk of being derailed by bureaucratic inertia and competing demands. As described in the Technical Assistance and Data Acquisition Section, when faced with resistance to participation, we employed a series of incremental steps that have proven largely effective, starting with accommodating states' needs to postpone participation and following up by reminding state officials of their prior commitments to support the evaluation; offering small financial incentives to support state efforts, drawing on personal and professional relationships; and as a last resort, calling upon senior state and federal officials to spur action. Most of all, the team has had to embrace that every state, and state agency, is different and that we have to be nimble in our efforts to work through varying application processes and state-specific challenges to succeed.

In Year 3, the evaluation team finalized a method to select comparison groups and developed a decision rule to reduce state data burden. With an increasing amount of birth certificate and Medicaid data being received, we are poised to launch concerted impact analysis efforts in Year 4. The statistical method designed by the evaluation team will use propensity score reweighting to construct a group of observably similar women from the same county where Strong Start participants reside when possible. For 14 awardees, however, we will draw comparison groups from different counties because: (1) Strong Start has saturated the area and there are few women not being served by the program, or (2) Strong Start is the only source of care for high risk pregnant women in the county, making it difficult to identify comparison group women with similar risk

profiles within the same area. To determine comparison counties, we use a statistical matching method—Mahalanobis Distance—to match counties that are most similar based on observable measures related to geography and population, socioeconomic factors, provider supply, and infant health. With a system in place to select counties, the evaluation team also worked to reduce the burden on states by decreasing the total number of counties from which we would have to obtain data. To do so, the evaluation team is excluding Strong Start participants using the following decision rule: for each site, we include any county where more than 5 percent of the site's population resides, and if this aggregate is greater than 90 percent of the sites population, the remaining counties are excluded. If not, other counties are added one at a time, based on who has the highest number of enrollees, until 90 percent is achieved. This allows us to exclude many counties, while keeping approximately 96 percent of enrollees in our analysis. Overall, the excluded participants had a similar health risk profile to the participants included.

Building on this methodological foundation, Year 4 will see the evaluation's Impact Analysis compare the impact of Strong Start with that of traditional Medicaid prenatal care on several key maternal and infant outcomes, including rates of pre-term births, low birthweight births, very low birthweight births, C-sections, and VBACs, as well as additional analysis of claims and encounter data to assess Strong Start's impact on expenditures for the mother and infant for up to one year post-delivery. We will also analyze whether the impacts of Strong Start differ across awardees or approach.

Plans for Year 4

By the end of Year 3 of the Strong Start for Mothers and Newborns evaluation (August 11, 2016), many tasks in the project's scope of work had been completed, while several others were proceeding on pace or somewhat behind schedule. In Year 3, a third round of qualitative case study data collection was completed, with all 27 awardees' data summarized in this report. Year 3 also included participant-level process evaluation data collection for Quarters 2 through 4 2015 and Quarter 1 2016. As part of the technical assistance and data acquisition task, the evaluation team requested birth certificate and Medicaid data from 20 states and ultimately received data from 7 agencies (including 2 Medicaid and 5 Vital Records agencies) over the course of the project year. Requests were approved by additional state agencies that are expected to provide the data in the coming project year. Finally, the impacts team finalized two major tasks in preparation for conducting its impacts analyses in Year 4: selecting comparison groups, and establishing a decision rule for excluding a relatively small number of cases for the benefit of reducing state data collection burden.

Year 4 of the evaluation calls for completion of the project's case study and participant-level data collection, continued work to obtain and link vital records and Medicaid data from state agencies, and the initiation of our impact analysis.

CASE STUDIES

In Year 4, the evaluation team will conduct a fourth and final round of case studies composed of telephone interviews with key informants from all 27 Strong Start awards. These interviews will begin in late fall 2016 and continue through spring 2017. Though we anticipate that most key informants will be awardee-level program staff (since many sites will have ceased program operations by the time we collect this round of data) we plan to interview some providers and program staff at a small number of Strong Start sites. These sites will be selected for study because they have either sustained Strong Start enhancements or because we have documented particularly noteworthy features of their Strong Start programs that merit follow up. The final round of case studies will revisit awardees' plans for sustaining Strong Start and also focus on key research questions related to the generalizability of Strong Start models to other Medicaid and CHIP care settings across the country, as well as the key features that are critical for successful replication and scaling up of Strong Start prenatal care enhancements should that be desired.

As part of the Year 4 case study task, we will also conduct a telephone-based survey of Medicaid and CHIP officials in the majority of states with Strong Start awards. The survey will be fielded in September and October 2016 and includes questions about enrollment processes and covered benefits for pregnant Medicaid and CHIP beneficiaries; how maternity services are delivered and reimbursed under the programs; and whether there are other non-Strong Start state, local, or

private initiatives to improve maternal and infant outcomes. Survey findings will inform the Year 4 case studies and be incorporated into future evaluation memos and reports.

PARTICIPANT-LEVEL PROCESS EVALUATION

Throughout Year 4, awardees that are still operating or have recently closed out their awards will continue to submit participant-level data on a quarterly basis. As described in this Year 3 Annual Report, the evaluation team has received and processed 91 percent of expected Intake Forms, 87 percent of Third Trimester Surveys, 77 percent of Postpartum Surveys, and more than 24,000 Exit Forms.

In time for the Year 4 Annual Report, we expect to have collected, compiled, and reported on all participant-level data that will be submitted for the Strong Start evaluation. As we near the end of the PLPE data submission timeline we will focus on particular areas of interest in Quarterly Reports, and explore them more deeply rather than providing briefer overviews as we have in the past. Descriptive and multivariate analyses will again be conducted to both describe the Strong Start population and compare participants enrolled in each of the models for the Year 4 Annual Report.

TECHNICAL ASSISTANCE AND DATA AQUISITION

With regard to technical assistance, in Year 4 the evaluation team will continue to pursue data use and sharing agreements with all states for which agreements are not already in place. At a minimum, this will include the following state agencies:

- California Vital Records
- DC Medicaid
- Florida Vital Records
- Georgia Medicaid
- Kentucky Medicaid
- Maryland Medicaid and Vital Records
- Michigan Department of Health and Human Services (for both Medicaid and Vital Records)
- Mississippi Medicaid
- Missouri Vital Records
- Tennessee Department of Health (for both Medicaid and Vital Records)
- Texas Medicaid and Vital Records

We have also begun conversations with officials in Puerto Rico to see if receipt of the territory's birth certificates is feasible. If it is determined that we can receive these data, we will work to obtain birth certificates for live births in 2014 and 2015.[330]

As needed, we will offer to participate in conference calls to provide additional information to state agencies about the evaluation (generally), the impact analysis (specifically), and our data requests. We will also remind these agencies about the available stipend to support their work, and that the evaluation team is available to provide technical assistance to help the states link birth certificate and Medicaid data, or to perform the linkage itself. Finally, as approvals are put in place, we will maintain regular and ongoing communication with the state agencies to facilitate the secure transfer of data in a timely manner.

While significant progress has been made in Year 3, it will be especially critical for the evaluation team to finalize as many data sharing agreements and obtain as much data as possible over the course of Year 4. The Impact Analysis, discussed below, will be a very complex and resource intensive effort, and with just two years left in the evaluation period of performance, we will need to aggressively pursue finalization of arrangements with states during the first half of Year 4 so that the evaluation team will have sufficient time to perform data linkages and analysis.

IMPACT ANALYSIS

In Year 4, future analyses will use propensity score weighting to estimate the impact of Strong Start on key health outcomes and Medicaid expenditures. After we collect and merge birth certificate and Medicaid data from states, we will use propensity score based weights to assure that there are no differences between our control variables for Strong Start participants and their corresponding weighted comparison group. Propensity score reweighting weights more heavily comparison group members who are most similar to the treatment group, while reducing the weight of comparison group members who are dissimilar. For the sites where the comparison group is drawn from the local county, an instrumental variables procedure will use distance to provider to test the sensitivity of our results. Year 4 will see an analysis comparing the impact of Strong Start with traditional Medicaid on key health outcomes (e.g., probability of having a pre-term birth, a low birthweight birth, a very low birthweight birth, a Cesarean section, and a vaginal birth after a Cesarean section), as well as additional analysis of claims data to assess Strong Start's impact on expenditures for the mother and infant for one year post-delivery. We will also analyze whether the impacts of Strong Start differ across awardees or approach. We hope to conduct analyses of both 2014 and 2015 linked birth certificate and Medicaid data for our Year 4 Annual Report, due in summer 2017. We will include as many years of data as possible that will allow us time to properly clean, link and analyze the data for the Year 4 Annual Report.

[330] Births for 2016 will most likely not be pursued, since poor outcomes resulting from the emerging Zika Virus crisis would skew outcomes for this year.

References

Adams, K., Ayadi, F., Melvin, C., & Rivera, C. (2005). Smoking among Medicaid insured mothers: what are the neonatal expenses? *Health Care Financing Review, 26*(2), 105-118. https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/HealthCareFinancingReview/downloads/04-05Winterpg105.pdf

Althabe, F., Sosa, C., Belizán, J. M., Gibbons, L., Jacquerioz, F., & Bergel, E. (2006). Cesarean section rates and maternal and neonatal mortality in low-, medium-, and high-income countries: an ecological study. *Birth (Berkeley, Calif.)*, *33*(4), 270–277. http://doi.org/10.1111/j.1523-536X.2006.00118.x

American College of Nurse-Midwives. (2016). Our Philosophy of Care. http://www.midwife.org/Our-Philosophy-of-Care

Anum, E. A., Retchin, S. M., & Strauss, J. F. (2010). Medicaid and preterm birth and low birth weight: the last two decades. *Journal of Women's Health (2002)*, *19*(3), 443–451. http://doi.org/10.1089/jwh.2009.1602

Austin, P. (2010). Statistical Criteria for Selecting the Optimal Number of Untreated Subjects Matched to Each Treated Subject When Using Many-to-One Matching on the Propensity Score. *American Journal of Epidemiology.* doi: 10.1093/aje/kwq224

Austin, P. C., & Stuart, E.A. (2015). Moving towards best practice when using inverse probability of treatment weighting (IPTW) using the propensity score to estimate causal treatment effects in observational studies. *Statistics in Medicine, 34,* 3661-3679.

Austin, P.C., (2008). A critical appraisal of propensity-score matching in the medical literature between 1996 and 2003. *Statistics in Medicine, 27,* 2037-2049.

Ayres-de-Campos, D., Ugwumadu, A., Banfield, P., Lynch, P., Amin, P., Horwell, D., … Rosen, K. (2010). A randomised clinical trial of intrapartum fetal monitoring with computer analysis and alerts versus previously available monitoring. *BMC Pregnancy and Childbirth*, *10*, 71. http://doi.org/10.1186/1471-2393-10-71

Baeten, J. M., Bukusi, E. A., & Lambe, M. (2001). Pregnancy complications and outcomes among overweight and obese nulliparous women. *American Journal of Public Health*, *91*(3), 436–440.

Bailey, B. A. (2010). Partner violence during pregnancy: prevalence, effects, screening, and management. *International Journal of Women's Health*, *2*, 183–197.

Bang, H. & Robins, J.M. (2005). Doubly Robust Estimation in Missing Data and Causal Inference Models. *Biometrics, 61,* 962-973.

Bateman, B. T., Hernandez-Diaz, S., Huybrechts, K. F., Palmsten, K., Mogun, H., Ecker, J. L., & Fischer, M. A. (2012). Patterns of Outpatient Antihypertensive Medication Use During Pregnancy in a Medicaid Population. *Hypertension*, *60*(4), 913–920. http://doi.org/10.1161/HYPERTENSIONAHA.112.197095

Behrman, R., & Butler, A. (Eds.). (2007). 4, Sociodemographic and Community Factors Contributing to Preterm Birth. In Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes, *Preterm Birth: Causes, Consequences, and Prevention.* Washington (DC): National Academies Press (US). Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK11388/

Beijers, R., Jansen, J., Riksen-Walraven, M., & de Weerth, C. (2010). Maternal Prenatal Anxiety and Stress Predict Infant Illnesses and Health Complaints. *American Academy of Pediatrics*, *126*(2). Retrieved from http://pediatrics.aappublications.org/content/pediatrics/126/2/e401.full.pdf

Bennett, H. A., Einarson, A., Taddio, A., Koren, G., & Einarson, T. R. (2004). Prevalence of depression during pregnancy: systematic review. *Obstetrics and Gynecology*, *103*(4), 698–709. http://doi.org/10.1097/01.AOG.0000116689.75396.5f

Bloch, J. R., Webb, D. A., Matthew, L., Dennis, E. F., Bennett, I. M., & Culhane, J. F. (2010). Beyond Marital Status: The Quality of the Mother–Father Relationship and Its Influence on Reproductive Health Behaviors and Outcomes Among Unmarried Low Income Pregnant Women. *Maternal and Child Health Journal*, *14*(5), 726–734. http://doi.org/10.1007/s10995-009-0509-7

Blomberg, M. I., & Källén, B. (2010). Maternal obesity and morbid obesity: The risk for birth defects in the offspring. *Birth Defects Research Part A: Clinical and Molecular Teratology*, *88*(1), 35–40. http://doi.org/10.1002/bdra.20620

Buescher, P. A., Roth, M. S., Williams, D., & Goforth, C. M. (1991). An evaluation of the impact of maternity care coordination on Medicaid birth outcomes in North Carolina. *American Journal of Public Health*, *81*(12), 1625–1629.

Busso, M., DiNardo, J., & McCrary, J. (2014). New Evidence on the Finite Sample Properties of Propensity Score Reweighting and Matching Estimators. *The Review of Economics and Statistics, 96(5),* 885-897.

Caliendo, M. & Kopeinig, S. (2005). Some Practical Guidance for the Implementation of Propensity Score Matching. *IZA DP No. 1588.*

Centers for Disease Control and Prevention. (1997). *PRAMS 1996 Surveillance Report*. Atlanta, GA: Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2011). Breastfeeding Report Card - United States, 2011. Retrieved August 9, 2016, from https://www.cdc.gov/breastfeeding/pdf/2011breastfeedingreportcard.pdf

Centers for Disease Control and Prevention. (n.d.). FastStats: Births-Methods of Delivery. Retrieved August 9, 2016, from http://www.cdc.gov/nchs/fastats/delivery.htm

Chen, M. J., Grobman, W. A., Gollan, J. K., & Borders, A. E. B. (2011). The use of psychosocial stress scales in preterm birth research. *American Journal of Obstetrics and Gynecology*, *205*(5), 402–434. http://doi.org/10.1016/j.ajog.2011.05.003

Child Trends Database. (2015). Births to Unmarried Women. Retrieved from http://www.childtrends.org/?indicators=births-to-unmarried-women

CMS/CMMI. (2014). Strong Start for Mothers and Newborns Initiative: Enhanced Prenatal Care Models. Retrieved August 10, 2016, from https://cmmicoordinator.polldaddy.com/s/was-this-helpful?iframe=https%3A%2F%2Finnovation.cms.gov%2Finitiatives%2FStrong-Start-Strategy-2%2F&ft=1

Copen, C. E., Thoma, M. E., Kirmeyer, S., & Centers for Disease Control and Prevention. (2015). Interpregnancy Intervals in the United States: Data From the Birth Certificate and the National Survey of Family Growth. *U.S Department of Health and Human Services Natioanl Vital Statistics Reports*, *64*(3), 1–11.

DeSisto, C. L., Kim, S. Y., & Sharma, A. J. (2014). Prevalence Estimates of Gestational Diabetes Mellitus in the United States, Pregnancy Risk Assessment Monitoring System (PRAMS), 2007–2010. *Preventing Chronic Disease*, *11*. http://doi.org/10.5888/pcd11.130415

Donovan, E. F., Lannon, C., Bailit, J., Rose, B., Iams, J. D., Byczkowski, T., & Ohio Perinatal Quality Collaborative Writing Committee. (2010). A statewide initiative to reduce inappropriate scheduled births at 36(0/7)-38(6/7) weeks' gestation. *American Journal of Obstetrics and Gynecology*, *202*(3), 243.e1–8. http://doi.org/10.1016/j.ajog.2010.01.044

Dubay, L., Blavin, F., Howell, E., & Garrett, B. (2014). Strong Start for Mothers and Newborns Evaluation: Comparison Group Feasibility Study. The Urban Institute.

Dunkel Schetter, C., & Tanner, L. (2012). Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Current Opinion in Psychiatry*, *25*(2), 141–148. http://doi.org/10.1097/YCO.0b013e3283503680

Fairley, L., & Leyland, A. H. (2006). Social class inequalities in perinatal outcomes: Scotland 1980–2000. *Journal of Epidemiology and Community Health*, *60*(1), 31–36. http://doi.org/10.1136/jech.2005.038380

Forssas, E., Gissler, M., Sihvonen, M., & Hemminki, E. (1999). Maternal predictors of perinatal mortality: the role of birthweight. *International Journal of Epidemiology*, *28*(3), 475–478.

Fricchione, G. (2004). Clinical practice. Generalized anxiety disorder. *The New England Journal of Medicine*, *351*(7), 675–682. http://doi.org/10.1056/NEJMcp022342

Gareau, S., Lopez-De Fede, A., Loudermilk, B.L., Cummings, T.H., Hardin, J.W., Picklesimer A.H., Crouch, E., & Covington-Kolb, S. (2016). Group Prenatal Care Results in Medical Savings with Better Outcomes: A Propensity Score Analysis of CenteringPregnancy Participation in South Carolina. *Journal of Maternal and Child Health, 20,* 1384-1393.

Gazmararian, J. A., Lazorick, S., Spitz, A. M., Ballard, T. J., Saltzman, L. E., & Marks, J. S. (1996). Prevalence of violence against pregnant women. *JAMA*, *275*(24), 1915–1920.

Gibson-Davis, C. M., Edin, K., & McLanahan, S. (2005). High Hopes but Even Higher Expectations: The Retreat From Marriage Among Low-Income Couples. *Journal of Marriage and Family*, *67*(5), 1301–1312. http://doi.org/10.1111/j.1741-3737.2005.00218.x

Girsen, A., Mayo, J., Carmichael, S., Phibbs, C., Shachar, B., Stevenson, D., … the March of Dimes Prematurity Research Center at Stanford University School of Medicine. (2016). Women's prepregnancy underweight as a risk factor for preterm birth: a retrospective study. *BJOG: An International Journal of Obstetrics & Gynaecology*, n/a–n/a. http://doi.org/10.1111/1471-0528.14027

Goodman, J. H., Chenausky, K. L., & Freeman, M. P. (2014). Anxiety disorders during pregnancy: a systematic review. *The Journal of Clinical Psychiatry*, *75*(10), e1153–1184. http://doi.org/10.4088/JCP.14r09035

Gruber, K. J., Cupito, S. H., & Dobson, C. F. (2013). Impact of Doulas on Healthy Birth Outcomes. *The Journal of Perinatal Education*, *22*(1), 49–58. http://doi.org/10.1891/1058-1243.22.1.49

Hamilton, B. E., Martin, J. A., & Osterman, M. J. K. (n.d.). *Births: Preliminary Data for 2015* (National Vital Statistics Reports). Hyattsville, MD: National Center for Vital Statistics. Retrieved from http://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_03.pdf

Hartmann, H., Hayes, J., & Yi, Y. (2012). *How Increasing Breastfeeding Rates Will Affect WIC Expenditures: Saving Money While Meeting the Goals of Healthy People 2020*. Washington (DC): Institute for Women's Policy Research. Retrieved from http://www.iwpr.org/publications/pubs/how-increasing-breastfeeding-rates-will-affect-wic-expenditures

HCPHA. (n.d.). Community Health Services Division's Baby Love & Baby Love Plus Program for the Hertford County Public Health Authority. Retrieved August 10, 2016, from http://www.hertfordpublichealth.com/phsd-maternal.htm

Heins, H. C., Nance, N. W., McCarthy, B. J., & Efird, C. M. (1990). A randomized trial of nurse-midwifery prenatal care to reduce low birth weight. *Obstetrics and Gynecology*, *75*(3 Pt 1), 341–345.

Hill, I., Benatar, S., Courtot, B., Blavin, F., Howell, E., Dubay, L., … Rodin, D. (2014). *Strong Start for Mothers and Newborns Evaluation: Year 1 Annual Report. Prepared for Center for Medicare and Medicaid Innovation*. Washington (DC): The Urban Institute.

Hill, I., Benatar, S., Courtot, B., Blavin, F., Howell, E., Dubay, L., … Rouse, M. (2015). *Strong Start for Mothers and Newborns Evaluation*. Washington (DC): The Urban Institute. Retrieved from http://www.urban.org/research/publication/strong-start-mothers-and-newborns-evaluation

Hirano, K. & Imbens, G. W. (2001). Estimation of Causal Effects using Propensity Score Weighting: An Application to Data on Right Heart Catheterization. *Health Services and Outcomes Research Methodology, 2,* 259-278.

Hirano, K., Imbens, G.W., & Ridder, G. (2003). Efficient Estimation of Average Treatment Effects Using the Estimated Propensity Score. *Econometrica, 71,* 1161-1189.

Hobfoll, S., Ritter, C., Lavin, J., Hulsizer, M., & Cameron, R. (1995). Depression prevalence and incidence among inner-city pregnant and postpartum women. *Journal of Consulting and Clinical Psychology, 63*(3), 445-453. https://www.ncbi.nlm.nih.gov/pubmed/7608357

Holtrop, J. S., Meghea, C., Raffo, J. E., Biery, L., Chartkoff, S. B., & Roman, L. (2010). Smoking among pregnant women with Medicaid insurance: are mental health factors related? *Maternal and Child Health Journal*, *14*(6), 971–977. http://doi.org/10.1007/s10995-009-0530-x

Howell, E., Dubay, L., Courtot, B., Benatar, S., Garrett, B., Hill, I., … Edwards, J. (2014). *Strong Start for Mothers and Newborns Evaluation: Final Design Plan*. Washington (DC): The Urban Institute.

Imbens, G.W. (2004). Nonparametric estimation of average treatment effects under exogeneity: a review. *The Review of Economics and Statistics, 86(1),* 4-29.

Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. (2007). *Preterm Birth: Causes, Consequences, and Prevention*. (R. E. Behrman & A. S. Butler, Eds.). Washington (DC): National Academies Press (US). Retrieved from http://www.ncbi.nlm.nih.gov/books/NBK11362/

Katon, J. G., Russo, J., Gavin, A. R., Melville, J. L., & Katon, W. J. (2011). Diabetes and depression in pregnancy: is there an association? *Journal of Women's Health (2002)*, *20*(7), 983–989. http://doi.org/10.1089/jwh.2010.2662

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 593–602. http://doi.org/10.1001/archpsyc.62.6.593

Kim, S.-H., Kim, M.-Y., Yang, J.-H., Park, S.-Y., Yim, C. H., Han, K. O., … Park, S. (2011). Nutritional risk factors of early development of postpartum prediabetes and diabetes in women with gestational diabetes mellitus. *Nutrition (Burbank, Los Angeles County, Calif.)*, *27*(7-8), 782–788. http://doi.org/10.1016/j.nut.2010.08.019

Kost, K., & Maddow-Zimet, I. (2016). *U.S. Teenage Pregnancies, Births and Abortions, 2011: National Trends by Age, Race and Ethnicity*. New York, NY and Washington, DC: Guttmacher Institute.

Kozhimannil, K. B., Hardeman, R. R., Attanasio, L. B., Blauer-Peterson, C., & O'Brien, M. (2013). Doula Care, Birth Outcomes, and Costs Among Medicaid Beneficiaries. *American Journal of Public Health*, *103*(4), e113–e121. http://doi.org/10.2105/AJPH.2012.301201

Laughon, S., Zhang, J., Grewal, J., Sundaram, R., Bever, J., & Reddy, U. (2012). Induction of labor in a contemporary obstetric cohort. *American Journal of Obstetrics and Gynecology, 206*(6). doi: 10.1016/j.ajog.2012.03.014

Leddy, M. A., Power, M. L., & Schulkin, J. (2008). The Impact of Maternal Obesity on Maternal and Fetal Health. *Reviews in Obstetrics and Gynecology*, *1*(4), 170–178.

Leight, K. L., Fitelson, E. M., Weston, C. A., & Wisner, K. L. (2010). Childbirth and mental disorders. *International Review of Psychiatry (Abingdon, England)*, *22*(5), 453–471. http://doi.org/10.3109/09540261.2010.514600

Lunceford, J.K., & Davidian, M. (2004). Stratification and weighting via the propensity score in estimation of causal treatment effects: a comparative study. *Statistical Medicine, 23,* 2937-2960.

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., Curtin, S. C., & Mathews, T. J. (2015). *Final Data for 2013* (National Vital Statistics Reports No. 64(1)). Hyattsville, MD: National Center for Vital Statistics.

Martin, J. A., Wilson, E. C., Osterman, M. J. K., Saadi, E. W., Sutton, S. R., & Hamilton, B. E. (2013). *Assessing the quality of medical and health data from 2003 birth certificate revision: Results from two states.* (National Vital Statistics Reports No. 62(2)). Hyattsville, MD: National Center for Vital Statistics.

McLanahan, S., Haskins, R., Garfinkel, I., Mincy, R. B., & Donahue, E. (2010, October 26). Strengthening Fragile Families | Brookings Institution. Retrieved from https://www.brookings.edu/research/strengthening-fragile-families/

Molina, G., Weiser, T., & Lipsitz, S. (2015). Relationship between cesarean delivery rate and maternal and neonatal mortality. *Journal of the American Medical Association, 314*(21), 2263-2270. doi:10.1001/jama.2015.15553

Moniz, M., Dalton, V., Davis, M., Forman, J., Iott, B., Landgraf, J., & Chang, T. (2015). Characterization of Medicaid policy for immediate postpartum contraception. *Contraception, 92*(6), 523-531. DOI: http://dx.doi.org/10.1016/j.contraception.2015.09.014

North Carolina Department of Health and Human Services. (2010). Procedures for Private Child-Placing Agencies, Residential Child-Care Institutions, and Residential Maternity Care. Retrieved August 10, 2016, from http://ncchildcare.dhhs.state.nc.us/pdf_forms/RIL_procedures_letter.pdf

Norwitz, E.R., Phaneuf, L.E., Caughey, A.B. (2011). Progesterone Supplementation and the Prevention of Preterm Birth. *Obstetrics and Gynecology, 4*(2), 60-72.

Oshiro, B. T., Henry, E., Wilson, J., Branch, D. W., Varner, M. W., & Women and Newborn Clinical Integration Program. (2009). Decreasing elective deliveries before 39 weeks of gestation in an integrated health care system. *Obstetrics and Gynecology*, *113*(4), 804–811. http://doi.org/10.1097/AOG.0b013e31819b5c8c

Osterman, M. J. K., & Martin, J. A. (2014). *Recent declines in induction of labor by gestational age* (NCHS Data Brief No. 155(155)) (pp. 1–8). Retrieved from http://www.cdc.gov/nchs/products/databriefs/db155.htm

Palmer, L., Cook, A., & Courtot, B. (2009). *Providing Maternity Care to the Underserved: A Comparative Case Study of Three Maternity Care Models Serving Women in Washington, D.C.* The Urban Institute. Retrieved from http://www.urban.org/research/publication/providing-maternity-care-underserved

Paranjape, A., & Liebschutz, J. (2003). STaT: A Three-Question Screen for Intimate Partner Violence. *Journal of Women's Health*, *12*(3), 233–239. http://doi.org/10.1089/154099903321667573

Ranji, U., Salganicoff, A., Stewart, A. M., Cox, M., & Doamekpor, L. (2010). *State Medicaid Coverage of Perinatal Services: Summary of State Survey Findings*. Menlo Park, CA and Washington, DC: Kaiser Family Foundation and The George Washington University Medical Center School of Public Health and Human Services, Department of Health Policy.

Robbins, C. L., Keyserling, T. C., Pitts, S. B. J., Morrow, J., Majette, N., Sisneros, J. A., … Dietz, P. M. (2013). Screening low-income women of reproductive age for cardiovascular disease risk

factors. *Journal of Women's Health (2002)*, *22*(4), 314–321. http://doi.org/10.1089/jwh.2012.4149

Romano, A. (2012). *What is a Maternity Care Home?*. National Partnership for Women and Families. Retrieved from http://transform.childbirthconnection.org/2012/03/what-is-a-maternity-care-home/

Rosenbaum, P. (1987). Model-based direct adjustment. *Journal of the American Statistical Association, 82,* 387-394.

Rosenbaum, P. & Rubin, D. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrica, 79,* 41-55.

Ross, L. E., & McLean, L. M. (2006). Anxiety disorders during pregnancy and the postpartum period: A systematic review. *The Journal of Clinical Psychiatry*, *67*(8), 1285–1298.

Rubin, D. B. (1979). Using Multivariate Matched Sampling and Regression Adjustment to Control Bias in Observational Studies. *Journal of the American Statistical Association*, *74*, 318–328.

Rubin, D. (2004). On Principles for Modeling Propensity Scores in Medical Research. *Pharmacoepidemiology Drug Safety, 13,* 855-857.

Saltzman, L. E., Johnson, C. H., Gilbert, B. C., & Goodwin, M. M. (2003). Physical abuse around the time of pregnancy: an examination of prevalence and risk factors in 16 states. *Maternal and Child Health Journal*, *7*(1), 31–43.

Sandall, J., Soltani, H., Gates, S., Shennan, A., & Devane, D. (2015). Midwife-led continuity models versus other models of care for childbearing women - Sandall - 2013 - The Cochrane Library - Wiley Online Library. *The Cochrane Collaboration*, (9). Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004667.pub3/abstract

Shattuck, R. M., & Kreider, R. M. (2013). *Social and Economic Characteristics of Currently Unmarried Women With a Recent Birth: 2011* (American Community Survey Reports). United States Census Bureau. Retrieved from https://www.census.gov/prod/2013pubs/acs-21.pdf

Siega-Riz, A.-M., Siega-Riz, A.-M., & Laraia, B. (2006). The Implications of Maternal Overweight and Obesity on the Course of Pregnancy and Birth Outcomes. *Maternal and Child Health Journal*, *10*(1), 153–156. http://doi.org/10.1007/s10995-006-0115-x

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097. http://doi.org/10.1001/archinte.166.10.1092

Stapleton, S. R., Osborne, C., & Illuzzi, J. (2013). Outcomes of care in Birth Centers: demonstration of a durable model. *Journal of Midwifery & Women's Health*, *58*(1), 3–14. http://doi.org/10.1111/jmwh.12003

The Urban Institute. (2015a). *Medicaid/Birth Certificate Data Request Applications: Common Questions*. Washington (DC): The Urban Institute.

The Urban Institute. (2015b). *Strong Start for Mothers and Newborns Evaluation Overview of Information Needs for the Impact analysis*. Washington (DC): The Urban Institute, American Institutes of Research, Health Management Associates, Briljent.

The Urban Institute. (2015c). *Strong Start for Mothers and Newborns Evaluation Overview of Information Needs for the Impact analysis*. Washington (DC): The Urban Institute.

Van Teijlingen, E. R., Hundley, V., Rennie, A.-M., Graham, W., & Fitzmaurice, A. (2003). Maternity satisfaction studies and their limitations: "What is, must still be best." *Birth (Berkeley, Calif.)*, *30*(2), 75–82.

Walsh, D., & Downe, S. M. (2004). Outcomes of free-standing, midwife-led Birth Centers: a structured review. *Birth (Berkeley, Calif.)*, *31*(3), 222–229. http://doi.org/10.1111/j.0730-7659.2004.00309.x

Woods, S. M., Melville, J. L., Guo, Y., Fan, M.-Y., & Gavin, A. (2010). Psychosocial Stress during Pregnancy. *American Journal of Obstetrics and Gynecology*, *202*(1), 61.e1–61.e7. http://doi.org/10.1016/j.ajog.2009.07.041

World Health Organization. (2015). *Cesarean sections should only be performed when medically necessary*. World Health Organization.

Yu, Z., Han, S., Zhu, J., Sun, X., Ji, C., & Guo, X. (2013). Pre-Pregnancy Body Mass Index in Relation to Infant Birth Weight and Offspring Overweight/Obesity: A Systematic Review and Meta-Analysis. *PLOS ONE*, *8*(4), e61627. http://doi.org/10.1371/journal.pone.0061627

Zhang, S., Cardarelli, K., Shim, R., Ye, J., Booker, K. L., & Rust, G. (2013). Racial disparities in economic and clinical outcomes of pregnancy among Medicaid recipients. *Maternal and Child Health Journal*, *17*(8), 1518–1525. http://doi.org/10.1007/s10995-012-1162-0

Technical Appendices

APPENDIX A: FIGURES FROM THE LITERATURE REVIEW

TABLE A.1.: STRONG START AWARDEE AND MODEL

Awardee Name	State	Strong Start Model (intervention)	Total Number of Sites		
			Birth Centers	Maternity Home	Group Prenatal Care
Access Community Health Network	Illinois	Maternity Care Home	–	32	–
Albert Einstein Healthcare Network	Pennsylvania	Centering Pregnancy	–	–	2
American Association of Birth Centers	Alaska, Arizona, California, Florida, Illinois, Kansas, Maryland, Minnesota, Nebraska, New Mexico, New York, North Carolina, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, West Virginia, and Wisconsin	Birth Center	38 Active and 16 Inactive	–	–
Amerigroup Corporation	Louisiana	Centering Pregnancy	–	–	7
Central Jersey Family Health Consortium, Inc.	New Jersey	Centering Pregnancy	–	–	8
Florida Association of Healthy Start Coalitions	Florida	Maternity Care Home	–	8	–
Grady Memorial Hospital Corporation DBA Grady Health System	Georgia	Centering Pregnancy	–	–	4
Harris County Hospital District	Texas	Centering Pregnancy	–	–	7
HealthInsight of Nevada	Nevada	Centering Pregnancy	–	–	3
Johns Hopkins University	Maryland	Maternity Care Home	–	5	–
Los Angeles County Department of Health Services	California	Maternity Care Home	–	5	–
Maricopa Special Health Care District	Arizona	Maternity Care Home	–	5	–
Medical University of South Carolina	South Carolina	Maternity Care Home	–	7	–
Meridian Health Plan	Michigan	Maternity Care Home	–	1	–
Mississippi Primary Health Care Association, Inc.	Mississippi	Maternity Care Home	–	9	–
Oklahoma Health Care Authority	Oklahoma	Centering Pregnancy	–	–	4
Providence Health Foundation of Providence Hospital	Washington, DC	Birth Center, Maternity Care Home and Centering	1	3	2
Signature Medical Group	Missouri	Maternity Care Home	–	9	–
St. John Community Health Investment Corp.	Michigan	Enhanced Prenatal Care Support Group (Year 1) Centering pregnancy (Year 2)	–	–	3
Texas Tech University Health Sciences Center	Texas	Maternity Care Home	–	2	1

Awardee Name	State	Strong Start Model (intervention)	Total Number of Sites		
			Birth Centers	Maternity Home	Group Prenatal Care
United Neighborhood Health Services, Inc.	Tennessee	Maternity Care Home	–	7	–
University of Alabama at Birmingham	Alabama	Maternity Care Home	–	4	–
University of Kentucky Research Foundation	Kentucky	Centering Pregnancy	–	–	6
University of Puerto Rico Medical Sciences Campus	Puerto Rico	Centering Pregnancy	–	–	1
University of South Alabama[1]	Alabama	Maternity Care Home and Centering Pregnancy	–	6	–
University of Tennessee Medical Group	Tennessee	Centering Pregnancy	–	–	2
Virginia Commonwealth University	Virginia	Centering Pregnancy	–	–	4
		Total:	**42**	**103**	**60**

Notes: 1: One site at the University of South Alabama is implementing both the maternity care home and group prenatal care model. For the total number of sites, we count the site as the primary model (maternity care home). VCU and OKHCA plan to implement more than one model in at least one of their sites, and this will be accounted for in the Year 3 Annual Report.
Dash symbols indicate that the awardee is not operating any sites in a particular model.

TABLE A.2.: MEDICAID AND CHIP ELIGIBILITY POLICIES FOR CHILD-BEARING WOMEN, BY STRONG START STATE

Location	Income Eligibility (Percent of FPL)-Pregnant Women		Medicaid Eligibility-Parents of Dependent Children	Medicaid Eligibility-Other Adults	Family Planning Program	ACA Plans	
	Medicaid (Title XIX)	CHIP (Title XXI)				Medicaid Expansion	Marketplace Type
Alabama	146%	NA	18%	0%	Yes	Not participating	FFM
Alaska	205%	NA	143%	0%	No	Not participating	FFM
Arizona	161%	NA	138%	138%	No	Participating	FFM
California	213%	NA	138%	138%	Yes	Participating	SBM
District of Columbia	211%	324%	221%	215%	No	Participating	SBM
Florida	196%	NA	34%	0%	Yes	Not Participating	FFM
Georgia	225%	NA	37%	0%	Yes	Not participating	FFM
Illinois	213%	NA	138%	138%	No	Participating	Partnership
Kansas	171%	NA	38%	0%	No	Not Participating	FFM[6]
Kentucky	200%	NA	138%	138%	No	Participating	SBM
Louisiana	138%	NA	24%	0%	Yes	Not participating	FFM
Maryland	264%	NA	138%	138%	Yes	Participating	SBM
Michigan	200%	NA	138%	138%	Yes	Participating[5]	Partnership
Minnesota	283%	NA	138%[1]	138%	Yes	Participating	SBM
Mississippi	199%	NA	27%	0%	Yes	Not participating	FFM
Missouri	201%	NA	22%	0%	Yes	Not Participating	FFM
Nebraska	199%	NA	54%	0%	No	Not participating	FFM[6]
Nevada	165%	NA	138%	138%	No	Participating	SBM[7]
New Jersey	199%	205%	138%	138%	No	Participating	FFM
New Mexico	255%	NA	138%	138%	Yes	Participating	SBM[7]
New York	223%	NA	138%	138%	Yes	Participating	SBM
North Carolina	201%	NA	44%	0%	Yes	Not participating	FFM
Oklahoma	138%	NA	44%	0%[2]	Yes	Not participating	FFM
Oregon	190%	NA	138%	138%	Yes	Participating	SBM[7]
Pennsylvania	220%	NA	138%	138%	Yes	Participating[5]	FFM
South Carolina	199%	NA	67%	0%	Yes	Not participating	FFM
Tennessee	200%	NA	101%	0%	No	Not participating	FFM
Texas	203%	NA	18%	0%	Yes4	Not participating	FFM
Virginia	148%	205%	44%	0%	Yes	Not Participating	FFM5

Location	Income Eligibility (Percent of FPL)-Pregnant Women		Medicaid Eligibility-Parents of Dependent Children	Medicaid Eligibility-Other Adults	Family Planning Program	ACA Plans	
	Medicaid (Title XIX)	CHIP (Title XXI)				Medicaid Expansion	Marketplace Type
West Virginia	163%	NA	138%	138%	No	Participating	Partnership
Wisconsin	306%	NA	100%3	100%	Yes	Not participating	FFM

Notes: [1]Minnesota received approval to implement a Basic Health Program (BHP) established by the ACA in December 2014 and transferred coverage for Medicaid enrollees with incomes between 138 and 200% FPL to the BHP as of January 1, 2015.
[2]In Oklahoma, individuals without a qualifying employer with incomes up to 100% FPL are eligible for more limited subsidized insurance though the Insure Oklahoma Section 1115 waiver program. Individuals working for certain qualified employers with incomes at or below 200% FPL are eligible for premium assistance for employer-sponsored insurance.
[3]Wisconsin amended its Medicaid state plan and existing Section 1115 waiver to cover adults up to 100% FPL in Medicaid but did not adopt the ACA Medicaid expansion.
[4]Texas operates an entirely state-funded program that provides family planning services to women at least 18 years of age and up to 185 percent FPL..
[5]Michigan and Pennsylvania have approved Section 1115 waivers for their Medicaid expansions. In February 2015, Pennsylvania announced it will withdraw the Healthy Pennsylvania waiver to implement a traditional Medicaid expansion called Health Choices. The transition from Healthy Pennsylvania to Health Choices is planned to be completed by September 30, 2015.
[6]Kansas, Nebraska, and Virginia have received federal approval to conduct plan management activities to support certification of qualified health plans in FFMs.
[7]Nevada, New Mexico, and Oregon are operating SBMs with federal support.
Sources: Medicaid eligibility: http://kff.org/health-reform/state-indicator/medicaid-and-chip-income-eligibility-limits-for-pregnant-women-as-a-percent-of-the-federal-poverty-level/; http://kff.org/health-reform/state-indicator/medicaid-income-eligibility-limits-for-adults-as-a-percent-of-the-federal-poverty-level/; Family Planning: http://www.guttmacher.org/statecenter/spibs/spib_SMFPE.pdf; Health Reform: http://kff.org/health-reform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/; http://kff.org/health-reform/state-indicator/state-health-insurance-marketplace-types/

APPENDIX B: PARTICIPANT-LEVEL PROCESS EVALUATION DATA SUBMITTED THROUGH Q1 2016

TABLE B.1.: ENROLLMENT, DELIVERIES AND FORM SUBMISSION, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Number of Women Enrolled (Obtained from the Program-Level Program Progress Report)					
Newly Enrolled in Q1 2016	N	756	1008	1961	3725
Total Enrolled through Q1 2016	N	7904	10211	24023	42138
Number Women Delivered through Q1 2016	N	3694	5761	13922	23377
Forms Received through Q1 2016					
Intake Forms Received through Q1 2016	N	6594	8559	22996	38149
Received through Q1 2016 as a percentage of the number of women ever enrolled	%	83.4	83.8	95.7	90.5
Third-Trimester Surveys Received through Q1 2016	N	4088	4567	11732	20387
Received through Q1 2016 as a percentage of the number of women ever delivered	%	110.7	79.3	84.3	87.2
Postpartum Surveys Received through Q1 2016	N	3407	3983	10659	18049
Received through Q1 2016 as a percentage of the number of women ever delivered	%	92.2	69.1	76.6	77.2
Exit Forms Received through Q1 2016	N	4747	6148	14056	24951
Received through Q1 2016 as a percentage of the number of women ever delivered	%	128.5	106.7	101.0	106.7

TABLE B.2.: SOCIODEMOGRAPHIC CHARACTERISTICS, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	All Models
Sociodemographic Characteristics					
Mother's Age at Intake	N	6556	8379	22738	37673
Less than 18 years of age	%	2.8	6.9	5.7	5.5
18 and 19 years of age	%	6.6	12.4	9.7	9.7
Greater than or equal to 20 and less than 35 years of age	%	81.5	72.7	75.3	75.8
35 years of age or older	%	9.0	8.0	9.4	9.0
Race and Ethnicity	N	6540	8350	22638	37528
Hispanic	%	25.0	40.1	27.1	29.6
Non-Hispanic White	%	54.0	12.8	23.3	26.3
Non-Hispanic Black	%	15.8	41.7	45.6	39.5
Non-Hispanic Other Race or Non-Hispanic Multiple Races	%	5.2	5.3	4.0	4.5
Ethnicity	N	1633	3350	6137	11120
Mexican, Mexican American, Chicana	%	52.5	35.8	58.2	50.6
Puerto Rican	%	13.0	31.1	3.6	13.3
Cuban	%	1.3	1.1	1.1	1.2

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	All Models
Other Hispanic, Latina, or Spanish origin	%	30.6	31.1	35.9	33.7
multiple Hispanic, Latina, or Spanish origins	%	2.6	0.9	1.1	1.3
Living in Shelter or Homeless at Intake	N	6594	8559	22996	38149
Yes	%	1.3	1.9	1.4	1.5
Employed at Intake	N	6507	8240	22573	37320
Yes	%	41.9	35.6	40.3	39.6
Education Level at Intake	N	5908	6875	19229	32012
Less than High School	%	15.0	28.9	28.9	26.3
High School Graduate or GED	%	58.9	58.2	60.2	59.5
Bachelor's Degree	%	12.1	4.1	3.4	5.1
Other College Degree	%	14.0	8.9	7.5	9.0
Relationship Status at Intake	N	6507	7904	22401	36812
Married, living with spouse	%	40.3	19.0	18.3	22.3
Married, not living with spouse	%	1.8	2.1	2.0	2.0
Living with a partner	%	33.2	34.5	31.1	32.2
In a relationship but not living together	%	14.5	25.6	30.1	26.4
Not in a relationship right now	%	10.3	18.7	18.5	17.1
Smokes Cigarettes at Intake	N	5975	7022	21576	34573
Yes	%	11.0	10.0	13.7	12.5
Food Insecure at Intake	N	6203	7323	20905	34431
Yes	%	18.3	23.3	18.4	19.4

TABLE B.3.: MEDICAL RISK FACTORS, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Mental Risk Factors					
Exhibiting Depressive Symptoms at Intake	N	5922	6704	20476	33102
Yes	%	23.4	31.1	24.9	25.9
No	%	76.6	68.9	75.1	74.1
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Throw)	N	6470	7885	21974	36329
Yes	%	20.6	17.5	19.9	19.5
No	%	79.4	82.5	80.1	80.5

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	N	6122	6949	19966	33037
No	%	97.8	96.9	97.6	97.5
Yes	%	2.2	3.1	2.4	2.5
Mother's Weight					
BMI of Mother at First Prenatal Visit	N	4497	4464	12313	21274
Underweight at first prenatal visit (BMI < 18.5)	%	4.3	3.6	2.8	3.3
Normal weight at first prenatal visit (BMI >= 18.5 and BMI < 25)	%	46.6	34.3	31.0	35.0
Overweight at first prenatal visit (BMI >= 25 and BMI < 30)	%	25.4	27.8	25.4	25.9
Obese at first prenatal visit (BMI >= 30 and BMI < 40)	%	19.9	27.0	29.7	27.1
Very obese at first prenatal visit (BMI >= 40)	%	3.8	7.3	11.2	8.8
Pre-Pregnancy Diagnoses					
Pre-Pregnancy Diagnosis of Type I Diabetes	N	4738	5880	13630	24248
Yes	%	0.2	2.5	1.1	1.2
No	%	99.8	69.5	91.9	88.0
Not Known	%	0.0	28.0	7.0	10.7
Pre-Pregnancy Diagnosis of Type II Diabetes	N	4733	5862	13605	24200
Yes	%	0.3	3.8	2.1	2.1
No	%	99.7	81.8	91.4	90.7
Not Known	%	0.0	14.4	6.6	7.2
Pre-Pregnancy Diagnosis of Hypertension	N	4738	5870	13636	24244
Yes	%	0.6	6.7	7.8	6.1
No	%	99.4	82.4	85.9	87.7
Not Known	%	0.0	11.0	6.2	6.2
Risk Factors from Past Pregnancies					
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	N	2756	3102	8466	14324
Yes	%	9.6	11.6	18.5	15.3
No	%	90.1	78.7	72.8	77.4
Not Known	%	0.3	9.7	8.7	7.3
Previous Birth < 2,500 grams	N	2750	2789	8402	13941
Yes	%	1.9	9.5	14.6	11.1
No	%	97.7	73.8	72.4	77.7

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Not Known	%	0.4	16.7	13.0	11.3
Previous Miscarriage (< 20 weeks EGA)	N	3401	3214	9466	16081
Yes	%	31.4	27.0	33.3	31.6
No	%	68.5	59.6	58.9	61.1
Not Known	%	0.1	13.4	7.8	7.3
Previous Elective Termination	N	3403	3217	9464	16084
Yes	%	16.4	17.8	17.9	17.6
No	%	83.5	68.9	74.0	75.0
Not Known	%	0.1	13.3	8.1	7.4
Previous Still Birth (fetal death >= 20 weeks EGA)	N	2752	3046	8441	14239
Yes	%	0.9	1.8	3.8	2.8
No	%	99.1	83.7	86.4	88.3
Not Known	%	0.1	14.4	9.8	8.9
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	N	2156	2254	6595	11005
< 6 months	%	7.0	8.3	8.0	7.8
>= 6 months and < 12 months	%	13.6	8.9	9.8	10.4
>= 12 months and < 18 months	%	16.7	8.6	9.6	10.8
>= 18 months	%	62.7	74.3	72.6	71.0

TABLE B.4.: RISK FACTORS DURING THE CURRENT PREGNANCY, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Risk Factors during Current Pregnancy					
Urinary Tract Infection(s) during Last 6 months of Pregnancy	N	4728	5751	13480	23959
Yes	%	6.2	11.1	14.1	11.8
No	%	93.7	72.7	67.3	73.8
Not Known	%	0.1	16.2	18.5	14.3
Cervical Incompetence	N	4727	5861	13488	24076
Yes	%	0.02	0.67	1.53	1.02
No	%	99.83	75.94	81.06	83.50
Not Known	%	0.15	23.39	17.41	15.48

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Placenta Previa	N	4727	5840	13485	24052
Yes	%	0.23	0.86	1.19	0.92
No	%	99.62	84.13	81.71	85.82
Not Known	%	0.15	15.02	17.09	13.26
Placental Abruption	N	4731	5834	13476	24041
Yes	%	0.4	0.4	0.5	0.4
No	%	99.4	84.1	81.0	85.4
Not Known	%	0.1	15.6	18.5	14.2
Gestational Diabetes	N	4732	5836	13493	24061
Yes	%	2.4	5.6	5.9	5.1
No	%	97.5	79.2	79.1	82.8
Not Known	%	0.1	15.2	15.0	12.1
Pregnancy-Related Hypertension	N	4731	5834	13495	24060
Yes	%	1.3	7.4	6.6	5.7
No	%	98.6	77.3	78.8	82.3
Not Known	%	0.1	15.3	14.7	12.0
Preeclampsia	N	4730	5834	13487	24051
Yes	%	1.8	5.4	5.1	4.5
No	%	98.2	79.1	79.4	83.0
Not Known	%	0.1	15.6	15.5	12.5
Syphilis	N	4732	5811	13500	24043
Yes	%	0.0	0.4	0.4	0.3
No	%	4.5	85.4	90.1	72.1
Not Known	%	95.4	14.2	9.6	27.6
Human Immunodeficiency Virus (HIV)	N	4732	5858	13502	24092
Yes	%	0.0	0.7	0.5	0.4
No	%	99.9	77.6	91.5	89.8
Not Known	%	0.1	21.7	8.0	9.8
Congenital Abnormalities of the Fetus	N	4729	5846	13469	24044
Yes	%	1.3	1.4	1.7	1.6
No	%	98.5	75.3	81.0	83.1
Not Known	%	0.2	23.3	17.2	15.4
Maternal Weight Gain	N	1926	3376	9536	14838
Very low weight gain (<0.26 lb/week)	%	13.7	17.7	24.7	21.7
Very high weight gain (>=1.74 lb/week)	%	0.9	0.6	0.7	0.7

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Average weight gain (>=0.26 and < 1.74 lb/week	%	85.5	81.8	74.6	77.6
Using Birth Control when became Pregnant with this Pregnancy	N	6495	8168	22271	36934
Yes	%	7.4	8.5	11.1	9.9
No	%	84.7	84.7	84.6	84.7
Sometimes	%	7.9	6.8	4.3	5.5

TABLE B.5.: BIRTH OUTCOMES AND PRETERM LABOR MANAGEMENT DATA, BY MODEL AND OVERALL

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Births					
Total Number of Exit Forms with Valid Birth Information	N	4717	4908	11869	21494
Number of Babies Born	N	4727	4956	12119	21802
Live Births	N	4695	4720	11006	20421
	%	99.3	95.2	90.8	93.7
Stillborn Infants	N	18	79	162	259
	%	0.4	1.6	1.3	1.2
Birth Outcomes: Estimated Gestational Age (EGA) and Birth Weight					
Number of Live Births	N	4667	4367	10078	19112
Very Preterm Births, <34 weeks	%	1.4	3.6	6.4	4.5
Preterm Births, 34 weeks to 36 weeks, 6 days	%	3.8	8.5	9.4	7.8
Early Term Births, 37 weeks to 38 weeks, 6 days	%	20.0	27.5	28.0	25.9
Term Births, 39 weeks to 41 weeks, 6 days	%	70.9	58.7	54.6	59.5
Post Term Births, 42 weeks or more	%	3.9	1.6	1.6	2.2
Number of Live Births	N	4584	4467	10247	19298
Very Low Birthweight,1500 grams	%	0.6	1.6	2.9	2.1
Low Birthweight, 1500 - 2499 grams	%	3.3	8.9	11.6	9
Normal Birthweight, 2500-3999 grams	%	85.2	84.2	79.8	82.1
Macrosomic, >4000 grams	%	10.9	5.3	5.7	6.8
Preterm Labor Management					
Antenatal Steroids	N	4712	5566	12343	22621
Yes	%	0.5	1.9	3.2	2.3

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
No	%	98.9	67.7	62.3	71.3
Not Known	%	0.6	30.4	34.5	26.4
Vaginal Progesterone	N	4302	5276	12345	21923
Yes	%	0.2	0.4	1.1	0.7
No	%	99.2	77.2	68.5	76.6
Not Known	%	0.6	22.4	30.4	22.7
Progesterone Injections	N	317	520	1936	2773
Yes	%	2.2	9.0	16.5	13.5
No	%	97.8	72.1	63.1	68.8
Not Known	%	0.0	18.8	20.4	17.7
Tocolytics	N	4708	5565	12332	22605
Yes	%	0.4	0.8	1.4	1.1
No	%	99.0	68.9	60.4	70.5
Not Known	%	0.6	30.4	38.2	28.4
Induction of Labor, excluding Planned Cesarean sections	N	4612	5157	11174	20943
Yes	%	16.0	27.6	21.9	22.0
No	%	83.4	44.3	42.1	51.8
Not Known	%	0.59	28.10	35.94	26.22
Induction of labor with Pitocin,excluding planned Cesarean sections	N	4445	4500	9538	18483
Yes	%	7.24	26.27	20.37	18.65
No	%	91.81	51.82	50.96	61.00
Not Known	%	0.94	21.91	28.66	20.35
Delivery method					
Planned Delivery Method At Third Trimester	N	4037	4388	11558	19983
Vaginal	%	96.48	84.00	80.61	84.56
C-Section	%	2.23	8.61	13.06	9.89
Unsure	%	1.29	7.38	6.33	5.54
Delivery method, based on exit data	N	4706	4689	10819	20214
Vaginal Only	%	87.31	70.68	67.34	72.77
C-Section Only	%	12.69	29.28	32.30	27.03
Both Vaginal and C-Section	%	0.00	0.04	0.36	0.20
Vaginal Delivery among Women who Planned Vaginal Delivery	N	3895	3686	9317	16898

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Yes	%	74.66	52.06	47.53	54.77
Delivery Method Among Women with Previous C-Section	N	226	672	1921	2819
VBAC	%	31.4	22.9	16.5	19.2
Repeat C-section	%	68.6	77.1	83.5	80.8
Scheduled C-section	N	589	1319	3248	5156
Yes	%	13.6	31.7	35.0	31.7
No	%	22.2	48.9	45.8	43.9
Not Known	%	64.2	19.4	19.2	24.4
Multiples					
Multiples Pregnancy, based on Exit Data	N	4717	4908	11869	21494
two or more identified fetuses	%	0.2	1.0	2.1	1.4
one identified fetus	%	99.8	99.0	97.9	98.6
Multiples Birth, based on Exit Data	N	4686	4678	10794	20158
two or more infants born alive	%	0.2	0.9	1.9	1.3
one infant born alive	%	99.8	99.1	98.1	98.7

TABLE B.6.: ENHANCED ENCOUNTERS AND SERVICES, BY MODEL AND OVERALL

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Enhanced Encounters					
Enhanced encounters, average and median number per participant	N	4287	2178	11889	18354
	Mean	4.0	2.4	4.8	4.3
	Median	3.0	2.0	3.0	3.0
Received Care Coordinator Encounters	N	4737	5898	13691	24326
Yes	%	97.6	39.0	90.6	79.4
No	%	2.2	39.4	7.9	14.4
Not Known	%	0.2	21.6	1.5	6.1
Average and Median Number of Care Coordination Encounters per Participant	N	4280	2158	11853	18291
	Mean	3.9	2.3	4.6	4.2
	Median	3.0	2.0	3.0	3.0
Received Mental Health Encounters	N	4723	5870	13350	23943
Yes	%	0.6	3.0	8.4	5.6

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
No	%	92.6	74.1	85.2	83.9
Not Known	%	6.7	23.0	6.3	10.5
Average and Median Number of Mental Health Encounters per Participant	N	22	141	1056	1219
	Mean	2.4	1.7	2.3	2.2
	Median	1.0	1.0	2.0	2.0
Received Doula Encounters	N	679	5859	13295	19833
Yes	%	80.6	0.3	0.9	3.4
No	%	17.4	75.7	94.3	86.1
Not Known	%	2.1	24.0	4.8	10.4
Average and Median Number of Doula Encounters per Participant	N	68	5	109	182
	Mean	2.4	1.2	2.5	2.4
	Median	2.0	1.0	2.0	2.0
Enhanced Services					
Average and Median Number of Enhanced Services per Participant	N	1354	1018	4312	6684
	Mean	1.5	2.2	4.4	3.5
	Median	1.0	1.0	2.0	2.0
Received Health Education, not Centering	N	56	5589	10958	16603
Yes	%	42.9	7.8	27.8	21.1
No	%	33.9	71.2	64.4	66.6
Not Known	%	23.2	21.0	7.9	12.3
Average and Median Number of Health Education Services per Participant	N	8	345	2739	3092
	Mean	1.3	1.2	2.5	2.4
	Median	1.0	1.0	1.0	1.0
Received Home Visits	N	2317	5589	10966	18872
Yes	%	58.0	2.0	7.0	11.8
No	%	41.6	74.8	87.6	78.2
Not Known	%	0.3	23.2	5.4	10.1
Average and Median Number of Home Visiting Services per Participant	N	1345	55	715	2115
	Mean	1.5	1.3	1.5	1.5
	Median	1.0	1.0	1.0	1.0
Received Self-Care, not Centering	N	52	5571	10615	16238
Yes	%	0.0	3.4	10.9	8.3
No	%	53.8	62.7	82.2	75.4
Not Known	%	46.2	33.9	6.9	16.3

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Average and Median Number of Self-Care Services per Participant	N	0	158	925	1083
	Mean	-	1.2	4.0	3.6
	Median	-	1.0	2.0	2.0
Received Nutrition Counseling	N	4564	5568	10805	20937
Yes	%	0.4	21.8	32.4	22.6
No	%	92.4	57.8	60.5	66.7
Not Known	%	7.3	20.4	7.1	10.7
Average and Median Number of Nutrition Counseling Services per Participant	N	4	867	3123	3994
	Mean	1.0	1.5	2.2	2.0
	Median	1.0	1.0	1.0	1.0
Received Substance Abuse Services	N	4566	5380	10716	20662
Yes	%	0.1	2.5	2.8	2.1
No	%	92.6	85.8	89.7	89.3
Not Known	%	7.3	11.8	7.5	8.6
Average and Median Number of Substance Abuse Services per Participant	N	0	49	308	357
	Mean	-	4.7	2.2	2.6
	Median	-	1.0	1.0	1.0
Referrals					
Referrals for Nonmedical Services Outside of the Strong Start Program	N	4736	5849	13545	24130
Yes	%	3.4	26.9	49.0	34.7
No	%	89.9	57.4	39.9	53.9
Not Known	%	6.7	15.7	11.1	11.3
Referrals for High Risk Medical Services	N	4721	5867	13201	23789
Yes	%	0.4	18.9	20.7	16.2
No	%	92.8	55.2	73.3	72.7
Not Known	%	6.8	25.9	6.1	11.1
Support Person					
Plan to have a support person	N	3807	4197	10311	18315
Yes	%	95.6	92.9	93.6	93.9
No	%	0.9	1.7	1.8	1.6
Unsure	%	3.5	5.4	4.5	4.5
Had a support person during labor	N	3181	3216	9175	15572
Yes	%	98.1	78.1	94.0	91.6
No	%	1.4	5.6	4.1	3.8

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Unsure	%	0.5	16.3	1.9	4.6
Delivery Process					
Delivery Location, based on Exit Data	N	4712	5043	11141	20896
Hospital	%	49.7	99.7	99.0	88.1
Birth center	%	42.3	0.1	0.1	9.6
Home birth	%	7.5	0.0	0.2	1.8
Other	%	0.5	0.2	0.7	0.5
Prenatal Service Provider					
Routine Prenatal Service Provider, based on Exit Data	N	4734	5232	12730	22696
Obstetrician	%	2.2	29.2	63.1	42.6
Licensed Professional Midwife	%	19.2	2.0	0.6	4.8
Nurse Practitioner	%	0.1	20.5	4.8	7.4
Certified Nurse Midwife/Certified Midwife	%	77.2	43.4	20.0	37.3
Family Medicine Physician	%	1.1	3.0	1.4	1.7
Other Provider	%	0.2	1.9	10.1	6.1
Prenatal Visits					
Received Individual Prenatal Visits	N	4722	5116	12010	21848
Yes	%	99.9	92.2	95.7	93.3
No	%	0.1	18.4	4.3	6.7
Average and Median Number of Individual Prenatal Visists per Participant	N	4715	4716	11494	20385
	Mean	10.9	5.3	9.4	8.9
	Median	11.0	5.0	10.0	9.0
Received Group Prenatal Visits	N	4722	5116	12010	21848
Yes	%	2.4	81.7	1.1	20.2
No	%	97.6	18.3	98.9	79.8
Average and Median Number of Group Prenatal Visits per Participant	N	111	4182	127	4420
	Mean	7.0	6.1	5.8	6.1
	Median	7.0	6.0	5.0	6.0

TABLE B.7.: BIRTH CONTROL, BREASTFEEDING, AND PARTICIPANT SATISFACTION, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Birth Control Counseling					
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	N	3132	3163	9132	15427
Yes	%	75.6	77.6	83.0	80.4
No	%	21.4	14.6	14.7	16.1
Unsure	%	3.0	7.8	2.3	3.6
Breastfeeding					
Breastfeeding Intention at Third Trimester	N	4015	4376	11521	19912
Breastfeed only	%	80.8	49.1	39.0	49.7
Formula feed only	%	4.1	9.9	17.2	12.9
Both breast and formula feed	%	11.3	32.2	32.8	28.3
I haven't decided	%	3.9	8.8	11.0	9.1
Breastfeeding after Delivery (Based on Postpartum Form Data)	N	3165	3192	9231	15588
Yes	%	91.9	78.3	72.3	77.5
No	%	7.6	14.6	26.5	20.2
Prefer not to answer	%	0.5	7.0	1.3	2.3
Breastfeeding among Women who Intended to Breastfeed	N	3696	3557	8276	15529
Yes	%	66.4	49.0	56.0	56.8
Satisfaction					
Satisfaction with Prenatal Care	N	4017	4290	11321	19628
Not at all satisfied	%	0.0	0.7	0.6	0.5
Slightly satisfied	%	0.6	1.1	1.5	1.2
Moderately satisfied	%	3.6	5.2	8.1	6.6
Very satisfied	%	29.9	40.3	42.2	39.3
Extremely satisfied	%	65.8	52.7	47.6	52.4
Satisfaction with Delivery Experience	N	3158	2723	9043	14924
Not at all satisfied	%	2.1	3.4	2.5	2.6
Slightly satisfied	%	2.9	4.4	3.2	3.3
Moderately satisfied	%	10.5	11.7	12.4	11.9
Very satisfied	%	28.2	44.7	42.9	40.1
Extremely satisfied	%	56.2	35.8	39.1	42.1

APPENDIX C: DATA QUALITY REPORT

TABLES C.1: MISSING DATA ELEMENTS BY MODEL

TABLE C.1.1.: SOCIODEMOGRAPHIC CHARACTERISTICS

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Mother's Age at Intake	N	38	180	258	476
	%	0.6	2.1	1.1	1.2
Race and Ethnicity	N	54	209	358	621
	%	0.8	2.4	1.6	1.6
Employed at Intake	N	87	319	423	829
	%	1.3	3.7	1.8	2.2
Education Level at Intake	N	686	1684	3767	6137
	%	10.4	19.7	16.4	16.1
Relationship Status at Intake	N	87	655	595	1337
	%	1.3	7.7	2.6	3.5
Smokes Cigarettes at Intake	N	619	1537	1420	3576
	%	9.4	18	6.2	9.4
Food Insecure at Intake	N	68	589	785	1442
	%	1.0	6.9	3.4	3.8

TABLE C.1.2.: RISK FACTORS FROM PAST PREGNANCIES

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Mental Risk Factors					
Exhibiting Depressive Symptoms at Intake	N	100	626	841	1567
	%	1.5	7.3	3.7	4.1
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	N	79	602	905	1586
	%	1.2	7	3.9	4.2
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	N	417	1408	2811	4636
	%	6.3	16.5	12.2	12.2
BMI of Mother at First Prenatal Visit	N	250	1684	1743	3677
	%	5.3	27.4	12.4	14.7
Pre-Pregnancy Diagnoses					
Pre-Pregnancy Diagnosis of Type I Diabetes	N	9	268	426	703
	%	0.2	4.4	3	2.8
Pre-Pregnancy Diagnosis of Type II Diabetes	N	14	286	451	751
	%	0.3	4.7	3.2	3
Pre-Pregnancy Diagnosis of Hypertension	N	9	278	420	707
	%	0.2	4.5	3	2.8
Risk Factors from Past Pregnancies					
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	N	12	112	336	460
	%	0.4	3.5	3.8	3.1
Previous Birth < 2,500 grams	N	18	425	400	843
	%	0.7	13.2	4.5	5.7

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Previous Miscarriage (< 20 weeks EGA)	N	17	67	138	222
	%	0.5	2	1.4	1.4
Previous Elective Termination	N	15	64	140	219
	%	0.4	2	1.5	1.3
Previous Still Birth (fetal death >= 20 weeks EGA)	N	16	168	361	545
	%	0.6	5.2	4.1	3.7
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	N	612	960	2207	3779
	%	22.1	29.9	25.1	25.6

TABLE C.1.3.: RISK FACTORS FROM CURRENT PREGNANCY

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Risk Factors During Current Pregnancy					
Urinary Tract Infection(s) during Last 6 months of Pregnancy	N	19	397	576	992
	%	0.4	6.5	4.1	4
Cervical Incompetence	N	20	287	568	875
	%	0.4	4.7	4	3.5
Placenta Previa	N	20	308	571	899
	%	0.4	5	4.1	3.6
Placental Abruption	N	16	314	580	910
	%	0.3	5.1	4.1	3.6
Gestational Diabetes	N	15	312	563	890
	%	0.3	5.1	4	3.6
Pregnancy-Related Hypertension	N	16	314	561	891
	%	0.3	5.1	4	3.6
Preeclampsia	N	17	314	569	900
	%	0.4	5.1	4	3.6
Syphilis	N	15	337	556	908
	%	0.3	5.5	4	3.6
Human Immunodeficiency Virus (HIV)	N	15	290	554	859
	%	0.3	4.7	3.9	3.4
Congenital Abnormalities of the Fetus	N	18	302	587	907
	%	0.4	4.9	4.2	3.6
Maternal Weight Gain	N	2821	2772	4520	10113
	%	59.4	45.1	32.2	40.5
Using Birth Control when became Pregnant with this Pregnancy	N	99	391	725	1215
	%	1.5	4.6	3.2	3.2

TABLE C.1.4.: BIRTH OUTCOMES

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Birth Status (Live or Stillborn)	N of Babies	14	178	966	1158
	%	0.3	3.6	8	5.3
Number of Live Births for EGA	N of Babies	21	604	1003	1628
	%	0.4	12.8	9.1	8
Number of Live Births for Birth Weight	N of Babies	111	253	759	1123
	%	2.4	5.4	6.9	5.5
Preterm Labor Management					
Antenatal Steroids	N	35	582	1713	2330
	%	0.7	9.5	12.2	9.3
Vaginal Progesterone	N	445	872	1711	3028
	%	9.4	14.2	12.2	12.1
Progesterone Injections	N	38	99	249	386
	%	10.7	16	11.4	12.2
Tocolytics	N	39	583	1724	2346
	%	0.8	9.5	12.3	9.4
Induction of Labor, excluding Planned Cesarean sections	N	55	571	1721	2347
	%	1.2	10	13.3	10.1
Induction of labor with Pitocin, excluding planned Cesarean sections	N	222	1228	3357	4807
	%	4.8	21.4	26	20.6
Delivery Method					
Planned Delivery Method At Third Trimester	N	51	179	174	404
	%	1.2	3.9	1.5	2
Delivery method, based on exit data	N	41	1459	3237	4737
	%	0.9	23.7	23	19
Scheduled C-section	N	8	56	285	349
	%	1.3	4.1	8.1	6.3
Multiples					
Multiples Pregnancy, based on Exit Data	N	30	1240	2187	3457
	%	0.6	20.2	15.6	13.9
Multiples Birth, based on Exit Data	N	61	1470	3262	4793
	%	1.3	23.9	23.2	19.2

TABLE C.1.5.: SERVICE UTILIZATION

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Enhanced Encounters					
Received Care Coordinator Encounters	N	10	250	365	625
	%	0.2	4.1	2.6	2.5
Received Mental Health Encounters	N	24	278	706	1008
	%	0.5	4.5	5	4

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Received Doula Encounters	N	4068	289	761	5118
	%	85.7	4.7	5.4	20.5
Enhanced Services					
Received Health Education, not Centering	N	4691	559	3098	8348
	%	98.8	9.1	22	33.5
Received Home Visits	N	2430	559	3090	6079
	%	51.2	9.1	22	24.4
Received Self-Care, not Centering	N	4695	577	3441	8713
	%	98.9	9.4	24.5	34.9
Received Nutrition Counseling	N	183	580	3251	4014
	%	3.9	9.4	23.1	16.1
Received Substance Abuse Services	N	181	768	3340	4289
	%	3.8	12.5	23.8	17.2
Referrals					
Referrals for Nonmedical Services Outside of the Strong Start Program	N	11	299	511	821
	%	0.2	4.9	3.6	3.3
Had a support person during labor	N	226	767	1484	2477
	%	6.6	19.3	13.9	13.7
Delivery Process					
Delivery Location, based on Exit Data	N	35	1105	2915	4055
	%	0.7	18	20.7	16.3
Routine Prenatal Service Provider, based on Exit Data	N	13	916	1326	2255
	%	0.3	14.9	9.4	9

TABLE C.1.6.: SATISFACTION

Data Elements	Type	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	N	275	820	1527	2622
	%	8.1	20.6	14.3	14.5
Breastfeeding					
Breastfeeding Intention at Third Trimester	N	73	191	211	475
	%	1.8	4.2	1.8	2.3
Breastfeeding after Delivery (Based on Postpartum Form Data)	N	242	791	1428	2461
	%	7.1	19.9	13.4	13.6
Satisfaction					
Satisfaction with Prenatal Care	N	71	277	411	759
	%	1.7	6.1	3.5	3.7
Satisfaction with Delivery Experience	N	249	1260	1616	3125
	%	7.3	31.6	15.2	17.3

TABLE C.2: MISSING DATA ELEMENTS BY AWARDEE

TABLE C.2.1.: SOCIODEMOGRAPHIC CHARACTERISTICS

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Mother's Age at Intake	N	0	23	38	4	15	0	26	4	8	2	1	0	4	9	1	2	24	7	2	136	4	2	38	0	116	3	7	476
	%	0	2.5	0.6	0.7	1.4	0	4	0.3	1.5	0.1	0	0	0.5	0.5	0	0.3	0.9	0.4	1.5	17.8	0.4	0.2	5.6	0	7.4	0.9	0.6	1.2
Race and Ethnicity	N	37	13	52	1	21	4	0	4	9	4	88	5	4	10	33	5	62	48	0	27	19	3	24	17	9	56	66	621
	%	1.4	1.4	0.8	0.2	2	0.3	0	0.3	1.6	0.3	3.2	0.6	0.5	0.6	1.5	0.8	2.3	2.8	0	3.5	1.7	0.2	3.5	1.9	0.6	16.1	5.3	1.6
Employed at Intake	N	28	23	82	9	21	8	10	8	5	6	36	4	0	10	41	6	35	171	0	26	8	4	20	14	35	70	149	829
	%	1.1	2.5	1.3	1.5	2	0.6	1.5	0.7	0.9	0.4	1.3	0.5	0	0.6	1.8	1	1.3	10.1	0	3.4	0.7	0.3	2.9	1.5	2.2	20.2	11.9	2.2
Education Level at Intake	N	626	121	655	54	239	122	56	118	58	83	428	129	34	80	493	118	448	433	14	232	312	80	291	274	161	124	354	6137
	%	24.3	13	10.4	9	23	9.2	8.6	9.7	10.6	5.2	15.8	16.6	4.1	4.5	21.8	19.1	16.5	25.5	10.5	30.3	28.7	6.1	42.7	30.2	10.3	35.7	28.3	16.1
Relationship Status at Intake	N	44	60	77	22	56	7	21	8	11	23	19	8	2	8	117	12	74	188	0	18	13	11	23	35	68	199	213	1337
	%	1.7	6.4	1.2	3.6	5.4	0.5	3.2	0.7	2	1.4	0.7	1	0.2	0.5	5.2	1.9	2.7	11.1	0	2.4	1.2	0.8	3.4	3.9	4.3	57.3	17	3.5
Smokes Cigarettes at Intake	N	129	172	581	82	160	14	66	68	53	132	107	6	1	20	459	38	230	172	6	54	27	7	0	106	123	277	486	3576
	%	5	18.5	9.3	13.6	15.4	1.1	10.1	5.6	9.7	8.3	4	0.8	0.1	1.1	20.3	6.2	8.5	10.1	4.5	7.1	2.5	0.5	0	11.7	7.9	79.8	38.9	9.4
Food Insecure at Intake	N	33	50	64	15	38	5	7	2	9	3	41	6	3	0	69	1	33	430	2	54	12	2	22	26	34	197	284	1442
	%	1.3	5.4	1	2.5	3.7	0.4	1.1	0.2	1.6	0.2	1.5	0.8	0.4	0	3.1	0.2	1.2	25.4	1.5	7.1	1.1	0.2	3.2	2.9	2.2	56.8	22.7	3.8

TABLE C.2.2.: RISK FACTORS FROM PAST PREGNANCIES

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Mental Risk Factors																													
Exhibiting Depressive Symptoms at Intake	N	17	42	99	17	38	5	8	3	12	6	41	6	7	3	62	4	42	436	0	96	7	18	30	32	31	196	309	1567
	%	0.7	4.5	1.6	2.8	3.7	0.4	1.2	0.2	2.2	0.4	1.5	0.8	0.9	0.2	2.7	0.6	1.5	25.7	0	12.5	0.6	1.4	4.4	3.5	2	56.5	24.7	4.1
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	N	38	42	74	14	31	65	10	2	6	5	49	2	5	4	29	2	52	421	2	90	46	3	38	17	23	195	321	1586
	%	1.5	4.5	1.2	2.3	3	4.9	1.5	0.2	1.1	0.3	1.8	0.3	0.6	0.2	1.3	0.3	1.9	24.8	1.5	11.8	4.2	0.2	5.6	1.9	1.5	56.2	25.7	4.2
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	N	293	107	386	56	164	276	46	154	55	69	107	76	52	138	207	42	274	575	37	222	159	148	97	126	127	196	447	4636
	%	11.4	11.5	6.2	9.3	15.8	20.8	7.1	12.7	10.1	4.3	4	9.8	6.3	7.8	9.2	6.8	10.1	33.9	27.8	29	14.6	11.3	14.2	13.9	8.1	56.5	35.8	12.2
BMI of Mother at First Prenatal Visit	N	25	58	236	205	10	26	34	8	12	57	134	15	89	145	754	42	134	204	57	26	7	1	369	14	3	48	964	3677
	%	2.6	10.1	5.2	48.1	1.3	3.1	11.8	0.8	4.3	4.5	10.6	2	11	33	34.6	23.9	7.4	16.3	74	9.3	1	0.1	75	2.3	0.3	17.1	94.8	14.7
Pre-Pregnancy Diagnoses																													
Pre-Pregnancy Diagnosis of Type I Diabetes	N	5	8	0	163	2	6	0	16	4	39	19	34	7	5	122	19	57	102	1	16	4	10	0	3	12	48	1	703
	%	0.5	1.4	0	38.3	0.3	0.7	0	1.6	1.4	3.1	1.5	4.6	0.9	1.1	5.6	10.8	3.1	8.2	1.3	5.7	0.5	1.2	0	0.5	1.2	17.1	0.1	2.8
Pre-Pregnancy Diagnosis of Type II Diabetes	N	4	7	5	164	2	5	0	16	5	38	19	33	7	5	130	18	56	122	1	17	4	11	21	3	12	45	1	751
	%	0.4	1.2	0.1	38.5	0.3	0.6	0	1.6	1.8	3	1.5	4.4	0.9	1.1	6	10.2	3.1	9.8	1.3	6	0.5	1.3	4.3	0.5	1.2	16	0.1	3
Pre-Pregnancy Diagnosis of Hypertension	N	6	8	0	164	2	6	1	16	4	35	19	34	4	5	121	19	55	102	0	17	4	10	0	2	13	59	1	707
	%	0.6	1.4	0	38.5	0.3	0.7	0.3	1.6	1.4	2.8	1.5	4.6	0.5	1.1	5.6	10.8	3	8.2	0	6	0.5	1.2	0	0.3	1.3	21	0.1	2.8
Risk Factors from Past Pregnancies																													
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	N	16	8	0	68	2	4	2	5	7	24	21	5	0	10	113	6	99	41	0	7	7	8	0	0	3	4	0	460
	%	2.3	2.4	0	31.1	0.7	0.7	2	0.8	5.4	2.9	3.5	1.1	0	3.8	8.6	6.8	8.4	5.2	0	3.6	1.4	1.6	0	0	0.5	3.2	0	3.1
Previous Birth < 2,500 grams	N	18	7	4	72	3	8	2	7	11	49	21	10	9	13	115	11	101	53	2	9	5	8	293	0	7	5	0	843
	%	2.6	2.1	0.2	32.9	1.1	1.5	2	1.1	8.5	5.9	3.5	2.2	1.6	4.9	8.7	12.5	8.6	6.8	3.2	4.7	1	1.6	98	0	1.2	4	0	5.7
Previous Miscarriage (< 20 weeks EGA)	N	4	10	0	10	1	2	1	2	6	21	13	12	2	2	39	6	40	14	0	2	2	7	0	1	7	18	0	222
	%	0.5	2.5	0	5.6	0.2	0.3	0.8	0.3	4.3	2.2	1.7	2.3	0.3	0.7	3	7.1	3.2	1.6	0	1	0.4	1.2	0	0.2	1.1	13.6	0	1.4
Previous Elective Termination	N	5	7	0	12	0	2	1	2	3	11	13	12	3	2	44	8	39	14	1	3	6	7	0	1	7	16	0	219
	%	0.7	1.7	0	6.7	0	0.3	0.8	0.3	2.2	1.2	1.7	2.3	0.5	0.7	3.4	9.5	3.1	1.6	1.5	1.5	1.1	1.2	0	0.2	1.1	12.1	0	1.3
Previous Still Birth (fetal death	N	22	10	4	68	3	8	2	5	7	35	22	13	3	11	116	9	102	22	2	7	6	9	34	0	9	16	0	545

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
>= 20 weeks EGA)	%	3.2	2.9	0.2	31.1	1.1	1.5	2	0.8	5.4	4.2	3.6	2.8	0.5	4.2	8.8	10.2	8.6	2.8	3.2	3.6	1.2	1.8	11.4	0	1.5	12.8	0	3.7
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	N	135	150	586	33	74	28	20	171	28	183	385	126	143	35	455	19	202	260	25	53	63	59	81	86	108	125	146	3779
	%	19.8	44.2	22.4	15.1	26.8	5.2	20.4	27.3	21.5	21.9	63.8	27.6	25.8	13.2	34.5	21.6	17.1	33.2	40.3	27.5	12.5	11.6	27.1	22	18.5	100	28.5	25.6

TABLE C.2.3.: RISK FACTORS FROM CURRENT PREGNANCY

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Risk Factors During Current Pregnancy																													
Urinary Tract Infection(s) during Last 6 months of Pregnancy	N	9	21	0	177	5	4	1	7	16	67	23	44	2	9	82	22	73	251	3	18	0	3	103	3	8	40	1	992
	%	0.9	3.7	0	41.5	0.7	0.5	0.3	0.7	5.8	5.3	1.8	5.9	0.2	2	3.8	12.5	4	20.1	3.9	6.4	0	0.4	20.9	0.5	0.8	14.2	0.1	4
Cervical Incompetence	N	9	17	5	177	4	3	1	7	13	70	17	42	1	10	83	22	70	251	0	19	1	3	0	3	6	40	1	875
	%	0.9	3	0.1	41.5	0.5	0.4	0.3	0.7	4.7	5.5	1.3	5.7	0.1	2.3	3.8	12.5	3.9	20.1	0	6.8	0.1	0.4	0	0.5	0.6	14.2	0.1	3.5
Placenta Previa	N	11	17	5	178	3	4	1	7	13	70	15	43	2	12	81	22	70	249	0	19	2	4	21	3	6	40	1	899
	%	1.1	3	0.1	41.8	0.4	0.5	0.3	0.7	4.7	5.5	1.2	5.8	0.2	2.7	3.7	12.5	3.9	19.9	0	6.8	0.3	0.5	4.3	0.5	0.6	14.2	0.1	3.6
Placental Abruption	N	11	24	0	178	3	4	1	7	13	70	17	48	1	13	82	21	71	252	0	19	1	3	21	3	5	41	1	910
	%	1.1	4.2	0	41.8	0.4	0.5	0.3	0.7	4.7	5.5	1.3	6.5	0.1	3	3.8	11.9	3.9	20.2	0	6.8	0.1	0.4	4.3	0.5	0.5	14.6	0.1	3.6
Gestational Diabetes	N	9	18	0	176	3	4	4	12	14	73	16	43	2	11	83	21	70	241	0	18	1	3	21	3	5	38	1	890
	%	0.9	3.1	0	41.3	0.4	0.5	1.4	1.2	5.1	5.8	1.3	5.8	0.2	2.5	3.8	11.9	3.9	19.3	0	6.4	0.1	0.4	4.3	0.5	0.5	13.5	0.1	3.6
Pregnancy-Related Hypertension	N	9	22	0	178	3	4	2	7	12	72	20	46	2	12	88	21	70	228	0	18	0	4	21	3	5	43	1	891
	%	0.9	3.8	0	41.8	0.4	0.5	0.7	0.7	4.3	5.7	1.6	6.2	0.2	2.7	4	11.9	3.9	18.3	0	6.4	0	0.5	4.3	0.5	0.5	15.3	0.1	3.6
Preeclampsia	N	10	22	0	177	3	4	3	7	13	77	21	49	1	11	79	21	72	235	0	17	2	4	21	3	5	42	1	900
	%	1	3.8	0	41.5	0.4	0.5	1	0.7	4.7	6.1	1.7	6.6	0.1	2.5	3.6	11.9	4	18.8	0	6	0.3	0.5	4.3	0.5	0.5	14.9	0.1	3.6
Syphilis	N	11	18	0	180	3	5	3	8	13	74	14	41	1	11	82	21	70	236	0	19	0	3	42	3	6	43	1	908
	%	1.1	3.1	0	42.3	0.4	0.6	1	0.8	4.7	5.9	1.1	5.5	0.1	2.5	3.8	11.9	3.9	18.9	0	6.8	0	0.4	8.5	0.5	0.6	15.3	0.1	3.6
Human Immunodeficiency Virus (HIV)	N	11	18	0	179	3	4	3	7	12	72	13	39	1	11	84	21	69	236	0	20	2	3	0	3	6	41	1	859
	%	1.1	3.1	0	42	0.4	0.5	1	0.7	4.3	5.7	1	5.2	0.1	2.5	3.9	11.9	3.8	18.9	0	7.1	0.3	0.4	0	0.5	0.6	14.6	0.1	3.4
Congenital Abnormalities of the Fetus	N	11	21	0	179	5	4	4	8	13	73	24	46	1	12	90	21	77	237	2	19	2	3	0	4	6	44	1	907
	%	1.1	3.7	0	42	0.7	0.5	1.4	0.8	4.7	5.8	1.9	6.2	0.1	2.7	4.1	11.9	4.2	19	2.6	6.8	0.3	0.4	0	0.7	0.6	15.7	0.1	3.6
Maternal Weight Gain	N	303	172	2780	212	158	386	72	155	67	146	1172	219	163	85	676	56	406	327	68	68	203	42	468	122	326	281	980	10113
	%	31.1	30	61.6	49.8	20.8	45.4	25.1	15.3	24.2	11.6	92.4	29.5	20.2	19.3	31	31.8	22.4	26.2	88.3	24.2	27.7	5	95.1	20	32.3	100	96.4	40.5
Using Birth Control when became Pregnant with this Pregnancy	N	35	32	89	12	43	16	12	22	6	50	38	9	5	8	86	11	61	333	1	23	17	11	23	20	52	200	0	1215
	%	1.4	3.4	1.4	2	4.1	1.2	1.8	1.8	1.1	3.1	1.4	1.2	0.6	0.5	3.8	1.8	2.2	19.6	0.8	3	1.6	0.8	3.4	2.2	3.3	57.6	0	3.2

TABLE C.2.4.: BIRTH OUTCOMES

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Birth Status (Live or Stillborn)	N of Babies	284	32	6	11	89	46	12	0	7	21	33	13	67	4	225	4	55	27	0	9	189	4	0	0	0	15	5	1158
	%	28.6	5.8	0.1	4	11.8	6.7	4.5	0	3.1	1.8	4.2	2.4	8.1	1.1	11.7	2.9	3.7	2.5	0	3.4	25.6	0.5	0	0	0	6.8	1	5.3
Number of Live Births for EGA	N of Babies	20	69	15	33	67	16	37	37	12	11	636	7	7	14	147	7	25	48	17	29	12	4	5	74	39	66	174	1628
	%	2.9	13.4	0.3	12.7	10.1	2.5	14.6	4.2	5.4	0.9	84.6	1.3	0.9	3.8	8.7	5.2	1.8	4.5	25.8	11.6	2.2	0.5	1.5	13.1	5.2	32.4	36.9	8
Number of Live Births for Birth Weight	N of Babies	27	10	104	11	17	22	9	2	6	21	30	9	8	66	191	9	39	87	2	251	15	6	11	9	1	60	100	1123
	%	3.9	1.9	2.3	4.2	2.6	3.5	3.5	0.2	2.7	1.8	4	1.7	1.1	17.9	11.3	6.7	2.7	8.2	3	100	2.8	0.8	3.3	1.6	0.1	29.4	21.2	5.5
Preterm Labor Management																													
Antenatal Steroids	N	278	34	0	178	20	148	5	143	33	99	202	48	10	20	253	31	233	252	0	1	62	34	0	43	146	57	0	2330
	%	28.5	5.9	0	41.8	2.6	17.4	1.7	14.1	11.9	7.8	15.9	6.5	1.2	4.5	11.6	17.6	12.9	20.2	0	0.4	8.4	4.1	0	7.1	14.5	20.3	0	9.3
Vaginal Progesterone	N	281	30	411	177	20	147	5	143	34	100	202	50	10	21	247	31	229	254	0	1	62	33	295	43	146	56	0	3028
	%	28.8	5.2	9.1	41.5	2.6	17.3	1.7	14.1	12.3	7.9	15.9	6.7	1.2	4.8	11.3	17.6	12.6	20.3	0	0.4	8.4	3.9	60	7.1	14.5	19.9	0	12.1
Progesterone Injections	N	39	3	32	17	1	19	1	10	1	17	24	10	2	2	36	4	39	29	0	1	10	6	42	10	28	3	0	386
	%	22.4	3.2	9.7	37	2.5	12.7	6.2	12.7	5.9	7.9	19.7	11.2	0.9	5.7	10.8	23.5	22.5	22.1	0	1.4	11.1	2.9	80.8	8	13	17.6	0	12.2
Tocolytics	N	278	34	5	180	20	150	5	143	33	105	203	49	10	23	250	31	229	256	0	1	62	34	0	44	146	55	0	2346
	%	28.5	5.9	0.1	42.3	2.6	17.6	1.7	14.1	11.9	8.3	16	6.6	1.2	5.2	11.5	17.6	12.6	20.5	0	0.4	8.4	4.1	0	7.2	14.5	19.6	0	9.4
Induction of Labor, excluding Planned Cesarean sections	N	278	19	23	177	21	148	7	148	33	97	207	59	11	18	252	32	230	243	2	1	64	36	0	42	147	52	0	2347
	%	31.8	3.7	0.5	44.4	3	18.7	2.6	15.5	12.9	8.4	17.8	8.3	1.6	4.5	12.5	19	13.4	22.1	2.9	0.4	9.4	4.8	0	9	16	19.4	0	10.1
Induction of labor with Pitocin, excluding planned Cesarean sections	N	340	71	185	180	35	606	49	170	35	135	324	137	50	58	668	34	425	282	22	4	98	44	0	83	177	56	539	4807
	%	38.9	14	4.2	45.1	4.9	76.5	18	17.8	13.7	11.7	27.8	19.2	7.1	14.4	33.1	20.2	24.7	25.6	31.4	1.5	14.3	5.8	0	17.8	19.3	20.9	53	20.6
Delivery Method																													
Planned Delivery Method At Third Trimester	N	16	36	48	20	23	4	15	1	19	9	16	2	4	7	55	4	22	8	1	4	15	2	8	23	18	5	19	404
	%	1	10	1.2	5.7	3.9	0.6	3.7	0.1	6.1	1	2	0.4	0.7	0.6	5	3.6	1.3	1.1	1.3	1	3	0.3	2.3	4.2	2.5	2.5	4.9	2
Delivery method, based on exit data	N	286	57	8	171	98	255	34	144	56	120	527	205	75	57	559	40	406	216	16	38	201	41	208	43	275	88	513	4737
	%	29.3	9.9	0.2	40.1	12.9	30	11.8	14.2	20.2	9.5	41.6	27.6	9.3	13	25.7	22.7	22.4	17.3	20.8	13.5	27.4	4.9	42.3	7.1	27.2	31.3	50.4	19
Scheduled C-section	N	3	5	0	17	10	3	1	7	2	36	13	5	6	105	60	1	27	15	0	7	8	2	0	3	8	4	1	349
	%	1.4	3.6	0	20.7	4.7	1.3	1.4	3.5	3.3	9.4	4.9	4.8	2.3	68.2	10.2	2.9	6.4	4.9	0	12.1	5	0.9	0	1.1	3.2	6.8	0.8	6.3

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Multiples																													
Multiples Pregnancy,	N	3	24	10	156	7	186	19	143	51	86	487	204	8	69	293	36	342	176	13	20	8	41	164	39	273	62	537	3457
based on Exit Data	%	0.3	4.2	0.2	36.6	0.9	21.9	6.6	14.1	18.4	6.8	38.4	27.5	1	15.7	13.5	20.5	18.9	14.1	16.9	7.1	1.1	4.9	33.3	6.4	27	22.1	52.8	13.9
Multiples Birth,	N	293	62	33	170	102	241	33	144	58	113	527	222	90	73	526	42	403	209	13	34	201	71	164	60	282	78	549	4793
based on Exit Data	%	30.1	10.8	0.7	39.9	13.4	28.3	11.5	14.2	20.9	9	41.6	29.9	11.1	16.6	24.2	23.9	22.2	16.7	16.9	12.1	27.4	8.5	33.3	9.9	27.9	27.8	54	19.2

TABLE C.2.5.: SERVICE UTILIZATION

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Enhanced Encounters																													
Received Care	N	3	9	2	162	4	1	3	2	9	39	8	0	3	151	47	24	39	38	26	0	3	4	0	2	2	43	1	625
Coordinator Encounters	%	0.3	1.6	0	38	0.5	0.1	1	0.2	3.2	3.1	0.6	0	0.4	34.3	2.2	13.6	2.2	3	33.8	0	0.4	0.5	0	0.3	0.2	15.3	0.1	2.5
Received Mental	N	2	18	5	167	4	12	7	2	9	57	50	15	0	51	86	22	72	54	26	281	15	5	0	1	2	44	1	1008
Health Encounters	%	0.2	3.1	0.1	39.2	0.5	1.4	2.4	0.2	3.2	4.5	3.9	2	0	11.6	3.9	12.5	4	4.3	33.8	100	2	0.6	0	0.2	0.2	15.7	0.1	4
Received Doula Encounters	N	5	21	4035	167	6	12	7	4	10	54	59	17	1	96	89	23	88	46	26	281	16	5	0	2	1	46	1	5118
	%	0.5	3.7	89.4	39.2	0.8	1.4	2.4	0.4	3.6	4.3	4.7	2.3	0.1	21.8	4.1	13.1	4.9	3.7	33.8	100	2.2	0.6	0	0.3	0.1	16.4	0.1	20.5
Enhanced Services																													
Received Health Education,	N	2	20	4512	178	4	747	281	2	12	46	66	16	464	276	100	25	1013	137	26	0	14	359	0	1	2	44	1	8348
not Centering	%	0.2	3.5	100	41.8	0.5	87.8	97.9	0.2	4.3	3.6	5.2	2.2	57.4	62.7	4.6	14.2	55.9	11	33.8	0	1.9	42.9	0	0.2	0.2	15.7	0.1	33.5
Received Home Visits	N	3	20	2250	182	4	747	281	1	10	45	32	16	464	275	140	24	1012	135	26	0	7	357	0	2	2	43	1	6079
	%	0.3	3.5	49.9	42.7	0.5	87.8	97.9	0.1	3.6	3.6	2.5	2.2	57.4	62.5	6.4	13.6	55.8	10.8	33.8	0	1	42.7	0	0.3	0.2	15.3	0.1	24.4
Received Self-Care,	N	2	23	4512	178	5	747	282	1	14	47	34	16	464	275	207	25	1021	138	27	281	10	357	0	1	2	43	1	8713
not Centering	%	0.2	4	100	41.8	0.7	87.8	98.3	0.1	5.1	3.7	2.7	2.2	57.4	62.5	9.5	14.2	56.3	11	35.1	100	1.4	42.7	0	0.2	0.2	15.3	0.1	34.9
Received Nutrition Counseling	N	3	21	0	174	4	747	282	7	11	41	12	16	464	229	99	24	1016	137	26	275	13	358	0	5	2	47	1	4014
	%	0.3	3.7	0	40.8	0.5	87.8	98.3	0.7	4	3.2	0.9	2.2	57.4	52	4.5	13.6	56	11	33.8	97.9	1.8	42.8	0	0.8	0.2	16.7	0.1	16.1

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Received Substance Abuse Services	N	2	22	0	178	5	747	282	2	15	53	10	16	464	242	150	25	1021	145	28	281	7	358	181	2	2	50	1	4289
	%	0.2	3.8	0	41.8	0.7	87.8	98.3	0.2	5.4	4.2	0.8	2.2	57.4	55	6.9	14.2	56.3	11.6	36.4	100	1	42.8	36.8	0.3	0.2	17.8	0.1	17.2
Referrals																													
Referrals for Nonmedical Services Outside of the Strong Start Program	N	7	26	0	176	4	1	1	4	11	54	6	2	2	99	95	24	49	53	26	98	0	21	0	8	9	44	1	821
	%	0.7	4.5	0	41.3	0.5	0.1	0.3	0.4	4	4.3	0.5	0.3	0.2	22.5	4.4	13.6	2.7	4.2	33.8	34.9	0	2.5	0	1.3	0.9	15.7	0.1	3.3
Had a support person during labor	N	124	149	219	160	64	243	1	297	7	271	26	6	130	6	132	26	110	41	51	3	44	153	0	5	158	4	47	2477
	%	9.1	59.4	6.8	46.6	13.9	33.4	0.8	31.5	3	27.3	4.7	2	17.4	0.5	12.7	23	7.6	6.7	59.3	1.2	11.7	21.4	0	1.3	27.8	4.4	6.9	13.7
Delivery Process																													
Delivery Location, based on Exit Data	N	281	46	6	166	82	231	32	143	55	103	523	190	74	48	439	33	351	206	3	2	189	37	0	27	273	56	459	4055
	%	28.8	8	0.1	39	10.8	27.1	11.1	14.1	19.9	8.2	41.2	25.6	9.2	10.9	20.2	18.8	19.4	16.5	3.9	0.7	25.7	4.4	0	4.4	27	19.9	45.1	16.3
Routine Prenatal Service Provider, based on Exit Data	N	1	17	1	184	9	10	20	70	64	85	351	17	16	102	294	45	126	189	29	0	10	10	31	25	26	73	450	2255
	%	0.1	3	0	43.2	1.2	1.2	7	6.9	23.1	6.7	27.7	2.3	2	23.2	13.5	25.6	6.9	15.1	37.7	0	1.4	1.2	6.3	4.1	2.6	26	44.2	9

TABLE C.2.6.: SATISFACTION

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	N	119	155	270	154	84	251	2	299	13	266	44	6	127	10	148	30	117	33	52	4	29	155	0	17	181	9	47	2622
	%	8.7	61.8	8.4	44.9	18.2	34.5	1.7	31.7	5.6	26.8	7.9	2	17	0.8	14.2	26.5	8.1	5.4	60.5	1.5	7.7	21.7	0	4.6	31.9	10	6.9	14.5
Breastfeeding																													
Breastfeeding Intention at Third Trimester	N	26	35	69	25	34	7	17	4	17	18	19	5	5	6	45	4	36	18	2	4	13	5	6	25	14	1	15	475
	%	1.6	9.7	1.8	7.2	5.8	1	4.2	0.5	5.4	2.1	2.4	1.1	0.9	0.5	4.1	3.6	2.1	2.5	2.6	1	2.6	0.8	1.7	4.5	1.9	0.5	3.9	2.3
Breastfeeding after Delivery (Based on Postpartum Form Data)	N	80	152	236	149	76	238	1	297	12	263	25	2	133	9	151	30	99	34	51	2	23	155	0	13	180	3	47	2461
	%	5.8	60.6	7.3	43.4	16.5	32.7	0.8	31.5	5.2	26.5	4.5	0.7	17.8	0.8	14.5	26.5	6.9	5.6	59.3	0.8	6.1	21.7	0	3.5	31.7	3.3	6.9	13.6
Satisfaction																													

Data Elements	Type	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Satisfaction with Prenatal Care	N	30	39	71	34	30	8	20	1	12	14	13	8	4	7	39	4	191	28	1	8	21	1	13	29	20	2	111	759
	%	1.9	10.9	1.8	9.8	5.1	1.1	5	0.1	3.8	1.6	1.6	1.7	0.7	0.6	3.5	3.6	11.1	3.9	1.3	1.9	4.2	0.2	3.7	5.3	2.7	1	28.6	3.7
Satisfaction with Delivery Experience	N	110	151	246	176	68	248	1	301	6	257	31	4	128	5	148	34	263	32	51	4	30	153	12	2	156	4	504	3125
	%	8	60.2	7.6	51.3	14.8	34.1	0.8	31.9	2.6	25.9	5.6	1.3	17.1	0.4	14.2	30.1	18.3	5.2	59.3	1.5	8	21.4	4.9	0.5	27.5	4.4	74	17.3

TABLE C.3: RECEIVIED FORMS AND DATA ELEMENTS, ALL AWARDEES

TABLE C.3.1.: ENROLLMENT AND RECEIVED FORMS

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Number or Women Enrolled (Obtained from the Program-Level Program Progress Report																													
Newly Enrolled in Q1 2016	N																												
Total Enrolled through Q1 2016	N																												
Number Women Delivered through Q1 2016	N																												
Forms Received through Q1 2016																													
Intake Forms Received through Q1 2016	**N**	**2577**	**931**	**6271**	**603**	**1037**	**1326**	**651**	**1214**	**547**	**1593**	**2708**	**778**	**822**	**1760**	**2258**	**617**	**2713**	**1696**	**133**	**765**	**1088**	**1310**	**682**	**908**	**1564**	**347**	**1250**	**38149**
Received through Q1 2016 as a percentage of the number of women ever enrolled	%																												
Received in Q1 2014	N	302	105	707	17	190	166	36	167	73	406	238	101	218	576	751	41	252	71	17	52	110	235	125	98	169	38	253	5514
Received in Q2 2014	N	232	47	631	117	92	138	39	118	48	205	193	45	85	227	275	27	135	76	9	64	87	100	105	18	98	5	58	3274
Received in Q3 2014	N	231	80	745	84	142	126	77	172	91	114	213	66	89	222	289	19	172	146	5	46	142	90	46	74	223	50	89	3843
Received in Q4 2014	N	272	66	642	53	157	126	77	102	55	115	259	88	102	195	145	25	386	260	13	70	98	72	54	92	173	45	117	3859
Received in Q1 2015	N	292	87	747	64	65	160	121	159	63	166	267	99	95	321	273	14	403	180	10	91	128	79	99	127	215	0	66	4391
Received in Q2 2015	N	388	72	834	58	100	161	82	142	64	174	365	176	104	218	302	29	456	286	20	111	133	256	106	158	210	56	222	5283
Received in Q3 2015	N	329	175	818	89	151	151	82	135	35	150	388	117	79	0	221	60	335	316	13	80	152	233	79	150	188	67	193	4786
Received in Q4 2015	N	268	136	598	54	61	168	69	129	74	142	366	79	50	1	2	107	284	309	16	122	124	200	41	140	200	41	168	3949
Received in Q1 2016	N	263	163	549	67	79	130	68	90	44	121	419	7	0	0	0	295	290	52	30	129	114	45	27	51	88	45	84	3250
Third Trimester Forms	**N**	**1590**	**359**	**3874**	**348**	**584**	**705**	**402**	**843**	**312**	**875**	**788**	**458**	**544**	**1169**	**1108**	**110**	**1726**	**724**	**77**	**412**	**505**	**649**	**354**	**552**	**729**	**202**	**388**	**20387**
Received through Q1 2016 as a percentage of the number of women ever enrolled	%																												
Received in Q1 2014	N	62	6	228	2	12	5	14	55	47	23	1	0	15	94	107	3	8	20	0	3	8	9	16	24	0	3	1	766

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Received in Q2 2014	N	112	37	309	16	64	60	19	88	37	105	0	45	83	161	179	7	43	29	1	10	26	33	25	26	3	26	16	1560
Received in Q3 2014	N	161	58	483	69	70	98	49	122	40	94	1	42	55	199	160	15	122	53	6	13	65	70	64	40	43	24	31	2247
Received in Q4 2014	N	175	48	526	43	79	93	51	85	41	124	8	44	67	155	147	11	134	1	8	37	70	49	37	68	81	13	26	2221
Received in Q1 2015	N	184	57	499	51	82	83	61	71	48	124	36	52	94	217	125	13	174	115	9	55	55	57	39	83	121	0	34	2539
Received in Q2 2015	N	213	63	523	30	47	78	55	103	32	124	92	94	61	171	104	13	310	133	13	70	68	64	41	75	110	37	41	2765
Received in Q3 2015	N	269	44	498	32	91	120	28	125	39	130	237	94	89	143	147	15	205	118	9	85	74	165	53	132	122	43	96	3203
Received in Q4 2015	N	216	15	467	58	90	92	77	93	25	106	204	62	48	29	101	14	368	108	4	61	66	113	43	104	128	28	102	2822
Received in Q1 2016	N	198	31	341	47	49	76	48	101	3	45	209	25	32	0	38	19	362	147	27	78	73	89	36	0	121	28	41	2264
Post-Partum Forms	**N**	**1369**	**251**	**3220**	**343**	**461**	**728**	**119**	**943**	**233**	**994**	**555**	**303**	**748**	**1184**	**1042**	**113**	**1439**	**612**	**86**	**259**	**376**	**715**	**246**	**371**	**568**	**90**	**681**	**18049**
Received through Q1 2016 as a percentage of the number of women ever enrolled	%																												
Received in Q1 2014	N	27	1	137	5	18	0	2	19	12	80	6	0	54	61	32	2	4	14	0	9	25	0	0	21	2	2	3	536
Received in Q2 2014	N	54	0	229	2	47	9	6	44	27	53	0	29	80	126	108	2	28	19	0	10	13	30	9	25	1	10	19	980
Received in Q3 2014	N	121	17	316	16	34	88	7	100	34	94	1	26	73	230	135	9	61	32	0	17	24	57	36	27	16	1	20	1592
Received in Q4 2014	N	161	25	472	11	42	103	11	112	23	95	38	35	73	158	148	11	91	0	6	12	36	68	27	39	52	6	10	1865
Received in Q1 2015	N	176	90	469	32	72	129	17	136	45	139	47	26	134	142	165	11	102	119	46	26	60	67	28	53	59	0	31	2421
Received in Q2 2015	N	183	26	427	36	58	75	29	100	31	138	62	27	94	141	87	26	197	113	6	45	39	54	32	51	74	17	144	2312
Received in Q3 2015	N	213	56	430	118	51	102	14	148	25	148	110	43	91	178	120	12	216	87	13	49	71	82	51	70	80	26	131	2735
Received in Q4 2015	N	213	13	406	76	54	111	20	143	19	128	137	76	76	138	90	15	402	108	4	48	47	95	35	85	147	14	211	2911
Received in Q1 2016	N	221	23	334	47	85	111	13	141	17	119	154	41	73	10	157	25	338	120	11	43	61	262	28	0	137	14	112	2697
Exit Forms	**N**	**975**	**573**	**4512**	**426**	**761**	**851**	**287**	**1015**	**277**	**1262**	**1268**	**743**	**808**	**440**	**2178**	**176**	**1813**	**1249**	**77**	**281**	**734**	**836**	**492**	**609**	**1010**	**281**	**1017**	**24951**
Received through Q1 2016 as a percentage of the number of women ever enrolled	%																												
Received in Q1 2014	N	0	8	169	11	1	0	1	1	3	12	11	4	2	8	39	0	6	0	8	0	9	0	27	2	1	0	4	327
Received in Q2 2014	N	0	1	126	2	1	0	0	11	0	5	25	2	1	0	4	1	3	0	0	0	1	0	52	0	0	0	6	241
Received in Q3 2014	N	0	0	388	22	0	0	0	1	0	0	2	4	59	0	91	0	4	1	0	0	11	0	57	0	2	0	1	643
Received in Q4 2014	N	0	137	817	33	0	47	7	35	7	34	6	2	117	185	295	69	7	69	0	0	141	80	85	141	105	0	1	2420
Received in Q1 2015	N	11	124	477	53	239	229	6	112	145	263	114	0	158	138	718	6	62	178	32	0	131	70	71	102	52	0	62	3553
Received in Q2 2015	N	214	44	593	75	139	167	0	373	35	511	231	109	98	0	365	30	215	162	0	193	91	117	62	102	107	165	263	4461

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Received in Q3 2015	N	243	133	660	120	136	125	6	175	43	170	83	233	118	0	269	15	296	210	6	0	123	131	71	129	302	40	179	4016
Received in Q4 2015	N	256	37	580	76	116	142	155	185	33	142	510	281	67	109	143	17	832	255	5	0	97	171	61	133	226	57	246	4932
Received in Q1 2016	N	251	89	702	34	129	141	112	122	11	125	286	108	188	0	254	38	388	374	26	88	130	267	6	0	215	19	255	4358

TABLE C.3.2.: SOCIODEMOGRAPHIC CHARACTERISTICS

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Sociodemographic Characteristics																													
Mother's Age at Intake	**N**	**2577**	**908**	**6233**	**599**	**1022**	**1326**	**625**	**1210**	**539**	**1591**	**2707**	**778**	**818**	**1751**	**2257**	**615**	**2689**	**1689**	**131**	**629**	**1084**	**1308**	**644**	**908**	**1448**	**344**	**1243**	**37673**
Less than 18 years of age	%	6.40	6.83	2.73	4.01	4.31	7.01	8.16	8.02	6.31	7.48	2.59	11.57	1.83	2.63	8.60	7.15	5.50	4.20	2.29	5.88	5.35	6.42	4.97	7.38	8.43	13.95	5.63	5.46
18 and 19 years of age	%	9.55	13.55	6.43	10.02	10.18	11.54	17.60	9.59	17.81	11.44	5.50	13.75	6.36	9.77	12.01	7.64	8.52	11.01	9.16	13.20	8.49	10.09	12.58	10.13	12.15	16.86	11.58	9.75
Greater than or equal to 20 and less than 35 years of age	%	71.25	75.11	81.71	80.13	77.59	74.81	71.04	68.93	71.06	73.10	73.73	68.38	82.15	83.10	74.12	75.28	76.20	78.57	77.10	73.61	74.45	76.53	75.31	68.28	73.83	65.12	73.13	75.77
35 years of age or older	%	12.81	4.52	9.13	5.84	7.93	6.64	3.20	13.47	4.82	7.98	18.18	6.30	9.66	4.51	5.27	9.92	9.78	6.22	11.45	7.31	11.72	6.96	7.14	14.21	5.59	4.07	9.65	9.01
Race and Ethnicity	**N**	**2540**	**918**	**6219**	**602**	**1016**	**1322**	**651**	**1210**	**538**	**1589**	**2620**	**773**	**818**	**1750**	**2225**	**612**	**2651**	**1648**	**133**	**738**	**1069**	**1307**	**658**	**891**	**1555**	**291**	**1184**	**37528**
Hispanic	%	51.26	16.01	25.92	6.64	47.83	22.16	4.30	83.47	42.75	8.18	66.15	64.42	3.91	3.31	1.17	45.26	27.99	3.16	1.50	58.81	52.01	2.30	33.74	97.87	1.74	1.03	23.48	29.63
Non-Hispanic White	%	4.96	8.71	56.70	16.94	10.43	29.88	4.30	2.40	26.95	13.09	5.80	13.20	24.69	83.89	8.90	15.52	1.36	77.91	6.02	23.71	11.13	19.28	49.09	1.80	34.28	2.06	14.27	26.34
Non-Hispanic African American	%	41.77	68.63	12.08	73.09	37.20	42.36	88.79	13.39	17.10	72.37	19.43	19.28	70.05	11.31	88.99	6.70	67.37	15.66	90.23	14.91	34.33	78.12	12.77	0.34	60.32	96.91	51.86	39.53
Non-Hispanic Other Race or Non-Hispanic Multiple Races	%	2.01	6.64	5.31	3.32	4.53	5.60	2.61	0.74	13.20	6.36	8.63	3.10	1.34	1.49	0.94	32.52	3.28	3.28	2.26	2.57	2.53	0.31	4.41	0.00	3.67	0.00	10.39	4.50
Ethnicity	**N**	**1302**	**147**	**1612**	**40**	**486**	**293**	**28**	**1010**	**230**	**130**	**1733**	**498**	**32**	**58**	**26**	**277**	**742**	**52**	**2**	**434**	**556**	**30**	**222**	**872**	**27**	**3**	**278**	**11120**
Mexican, Mexican American, Chicana	%	85.02	18.37	52.98	25.00	16.46	15.70	42.86	65.05	70.00	22.31	67.57	87.55	62.50	72.41	46.15	64.62	9.16	17.31	0.00	32.95	55.76	70.00	71.17	0.23	51.85	66.67	20.50	50.60
Puerto Rican	%	2.46	59.86	12.84	2.50	16.05	40.96	17.86	0.20	1.30	17.69	0.52	1.00	6.25	3.45	11.54	0.72	1.89	0.00	50.00	0.23	0.72	6.67	1.80	95.99	14.81	0.00	8.99	13.26
Cuban	%	0.23	2.72	1.30	7.50	1.23	14.33	10.71	1.09	0.43	3.08	0.35	0.40	3.13	0.00	0.00	0.00	0.40	0.00	0.00	0.46	0.54	3.33	0.45	0.46	11.11	0.00	1.44	1.15

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Other Hispanic, Latina, or Spanish origin	%	10.91	14.97	30.21	62.50	64.40	21.50	28.57	33.66	26.52	56.92	30.87	10.44	28.13	22.41	42.31	32.85	88.01	80.77	50.00	66.13	42.81	16.67	26.13	2.75	14.81	33.33	67.99	33.71
Multiple Hispanic, Latina, or Spanish origins	%	1.38	4.08	2.67	2.50	1.85	7.51	0.00	0.00	1.74	0.00	0.69	0.60	0.00	1.72	0.00	1.81	0.54	1.92	0.00	0.23	0.18	3.33	0.45	0.57	7.41	0.00	1.08	1.29
Living in Shelter or Homeless at Intake	**N**	**2577**	**931**	**6271**	**603**	**1037**	**1326**	**651**	**1214**	**547**	**1593**	**2708**	**778**	**822**	**1760**	**2258**	**617**	**2713**	**1696**	**133**	**765**	**1088**	**1310**	**682**	**908**	**1564**	**347**	**1250**	**38149**
Yes	%	1.01	1.83	0.96	1.16	1.45	2.56	1.54	0.41	1.83	1.07	1.22	0.64	1.46	0.57	1.64	1.30	3.46	1.18	3.76	0.52	1.93	0.92	5.57	3.41	1.21	1.15	1.44	1.50
Employed at Intake	**N**	**2549**	**908**	**6189**	**594**	**1016**	**1318**	**641**	**1206**	**542**	**1587**	**2672**	**774**	**822**	**1750**	**2217**	**611**	**2678**	**1525**	**133**	**739**	**1080**	**1306**	**662**	**894**	**1529**	**277**	**1101**	**37320**
Yes	%	39.58	41.19	42.19	45.96	40.65	40.06	41.81	22.89	35.24	37.74	43.49	33.59	42.34	38.17	35.63	40.92	41.86	51.02	28.57	41.14	38.06	38.44	32.93	27.52	40.09	28.88	39.60	39.57
Education Level at Intake	**N**	**1951**	**810**	**5616**	**549**	**798**	**1204**	**595**	**1096**	**489**	**1510**	**2280**	**649**	**788**	**1680**	**1765**	**499**	**2265**	**1263**	**119**	**533**	**776**	**1230**	**391**	**634**	**1403**	**223**	**896**	**32012**
Less than High School	%	33.98	22.22	14.65	22.77	18.92	34.80	24.71	65.60	33.95	31.66	31.05	41.45	24.37	23.93	21.59	37.27	29.89	13.22	27.73	27.20	39.56	25.28	0.00	11.20	28.80	28.70	27.46	26.35
High School Graduate or GED	%	54.79	69.88	58.71	62.66	63.91	53.49	63.87	32.94	58.08	62.05	56.71	51.16	62.06	65.60	68.05	49.50	59.16	68.57	66.39	59.47	50.64	66.75	83.89	51.10	60.94	67.71	58.37	59.52
Bachelor's Degree	%	3.38	2.35	12.39	5.65	6.89	1.41	3.87	0.64	2.04	2.52	6.45	1.54	3.93	3.27	1.70	3.81	4.68	5.86	0.84	2.25	3.99	1.71	5.12	8.20	1.78	1.35	5.47	5.15
Other College Degree	%	7.84	5.56	14.25	8.93	10.28	10.30	7.56	0.82	5.93	3.77	5.79	5.86	9.64	7.20	8.67	9.42	6.27	12.35	5.04	11.07	5.80	6.26	11.00	29.50	8.48	2.24	8.71	8.99
Relationship Status at Intake	**N**	**2533**	**871**	**6194**	**581**	**981**	**1319**	**630**	**1206**	**536**	**1570**	**2689**	**770**	**820**	**1752**	**2141**	**605**	**2639**	**1508**	**133**	**747**	**1075**	**1299**	**659**	**873**	**1496**	**148**	**1037**	**36812**
Married, living with spouse	%	20.96	9.87	41.77	13.60	20.59	13.12	10.32	27.53	16.23	10.89	25.14	13.25	14.88	25.00	8.50	35.21	14.78	26.06	6.77	20.21	28.93	10.62	27.92	19.82	12.77	10.14	20.96	22.34
Married, not living with spouse	%	1.70	1.15	1.79	2.24	3.57	1.74	2.22	1.49	2.61	1.72	2.23	1.30	2.07	1.26	2.29	2.48	2.24	1.06	3.76	1.07	1.40	2.31	1.82	1.49	3.61	0.68	1.70	1.99
Living with a partner	%	32.29	33.18	33.61	37.69	27.93	35.71	30.63	35.99	44.59	35.16	35.37	37.14	25.98	30.19	19.57	33.72	28.53	36.14	24.06	35.07	34.33	24.56	38.39	46.16	27.27	23.65	32.29	32.20

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
In a relationship but not living together	%	29.02	34.10	13.38	28.74	30.48	29.95	33.17	17.99	19.22	29.81	27.67	30.91	41.22	27.57	43.95	14.71	32.28	21.68	24.06	20.35	21.49	38.41	18.97	17.98	31.62	43.92	29.02	26.38
Not in a relationship right now	%	16.03	21.70	9.44	17.73	17.43	19.48	23.65	17.00	17.35	22.42	9.59	17.40	15.85	15.98	25.69	13.88	22.17	15.05	41.35	23.29	13.86	24.10	12.90	14.55	24.73	21.62	16.03	17.09
Smokes cigarettes at Intake	**N**	**2448**	**759**	**5690**	**521**	**877**	**1312**	**585**	**1146**	**494**	**1461**	**2601**	**772**	**821**	**1740**	**1799**	**579**	**2483**	**1524**	**127**	**711**	**1061**	**1303**	**682**	**802**	**1441**	**70**	**764**	**34573**
Yes	%	8.05	14.36	10.91	9.60	3.99	17.23	5.30	0.87	9.31	17.52	4.46	9.84	12.67	23.74	18.45	10.54	7.49	20.14	9.45	12.66	10.65	19.42	31.38	3.12	21.79	17.14	15.05	12.51
Food Insecure at Intake	**N**	**2407**	**769**	**5903**	**543**	**911**	**1296**	**581**	**1186**	**496**	**1563**	**2367**	**726**	**809**	**1701**	**2106**	**582**	**2500**	**1200**	**125**	**637**	**1005**	**1266**	**613**	**813**	**1329**	**138**	**859**	**34431**
Yes	%	27.79	21.33	17.25	22.84	24.37	22.53	21.34	13.58	30.44	15.04	17.15	6.89	15.82	3.64	15.76	21.31	27.76	11.50	29.60	24.96	11.14	27.25	30.83	25.83	18.89	24.64	29.22	19.41

TABLE C.3.3.: RISK FACTORS AT INTAKE

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Mental Risk Factors																													
Exhibiting depressive symptoms at intake	**N**	**2325**	**711**	**5642**	**493**	**770**	**1276**	**560**	**1176**	**447**	**1546**	**2650**	**730**	**807**	**1659**	**1978**	**529**	**2277**	**1233**	**127**	**564**	**996**	**1111**	**582**	**654**	**1343**	**122**	**794**	**33102**
1-Yes	%	21.12	40.79	22.63	38.34	29.35	31.82	34.46	12.41	31.10	31.76	21.51	12.19	12.27	8.14	32.76	19.28	31.01	24.33	45.67	26.42	13.55	46.26	36.77	35.47	32.99	30.33	36.65	25.89
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	**N**	**2524**	**883**	**6154**	**585**	**985**	**1257**	**638**	**1211**	**536**	**1586**	**2641**	**770**	**817**	**1741**	**2221**	**611**	**2642**	**1258**	**131**	**672**	**1040**	**1304**	**638**	**885**	**1534**	**151**	**914**	**36329**
1-Yes	%	17.59	16.65	20.34	17.09	16.45	35.00	13.17	17.09	23.69	14.75	27.49	22.60	10.28	14.82	15.35	18.33	18.13	22.97	30.53	20.98	15.29	27.76	24.76	14.92	16.23	16.56	16.96	19.49
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	**N**	**2248**	**798**	**5834**	**539**	**842**	**1047**	**598**	**1058**	**481**	**1518**	**2593**	**694**	**769**	**1585**	**2038**	**565**	**2391**	**1114**	**95**	**536**	**923**	**1150**	**567**	**746**	**1420**	**144**	**744**	**33037**
1-Yes	%	3.47	3.13	2.13	3.71	4.04	2.77	2.68	1.23	1.87	2.37	3.16	0.43	1.69	0.13	2.85	1.77	3.60	2.78	6.32	1.68	1.19	2.00	5.64	4.42	1.90	2.08	3.09	2.53
Mother's Weight																													
BMI of Mother at First Prenatal Visit	**N**	**950**	**515**	**4276**	**221**	**751**	**825**	**253**	**1007**	**265**	**1205**	**1134**	**728**	**719**	**295**	**1424**	**134**	**1679**	**1045**	**20**	**255**	**727**	**835**	**123**	**595**	**1007**	**233**	**53**	**21274**
Underweight at first prenatal visit (BMI < 18.5)	%	2.42	2.33	4.44	5.43	2.40	3.39	5.93	1.79	5.28	2.66	2.91	3.02	2.50	3.73	2.81	7.46	2.20	2.68	5.00	2.35	2.75	3.47	4.88	6.22	3.18	3.43	3.77	3.30
Normal weight at first prenatal visit (BMI >= 18.5 and BMI < 25)	%	25.05	31.65	46.89	31.67	35.29	35.52	38.34	34.36	41.13	30.54	29.19	37.77	25.45	36.95	26.12	39.55	33.17	39.04	35.00	29.41	33.01	30.90	29.27	34.45	28.60	31.33	35.85	34.99
Overweight at first prenatal visit (BMI >= 25 and BMI < 30)	%	22.84	25.63	25.47	22.62	32.09	25.45	24.90	32.67	24.91	24.40	31.48	24.04	21.97	23.73	23.24	23.88	27.64	26.22	15.00	25.49	31.36	23.23	27.64	24.37	20.36	27.90	22.64	25.87
Obese at first prenatal visit (BMI >= 30 and BMI < 40)	%	35.47	30.87	19.74	29.86	23.83	26.55	23.32	26.61	23.77	28.80	29.54	27.75	32.13	25.42	33.36	20.15	28.65	23.64	30.00	34.12	25.58	29.70	29.27	25.38	34.06	29.18	30.19	27.05

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Very obese at first prenatal visit (BMI >= 40)	%	14.21	9.51	3.46	10.41	6.39	9.09	7.51	4.57	4.91	13.61	6.88	7.42	17.94	10.17	14.47	8.96	8.34	8.42	15.00	8.63	7.29	12.69	8.94	9.58	13.80	8.15	7.55	8.79
Pre-Pregnancy Diagnoses																													
Pre-Pregnancy Diagnosis of Type I Diabetes	**N**	**970**	**565**	**4512**	**263**	**759**	**845**	**287**	**999**	**273**	**1223**	**1249**	**709**	**801**	**435**	**2056**	**157**	**1756**	**1147**	**76**	**265**	**730**	**826**	**492**	**606**	**998**	**233**	**1016**	**24248**
Yes	%	0.31	0.53	0.20	0.76	0.13	2.37	33.45	0.10	0.73	0.49	0.72	0.42	1.25	0.69	1.17	0.64	0.46	1.13	2.63	2.64	0.27	2.54	0.00	4.95	1.40	3.00	0.30	1.24
No	%	99.69	98.94	99.80	99.24	98.81	97.51	54.01	85.29	97.44	97.63	92.79	99.01	95.76	96.55	69.16	82.17	96.13	98.17	73.68	93.21	96.99	97.46	0.00	93.89	96.79	89.27	3.84	88.02
Not Known	%	0.00	0.53	0.00	0.00	1.05	0.12	12.54	14.61	1.83	1.88	6.49	0.56	3.00	2.76	29.67	17.20	3.42	0.70	23.68	4.15	2.74	0.00	100.00	1.16	1.80	7.73	95.87	10.75
Pre-Pregnancy Diagnosis of Type II Diabetes	**N**	**971**	**566**	**4507**	**262**	**759**	**846**	**287**	**999**	**272**	**1224**	**1249**	**710**	**801**	**435**	**2048**	**158**	**1757**	**1127**	**76**	**264**	**730**	**825**	**471**	**606**	**998**	**236**	**1016**	**24200**
Yes	%	5.56	2.12	0.33	0.00	0.53	0.71	35.89	0.30	0.37	0.90	2.88	0.85	5.12	2.30	0.68	0.63	1.31	0.71	2.63	6.06	2.33	3.03	1.70	10.73	1.50	8.47	0.39	2.15
No	%	94.44	97.35	99.67	100.00	98.42	99.17	51.92	85.09	97.79	97.22	90.63	98.45	91.89	95.17	69.68	81.65	95.28	98.58	75.00	89.77	94.93	96.97	98.30	88.12	96.69	83.90	40.45	90.67
Not Known	%	0.00	0.53	0.00	0.00	1.05	0.12	12.20	14.61	1.84	1.88	6.49	0.70	3.00	2.53	29.64	17.72	3.41	0.71	22.37	4.17	2.74	0.00	0.00	1.16	1.80	7.63	59.15	7.18
Pre-Pregnancy Diagnosis of Hypertension	**N**	**969**	**565**	**4512**	**262**	**759**	**845**	**286**	**999**	**273**	**1227**	**1249**	**709**	**804**	**435**	**2057**	**157**	**1758**	**1147**	**77**	**264**	**730**	**826**	**492**	**607**	**997**	**222**	**1016**	**24244**
Yes	%	5.99	6.19	0.60	5.34	3.29	8.05	48.95	0.30	3.30	8.96	4.40	6.35	17.29	5.29	10.26	0.64	3.87	2.96	14.29	7.58	5.62	11.86	0.81	14.99	10.33	8.56	3.74	6.15
No	%	94.01	93.10	99.40	94.66	95.52	91.72	41.96	85.09	93.41	89.16	88.79	93.09	78.98	92.64	62.28	82.80	92.95	96.25	63.64	88.26	92.05	88.14	99.19	84.18	87.86	83.33	56.20	87.68
Not Known	%	0.00	0.71	0.00	0.00	1.19	0.24	9.09	14.61	3.30	1.87	6.81	0.56	3.73	2.07	27.47	16.56	3.19	0.78	22.08	4.17	2.33	0.00	0.00	0.82	1.81	8.11	40.06	6.17
Risk Factors from Past Pregnancies																													
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	**N**	**667**	**331**	**2617**	**151**	**274**	**531**	**96**	**621**	**123**	**810**	**582**	**452**	**555**	**255**	**1204**	**82**	**1082**	**743**	**62**	**186**	**495**	**501**	**299**	**391**	**580**	**121**	**513**	**14324**
Yes	%	20.24	22.66	9.44	13.25	10.22	24.29	10.42	7.89	4.88	20.49	12.03	15.71	34.95	9.02	13.95	14.63	10.26	13.46	12.90	23.66	11.72	28.34	7.02	7.16	31.38	9.92	15.59	15.28
No	%	77.81	74.92	90.52	84.77	87.96	73.07	83.33	87.92	92.68	76.79	82.47	80.97	64.50	86.27	47.59	65.85	83.73	86.41	59.68	69.35	76.36	71.66	92.98	49.62	67.24	72.73	74.27	77.41
Not Known	%	1.95	2.42	0.04	1.99	1.82	2.64	6.25	4.19	2.44	2.72	5.50	3.32	0.54	4.71	38.46	19.51	6.01	0.13	27.42	6.99	11.92	0.00	0.00	43.22	1.38	17.36	10.14	7.31
Previous Birth < 2,500 grams	**N**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Yes	%	16.24	15.66	1.57	11.56	6.59	16.51	12.50	11.95	3.36	13.25	9.62	13.20	30.59	7.54	13.56	1.30	8.61	8.62	5.00	11.96	11.07	24.75	100.00	2.05	21.88	10.83	8.97	11.05
No	%	74.74	80.42	98.43	85.03	89.38	72.87	75.00	83.84	93.28	78.73	80.41	77.18	56.78	92.06	47.42	50.65	82.69	89.19	18.33	80.43	74.25	73.65	0.00	53.96	69.97	70.83	61.79	77.69
Not Known	%	9.02	3.92	0.00	3.40	4.03	10.63	12.50	4.20	3.36	8.03	9.97	9.62	12.64	0.40	39.02	48.05	8.70	2.19	76.67	7.61	14.69	1.60	0.00	43.99	8.16	18.33	29.24	11.25

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Previous Miscarriage (< 20 weeks EGA)	**N**	**735**	**397**	**3242**	**170**	**404**	**590**	**125**	**674**	**132**	**933**	**769**	**503**	**614**	**285**	**1246**	**78**	**1209**	**851**	**65**	**202**	**544**	**565**	**11**	**409**	**634**	**114**	**580**	**16081**
Yes	%	33.61	28.97	31.59	33.53	31.93	37.80	33.60	31.31	31.82	34.30	37.45	33.20	38.93	24.91	21.99	19.23	29.36	35.96	30.77	41.58	30.88	43.89	0.00	15.16	36.12	10.53	23.62	31.62
No	%	65.44	68.51	68.38	65.88	66.09	59.15	64.00	65.13	65.91	63.34	59.43	66.00	58.47	71.93	37.08	46.15	65.76	63.57	46.15	57.92	61.03	56.11	100.00	42.54	62.93	57.02	50.17	61.05
Not Known	%	0.95	2.52	0.03	0.59	1.98	3.05	2.40	3.56	2.27	2.36	3.12	0.80	2.61	3.16	40.93	34.62	4.88	0.47	23.08	0.50	8.09	0.00	0.00	42.30	0.95	32.46	26.21	7.33
Previous Elective Termination	**N**	**734**	**400**	**3242**	**168**	**405**	**590**	**125**	**674**	**135**	**943**	**769**	**503**	**613**	**285**	**1241**	**76**	**1210**	**851**	**64**	**201**	**540**	**565**	**11**	**409**	**634**	**116**	**580**	**16084**
Yes	%	20.30	42.00	14.84	10.71	34.81	18.81	27.20	4.75	25.19	44.86	26.92	13.12	12.07	13.68	5.24	6.58	28.51	14.22	28.13	3.98	10.00	10.09	9.09	0.73	8.83	17.24	16.38	17.56
No	%	79.02	56.25	85.13	88.69	63.46	77.97	70.40	91.54	72.59	53.55	70.61	86.28	85.15	84.56	50.52	57.89	66.86	85.31	46.88	95.52	81.11	89.91	90.91	58.19	90.22	52.59	56.55	74.99
Not Known	%	0.68	1.75	0.03	0.60	1.73	3.22	2.40	3.71	2.22	1.59	2.47	0.60	2.77	1.75	44.24	35.53	4.63	0.47	25.00	0.50	8.89	0.00	0.00	41.08	0.95	30.17	27.07	7.44
Previous Still Birth (fetal death >= 20 weeks EGA)	**N**	**661**	**329**	**2613**	**151**	**273**	**527**	**96**	**621**	**123**	**799**	**581**	**444**	**552**	**254**	**1201**	**79**	**1079**	**762**	**60**	**186**	**496**	**500**	**265**	**391**	**574**	**109**	**513**	**14239**
Yes	%	1.82	3.34	0.80	3.97	3.66	3.80	0.00	0.00	1.63	3.63	5.16	2.93	9.96	1.57	2.66	1.27	2.04	1.97	0.00	10.75	3.02	8.60	2.64	2.05	3.66	1.83	0.58	2.82
No	%	97.28	93.92	99.20	94.70	94.87	93.74	95.83	95.97	95.93	93.62	90.53	96.62	88.95	95.67	49.46	59.49	92.03	97.51	30.00	88.17	86.29	91.40	97.36	54.99	95.12	69.72	67.06	88.25
Not Known	%	0.91	2.74	0.00	1.32	1.47	2.47	4.17	4.03	2.44	2.75	4.30	0.45	1.09	2.76	47.88	39.24	5.93	0.52	70.00	1.08	10.69	0.00	0.00	42.97	1.22	28.44	32.36	8.93
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	**N**	**548**	**189**	**2031**	**186**	**202**	**507**	**78**	**455**	**102**	**651**	**218**	**331**	**412**	**230**	**862**	**69**	**979**	**524**	**37**	**140**	**439**	**450**	**218**	**305**	**475**	**0**	**367**	**11005**
< 6 months	%	7.30	7.41	7.14	4.84	6.93	9.07	7.69	4.40	13.73	6.14	3.67	7.55	5.83	7.83	9.74	10.14	4.80	12.21	13.51	10.00	7.97	9.11	15.60	10.82	9.47	0.00	8.45	7.84
>= 6 months and < 12 months	%	5.66	8.47	13.93	10.75	2.97	13.21	12.82	6.15	12.75	9.83	5.50	15.11	10.92	9.13	11.83	17.39	7.25	11.83	2.70	10.00	6.83	9.11	7.80	12.46	12.00	0.00	8.45	10.38
>= 12 months and < 18 months	%	7.48	5.82	16.99	6.45	11.88	12.03	11.54	7.25	9.80	7.07	6.88	10.88	9.22	13.04	11.60	14.49	8.78	12.02	8.11	14.29	7.74	9.33	7.80	7.21	10.32	0.00	8.99	10.81
>= 18 months	%	79.56	78.31	61.94	77.96	78.22	65.68	67.95	82.20	63.73	76.96	83.94	66.47	74.03	70.00	66.82	57.97	79.16	63.93	75.68	65.71	77.45	72.44	68.81	69.51	68.21	0.00	74.11	70.97

TABLE C.3.4.: RISK FACTORS FROM CURRENT PREGNANCY

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Risk Factors During Current Pregnancy																													
Urinary Tract Infection(s) during Last 6 Months of Pregnancy	**N**	**966**	**552**	**4512**	**249**	**756**	**847**	**286**	**1008**	**261**	**1195**	**1245**	**699**	**806**	**431**	**2096**	**154**	**1740**	**998**	**74**	**263**	**734**	**833**	**389**	**606**	**1002**	**241**	**1016**	**23959**
Yes	%	24.02	13.04	5.98	14.06	27.25	4.96	31.47	3.37	4.60	16.74	15.90	21.75	18.24	7.19	16.84	3.25	8.16	10.52	6.76	21.67	6.40	12.85	11.57	4.13	16.07	2.49	5.91	11.85
No	%	75.98	81.52	94.02	84.34	65.34	82.53	62.59	81.94	83.52	78.83	58.63	59.08	66.75	80.97	52.86	71.43	66.95	86.57	5.41	70.72	61.17	84.39	88.43	95.54	54.59	72.61	42.03	73.81
Not Known	%	0.00	5.43	0.00	1.61	7.41	12.51	5.94	14.68	11.88	4.44	25.46	19.17	15.01	11.83	30.30	25.32	24.89	2.91	87.84	7.60	32.43	2.76	0.00	0.33	29.34	24.90	52.07	14.34
Cervical Incompetence	**N**	**966**	**556**	**4507**	**249**	**757**	**848**	**286**	**1008**	**264**	**1192**	**1251**	**701**	**807**	**430**	**2095**	**154**	**1743**	**998**	**77**	**262**	**733**	**833**	**492**	**606**	**1004**	**241**	**1016**	**24076**
Yes	%	3.62	2.16	0.00	1.20	0.66	1.65	0.00	0.20	0.38	1.43	1.04	0.71	6.32	0.23	0.62	0.00	0.86	1.10	5.19	1.53	0.41	2.04	0.00	1.82	0.60	0.41	0.20	1.02
No	%	96.38	94.06	100.00	96.79	91.15	90.09	93.36	85.12	87.12	94.21	76.98	81.46	78.69	90.93	65.92	74.03	90.76	96.89	71.43	93.89	30.70	95.56	0.00	97.85	76.20	83.40	47.74	83.50
Not Known	%	0.00	3.78	0.00	2.01	8.19	8.25	6.64	14.68	12.50	4.36	21.98	17.83	14.99	8.84	33.46	25.97	8.38	2.00	23.38	4.58	68.89	2.40	100.00	0.33	23.21	16.18	52.07	15.48
Placenta Previa	**N**	**964**	**556**	**4507**	**248**	**758**	**847**	**286**	**1008**	**264**	**1192**	**1253**	**700**	**806**	**428**	**2097**	**154**	**1743**	**1000**	**77**	**262**	**732**	**832**	**471**	**606**	**1004**	**241**	**1016**	**24052**
Yes	%	1.14	1.44	0.09	1.61	1.72	4.25	1.05	0.60	1.14	1.01	1.12	0.14	2.85	1.64	0.24	0.00	1.38	2.30	0.00	0.76	1.37	0.12	0.64	0.50	0.10	0.00	0.49	0.92
No	%	98.86	94.42	99.91	96.37	90.50	88.31	91.96	84.72	86.36	94.63	75.82	88.00	81.89	89.49	66.24	74.03	89.90	95.60	77.92	94.66	32.24	97.24	99.36	99.17	76.79	84.65	47.44	85.82
Not Known	%	0.00	4.14	0.00	2.02	7.78	7.44	6.99	14.68	12.50	4.36	23.06	11.86	15.26	8.88	33.52	25.97	8.72	2.10	22.08	4.58	66.39	2.64	0.00	0.33	23.11	15.35	52.07	13.26
Placental Abruption	**N**	**964**	**549**	**4512**	**248**	**758**	**847**	**286**	**1008**	**264**	**1192**	**1251**	**695**	**807**	**427**	**2096**	**155**	**1742**	**997**	**77**	**262**	**733**	**833**	**471**	**606**	**1005**	**240**	**1016**	**24041**
Yes	%	0.31	0.18	0.44	1.21	0.53	0.12	0.70	0.00	0.00	0.08	0.32	0.86	0.87	0.23	0.10	0.00	0.63	1.20	1.30	1.53	0.00	1.08	0.00	0.66	0.80	1.25	0.10	0.45
No	%	99.69	92.53	99.56	96.37	90.63	91.97	92.66	85.32	87.50	95.39	76.02	69.21	83.52	91.10	66.41	74.19	90.76	97.09	76.62	93.51	27.29	96.04	100.00	99.01	75.62	82.92	47.83	85.40
Not Known	%	0.00	7.29	0.00	2.42	8.84	7.91	6.64	14.68	12.50	4.53	23.66	29.93	15.61	8.67	33.49	25.81	8.61	1.71	22.08	4.96	72.71	2.88	0.00	0.33	23.58	15.83	52.07	14.15
Gestational Diabetes	**N**	**966**	**555**	**4512**	**250**	**758**	**847**	**283**	**1003**	**263**	**1189**	**1252**	**700**	**806**	**429**	**2095**	**155**	**1743**	**1008**	**77**	**263**	**733**	**833**	**471**	**606**	**1005**	**243**	**1016**	**24061**
Yes	%	6.42	3.06	2.42	5.60	9.63	11.33	2.47	8.97	1.14	6.48	8.23	4.86	7.57	5.13	3.44	3.87	3.84	5.16	6.49	12.93	4.50	6.00	5.10	9.08	4.38	1.23	2.26	5.14
No	%	93.58	90.81	97.58	92.00	82.72	81.70	91.17	76.27	86.31	88.56	69.33	75.29	77.42	86.25	65.01	71.61	88.12	93.15	49.35	83.27	68.49	91.84	94.90	90.59	72.34	83.95	45.67	82.77
Not Known	%	0.00	6.13	0.00	2.40	7.65	6.97	6.36	14.76	12.55	4.96	22.44	19.86	15.01	8.62	31.55	24.52	8.03	1.69	44.16	3.80	27.01	2.16	0.00	0.33	23.28	14.81	52.07	12.09
Pregnancy-Related Hypertension	**N**	**966**	**551**	**4512**	**248**	**758**	**847**	**285**	**1008**	**265**	**1190**	**1248**	**697**	**806**	**428**	**2090**	**155**	**1743**	**1021**	**77**	**263**	**734**	**832**	**471**	**606**	**1005**	**238**	**1016**	**24060**
Yes	%	5.07	10.71	1.24	8.47	10.42	5.43	19.65	7.74	2.64	10.59	5.85	9.33	6.33	2.57	10.91	1.29	3.10	5.29	12.99	9.89	3.81	4.57	2.55	6.93	4.78	13.45	2.66	5.73
No	%	94.93	81.67	98.76	89.11	81.93	87.01	74.04	77.58	84.91	85.21	71.15	64.56	78.04	88.08	61.44	74.84	88.70	93.05	66.23	85.93	68.80	92.55	97.45	92.74	71.94	71.85	45.28	82.30
Not Known	%	0.00	7.62	0.00	2.42	7.65	7.56	6.32	14.68	12.45	4.20	23.00	26.11	15.63	9.35	27.66	23.87	8.20	1.67	20.78	4.18	27.38	2.88	0.00	0.33	23.28	14.71	52.07	11.97
Preeclampsia	**N**	**965**	**551**	**4512**	**249**	**758**	**847**	**284**	**1008**	**264**	**1185**	**1247**	**694**	**807**	**429**	**2099**	**155**	**1741**	**1014**	**77**	**264**	**732**	**832**	**471**	**606**	**1005**	**239**	**1016**	**24051**
Yes	%	4.35	8.71	1.71	6.43	3.56	3.07	13.03	7.74	1.89	5.82	4.81	7.35	6.94	0.93	2.10	0.65	3.16	5.23	7.79	6.44	2.87	12.14	3.18	4.29	10.95	7.11	2.56	4.52

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
No	%	95.54	83.85	98.29	91.16	87.07	89.26	80.63	77.58	85.61	89.70	70.73	64.12	77.57	90.21	67.22	74.84	88.68	93.10	71.43	89.77	69.40	84.86	96.82	95.38	65.57	77.82	45.37	83.00
Not Known	%	0.10	7.44	0.00	2.41	9.37	7.67	6.34	14.68	12.50	4.47	24.46	28.53	15.49	8.86	30.68	24.52	8.16	1.68	20.78	3.79	27.73	3.00	0.00	0.33	23.48	15.06	52.07	12.47
Syphilis	N	**964**	**555**	**4512**	**246**	**758**	**846**	**284**	**1007**	**264**	**1188**	**1254**	**702**	**807**	**429**	**2096**	**155**	**1743**	**1013**	**77**	**262**	**734**	**833**	**450**	**606**	**1004**	**238**	**1016**	**24043**
Yes	%	0.00	0.18	0.00	0.81	0.26	0.83	0.70	0.00	0.38	0.93	0.32	0.43	0.25	0.00	0.48	0.00	0.34	0.20	0.00	0.76	0.41	0.12	0.44	1.16	0.50	0.84	0.00	0.31
No	%	100.00	94.41	0.00	97.56	90.90	93.50	92.96	85.30	87.12	94.87	89.87	95.73	84.76	90.91	85.59	74.84	87.21	98.12	49.35	98.09	75.34	97.36	99.56	98.51	95.22	85.71	47.93	72.10
Not Known	%	0.00	5.41	100.00	1.63	8.84	5.67	6.34	14.70	12.50	4.21	9.81	3.85	14.99	9.09	13.93	25.16	12.45	1.68	50.65	1.15	24.25	2.52	0.00	0.33	4.28	13.45	52.07	27.58
Human Immunodeficiency Virus (HIV)	N	**964**	**555**	**4512**	**247**	**758**	**847**	**284**	**1008**	**265**	**1190**	**1255**	**704**	**807**	**429**	**2094**	**155**	**1744**	**1013**	**77**	**261**	**732**	**833**	**492**	**606**	**1004**	**240**	**1016**	**24092**
Yes	%	0.52	0.54	0.02	0.81	0.13	1.30	0.35	0.00	0.00	0.08	0.16	0.14	0.74	0.23	0.48	0.00	0.52	0.10	1.30	0.77	0.00	1.08	0.00	4.62	0.80	0.00	0.20	0.44
No	%	99.48	94.05	99.98	97.57	96.44	93.39	94.01	85.32	87.55	95.63	90.60	96.31	92.94	90.91	87.34	76.13	91.57	98.22	49.35	97.70	76.64	96.88	0.00	95.05	95.12	87.08	47.74	89.79
Not Known	%	0.00	5.41	0.00	1.62	3.43	5.31	5.63	14.68	12.45	4.29	9.24	3.55	6.32	8.86	12.18	23.87	7.91	1.68	49.35	1.53	23.36	2.04	100.00	0.33	4.08	12.92	52.07	9.78
Congenital Abnormalities of the Fetus	N	**964**	**552**	**4512**	**247**	**756**	**847**	**283**	**1007**	**264**	**1189**	**1244**	**697**	**807**	**428**	**2088**	**155**	**1736**	**1012**	**75**	**262**	**732**	**833**	**492**	**605**	**1004**	**237**	**1016**	**24044**
Yes	%	0.00	1.45	1.26	2.83	2.12	2.72	0.00	0.20	0.00	3.36	2.97	2.15	4.58	1.40	0.34	0.00	0.69	1.68	4.00	1.15	0.55	1.68	0.00	6.61	2.49	0.42	0.10	1.56
No	%	100.00	93.12	98.63	94.74	91.67	88.90	93.64	85.00	87.50	92.35	70.34	80.49	82.16	89.49	67.77	76.77	90.50	96.64	62.67	93.51	37.43	95.80	0.00	93.06	73.11	86.08	47.83	83.07
Not Known	%	0.00	5.43	0.11	2.43	6.22	8.38	6.36	14.80	12.50	4.29	26.69	17.36	13.26	9.11	31.90	23.23	8.81	1.68	33.33	5.34	62.02	2.52	100.00	0.33	24.40	13.50	52.07	15.37
Maternal Weight Gain	N	**672**	**401**	**1732**	**214**	**603**	**465**	**215**	**860**	**210**	**1116**	**96**	**524**	**645**	**355**	**1502**	**120**	**1407**	**922**	**9**	**213**	**531**	**794**	**24**	**487**	**684**	**0**	**37**	**14838**
Very low weight gain (<0.26 lb/week)	%	24.40	21.95	13.05	17.76	12.94	21.29	10.70	13.02	15.24	25.27	18.75	17.37	22.64	17.75	30.09	14.17	24.80	15.84	22.22	39.44	41.24	20.40	29.17	32.03	22.66	0.00	16.22	21.67
Very high weight gain (>=1.74 lb/week)	%	0.60	0.50	0.92	0.47	0.83	1.72	0.47	0.12	1.90	0.54	0.00	1.15	0.16	1.13	0.73	3.33	0.21	1.08	0.00	0.47	0.19	0.88	0.00	0.21	0.88	0.00	2.70	0.70
Average weight gain (>=0.26 and < 1.74 lb/week)	%	75.00	77.56	86.03	81.78	86.24	76.99	88.84	86.86	82.86	74.19	81.25	81.49	77.21	81.13	69.17	82.50	74.98	83.08	77.78	60.09	58.57	78.72	70.83	67.76	76.46	0.00	81.08	77.63
Using Birth Control when became Pregnant with this Pregnancy	N	**2542**	**899**	**6182**	**591**	**994**	**1310**	**639**	**1192**	**541**	**1543**	**2670**	**769**	**817**	**1752**	**2172**	**606**	**2652**	**1363**	**132**	**742**	**1071**	**1299**	**659**	**888**	**1512**	**147**	**1250**	**36934**
Yes	%	9.21	8.12	7.42	8.12	7.95	9.85	7.04	12.75	7.76	9.92	14.42	9.10	6.12	11.13	17.82	12.05	10.11	8.51	14.39	10.65	8.50	11.39	12.14	5.74	8.20	6.12	7.12	9.88
No	%	84.97	87.99	84.45	87.31	88.03	87.48	88.11	77.52	85.95	87.23	81.27	90.12	91.19	85.56	70.17	82.67	86.80	90.98	84.85	87.87	91.04	86.99	86.04	93.58	86.77	92.52	69.60	84.65
Sometimes	%	5.82	3.89	8.12	4.57	4.02	2.67	4.85	9.73	6.28	2.85	4.31	0.78	2.69	3.31	12.02	5.28	3.09	0.51	0.76	1.48	0.47	1.62	1.82	0.68	5.03	1.36	23.28	5.47

TABLE C.3.5.: BIRTH OUTCOMES

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Births																													
Total Number of Exit Forms with Valid Birth Information	**N**	**972**	**549**	**4502**	**270**	**754**	**665**	**268**	**872**	**226**	**1176**	**781**	**539**	**800**	**371**	**1885**	**140**	**1471**	**1073**	**64**	**261**	**726**	**795**	**328**	**570**	**737**	**219**	**480**	**21494**
Number of Babies Born	**N**	**993**	**554**	**4511**	**273**	**757**	**691**	**268**	**876**	**228**	**1191**	**793**	**544**	**830**	**373**	**1928**	**140**	**1491**	**1089**	**66**	**266**	**737**	**825**	**329**	**592**	**752**	**220**	**485**	**21802**
Live births	N	695	516	4488	259	662	631	254	875	221	1162	752	526	744	369	1686	134	1428	1056	66	251	543	789	329	566	743	204	472	20421
	%	98.03	98.85	99.62	98.85	99.10	97.83	99.22	99.89	100.00	99.32	98.95	99.06	97.51	100.00	99.00	98.53	99.44	99.44	100.00	97.67	99.09	96.10	100.00	95.61	98.80	99.51	98.33	98.92
Stillborn Infants	N	14	7	17	8	7	13	14	1	0	9	9	6	19	2	27	2	10	7	0	6	4	31	0	27	9	2	8	259
	%	1.97	1.34	0.38	3.05	1.05	2.02	5.47	0.11	0.00	0.77	1.18	1.13	2.49	0.54	1.59	1.47	0.70	0.66	0.00	2.33	0.73	3.78	0.00	4.56	1.20	0.98	1.67	1.25
Birth Outcomes: Estimated Gestational Age (EGA) and Birth Weight																													
Number of Live Births for EGA	**N**	**666**	**453**	**4463**	**298**	**587**	**606**	**215**	**860**	**207**	**1137**	**112**	**524**	**717**	**409**	**1614**	**143**	**1424**	**995**	**48**	**225**	**534**	**777**	**352**	**479**	**691**	**158**	**418**	**19112**
Very Preterm Births, <34 weeks	%	4.65	4.64	1.37	5.03	2.90	6.77	2.79	2.21	2.42	5.63	5.36	4.77	9.34	3.67	7.81	3.50	4.49	2.31	12.50	5.78	6.74	10.55	1.99	6.05	7.24	8.23	4.55	4.53
Preterm Births, 34 weeks to 36 weeks, 6 days	%	10.06	9.93	3.61	6.38	5.45	9.74	5.58	6.98	6.76	9.23	9.82	9.16	12.27	5.87	11.52	4.20	6.18	7.64	8.33	9.78	8.61	11.84	7.10	16.70	10.42	13.92	8.37	7.84
Early Term Births, 37 weeks to 38 weeks, 6 days	%	28.08	26.05	19.87	30.87	24.02	29.04	28.84	32.21	23.67	29.20	25.00	31.11	33.89	20.78	29.93	20.98	22.47	24.82	35.42	32.44	24.34	28.44	25.00	35.70	28.94	20.25	24.88	25.93
Term Births, 39 weeks to 41 weeks, 6 days	%	56.16	57.62	71.19	55.03	65.93	53.96	62.33	58.02	64.73	54.62	50.00	52.86	44.21	67.97	48.95	65.73	63.97	64.92	43.75	48.89	55.99	48.01	65.06	40.29	52.97	55.70	59.33	59.51
Post Term Births, 42 weeks or more	%	1.05	1.77	3.97	2.68	1.70	0.50	0.47	0.58	2.42	1.32	9.82	2.10	0.28	1.71	1.80	5.59	2.88	0.30	0.00	3.11	4.31	1.16	0.85	1.25	0.43	1.90	2.87	2.18
Number of Live Births for Birth Weights	**N**	**668**	**506**	**4384**	**248**	**645**	**609**	**245**	**873**	**215**	**1141**	**722**	**517**	**736**	**303**	**1495**	**125**	**1389**	**969**	**64**	**0**	**528**	**783**	**318**	**557**	**742**	**144**	**372**	**19298**
Very Low Birth Weight, <1500 grams	%	2.70	1.00	0.60	1.60	0.80	3.00	1.60	0.90	0.50	2.80	2.80	4.60	5.40	1.30	2.50	0.80	1.30	0.70	4.70	0.00	1.50	5.20	1.90	3.60	4.00	4.90	2.40	2.10

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Low Birth Weight, <2500 grams	%	15.00	11.50	3.80	11.30	7.80	15.40	10.20	6.00	7.40	15.20	11.20	12.20	21.30	8.60	16.00	4.80	10.20	8.50	15.60	0.00	9.70	23.80	9.10	21.00	15.60	15.30	11.60	11.00
Not Low Birth Weight: 2500 - 3999 grams	%	78.70	84.40	85.20	85.10	87.00	78.30	86.90	88.10	88.80	78.60	81.90	83.20	74.60	84.50	81.30	88.00	82.40	84.40	84.40	0.00	82.40	72.00	83.60	74.30	78.70	78.50	80.40	82.10
Macrosomia, >4000 grams	%	6.30	4.20	11.00	3.60	5.30	6.20	2.90	6.00	3.70	6.20	6.90	4.60	4.10	6.90	2.70	7.20	7.50	7.10	0.00	0.00	8.00	4.20	7.20	4.70	5.70	6.20	8.10	6.80
Preterm Labor Management																													
Antenatal steroids	N	**697**	**539**	**4512**	**248**	**741**	**703**	**282**	**872**	**244**	**1163**	**1066**	**695**	**798**	**420**	**1925**	**145**	**1580**	**997**	**77**	**280**	**672**	**802**	**492**	**566**	**864**	**224**	**1017**	**22621**
Yes	%	0.00	3.53	0.47	3.63	0.81	2.42	1.42	0.34	0.82	6.71	2.63	3.31	8.40	0.48	0.36	0.00	0.76	1.81	14.29	1.07	0.60	10.97	0.00	7.42	5.32	3.13	0.98	2.33
No	%	0.00	62.34	99.53	93.95	87.31	72.83	82.27	87.50	86.07	87.88	65.48	76.83	80.08	66.90	38.13	77.93	40.13	95.79	41.56	98.21	58.33	88.15	0.00	88.34	78.24	55.36	37.36	71.26
Not Known	%	100.00	34.14	0.00	2.42	11.88	24.75	16.31	12.16	13.11	5.42	31.89	19.86	11.53	32.62	61.51	22.07	59.11	2.41	44.16	0.71	41.07	0.87	100.00	4.24	16.44	41.52	61.65	26.41
Vaginal progesterone	N	**694**	**543**	**4101**	**249**	**741**	**704**	**282**	**872**	**243**	**1162**	**1066**	**693**	**798**	**419**	**1931**	**145**	**1584**	**995**	**77**	**280**	**672**	**803**	**197**	**566**	**864**	**225**	**1017**	**21923**
Yes	%	2.45	0.18	0.15	1.20	0.40	0.99	0.00	0.11	0.00	1.98	0.75	0.00	6.64	0.95	0.16	0.00	0.32	1.01	0.00	0.00	0.00	0.12	0.51	0.35	0.46	0.00	0.79	0.73
No	%	97.41	68.14	99.85	96.79	88.26	14.35	83.69	87.73	87.24	93.63	67.64	81.10	82.21	67.30	38.43	77.93	53.28	96.48	51.95	99.29	58.63	99.25	99.49	95.58	83.10	58.67	37.46	76.61
Not Known	%	0.14	31.68	0.00	2.01	11.34	84.66	16.31	12.16	12.76	4.39	31.61	18.90	11.15	31.74	61.42	22.07	46.40	2.51	48.05	0.71	41.37	0.62	0.00	4.06	16.44	41.33	61.75	22.66
Progesterone Injections	N	**135**	**90**	**299**	**29**	**39**	**131**	**15**	**69**	**16**	**198**	**98**	**79**	**212**	**33**	**297**	**13**	**134**	**102**	**17**	**72**	**80**	**201**	**10**	**115**	**188**	**14**	**87**	**2773**
Yes	%	22.96	23.33	1.34	13.79	7.69	27.48	0.00	7.25	6.25	20.20	27.55	7.59	41.51	3.03	0.34	0.00	6.72	17.65	11.76	0.00	1.25	22.39	50.00	3.48	10.11	0.00	3.45	13.49
No	%	77.04	52.22	98.66	86.21	82.05	60.31	80.00	85.51	75.00	76.26	52.04	77.22	53.77	60.61	38.05	92.31	53.73	78.43	52.94	98.61	53.75	77.11	50.00	91.30	76.60	35.71	35.63	68.77
Not Known	%	0.00	24.44	0.00	0.00	10.26	12.21	20.00	7.25	18.75	3.54	20.41	15.19	4.72	36.36	61.62	7.69	39.55	3.92	35.29	1.39	45.00	0.50	0.00	5.22	13.30	64.29	60.92	17.74
Tocolytics	N	**697**	**539**	**4507**	**246**	**741**	**701**	**282**	**872**	**244**	**1157**	**1065**	**694**	**798**	**417**	**1928**	**145**	**1584**	**993**	**77**	**280**	**672**	**802**	**492**	**565**	**864**	**226**	**1017**	**22605**
Yes	%	0.00	1.11	0.38	0.81	0.94	0.71	0.71	0.57	3.28	2.25	2.35	2.74	5.64	0.24	0.05	1.38	0.38	0.81	9.09	2.86	0.00	1.12	0.00	0.35	2.20	0.00	0.79	1.05
No	%	0.00	64.38	99.62	96.75	86.50	11.55	83.33	87.27	84.02	92.48	65.45	77.52	83.08	67.63	38.17	79.31	40.03	96.68	44.16	96.43	58.78	98.00	0.00	95.40	81.48	58.41	38.15	70.52
Not Known	%	100.00	34.51	0.00	2.44	12.55	87.73	15.96	12.16	12.70	5.27	32.21	19.74	11.28	32.13	61.77	19.31	59.60	2.52	46.75	0.71	41.22	0.87	100.00	4.25	16.32	41.59	61.06	28.43
Induction of Labor, excluding Planned Cesarean sections	N	**595**	**488**	**4416**	**222**	**689**	**644**	**265**	**809**	**223**	**1055**	**959**	**654**	**695**	**384**	**1766**	**136**	**1488**	**859**	**68**	**268**	**619**	**720**	**492**	**425**	**771**	**216**	**1017**	**20943**
Yes	%	20.50	27.46	15.99	32.88	30.33	10.40	43.40	56.24	18.83	31.66	25.55	20.49	32.52	20.57	6.68	19.85	9.54	45.98	27.94	22.01	16.48	36.53	0.00	35.76	28.92	25.46	11.41	22.02
No	%	66.72	54.92	84.01	63.96	50.22	8.39	40.38	40.54	67.71	61.99	37.96	50.00	56.26	40.10	24.97	62.50	31.72	50.52	47.06	77.24	36.03	62.08	0.00	58.35	52.92	40.28	35.59	51.75
Not Known	%	12.77	17.62	0.00	3.15	19.45	81.21	16.23	3.21	13.45	6.35	36.50	29.51	11.22	39.32	68.35	17.65	58.74	3.49	25.00	0.75	47.50	1.39	100.00	5.88	18.16	34.26	53.00	26.22

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Induction of Labor with Pitocin, excluding Planned Cesarean sections	**N**	**533**	**436**	**4254**	**219**	**675**	**186**	**223**	**787**	**221**	**1017**	**842**	**576**	**656**	**344**	**1350**	**134**	**1293**	**820**	**48**	**265**	**585**	**712**	**492**	**384**	**741**	**212**	**478**	**18483**
Yes	%	18.76	13.76	7.26	30.59	28.59	16.67	46.64	49.43	16.74	30.09	25.42	11.81	23.32	15.12	5.33	11.19	5.72	41.59	29.17	20.00	10.09	36.80	0.00	39.06	26.32	25.00	15.90	18.65
No	%	75.05	72.02	92.74	66.21	52.74	30.11	51.12	43.84	68.33	66.18	45.61	67.01	62.50	45.35	33.11	66.42	36.27	52.68	60.42	78.49	38.97	62.78	0.00	53.91	58.70	37.74	76.99	61.00
Not Known	%	6.19	14.22	0.00	3.20	18.67	53.23	2.24	6.73	14.93	3.74	28.98	21.18	14.18	39.53	61.56	22.39	58.00	5.73	10.42	1.51	50.94	0.42	100.00	7.03	14.98	37.26	7.11	20.35
Planned Delivery Method At Third Trimester	**N**	**1574**	**323**	**3826**	**328**	**561**	**701**	**387**	**842**	**293**	**866**	**772**	**456**	**540**	**1162**	**1053**	**106**	**1704**	**716**	**76**	**408**	**490**	**647**	**346**	**529**	**711**	**197**	**369**	**19983**
Vaginal	%	82.53	86.38	96.42	83.23	88.77	78.46	88.63	90.14	85.32	81.06	80.05	90.57	75.00	83.22	71.42	89.62	82.34	82.40	80.26	84.31	85.51	86.55	86.13	70.89	78.20	85.79	62.60	84.56
C-section	%	11.05	9.29	2.25	10.98	6.77	17.55	4.65	5.82	7.51	14.55	12.18	6.14	19.07	13.77	17.09	6.60	9.10	16.06	13.16	11.03	10.20	9.12	8.38	18.34	14.35	9.14	6.23	9.89
Unsure	%	6.42	4.33	1.33	5.79	4.46	3.99	6.72	4.04	7.17	4.39	7.77	3.29	5.93	3.01	11.49	3.77	8.57	1.54	6.58	4.66	4.29	4.33	5.49	10.78	7.45	5.08	31.17	5.54
Delivery Method based on Exit Data	**N**	**689**	**516**	**4504**	**255**	**663**	**596**	**253**	**871**	**221**	**1142**	**741**	**538**	**733**	**383**	**1619**	**136**	**1407**	**1033**	**61**	**243**	**533**	**795**	**284**	**566**	**735**	**193**	**792**	**46474**
Vaginal Only	%	68.36	73.45	87.68	67.84	68.02	60.57	71.94	77.04	72.40	66.37	64.51	80.48	64.67	59.79	63.80	75.00	70.22	70.38	77.05	76.13	69.79	71.82	79.23	52.30	65.85	69.43	47.47	31.65
C-Section Only	%	31.64	26.55	12.32	31.76	31.98	39.26	28.06	22.96	27.60	33.63	35.49	19.52	35.20	40.21	36.13	25.00	27.65	29.33	22.95	23.87	30.21	27.67	20.77	47.70	34.15	30.57	16.16	11.76
Both Vaginal and C-Section	%	0.00	0.00	0.00	0.39	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.06	0.00	2.13	0.29	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.09
Vaginal Delivery among Women who Planned Vaginal Delivery	**N**	**1299**	**279**	**3689**	**273**	**498**	**550**	**343**	**759**	**250**	**702**	**618**	**413**	**405**	**967**	**752**	**95**	**1403**	**590**	**61**	**344**	**419**	**560**	**298**	**375**	**556**	**169**	**231**	**16898**
Yes	%	28.10	56.63	75.09	52.38	51.81	48.55	36.15	65.35	53.60	70.51	33.17	58.60	68.15	14.37	60.51	58.95	61.80	60.68	27.87	25.00	57.52	59.29	43.96	50.93	57.19	28.40	35.93	54.77
Delivery Method among Women with Previous C-section	**N**	**143**	**89**	**207**	**43**	**71**	**125**	**23**	**116**	**26**	**215**	**128**	**73**	**171**	**28**	**244**	**10**	**217**	**186**	**10**	**56**	**103**	**143**	**10**	**173**	**145**	**17**	**57**	**2829**
VBAC	%	20.98	26.97	29.47	20.93	9.86	10.40	17.39	34.48	26.92	17.21	19.53	34.25	18.71	14.29	6.15	20.00	24.06	8.79	40.00	25.00	14.56	26.76	100.00	16.76	8.97	11.76	26.32	19.23
Repeat C-section	%	79.02	73.03	70.53	79.07	90.14	89.60	82.61	65.52	73.08	82.79	80.47	65.75	81.29	85.71	93.85	80.00	75.94	91.21	60.00	75.00	85.44	73.24	0.00	83.24	91.03	88.24	73.68	80.77
Scheduled C-section	**N**	**215**	**132**	**555**	**65**	**202**	**232**	**70**	**193**	**59**	**348**	**250**	**100**	**253**	**49**	**526**	**33**	**392**	**291**	**14**	**51**	**153**	**222**	**59**	**267**	**243**	**55**	**127**	**5156**
Yes	%	46.51	50.00	13.15	41.54	25.25	25.43	21.43	30.05	35.59	31.61	40.40	30.00	40.32	42.86	30.42	24.24	24.23	49.83	50.00	23.53	32.68	35.59	0.00	52.81	37.86	21.82	0.00	31.71
No	%	46.51	46.21	19.10	55.38	68.81	29.31	74.29	65.28	64.41	65.52	57.20	67.00	57.31	46.94	21.86	42.42	36.22	48.11	50.00	76.47	26.14	64.41	0.00	42.70	62.14	47.27	0.00	43.89
Not Known	%	6.98	3.79	67.75	3.08	5.94	45.26	4.29	4.66	0.00	2.87	2.40	3.00	2.37	10.20	47.72	33.33	39.54	2.06	0.00	0.00	41.18	0.00	100.00	4.49	0.00	30.91	100.00	24.40
Multiples																													

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Multiples Pregnancy, based on Exit Data	**N**	**972**	**549**	**4502**	**270**	**754**	**665**	**268**	**872**	**226**	**1176**	**781**	**539**	**800**	**371**	**1885**	**140**	**1471**	**1073**	**64**	**261**	**726**	**795**	**328**	**570**	**737**	**219**	**480**	**21494**
Two or more identified fetuses	%	1.85	0.91	0.20	1.11	0.40	3.91	0.00	0.46	0.88	1.28	1.54	0.93	3.50	0.54	2.28	0.00	1.36	1.49	3.13	1.92	1.52	3.77	0.30	3.86	2.04	0.46	1.04	1.41
One identified fetus	%	98.15	99.09	99.80	98.89	99.60	96.09	100.00	99.54	99.12	98.72	98.46	99.07	96.50	99.46	97.72	100.00	98.64	98.51	96.88	98.08	98.48	96.23	99.70	96.14	97.96	99.54	98.96	98.59
Multiples Birth, based on Exit Data	**N**	**682**	**511**	**4479**	**256**	**659**	**610**	**254**	**871**	**219**	**1149**	**741**	**521**	**718**	**367**	**1652**	**134**	**1410**	**1040**	**64**	**247**	**533**	**765**	**328**	**549**	**728**	**203**	**468**	**20158**
Two or more infants born alive	%	1.91	0.98	0.20	1.17	0.46	3.44	0.00	0.46	0.91	1.13	1.48	0.96	3.34	0.54	2.06	0.00	1.28	1.54	3.13	1.62	1.88	3.14	0.30	3.10	2.06	0.49	0.85	1.29
One infant born alive	%	98.09	99.02	99.80	98.83	99.54	96.56	100.00	99.54	99.09	98.87	98.52	99.04	96.66	99.46	97.94	100.00	98.72	98.46	96.88	98.38	98.12	96.86	99.70	96.90	97.94	99.51	99.15	98.71

TABLE C.3.6.: SERVICE UTILITZATION

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Enhanced Encounters																													
Enhanced encounters, average and median number per participant	**N**	**972**	**289**	**4070**	**22**	**417**	**851**	**68**	**854**	**36**	**1130**	**1248**	**742**	**807**	**331**	**1189**	**33**	**1596**	**1010**	**46**	**207**	**680**	**825**	**0**	**30**	**715**	**43**	**143**	**18354**
	Mean	5.47	2.03	3.76	1.23	1.49	7.25	1.44	2.88	1.72	6.07	3.34	7.62	11.24	4.26	2.79	5.24	4.73	4.23	1.33	2.03	4.36	1.74	0.00	1.03	1.96	2.30	1.76	4.35
	Median	5.00	1.00	3.00	1.00	1.00	6.00	1.00	3.00	1.00	5.00	2.50	7.00	7.00	4.00	2.00	6.00	3.00	4.00	1.00	2.00	4.00	1.00	0.00	1.00	1.00	1.00	1.00	3.00
Received Care Coordinator Encounters	**N**	**972**	**564**	**4510**	**264**	**757**	**850**	**284**	**1013**	**268**	**1223**	**1260**	**743**	**805**	**289**	**2131**	**152**	**1774**	**1211**	**51**	**281**	**731**	**832**	**492**	**607**	**1008**	**238**	**1016**	**24326**
Yes	%	100.00	52.48	97.61	14.39	57.60	100.00	24.30	85.39	13.81	96.89	99.37	100.00	100.00	83.74	73.91	44.74	93.52	90.75	90.20	74.02	93.71	99.52	0.00	7.08	71.03	17.65	16.14	79.44
No	%	0.00	38.12	2.22	79.55	38.18	0.00	75.35	13.43	82.84	2.86	0.40	0.00	0.00	14.19	21.68	18.42	5.75	8.75	9.80	25.98	6.29	0.48	0.00	92.42	26.98	68.91	21.56	14.42
Not Known	%	0.00	9.40	0.18	6.06	4.23	0.00	0.35	1.18	3.36	0.25	0.24	0.00	0.00	2.08	4.41	36.84	0.73	0.50	0.00	0.00	0.00	0.00	100.00	0.49	1.98	13.45	62.30	6.13
Average and Median Number of Care Coordination Encounters per Participant	**N**	**970**	**285**	**4070**	**18**	**415**	**851**	**68**	**854**	**36**	**1126**	**1248**	**742**	**807**	**331**	**1189**	**32**	**1586**	**984**	**46**	**207**	**679**	**823**	**0**	**30**	**715**	**42**	**137**	**18291**
	Mean	5.32	1.94	3.76	1.11	1.34	7.25	1.44	2.78	1.72	5.92	3.06	7.62	11.00	3.25	2.79	5.25	4.53	3.26	1.33	2.03	4.25	1.53	0.00	1.03	1.96	2.29	1.54	4.19
	Median	5.00	1.00	3.00	1.00	1.00	6.00	1.00	3.00	1.00	5.00	2.00	7.00	7.00	3.00	2.00	6.00	3.00	3.00	1.00	2.00	4.00	1.00	0.00	1.00	1.00	1.00	1.00	3.00
Received Mental Health Encounters	**N**	**973**	**555**	**4507**	**259**	**757**	**839**	**280**	**1013**	**268**	**1205**	**1218**	**728**	**808**	**389**	**2092**	**154**	**1741**	**1195**	**51**	**0**	**719**	**831**	**492**	**608**	**1008**	**237**	**1016**	**23943**
Yes	%	6.47	7.57	0.13	4.25	8.32	0.00	0.00	3.75	0.37	6.31	10.10	0.00	12.87	2.06	1.00	1.95	3.79	46.28	0.00	0.00	6.82	10.47	0.00	0.00	0.00	1.27	1.57	5.57
No	%	93.53	81.08	92.92	89.19	85.47	99.52	99.64	95.06	96.64	85.89	70.11	100.00	70.30	81.49	91.97	42.21	93.62	53.05	100.00	0.00	91.38	88.45	0.00	99.34	97.82	84.81	34.35	83.95
Not Known	%	0.00	11.35	6.94	6.56	6.21	0.48	0.36	1.18	2.99	7.80	19.79	0.00	16.83	16.45	7.03	55.84	2.58	0.67	0.00	0.00	1.81	1.08	100.00	0.66	2.18	13.92	64.07	10.48
Average and Median Number of Mental Health Encounters per Participant	**N**	**63**	**28**	**0**	**5**	**58**	**0**	**0**	**36**	**0**	**41**	**113**	**0**	**71**	**51**	**2**	**3**	**61**	**553**	**0**	**0**	**48**	**74**	**0**	**0**	**0**	**2**	**10**	**1219**
	Mean	1.65	1.21	NaN	1.40	1.12	NaN	NaN	2.39	NaN	4.54	3.11	NaN	2.83	2.37	1.00	1.33	3.57	1.91	NaN	NaN	1.65	2.28	NaN	NaN	NaN	1.50	3.60	2.23
	Median	1.00	1.00		1.00	1.00			2.00		2.00	2.00		2.00	2.00	1.00	1.00	2.00	2.00			1.00	1.00				1.50	2.50	2.00
Received Doula Encounters	**N**	**970**	**552**	**477**	**259**	**755**	**839**	**280**	**1011**	**267**	**1208**	**1209**	**726**	**807**	**344**	**2089**	**153**	**1725**	**1203**	**51**	**0**	**718**	**831**	**492**	**607**	**1009**	**235**	**1016**	**19833**
Yes	%	1.75	1.09	100.00	0.00	0.00	0.12	0.00	0.00	0.00	0.17	0.00	0.00	0.25	0.00	4.45	0.65	4.06	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.43	1.08	3.45
No	%	98.25	69.93	0.00	96.53	97.09	99.40	99.64	98.91	97.00	92.63	94.87	100.00	84.26	88.37	87.60	47.06	92.64	99.75	100.00	0.00	98.05	98.44	0.00	98.52	97.82	87.66	34.65	86.15
Not Known	%	0.00	28.99	0.00	3.47	2.91	0.48	0.36	1.09	3.00	7.20	5.13	0.00	15.49	11.63	7.95	52.29	3.30	0.25	0.00	0.00	1.95	1.20	100.00	1.48	2.18	11.91	64.27	10.40
Average and Median Number of	**N**	**16**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**89**	**0**	**1**	**68**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**4**	**182**
	Mean	3.19	1.00	NaN	NaN	NaN	1.00	NaN	NaN	NaN	2.00	NaN	NaN	NaN	2.42	NaN	1.00	2.35	NaN	NaN	NaN	NaN	1.00	NaN	NaN	NaN	NaN	1.25	2.40

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Doula Encounters per Participant	Median	1.50	1.00				1.00				2.00				2.00		1.00	2.00					1.00					1.00	2.00
Enhanced Services																													
Average and Median Number of Enhanced Services per Participant	**N**	**246**	**224**	**1343**	**7**	**575**	**0**	**0**	**106**	**7**	**240**	**235**	**0**	**166**	**109**	**1181**	**9**	**386**	**533**	**49**	**110**	**91**	**439**	**0**	**36**	**548**	**44**	**0**	**6684**
	Mean	3.09	1.91	1.47	1.43	2.35	NaN	NaN	1.39	7.43	2.85	2.52	NaN	1.45	10.02	7.76	4.67	3.87	5.14	8.31	1.48	3.64	2.07	0.00	1.06	1.05	3.43	0.00	3.49
	Median	2.50	1.00	1.00	1.00	2.00			1.00	5.00	2.00	1.00		1.00	10.00	2.00	3.00	2.00	4.00	7.00	1.00	2.00	2.00	0.00	1.00	1.00	3.00	0.00	2.00
Received Health Education, not Centering	**N**	**973**	**553**	**0**	**248**	**757**	**104**	**6**	**1013**	**265**	**1216**	**1202**	**727**	**344**	**164**	**2078**	**151**	**800**	**1112**	**51**	**281**	**720**	**477**	**492**	**608**	**1008**	**237**	**1016**	**16603**
Yes	%	24.87	1.45	0.00	2.82	33.42	0.00	0.00	7.90	17.74	0.99	8.07	0.00	30.81	0.00	59.67	4.64	44.25	42.54	96.08	14.95	7.50	83.02	0.00	0.00	0.00	5.49	2.36	21.10
No	%	75.13	74.32	0.00	87.90	60.63	100.00	100.00	91.02	78.87	91.78	61.90	100.00	31.40	89.02	33.21	33.11	53.00	56.83	3.92	85.05	91.94	16.56	0.00	99.67	98.02	80.59	57.68	66.55
Not Known	%	0.00	24.23	0.00	9.27	5.94	0.00	0.00	1.09	3.40	7.24	30.03	0.00	37.79	10.98	7.12	62.25	2.75	0.63	0.00	0.00	0.56	0.42	100.00	0.33	1.98	13.92	39.96	12.34
Average and Median Number of Health Education Services per Participant per Participant	**N**	**242**	**7**	**0**	**2**	**240**	**0**	**0**	**77**	**4**	**8**	**98**	**0**	**104**	**89**	**919**	**7**	**273**	**470**	**49**	**42**	**53**	**396**	**0**	**0**	**0**	**12**	**0**	**3092**
	Mean	2.91	1.14	NaN	1.00	1.13	NaN	NaN	1.23	2.00	1.25	2.10	NaN	1.10	2.39	3.45	3.57	2.19	1.83	3.90	1.36	4.17	1.21	NaN	NaN	NaN	2.33	NaN	2.35
	Median	2.00	1.00		1.00	1.00			1.00	1.50	1.00	2.00		1.00	2.00	1.00	3.00	2.00	1.00	3.00	1.00	4.00	1.00				1.00		1.00
Received Home Visits	**N**	**972**	**553**	**2262**	**244**	**757**	**104**	**6**	**1014**	**267**	**1217**	**1236**	**727**	**344**	**165**	**2038**	**152**	**801**	**1114**	**51**	**281**	**727**	**479**	**492**	**607**	**1008**	**238**	**1016**	**18872**
Yes	%	4.32	3.98	59.37	0.41	7.53	0.00	0.00	0.00	0.00	7.89	0.08	0.00	13.08	0.00	12.02	5.92	0.37	21.27	0.00	26.33	3.16	0.42	0.00	0.00	0.00	5.04	0.79	11.76
No	%	95.68	59.31	40.63	86.07	80.85	100.00	100.00	98.92	96.25	85.54	93.53	100.00	46.51	89.09	81.11	36.84	95.13	77.83	98.04	73.67	96.29	98.33	0.00	99.67	97.92	80.25	59.25	78.16
Not Known	%	0.00	36.71	0.00	13.52	11.62	0.00	0.00	1.08	3.75	6.57	6.39	0.00	40.41	10.91	6.87	57.24	4.49	0.90	1.96	0.00	0.55	1.25	100.00	0.33	2.08	14.71	39.96	10.07
Average and Median Number of Home Visiting Services per Participant	**N**	**43**	**1**	**1343**	**0**	**38**	**0**	**0**	**0**	**0**	**84**	**1**	**0**	**2**	**89**	**164**	**2**	**3**	**236**	**0**	**72**	**23**	**2**	**0**	**0**	**0**	**12**	**0**	**2115**
	Mean	1.30	1.00	1.47	NaN	1.21	NaN	NaN	NaN	NaN	1.67	1.00	NaN	1.50	2.39	1.09	6.00	1.00	1.53	NaN	1.24	1.04	1.00	NaN	NaN	NaN	1.67	NaN	1.48
	Median	1.00	1.00	1.00		1.00					1.00	1.00		1.50	2.00	1.00	6.00	1.00	1.00		1.00	1.00	1.00				1.00		1.00
Received Self-Care, not Centering	**N**	**973**	**550**	**0**	**248**	**756**	**104**	**5**	**1014**	**263**	**1215**	**1234**	**727**	**344**	**165**	**1971**	**151**	**792**	**1111**	**50**	**0**	**724**	**479**	**492**	**608**	**1008**	**238**	**1016**	**16238**
Yes	%	0.00	0.73	0.00	0.40	20.11	0.00	0.00	0.10	11.41	0.00	0.00	0.00	0.58	0.00	26.59	0.00	9.47	44.28	96.00	0.00	1.66	0.00	0.00	0.33	0.00	0.84	0.00	8.28
No	%	100.00	59.45	0.00	89.11	72.35	100.00	100.00	98.82	85.17	93.25	85.17	100.00	56.10	89.09	65.85	37.09	83.08	55.00	4.00	0.00	97.79	98.75	0.00	99.34	98.02	83.61	0.00	75.45
Not Known	%	0.00	39.82	0.00	10.48	7.54	0.00	0.00	1.08	3.42	6.75	14.83	0.00	43.31	10.91	7.56	62.91	7.45	0.72	0.00	0.00	0.55	1.25	100.00	0.33	1.98	15.55	100.00	16.27
Average and Median Number of	**N**	**0**	**2**	**0**	**0**	**149**	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**1**	**89**	**239**	**0**	**42**	**492**	**49**	**0**	**13**	**0**	**0**	**0**	**0**	**2**	**0**	**1083**
	Mean	NaN	1.50	NaN	NaN	1.08	NaN	NaN	2.00	2.75	NaN	NaN	NaN	2.00	2.38	9.12	NaN	3.50	1.99	3.90	NaN	2.15	NaN	NaN	NaN	NaN	2.50	NaN	3.62

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Self-Care Services per Participant	Median		1.50			1.00			2.00	2.50				2.00	2.00	9.00		3.00	2.00	3.00		2.00					2.50		2.00
Received Nutrition Counseling	**N**	**972**	**552**	**4512**	**252**	**757**	**104**	**5**	**1008**	**266**	**1221**	**1256**	**727**	**344**	**211**	**2079**	**152**	**797**	**1112**	**51**	**6**	**721**	**478**	**492**	**604**	**1008**	**234**	**1016**	**20937**
Yes	%	0.00	34.06	0.02	23.02	75.17	0.00	0.00	3.97	24.06	14.82	12.74	0.00	22.67	9.00	70.66	6.58	55.08	23.65	47.06	100.00	5.83	61.09	0.00	12.75	54.56	17.09	15.94	22.60
No	%	100.00	45.83	92.93	67.06	20.21	100.00	100.00	94.94	74.06	78.62	65.76	100.00	36.05	78.67	22.46	34.21	42.53	75.54	52.94	0.00	93.62	38.70	0.00	86.92	43.85	70.51	44.09	66.73
Not Known	%	0.00	20.11	7.05	9.92	4.62	0.00	0.00	1.09	1.88	6.55	21.50	0.00	41.28	12.32	6.88	59.21	2.38	0.81	0.00	0.00	0.55	0.21	100.00	0.33	1.59	12.39	39.96	10.67
Average and Median Number of Nutrition Counseling Services per Participant	**N**	**0**	**179**	**0**	**6**	**549**	**0**	**0**	**40**	**7**	**152**	**128**	**0**	**77**	**107**	**1140**	**4**	**362**	**261**	**24**	**6**	**40**	**290**	**0**	**36**	**548**	**38**	**0**	**3994**
	Mean	NaN	1.16	NaN	1.17	1.58	NaN	NaN	1.23	3.57	3.07	2.38	NaN	1.08	2.23	3.10	1.25	2.02	1.66	1.04	2.83	1.38	1.28	NaN	1.06	1.05	2.42	NaN	2.03
	Median		1.00		1.00	1.00			1.00	4.00	2.00	1.00		1.00	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	2.00		1.00
Received Substance Abuse Services	**N**	**973**	**551**	**4512**	**248**	**756**	**104**	**5**	**1013**	**262**	**1209**	**1258**	**727**	**344**	**198**	**2028**	**151**	**792**	**1104**	**49**	**0**	**727**	**478**	**311**	**607**	**1008**	**231**	**1016**	**20662**
Yes	%	0.00	6.90	0.00	0.81	0.53	0.00	0.00	0.20	10.69	3.23	3.10	0.00	3.78	1.52	4.68	0.66	1.26	6.43	0.00	0.00	0.55	7.11	9.97	0.00	0.00	1.30	2.36	2.13
No	%	100.00	78.04	92.95	90.32	92.86	100.00	100.00	98.62	85.88	90.07	76.47	100.00	54.94	85.35	87.97	37.09	92.55	92.84	97.96	0.00	97.66	92.26	90.03	99.67	98.51	86.58	57.68	89.31
Not Known	%	0.00	15.06	7.05	8.87	6.61	0.00	0.00	1.18	3.44	6.70	20.43	0.00	41.28	13.13	7.35	62.25	6.19	0.72	2.04	0.00	1.79	0.63	0.00	0.33	1.49	12.12	39.96	8.56
Average and Median Number of Substance Abuse Services per Participant	**N**	**0**	**36**	**0**	**1**	**4**	**0**	**0**	**1**	**4**	**8**	**29**	**0**	**2**	**92**	**74**	**0**	**4**	**70**	**0**	**0**	**3**	**26**	**0**	**0**	**0**	**3**	**0**	**357**
	Mean	NaN	5.78	NaN	1.00	1.00	NaN	NaN	1.00	2.00	8.50	2.79	NaN	19.00	2.34	1.41	NaN	3.50	1.50	NaN	NaN	1.00	2.12	NaN	NaN	NaN	2.00	NaN	2.55
	Median		1.00		1.00	1.00			1.00	1.00	1.50	2.00		19.00	2.00	1.00		4.00	1.00			1.00	1.00				1.00		1.00
Referrals																													
Referrals for Non-Medical Services outside of the Strong Start Program	**N**	**968**	**547**	**4512**	**250**	**757**	**850**	**286**	**1011**	**266**	**1208**	**1262**	**741**	**806**	**341**	**2083**	**152**	**1764**	**1196**	**51**	**183**	**734**	**815**	**492**	**601**	**1001**	**237**	**1016**	**24130**
Yes	%	0.00	9.14	0.31	16.00	50.07	62.24	0.00	39.17	32.33	15.98	84.55	98.79	65.88	15.25	28.85	1.97	53.34	76.59	0.00	97.81	72.89	13.50	100.00	0.17	44.36	24.05	2.76	34.71
No	%	1.03	69.47	92.64	76.40	43.99	37.76	98.95	58.56	66.17	77.57	13.63	1.21	28.16	75.37	61.21	41.45	43.65	23.08	98.04	2.19	25.89	85.40	0.00	99.67	54.45	63.29	32.58	53.95
Not Known	%	98.97	21.39	7.05	7.60	5.94	0.00	1.05	2.27	1.50	6.46	1.82	0.00	5.96	9.38	9.94	56.58	3.00	0.33	1.96	0.00	1.23	1.10	0.00	0.17	1.20	12.66	64.67	11.34
Referrals for High Risk Medical Services	**N**	**965**	**558**	**4512**	**265**	**756**	**769**	**286**	**1010**	**265**	**1217**	**1241**	**728**	**808**	**341**	**2091**	**151**	**1744**	**1137**	**51**	**3**	**721**	**817**	**492**	**604**	**1008**	**233**	**1016**	**23789**
Yes	%	44.77	25.45	0.00	47.92	38.76	8.32	0.70	18.12	9.43	25.47	35.05	16.48	40.97	9.09	6.70	3.97	13.76	7.56	0.00	100.00	9.71	24.11	0.00	31.79	37.40	1.72	4.72	16.22

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
No	%	55.13	53.94	92.95	50.19	54.76	88.95	98.25	66.83	88.68	67.87	53.34	83.52	50.99	80.94	81.68	47.68	83.26	92.08	98.04	0.00	80.72	75.15	0.00	67.88	61.11	85.41	30.41	72.69
Not Known	%	0.10	20.61	7.05	1.89	6.48	2.73	1.05	15.05	1.89	6.66	11.60	0.00	8.04	9.97	11.62	48.34	2.98	0.35	1.96	0.00	9.57	0.73	100.00	0.33	1.49	12.88	64.86	11.09
Support Person																													
Plan to have a support person	**N**	**1397**	**316**	**3627**	**310**	**508**	**606**	**380**	**772**	**287**	**726**	**693**	**341**	**430**	**1064**	**932**	**101**	**1541**	**710**	**60**	**377**	**402**	**600**	**351**	**527**	**697**	**198**	**362**	**18315**
Yes	%	93.49	93.04	95.67	96.77	94.29	94.55	97.37	95.34	95.47	96.14	95.24	96.48	96.51	97.27	93.99	95.05	84.75	98.59	85.00	96.82	95.02	96.50	94.30	92.22	93.69	96.97	65.19	93.87
No	%	1.72	0.63	0.88	0.97	1.38	2.48	0.26	1.55	1.39	1.79	1.73	0.88	1.63	0.47	2.68	1.98	3.11	0.85	1.67	1.06	1.49	1.17	2.85	3.98	2.30	0.00	1.66	1.59
Unsure	%	4.80	6.33	3.45	2.26	4.33	2.97	2.37	3.11	3.14	2.07	3.03	2.64	1.86	2.26	3.33	2.97	12.13	0.56	13.33	2.12	3.48	2.33	2.85	3.80	4.02	3.03	33.15	4.54
Had a support person during labor	**N**	**1245**	**102**	**3001**	**183**	**397**	**485**	**118**	**646**	**226**	**723**	**529**	**297**	**618**	**1178**	**910**	**87**	**1329**	**571**	**35**	**256**	**332**	**562**	**246**	**366**	**410**	**86**	**634**	**15572**
Yes	%	93.73	95.10	98.47	93.99	97.23	94.64	100.00	95.51	96.90	94.47	94.52	96.30	96.60	98.56	92.42	90.80	84.57	99.12	94.29	96.09	97.29	95.37	94.31	67.21	96.10	95.35	22.08	91.57
No	%	5.62	1.96	1.03	3.28	1.76	4.74	0.00	3.87	2.21	5.39	5.10	3.70	3.24	1.44	4.95	2.30	5.57	0.53	5.71	3.52	2.71	4.63	0.00	32.51	3.90	3.49	1.26	3.85
Unsure	%	0.64	2.94	0.50	2.73	1.01	0.62	0.00	0.62	0.88	0.14	0.38	0.00	0.16	0.00	2.64	6.90	9.86	0.35	0.00	0.39	0.00	0.00	5.69	0.27	0.00	1.16	76.66	4.59
Delivery Process																													
Delivery Location, based on Exit Data	**N**	**694**	**527**	**4506**	**260**	**679**	**620**	**255**	**872**	**222**	**1159**	**745**	**553**	**734**	**392**	**1739**	**143**	**1462**	**1043**	**74**	**279**	**545**	**799**	**492**	**582**	**737**	**225**	**558**	**20896**
Hospital	%	99.86	99.62	47.67	99.62	99.56	99.35	100.00	99.54	99.10	99.40	99.33	97.11	99.86	99.74	99.14	100.00	97.74	99.04	83.78	99.64	99.45	98.87	100.00	100.00	100.00	100.00	99.64	88.08
Birth center	%	0.00	0.00	44.07	0.00	0.00	0.32	0.00	0.23	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.68	0.19	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.36	9.60
Home birth	%	0.14	0.19	7.77	0.00	0.00	0.00	0.00	0.11	0.00	0.52	0.27	0.00	0.00	0.00	0.00	0.00	0.21	0.29	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	1.78
Other	%	0.00	0.19	0.49	0.38	0.44	0.32	0.00	0.11	0.90	0.09	0.40	2.89	0.00	0.26	0.86	0.00	1.37	0.48	16.22	0.00	0.55	0.63	0.00	0.00	0.00	0.00	0.00	0.54
Routine Prenatal Service Provider, based on Exit Data	**N**	**974**	**556**	**4511**	**242**	**752**	**841**	**267**	**945**	**213**	**1177**	**917**	**726**	**792**	**338**	**1884**	**131**	**1687**	**1060**	**48**	**281**	**724**	**826**	**461**	**584**	**984**	**208**	**567**	**22696**
Obstetrician	%	52.87	0.36	2.31	69.42	8.91	86.44	0.00	2.43	8.45	67.46	44.93	52.75	49.49	91.42	94.85	52.67	25.01	100.00	2.08	99.64	63.95	0.85	73.32	100.00	54.07	26.92	25.93	42.56
Licensed Professional Midwife	%	0.00	0.18	20.15	2.07	0.27	0.00	0.00	0.21	2.35	0.25	1.42	0.00	0.00	0.00	0.05	0.00	3.20	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.10	11.06	12.70	4.82
Nurse Practitioner	%	0.00	82.73	0.00	21.49	0.00	11.41	19.10	18.84	30.99	12.32	9.49	1.38	0.13	0.30	1.01	15.27	0.77	0.00	0.00	0.36	9.81	0.12	0.00	0.00	27.64	13.46	20.81	7.45
Certified Nurse Midwife/Certified Midwife	%	30.18	0.18	76.52	6.20	70.35	2.14	80.90	78.52	58.22	17.67	38.60	44.77	35.10	8.28	1.22	30.53	69.89	0.00	0.00	0.00	2.49	0.00	26.68	0.00	17.99	45.67	40.21	37.31
Family Medicine Physician	%	0.00	0.00	0.80	0.00	20.48	0.00	0.00	0.00	0.00	0.00	0.11	0.55	0.38	0.00	0.00	1.53	1.07	0.00	0.00	0.00	23.48	0.00	0.00	0.00	0.20	0.96	0.00	1.73
Other Provider	%	16.94	16.55	0.22	0.83	0.00	0.00	0.00	0.00	0.00	2.29	5.45	0.55	14.90	0.00	2.87	0.00	0.06	0.00	97.92	0.00	0.00	99.03	0.00	0.00	0.00	1.92	0.35	6.14

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Prenatal Visits																													
Received Individual Prenatal Visits	**N**	**673**	**526**	**4510**	**350**	**605**	**607**	**284**	**869**	**275**	**1171**	**1268**	**530**	**724**	**414**	**1851**	**159**	**1665**	**1145**	**51**	**273**	**552**	**795**	**362**	**608**	**698**	**173**	**710**	**21848**
Yes	%	99.55	92.02	99.89	75.43	98.51	99.18	100.00	99.54	83.64	99.91	92.27	100.00	90.61	97.58	92.06	45.28	97.90	96.16	0.00	86.45	99.46	99.12	0.00	99.18	98.57	0.00	82.25	93.30
No	%	0.45	7.98	0.11	24.57	1.49	0.82	0.00	0.46	16.36	0.09	7.73	0.00	9.39	2.42	7.94	54.72	2.10	3.84	100.00	13.55	0.54	0.88	100.00	0.82	1.43	100.00	17.75	6.70
Average and Median Number of Individual Prenatal Visits per Participant	**N**	**670**	**484**	**4505**	**264**	**596**	**602**	**284**	**865**	**230**	**1170**	**1170**	**530**	**656**	**404**	**1704**	**72**	**1630**	**1101**	**0**	**236**	**549**	**788**	**0**	**603**	**688**	**0**	**584**	**20385**
	Mean	9.74	4.32	11.01	4.64	5.88	11.56	4.44	6.09	4.76	8.97	6.78	9.65	10.92	10.50	10.00	5.17	8.08	10.27	.	10.18	6.55	11.32	.	3.50	9.27	.	7.03	8.92
	Median	10.00	4.00	12.00	4.00	5.00	11.00	4.00	6.00	4.00	9.00	6.00	10.00	11.00	11.00	10.00	5.00	8.00	11.00	.	10.00	7.00	12.00	.	3.00	10.00	.	7.00	9.00
Received Group Prenatal Visits	**N**	**673**	**526**	**4510**	**350**	**605**	**607**	**284**	**869**	**275**	**1171**	**1268**	**530**	**724**	**414**	**1851**	**159**	**1665**	**1145**	**51**	**273**	**552**	**795**	**362**	**608**	**698**	**173**	**710**	**21848**
Yes	%	5.05	94.68	2.35	75.14	98.18	0.00	97.18	98.27	97.09	0.00	0.00	0.00	8.15	1.21	0.32	62.89	5.17	0.00	0.00	6.23	0.00	0.00	6.91	99.67	15.62	0.00	72.54	20.23
No	%	94.95	5.32	97.65	24.86	1.82	100.00	2.82	1.73	2.91	100.00	100.00	100.00	91.85	98.79	99.68	37.11	94.83	100.00	100.00	93.77	100.00	100.00	93.09	0.33	84.38	100.00	27.46	79.77
Average and Median Number of Group Prenatal Visits per Participant	**N**	**34**	**498**	**106**	**263**	**594**	**0**	**276**	**854**	**267**	**0**	**0**	**0**	**59**	**5**	**6**	**100**	**86**	**0**	**0**	**17**	**0**	**0**	**25**	**606**	**109**	**0**	**515**	**4420**
	Mean	4.44	4.75	7.00	6.37	6.06	.	5.28	7.53	5.35	.	.	.	4.63	11.00	6.17	4.73	6.78	.	.	11.47	.	.	8.48	7.20	5.72	.	4.45	6.10
	Median	4.00	5.00	7.00	7.00	7.00	.	5.00	8.00	5.00	.	.	.	5.00	12.00	6.00	5.00	7.00	.	.	12.00	.	.	10.00	7.00	6.00	.	4.00	6.00

TABLE C.3.7.: SATISFACTION

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Birth Control Counseling																													
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	**N**	**1250**	**96**	**2950**	**189**	**377**	**477**	**117**	**644**	**220**	**728**	**511**	**297**	**621**	**1174**	**894**	**83**	**1322**	**579**	**34**	**255**	**347**	**560**	**246**	**354**	**387**	**81**	**634**	**15427**
Yes	%	75.20	79.17	74.54	94.18	68.70	80.29	91.45	89.60	67.73	95.19	87.48	81.48	98.23	71.12	82.55	78.31	77.23	92.75	82.35	77.25	82.42	95.00	86.59	57.06	95.09	95.06	69.87	80.39
No	%	21.28	18.75	22.31	5.29	28.12	17.40	6.84	9.63	25.91	4.26	11.15	18.18	1.45	27.77	14.88	18.07	16.79	6.74	14.71	22.35	14.12	4.46	0.00	41.53	4.39	4.94	3.00	16.06
Unsure	%	3.52	2.08	3.15	0.53	3.18	2.31	1.71	0.78	6.36	0.55	1.37	0.34	0.32	1.11	2.57	3.61	5.98	0.52	2.94	0.39	3.46	0.54	13.41	1.41	0.52	0.00	27.13	3.55
Breastfeeding																													
Breastfeeding Intention at Third Trimester	**N**	**1564**	**324**	**3805**	**323**	**550**	**698**	**385**	**839**	**295**	**857**	**769**	**453**	**539**	**1163**	**1063**	**106**	**1690**	**706**	**75**	**408**	**492**	**644**	**348**	**527**	**715**	**201**	**373**	**19912**
Breastfeed only	%	34.08	42.28	82.44	36.22	55.82	41.69	48.05	52.21	66.44	19.84	65.28	56.95	54.73	61.31	9.41	70.75	30.36	71.39	44.00	58.82	31.50	31.21	55.17	51.42	19.02	24.38	37.27	49.65
Formula feed only	%																												
Both breast and formula feed	%	39.71	29.94	10.14	36.22	30.55	29.80	38.96	41.00	20.34	36.64	23.67	25.61	26.35	11.35	43.74	16.04	44.97	13.46	32.00	18.14	45.12	39.91	27.30	29.98	40.42	35.82	20.64	28.33
I haven't decided	%	12.66	12.35	3.65	5.88	10.00	12.61	8.31	2.03	7.46	14.82	5.59	6.40	9.28	7.91	17.69	5.66	14.91	3.26	10.67	7.60	5.49	6.21	5.46	7.97	9.79	16.42	31.64	9.08
Breast Feeding after Delivery (Based on Postpartum Form Data)	**N**	**1289**	**99**	**2984**	**194**	**385**	**490**	**118**	**646**	**221**	**731**	**530**	**301**	**615**	**1175**	**891**	**83**	**1340**	**578**	**35**	**257**	**353**	**560**	**246**	**358**	**388**	**87**	**634**	**15588**
Yes	%	73.47	84.85	92.02	69.07	87.53	72.65	86.44	92.26	93.21	57.46	90.75	79.07	74.63	73.96	73.47	84.34	80.15	77.34	80.00	72.76	81.30	72.50	77.64	75.14	61.86	66.67	57.41	77.48
No	%	25.52	13.13	7.47	30.93	11.43	26.94	11.86	7.59	5.88	42.27	8.87	20.93	25.37	26.04	25.52	15.66	14.55	22.32	20.00	26.85	18.41	27.50	0.00	24.30	37.37	32.18	17.67	20.23
Prefer not to answer	%	1.01	2.02	0.50	0.00	1.04	0.41	1.69	0.15	0.90	0.27	0.38	0.00	0.00	0.00	1.01	0.00	5.30	0.35	0.00	0.39	0.28	0.00	22.36	0.56	0.77	1.15	24.92	2.28

Data Elements	N or %	Access Community Health Network	Albert Einstein Health Network	American Association of Birth Centers	Amerigroup Corporation	Central Jersey Family Health Consortium	Florida Association of Healthy Start Coalitions	Grady Memorial Hospital Association DBA Grady Health System	Harris County Hospital District	HealthInsight of Nevada	Johns Hopkins University	Los Angeles County Department of Health Services	Maricopa Special Health Care District	Medical University of South Carolina	Meridian Health Plan	Mississippi Primary Health Care Association	Oklahoma Health Care Authority	Providence Health Foundation of Providence Hospital	Signature Medical Group	St. John Community Health Investment Corp.	Texas Tech University Health Sciences Center	United Neighborhood Health Services	University of Alabama at Birmingham	University of Kentucky Research Foundation	University of Puerto Rico Medical Sciences Campus	University of South Alabama	University of Tennessee Medical Group	Virginia Commonwealth University	Total
Breastfeeding among Women who Intended to Breastfeed	**N**	**1154**	**234**	**3523**	**234**	**475**	**499**	**335**	**782**	**256**	**484**	**684**	**374**	**437**	**845**	**565**	**92**	**1273**	**599**	**57**	**314**	**377**	**458**	**287**	**429**	**425**	**121**	**216**	**15529**
Yes	%	62.39	23.08	66.02	47.01	54.11	53.11	24.18	57.67	67.19	62.19	36.26	45.45	81.46	65.44	49.91	65.22	69.60	47.75	33.33	44.27	54.91	50.87	46.69	47.79	40.00	25.62	51.85	56.85
Satisfaction																													
Satisfaction with Prenatal Care	**N**	**1560**	**320**	**3803**	**314**	**554**	**697**	**382**	**842**	**300**	**861**	**775**	**450**	**540**	**1162**	**1069**	**106**	**1535**	**696**	**76**	**404**	**484**	**648**	**341**	**523**	**709**	**200**	**277**	**19628**
Not at all satisfied	%	0.96	1.56	0.03	0.32	0.90	0.57	0.26	0.24	0.00	0.58	0.90	0.22	0.00	0.34	0.37	0.00	0.52	0.00	2.63	0.50	0.21	1.23	0.29	1.53	0.99	0.00	1.81	0.49
Slightly satisfied	%	1.41	1.25	0.55	0.96	1.08	2.30	1.05	0.59	1.67	2.44	2.58	1.11	1.48	0.86	1.12	0.94	2.08	0.14	3.95	1.24	0.21	1.54	0.00	1.91	1.41	1.50	1.08	1.23
Moderately satisfied	%	6.99	8.13	3.29	3.50	4.15	9.18	6.81	2.73	8.00	6.50	11.23	4.89	5.93	7.31	7.39	9.43	11.73	2.30	15.79	8.91	11.36	9.10	5.28	4.97	6.49	3.50	12.27	6.58
Very satisfied	%	48.59	41.25	29.48	26.75	50.72	37.88	32.20	44.77	39.33	44.48	46.32	18.67	53.89	34.42	43.78	33.96	50.49	28.30	46.05	46.29	48.35	31.33	53.96	34.03	35.12	38.50	38.99	39.26
Extremely satisfied	%	42.05	47.81	66.66	68.47	43.14	50.07	59.69	51.66	51.00	45.99	38.97	75.11	38.70	57.06	47.33	55.66	35.18	69.25	31.58	43.07	39.88	56.79	40.47	57.55	55.99	56.50	45.85	52.44
Satisfaction with Delivery Experience	**N**	**1259**	**100**	**2974**	**167**	**393**	**480**	**118**	**642**	**227**	**737**	**524**	**299**	**620**	**1179**	**894**	**79**	**1176**	**580**	**35**	**255**	**346**	**562**	**234**	**369**	**412**	**86**	**177**	**14924**
Not at all satisfied	%	3.49	0.00	2.05	1.80	1.27	2.92	3.39	0.78	0.44	2.44	4.77	1.34	1.61	1.10	1.45	0.00	3.23	0.34	17.14	2.75	0.58	4.45	3.42	9.76	2.91	1.16	14.69	2.57
Slightly satisfied	%	3.49	3.00	2.79	0.60	3.05	5.83	2.54	2.65	2.20	4.48	6.30	1.00	1.45	1.44	1.79	1.27	4.93	1.38	8.57	3.53	1.45	4.27	4.27	10.57	3.88	2.33	9.60	3.34
Moderately satisfied	%	14.85	15.00	10.12	5.99	16.79	12.71	14.41	10.44	9.69	10.58	13.36	8.70	11.77	11.28	9.28	10.13	17.01	6.03	14.29	16.08	13.58	13.52	7.26	15.18	12.62	9.30	9.04	11.86
Very satisfied	%	50.36	48.00	28.38	21.56	57.00	39.38	39.83	52.49	42.29	39.35	50.95	32.44	50.00	37.23	39.93	49.37	47.19	31.55	31.43	49.02	45.95	37.72	55.98	30.35	34.71	56.98	28.81	40.10
Extremely satisfied	%	27.80	34.00	56.66	70.06	21.88	39.17	39.83	33.64	45.37	43.15	24.62	56.52	35.16	48.94	47.54	39.24	27.64	60.69	28.57	28.63	38.44	40.04	29.06	34.15	45.87	30.23	37.85	42.13

APPENDIX D: TECHNICAL ASSISTANCE STATE BACKGROUND BRIEF

Strong Start

TA Background Brief Template

Strong Start Awardee Information	
I. Awardee Name	
A. Awardee Program Director, Contact information	
B. Approach Type	
C. Total Ever Enrolled through most recent quarter	
Medicaid Program Information	
II. Department within which Medicaid is located	
A. Department Director, Contact information	
B. Medicaid Agency Administration	
1. Agency Director, Contact information	
2. Agency Data Coordinator, Contact Information	
3. Other Department/Agency staff responsible for regulations, data sharing, privacy, contact information	
C. Upper Income Eligibility Threshold	
D. Total covered births in most recent year	
Vital Statistics Program Information	
III. Department within which Vital Statistics is located	
A. Department Director, Contact information	
B. Vital Statistics Agency Administration	
1. Agency Director, Contact information	
2. Agency Data Coordinator, Contact Information	
3. Other Department/Agency staff responsible for regulations, data sharing, privacy, contact information	
C. Total state births in most recent year	
Other Key Informants of Possible Relevance	
IV. Types of contacts	
A. Contacts surveyed by CMMI/Caitlin (Names, Contact information)	
B. Strong Start Letters of Support contacts (names, contact information, Summary of commitment made)	
C. Academy Health Workshop Participants/Resources (names, contact information)	
D. National Organization Contacts (e.g., Vital Statistics Directors, HIPAA/Privacy Orgs., Medicaid Directors, MCH Directors)	

Strong Start Awardee Information	
Current and/or Previous State-Level Data Linkage/Evaluation Efforts	
V. Previous efforts	**Yes/No**
A. *If yes*, Project #1	
1. Source of information	
2. Project Name	
3. Summary Description (including data sets linked, years, and findings)	
4. Agency/organization responsible	
5. Project leader, Contact information	
B. *Repeat for additional projects*	
Initial/Overall Assessment of Viability of Linkage	
VI. Probability of success	**High/Medium/Low**
A. Facilitating factors	
B. Primary barriers	
Next Steps	
VII. Outline and sequence of next steps (including contacts)	

APPENDIX E: TECHNICAL ASSISTANCE EXECUTIVE BRIEF TEMPLATE

Supporting Data Linkage for the Strong Start II Initiative in [state name] to Improve Health Outcomes and Reduce Medicaid Spending

What is Strong Start?

The Strong Start II initiative aims to improve maternal and infant outcomes for women enrolled in Medicaid and the Children Health Insurance Program (CHIP) through three innovative evidence-based enhanced prenatal care models: maternity care homes, group prenatal care, and birth centers. The goal is to determine whether these new care models improve maternal and infant health outcomes, including reducing the prevalence of preterm births.

According to the March of Dimes, "Preterm birth is the leading cause of newborn death, and babies who survive an early birth often have breathing problems, cerebral palsy, intellectual disabilities and other health challenges." Thus, Strong Start's success would mean an increase in the proportion of babies who are not burdened with the health risks of a preterm birth. In turn, reduced preterm birth rates could mean that states would see a decrease in the total cost of medical care over the first year of life for children born to high risk mothers. The Centers for Medicare & Medicaid Services (CMS) has funded # awardees in [state name] to provide enhanced prenatal care services over a three-year period that began February 2013. These awardees include: [list awardees].

What Can Your State Do to Support Strong Start?

[State Name] can support Strong Start by assisting with a CMS-funded evaluation to measure the impact of the initiative on health outcomes, health care delivery, and cost of care. A central part of this evaluation utilizes the data from birth certificates (vital records), and Medicaid and CHIP enrollment and utilization. We need support from [name of State Agencies] to either develop matched birth certificate and Medicaid/CHIP administrative data files, OR provide birth certificates and Medicaid/CHIP data to the evaluation team so that it can perform the linkage necessary to conduct the impacts evaluation. Specific steps that would likely be involved in either approach would include: (1) gaining approvals for linking data, (2) releasing patient level data, and (3) sharing the requested data between states agencies and with CMS-funded evaluators. Similar data linkage efforts have been effectively leveraged to evaluate programs and improve public health.

STRONG START EVALUATION IS AN INVESTMENT IN [STATE NAME]'S FUTURE

- Reducing the proportion of births that are preterm gives more babies a healthy start in life. Preterm babies are at additional risk for a host of serious health problems.
- Improving birth outcomes is critical for health disparities elimination efforts. Currently, African American women and low-income women are much more likely to have preterm births.
- A conservative estimate of the average societal costs associated with a preterm birth is over $60,000.

Why Support the Evaluation of Strong Start in [state name]?

- In [state name], XX percent of births are preterm, ranking # highest in the number of preterm births nationally.
- Prior research has noted that identifying effective interventions to reduce preterm births can reduce costs to the public sector (e.g., Medicaid). In [state name], early gestational births account for an estimated [$$$] per year in Medicaid costs alone—reducing preterm births could result in major savings in both the short and long term.
- To determine how best to reduce the number and cost of preterm births, it is critical to evaluate Strong Start II.
- Customized technical assistance is available to support states in building their capacity to link vital record and Medicaid/CHIP data, or in sharing sensitive data with the evaluation team.
- Limited financial support will be available to states to partially offset the cost of performing the data linkage and/or sharing the data.

How can [state name] get help linking data?

CMS has hired a team of experts from the Urban Institute (UI), the American Institutes for Research (AIR), Health Management Associates (HMA) to assist states as part of the Strong Start evaluation.

- AIR is providing technical assistance to help states understand and navigate the legal and regulatory aspects of sharing and linking data, including compliance with HIPPA and Institutional Review Boards requirements.
- HMA is helping state officials to link birth certificate and Medicaid/CHIP data, including providing trainings to develop each state's capacity to link data.

This support will be tailored to reflect the unique environment and goals of each state. For more information about how AIR and HMA can help you link your data, contact XXXXXX.

About the authors

The Center for Medicare and Medicaid Innovation (CMMI) of CMS has contracted with the Urban Institute and its subcontractors—the American Institutes for Research (AIR), Health Management Associates (HMA), and Briljent—to conduct an independent evaluation of Strong Start II. HMA, AIR, and the Urban Institute will collaborate and assist states in developing and providing the data needed to conduct the evaluation.

References:

[NOTE: ONCE THE TEMPLATE IS APPROVED, THIS SECTION WILL BE UPDATED WITH CORRECT REFERENCES FOR EACH STATE WHERE APPLICABLE.]

APPENDIX F: INFORMATION NEEDS DOCUMENT

Strong Start for Mothers and Newborns Evaluation

Overview of Information Needs for the Impact Analysis

PROJECT OVERVIEW

The Strong Start for Mothers and Newborns initiative (Strong Start II), funded under the Affordable Care Act, aims to improve maternal and infant outcomes for women enrolled in Medicaid and the Children's Health Insurance Program (CHIP) through the funding of three innovative evidence-based enhanced prenatal care models: birth centers, maternity care homes, and group prenatal care visits. The initiative, which consists of 27 awardees and 182 provider sites across 32 states, the District of Columbia, and Puerto Rico, will serve up to 80,000 women over three-to-four years beginning in 2013. In your state, the awardees are: [insert awardee name(s)] in [insert city].[332]

The Center for Medicare and Medicaid Innovation (CMMI) of the Centers for Medicare and Medicaid Services (CMS) has contracted with the Urban Institute and its subcontractors—the American Institutes for Research (AIR), Health Management Associates (HMA), and Briljent—to conduct an independent evaluation of Strong Start II. This five-year evaluation will monitor the implementation of Strong Start interventions and evaluate the impact of Strong Start on health care delivery, health outcomes, and cost of care. The evaluation is built around three principle data collection efforts: qualitative case studies; participant surveys; and an impact analysis, which aims to measure the various outcomes among Strong Start mothers and infants against a comparison group.

The impact analysis is designed to answer the following three broad evaluation questions:

- What are the impacts of the enhanced prenatal care models supported by Strong Start on rates of preterm birth, birth weight, and cost, relative to traditional Medicaid?
- Do impacts differ across awardees and across the three Strong Start models? If so, how?
- How does the case study analysis help explain the impact findings?

Should someone in your state request it, the evaluation team is prepared to offer technical assistance for constructing files that we need for the impact analysis (such as the linkage between birth certificates and Medicaid eligibility files). If your state is unable to conduct the linkage, we will work with you to obtain access to birth certificate and Medicaid data so that the Urban Institute could conduct the linkage.

[332] [If state wrote letter of support for awardee's application, note here. Include supporting agency, signatory, and date written. **Suggested language**: "Note that when [awardee] first submitted its application to participate in Strong Start, a letter of support was submitted by [agency] on [date], signed by [name]."

LINKAGE PROCESS AND INFORMATION NEEDS

To conduct the impact analysis, the Urban Institute must obtain data from birth certificates, Medicaid/CHIP eligibility data, and Medicaid claims/encounter data for Strong Start mothers and infants as well as for a comparison group. These data must be linked to each other. The Urban Institute's Institutional Review Board (IRB) has reviewed our plans for data linkage and has determined that our study meets the criteria for a waiver of informed consent based on our study design and the data protection protocols outlined in our IRB package (which can be sent, upon request).

We are requesting your state's help in performing the required linkages. To accomplish this, the following steps, or some similar process, will likely be needed to identify and link all the records we are requesting from the state.

1. The evaluation team will provide you a list of Strong Start participants.[333] This list will contain enough information to link participants to birth certificates, Medicaid eligibility data, and Medicaid claims/encounter data. In addition to Medicaid number and Strong Start participant ID, it will include name, address, and birthdate, among other information. This list would be used to identify the Strong Start participants in birth certificate files.
2. For each Strong Start site in your state, the evaluation team will give you a list of geographic areas (counties or zip-codes) where Strong Start participants reside so that a comparison group of Medicaid covered women who are not enrolled in Strong Start can be identified.[334]
3. Birth certificates for both Strong Start participants and all women in the geographic areas identified for the comparison group will then be merged to Medicaid eligibility records. The comparison group will only include Medicaid covered women, so this step will identify women on the birth certificates who are covered by Medicaid. This merge can be accomplished through a variety of processes, including ones you may have used in the past for similar purposes.
4. The state will then send the evaluation team the de-identified birth certificates for Strong Start participants and all Medicaid births in the identified geographic areas. We would ask that you append three key variables to each record in this data set: (1) a unique ID number that links to your Medicaid eligibility and claims/encounter records (this does not need to be the Medicaid ID number, as long as you retain a cross-reference to that number); (2) an indicator of whether the woman was enrolled in Strong Start; and (3) and indicator of the Strong Start site (provided to you in step two).

[333] This information would be shared via an encrypted CD or secure File Transfer Protocol (FTP) process.
[334] All Medicaid covered births in the identified geographic area will be included in our comparison group and propensity score weighting will be used to assure the treatment and comparison groups are similar along a variety of dimensions.

5. As a final step, the state will link this file to Medicaid claims/encounter data for mother and infant, for one year prior to and following the infant's birth date. These linked data—containing birth certificates, Medicaid eligibility data, and Medicaid claims/encounter data for the Strong Start and comparison group enrollees—would be returned to the evaluation team for analysis after all Medicaid claims/encounter data were available for the year following birth.

Please Note: After the state performs the linkage, the evaluation team would NOT need identifiable birth certificates or Medicaid eligibility and claims/encounter data. De-identified, linked data which contain randomly assigned IDs that links women across both types of records (birth certificates and Medicaid files) will fully meet our research needs.

Once again, the process described above would apply if your state is able to perform the data linkage required for our evaluation. However, if the state is unable to perform the linkage, we would be happy to work with you to develop a process that would allow the Urban Institute to obtain the needed birth certificate and Medicaid data so that we could conduct the linkage ourselves.

Exhibits 1 and 2 outline examples of the variables the evaluation team would construct from your Medicaid files and birth certificates for use in the impact analysis. Linked data returned to the evaluation team would need to include the variables that could be used to construct these analysis variables. The precise list of variables (and variable names) we obtain from you would depend on the content of your files and would be negotiated with you as part of the request process. We would also need to acquire a list of codes (and their meanings) from you at the time we acquire the files.

Exhibit 1: Medicaid Eligibility and Claims/Encounter Variables

Variable	Specification
Eligibility Group/Insurance Status (for mother and infant, by month)	
Basis of Medicaid Eligibility	Disabled, receiving cash assistance, Section 1931 eligibility, ACA expansion
Managed Care Enrollment	Whether the mother or infant was enrolled in a risk-based managed care plan
Other insurance Status	Private, Medicare
Medicaid Expenditures	
Total Medicaid Expenditures for Mother in Year Prior to and After Delivery	Continuous variable that equals total Medicaid payments for mother from year prior to delivery to one year after delivery. This variable would be calculated by evaluator based on payment fields over the time period.
Total Medicaid Expenditures for Infant in First Year of Life	Continuous variable that equals total Medicaid payments for infant from delivery to first birthday. This variable would be calculated by evaluator based on payment fields over the time period.
Utilization Variables	
Hospital Days for Mother	Number of hospital days for mother at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.
Hospital Days for Infant	Number of hospital days for infant at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.
Neonatal ICU Days for Infant	Number of neonatal ICU days for infant at delivery and in first year after birth. Would be calculated by evaluator based on *ICD-9-CM, CPT-4, HCPCS* and other codes on claims data.

Exhibit 2: Birth Certificate Variables

Variable	Specification
Demographic Characteristics	
Mother's Age	Actual age (1 year increments)
Mother's Race	White non-Hispanic, Black non-Hispanic, Puerto Rican, other Hispanic, American Indian or Alaskan Native, Native Hawaiian or other Pacific Islander, Asian, mixed race, other
Mother's Education	Eighth grade or less, no high school degree (age related), no high school degree, GED (if available), high school degree, some college no degree, associate's degree, bachelor's degree, master's degree, doctorate or professional degree
Marital Status	Married, not married and paternity acknowledgement signed, not married and paternity acknowledgement not signed
Zip code and Census Tract	Zip code and/or census tract
Behavioral Risk Factors	
Smoking	Number of cigarettes smoked in three months prior to pregnancy
Prenatal Care Initiation	Date of prenatal care initiation
Medical Risk Factors	
Plurality	Single, twin, triplet, four or more
Previous Live Births	First birth, second birth, third birth, etc.
Previous Preterm birth	Mother has had a previous pre-term birth
Previous Other Poor Pregnancy Outcome	Mother has had previous perinatal death, or small for gestational age birth
Inter-pregnancy interval (live birth)	Time since last live birth less than 6 months, 6 to 17 months, 18 to 23 months, 24 months or more
Inter-pregnancy interval (other pregnancy outcome)	Time since last other birth outcome less than 6 months, 6 to 17 months, 18 to 23 months, 24 months or more
Pre-pregnancy Diabetes	Mother had diabetes prior to pregnancy
Pre-pregnancy Hypertension	Mother had hypertension prior to pregnancy
Mother's BMI pre-pregnancy	Underweight, normal weight, overweight, obese
Hospital is participating in Hospital Engagement Network (HEN)	Delivery hospital is in HEN network
Key Outcomes	
Birth weight	Continuous variable
Gestational Age	Continuous variable calculated by dates
Process Outcomes	
Weekend Delivery	Day of delivery
Early Term Delivery	Gestational Age
Cesarean Section	= 1 if Delivery by Cesarean Section = 0 if Vaginal Delivery
Vaginal Birth After Cesarean	= 1 if Cesarean Section = 0 & Previous Cesarean Section = 1 = 0 if Cesarean Section = 1 & Previous Cesarean Section = 1 Only defined for those with Previous Cesarean Section = 1
Apgar Score	Categorical Variable

APPENDIX G: TECHNICAL ASSISTANCE STATUS TRACKER

Strong Start TA Status Chart as of August 8, 2016															
Data Acquisition Process															
State	**Firm**	**Agency**	**Initial Contact (Date)**	**State Officials Receptive (Y/N/May be)**	**Data Application in Progress**	**Data Application Submitted (Date)**	**Data Request Approved (Date)**	**IRB Status**	**DUA/BAA in Progress**	**DUA/BAA Submitted (Date)**	**DUA/BAA Signed (Date)**	**2014 Data Transferred**	**Stipend Requested?**	**Fees**	**Linkage Responsibility**	**Linkage Underway**
Alabama	AIR	Medicaid	3/26/2015	Y	N/A	N/A	6/19/2015	N/A	N/A	N/A	N/A		Y	3,000	UI	
		Vital Records	3/19/2015	Y	✓	4/27/2015	7/11/2016	N/A	✓		7/11/2016					
Arizona	HMA	Medicaid	Various	Y	Yes	N/A	7/18/2016	N/A	Yes	Yes	6/22/2016			$25,000 over the course of three years for obtaining and matching data	State (CHiR)	
		Vital Records	Various	Y		✓	7/19/2016	N/A	Yes	Yes						
California	UI	Medicaid	12/18/2014	Y	✓	3/13/2015									State	
		CPHS	12/18/2015	Y	✓	3/6/2015	4/3/2015									
		Vital Records			✓	3/27/2015 (resubmitted 6/10/15 per VSAC request)							Y			
District of Columbia	AIR	Medicaid	4/29/2015	Y				TBD	✓				Y		DC Medicaid	
		Vital Records		Y	✓	7/22/2015	8/18/2015	N/A			10/22/2015	Y				

Strong Start TA Status Chart as of August 8, 2016																
Data Acquisition Process																
State	Firm	Agency	Initial Contact (Date)	State Officials Receptive (Y/N/May be)	Data Application in Progress	Data Application Submitted (Date)	Data Request Approved (Date)	IRB Status	DUA/BAA in Progress	DUA/BAA Submitted (Date)	DUA/BAA Signed (Date)	2014 Data Transferred	Stipend Requested?	Fees	Linkage Responsibility	Linkage Underway
Florida	HMA	Medicaid	Various	Y	✓	4/30/2015		N/A			5/17/2016			Nominal Fee for processing of application of $250	UI	
		Vital Records	Various	Y	✓	5/1/2015		N/A	Yes	8/1/2016						
Georgia	HMA	Medicaid	6/2/2015	Y				N/A	✓						UI	
		Vital Records	2/20/2015	Y	✓	7/16/2015	7/8/2016	Approved (7/1/2016)	N/A	N/A	N/A		Y	One Time Fee for processing of application of $200, plus (# Records * 23 Variables = Total Cost) Cost per Year of Data		
Illinois	AIR	Medicaid	1/7/2015	Y	✓	2/23/2015	4/16/2015	N/A							Medicaid	
		Vital Records	1/21/2015	Y	✓	3/18/2015		Submitted								
Kentucky	AIR	Medicaid			✓	11/13/2015		N/A	✓						Medicaid	

Strong Start TA Status Chart as of August 8, 2016															
Data Acquisition Process															
State	Firm	Agency	Initial Contact (Date)	State Officials Receptive (Y/N/May be)	Data Application in Progress	Data Application Submitted (Date)	Data Request Approved (Date)	IRB Status	DUA/BAA in Progress	DUA/BAA Submitted (Date)	DUA/BAA Signed (Date)	2014 Data Transferred	Stipend Requested?	Fees	Linkage Responsibility	Linkage Underway
		Vital Records	5/21/2015	Y	✓	3/9/2016	5/16/2016 (The IRB approved our app, but the State Registrar still needs to approve it)	Approved					Y			
Louisiana	HMA	Medicaid	3/25/2015	Y	✓	N/A	N/A	Delayed				Y, 2014 and 2015 data		Staff time is charged at $20 an hour, and vital records usually charges for 2-3 hours to make a file.	UI	
		Vital Records	3/31/2015	Y	✓	7/20/2015							Y			
Maryland	AIR	Medicaid	4/27/2015	Y	✓	5/27/2016		Submitted					Y		Unknown	
		Vital Records	3/27/2015	N	✓	4/21/2015		N/A					N			

Strong Start TA Status Chart as of August 8, 2016																
Data Acquisition Process																
State	**Firm**	**Agency**	**Initial Contact (Date)**	**State Officials Receptive (Y/N/May be)**	**Data Application in Progress**	**Data Application Submitted (Date)**	**Data Request Approved (Date)**	**IRB Status**	**DUA/BAA in Progress**	**DUA/BAA Submitted (Date)**	**DUA/BAA Signed (Date)**	**2014 Data Transferred**	**Stipend Requested?**	**Fees**	**Linkage Responsibility**	**Linkage Underway**
Michigan	AIR	Medicaid and Vital Records	1/6/2015	Y	✓	6/1/2015	6/1/2015 (4/11/16 - We submitted additional IRB materials)	Submitted							State	
Mississippi	AIR	Medicaid	4/14/2015	Maybe	N/A	N/A	N/A	N/A	✓						Vital Records	
		Vital Records	3/26/2015	Y	N/A	N/A	N/A	N/A	✓		1/15/2016		Y			
Missouri	AIR	Medicaid	8/20/2015	Maybe	✓	4/7/2016	6/7/2016	N/A					Y		Vital Records	
		Vital Records	5/4/2015	Maybe	✓	3/10/2016		Submitted					Y			
Nevada	AIR	Medicaid	2/19/2015	Y	N/A	N/A	N/A	N/A	✓	6/15/2015	7/11/2015				Urban	
		Vital Records	2/23/2015	Y	✓	3/20/2015		N/A			3/18/2016		Y			
New Jersey	HMA	Medicaid	3/10/2015	Y	N/A	N/A	N/A	N/A	N/A		3/1/2016	In Process			State	
		Vital Records		Y	N/A	N/A	N/A	N/A	N/A							
Pennsylvania	AIR	Medicaid	3/11/2015	Y	N/A	N/A	N/A	N/A	✓	4/9/2015			Y		PA Medicaid	
		Vital Records	2/18/2015	Y	✓	3/20/2015	4/14/2015	N/A				2014 and 2015 data submitted				
South Carolina	UI	Medicaid	2/18/2015	Y	✓	3/27/2015	7/21/2015		N/A			✓			State	

Strong Start TA Status Chart as of August 8, 2016																
Data Acquisition Process																
State	**Firm**	**Agency**	**Initial Contact (Date)**	**State Officials Receptive (Y/N/May be)**	**Data Application in Progress**	**Data Application Submitted (Date)**	**Data Request Approved (Date)**	**IRB Status**	**DUA/BAA in Progress**	**DUA/BAA Submitted (Date)**	**DUA/BAA Signed (Date)**	**2014 Data Transferred**	**Stipend Requested?**	**Fees**	**Linkage Responsibility**	**Linkage Underway**
		Vital Records	1/12/2015	Y	✓	3/27/2015	7/29/2015		✓	7/29/2015	7/29/2015	✓				
Tennessee	AIR	Medicaid	4/29/2015	Y	✓										Vital Records	
		Vital Records	4/8/2015	Y	✓	6/19/2015	N/A	In the process of being resubmitted	✓	✓	1/27/2016 (5/12/16 - We were asked to resubmit using updated forms.)		Y			
Texas	HMA	Medicaid	3/11/2015	Y	N/A	N/A	N/A	N/A	✓					$21,000 over the course of three years of evaluation	State	
		Vital Records	5/1/2015	Y	✓ (IRB App)			Pending UI Approval								
Virginia	AIR	Medicaid	5/11/2015					N/A	✓						UI	
		Vital Records	5/11/2015			11/12/2015		N/A	✓		4/25/2016	Y	Y			

APPENDIX H: RATIONALE FOR PROPENSITY SCORE REWEIGHTING

Propensity score reweighting vs. matching for estimating Strong Start treatment effects

Propensity score reweighting (i.e., inverse probability of treatment weighting on the propensity score) is one of a class of available propensity-score-based methods (also including *matching* on the propensity score, *stratification* on the propensity score, and *covariate adjustment* using the propensity score) employed to reduce the effects of confounding in observational studies (Austin, 2011; Imbens, 2004; Rosenbaum and Rubin, 1983). Like propensity score matching (and other methods that directly match on covariates like nearest neighbor matching), propensity score reweighting allows for the construction of a comparison group of untreated individuals that are observationally similar to treated individuals (Hirano and Imbens, 2001; Imbens, 2004). Both methods allow for close inspection of the degree to which covariates are balanced in the treatment and comparison groups, and performing such inspection is an element of best-practice implementation (Austin, 2008; Austin and Stuart, 2015; Hill, 2008). The propensity score reweighting approach to construct a comparison group has been applied previously to evaluate the impact of birth center care on birth outcomes (Benatar et al., 2013). This approach is also currently being used in CMMI evaluations of the Multi-Payer Advanced Primary Care Practice Demonstration (Smith, 2013) and the FQHC Advanced Primary Care Practice Demonstration (Timbie, 2013).

Propensity score matching and weighting share the step of estimating a propensity score model of treatment status. Given the estimated propensity score, matching involves attempting to match each treated case to one or more untreated cases with a similar propensity score to create a comparison group. The matching process involves a number of decisions including choice of matching method, number of cases to match, whether to use a caliper in the match, and matching with or without replacement (Caliendo and Kopeinig, 2005). In widely used pair-wise (1:1) matching, only a subset (quite possibly a small subset) of untreated cases are matched and used for the comparison group. In contrast, with propensity score reweighting, a statistical weight is calculated as a function of the propensity score (Rosenbaum, 1987). Potentially all available untreated cases are then used for the comparison group. Untreated cases that are more similar to treatment group members receive larger statistical weights, and dissimilar comparison group members receive lower weights. The weighted untreated cases are used as the comparison group, which will have means and distributions of observable characteristics that are very similar to the treated group. If meaningful differences in covariates are detected in early stages, the propensity score model is refined until remaining differences are negligible.

Both propensity score weighting and the many variants of matching produce treatment effects estimates that have similar large sample properties. Under the common assumption that treatment status is independent of the potential outcomes given the covariates, both weighting and matching yield treatment effect estimates that are statistically consistent, i.e., estimates converge to their true values as the sample size increases (Imbens, 2004; Lunceford and Davidian, 2004). Whereas propensity score weighting allows treatment effect estimates that are statistically efficient (Hirano, Imbens, and Ridder, 2003), propensity score matching estimators are generally not efficient. More

efficient estimates will generally have lower standard errors, and therefore be more likely to statistically detect treatment effects. In selecting the number of comparison group cases (M) in 1:M propensity score matching, a higher value of M tends to increase precision (reduce variance) at the expense of higher bias (Austin, 2010). Because propensity score weighting uses all untreated cases, the method does not present this tradeoff. Propensity score weighting estimates may be more sensitive than matching if the propensity score equation is misspecified (Rubin, 2004). Careful modeling of the propensity score equation can help avoid this potential problem. Further, when propensity score weighting is combined with regression adjustment for covariates, estimates have been shown to be "doubly robust" to misspecification in either the propensity score equation or the outcome equation (Bang and Robins, 2005).

The various matching and weighting methods differ in their finite (small) sample performance. Recent Monte Carlo simulation evidence finds that, in realistic microeconomic datasets where there is adequate overlap in the propensity score distributions of treated and untreated observations, propensity score reweighting is more effective than pairwise matching and is competitive with the most effective matching estimators (Busso, DiNardo, and McCrary, 2014). Both methods rank well in terms of minimizing bias, but propensity score weighing using normalized weights has lower variance than pairwise matching across a wide range of alternative data generating process scenarios.

Because the Strong Start impacts analyses will estimate treatment effects at the site level (many of which involve a modest number of treated cases), a statistically efficient method that makes full use of available data will have the best chance of detecting true treatment effects. Given the statistical efficiency of propensity score reweighting and its documented strong performance relative to alternatives, we will use the propensity score reweighting approach as our primary estimation method for the impacts analysis.

[1] University of South Alabama (USA) is another location, other than UAB, that women in the state can go for high risk maternity care. However, USA is different from UAB because their high risk clinic is not a Strong Start site, although Strong Start women can be referred there if they become high risk. At UAB, the high risk clinic is one of the Strong Start sites.
[2] See Rubin, D.B. (1979). "Using Multivariate Matched Sampling and Regression Adjustment to Control Bias in Observational Studies." *Journal of the American Statistical Association* 74, 318–328
[3] Impact analysis team. Rule A Memorandum. Submitted to CMMI on March 17, 2016.

2100 M Street NW
Washington, DC 20037

www.urban.org