

# Strong Start for Mothers and Newborns Evaluation: YEAR 4 ANNUAL REPORT

# **Volume 1: Cross-Cutting Findings**

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# **Executive Summary**

The United States has among the worst maternal and infant birth outcomes in the developed world despite very high levels of health care spending. The Strong Start for Mothers and Newborns initiative,<sup>1</sup> funded under Section 3021 of the Affordable Care Act (ACA), aims to improve maternal and infant outcomes for pregnancies covered by Medicaid and the Children's Health Insurance Program (CHIP). The initiative funded services through three evidence-based prenatal care models—Maternity Care Homes, Group Prenatal Care, and Birth Centers—and supported the delivery of enhanced services through 27 awardees and approximately 175 provider sites<sup>2</sup> across 29 states, the District of Columbia, and Puerto Rico. These awardees and sites served a total of 45,977 women enrolled in the program. 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 awardees received no-cost extensions to prolong service provision and began winding down during calendar year 2016, with 12 awardees continuing into early 2017. At the time of this writing, all Strong Start awardees have ceased program activities, and any sustained services are no longer supported by Strong Start cooperative agreement funds.

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 maternal and infant health outcomes, health care delivery, and cost of care. To answer these questions, the evaluation includes three primary components:

- **Qualitative case studies**, which develop an in-depth understanding of how Strong Start approaches are designed and implemented, document challenges awardees encountered during implementation, describe perceived success and factors that contributed to success, and understand participant experiences;
- **Participant-level process evaluation**, which collects detailed information on the demographic and risk characteristics, service use, and outcomes of all Strong Start participants; and
- *Impact analysis*, which assesses whether and to what extent Strong Start has had an impact on rates of preterm birth, 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.

The purpose of this fourth 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.

<sup>&</sup>lt;sup>1</sup> 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.

<sup>&</sup>lt;sup>2</sup> 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.

# STRONG START SITES AND AWARDEES

The 27 Strong Start awardees each adopted one or more of the Strong Start models of care. Specifically, as the award period ended, 17 were operating Maternity Care Home models, 13 were operating Group Prenatal Care models, and two were operating Birth Center models. Included in these counts are four awardees that were operating more than one model. In total, as of Year 4, 54 percent of Strong Start's provider sites implemented Maternity Care Home (95 sites), 25 percent offered Group Prenatal Care (44 sites), and 21 percent provide Strong Start services in a Birth Center setting (37 sites), for a total of 176 sites across all three models.

Initially, Strong Start had a goal of reaching up to 80,000 women over a three-year award 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 early challenges with enrollment, in Year 2 most Strong Start awardees revised their enrollment targets downward (CMS/CMMI, 2014). Most new enrollment goals were between 1,000 and 2,000 women over the entire period of program operation, with total enrollment revised to approximately 58,000 women across all 27 awardees. Even as operations wound down in 2016, awardees continued to work hard toward achieving this goal and ended the fourth quarter of 2016 with a total of 45,977 women ever enrolled in the Strong Start program, nearly 80 percent of target enrollment.

# SUMMARY CONCLUSIONS

Syntheses of findings through the fourth year of data collection allow us to make a number of observations about awardees' experiences implementing Strong Start, promising practices they adopted to overcome common challenges, and preliminary outcomes among Strong Start participants. With Participant-Level Process Evaluation and Case Study data collection now complete, and efforts to obtain and link birth certificate and Medicaid data to support our impacts analysis ongoing, we present the following summary conclusions.

- 1. Strong Start awardees wrapped up service provision having served nearly 46,000 women over three to four years. Strong Start awardees received funding for a four-year period, originally comprising a three-year intervention period for implementation and service delivery, and a fourth year to complete program and evaluation data collection. Most awardees received no-cost extensions, allowing them to continue enrolling and serving participants for part or all of the fourth year of the program and continue data submission into a fifth year. Strong Start enrollment ended by December 2016, and the initiative's final deliveries for Strong Start-enrolled women occurred by March 2017. In all, 45,977 women were ever enrolled in Strong Start, representing nearly 80 percent of the target enrollment set by the awardees.
- 2. Strong Start participants appear to be less likely to develop gestational diabetes than other lowincome populations, which could be connected to awardee efforts related to education and support for appropriate nutrition and activity during pregnancy. This evaluation's participant-level process data indicate that the rate of gestational diabetes is relatively low overall: 5.4 percent of Strong Start enrollees developed gestational diabetes during pregnancy. Though Hispanic women were more likely than other racial and ethnic groups to develop gestational diabetes during their Strong Start pregnancies, their rates were still lower than benchmarks for

pregnant Medicaid beneficiaries overall, which are reportedly as high as 10 percent. As has been well documented in the literature, older participants are more likely to develop this condition, but the Strong Start population skews younger. Despite reports that few participants received formal nutritional counseling, key informants participating in our case studies perceived that their efforts to counsel women on healthy activity and nutrition on a less formal, ongoing basis during pregnancy helped lead to better outcomes.

- 3. Maternity Care Home participants are significantly more likely than either Birth Center or Group Prenatal Care participants to be using a moderately or highly effective form of contraception *postpartum.* Providing family planning counseling during pregnancy has been, to varying degrees, a focus of virtually all Strong Start awardees and sites. But regression analysis of participant level data suggests that Maternity Care Home models have been more successful than other Strong Start models in facilitating women's postpartum adoption of moderately or highly effective forms of contraception-including tubal ligations and long-acting reversible contraception (LARC), which includes intrauterine devices (IUDs) or implants (e.g., Nexplanon). This evaluation's case studies found that Group Prenatal Care participants experienced some discontinuity of care postpartum, with some not seeing the provider they had interacted with throughout their pregnancies at their postpartum checkup. This could contribute to higher noshow rates or discomfort discussing family planning with an unfamiliar provider. Birth Center providers, meanwhile, are frequently unable to insert IUDs or prescribe contraceptive implants, which could impede their ability to promote usage of highly effective contraception. Additionally, tubal ligations cannot be conducted by midwives or at birth centers. It is not precisely clear why Maternity Care Homes are more impactful on this measure. In addition to the model's emphasis on care coordination that may lead to a more effective linkage to family planning services postpartum, possible explanations include variation in state Medicaid policies related to LARC access; greater reliance on physician providers that can offer the full scope of highly effective contraception; and differences in the types of organizations operating the Strong Start award (e.g., Maternity Care Homes are more likely to be large health systems and less likely to be religiously affiliated).
- 4. Strong Start enrollees in Group Prenatal Care and Birth Center models appear to experience better outcomes compared with their counterparts enrolled in Maternity Care Homes. Armed with a much larger sample of participant-level data, the evaluation repeated its regression analyses from Year 3 and compared outcomes among Strong Start participants across models. Once again, controlling for a large number of demographic characteristics and medical and social risk factors, these analyses find that Maternity Care Home participants are significantly more likely to have a preterm birth or low birthweight birth than women receiving care under the Group Prenatal Care model or from Birth Centers. We also observe that, after controlling for observable risk factors and demographic characteristics, Maternity Care Home participants are significantly more likely than Birth Center participants to have a C-section delivery. These are not impact analyses and do not compare outcomes among Strong Start participants to women receiving "traditional" Medicaid prenatal care; that analysis is being carried out separately using linked birth certificate and Medicaid data for Strong Start women and propensity-scorereweighted comparison groups and will be available in the final evaluation report. Still, while there are likely unobservable differences in the populations served by each Strong Start model, these regression results suggest that the more transformative models of care implemented

under Strong Start–Group Prenatal Care and Birth Center care–could be more successful in moving the needle on outcomes for low-income mothers than the Maternity Care Home model, which hews more closely to prenatal care typically provided to Medicaid beneficiaries.

- 5. A majority of Strong Start awardees are sustaining at least some components of their enhanced prenatal care services after the conclusion of their cooperative agreements. Year 4 case study findings indicate that slightly more than half of all Strong Start awardees and birth center sites are either fully or partially sustaining enhanced prenatal care models implemented under Strong Start. Maternity Care Home and Group Prenatal Care awardees are more likely to be sustaining their full Strong Start program, including 9 out of 17 maternity care homes and seven out of 13 group prenatal care awardees. Moreover, most Maternity Care Home awardees are expanding their programs to additional sites or populations. All Birth Center sites, meanwhile, are continuing their pre-Strong Start midwifery models of prenatal care, and most have decided to continue, at least partially, peer counseling services added under Strong Start in some shape or form. A considerable proportion of awardees (including some not sustaining their models) reported that they have improved their standards of practice in delivering prenatal care in ways that can be directly attributed to their experiences with the Strong Start program. Most awardees sustaining Strong Start are partly or fully self-funding the services; that is, they are using internal practice or health system monies to fund the services now that Strong Start funding has ended. Generally speaking, awardees' commitment to sustaining Strong Start speaks to key informants' common belief that the program is benefiting women and their families, has advantages for health care provider sites, and is contributing to better maternal and newborn outcomes.
- 6. State Medicaid and CHIP policies generally support timely access to prenatal care, but coverage of enhanced prenatal care appears to be rare or variable. The evaluation's survey of state Medicaid/CHIP officials provided valuable context regarding the policy environments in which Strong Start was implemented, including identification of potential barriers to and supports for Strong Start efforts and goals. While state officials were not able to fully describe policies that were at the discretion of the Medicaid managed care organizations (MCOs), such as payment arrangements with providers and the specific content of prenatal care services delivered under bundled payment arrangements, they provided a high-level view that allowed assessment of policy variation among states implementing Strong Start. With some notable exceptions (e.g., limits on the number of medically necessary prenatal care visits in certain states, and postpartum coverage for CHIP-enrolled women), few policies were perceived as barriers to timely access to care for pregnant women. Coverage and/or enhanced payment for enhanced prenatal care services was rare or variable, with the exception of contraception, 17P, and breast pumps, which were routinely covered. Most states described some combination of maternity-related financial rewards/penalties and programs to MCOs or providers, most commonly to incentivize perinatal care, but sometimes directly targeting birth outcomes and cost. The survey, in tandem with case study findings, uncovered issues critical to understanding and improving Medicaid/CHIP provision of perinatal care that warrant further study, including a better understanding of how MCO policies impact prenatal care and birth outcomes, and how state-level policies and payment rates may impact the accessibility of services.

- 7. Challenges with maternity care provider continuity varied by model, and most awardees acknowledged that it was not common for Strong Start participants to have the same health care provider for pregnancy, delivery, and postpartum care. However, the Strong Start interventions improved continuity of care by providing consistent Strong Start staff throughout the maternity experience. Key informants broadly agreed that Strong Start had succeeded in improving continuity of care because participants had either a single care manager (Maternity Care Home), peer counselor (Birth Center models), or a consistent group facilitator (Group Prenatal Care model) throughout pregnancy. In the latter case, meeting with the same facilitator (and, often, cofacilitating provider) for all group sessions reportedly promoted comfort and participants' willingness to share feelings, confidence to ask questions, and group bonding. However, this continuity did not typically extend to the delivery-as deliveries were often attended by whoever was "on call" at the hospital and rarely included group facilitators-nor did it extend to postpartum care, since the model typically did not include such sessions. At most Maternity Care Home sites, continuity of obstetrical care providers was minimal throughout the maternity period; women may see a range of providers during prenatal visits and have little familiarity with their delivering provider, which made continuity of the Strong Start care manager all the more important, according to key informants. Maternity Care Home care managers provided continuous support and referrals to their patients that key informants described as critical for promoting trust and information-sharing. Meanwhile, Birth Center sites typically rotate midwives during prenatal visits so women will be familiar with all midwives that could be on call for attending births. However, since midwifery visits are usually longer than OB visits, Birth Center patients have more time to become comfortable with each of the rotating midwives. Similar to Maternity Care Home care managers, Birth Center peer counselor continuity was described as instrumental in building trusting relationships and providing additional psychosocial support.
- 8. During Year 4, the evaluation team continued to make significant progress in pursuing, obtaining, and cleaning birth certificate and Medicaid data from the 20 states with Strong Start awards. As has been described in detail in previous annual reports, the evaluation team's Technical Assistance and Data Acquisition task involves the painstaking process of contacting state agencies, informing them of the goals of Strong Start and its evaluation, persuading them of the value of supporting the evaluation (by sharing state data), completing multiple lengthy applications requesting data, and then working closely with state officials to securely obtain files in the form necessary to carry out our Impacts analysis. In all cases, these efforts were required for both the states' vital records agencies (responsible for birth certificates) and Medicaid agencies (responsible for Medicaid eligibility and claims/encounter data). By the end of Year 4, the team had succeeded in obtaining all needed files from four states (FL, LA, NV, SC) and partial data from eight states (AL, AZ, DC, GA, MI, MO, NJ, PA). Furthermore, the evaluation expects to receive data for four states (CA, MD, TN, TX), leaving just four states where data receipt is uncertain (IL, KY, MS, VA).
- 9. During Year 4, the impacts team made significant progress in finalizing its analytic methods, linking birth certificate and Medicaid data, and conducing preliminary analyses. Specifically, the impacts and TA teams continued to work closely to obtain birth certificate and Medicaid data from 20 states with Strong Start awards. The impacts team also linked Medicaid eligibility and birth certificate data and prepared claims/encounter data in several states; assessed selection and

comparison group challenges; determined the appropriateness of various analyses; and implemented its preliminary propensity score reweighting model in four states as a test. The preliminary propensity score models served as a "proof of concept" and allowed us to move on to identify methods for further refining the analyses. Moving forward, we will continue to collect, prepare, and analyze Medicaid and birth certificate data for remaining states and years; develop analytic claims files and finalize an approach to analyzing costs data; prepare final estimates on the impact of Strong Start on birth outcomes and costs/utilization (from claims data); implement enhancements to the propensity score reweighting approach by adding site of prenatal care and pre-pregnancy diagnoses to the model; and implement an instrumental variable model based on distance to site to further control for selection in preparation for presenting impacts results in the final report.

# Introduction

The Strong Start for Mothers and Newborns initiative (Strong Start II),<sup>3</sup> funded under Section 3021 of the Affordable Care Act (ACA), 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 approximately 175 provider sites<sup>4</sup> across 29 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 awardees received no cost extensions to prolong service provision and were winding down during calendar year 2016, with 12 awardees continuing into early 2017. At the time of this report, all Strong Start awardees have ceased program activities, and any sustained services are being supported by their own funding sources.

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 maternal and infant health outcomes, health care delivery, and cost of care; key research questions are displayed in Figure 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 select program monitoring measures collected by CMMI to support the oversight of Strong Start implementation and 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 fourth 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.

<sup>&</sup>lt;sup>3</sup> 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.

<sup>&</sup>lt;sup>4</sup> 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.

#### FIGURE 1: RESEARCH 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 context 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, including demographic characteristics (age, race/ethnicity, family composition, income), eligibility group, risk characteristics (physical, behavioral, socioemotional), 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 infant gestational age, birth weight, rate of Cesarean Section births, and cost for women and infants during pregnancy 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 in 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 policymakers' 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 their providers and other pregnant women. The most well-known Group Prenatal Care model is *CenteringPregnancy* (Centering), which was formalized in 1998 through the Centering HealthCare Institute (CHI). Under Centering, groups of 8 to 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 were not required to adopt a curriculum, but most explicitly used Centering or 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).<sup>5</sup> 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 risk of premature birth by 36 percent compared with women who had traditional prenatal care and that, for every premature birth prevented, there was an average savings of \$22,667 during the infant's first year of life. In addition, participation in CenteringPregnancy reduced the incidence of low birthweight births by 44 percent, resulting in a cost savings of \$29,627 during the infant's first year of life. 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.

## **BIRTH CENTER CARE**

Freestanding Birth Centers are facilities, usually directed by midwives, which provide comprehensive prenatal, delivery, and postpartum care (and often provide well-woman gynecological care as well). 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 currently 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. States have different licensure requirements, and some states do not have any accredited birth centers.

Birth Centers, which follow the midwifery model of prenatal care,<sup>6</sup> 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 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. 2013).

For Strong Start, the Birth Center model is further enhanced by the addition of support provided by "peer counselors" or "perinatal navigators" who meet 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

 $<sup>^{\</sup>scriptscriptstyle 5}$  Specific information related to the Strong Start design plan can be found in Annual Reports 1, 2, and 3.

<sup>&</sup>lt;sup>6</sup> American College of Nurse Midwives, <u>http://www.midwife.org/Our-Philosophy-of-Care</u>

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). However, none of these studies focused only on Medicaid-enrolled women. Thus, the current evaluation will contribute substantial information concerning the impact of Birth Center-provided prenatal care for Medicaid-enrolled women and their infants.

## STRONG START AWARDEES AND SITES

The 27 Strong Start awardees each adopted one or more of the Strong Start models of care. Specifically, at the end of the award period, 17 had implemented the Maternity Care Home approach, 13 implemented Group Prenatal Care, and two implemented Birth Center Care. Included in these counts are four awardees that 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.<sup>7</sup> 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. However, Year 4 saw another decrease in the total number of sites as providers wound down their operations, from a total of 227 sites in Year 3 to 176 sites in Year 4. As shown in Figure 2, 54 percent of Strong Start's provider sites implemented Maternity Care Home (95 sites), 25 percent offered Group Prenatal Care (44 sites), and 21 percent provide Strong Start services in a Birth Center setting (37 sites).



FIGURE 2: STRONG START SITES, BY MODEL (N = 176)

The awardee sites in Year 4 are spread widely across 29 states, the District of Columbia, and Puerto Rico. The geographic distribution of Strong Start sites is illustrated in Figure 3. The Southeastern region of the US has 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 Table 1, the number of Strong Start provider sites per state/territory ranges from just one (in Puerto Rico) to 31 sites (in Illinois).

<sup>&</sup>lt;sup>7</sup> 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.

The awardees were 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 were either Federally Qualified Health Centers (FQHCs) or clinics associated with a hospital or health center. The remaining sites included nationally certified Birth Centers, tribal health centers, local health departments, and physician groups.

#### FIGURE 3: STRONG START AWARDEES AND SITES IN YEAR 4, BY GEOGRAPHIC REGION



#### Strong Start Awardees and Sites

Strong Start awardees received funding for a four-year period, comprising a three-year intervention period for implementation and service delivery, and a fourth year to complete program and evaluation data collection. In addition, most awardees received no-cost extensions, allowing them to continue to enroll participants and provide services for part or all of the fourth year of the program and continue data submission into a fifth year. Most Strong Start program enrollment had ended by September 2016, and many awardees had also ceased Strong Start-funded enhanced services by that point (Table 1). Across awardees, specific enrollment end dates ranged from August 2015 to December 2016. Accordingly, the final deliveries among Strong Start-enrolled women occurred between February 2016 (for Meridian Health Plan) and March 2017 (for United Neighborhood Health Services, Inc.). Most Strong Start programs ended (including the completion of all data collection) in fall 2016 or winter 2017.

	<b>.</b>		Number of Site		Sites	s Status of Award	
Awardee Name	State	Strong Start Model	мсн	GPC	BC	Enrollment Ended	Final Deliveries
Access Community Health Network (ACCESS)	IL	Maternity Care Home	31	N/A	N/A	January 2016	September 2016
Albert Einstein Healthcare Network (Einstein)	PA	Group Prenatal Care	N/A	3	N/A	July 2016	December 2016
American Association of Birth Centers (AABC)	20 <sup>1</sup>	Birth Center	N/A	N/A	36 <sup>2</sup>	September 2016	December 2016
Amerigroup Corporation (Amerigroup)	LA	Group Prenatal Care	N/A	5	N/A	August 2016	December 2016
Central Jersey Family Health Consortium, Inc. (Central Jersey)	NJ	Group Prenatal Care	N/A	7	N/A	July 2016	December 2016
Florida Association of Healthy Start Coalitions (FASHC)	FL	Maternity Care Home	5	N/A	N/A	June 2016	October 2016
Grady Memorial Hospital Corporation DBA Grady Health System (Grady)	GA	Group Prenatal Care	N/A	4	N/A	May 2016	November/ December 2016
Harris County Hospital District (Harris)	тх	Group Prenatal Care	N/A	7	N/A	March 2016	August 2016
HealthInsight of Nevada (HealthInsight)	NV	Group Prenatal Care	N/A	3	N/A	July 2016	February 2017
Johns Hopkins University (Hopkins)	MD	Maternity Care Home	5	N/A	N/A	April 2016	November 2016
Los Angeles County Department of Health Services (LADHS)	CA	Maternity Care Home	6	N/A	N/A	August 2016	December 2016
Maricopa Special Health Care District (Maricopa)	AZ	Maternity Care Home	5	N/A	N/A	December 2016	February 2017
Medical University of South Carolina (MUSC)	SC	Maternity Care Home	5	N/A	N/A	December 2015	April/May 2016
Meridian Health Plan (Meridian)	MI	Maternity Care Home	1	N/A	N/A	December 2015	February 2016
Mississippi Primary Health Care Association, Inc. (MPHCA)	MS	Maternity Care Home	7	N/A	N/A	September 2015	May 2016
Oklahoma Health Care Authority (OKHCA)	ОК	Group Prenatal Care, Maternity Care Home	3	N/A	N/A	September 2016	January 2017
Providence Health Foundation (Providence)	DC	Birth Center, Maternity Care Home, Group Prenatal Care	3	1	1	November 2016	January 2017
Signature Medical Group (Signature)	МО	Maternity Care Home	6	N/A	N/A	December 2015	August 2016
St. John Community Health Investment Corp. (St. John)	МІ	Group Prenatal Care, Maternity Care Home	1	1	N/A	October 2016	January 2017
Texas Tech University Health Sciences Center (Texas Tech)	тх	Maternity Care Home, Group Prenatal Care	1	1	N/A	October 2016	February 2017
United Neighborhood Health Services, Inc. (United)	TN	Maternity Care Home	7	N/A	N/A	June 2016	March 2017
University of Alabama at Birmingham (UAB)	AL	Maternity Care Home	3	N/A	N/A	February 2016	August 2016
University of Kentucky Research Foundation (UKRF)	КY	Group Prenatal Care	N/A	5	N/A	March 2016	September 2016
University of Puerto Rico Medical Sciences Campus (UPR)	PR	Group Prenatal Care	N/A	1	N/A	February 2016	September 2016
University of South Alabama (USA)	AL	Maternity Care Home	4	N/A	N/A	May 2016	September 2016
University of Tennessee Health Sciences Center (UTHSC)	TN	Group Prenatal Care	N/A	2	N/A	June 2016	October 2016
Virginia Commonwealth University (VCU) <sup>3</sup>	VA	Group Prenatal Care, Maternity Care Home	5	4	N/A	September 2016	December 2016
Totals			98	44	37	N	/Δ

#### TABLE 1: STRONG START SITES AT END OF PROGRAM, BY AWARDEE

- Source: Data on the number of sites is primarily from the evaluation's Year 4 case study interviews, supplemented by additional documents provided to the case study team during the Year 4 data collection period, information in the Year 3 memos, and the 2016 quarterly program monitoring reports awardees submit to CMMI.
- Notes: <sup>1</sup> During evaluation Y4, AABC had active sites in Alaska, Arizona, California, Connecticut, Florida, Idaho, Illinois, Kansas, Maryland, Minnesota, Missouri, New Mexico, North Carolina, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

<sup>2</sup> AABC also reported 14 sites that were inactive or had dropped out of Strong Start.

<sup>3</sup> Four VCU sites are implementing both MCH and GPC models. These sites are each counted once in the MCH column, and once in the GPC column. Therefore, the total number of sites overall is smaller than the totals reported in this table. For one of the four sites, case study interviewees gave conflicting reports of whether the site had implemented the MCH model; for this annual report (and in this table) that site is counted as having both the GPC and MCH model.

Initially, Strong Start had a goal of reaching up to 80,000 women over a three-year award 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 early challenges with enrollment, in Year 2, most Strong Start awardees revised their enrollment targets downward (CMS/CMMI, 2014). Most 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 for up to one year), with total enrollment revised to approximately 58,000 women across all 27 awardees. In Years 3 and 4, awardees worked toward this goal and ended with a total of 45,977 women ever enrolled in the Strong Start program, nearly 80 percent of target enrollment.

The state and local context within which Strong Start awardees provided care likely affected their operations and, potentially, their success. In particular, Medicaid and CHIP eligibility and coverage policies vary considerably across the 29 states (and the District of Columbia and Puerto Rico) where Strong Start awardees were situated and included 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<sup>8</sup> income eligibility limit for pregnant women in April 2017 in the Strong Start states ranged from the minimum federally-required level of 138 percent of the federal poverty level (FPL) in Louisiana and Oklahoma, to 324 percent of the FPL in the District of Columbia.

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<sup>9</sup> regardless of pregnancy or parenting status.<sup>10</sup> By July 2016, this total for Strong Start had increased to 14 states and DC. (For detailed information regarding each Strong Start state's income eligibility threshold by coverage authority, please see Table A.1 in Appendix A.)

<sup>&</sup>lt;sup>8</sup> 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.

<sup>&</sup>lt;sup>9</sup> 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.

<sup>&</sup>lt;sup>10</sup> This includes states (e.g., Michigan and Pennsylvania) that have expanded Medicaid through a Section 1115 waiver.

# EVALUATION DESIGN AND DATA COLLECTION PROGRESS THROUGH YEAR 4

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 by CMMI to support the oversight of awardee implementation. This section provides brief summaries of these research methods and our progress through Year 4 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).

## PARTICIPANT-LEVEL PROCESS EVALUATION

The participant-level process evaluation was 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 was 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 (based largely on medical record reviews). Strong Start awardees were required to collect participant-level data from their sites and transmit these data to the evaluation team on a quarterly basis through a system that protected patients' identifying and personal health information. These data have been 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 of the evaluation, participant-level data were collected through calendar 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 the Year 1 time period, 22 awardees submitted data, increasing to 26 of 27 awardees in Year 2 (through calendar Quarter 1 2015) and all 27 in Years 3 and 4. In total, the evaluation team has received 42,581 Intake Forms, 26,619 Third Trimester Surveys, 25,939 Postpartum Surveys, and 37,965 Exit Forms. This information is summarized in Table 2.

Evaluation Year	Number of Awardees Submitting Data	Total Intake Forms Submitted	Total Third Trimester Surveys Submitted	Total Postpartum Surveys Submitted	Total Exit Forms Submitted
Year 1	22	3,777	569	346	N/A
Year 2	26	19,155	8,704	6,949	6,669
Year 3	27	38,149	20,387	18,049	24,951
Year 4	27	42,581	26,619	25,939	37,965

#### TABLE 2: FORM SUBMISSION THROUGH YEAR 4

### CASE STUDIES OF IMPLEMENTATION

The evaluation's case studies were conducted in each of the first four years of the evaluation. They provide an in-depth understanding of how Strong Start models were designed, implemented, and evolved over time; document barriers or challenges awardees encountered during implementation; and describe perceived successes and factors that contributed to success. Our case studies included four components: document review, key informant interviews, focus groups with participating pregnant and postpartum women (as well as a small number of groups with similar nonparticipants), and structured observations of care and care settings. Because of resource limitations that precluded studying all service delivery sites, we collected case study data from all awardees and approximately one-third of sites they operated.

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. In Year 1, data collection occurred between March and November 2014, was primarily in person, and involved 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. In Year 2, data collection occurred between March and June 2015, was primarily by phone, and involved 144 interviews with 195 key informants.<sup>11</sup> The third round of case studies focused on Strong Start's perceived influence on maternal and newborn outcomes, as well as awardees' early plans for sustaining their interventions. In Year 3, data collection occurred between November 2015 and September 2016, was primarily in person again, and involved 211 interviews and 314 key informants, 65 focus groups with 438 pregnant and postpartum Strong Start participants and more than a dozen structured observations of enhanced service delivery.

<sup>&</sup>lt;sup>11</sup> In addition, a site visit involving in-person interviews and focus groups was conducted with one awardee, the University of Puerto Rico, in Y2.

To further build on the wealth of data accumulated over the first three evaluation years, the fourth and final round of case studies focused on: (1) whether and how Strong Start programs will be sustained, and (2) identifying the factors perceived as most important for successful program replication. Year 4 data collection was primarily by phone and included 109 interviews with a total of 145 key informants.<sup>12</sup> The interviews were conducted between October 2016 and May 2017, and were with program staff from all 27 Strong Start awardees as well as staff and providers at selected sites.

## **IMPACT ANALYSIS**

As discussed above, 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 and with state Medicaid and Vital Records agencies in 20 states to begin receiving files. 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. After obtaining merged birth certificate and Medicaid data from states, a propensity score re-weighting method (described in more detail in Appendix H of the Year 3 Annual Report)<sup>13</sup> is being 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.

<sup>&</sup>lt;sup>12</sup> Some interviews for Virginia Commonwealth University and the AABC site in North Carolina (Women's Birth and Wellness Center) were conducted in person in Y4. The case study team also conducted a single focus group with five participants in Y4, to examine participant perspectives on a maternity care home model that Virginia Commonwealth University implemented in evaluation Y3.

<sup>&</sup>lt;sup>13</sup> <u>https://downloads.cms.gov/files/cmmi/strongstart-enhancedprenatalcare\_evalrptyr3v1.pdf</u>

In Year 4, the impacts and TA teams continued to work closely to obtain birth certificate and Medicaid data from our study of states. The impacts team also linked Medicaid eligibility and birth certificate data and prepared claims data in several states; assessed selection bias and comparison group challenges and determined the appropriateness of various analyses; and applied preliminary propensity score reweighting models in four states. In the Year 5, the final year of the evaluation, we will continue to collect, prepare, and analyze Medicaid and birth certificate data for remaining states and years; develop analytic claims files and finalize an approach to analyzing costs data; prepare final estimates on the impact of Strong Start on birth outcomes and costs/utilization (from claims data); implement enhancements to the propensity score reweighting approach by adding site of prenatal care and pre-pregnancy diagnoses to the model; and implement an instrumental variable model based on distance to site to further control for selection.

## **PROJECT REPORTS**

Numerous reports are produced from each evaluation component. For example, for each case study, we produced analytical memos that addressed implementation, programmatic adaptations, and staff and participant experiences. The participant-level process analysis was presented in quarterly reports and addressed key findings related to participant risk factors, service use, outcomes and satisfaction, among other measures. 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 THROUGH 3**

Findings from the first three years of the Strong Start evaluation were primarily focused on the case studies of implementation and the participant-level process evaluation. Years 1 and 2 case studies described awardees' changes in enrollment strategies made in an effort to reach target enrollment goals, including enrolling women after 28 weeks gestation, eliminating the requirement that women be identified with an additional risk factor for preterm birth beyond Medicaid eligibility, adopting "opt-out" enrollment to make Strong Start participation the default prenatal care option, and enrolling women with "pending" Medicaid eligibility. Participant-level data from Years 1 and 2 highlighted the high levels of both medical and social risks experienced by Strong Start enrollees. Medical risk included high rates of previous preterm, previous C-section, short inter-pregnancy interval, and referral for high-risk medical services. Social risk factors included being unemployed, unmarried, a smoker at intake, a history of intimate partner violence, an unintended pregnancy, and depression. Of note, these data revealed alarmingly high levels of depression among Strong Start women, with nearly 26 percent of women enrolled in Strong Start presenting with symptoms of depression, compared with a rate of 7 to 16 percent of all US women who experience depression during pregnancy. However, our case studies demonstrated that all three enhanced prenatal care models used under Strong Start are designed to address the psychosocial needs, particularly by emphasizing relationship-centered care and providing support.

Year 3 findings focused more emphasis on preliminary outcomes among Strong Start participants. In general, our case studies found that awardee staff and providers were uncertain whether Strong Start enhanced services were directly affecting rates of preterm deliveries and low birthweight births; however, they were confident that Strong Start was impacting the well-being of pregnant women by cultivating trusting relationships that allowed programs to better address the psychosocial needs of their clients. To account for the concern recognized by the evaluation team that each of the three Strong Start approaches attracts women with different risk profiles, Year 3 findings also included multivariate regression-adjusted analyses of participant-level process evaluation data that controlled for a variety of demographic, psychosocial and medical risk factors. These analyses showed that, after controlling for participant risk profiles, Birth Center and Group Prenatal Care participants, whose care departs more from a traditional medical model of prenatal care that that of the Maternity Care Homes, were significantly less likely to have a preterm birth or low birthweight baby compared to Maternity Care Home participants. Unadjusted PLPE data analyses indicate that C-section rates are particularly low among Birth Center enrollees, consistent with published data (Stapleton et al. 2013). But we also observed that rates among Group Prenatal Care participants were lower than benchmarks, and that Maternity Care Home rates were no higher than what is observed nationally, despite Strong Start enrolling particularly high-risk participants. Regression-adjusted analyses show that Birth Center participants are still the least likely to have a C-section, even after controlling for demographic and risk factors.

Year 3 analyses also explored Strong Start's efforts to enhance nutritional counseling, breastfeeding education and support, and family planning education and access. Specifically, Birth Center and Group Prenatal Care models integrate education and counseling on nutrition and physical activity during pregnancy into their routine care. PLPE data suggest that about one-third of women enrolled in any of the three Strong Start models received supplemental nutritional counseling in addition to routine care. With regard to breastfeeding, nearly 80 percent of participants in Year 3 reported initiating breastfeeding, which is on par with national estimates and higher than those reported among WIC recipients (68 percent), a comparable population (Thorn et al. 2015). Birth Center and Group Prenatal Care awardees specifically addressed breastfeeding as part of routine care, which may influence women's decisions to breastfeed. Family planning and contraception counseling was also highly emphasized by Strong Start models, especially Group Prenatal Care, where one full group session is devoted to the topic. Most Maternity Care Homes and Birth Centers also incorporate family planning discussions into their visits. According to PLPE data, 69 percent of Strong Start participants reported that they had received family planning counseling after delivery. However, there were barriers to the receipt of family planning services, including low postpartum visit attendance rates, loss of Medicaid or CHIP coverage postpartum, religious affiliations of institutions or providers, and discontinuity with delivery hospitals.

Beyond the case study and PLPE findings, Year 3 saw significant progress in preparing for the study's impacts analysis. The Data Linkage Technical Assistance team succeeded in gaining approval of data requests from 11 Vital Records agencies and 14 Medicaid agencies and received 2014 and/or 2015 birth certificate and/or Medicaid files from seven states. The evaluation team also finalized a method to select comparison groups and developed a decision rule to reduce state data burden.

# **ORGANIZATION OF THE YEAR 4 ANNUAL REPORT**

This Year 4 Annual Report presents findings from the fourth year of the Strong Start evaluation and concentrates on information gathered through participant-level data collected through Quarter 1 2017 and case studies conducted in person and by phone from January to May of 2017. Detailed information is also presented on progress with the technical assistance/data acquisition task, as well as analytical methods that were finalized in advance of next year's impacts analysis. 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 4 Findings

A summary of findings from Year 4 of the evaluation is presented below. Findings from the participantlevel program evaluation component of the study come first, followed by case study findings from the fourth 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 preliminary work with merged birth certificate and Medicaid data as well as their efforts to finalize analytical methods and models in preparation for the final year's analyses of the effects of Strong Start on maternal and infant outcomes and costs.

# PARTICIPANT-LEVEL PROCESS EVALUATION

## INTRODUCTION

Participant-level process evaluation (PLPE) data are used to track several process indicators including participant demographic characteristics and maternal risk factors, pregnancy conditions, and an early look at specific maternal and infant outcomes. Data have been 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)
- 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 is filled out by Strong Start staff and is also available in both languages to accommodate provider in Puerto Rico who are more comfortable in Spanish. With the exception of the Exit Form, the PLPE data collection system was rolled out in January 2014. Brief summaries of each form are presented in Figure 4.

#### FIGURE 4: 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 sociodemographics, 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 collected 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.

Copies of each instrument have been included as appendices in prior Annual Reports.<sup>14</sup>

These participant data provide rich information on each Strong Start enrollee, some of which is not reliably reported in administrative data sources. Data included in this Year 4 Annual Report includes all Intake Forms, Third Trimester Surveys, Postpartum Surveys and Exit Forms submitted through December 31, 2016 (Quarter 4 2016). By this point, all awards had stopped enrolling new participants, and most women had delivered, though awardees had through June 30, 2017 to submit final data.

## 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 (Institute of Medicine 2006). 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 three years of Strong Start implementation indicate that Strong Start enrollees exhibited a wide variety of social, emotional, physical, and medical risk factors. These findings hold true in this fourth year of the evaluation, as the demographic, psychosocial, and medical risk profiles of women enrolled in the program have remained steady from year to year. More complete data now available, however, allows for more extensive subgroup considerations which are presented in this year's report.

## **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 how participant demographics 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 makeup of the sample, as well as the mother's age at enrollment into Strong Start.

Consistent with previous years, we find the Strong Start population contains a higher proportion of black women (40 percent) than the national population of pregnant Medicaid beneficiaries. According to the Centers for Disease Control and Prevention's (CDC) 2014 National Health Interview Survey (NHIS), 22 percent of pregnant women receiving Medicaid are black. Approximately 26 percent of Strong Start enrollees are white. Thirty percent of women enrolled in the program identify as Hispanic, and the remaining 5 percent report being Asian, mixed race, or "other."<sup>15,16</sup> These racial breakdowns are nearly identical to those of our Year 3 sample. The overrepresentation 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

 $<sup>^{14}</sup>$  The Strong Start data collection forms can be found in the Year 1 Annual Report at

<sup>&</sup>lt;u>http://innovation.cms.gov/Files/reports/strongstart-enhancedprenatal-yr1evalrpt/pdf</u>
<sup>15</sup> Race and ethnicity data are collected through two separate questions on the Intake Forms, but combined categories have been created for reporting purposes. <sup>16</sup> 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.

et al. 2013; Martin et al. 2015).<sup>17</sup> Racial breakdowns do differ substantially by Strong Start mode. For instance, Birth Centers serve a significantly larger proportion of white women that the other two models of Strong Start care. This difference is the most dramatic across models, but other racial differences emerge as well. We also observe that significantly more Hispanic women were served by Group Prenatal Care sites than Birth Centers of Maternity Care Homes, and significantly more black women received care in Group Prenatal Care settings and Maternity Care Homes than Birth Center sites. 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 approach dips 31 percent, which is comparable to the rate of Hispanic participants enrolled in Maternity Care Homes. These data (retaining UPR) are shown in Figure 5.



FIGURE 5: 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 approach are as follows: 0.8 percent for Birth Centers, 2.3 percent for Group Prenatal Care, and 1.7 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix C. Ns are based on women for whom Intake Forms were submitted and had nonmissing data for race and/or ethnicity.

<sup>&</sup>lt;sup>17</sup> One Maternity Care Home 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.

Three-quarters of women enrolled in Strong Start are between 20 and 34 years of age. Nine percent are of advanced maternal age (35 and older), and about 15 percent are teens. Most teens enrolled in Strong Start (65 percent) are 18 to 19 years old, which is consistent with other data on teen pregnancy. As presented in a 2016 report by the Alan Guttmacher Institute, while 18- to 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 by model and overall are summarized in Table 3.

Data Element	N or %	Birth Center	Group Prenatal Care	Maternity Care Home	All Approaches
Mother's Age at Intake	N	7381	9663	25089	42133
Less than 18 years of age	%	2.8	7.0	5.6	5.4
18 and 19 years of age	%	6.5	12.6	9.6	9.7
Greater than or equal to 20 and less than 35 years	%	81.7	72.8	75.2	75.8
35 years of age or older	%	9.1	7.6	9.7	9.1

#### TABLE 3: MOTHER'S AGE AT INTAKE, BY MODEL AND OVERALL

Note: Ns are based on women for whom Intake Forms were submitted and had nonmissing data for birth date on the crosswalk and date of entry into care on the Intake Form. Missing data are excluded from these calculations. Rates of missing for mother's age at intake by approach are as follows: 0.4 for Birth Centers, 1.6 percent for Group Prenatal Care, and 1 percent for Maternity Care Homes. Rate of missing by measure can also be found in Appendix B.

#### Socioeconomic Profile of Strong Start Participants

The socioeconomic profile of Strong Start participants helps us to understand whether the program is targeting women whose socioeconomic status may put them at greater risk of experiencing poor birth outcomes. In this section, we present data on participants' educational background, employment, food security and relationship status.

Like demographic characteristics, the socioeconomic profile of the Strong Start population has remained stable throughout the evaluation. Consistent with multiple rounds of case study analyses, which indicate that Strong Start enrollees experience high levels of need (Hill et al. 2014; Hill et al. 2015; Hill et al. 2016), Intake Form data through Quarter 4 2016 continue to show that enrollees have low levels of educational attainment, high rates of unemployment, and experience persistent food insecurity. **Educational Attainment.** As shown in Figure 6, more than a quarter of Strong Start participants did not complete high school, and an additional 60 percent reported a high school diploma or GED as their highest degree. Low educational attainment is a risk factor for poor birth outcomes, including low birthweight and preterm birth (Institute of Medicine 2007). The proportion of Strong Start participants with a college degree remains low, with five percent of women possessing a bachelor's degree, and another 9 percent having completed some other form of college (such as an associate's degree). When we limit the sample to women ages 25 years and older, rates do increase, with approximately 22 percent of women having either a bachelor's degree or other college degree.



FIGURE 6: HIGHEST LEVEL OF EDUCATION COMPLETED BY STRONG START PARTICIPANTS, BY MODEL AND OVERALL

Notes: Missing data are excluded from these calculations. Rates of missing for education level by model are as follows: 10.6 percent for Birth Centers, 19.9 percent for Group Prenatal Care, and 17.3 percent for Maternity Care Homes. Rates of missing by measure can also be found in Appendix C. Ns are based on women for whom Intake Forms were submitted and had nonmissing data for these measures.

Educational attainment rates vary by model. Birth Center enrollees are significantly (*p* < 0.001) more likely to have a bachelor's degree than women enrolled in either of the other two models,<sup>18</sup> though rates are low across the board (13 percent of Birth Center enrollees have a bachelor's degree compared with 4 percent of women enrolled in Group Prenatal Care and 4 percent of women enrolled in Maternity Care Homes). Corresponding differences exist among women without a high school education (29 percent of Maternity Care Home enrolleds, compared with 28 percent of Group Prenatal Care participants, and 15 percent of women enrolled in Birth Center care). While the percentage of women in each category has varied over the years, the direction has remained the same and is consistent with evidence that women receiving birth center care tend to be highly educated (Walsh and Downe 2004). One study of birth center clients found that approximately half had a college degree

<sup>&</sup>lt;sup>18</sup> Significant differences were established using t-tests ( $p \le .001$ ).

(Stapleton et al. 2013). Medicaid clients being served in Strong Start Birth Centers were about half as likely to have a college degree, suggesting that while they are more likely to be college educated than other Strong Start participants, they may differ from birth center clients as a whole.<sup>19</sup> A sizable number of participants continue to choose not to answer this question (nearly 17 percent overall). Though the reason behind this high rate of missing responses is unknown, case study informants have indicated that some women did not understand how it was relevant to their prenatal care and felt that their education level was sensitive or personal information they were unwilling to share.

*Employment.* As we've observed in past annual reports, more than half of women (60 percent) enrolled in Strong Start report at intake that they do not have a job. Only 19 percent of women who report not having a job are in school. These high rates of unemployment could indicate underlying health concerns that could increase women's risk of poor birth outcomes, that multiparous women are caring for young children, or that the areas where Strong Start participants live do not have sufficient resources to offer employment opportunities or transportation, but we do not have the information to fully understand the cause of joblessness among Strong Start enrollees. As shown in Figure 7, joblessness rates are relatively similar across Strong Start models, though Group Prenatal Care enrollees are notably less likely to be employed than women enrolled in the other two approaches. This might be indicative of some level of selection bias, as perhaps women who are employed would be unable to attend two-hour group sessions for their prenatal care.



#### FIGURE 7: RATES OF UNEMPLOYMENT AND FOOD INSECURITY, BY MODEL AND OVERALL

Notes: Ns are based on women for whom Intake Forms were submitted and had nonmissing data for these measures. The Ns for Food Insecurity are as follows: BC= 6,956; GPC=8.206; MCH=23,060 and All Approaches= 38,222. The Ns for Not Employed are: BC=7,309; GPC=9,397; MCH=23,865 and All Approaches=41,571. Rates of missing by measure can also be found in Appendix C.

<sup>&</sup>lt;sup>19</sup> Approximately one-quarter of birth center clients in this sample (Stapleton et al. 2013) did have Medicaid coverage.

**Food Insecurity.** Through Q4 2016, nearly 20 percent of participants report experiencing food insecurity despite incomes low enough to qualify for WIC (Medicaid receipt confers automatic eligibility for WIC) and the Supplemental Nutrition Assistance Program (SNAP. The USDA reports that, in 2015, 12.5 percent of US households struggled with food insecurity (down from 14.9 percent in 2011). Food insecurity in Southern states, where Strong Start awardees are disproportionately located, does tend to be higher than the national average. Consistently high rates of food insecurity among the Strong Start population 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 (p < 0.001) though the magnitude of this difference is relatively small. We have learned from the case studies that even though many women are receiving WIC and/or other food assistance, Strong Start peer counselors and care coordinators frequently refer participants to food pantries among other resources to help address persistent food needs.

*Relationship Status.* As in the first three years of participant-level data collection, the Year 4 analysis finds that the share of Strong Start participants who are married is substantially lower than other studies of low-income mothers. Just 22 percent of all Strong Start participants report being married and living with their spouse, while another two percent indicate they are married but not living with their spouse. Published studies suggest that marriage rates among low-income mothers range widely, and have been decreasing in recent years (studies report marriage rates for low-income women ranging from 30 percent to 70 percent), but Strong Start participants are less likely to report being married than the low end of this range (Shattuck and Krieder 2013; Brown et al. 2016; Gibson-Davis and Rackin 2014).<sup>20</sup> Because being unmarried was a risk factor that a small number of awardees used initially for determining Strong Start eligibility, we might expect that more unmarried women were enrolled in the early years of Strong Start. However, after the requirement that women present at least one additional risk factor in addition to Medicaid eligibility to be eligible for Strong Start was removed in 2014, the PLPE data indicate that the proportion of married participants remained steady in subsequent years.

Most Strong Start enrollees do report having a partner whether or not they are married: 32 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 partner, but 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 woman's relationship can have bearing on maternal and infant outcomes around pregnancy, with women in stable partnerships experiencing more positive outcomes (Bloch et al. 2010; Fairley and Leyland 2006; Butler and 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; Cho et al. 2016).

<sup>&</sup>lt;sup>20</sup> 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.

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 18 percent and 19 percent, respectively). Nearly equal numbers of women across model are living with a partner (approximately a third of women enrolled in each model). These differences are presented in Figure 8.





*Notes:* Values of less than three percent are not labeled. Missing data are excluded from these calculations. Rates of missing for relationship status by approach are as follows: 1.3 percent for Birth Centers, 9.5 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 nonmissing data for these measures.

Strong Start participant-level data on relationship status are collected at three points during the perinatal period: at intake, during the third trimester and postpartum. This year, we examined changes in relationship status between program intake and the postpartum period among women enrolled in Strong Start and report whether there was an increase in relationship stability, a decrease in stability, or no change in status. For this analysis, "married and living with a spouse" is considered the most stable status, and "not in a relationship stability because it does not take into account women's perceptions of stability or relationship functioning and we are unable to track whether a woman's partner is the same person at both points in time, we are able to see general trends over time and differences by approach.

As presented in Figure 9, we find that a majority of participants (80 percent overall) experience no change in relationship status over the course of their pregnancy. Of the remaining enrollees, just over half (11 percent overall) experience a decrease in relationship stability and 9 percent an increase in relationship stability. Proportions vary by model: Birth Centers see the smallest proportion of women experiencing changes in relationship status (approximately 16 percent), while Maternity Care Home enrollees see the largest (21 percent). The reverse trend exists for increases in relationship stability, with a greater proportion of Maternity Care Home participants entering into a more stable relationship (10 percent) during their pregnancies than those enrolled in Group Prenatal Care and Birth Centers (7 percent and 6 percent, respectively). This observation could be due, in part, to a smaller share of Maternity Care Home participants falling into the more stable relationship categories at intake. The proportion of women entering into a less stable relationship category is fairly equal across models (around 10 percent).





*Note:* Totals may be greater than 100 percent due to rounding. Missing data are excluded from these calculations. Ns are based on women with nonmissing data for relationship status on both the Intake Form and the Third Trimester Survey.

Overall, we observe that Birth Center participants depart somewhat from the average demographic profile of other Strong Start participants, with larger proportions of white, married, and college-educated women than women enrolled in either Group Prenatal Care or 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 such as family pressure, job constraints, and community norms.

### **Psychosocial Risk Factors**

Strong Start evaluation data collected on participants allows the evaluation team to describe the psychosocial risk profiles of enrollees at a level of detail not available in other data sets. The Intake Form standardized assessment of depression and anxiety for Strong Start enrollees across all awardees and systematically collected information on current or historical experience with intimate partner violence (IPV). These data also include measures on pregnancy intention, previous birth outcomes, and preexisting medical conditions that are essential for understanding the underlying risks experienced by the Strong Start population.

**Depression and Anxiety.** As reported previously, Strong Start enrollees exhibit high rates of depression and anxiety at intake. More than a quarter of participants screened described depressive symptoms identified on a 10-item version of the CES-D (Center for Epidemiologic Studies Depression Scale).<sup>21</sup> Individuals who score eight or higher (out of 10 items) are categorized as exhibiting depressive symptoms. As observed in past reports and presented in Figure 10, Group Prenatal Care participants exhibited the highest rate of depressive symptoms (30 percent), and are significantly more likely to screen positively for depression than women enrolled in either the Birth Center (*p* < 0.001) or Maternity Care Home (*p* < 0.001) models. Birth Center participants were the least likely to screen positively for depression at intake (23 percent).

FIGURE 10: PROPORTION OF STRONG START PARTICIPANTS EXHIBITING DEPRESSIVE SYMPTOMS, ANXIETY, OR BOTH AT INTAKE, BY MODEL AND OVERALL



*Notes:* Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C. Ns are based on women for whom Intake Forms were submitted and had nonmissing data for these measures. Denominators for participants with depressive symptoms are: BC=7,194, GPC=8,770, MCH=24,227, Total=40,191. Denominators for anxiety are: BC=7,202, GPC=8,818, MCH=24,254, Total=40,274. Denominators for participants exhibiting anxiety and depression are BC=7,159 GPC=8,674, MCH=24,136, Total=39,969.

 $<sup>^{21}</sup>$  The CES-D used on the Intake Form is a hybrid of two validated shortened version of the scale, and is referred to as the MIHOPE-10. This version is also being utilized in the MIHOPE-Strong Start evaluation.
The prevalence of depression in the Strong Start population (across all models) is substantially higher than what has been cited in the peer-reviewed literature, which suggests that depression is observed in approximately 7 to 16 percent of pregnant women (Bennett et al. 2004; Melville et al. 2010; Katon et al. 2011). This is especially troubling, given research suggesting that depression during pregnancy is associated with myriad poor birth outcomes, including preterm birth and low birth weight (Grote et al. 2010).

Anxiety rates are also high among Strong Start enrollees. A 2014 meta-analysis of antenatal generalized anxiety disorder (GAD) found that between 0 and 10.5 percent of pregnant women experience GAD (Goodman et al. 2014). Strong Start enrollees were screened for GAD at intake using the GAD-7, and we observe that overall 13 percent of Strong Start participants expressed symptoms of moderate or severe anxiety. These rates varied by model with the highest rates among Group Prenatal Care enrollees (16 percent) and the lowest rates among Birth Center participants (10 percent). The low end of the range for Strong Start lines up with the high end of the range reported in the literature. Antenatal anxiety has been associated with shorter gestations and low birthweight, but the strongest evidence links anxiety during pregnancy with reduced capacity for women's offspring to appropriately self-regulate, with cognitive and motor development delays and with challenges related to infant temperament during the first year of life (Beijers et al. 2010).

Though the prevalence of each of these conditions alone is concerning, we also observe that ten percent of Strong Start enrollees screen positive for both anxiety and depression. To the best of our knowledge the co-incidence of these two mental health conditions during pregnancy has not been reported in the literature. This finding, however, suggests that a sizable number of pregnant Medicaid beneficiaries are in great need of mental health supports during their pregnancies. Yet, as learned through case study interviews, the mental health resources available to these women are severely limited. PLPE encounter data indicate that fewer than 10 percent of participants who screened positive for depression received a mental health encounter. Women's mental health could be impacted by adverse childhood experiences or violence in the home. In fact, we observe that 19 percent of Strong Start participants experienced intimate partner violence at some point during their lives, and 2.5 percent report being currently involved in an abusive relationship. Importantly, there are many other mental health conditions that are not screened for on the Strong Start Intake Form (such as posttraumatic stress disorder, bipolar disorder or schizophrenia), though we heard from key informants that women enrolled in their programs also struggled with these challenges, and services available to these women are also severely constrained. Lastly, we note that mental health disorders in this population may be further exacerbated by experiencing an unplanned pregnancy. Seventy percent of Strong Start enrollees had not planned their current pregnancy even though most of those women report not using contraception at the time of conception (85 percent). Unintended pregnancy commonly increases financial, relationship, employment, and/or physical stress, and stress has been long associated with preterm birth (Copper et al. 1996; Gipson et al. 2008; Guttmacher 2016).

### **Medical Risk Factors**

Participants enrolled in Strong Start enhanced prenatal care programs possess a host of medical conditions and histories that put them at increased risk for poor birth outcomes. As reported in past Annual Reports, while participants have lower rates of pre-pregnancy diabetes and hypertension than have been reported for other low-income pregnant populations (Robbins et al. 2013), rates of obesity are high. These findings are presented in Figure 11. Sixty-two percent of Strong Start enrollees are overweight or obese at their first prenatal care visit. Higher maternal weight has been associated with increased risk of diabetes (during and prior to pregnancy), hypertension, C-section delivery, macrosomic infants, and an 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 associated with preterm birth and other complications (Girsen et al. 2016), but only three percent of Strong Start population is likely to enter care later in pregnancy and that could result in higher weights at the initial visit, it is important to note that the vast majority of women enrolled in Strong Start entered care prior to 20 weeks' gestation.





Notes: Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C. Ns are based on women for whom Exit Forms were submitted and had nonmissing data for these measures. Denominators for diabetes are: BC=6,370, GPC=7,865, MCH=21,304, Total=35,539. Denominators for hypertension are: BC=6,376, GPC=7,865 MCH=21,350, Total=35,591. Denominators for obesity at first prenatal visit are: BC=6,159, GPC=6,099, MCH=18,924, Total=31,182. *Parity.* More than 60 percent of Strong Start enrollees have given birth to at least one child prior to their Strong Start pregnancy, and among those women, many are at risk for experiencing subsequent poor birth outcomes. Specifically, we observe that 20 percent of participants previously experienced a preterm birth, the single largest predictor of subsequent preterm births. Year 4 rates of prior preterm birth, which as in previous years were highest among Maternity Care Home enrollees and lowest among Birth Center participants, inched up slightly from findings reported in the third Strong Start Annual Report. As in the past, reports of having had a prior low birth weight baby remain lower than preterm rates, but follow the same trend, being lowest among Birth Center participants and highest among Maternity Care Home participants. Short interpregnancy intervals (SIPI), defined as having given birth fewer than 18 months prior to the becoming pregnant again, depart from this trend. We observe that Birth Center participants are most likely to have had a SIPI and Group Prenatal Care enrollees are the least likely. SIPIs have been associated with low birthweight, preterm birth, neonatal death, and placental problems associate with maternal hemorrhage (Copen et al. 2015). Data on these three measures are presented by model and overall in Figure 12.



### FIGURE 12: MEDICAL RISK FACTORS IN MULTIPAROUS WOMEN, BY MODEL AND OVERALL

*Notes*: Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C. Ns are based on women for whom Exit Forms were submitted and had nonmissing data for these measures. Denominators for previous preterm birth are: BC=3,876, GPC=4,380, MCH=14,364, Total=22,620. Denominators for previous low birthweight are: BC=3,798, GPC=3,783, MCH=13,150, Total=20,731. Denominators for short interpregnancy interval are: BC=3,142, GPC=3,046, MCH=11,163, Total=17,351.

# **INTERIM OUTCOMES**

A unique benefit of collecting comprehensive participant-level data is that it affords the ability to track conditions that women may have developed during pregnancy—including gestational diabetes and pregnancy-related hypertension—and investigate any trends by model or participant characteristics associated with interim outcomes observed.

# **Pregnancy-Related Conditions**

As we've observed in the past, Strong Start participants have lower than expected rates of gestational diabetes, though they do continue to have higher rates of pregnancy-related hypertension than observed in other studies of low-income pregnant women. As presented in Figure 13, 5.4 percent of Strong Start enrollees developed gestational diabetes during pregnancy, and 5.6 percent of participants presented with pregnancy-related hypertension. These rates vary slightly by model, with Group Prenatal Care participants being the most likely to have pregnancy-related hypertension (7 percent) and Maternity Care Home participants being most likely to develop gestational diabetes (6 percent). These rates have inched slightly higher than those reported in previous Strong Start Annual Reports. However, gestational diabetes rates remain lower than other studies have found, which indicate the incidence among Medicaid beneficiaries is as high as 10 percent (DiSisto et al. 2014). Hypertension rates continue to be higher than national benchmarks, which hover around three percent for low-income pregnant women (Bateman et al. 2012). Preeclampsia rates, however, are in line with national estimates for Medicaid beneficiaries (between 3 and 6 percent) (Palmsten et al. 2014).



FIGURE 13: RATES OF GESTATIONAL DIABETES, PREGNANCY-RELATED HYPERTENSION AND PREECLAMPSIA, BY MODEL AND OVERALL

*Notes:* Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C. Ns are based on women for whom Exit Forms were submitted and had nonmissing data for these measures. Denominators for gestational diabetes are: BC=6,369, GPC=7,866, MCH=21,186, Total=35,421. Denominators for pregnancy-related hypertension are: BC=6,368, GPC=7,857, MCH=21,184, Total=35,409. Denominators for preeclampsia are: BC=6,368, GPC=7,863, MCH=21,175, Total=35,406.

When we consider breakdowns by race and ethnicity, we observe that Hispanic participants are more likely than enrollees of other race/ethnicities to develop gestational diabetes during their Strong Start pregnancies. The rate of GDM (gestational diabetes mellitus) among Hispanic women is higher than that of the Strong Start population as a whole (7.5 percent vs. 5.4 percent), and higher than that of either white or black women enrolled in Strong Start. These rates are presented in Table 4. Other studies have found that rates of gestational diabetes do vary by race and ethnicity (Chasen-Taber et al. 2015; Bardenheier et al. 2015), with Hispanic and black women being at higher risk of developing GDM than white women. Interestingly, in this sample, black women were less likely than white participants to develop GDM during their Strong Start pregnancy.

Participant Characteristics	Share that Developed GDM (N)			
Race/Ethnicity				
Hispanic	7.46% (737)			
Non-Hispanic White	4.54% (373)			
Non-Hispanic African American	4.43% (623)			
Non-Hispanic Other Race or Non-Hispanic Mixed Race	6.55% (99)			
Age				
<18	1.38% (26)			
≥18 and <20	2.46% (81)			
≥20 and <35	5.26% (1,363)			
≥35	12.85% (395)			
Parity				
Nulliparous	4.06% (576)			
Multiparous	6.30% (1,338)			
BMI				
Underweight	2.56% (26)			
Normal weight	2.43% (257)			
Overweight	5.39% (426)			
Obese	8.77% (731)			
Very obese	11.28% (308)			
Depression				
Indicated depression	4.98% (424)			
Did not indicate depression	5.71% (1,369)			
Food security				
Indicated food insecurity	6.15% (369)			
Did not indicate food insecurity	5.32% (1,323)			

### TABLE 4: RATES OF GESTATIONAL DIABETES BY PARTICIPANT CHARACTERISTICS (N = 1,914)

Strong Start participants' age is also associated with gestational diabetes. Consistent with other research, older participants are more likely to develop GDM than women who are younger (Lavery et al. 2017). In fact, women ages 35 or older are more than twice as likely as Strong Start participants on the whole to develop GDM (12.9 percent vs. 5.4 percent), though rates among Strong Start participants are still lower than rates for women of advanced maternal age reported in the literature (DeSisto et al. 2014). Very few younger women developed GDM during their Strong Start pregnancy. Multiparous women are also more likely to develop gestational diabetes than first time mothers, but this is likely confounded by age and the fact that multiparous women are likely to be older than nulliparous women.

Lastly, we considered gestational diabetes incidence by select physical and psychosocial characteristics and find that heavier women are considerably more likely to develop GDM, obese women are about 60 percent more likely to develop gestational diabetes than the Strong Start population as a whole (8.7 percent), and very obese women developed GDM at a rate that is twice as high as the overall rate (11.3 percent). These rates are similar to those reported in the literature (e.g., Kim et al. 2010). Approximately one-quarter of women enrolled who presented as very obese at intake received nutritional counseling during their Strong Start pregnancy, and 36 percent of very obese women received nutritional counseling. Though we do not observe that these interventions reduced the rate of developing GDM relative to rates reported in the literature, during case study interviews key informants did perceive that their efforts to counsel women on healthy activity and nutrition during pregnancy were leading to better outcomes. Finally, we find that women who are depressed are slightly less likely than women who are not depressed to develop gestational diabetes.

A pregnancy risk associated with gestational diabetes is elevated infant birthweights. Women with gestational diabetes are at increased risk of giving birth to a macrosomic infant (>4000g). Macrosomic infants are more likely to experience shoulder dystocia, clavicle fractures, and brachial plexus injury if delivered vaginally. There are also risks to the infant, post-delivery, associated with gestational diabetes and maternal weight including hypoglycemia, jaundice, and congenital abnormalities. Complications such as obesity and Type 2 diabetes persist into early childhood. As a result of concerns associated with macrosomia, women with GDM are often induced early or scheduled for C-sections. Estimates suggest that between 15 and 45 percent of women with gestational diabetes deliver macrosomic infants (KC et al. 2015). Because, however, measurement of fetal size and weight can be inaccurate, scheduled, elective C-sections for women with gestational diabetes may at times be unnecessary (ACOG 2016). We do observe that Strong Start participants with GDM are significantly more likely to deliver by C-section than women without gestational diabetes (40 percent vs. 25 percent [*p* < .01]).

Looking at the PLPE data, we also observe that women with gestational diabetes are more likely to have a macrosomic infant, but the vast majority give birth to infants with a normal birthweight. Though not presented in Table 5, women with gestational diabetes are also slightly more likely to deliver a baby preterm (15 percent vs. 12 percent) or early term (35 percent vs. 25 percent) than the general Strong Start population. These results are presented in Table 5.

Gestational	Birthweight, % (N)						
Diabetes	Very low birthweight	Low birthweight	Normal birthweight	Macrosomic	Unknown birthweight		
Yes	1.83% (31)	7.78%% (132)	80.48% (1,365)	10.44% (177)	10.36% (196)		
No	1.76% (436)	8.24%% (2,045)	83.65% (20,776)	6.70% (1,663)	13.10% (3,741)		
Unknown	3.26% (41)	11.14% (140)	82.02% (1,031)	3.82% (48)	67.64% (2,628)		

### TABLE 5: BIRTHWEIGHT BY MATERNAL GESTATIONAL DIABETES STATUS

*Note:* Rows sum to over 100 percent because some women had multiple babies with multiple birthweights.

**Delivery Method.** Overall, 27 percent of women enrolled in Strong Start delivered by C-section (Figure 14). These rates are lower than national C-section rates, which were 31.9 percent in 2015 (Martin et al. 2017), but appear to be driven by particularly low C-section rates among Birth Center enrollees (13 percent). Birth Center rates may be attributable in part to women at higher risk of C-section risking out of Birth Center care, as well as women intent upon having a more natural birth experience seeking out a Birth Center. Approximately half of all Cesareans preformed in the US are thought to be medically unnecessary (WHO 2015). Notably, Maternity Care Home participants, who appear to be the highest-risk group of Strong Start enrollees overall, have C-section rates that are slightly lower than the national average (31.6 percent). Three percent of Strong Start deliveries, and almost 20 percent of women who previously had a C-section delivery, had a vaginal birth after C-section (VBAC).



### FIGURE 14: DELIVERY METHOD AMONG STRONG START PARTICIPANTS, BY MODEL AND OVERALL

*Notes*: Delivery method was assessed through the Exit Form; values of less than 2 percent are not labeled. Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C. Ns are based on women for whom Exit Form data were submitted and had nonmissing values for delivery method.

With increasingly complete data on Strong Start participants, we've looked closely at associations between delivery method and characteristics of women and infants, and found very low rates of C-section among women who were nulliparous, had a singleton pregnancy, and carried to term (37 weeks or more) (Table 6). These characteristics (as well as vertex position, a variable that is not available in the Strong Start PLPE data) represent low-risk deliveries that are typically targeted in efforts to reduce non-medically necessary C-sections. Among nulliparous women enrolled in Strong Start with a singleton pregnancy who carried to term (low risk pregnancies), the C-section rates are lower than the low-risk Cesarean rate reported for all US births in 2016 (24.3 percent vs 25.7 percent) (Martin et al. 2017). Rates of low-risk C-section are especially low for women enrolled in birth center care (16.43 percent). Importantly, delivery method reported in the PLPE data has high concordance with that reported on birth certificates, according to analyses conducted by the Urban Institute evaluation team, adding additional confidence to this finding.

Mathed of Dalivary	Deliveries by Strong Start Model; % (N)					
Birth Center Group		Group Prenatal Care	iroup Prenatal Care Maternity Care Home			
All women: Primary Delivery Outcomes						
Vaginal	87.03% (5,502)	70.99% (4,585)	68.18% (11,988)	72.70% (22,075)		
Cesarean <sup>1</sup>	12.97% (820)	28.94% (1,869)	31.63% (5,562)	27.17% (8,251)		
Women with previous C-s	ection: Delivery Outco	nes				
Repeat C-section	71.20% (225)	76.36% (704)	83.58% (2,530)	81.10% (3,459)		
VBAC	28.80% (91)	23.64% (218)	16.42% (497)	18.90% (806)		
Nulliparous women with singleton, term pregnancies (NTS)						
C-section births	16.43% (387)	26.83% (624)	26.77% (1,374)	24.30% (2,385)		

### TABLE 6: STRONG START PARTICIPANT DELIVERY METHOD DETAIL, BY MODEL AND OVERALL

*Note:* <sup>1</sup> NTS and Repeat C-sections do not add to 100 percent because they exclude women who reported both methods of delivery.

# MATERNAL AND INFANT OUTCOMES

The primary goal of CMMI's Strong Start investment was to reduce preterm delivery, infant low birthweight, and costs for pregnant Medicaid beneficiaries, a group of women who are at higher risk of experiencing poor birth outcomes. As reported in past years' Annual Reports, we observe that preterm delivery and low birthweight rates among Strong Start participants collected from the participant-level data are higher those reported for women nationally by the CDC. The CDC reports that the preterm birth rate increased slightly in 2016 (for the second year in a row) to 9.84 percent. Strong Start rates of preterm birth, on the other hand, remains unchanged, at 12.3 percent. The national increase in preterm birth is driven by late-preterm births—7.09 percent of births nationally occurred after 34 and prior to 37 weeks.

Among Strong Start participants, 8.3 percent of babies were born between 34 and 37 weeks. Overall, rates of preterm birth are highest among back women (13.75 percent), and women from Puerto Rico (11.5 percent) (Martin et al. 2017). We also observe that black women enrolled in Strong Start are most likely to have a preterm birth (15 percent) as are Hispanic women enrolled in the program (11.72 percent), a sizable proportion of whom come from Puerto Rico where Group Prenatal Care was implemented. Strong Start EGAs are presented in Figure 15.





*Notes:* Ns are based on nonmissing data. 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. Missing rates for EGA, by approach, can be found in Appendix C. Columns may not add to exactly 100 percent because of rounding.

Consistent with rates reported in the past, 10.8 percent of Strong Start babies were born at low birthweight (1500–2500g) or very low birthweight (<1500g; Figure 16). These rates continue to be higher than national averages. In 2016, the CDC reports that 9.55 percent of babies were born weighing less than 2500g. Infant birthweight does vary by model, but follows the same pattern as preterm birth, with Maternity Care Home participants being most likely to have a low or very low birthweight baby and Birth Center women being the least likely to deliver a low birthweight infant. Racial and ethnic differences in these outcomes also exist. Black women enrolled in Strong Start have the highest rate of low birthweight babies (15.17 percent). This is higher than black women nationally (13.66 percent), but the CDC reports of birth outcomes do not account for income or insurance status (Martin et al. 2017).



FIGURE 16: INFANT BIRTHWEIGHT, BY MODEL AND OVERALL

*Notes*: Birthweight is reported on the Exit Form. Ns are based on nonmissing data. Missing data are excluded from these calculations. Rates of missing by measure can be found in Appendix C.

With more complete data now available, additional analyses help us describe the group of Strong Start enrollees who had a preterm birth (Table 7) or low birthweight baby (Table 8). We consider how women's parity, pregnancy conditions, and maternal BMI are associated with these outcomes. Specifically, we observe that multiparous women are more like to have a preterm birth. Approximately one-quarter of women with a history of preterm birth delivered preterm with their Strong Start pregnancy, but almost three-quarters of those women carried to term. Only 9 percent of multiparous women without a history of preterm birth delivered before 37 weeks. Nearly 42 percent of women delivered preterm delivered by C-section (among women for whom we have delivery information).

Data Elements	Very Preterm % (N)	Preterm % (N)	Early term % (N)	Term/Term+ % (N)	Unknown EGA % (N)	
Parity						
Nulliparous	3.02% (459)	5.45% (829)	27.85% (2,716)	50.14% (7,628)	23.53% (3,580)	
Multiparous	3.41% (775)	6.90% (1,570)	21.55% (4,903)	48.55% (11,046)	19.60% (4,459)	
(Prev preterm)	7.91% (361)	13.09% (597)	25.98% (1,185)	32.98% (1,504)	20.04% (914)	
(Not prev preterm)	2.27% (400)	5.32% (940)	20.58% (3,634)	53.13% (9,382)	18.70% (3,302)	
Pregnancy Conditions						
Gestational diabetes	4.39% (84)	9.72% (186)	31.09% (595)	43.42% (831)	11.39% (218)	
Preeclampsia	14.45% (235)	22.94% (373)	28.54% (464)	26.63% (433)	7.44% (121)	
Smoking	3.95% (158)	7.85% (314)	21.39% (856)	44.34% (1,774)	22.47% (899)	
Maternal BMI						
Underweight	3.58% (37)	8.62% (89)	24.10% (249)	48.31% (499)	15.39% (159)	
Normal weight	2.82% (304)	5.89% (635)	20.88% (2,253)	54.11% (5,838)	16.31% (1,760)	
Overweight	3.09% (249)	6.20% (499)	20.14% (1,621)	53.06% (4,270)	17.51% (1,409)	
Obese	3.61% (307)	6.85% (583)	21.11% (1,797)	49.67% (4,228)	18.76% (1,597)	
Very obese	4.68% (131)	8.22% (230)	23.08% (646)	44.16% (1,236)	19.86% (556)	

Looking closely at the characteristics of women in Strong Start who delivered preterm, we observe that women who developed gestational diabetes were more likely to deliver preterm than the Strong Start population as a whole (nearly 15 percent). Few of those deliveries, however, were very preterm, suggesting that perhaps they were early inductions intended to avoid complications associated with potentially macrosomic infants. More than a third of women who developed preeclampsia ended up delivering a preterm infant (37.36 percent). This is perhaps unsurprising, as the only way to resolve the potentially fatal progression to eclampsia is to deliver the baby. Women enrolled in Strong Start were slightly more likely to develop pregnancy-related hypertension than the national average, so reducing incidence in this population could have substantial effects in improving birth outcomes. Though maternal weight is associated with an increased risk of preeclampsia (Bodnar et al. 2005), much about how to prevent preeclampsia remains unknown. Very obese women enrolled in Strong Start were slightly more likely to deliver preterm (12.9 percent) than women in other weight categories.

Over 13 percent of multiparous women with a history of preterm birth had a low birthweight baby compared to only 5percent of multiparous women without a previous preterm baby (Table 8). Women with preeclampsia were particularly likely to deliver a low or very low birthweight infant (32.8 percent), likely driven by early deliveries to resolve this serious condition, while women with gestational diabetes were most likely to deliver a macrosomic infant (10.4 percent). Underweight women also had higher rates of low birthweight (16 percent).

Data Elements	Very Low BW % (N)	Low BW % (N)	Normal BW % (N)	Macrosomic % (N)	Unknown BW % (N)
Parity					
Nulliparous	1.79% (201)	8.66% (972)	84.65% (9,505)	5.14% (577)	23.86% (3,519)
Multiparous	1.87% (330)	8.16% (1,442)	82.54% (14,578)	7.85% (1,386)	19.62% (4,310)
(Prev preterm)	4.66% (164)	16.21% (570)	74.72% (2,628)	4.98% (175)	19.57% (856)
(Not prev preterm)	1.17% (163)	6.07% (844)	84.45% (11,735)	8.68% (1,206)	18.69% (3,195)
Pregnancy Conditions					
Gestational diabetes	1.83% (31)	7.78% (132)	80.48% (1,365)	10.44%% (177)	10.36% (196)
Preeclampsia	8.95% (135)	23.86%% (360)	63.55% (959)	4.57% (69)	6.85% (111)
Smoking	2.53% (74)	13.07% (382)	81.01% (2,367)	3.87% (113)	24.08% (927)
Maternal BMI					
Underweight	1.97% (17)	14.04% (121)	82.13% (708)	2.09% (18)	14.48% (146)
Normal weight	1.20% (107)	8.39% (748)	85.43% (7,615)	5.22% (465)	15.41% (1,624)
Overweight	1.93% (127)	7.07% (464)	84.46% (5,544)	6.86%% (450)	15.99% (1,249)
Obese	2.15% (146)	8.11% (551)	80.95% (5,503)	9.27% (630)	17.28% (1,420)
Very obese	2.49% (55)	8.92% (197)	80.26% (1,773)	8.78% (194)	16.67% (442)

### TABLE 8: INFANT BIRTHWEIGHT AND MATERNAL CHARACTERISTICS

Note: Some rows may add up to over 100 percent because some women gave multiple births with multiple birthweights.

# MULTIVARIATE REGRESSION ANALYSES

With data collected through Quarter 4 2016, we have replicated the multivariate regression analyses conducted for the Year 3 Annual Report, looking at model differences in preterm birth, low birthweight and C-section deliveries but with more than double the sample size. In addition, we have added new analyses focused on postpartum family planning outcomes and model differences associated with contraceptive choices.

# Main Outcomes: Preterm Birth, Low Birthweight, and C-Section Deliveries

For the main outcome regression analyses, we have conducted unadjusted and regression-adjusted analyses in which we compare outcomes among women enrolled in Birth Center and Group Prenatal Care models to those enrolled in Maternity Care Homes. Regression-adjusted analyses control for a variety of demographic, psychosocial, and medical risk factors that have been previously associated with poor birth outcomes. The Maternity Care Home model was selected as the reference category because it has the largest enrollment, and is also more 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, partner status, previous preterm birth (preterm) previously low birthweight baby (low birthweight), previous C-section (C-section), depression, pregnancy intention, pregnancy-induced hypertension, gestational diabetes, smoking behaviors, food insecurity, intimate partner violence, and referral to high-risk medical services during women's Strong Start pregnancies.

Because these data were collected only for Strong Start participants, we have no comparison group of women who were not enrolled in Strong Start. 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 enrolling the healthiest and most stable group and Maternity Care Homes enrolling a sicker and more challenging population. Group Prenatal Care participants appear to be higher risk than Maternity Care Home and Birth Center participants on some measures, and lower on others. Although we have accounted for observable difference in risk by including a variety of controls in our models, there will always be unobservable factors that we cannot control for that could affect our findings.

Though missing data necessitates excluding about 37 percent of our sample for these analyses (we include 23,839 women out of 37,965 women for whom Exit Forms have been submitted), this represents an improvement from the Year 3 Annual Report, when 50 percent of women for whom Exit Forms were submitted had to be excluded from our main regression analyses. Approximately 2,000 women were dropped from the analysis because they did not submit an Intake Form, and another 1,000 women were excluded because they had a miscarriage or terminated pregnancy. Nearly 9,000 women were excluded because they did not have outcome information, most commonly as a result of being lost to follow-up. And roughly 2,000 women were excluded because of missing covariates. The steps involved with constructing the analytic sample are presented in Table 9.

Logic for Dropping Observations	# Excluded	# of Remaining Observations
Starting Sample: # of Participants who have completed Exit Forms	N/A	37,965
Dropping those who have not completed intake forms	2,115	35,850
Dropping Miscarriages and Terminations	1,131	34,719
Dropping those missing main outcome variable (preterm, LBW, C-section)	8,735	25,984
Dropping those missing any covariates	2,145	23,839
Main Analytic Sample		23,839

# TABLE 9: CONSTRUCTING THE ANALYTIC SAMPLE

We performed t-tests to compare those we removed from that analysis for missing covariates with those who remained and did not find any evidence that would suggest there are systematic difference between the two groups.

Summary statistics for the sample included in the regression are presented in Table 10. This table lists unadjusted means for all outcome measures and covariates included in the regression models. We conducted pairwise statistical tests to compare means across models and observe that the populations enrolled in each Strong Start model do vary significantly in most cases. Birth Center participants are mostly likely to be white, while Group Prenatal Care participants are mostly likely to be Hispanic and Maternity Care Home participants are most likely to be black. Group Prenatal Care participants are significantly more likely to be first-time mothers than participants in either of the other two models of care, and least likely to have a job. Maternity Care Home participants are significantly more likely to have a job. Maternity to have been referred out for high-risk medical services during their Strong Start pregnancy.

Data Elementa	Model					
Data Elements	Maternity Care Homes	Birth Centers	Group Prenatal Care			
Outcomes <sup>1</sup>	Unadjusted Means <sup>2,3</sup>					
Preterm	0.14	0.05***	0.11***^^^			
Low Birthweight	0.13	0.04***	0.10***^^^			
C-Section	0.32	0.12***	0.29***^^^			
Demographic Characteristics						
Race/Ethnicity						
White	0.23	0.54***	0.12***^^^			
Hispanic	0.24	0.25	0.46***^^^			
Black	0.49	0.15***	0.37***^^^			
Other	0.03	0.05***	0.04*** ^^			
Age						
Less than 15 years old	0.00	0.00***	0.00 ^ ^			
15 to 17 years of age	0.05	0.02***	0.06***^^^			
18 to 19 years of age	0.10	0.06***	0.11***^^^			
20 to 24 years of age	0.34	0.29***	0.35 *^^^			
25 to 29 years of age	0.26	0.33***	0.23***^^^			
30 to 34 years of age	0.16	0.21***	0.15^^^			
More than 35 years old	0.09	0.09	0.08			
Education						
Less than High School	0.25	0.12***	0.26^^^			
High School Graduate / GED	0.53	0.53	0.47***^^^			
Bachelor's Degree	0.03	0.12***	0.03 *^^^			
Other Degree	0.06	0.10***	0.07***^^^			
Multiple Degrees	0.00	0.03***	0.01 **^^^			
Education Unknown	0.13	0.09***	0.16***^^^			

### TABLE 10: SUMMARY STATISTICS FOR BIRTH OUTCOMES AND COVARIATES BY MODEL

	Model					
Data Elements	Maternity Care Homes	Birth Centers	Group Prenatal Care			
Relationship Status	•	•				
Married, Living with Spouse	0.17	0.43***	0.19***^^^			
Married, Not Living with Spouse	0.02	0.02 *	0.02			
Living with a partner/boyfriend	0.31	0.33*	0.35***^^^			
In a relationship not living together	0.30	0.13***	0.26***^^^			
Not in a relationship	0.19	0.09***	0.18^^^			
Employment		•				
Employed	0.40	0.44***	0.35***^^^			
Not employed	0.60	0.56***	0.65***^^^			
Risk Factors From Previous Pregnancy						
Previous Preterm Birth						
No Previous Birth	0.36	0.36	0.46***^^^			
Previous Full Term Birth	0.49	0.56***	0.44***^^^			
Previous Preterm Birth	0.15	0.08***	0.10***^^^			
Previous Low Birth Weight		•				
No Previous Birth	0.36	0.36	0.46***^^^			
Previous Healthy Birth Weight	0.45	0.62***	0.38***^^^			
Previous Low Birth Weight	0.09	0.01***	0.04***^^^			
Previous Birth Weight Unknown	0.11	0.01***	0.11^^^			
Previous C-section		•				
No Previous Birth	0.36	0.36	0.46***^^^			
Previous Vaginal Birth	0.47	0.59***	0.40***^^^			
Previous C-section	0.17	0.05***	0.14***^^^			
Interpregnancy Interval	•	•				
No Previous Birth	0.36	0.36	0.46***^^^			
Normal Interpregnancy Interval	0.38	0.37 **	0.33***^^^			
Short Interpregnancy Interval	0.15	0.21***	0.10***^^^			
Interpregnancy Interval Unknown	0.11	0.06***	0.11^^^			
Risk Factors From Current Pregnancy						
Depression						
Not Depressed at Intake	0.70	0.73***	0.62***^^^			
Depressed at Intake	0.23	0.20***	0.25 **^^^			
Depression Score Incomplete	0.07	0.08	0.14***^^^			
Anxiety						
Not Anxious at Intake	0.86	0.91***	0.85***^^^			
Anxious at Intake	0.13	0.08***	0.14^^^			
Anxiety Score Incomplete	0.00	0.01***	0.01*** ^^			
Food Insecurity		•				
Not Food Insecure at Intake	0.78	0.78	0.72***^^^			
Food Insecure at Intake	0.17	0.17	0.21***^^^			
Food Insecurity Score Incomplete	0.05	0.05 *	0.07***^^^			
Intendedness of Pregnancy						
Unintentional Pregnancy	0.26	0.39***	0.30***^^^			
Intentional Pregnancy	0.74	0.61***	0.70***^^^			

Data Elemente	Model				
Data Elements	Maternity Care Homes	Birth Centers	Group Prenatal Care		
Pregnancy-Related Hypertension	•	•			
No Pregnancy-related Hypertension	0.82	0.98***	0.85***^^^		
Pregnancy-related Hypertension	0.07	0.01***	0.09***^^^		
Hypertensive Status Unknown	0.11	0.00***	0.06***^^^		
Gestational Diabetes					
No Gestational Diabetes	0.81	0.97***	0.87***^^^		
Gestational Diabetes	0.07	0.02***	0.07^^^		
Diabetic Status Unknown	0.12	0.00***	0.07***^^^		
Smoking					
Did not Smoke at Intake	0.82	0.83	0.79***^^^		
Smoked at Intake	0.13	0.08***	0.07***		
Intimate Partner Violence					
No History of Intimate Partner Violence	0.80	0.79	0.81*^^^		
History of Intimate Partner Violence	0.19	0.20	0.17 **^^^		
Intimate Partner Violence Score Incomplete	0.01	0.01	0.02		
Referral for High-Risk Medical Services					
No Referral for High-Risk Medical Services	0.65	0.94***	0.59***^^^		
Referral for High-Risk Medical Services	0.24	0.00***	0.21***^^^		
Referral Status Unknown	0.11	0.06***	0.20***^^^		
Year					
2013	0.02	0.01***	0.01^^^		
2014	0.26	0.25 *	0.31***^^^		
2015	0.47	0.41***	0.49 **^^^		
2016	0.25	0.33***	0.19***^^^		

*Notes:* <sup>1</sup>Outcomes are defined as follows:

<sup>a</sup> Preterm Birth: A clinically estimated gestational age of < 37 weeks

<sup>b</sup> Low Birth Weight: Infant weight less than 2500 grams at birth

<sup>c</sup> C-section: Final route of delivery is a cesarean section

<sup>2</sup>Significance calculated using pairwise comparison of means test.

<sup>3</sup>For the difference in means from Maternity Care Homes Cells, cells that contain one asterisk (\*) indicate significance at the 0.10 level; cells that contain two asterisks (\*\*) indicate significance at the 0.05 level; and cells that contain three asterisks (\*\*\*) indicate significance at the 0.01 level. Carets (^) are used to represent the difference in means from Birth Centers.

Upon controlling for the specified covariates, we find that Birth Center participants are significantly less likely to have a preterm birth (a 4-percentage point decrease) than Maternity Care Home participants, as are women enrolled in Group Prenatal Care (a 2 percentage point decrease). Women enrolled in each of these two models are also significantly less likely to have a low birthweight baby than women enrolled in Maternity Care Homes (3 percentage points less for Birth Center enrollees and 2 percentage points less for Group Prenatal Care). Only Birth Center participants, however, are less likely than Maternity Care Home enrollees to have a Cesarean delivery (an 8-percentage point decrease).

We observe that being black is highly associated with increased risk of all three outcomes, and note that Maternity Care Home awardees are disproportionately more likely to have enrolled black women in their programs, which included large FQHC and hospital outpatient networks in urban areas. Age is also associated with increased risk, while education appears to be a protective factor. Not surprisingly, smoking is associated with a lower birthweight baby and gestational diabetes is indicative of decreased

risk of low birthweight, and increased risk of C-section. Full results from the linear regression analyses are presented in Table 11.

# TABLE 11: REGRESSION ANALYSIS ON BIRTH OUTCOMES<sup>1</sup>

Birth Outcomes <sup>2,3</sup>					
Covariates	Preterm	Low	C-section		
Model		Birthweight			
Maternity	_	_			
Birth Center	-0.04***	-0.03***	-0.08***		
Group	-0.02***	-0.02***	-0.01		
Race	0.02	0.02			
White	-	_			
Hispanic	0.01*	0.01	-0.02**		
Black	0.02***	0.05***	0.02*		
Other	-0.01	0.02	-0.01		
Age					
20-24	_	_	-		
< 15	0.05	-0.04	-0.08*		
15-17	-0.02	-0.02*	-0.09***		
18-19	-0.01	-0.01	-0.07***		
25-29	0.02**	0.01	0.03***		
30-34	0.02**	0.01*	0.05***		
≥ 35	0.04***	0.02**	0.09***		
Education	I.				
High School Degree / GED	-	-	-		
Less than High School	0.00	0.00	-0.01		
Bachelor's Degree	-0.02*	-0.02*	-0.02		
Other College Degree	0.00	-0.01	0.01		
Multiple College Degrees	-0.02	0.02	0.00		
Did not Respond to Education Query	0.00	0.00	0.00		
Relationship Status					
Married, Living with Spouse	-	-	-		
Married, not living with spouse	-0.01	0.00	0.04*		
Living with Partner or Boyfriend	0.01	0.01*	0.01		
In a relationship but not living together	0.01	0.01*	0.02*		
Not in a relationship	0.01	0.02**	0.03**		
Employment					
Employed	-	-	-		
Unemployed	0.01	0.01	0.00		
Risk Factors From Previous Pregnancy					
No Previous Birth	-	-	-		
Previous Preterm Birth	0.00	-	-		
Previous Full Term Birth	-0.13***	-	-		
No Previous Birth	-	-	-		
Previous Low Birth Weight	-	0.00	-		
Previous Healthy Birth Weight	-	-0.14***	-		
Previous Weight Unknown	-	-0.09***	-		

Birth Outcomes <sup>2,3</sup>				
Covariates	Preterm	Low Birthweight	C-section	
No Previous Birth	-	-	-	
Previous Delivery Cesarean Section	-	-	0.00	
Previous Delivery Vaginal	-	-	-0.66***	
No Previous Birth	-	-	-	
Normal Interpregnancy Interval	0.10***	0.10***	0.48***	
Short Interpregnancy Interval	0.12***	0.10***	0.48***	
No Previous Birth Date	0.12***	0.10***	0.51***	
Risk Factors From Current Pregnancy				
Depression				
Not Depressed	-	-	-	
Depressed	0.01	0.01	0.00	
Depression not scored	0.01	0.01	0.00	
Anxiety				
Not Anxious	-	-	-	
Anxious	0.02*	0.01	0.02*	
Anxiety not scored	-0.02	0.01	-0.04	
Food Insecurity				
Not Food Insecure	-	-	-	
Food Insecure	-	0.00	-	
Food insecurity not scored	-	-0.01	-	
Pregnancy Intention				
Intended	-	-	-	
Unintended	0.01	0.00	-0.02**	
Pregnancy-Related Hypertension				
No Pregnancy-Related Hypertension	-	-	-	
Pregnancy -Related Hypertension	0.07***	0.06***	0.08***	
Hypertensive Status Unknown	0.05	0.04	0.05	
Gestational Diabetes				
No Gestational Diabetes	-	-	-	
Gestational Diabetes	0.01	-0.03***	0.05***	
Diabetes Status Unknown	-0.02	-0.04	0.03	
Smoking				
Did not report smoking at Intake	-	-	-	
Reported smoking at Intake	0.02*	0.04***	0.01	
Smoking Status Unknown	-0.02	-0.01	0.00	
Intimate Partner Violence				
No History of Intimate Partner Violence	-	-	-	
History of Intimate Partner Violence	0.00	0.00	0.00	
Intimate Partner Violence not scored	-0.01	-0.02	0.03	
Referral For High-Risk Medical Services				
No Referral for High-Risk Medical Services	-	-	-	
Referral for High-Risk Medical Services	0.07***	0.07***	0.06***	
Referral Status Unknown	0.02*	0.02*	0.02*	

Birth Outcomes <sup>2,3</sup>					
Covariates	Preterm	Low Birthweight	C-section		
Year					
2014	-	-	-		
2013	0.09***	0.09***	0.03		
2015	-0.01*	-0.01	-0.02*		
2016	-0.03***	-0.02***	-0.02***		

Notes: Cells that contain a dash (-) indicate a reference category. Only theoretically driven covariates are included in each model, so they are not consistent in all outcomes.

<sup>1</sup>Using a linear regression

<sup>2</sup> Cells that contain one asterisk (\*) indicate significance at the 0.10 level; cells that contain two asterisks (\*\*) indicate significance at the 0.05 level; and cells that contain three asterisks (\*\*\*) indicate significance at the 0.01 level. <sup>3</sup> Outcomes are defined as follows:

<sup>a</sup> Preterm birth rate: A clinically estimated gestational age of < 37 weeks

<sup>b</sup> Low birth weight: Weight less than 2500 grams at birth

<sup>c</sup> C-section: Final route of delivery is a cesarean section

Though these regression analyses provide an interesting cross-model comparison, they do not tell us how Strong Start women fare compared with similar women not enrolled in Strong Start who received "typical" prenatal care through Medicaid. Analyses that are conducted as part of the Impacts component of this evaluation (discussed in the Impact Analysis section) will use propensity-scorereweighted comparison groups to provide a more rigorous measure of the impacts of Strong Start. These PLPE data give us some hints about where we might expect to see effects associated with the enhanced services awardees have provided and which models might be likely to drive those effects. But these results are not generalizable and should not be interpreted as the "impacts" that Strong Start models may have had on birth outcomes.

# **Family Planning Outcomes**

As Strong Start awardees wrap up service provision the evaluation team wanted to look at some of the ways in which programs may have affected women's choices about interpregnancy spacing based on the information and guidance offered by Strong Start staff, a focus we often heard about during case study interviews. We might expect that different approaches embraced by the three Strong Start models, as well as different scopes of practices and postpartum provider continuity, might affect women's postpartum contraceptive choices.

While we have been able to descriptively examine this question in the past, with more complete data we have been able to conduct a regression analysis controlling for a variety of participant characteristics on whether women reported using a "moderately" or "highly" effective form of contraception postpartum. Moderately or highly effective contraception includes long-acting reversible contraception, such as an IUD or implant (e.g., Nexplanon), male or female sterilization, oral contraceptives, and injectables (e.g., Depo Provera).

Table 12 presents information on the sample used in this regression analyses, which is more limited than the main regression analysis because of additional covariates included and fewer women reporting on family planning outcomes. For this analysis, we were able to retain more than 16,000 participants after removing women who did not have completed forms essential to the analysis (Intake or Postpartum) and women dropped due to miscarriage or termination. Another roughly 7,000 women were dropped because they were missing either the outcome variable or covariates included in the model. The final sample included represents more than 40 percent of women for whom Exit Forms were submitted, which is consistent with expectations given that many women in this population do not return for their postpartum visits.

Logic for dropping observations	# Excluded	# of remaining observations
Starting Sample: # of Participants who have completed Exit Forms	N/A	37,965
Dropping those who have not completed Intake Forms	2,115	35,850
Dropping those who have not completed Postpartum Survey	12,219	23,631
Dropping Miscarriages and Abortions	163	23,468
Dropping those missing contraception variable	3,767	19,701
Dropping those missing any covariates	3,357	16,344
Main Analytic Sample	16,3	344

### TABLE 12: CONSTRUCTING THE ANALYTIC SAMPLE

Again, with this sample, we performed t-tests to compare those we removed from that analysis for missing covariates with those who remained and did not find any evidence that would suggest there are systematic difference between the two groups.

Summary statistics on outcomes and covariates Ns are presented in Table 13. Unadjusted means suggest that women enrolled in Maternity Care Home models of care are significantly more likely than Birth Center or Group Prenatal Care participants to be using a moderately or highly effective form of contraception postpartum, and Group Prenatal Care participants are more likely than Birth Center enrollees to be using moderately or highly effective contraception. We observe the same patterns for covariate used in the main regression sample. Importantly we did include some additional variables in this model—most notably outcomes related to women's Strong Start births—expecting that their birth experiences could impact their contraceptive decision making.

#### Model **Data Elements Group Prenatal** Maternity Care Homes **Birth Centers** Care Unadjusted Means<sup>2,3</sup> Outcomes<sup>1</sup> Using a Moderately/Highly Effective Form of Contraception 0.54 0.30\*\*\* 0.47\*\*\*^^^ Covariates Race/Ethnicity 0.14\*\*\*^^^ White 0.22 0.54\*\*\* 0.25 0.25 0.49\*\*\*^^^ Hispanic

### TABLE 13: SUMMARY STATISTICS FOR FAMILY PLANNING OUTCOMES AND COVARIATES BY MODEL

	Model			
Data Elements	Maternity Care Homes	Birth Centers	Group Prenatal Care	
Black	0.50	0.15***	0.33***^^^	
Other	0.03	0.06***	0.05*** ^^	
Age	•			
Less than 15 years old	0.00	0.00***	0.00 ^ ^	
15 to 17 years of age	0.05	0.02***	0.06^^^	
18 to 19 years of age	0.10	0.06***	0.11^^^	
20 to 24 years of age	0.33	0.29***	0.34^^^	
25 to 29 years of age	0.26	0.33***	0.23***^^^	
30 to 34 years of age	0.16	0.21***	0.16^^^	
More than 35 years old	0.09	0.09	0.09	
Education				
Less than High School	0.25	0.12***	0.28***^^^	
High School Graduate / GED	0.53	0.53	0.46***^^^	
Bachelor's Degree	0.03	0.13***	0.04 **^^^	
Other Degree	0.06	0.11***	0.07 **^^^	
Multiple Degrees	0.00	0.03***	0.01 **^^^	
Education Unknown	0.13	0.09***	0.14^^^	
Relationship Status	•	L		
Married, Living with Spouse	0.18	0.44***	0.21***^^^	
Married, Not Living with Spouse	0.02	0.01 *	0.02 ^	
Living with a partner/boyfriend	0.31	0.33	0.35*** ^^	
In a relationship not living together	0.30	0.13***	0.24***^^^	
Not in a relationship	0.19	0.09***	0.17 *^^^	
Employment	•	L		
Employed	0.41	0.44***	0.36***^^^	
Unemployed	0.59	0.56***	0.64***^^^	
Risk Factors from Previous Pregnancy				
Previous Preterm Birth				
No Previous Birth	0.36	0.37	0.46***^^^	
Previous Full Term Birth	0.49	0.56***	0.45***^^^	
Previous Preterm Birth	0.15	0.08***	0.09*** ^ ^	
Previous Low Birth Weight				
No Previous Birth	0.36	0.37	0.46***^^^	
Previous Healthy Birth Weight	0.45	0.61***	0.38***^^^	
Previous Low Birth Weight	0.09	0.01***	0.05***^^^	
Previous Birth Weight Unknown	0.10	0.01***	0.12***^^^	
Previous C-section	•	•		
No Previous Birth	0.36	0.37	0.46***^^^	
Previous Vaginal Birth	0.46	0.58***	0.41***^^^	
Previous C-section	0.17	0.05***	0.13***^^^	
Interpregnancy Interval				
No Previous Birth	0.36	0.37	0.46***^^^	
Normal Interpregnancy Interval	0.39	0.37 **	0.34*** ^^	
Short Interpregnancy Interval	0.14	0.21***	0.09***^^^	
Interpregnancy Interval Unknown	0.10	0.05***	0.11^^^	

	Model			
Data Elements	Maternity Care Homes	Birth Centers	Group Prenatal Care	
Current Pregnancy Outcomes				
Preterm Birth	1			
Full Term Birth	0.87	0.95***	0.89***^^^	
Preterm Birth	0.13	0.05***	0.11***^^^	
Low Birth Weight				
Healthy Birth Weight	0.88	0.96***	0.90***^^^	
Low Birth Weight	0.12	0.04***	0.10***^^^	
Previous C-section				
Vaginal Birth	0.68	0.88***	0.71***^^^	
C-section	0.32	0.12***	0.29***^^^	
Risk Factors From Current Pregnancy				
Depression				
Not Depressed at Intake	0.70	0.72 **	0.65***^^^	
Depressed at Intake	0.22	0.20***	0.23^^^	
Depression Score Incomplete	0.08	0.08	0.12***^^^	
Anxiety				
Not Anxious at Intake	0.87	0.91***	0.86^^^	
Anxious at Intake	0.13	0.08***	0.13^^^	
Anxiety Score Incomplete	0.00	0.01***	0.01***	
Food Insecurity				
Not Food Insecure at Intake	0.78	0.79	0.74***^^^	
Food Insecure at Intake	0.17	0.17	0.20***^^^	
Food Insecurity Score Incomplete	0.05	0.04 **	0.07 **^^^	
Intendedness of Pregnancy				
Unintentional Pregnancy	0.27	0.40***	0.32***^^^	
Intentional Pregnancy	0.73	0.60***	0.68***^^^	
Pregnancy-related Hypertension				
No Pregnancy-related Hypertension	0.84	0.99***	0.84^^^	
Pregnancy-related Hypertension	0.06	0.01***	0.08 **^^^	
Hypertensive Status Unknown	0.10	0.00***	0.09 *^^^	
Gestational Diabetes				
No Gestational Diabetes	0.83	0.98***	0.84 **^^^	
Gestational Diabetes	0.07	0.02***	0.07^^^	
Diabetic Status Unknown	0.10	0.00***	0.09 **^^^	
Smoking				
Did not Smoke at Intake	0.83	0.84	0.79***^^^	
Smoked at Intake	0.13	0.07***	0.07***	
Intimate Partner Violence				
No History of Intimate Partner Violence	0.81	0.79 **	0.81 ^^	
History of Intimate Partner Violence	0.18	0.20***	0.18 ^^	
Intimate Partner Violence Score Incomplete	0.01	0.01	0.01	
Referral for High-Risk Medical Services				
No Referral for High-Risk Medical Services	0.65	0.94***	0.56***^^^	
Referral for High-Risk Medical Services	0.24	0.00***	0.22 **^^^	
Referral Status Unknown	0.10	0.06***	0.22***^^^	

	Model			
Data Elements	Maternity Care Homes Birth Centers		Group Prenatal Care	
Year				
2013	0.00	0.00 *	0.01***^^^	
2014	0.26	0.25	0.31***^^^	
2015	0.47	0.40***	0.49^^^	
2016	0.26	0.34***	0.20***^^^	

*Notes:* <sup>1</sup>Outcomes are defined as follows:

<sup>a</sup> Preterm birth rate: A clinically estimated gestational age of < 37 weeks

<sup>b</sup> Low birth weight: Weight less than 2500 grams at birth

<sup>c</sup> C-section: Final route of delivery is a cesarean section

<sup>2</sup>Significance calculated using pairwise comparison of means test.

<sup>3</sup> For the difference in means from Maternity Care Homes Cells, cells that contain one asterisk (\*) indicate significance at the 0.10 level; cells that contain two asterisks (\*\*) indicate significance at the 0.05 level; and cells that contain three asterisks (\*\*\*) indicate significance at the 0.01 level. Carets (^) are used to represent the difference in means from Birth Centers.

When controlling for observable participant characteristics, we find that Birth Center and Group Prenatal Care participants remain significantly less likely to report using a moderately or highly effective form of contraception postpartum (18 percentage points and 5 percentage points less likely, respectively) than Maternity Care Home participants.

We also observe that being black and being young are each positively and significantly associated with using a moderately or highly effective form of contraception postpartum, but being more educated is negatively and significantly associated with the outcome. This may be because younger women would be more concerned that having another baby at a young age would further impact their life trajectory, while more educated women may have more stability in their lives and may be less concerned about the consequences of having another child. Linear regression results are presented in Table 14.

Data Elements	Coefficient		
Covariates	Likelihood of using moderately/highly effective form of Contraception Compared with Maternity Care Home Participants <sup>1,2</sup>		
Model			
Maternity	-		
Birth Center	-0.18***		
Group	-0.05***		
Race			
White	-		
Hispanic	0.01		
Black	0.05***		
Other	-0.02		
Age			
20-24	-		
< 15	0.19**		
15-17	0.10***		
18-19	0.03		
25-29	-0.02		
30-34	-0.01		
≥ 35	0.03		

### TABLE 14: REGRESSION ANALYSIS ON USE OF MODERATELY/HIGHLY EFFECTIVE FORM OF CONTRACEPTION

Data Elements	Coefficient	
Covariates	Likelihood of using moderately/highly effective form of Contraception Compared with Maternity Care Home Participants <sup>1,2</sup>	
Education		
High School Degree / GED	-	
Less than High School	0.00	
Bachelor's Degree	-0.08***	
Other College Degree	0.00	
Multiple College Degrees	0.00	
Did not Respond to Education Query	-0.01	
Relationship Status		
Married, Living with Spouse	-	
Married, not living with spouse	-0.02	
Living with Partner or Boyfriend	0.04***	
In a relationship but not living together	0.03*	
Not in a relationship	-0.02	
Employment		
Employed	-	
Unemployed	0.91**	
Risk Factors From Previous Pregnancy <sup>3</sup>		
No Previous Birth	-	
Previous Preterm Birth	0.00	
Previous Full Term Birth	-0.01	
No Previous Birth	-	
Previous Low Birth Weight	0.02	
Previous Healthy Birth Weight	0.00	
Previous Weight Unknown	0.00	
No Previous Birth	-	
Previous Delivery Cesarean Section	0.00	
Previous Delivery Vaginal	-0.07***	
No Previous Birth	-	
Normal Interpregnancy Interval	0.15***	
Short Interpregnancy Interval	0.14***	
No Previous Birth Date	0.12***	
Risk Factors From Current Pregnancy		
Full Term Birth	-	
Preterm Birth	0.01	
Healthy Birth Weight	-	
Low Birth Weight	0.00	
Vaginal Delivery	-	
Cesarean Section	0.01	
Depression		
Not Depressed	-	
Depressed	0.01	
Depression not scored	-0.01	
Anxiety		
Not Anxious	-	
Anxious	-0.02	
Anxiety not scored	0.05	

Data Elements	Coefficient
Covariates	Likelihood of using moderately/highly effective form of Contraception
Food Insecurity	compared with Maternity care nome i articipants
Not Food Insecure	-
Food Insecure	-0.03**
Food insecurity not scored	-0.02
Pregnancy Intention	
Intended	-
Unintended	-0.06***
Pregnancy-Related Hypertension	
No Pregnancy-Related Hypertension	-
Pregnancy -Related Hypertension	0.05**
Hypertensive Status Unknown	0.04
Gestational Diabetes	
No Gestational Diabetes	-
Gestational Diabetes	0.02
Diabetes Status Unknown	-0.14**
Smoking	
Did not Smoke at Intake	-
Smoked at Intake	0.03*
Smoking Status Unknown	0.01
Intimate Partner Violence	
No History of Intimate Partner Violence	-
History of Intimate Partner Violence	0.01
Intimate Partner Violence not scored	-0.04
Referral For High-Risk Medical Services	
No Referral for High-Risk Medical Services	-
Referral for High-Risk Medical Services	0.02*
Referral Status Unknown	0.02
Year	
2014	-
2013	-0.05
2015	-0.01
2016	0.01

Notes: Cells that contain a dash (-) indicate a reference category.

<sup>1</sup>Using a linear regression. <sup>2</sup> Cells that contain one asterisk (\*) indicate significance at the 0.10 level; cells that contain two asterisks (\*\*) indicate significance at the 0.05 level; and cells that contain three asterisks (\*\*\*) indicate significance at the 0.01 level. <sup>3</sup> Outcomes are defined as follows:

<sup>a</sup> Preterm birth rate: A clinically estimated gestational age of < 37 weeks

<sup>b</sup> Low birth weight: Weight less than 2500 grams at birth

<sup>c</sup> C-section: Final route of delivery is a cesarean section

# SUMMARY OF PARTICIPANT-LEVEL PROCESS EVALUATION DATA FINDINGS

With three years of data collected on nearly every Strong Start participant we have amassed a tremendous amount of information on the Strong Start population, and can describe levels of psychosocial need, medical risk factors, and interim outcomes. In addition, we have early data on birth outcomes that can both foretell trends we might observe in birth certificate and Medicaid data being acquired from states and be used to assess concordance between what the programs have collected and what is reported in the state-acquired data.

For this annual report, we have looked more completely at participant characteristics associated with particular outcomes and have been able to discern who might be most likely to develop certain pregnancy conditions (such as gestational diabetes), and understand more about the outcomes of affected women's pregnancies. We are able, in addition, to consider whether there are certain participant characteristics driving outcomes of interest, and whether Strong Start might be serving a particularly high-risk group of women.

This year we have once again replicated regression-adjusted analyses comparing Birth Center and Group Prenatal Care participant's rates of preterm birth, low birthweight babies and C-section deliveries, controlling for a variety of observable participant characteristics, with those of women enrolled in Maternity Care Homes. With double the sample this year compared to last, we continue to observe results indicating that Maternity Care Home enrollees are significantly more likely than Birth Center or Groups Prenatal Care participants to have a preterm delivery and to deliver a low birthweight baby. They are also significantly more likely than Birth Center participants to have a C-section. Though these results do not indicate the impact that Strong Start is having overall, they suggest that Maternity Care Homes—most akin to traditional prenatal care—may be less effective in moving the needle on poor birth outcomes than models of care that depart more significantly from a traditional medical model, such as Birth Center and Group Prenatal Care models.

Lastly, we examined the likelihood that women report using a moderately to highly effective form of contraception postpartum while controlling for a variety of observable characteristics and find that Maternity Care Home participants are more likely to use more effective forms of contraception postpartum. There are likely a number of factors that influence this outcome, including being part of a health system that has coordinated family planning care and (according to case study findings) having care coordinators focused intently on family planning throughout women's pregnancies. In addition, lower rates of effective postpartum contraception in birth centers may be influenced by the fact that some birth center midwives are unable to prescribe certain forms of contraception and may be more accepting of natural family planning methods. Furthermore, a disproportionate number of Latina women enrolled in Group Prenatal Care, and case study reports indicate that many Latina women expressed cultural or religious objections to contraception.

# **CASE STUDIES**

During the fourth round of case studies, the evaluation team had a final opportunity to gather qualitative information about awardees' experiences implementing Strong Start and their plans for sustaining enhanced prenatal care moving forward. Building on the comprehensive data collected annually over the course of the evaluation, this year's case study analysis examines whether and how Strong Start programs have been (or will be) sustained, awardee perceptions of how Strong Start enhanced prenatal care influenced key maternal and newborn outcomes (as well as other program impacts), and selected key features of awardees' Strong Start interventions. Findings are presented below in that order.

This analysis includes data collected during the fourth round of key informant interviews, which occurred between October 2016 and May 2017 and included all 27 Strong Start awardees and representative provider sites. Table 15 lists the awardees and Birth Center sites included in the Year 4 interviews. As in prior years, Birth Center findings are presented in a slightly different manner—as *sites* reporting rather than awardees—since all but one of Strong Start's Birth Center sites are operated by a single awardee, the American Association of Birth Centers (AABC). Each year the evaluation team has selected a set of AABC sites for inclusion in the case studies to ensure that data are collected from a similar number of sites implementing each model. For Maternity Care Home and Group Prenatal Care awardees, typically one or two provider sites were included in the Year 4 interviews—a smaller number than in years past, as many sites had already ceased program operations at the time of the interviews.

Maternity Care Home Awardees (N=17)	Group Prenatal Care Awardees (N=13)	Birth Center Sites (N=11)
Access Community Health Network (IL)	Albert Einstein Healthcare	American Association of Birth
Florida Association of Healthy Start	Network (PA)	Centers (10 sites)
Coalitions (FL)	Amerigroup Corporation (LA)	Best Start Birth Center (CA)
Los Angeles County Department of Health	Central Jersey Family Health	Birth & Beyond (FL)
Services (CA)	Consortium, Inc. (NJ)	Breath of Life (FL)
Maricopa Special Health Care District (AZ)	Grady Memorial Hospital Corporation	Rosemary Birthing Home (FL)
Medical University of South Carolina (SC)	DBA Grady Health System (GA)	New Birth Company (KS)
Meridian Health Plan (MI)	Harris County Hospital District (TX)	Women's Birth & Wellness
Mississippi Primary Health Care Association,	Health Insight of Nevada (NV)	Center (NC)
Inc. (MS)	Providence Health Foundation of	Midwife Center for Birth &
Oklahoma Health Care Authority (OK)	Providence Hospital (DC)	Women's Health (PA)
Providence Health Foundation of Providence	St. John Community Health Investment	Charleston Birth Place (SC)
Hospital (DC)	Corp. (MI)	North Houston Birth Center (TX)
Signature Medical Group (MO)	Texas Tech University Health Sciences	Peacehealth Nurse Midwifery Birth
St. John Community Health Investment	Center (TX)	Center (OR)
Corp. (MI)	University of Kentucky Research	Providence Health Foundation of
Texas Tech University Health Sciences	Foundation (KY)	Providence Hospital (1 site)
Center (TX)	University of Puerto Rico Medical	Community of Hope Birth
United Neighborhood Health Services, Inc. (TN)	Sciences Campus (PR)	Center (DC)
University of Alabama at Birmingham (AL)	University of Tennessee Health Sciences	
University of South Alabama (AL)	Center (TN)	
Virginia Commonwealth University (VA)	Virginia Commonwealth University (VA)	

### TABLE 15: AWARDEES AND BIRTH CENTER SITES INCLUDED IN YEAR 4 CASE STUDY INTERVIEWS

While most of the findings presented below are from key informant interviews, two additional forms of data collection occurred as part of the evaluation's Year 4 qualitative effort. A web-based survey of AABC Birth Center sites was conducted in December 2016; approximately three dozen sites participated in the survey and selected findings are presented in the Key Features of Strong Start Programs section. In addition, a telephone-based survey of Medicaid officials from states with Strong Start programs was conducted in Fall 2016, and findings from this effort are summarized in the next chapter.

# SUSTAINING THE STRONG START AWARDS

# Awardee's Sustainability Plans

Slightly more than half of Strong Start awardees and Birth Center sites are fully or partially sustaining enhanced prenatal care models implemented under Strong Start, as shown in Table 16.

Awardee Model	Full Model Sustained		Partial Mo	Partial Model Sustained Continuing Prior N		Not
of Care	All SS Sites	Some SS Sites	All SS Sites	Some SS Sites	w/out SS Additions <sup>1</sup>	Model
Maternity Care Home awardees <sup>2</sup> (n=17)	6	3	0	2	1	6
Group Prenatal Care awardees (n=13)	4	3	0	0	5	1
Birth Center sites (n=11)	3	N/A	6	N/A	2	0

### TABLE 16: SUSTAINABILITY OF THE STRONG START PROGRAMS

*Notes:* <sup>1</sup> Some awardees and sites had enhanced prenatal care in place before they implemented Strong Start. In these cases, Strong Start services were layered on top of the preexisting enhancements, for example, sites with established group prenatal care programs that added community health worker services to group sessions, or Birth Center sites that added peer counseling services to complement their midwifery model of care. This column shows awardees and sites that will maintain the enhanced care models they had in place prior to Strong Start, but will not sustain the additional services that were layered on top of their pre-Strong Start enhancements.

<sup>2</sup> Johns Hopkins University reported some sites sustaining full model and others sustaining a partial model and therefore is represented in both columns. All other MCH and GPC awardees reported uniform sustainability plans for the sites that were sustaining a SS model (e.g., all sites sustained either full or partial model).

Maternity Care Home and Group Prenatal Care awardees are more likely to be sustaining their full Strong Start program; nine out of 17 maternity care home and seven out of 13 Group Prenatal Care awardees have decided to continue their full programs at all or some sites. Moreover, most sustaining Maternity Care Home awardees are also expanding their programs to additional sites or populations (Highlight Box 1).

### **HIGHLIGHT BOX 1**

### Maternity Care Home Awardees Are Sustaining and Expanding Strong Start Models

Several Maternity Care Home awardees are doing more than just sustaining Strong Start; they are also expanding health care enhancements to other prenatal sites or adapting the model for non-pregnant populations.

- ACCESS Community Health Network has extended care coordination services to all pregnant patients, regardless of payer. A key informant affiliated with ACCESS explained "The most important part of the sustainability is that most of the functions that we conceptualize through the Strong Start award are now the standard of care at ACCESS for high risk pregnancies" while another added, "[care coordination] has become such a key piece crucial to our care."
- For the Los Angeles Department of Health Services (LADHS), the "MAMA's Neighborhood" program has become the "standard of care" at all sites that have implemented to date. In other words, the target population for MAMA's has expanded beyond Medi-Cal beneficiaries to include all women receiving prenatal care at the six Strong Start sites, regardless of insurance status or type. The awardee also plans to expand the Strong Start prenatal care model to all county locations that provide prenatal care.
- Meridian Health Plan has continued telephonic care coordination for high-need pregnant women but is also including other high-need members as part of the health plan's larger care coordination efforts. The Community Health Outreach Worker's (CHOW) role has expanded to work with a broader population of Medicaid and Medicare beneficiaries, beyond maternity care patients.
- The Texas Tech University Health Sciences Center (Texas Tech) decided to expand its Maternity Care Home model to high-risk patients at all chronic care clinics as part of the health system's Strategic Plan. Under this performance initiative, community health workers will be referred to as "Life Coaches" and will provide support and referrals.
- United Neighborhood Health Services (UNHS) is using funds from a Medicaid value-based payment reform program to support care management for its prenatal population and for "high utilizers" with chronic conditions. Care managers will be present at all 12 UNHS sites, an expansion on the seven sites that were included under Strong Start.

All but one Group Prenatal Care awardee are fully sustaining the Strong Start model at some sites, or at a minimum continuing with the Group Prenatal Care programs they established prior to Strong Start without the enhancements (e.g., additional outreach staff to recruit patients for groups) added as part of the Strong Start award (Table 16). This finding is especially meaningful given that many Group Prenatal Care awardees struggled with achieving provider buy-in, finding suitable space, and enrolling patients in group sessions, among other challenges. These challenges were especially pertinent for awardees that had no prior experience with the model, and it is therefore notable that four of five awardees who began Group Prenatal Care "from scratch" are planning to sustain the full model, including three that will continue the model at all sites. University of Puerto Rico, for instance, has been particularly successful in establishing a Group Prenatal Care program under Strong Start, adopting the model for all pregnant patients (regardless of payer) as the standard approach to care while still in the intervention period. In the last round of case study interviews, key informants affiliated with this awardee reiterated their commitment to Group Prenatal Care, stating "it's our policy ... group prenatal care is [now] our model of care." None of the Group Prenatal Care awardees reported sustaining only some elements of Group Prenatal Care programs.

All Birth Center sites included in the Year 4 case studies are continuing their pre-Strong Start midwifery model of prenatal care (Table 16). As part of Strong Start, Birth Centers built on this model by adding peer counseling services to the comprehensive care provided by midwives. As evident from Table 16, most Birth Center sites have decided to continue peer counseling in some shape or form, although financial constraints meant most could do so only partially after Strong Start funding ended. For instance, one Birth Center kept the peer counselor role, but instead of offering one-on-one consultations as under Strong Start, the counseling now takes place during group sessions with minimal personal "check-in" during the third trimester. Key informants at another Birth Center also thought it was especially helpful to provide psychosocial support to pregnant patients close to their due dates and, therefore, decided to sustain one peer counseling encounter in the third trimester. The fact that so many Birth Center study sites chose to sustain peer counseling, even if on a smaller scale, indicates that sites recognized value of incorporating extra direct psychosocial support into their standard model of care. As a key informant affiliated with the AABC awardee explained, "We have heard from several sites that they are planning to continue [peer counseling]. They tend to be sites that are moderate to high volume so they have a little more cushion for having staff to do that. They see the benefit... One of the things we've learned from Strong Start, which focuses on Medicaid and CHIP populations, is that [this] population of women has more needs for support, education, relationships, and resources. I don't think that our birth centers recognized that. It's just more obvious now."

# **Post-Strong Start Prenatal Care Improvements**

Independent of their plans and ability to sustain Strong Start programs, many awardees and sites reported improvements in the way they deliver prenatal care that can be directly attributed to their experiences under Strong Start (Table 17). For instance, eight awardees decided to keep at least some elements of Strong Start data collection, primarily by adapting the risk assessment section of the evaluation's Intake Form, but a few also adopted questions from the third trimester and postpartum surveys. Several awardees highlighted the Intake Form's depression and anxiety screening questions noting that they had not been part of prenatal assessments prior to Strong Start but were helpful additions to their prenatal care approach. For instance, a key informant with Johns Hopkins University reported, "There was duplication between the preexisting intake performed by our nurses and clinicians and the Strong Start Intake Form, so [after the award period ended] sites were looking to streamline. They didn't include depression and anxiety screening [before], but things like nutrition and how many people are in the household are questions they were already asking during a new OB visit." Another will continue to assess patients using Strong Start risk criteria (e.g., prior preterm delivery or pregnancy loss, diabetes, and hypertension) and may also continue to ask patients about delivery and breastfeeding plans and satisfaction with care, akin to the Strong Start evaluation surveys.

Awardee Model of Care	Incorporated Elements of SS Data Collection (Intake Form and/or Surveys)	Continuing to Use Materials/Resources Developed or Adopted Under SS
Maternity Care Home awardees (n=17)	4	12
Group Prenatal Care awardees (n=13)	3	0
Birth Center sites (n=11)	1	5

### TABLE 17: STRONG START-RELATED PRENATAL CARE IMPROVEMENTS

Seventeen awardees, mostly Maternity Care Homes, reported they will continue to use materials and resources developed or adopted under Strong Start. The most frequently cited examples were riskscreening tools beyond the required Strong Start assessments that they began using as part of their intervention (e.g., to identify depression or substance abuse), followed by educational materials and classes, and then referrals to community resources and services. All six awardees that are not sustaining their Maternity Care Home programs reported making some type of prenatal care improvement under Strong Start that will be retained. For example, one awardee successfully standardized a breast pump referral process under Strong Start and continues to use it. Others described continuing referrals to supportive services like home visiting programs. For instance, a key informant with the Oklahoma Health Care Authority explained how she fostered a relationship with a Nurse Family Partnership program called Children First, saying, "I talked to [Children First] a lot during Strong Start to try and get some of our patients there, because their services are a lot more in-depth. Now we are trying to continue that relationship, and are referring all of our first-time moms under 29 weeks pregnant to that program if they are interested." Similarly, the two Birth Center study sites that have not sustained peer counseling are keeping other enhancements they adopted under Strong Start. One site continues to offer Medicaid clients free access to some prenatal classes, which started during Strong Start. Another site decided to build on the social support component of peer counseling by creating an "Information and Referrals" program to link patients who may benefit from additional support with available services in the community.

# Sustaining Strong Start Staff

In the previous round of case studies, awardees and sites reported that continuing to fund positions created and paid for under Strong Start was a major sustainability challenge. In Year 4, however, more than half of Maternity Care Home awardees and roughly one-third of Group Prenatal Care awardees and Birth Center sites reported that they have been able to sustain staff (Table 18). Remarkably, most of these awardees and sites are sustaining all positions in every site that participated in Strong Start.

<b>TABLE 18: SUSTAINED</b>	POSITIONS	CREATED	UNDER	STRONG START
		0	0	

Awardee Model of Care	Sustaining SS Staff
Maternity Care Home awardees (n=17)	10
Group Prenatal Care awardees (n=13)	4
Birth Center sites (n=11)	3

# Funding Sources for Sustaining Strong Start Enhanced Prenatal Care

Most awardees that reported sustaining enhanced prenatal care services implemented under Strong Start are partly or fully self-funding the services. That is, they are using internal practice or health system monies to fund the services now that the Strong Start intervention period has ended. In many cases, self-funding was characterized by key informants as an interim solution until other external sources of funding, such as grants or health insurance reimbursement, could be obtained. However, the cost of Strong Start seems to have become a more permanent fixture in the budgets of a few awardees and sites. This is particularly true for sites where preexisting staff took on additional roles and responsibilities under Strong Start that have, over time, become an integral part of prenatal care. For example, Breath of Life Birth Center in Florida used its registered nurse to provide the peer counseling services initiated under Strong Start, and key informants felt that as a result of this decision "the peer

counselor model [became] very well integrated" into their standard approach to care. Sometimes, Strong Start services were scaled back to make it possible for practices to absorb the program costs. Many AABC Birth Centers fall into this category, economizing by making peer counselor positions parttime or by conducting group sessions instead of individual peer counseling encounters. Finally, a few awardees committed to self-funding all enhancements implemented under Strong Start, including staff initially hired with Strong Start funding. These tended to be larger institutions and health systems with significant budgets that benefit from economies of scale. For instance, Johns Hopkins University has incorporated the full-time Strong Start positions into their case management budget, with a key informant explaining, "our [internal] evaluation was enough to make the case that this program has some positive returns that we can continue to build upon ... [T]he sites really didn't want [Strong Start care managers] to leave, so that helped us make the case to sustain the nine full-time employees in our budget."

A few awardees are relying on external grants or philanthropic funding to sustain Strong Start, sometimes in combination with self-funding. The most frequently cited grant used to sustain Strong Start services across all three models was the Healthy Start program.<sup>22</sup> Several awardees reported using Healthy Start funding to continue some or all services implemented under Strong Start. Other grants used for sustaining Strong Start enhancements include March of Dimes<sup>23</sup> funding and unspecified state or other grant funding. Several awardees have aligned Strong Start efforts with similar state Medicaid initiatives to continue providing enhanced prenatal care services. For example, St. John Community Health Investment Corporation is continuing some Maternity Care Home services at one site in collaboration with Michigan's Maternal and Infant Health Program, which provides home visits and care coordination for pregnant women and infants enrolled in Medicaid.<sup>24</sup> Another awardee will continue to provide enhanced prenatal care through the Prenatal High-Risk Management/Infant Services System, a case management program for their state's Medicaid beneficiaries with high-risk pregnancies.<sup>25</sup> A couple of awardees designed their Strong Start programs to address highly specialized needs among pregnant women in their communities, a feature they felt had helped them (or would ultimately help them) obtain additional funding to sustain enhanced prenatal care. Specifically, an awardee site provides Group Prenatal Care for women with opioid use disorder and was pursing substance abuse-targeted grant funding to sustain these groups more permanently (in the meantime the awardee is using internal funding to staff the groups). Another awardee began offering Group Prenatal Care sessions for women affected by the Zika virus during the height of the territory's Zika epidemic and received a grant from the National Institutes of Health to support continuation of these targeted groups of patients.

<sup>&</sup>lt;sup>22</sup> The Healthy Start Initiative, funded by Health Resources and Services Administration (HRSA), aims to reduce infant mortality by increasing access to prenatal care and other health care services and providing program participants with a range of social services and supports that address social determinants of health. For more information, see https://mchb.hrsa.gov/maternalchild-health-initiatives/healthy-start

The March of Dimes awards maternal-child health program grants to support programs working to improve the health of mothers and babies by preventing birth defects, premature birth and infant mortality. For more information, see http://www.marchofdimes.org/professionals/program-grants.aspx <sup>24</sup> For more information about this program, see: <u>http://www.michigan.gov/mihp/</u>

<sup>&</sup>lt;sup>25</sup> For more information about this program, see: <u>http://msdh.ms.gov/msdhsite/\_static/41.0,106.html</u>

Finally, a small group of awardees reported receiving support or reimbursement from Medicaid or Medicaid Managed Care Organizations (MCOs) to continue Strong Start services (Highlight Box 2). Several other awardees reported contacting MCOs and other payers to obtain support for enhanced prenatal care; however, most key informants were skeptical about the prospects of multipayer support to sustain or expand services implemented under Strong Start.

# Program Features Associated with Sustainability

Besides funding, key informants identified a number of other factors

### **HIGHLIGHT BOX 2**

### Sustaining Strong Start with Medicaid or Medicaid MCO Funding

Several awardees reported using Medicaid or Medicaid MCO funding to continue their Strong Start services:

- ACCESS Community Health Network in Illinois (Maternity Care Home) sustained care coordination services for pregnant patients through a combination of Medicaid MCO funds and private philanthropic funding.
- United Neighborhood Health Services (also a Maternity Care Home) is sustaining and expanding its Strong Start intervention through a Tennessee Medicaid value-based payment reform pilot program that began in January 2017. The pilot program provides per member per month payments to clinics for implementation of the patient-centered medical home model.
- Key informants affiliated with the Virginia Commonwealth University reported that Virginia Medicaid now pays an enhanced reimbursement rate for Group Prenatal Care, which is helping the awardee sustain its Strong Start program.
- Amerigroup Corporation (the only Group Prenatal Care awardee organization that is a Medicaid MCO) received approval from the Louisiana Medicaid agency in 2015 to provide enhanced reimbursement for group care (approximately an additional \$50 per participant per session) to providers in its MCO network. The awardee has been hopeful that the enhancement would improve provider buy-in, support sustainability activities, and improve enrollment numbers in Group Prenatal Care. But one Strong Start provider site interviewed for the Year 4 case studies suggested that, to date, enhanced reimbursement was having only a negligible effect because only a small portion of its pregnant Medicaid beneficiaries were enrolled in Amerigroup (versus other MCOs not offering the enhancement). Another key informant noted that their health system had not yet completed the "paperwork" necessary to receive the extra payments. It is also possible that other (non–Strong Start) in-network providers may still be unaware that enhanced reimbursement exists.

as critical to their ability to sustain Strong Start services (Table 19). For example, many staff and providers considered leadership and organizational support as key factors in their ability to sustain programs. They highlighted the importance of broad buy-in from all levels. Front-office staff and providers who fully embrace a program can more effectively advocate for its sustainment, and executives who believe the program is valuable may be more willing to allocate internal resources or leverage connections with health plans and other external funders. For example, five of the nine Maternity Care Home awardees that are sustaining Strong Start programs in all or some sites are fully self-funding the ongoing operation of their programs and in each case, key informants cited leadership support as critical in keeping the programs operational. For instance, key informants from Los Angeles Department of Health Services, which is using county funds to sustain and expand the program, explained, "The argument [for sustaining Strong Start] was easier for us because there was already this acknowledgement that prenatal care is not only a doctor's visit. That gave us a spring board. The leadership in the county here really understand healthcare in a social context... Having an appreciation of the interplay between physical mental and social health was an important framework that not all [regions] have." Wholesale organizational buy-in and commitment to the program may be particularly important for smaller organizations, such as Birth Centers, that are often freestanding (i.e., not associated with a major health system), nonprofit entities with limited resources. Key informants at one Birth Center staffed by a single midwife, recognized that, in the absence of external funding from Medicaid or other sources, sustainability boils down to a commitment of the center to paying for the enhanced services out of practice revenue.

Common Sustainability Facilitators			Common Sustainability Challenges	
•	Secured funding to continue program (e.g., grants, institutional funding, Medicaid or MCO support) Leadership and organizational support Data showing Strong Start's positive impact	• • • •	Lack of ongoing funding Absence of leadership/organizational support Continuous implementation problems throughout award period Loss of key Strong Start personnel or "program champions" during award period (e.g., staff turnover) Inability to integrate Strong Start with medical residency programs Overlap with other programs (i.e., service redundancy)	

# TABLE 19: FACILITATORS AND CHALLENGES RELATED TO STRONG START PROGRAM SUSTAINABILITY

Many key informants also noted that data showing Strong Start's impact on maternal and newborn outcomes and health care costs is instrumental in making the case for program sustainability. However, only a few awardees interviewed in Year 4 had used such data to inform efforts or decisions about sustainability. According to key informants with one awardee that implemented a Maternity Care Home and Group Prenatal Care, internal Strong Start evaluation results were responsible not only for keeping the Strong Start program intact but also expanding the care coordination model to all high-risk chronic care patients (pregnant and nonpregnant). Other awardees similarly stated that leadership support for Strong Start would not have been achieved without data demonstrating cost savings that supported a business case for their model. At the University of Kentucky Research Foundation, for instance, improved outcomes for targeted subgroups such as women with opioid use disorder contributed to the decision to keep the program at some sites. One key informant said, "We have looked at outcomes of the program, we did some internal evaluation, and we find that in those subpopulations there is a reduction in preterm birth, improved patient satisfaction, and improved breastfeeding."

# **Common Reasons for Not Sustaining Strong Start**

Lack of funding was the most frequently cited reason for not sustaining Strong Start (Table 19), particularly among awardees and sites that acquired additional staff to implement their programs and were unable to keep new hires on after Strong Start ended. In a few cases, the lack of financial support for continuation of services was connected to broader external factors. For example, the only state Medicaid agency operating a Strong Start award, discontinued its Strong Start activities because the state was facing a significant budget shortfall. A state's Medicaid program postponed implementation of Regional Care Organizations (locally-led MCOs), which was expected to be the major funding source for sustaining one awardee's Maternity Care Home model. Another awardee operated three sites with prenatal care practices that were bought by a large Federally Qualified Health Center network that was not interested in continuing the sites' Group Prenatal Care approach despite staff support and patient satisfaction with the model. Just as organizational buy-in and leadership support are important for program sustainability, the absence of this support was often observed by key informants as the most important internal contributor to their inability to continue Strong Start operations. For instance, key informants at one of the sites associated with the Providence Hospital Foundation felt that lack of support for their Maternity Care Home effort on a larger, organizational level undercut efforts to raise funds to sustain enhanced services. Similarly, two awardees reported lukewarm interest from leadership as the main factor preventing continuation of Group Prenatal Care. While key informants at the Medical University of South Carolina (MUSC) also thought lack of organizational buy-in was the main reason for not sustaining their Maternity Care Home model, they attributed failure to capture provider attention partly to program design, where care coordination was delivered mostly telephonically and therefore was not apparent to many providers. An MUSC team member explained, "Providers weren't aware of what we were doing because they didn't see us every day. I met with [Strong Start participants], some in person, and then providers realized who I was a little bit more because they saw me...but I think there was an invisibility to our program because it was telephonic."

A range of other nonfinancial reasons that contributed to decisions not to sustain the Strong Start program emerged from the Year 4 case study interviews, particularly among sites implementing Group Prenatal Care. Some struggled with program implementation during the entire intervention period and therefore opted to discontinue it after the Strong Start award was over. For example, one of four sites operated by a Group Prenatal Care awardee consistently had low Medicaid patient volume, which hindered both enrollment efforts and ability to form sizable Group Prenatal Care cohorts; this prompted the site to discontinue the model. A site operated by another awardee faced similar challenges with low participation in Group Prenatal Care; enrollment in last group held as part of Strong Start was so low that the group had to be canceled. Group Prenatal Care awardees often emphasized the importance of robust enrollment (as well as attendance) for program sustainability, since enrollment is key to comparing the model's cost-effectiveness against traditional prenatal care. In other words, a certain number of patients must attend a two-hour group prenatal care session to make the model as cost-effective as (or potentially more cost-effective than) the traditional care approach, whereby a provider would see each of those patients for a shorter, one-on-one visit. The costeffectiveness of Group Prenatal Care also depends on provider-level factors, such as the type of prenatal care provider (and reimbursement level) and the average length of a one-on-one prenatal visit. Medicaid reimbursement for midwives is sometimes lower than physician reimbursement (as explored in the next chapter on Medicaid maternity care policies) and prenatal visits with midwives are typically longer; it follows that Group Prenatal Care may be more cost-effective for Birth Centers than for traditional OB settings.

Losing key Strong Start personnel or a program champion and high stuff turnover/low buy-in were contributing factors in in the discontinuation of two Group Prenatal Care sites operated by the Amerigroup Corporation, where a key informant who had left the program for another position reported, "If I had stayed, I know they would have continued Group Prenatal Care for longer. But [the clinic ended the program] because they knew they would have to bring someone new in, and train them." Another Amerigroup site decided to discontinue the model primarily because of concerns that medical residents (who conducted group sessions) were not seeing enough patients to meet residency requirements, especially when group sessions were poorly attended. Finally, several key informants thought that Strong Start enhancements overlapped with their usual model of care or other initiatives, and were therefore not worth continuing as a separate effort. For instance, key informants at one Birth Center felt most of the education covered by the peer counseling encounter in the third trimester. A Maternity Care Home awardee in Alabama is not sustaining Strong Start and Steps Ahead,<sup>26</sup> provide similar services.

# Awardee's Sustainability Experiences May Change Over Time

While the research team obtained rich data on Strong Start sustainability as part of the Year 4 case studies, this analysis provides a snapshot in time. Though more than half of awardees and Birth Center study sites had secured funding to sustain some or all of their Strong Start programs at the time of our final round of interviews, it often was unclear whether those funds would keep programs operational in the long term, particularly when they relied on external grants or philanthropic support (often one-time, temporary funding sources). Even in situations where internal funds are used to support programs, a decline in revenue or other fiscal constraints may put sustainability plans in peril. Furthermore, a few awardees stated that uncertainty about future Medicaid financing and the possibility of ACA repeal made planning for long-term sustainability of programs like Strong Start difficult. On the other hand, many informants at sites that reported not sustaining Strong Start expressed hopes and plans to continue their pursuit of grant funding and payer support, and in some cases leadership buy-in, to bring the enhanced services back. Thus, it is possible (even likely) that the composition of awardees and sites sustaining or not sustaining Strong Start services will change in the future.

# AWARDEE PERSPECTIVES ON PROGRAM OUTCOMES

Strong Start awardees had a final opportunity during the Year 4 case study interviews to share their perceptions of whether and how their programs had influenced maternal and newborn outcomes. Overall, most awardees made a similar assessment of Strong Start outcomes in Year 4 as they had in Year 3, when the evaluation's case studies included an in-depth exploration of several key outcomes that Strong Start programs had the potential to influence (Hill et al. 2017). That is, their opinions were mixed on whether Strong Start enhancements had directly influenced maternal and infant health outcomes, with some key informants feeling confident the program had had such an impact and others less certain. However, the clear majority continue to believe that their efforts have improved the provision of prenatal care and the well-being of pregnant women by nurturing trusting provider-to-

<sup>&</sup>lt;sup>26</sup> For more information about this program, see <u>https://www.stepsaheadprogram.com/</u>
patient and patient-to-patient relationships that allowed programs to better address the psychosocial needs of their clients.

## Preterm Birth and Low Birthweight

Most Maternity Care Home and Group Prenatal Care awardees perceive that Strong Start improved rates of preterm birth and, consequently, low birthweight. Some qualified their responses to focus on improvements specifically for a high-risk population, such as women with a history of preterm birth or with substance abuse disorders. Some awardees also compared rates for Strong Start participants favorably to those for Medicaid beneficiaries overall or for their city or state. Awardees commonly reported that Strong Start enhancements, such as better nutritional education or screening and referrals to address psychosocial needs and stressors (e.g., intimate partner violence, food insecurity, depression, anxiety), would ultimately lead to improvements in preterm and low birthweight rates.

Birth Center sites were pleased with their relatively low rates of preterm birth and low birthweight, which they largely attributed to care provided by midwives. They highlighted that prenatal visits with midwives are typically longer than those with physicians, allowing more time for education and discussion, which in turn reduces stress and helps patients feel more supported. In addition, a few Birth Center sites noted that medical risk factors disqualified certain higher-risk patients from giving birth (and sometimes receiving care) at the center; these factors might include history of preterm birth, past C-section, or diabetes controlled with insulin. In other works, Birth Center outcomes also reflect serving a medically lower-risk population at most sites.

Though most Birth Center sites did not feel comfortable attributing preterm birth or low birthweight improvements to Strong Start's addition of a peer counselor in particular, a few felt the peer counselor was instrumental in improving participant nutrition, which they felt could have affected outcomes. They noted that peer counselors taught participants about the importance of good nutrition during pregnancy, and connected women with community resources such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program.

# **Breastfeeding Initiation**

Key informants across models felt that Strong Start services had positively influenced breastfeeding initiation rates. Birth Center sites reported that their standard model of birth center and midwifery care include breastfeeding-supportive activities such as staff trainings, frequent discussions with patients about breastfeeding, and education and support to patients, sometimes in the form of free classes. Maternity Care Home and Group Prenatal Care awardees were more likely to attribute better breastfeeding rates to services added under Strong Start. For instance, many Group Prenatal Care awardees attributed increasing rates to the breastfeeding education built into the *CenteringPregnancy* curriculum. One key informant from the University of Kentucky described how the extra emphasis on breastfeeding may have influenced breastfeeding initiation, saying, "In traditional care, we give them information about breastfeeding, but in group we went over it and had our lactation consultant come in and talk to them about it. So the extra education was helpful." Group Prenatal Care awardees also felt that women got encouragement to breastfeed or had more realistic expectations about breastfeeding because of their interactions with experienced mothers in their cohort. At the same time, some awardees acknowledged that increases in breastfeeding may be a result of institution-wide initiatives.

For example, hospitals affiliated with a number of awardees gained *Baby Friendly* certification, or were working toward it, during the Strong Start award period. These awardees felt that new in-hospital supports and policies may have been responsible for women attempting to breastfeed and were less sure about Strong Start's specific contribution.

## Health Care Visit Attendance

As in Year 3, some awardees observed that Strong Start participants were more likely than other Medicaid patients to return for care throughout pregnancy and into the postpartum period. For example, key informants the Florida Association of Healthy Start Coalitions (a Maternity Care Home) reported that Strong Start patients were more likely to receive care at one practice throughout their entire pregnancy, rather than transferring care to another practice or being lost to follow up (Highlight Box 3). Two other Maternity Care Home awardees noted that Strong Start participants were more likely than other patients to attend their appointments, especially the postpartum visit. These awardees thought that Strong Start helped participants feel more connected to the health system, and appointment reminders from a care manager—as well as assistance to address barriers to care such as transportation—led to better attendance. Similarly, key informants with a Group Prenatal Care awardee observed better patient retention and thought Strong Start participants were more eager to attend group sessions because they enjoyed developing social bonds with other patients and personal connections with providers.

## **HIGHLIGHT BOX 3**

## Strong Start Improves Postpartum Visit Attendance

During the case studies, many Strong Start awardees described challenges with low attendance at postpartum visits. Postpartum patients sometimes neglected to schedule an appointment or did not show up at their postpartum visit. The Strong Start program helped some awardees make improvements in this area, including the Florida Association of Healthy Start Coalitions (FAHSC). Prior to implementing Strong Start, FAHSC sites reported postpartum visit attendance rates that were as low as 50 percent (a similar rate was reported for Medicaid beneficiaries statewide). In comparison, across FAHSC sites, 79 percent of Strong Start participants completed postpartum visits, with site-level rates ranging from 63 to 90 percent. Program staff observed that at many sites, traditional prenatal care patients did not have much opportunity for provider continuity, partly because of an ongoing rotation of OBs between sites. With Strong Start, FAHSC added a care manager (called a Maternal Health Specialist or MHS) who met with participants to provide education and psychosocial support throughout their pregnancies. The MHS added a measure of continuity and emotional connectedness to FAHSC sites' prenatal care approach, and increased the chances that a patient would schedule and attend a postpartum visit. As one key informant said, "The face-to-face visits [that participants had] with the MHS, I think that's where you make relationships. I think that's why the postpartum visit rate is fairly strong, because they had a relationship with the MHS."

## **Better Preparation for Labor and Delivery**

A small number of awardees, mostly those implementing Group Prenatal Care, mentioned better preparation for labor and delivery as a notable positive outcome of Strong Start. For instance, key informants at several group care awardees noted that labor and delivery nurses could often identify women who participated in Strong Start because the women were more prepared and asked more informed, knowledgeable questions. Birth Center sites also felt Strong Start participants were well prepared for labor and delivery, and this was typically attributed to time spent on education and discussions with midwives during prenatal visits. However, at least one center reported that it was the peer counselor that had played a key role in helping women prepare for labor and delivery by discussing what to expect and compiling and sharing online resources for women to review.

## **Health Care Cost Savings**

Most key informants affiliated with awardees across all three models thought Strong Start led to cost savings, though their observations were generally based on anecdotal evidence and perceptions of improved physical and psychosocial outcomes among patients. Among those reporting likely cost savings because of Strong Start, only three awardees had conducted internal studies (Highlight Box 4).

#### **HIGHLIGHT BOX 4**

#### Strong Start Awardees' Internal Studies Show Health Care Cost Savings

Three awardees reported conducting their own studies of cost savings associated with their Strong Start programs. The University of Puerto Rico (Group Prenatal Care) conducted its own evaluation and is publishing an article reporting savings of \$3.7 million related to reduced preterm births and NICU costs. The Harris Health System's study reported that Strong Start and the *CenteringPregnancy* model of Group Prenatal Care led to \$1 to \$2 million in savings, mostly as a result of avoiding NICU stays, which the awardee estimates cost an average of \$40,000 per premature baby. Finally, the Texas Tech University Health Sciences Center's Maternity Care Home model found lower NICU admission rates and shorter NICU length of stays among newborns, as well as wider, healthier birth spacing related to greater use of LARCs.

Overall, awardees who attributed cost savings to Strong Start indicated that education about pregnancy and childbirth and consistent contact with a Strong Start care manager (if included in their intervention) were instrumental in improving outcomes that contributed to cost savings. They observed that information about nutrition, exercise, smoking cessation, and stress reduction helped women have healthier pregnancies. Strong Start may have also prevented unnecessary visits to an emergency room. Two Group Prenatal Care awardees indicated that information provided in group sessions may have reduced unnecessary emergency room visits. For instance, a key informant from HealthInsight noted, "I think that Group Prenatal Care probably keeps women out of the ER. We are good about educating on signs and symptoms of labor, so it likely saves trips there. Women also call the clinic less with questions because they get the information in the groups." Similarly, key informants from a Birth Center site (the Best Start Birth Center in California) felt that education reduced C-section rates, unnecessary emergency room visits, and hospital transfers during labor for patients generally (including those in Strong Start). A key informant from Best Start explained, "We make sure they are at a level where they don't have to be transferred [during labor] to a hospital. We work hard on that. I feel like that does reduce C-sections. If they have a breech baby, manipulating the baby...can help. The education we give

them can also help reduce the transfer rates. We give them a book on natural birthing. We give them information on how to do exercises to get the baby back down from breech. We also provide childbirth education classes."

Several awardees and sites identified other potential factors that may be associated with lower health care costs. Key informants from one Birth Center site felt improved connections between patients and providers resulted in more trusting relationships, which likely encouraged patients to make and keep follow-up appointments, adhere to recommended diet and lifestyle changes, and follow guidance for self-care. This may, in turn, have contributed to improved maternal and newborn infant outcomes. Another Birth Center site (which gives patients a choice between birth at the center or planned hospital birth) reported that contact with peer counselors led more women to choose a birth center delivery, resulting in cost savings; compared with hospital-based births, birth center deliveries are associated with lower costs.

In summary, awardees identified a range of improved outcomes that could lead to health care cost savings, including lower C-section rates, less unnecessary emergency room use, fewer NICU stays, reduced hospital length of stay for mothers, reduced hospital readmissions, delivering at a Birth Center rather than at a hospital, and better rates of breastfeeding rates and birth control use. Some also mentioned the cost savings that may have resulted from addressing participants' social and psychosocial needs through, for example, mental health support and treatment and reducing stress related to relationships (including domestic violence), homelessness, food insecurity, substance abuse, and past trauma.

## Improvement in Health Care Provider Processes

Though not as commonly observed as improvements in maternal and newborn outcomes, several awardees felt their Strong Start programs had spurred improvements in the way they delivered care.

- Team Approach: The overall team approach that some awardees adopted to implement Strong Start has reportedly had a positive influence on patient care. For instance, some awardees felt that providers worked more collaboratively under Strong Start, with a common goal of addressing all patient needs (both medical and psychosocial). One awardee noted that delving into the needs of Medicaid enrollees can be "a Pandora's box" (i.e., examining one area of need can uncover other needs, and addressing these needs may require more time and resources than initially expected) and emphasized that Strong Start helped orient prenatal care providers and other staff to the concept of meeting a patient's needs comprehensively and coordinating care.
- Referrals to Community Resources: Especially for Birth Center sites and Maternity Care Homes, the Strong Start program reportedly often resulted in an improved system of referrals to community-based services, including behavioral health services, housing, and food-related services or programs (e.g., WIC, food banks). In many cases, these relationships between prenatal care and other services did not exist prior to the program. For example, some Maternity Care Home awardees felt Strong Start prompted their sites to forge stronger links to community resources including mental health services. One key informant from Maricopa Special Health Care District noted, "Our facility can only do so much, and we can't provide everything that patients may need. We could refer them to WIC, to home health visits, to

emergency shelters or domestic violence resources, to food banks, to mental health or behavioral health counseling and services. That helped a lot, that we could connect them to help they needed." Another key informant with United Neighborhood Health Services (also a Maternity Care Home) explained, "We have some really good community programs here. That took some of the load off our support staff. They could send patients to existing programs, we didn't have to reinvent them... If you have good programs in the community, that helps to support the Strong Start program."

Use of EMRs: A few awardees used EMRs to facilitate communication between providers and patients and among staff about Strong Start participants, and to recruit patients into the program (Highlight Box 5). Communication among staff members improved in some cases where Strong Start staff had access to the EMR because all staff and providers could leave notes in the system. Two awardees mentioned that patient-provider communication and patient health literacy improved because Strong Start care managers encouraged program participants to use online patient portals to send messages to their nurse or doctor, access their records, get lab results, and receive text messages confidentially. This was especially valuable for patients who would respond to texts but not phone calls. Another awardee mentioned that because the EMR documents information on various patient concerns and needs (beyond medical), EMR use under Strong Start also encouraged providers take a more holistic approach to care.

#### **HIGHLIGHT BOX 5**

#### Using Electronic Medical Record (EMR) Systems to Improve Prenatal Care

EMRs played an important role in some Strong Start awards. Several awardees indicated that EMRs facilitated communication between providers and helped all providers involved in the patient's care stay up to date, which improved the quality of prenatal care. For instance, a key informant from Signature Medical Group (a Maternity Care Home awardee) said, "The EMRs have been important in keeping the communication going. If I get a call after hours, and a patient's experiencing a mental health crisis, I have a way of getting a hold of that office and letting them know immediately with EMR documentation so that no matter who [interacts with the] patient next, they will be aware of what's going on or have a heads up. Or if I'm not able to contact a patient and am not going to be at the office during their next visit, there's going to be a note that pops up for other doctors saying, 'I have not been to get a hold of this person. What is going on? How can we get this person to reengage?' [The EMR] really provides fluid, open communication that is so crucial to providing the best level of care for our patients."

The EMR also helps patients communicate with their providers. One key informant from Maricopa explained, "We also use a patient portal, [the Epic EMR system's] 'MyChart.' Once the patient registers, they can make appointments, they can communicate and send messages to the doctor or nurses, and they can access their records once they are released by the provider. For example, they can see lab results." Some Strong Start programs actively encouraged participants to use Patient Portals as part of their patient education and engagement activities.

As noted in the Sustainability discussion above, some Strong Start awardees discontinued enhanced prenatal care at the end of the award period. The Year 4 case studies examined whether eliminating Strong Start services had resulted in any perceived changes to outcomes. Most awardees that had ended services reported that outcomes had not changed or said they lacked data to determine whether outcomes had changed. Others felt it was too early to assess such changes. However, two awardees described differences that may point to future changes in outcomes. One awardee that ceased providing Maternity Care Home services six months prior to the case study interviews observed a decline in mental health referrals and visits to their walk-in prenatal psychiatry clinic, services that Strong Start care managers had encouraged and followed up on. A Birth Center site that stopped oneon-one peer counseling but retained group classes and sessions described being unable to meet clients' varied needs to the same degree as was possible through personalized counseling. Key informants from that site observed that women do not "open up" in group settings as much as they did during one-onone encounters, which limits providers' ability to identify and address needs.

In addition, one awardee (which incorporated most Strong Start enhancements into their basic model of care) noted that patients have described their experiences as less satisfying since Strong Start ended. Another awardee, which also retained most Strong Start enhanced services but discontinued outreach to recruit the Medicaid population specifically, stated that lower enrollment in Group Prenatal Care among Medicaid beneficiaries was the only adverse outcome they had observed since the program's end.

# **KEY FEATURES OF STRONG START PROGRAMS**

For each round of case studies, the evaluation team has explored a subset of program features that may contribute to successful Strong Start implementation, participation, or outcomes. The Year 3 case studies, for instance, examined outreach and enrollment approaches, use of 17-alpha-hydroxyprogesterone caproate (17P) to reduce the risk of preterm birth, and the family planning care provided at Strong Start sites.<sup>27</sup> The program features examined during Year 4 included:

- Health care provider continuity.
- Key elements of the *CenteringPregnancy* model used in varying degrees by all Group Prenatal Care awardees.
- Strong Start care manager qualifications and encounters.
- Birth Center features that may appeal to a range of patients.
- The role of aspirin for treating women with risk of preeclampsia.

Each focal area is discussed in the following sections.

<sup>&</sup>lt;sup>27</sup> The Year 1 report focused on implementation elements and challenges, and the Year 2 report focused on myriad elements including eligibility, care coordination, health education, recruitment and retention.

## Health Care Provider Continuity

Research evidence indicates that having a continuous medical provider improves patient-clinician relationships and results in improved clinical outcomes (Saultz and Lochner 2005; Sudhakar-Krishnan and Rudolf 2007). Case study key informants agreed with this principle, generally noting that greater maternity care continuity would improve patient experience, attendance at visits, and potentially health outcomes. In most Strong Start settings, however, it was not common for participants to have a continuous provider for pregnancy, delivery, and postpartum care. The challenges this presented varied by Strong Start model, but key informants across the three models agreed that Strong Start had still succeeded in improving continuity of care because participants had either a single care manager or peer counselor (Maternity Care Home, Birth Center models) or a consistent group facilitator (Group Prenatal Care model) throughout pregnancy.

Group Prenatal Care awardees found their enhanced prenatal care approach improved continuity during the prenatal period because the same provider served as group facilitator throughout pregnancy. This differed from traditional prenatal care offered at the sites, which generally involved patients seeing several different providers over the course of the pregnancy. Meeting with the same facilitator (and typically the same co-facilitating provider who also conducted brief one-on-one medical exams) for all group sessions reportedly promoted participants' willingness to share feelings, confidence to ask questions, and group bonding. A key informant at Texas Tech University Health Systems said, "It makes a difference if they see the same provider over and over, gives them comfort."

Provider continuity for Group Prenatal Care participants typically did not extend to delivery or postpartum care, however. Among sites implementing this model, the provider attending delivery often depended on the on-call schedule, and at some sites none of the Group Prenatal Care providers attended births. Some awardees addressed this issue by making sure group members were aware in advance of the low likelihood of provider continuity for delivery; others used a group session to introduce group participants to the other providers at the hospital who may be on call for their deliveries.

Because the Group Prenatal Care model typically did not include a postpartum session, participants would often see a different provider for postpartum care in a traditional one-on-one visit. At a few sites, participants could choose their Group Prenatal Care provider for the postpartum visit, and one awardee reported having group sessions for the postpartum visits. At others, group participants were more likely to see their group provider if the postpartum visit could be coordinated with a cohort's "reunion" gathering (an optional event that some sites organized), but neither of these scenarios was typical. One awardee reported that postpartum visit attendance improves if the prenatal care provider was also present at delivery.

At most Maternity Care Home sites, continuity of obstetrical care providers was minimal throughout the maternity period, which made continuity of the Strong Start care manager all the more important, according to key informants. "The care coordinator is the only one who follows the patient all the way through," reported a key informant at Los Angeles County Department of Health Services. Whether sites were teaching hospitals or neighborhood clinics, attending physicians, medical residents, or midwives generally rotated during prenatal care, and deliveries were attended by whichever provider was on call at the time. At a few sites, patients delivered at hospitals where their prenatal providers did not have admitting privileges. A few awardees tried to promote continuity when feasible (Highlight Box 6), but these were exceptions.

#### **HIGHLIGHT BOX 6**

## Strong Start Maternity Care Homes Make Efforts to Enhance Provider Continuity

Some Maternity Care Home awardees reported efforts to enhance provider continuity for maternity care patients. While many awardees have residency programs whereby deliveries are attended by the resident on call, Maricopa Special Health Care District and United Neighborhood Health Services tried to arrange for Strong Start participants to see the same provider throughout pregnancy and for their postpartum care.

Signature Medical Group treated Strong Start participants as they treated commercially insured patients, and provider continuity varied by site. At some Signature practices, maternity patients see the same physician throughout their care, while at others, patients rotate among providers. Patients scheduling a C-section or induction have more flexibility to choose the provider that will attend their delivery. All maternity patients can choose their postpartum visit provider and select the provider who was present at delivery.

Though provider continuity remains a challenge at Los Angeles County Department of Health Services (LADHS), at one site, low-risk women are often able to see the same midwife throughout their pregnancy. LADHS' Strong Start program has made efforts to increase continuity of care for women who transfer care to higher risk sites midway through pregnancy through integrated care teams whereby providers work at multiple sites. Women who transfer from a low-risk to high-risk clinic may be able to see a provider they've seen before.

The Strong Start Maternity Care Home care managers were the people who provided continuous care to Strong Start participants, and key informants described this as critical for promoting trust and information sharing. Recognizing the importance of these ongoing relationships, one awardee began to have individual care managers serve multiple sites so that a woman could keep her care manager even if she needed to transfer to a site for higher-risk prenatal care midway through pregnancy. A consistent care manager can also reduce misunderstanding or mixed messages related to seeing multiple providers. A key informant at a Florida Association of Healthy Start Coalitions' site noted, "We're at a practice that has providers rotate through offices. That can be confusing for the patient, and the [care manager] needs to help address that confusion."

The Strong Start Birth Center sites typically rotate midwives during prenatal visits so that women will be familiar with all midwives who could be on call for attending births. Key informants noted that even under this approach, Birth Center clients are able to form good relationships with multiple midwives because their appointments are typically longer than traditional prenatal care visits (e.g., 30-60 minutes compared with 5–15 minutes). In other words, a birth center patient may spend more time with each midwife she sees than a traditional OB patient spends with all the providers she sees in total. At two of the 11 Birth Center sites studied in Y4, a sole nurse midwife/owner provides "pure"

continuity of care from initial intake through delivery and postpartum care, but most birth centers studied in evaluation Y1 employed between three and seven midwives. At least one Birth Center enhanced continuity by ensuring that the midwife present at delivery also conducted the postpartum visit—rather than the midwife on schedule that day. At Birth Center sites where midwives did not have hospital privileges (discussed further in the Birth Center–Specific Features section), provider continuity suffered for women who needed to transfer to a hospital for delivery. One Birth Center site addressed this by having the Birth Center doula who was attending the birth remain with the woman through the hospital transfer.

All Birth Center study sites had the same peer counselor/navigator meet with a participant throughout pregnancy and postpartum. Similar to what Maternity Care Home key informants reported regarding care manager relationships, Birth Centers believed peer counselor continuity was instrumental in building trusting relationships. The ongoing relationship with the peer counselor "opened pathways and doors to better communication, to find out more of their needs," according to a key informant at Rosemary Birthing Home.

## Incorporating CenteringPregnancy Elements

Nearly all Group Prenatal Care awardees used the Centering Healthcare Institute's (CHI) approach, called *CenteringPregnancy* (Centering), or a modified version of it when implementing Strong Start. These awardees generally found that fidelity to that model was important for their program's success (Table 20).<sup>28</sup>

CP Element	# reporting this was a key element for successful GPC program
Curriculum	10
Cohort Guidelines (rec. size, group by gestational age)	8
Room setup (space, seating)	8
Snacks	5
Individual time with PNC Provider	5
Self-Care	4
Involving partners	3
Other <sup>2</sup>	7

## TABLE 20: KEY ELEMENTS OF CENTERINGPREGNANCY MODEL FOR STRONG START GROUP CARE AWARDEES (N = 12)<sup>1</sup>

Notes: <sup>1</sup>This table excludes St. John because they were no longer operating a group care model and did not comment on CenteringPregnancy in Year 4. <sup>2</sup> Other key elements reported were having two facilitators per group (and three for large groups), having adequate

<sup>2</sup> Other key elements reported were having two facilitators per group (and three for large groups), having adequate transportation, offering Spanish-speaking groups, having a provider "champion" the model, offering sessions at local hospitals or close to physicians' offices, and allowing participants to decide whether male partners could attend,

<sup>&</sup>lt;sup>28</sup> This part of the Y4 case study analysis does not include data from St. John, which was unable to fully implement CenteringPregnancy and used "Group Prenatal Care support sessions" that supplement rather than substitute for individual visits with prenatal care providers.

Specifically, most Group Prenatal Care awardees cited the importance of using the Centering curriculum, which prescribes discussion topics and related activities for each session, guidelines to form group cohorts based on gestational age (Highlight Box 7), and CHI's stipulations for a room setup with comfortable and adequate space that allows for circular seating of each woman and her support person. For example, awardees noted that forming groups of women with similar gestational age helped participants feel more connected and increased the likelihood that members would stay in touch after their pregnancies ended. Other elements deemed important by some awardees included providing snacks, ensuring individual time with a prenatal care provider (typically before the group discussion begins), encouraging self-care (such as taking one's weight and blood pressure), and involving partners.

## **HIGHLIGHT BOX 7**

## Using Community Health Workers in Strong Start

Texas Tech University Health Sciences Center (Texas Tech) implemented the Maternity Care Home model at its main OB clinic housed within the school's Medical Pavilion and at a neighborhood prenatal clinic. Two community health workers (CHWs) who underwent state-required CHW training and certification in addition to training related to Strong Start, provided referrals and psychosocial support to Strong Start participants during clinic visits, three home visits (at initial intake, in the third trimester and postpartum), and telephone calls and texts (total encounters varied based on need. An ongoing internal evaluation found that Texas Tech's Strong Start Maternity Care Home program has improved maternal and infant outcomes. According to key informants, when the awardee shared internal Strong Start evaluation results with the president of the Health Sciences Center, he was "blown away" and decided to expand the model to high risk patients at all of Texas Tech's chronic care clinics as part of the health system's Strategic Plan. Under this performance initiative, CHWs will be referred to as "Life Coaches" and will provide support and referrals to high-risk patients.

During the Strong Start implementation period, a few awardees reached out to CHI for guidance about scheduling, increasing participation, and training facilitators, or they attended CHI trainings and meetings. One awardee reported choosing a different Group Prenatal Care model initially because they found CHI certification to be too expensive. In Year 4, however, two of this awardee's site facilitators attended CHI training and program staff reported considering applying for a March of Dimes grant to implement the CHI model.

## **Care Manager and Peer Counselor Qualifications**

As noted earlier, a defining feature of both the Maternity Care Home and Birth Center models of care was the addition of an additional staff person (a care manager in Maternity Care Homes and a peer counselor at Birth Center sites) to provide care coordination and support for eligible pregnant women.<sup>29</sup> Strong Start care managers and peer counselors had a variety of qualifications and roles (Table 21). Registered nurses were the most common type of staff to fill this position in the Maternity Care Home model. Nine Maternity Care Homes and two Birth Center sites also used social workers to provide enhanced services.

<sup>&</sup>lt;sup>29</sup> Maternity Care Home and Birth Center awardees use different job titles for the people fulfilling this Strong Start-funded role (e.g., care coordinator, prenatal associate, peer counselor, prenatal navigator) but as described in prior annual reports 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 in Maternity Care Home models and "peer counselor" to refer to those individuals in Birth Centers.

# TABLE 21: STRONG START CARE MANAGER/PEER COUNSELOR PROFESSIONAL QUALIFICATIONS (MATERNITY CARE HOME AWARDEES AND BIRTH CENTER SITES ONLY)<sup>1</sup>

Strong Start Model	Advanced Practice Registered Nurse (CNM, FNP, etc.)	Registered Nurse	Social Worker	Medical Assistant	Doula	Community Health Worker	Other <sup>2</sup>	Unknown
Maternity Care Home Awardees (n=16) <sup>3</sup>	2	13	9	0	0	4	4	1
Birth Center Sites (n=11)	1	4	2	4	1	0	3	1

Notes: <sup>1</sup> Some sites reported care managers with multiple qualifications. For instance, one birth center care manager was a licensed midwife and registered nurse and another was a medical assistant, lactation consultant, and child passenger safety technician. <sup>2</sup> "Other" included qualifications such as licensed practical nurse (LPN), midwifery assistant, administrative assistant, and

<sup>2</sup> "Other" included qualifications such as licensed practical nurse (LPN), midwifery assistant, administrative assistant, and several nonspecified bachelor's and master's degree trained staff listed.

<sup>3</sup> UAB is excluded from this table. Unlike most MCH sites, no care management services were included in the Strong Start enhancements at UAB. Such services may have come from other complementary maternal and child health programs. Strong Start at UAB consisted primarily of universal screening by a nurse for depression or nutritional needs based on BMI, followed by referrals as appropriate to non-UAB behavioral health providers (with little or no follow-up to determine whether services had been delivered) and/or to a UAB dietician for typically one nutritional counseling session. Access to educational videos was also provided. Therefore, the qualifications for staff included a nurse to screen and a registered dietician for nutritional counseling.

Some of the Birth Center sites studied in Y4 used medical assistants and, in one case, a doula, reflecting the types of staff they were more likely to be available to take on the peer counselor role (as most sites implementing this model used existing staff rather than new hires for Strong Start). Only Maternity Care Homes used community health workers (Highlight Box 8), though there may have been some overlap between the roles they and social workers filled.

#### HIGHLIGHT BOX 8

#### Group Prenatal Care Cohort Size: An Important Element of Program Implementation

A few Group Prenatal Care awardees, including Albert Einstein Healthcare Network, Amerigroup Corporation, and Harris County Hospital District, reported that a minimum group size of eight to 10 participants is necessary for group care to be financially sustainable. They explained that if the groups are smaller than eight, the provider-facilitator could potentially serve (and collect reimbursement for) more patients through individual prenatal appointments during the same two-hour period.

Sites affiliated with some awardees, including Central Jersey Family Health Consortium, Inc, Texas Tech University Health Sciences Center (Texas Tech), the University of Puerto Rico, and the University of Tennessee Health Sciences Center, loosened CHI's guidelines on gestational age and combined women at different stages of pregnancy to increase group cohort size. This required some modification of the curriculum (which orders topics based in part on gestational age at each session) to ensure that topics were relevant to all participants. Texas Tech informants noted that the mix of gestational ages actually had benefits because women further along in pregnancy could give advice based on their personal experience. "The experiential factor may have been more of an enhancer than detractor," said a key informant. Since the awardee operating most Birth Center sites (AABC) designed its intervention to include addition of an individual with the title peer counselor, it is not surprising that Birth Center sites were more likely to use Strong Start staff who were qualified on the basis of being peers of the Strong Start participants (i.e., had similar demographic features or life experiences such as being Birth Center patients themselves), which key informants highlighted as important to their ability to connect with and better support participants. However, Birth Center peer counselors were not always true peers since they often appeared to be of higher socioeconomic status than participants, had more education, or had not received their prenatal care through Medicaid.

As the qualifications varied from one awardee to the next, so did opinions about which qualifications were necessary or especially valuable in the care manager or peer counselor role. Some Maternity Care Home key informants felt that it was valuable for care managers to have the clinical experience of a nurse so that they could provide medical information and triage problems, while others highlighted the social support or resources that social workers could provide. However, multiple key informants highlighted that the success of a care manager or peer counselor was more dependent on characteristics and personality of the practitioner than any degree or course of study they had completed. Personality and interpersonal skills determined the level of trust and connection they could build with participants and strongly influenced the impact of Strong Start interventions, an observation that has recurred over multiple years and across models in Strong Start. For example, one key informant at the University of Alabama at Birmingham highlighted that care managers "need to be open-minded and not judgmental." The informant added, "All they need to know is that someone cares—it cannot appear routine. They have to really know you care. Otherwise they won't tell you [sensitive personal information]. If you sit down and actually look at them and not have your back to them while you click away on the computer, they will open up."

## **Care Manager and Peer Counselor Encounters**

The mode and number of encounters that Maternity Care Home and Birth Center participants had with their care manager/peer counselor varied widely across awardees and sites (Table 22). In-person encounters were most common, with phone encounters a close second. Texting was the next most common form of contact, and only a small number of awardees or sites used email. In-person encounters generally occurred in conjunction with prenatal and postpartum visits, which was viewed as the most logistically feasible and convenient approach for enrollees and program staff alike. Phone calls or text messages were often used for appointment reminders or as an opportunity for participants to ask questions between appointments. Phone appointments occasionally substituted for an in-person meeting if a visit was missed and could not be rescheduled. Only a small number of Maternity Care Home awardees used phone encounters would ideally be in person, fostering trust and better communication. It could be hard for care managers to keep in touch with participants by phone because of challenges maintaining accurate contact information, and most awardees did not attempt to conduct their interventions primarily by phone, instead using calls for reminders or questions.

# TABLE 22: STRONG START CARE MANAGER/PEER COUNSELOR ENCOUNTERS (MATERNITY CARE HOME AND BIRTH CENTER MODELS ONLY)

Awardaa	Mode of Encounters				Typical No. of Encounters During Prenatal/Postpartum Period			
Awaruee	In- Person	Email	Text	Phone	1-2	3-4	5+	Not reported
Maternity Care Home Awardees (n=16) <sup>1</sup>	14	1	7	12	1	4	9	2
Birth Center Sites (n=11)	11	2	3	8	1	6	4	0

*Note:* <sup>1</sup> UAB is excluded from this table because they do not have a care manager. For UAB, risk assessment and dietician encounters were in person. Enrollees also had access to a mobile app separately developed by the awardee, but this wasn't universally used and only became available toward the end of the program.

Care coordinators at ACCESS noted that if a barrier or need is identified, "the ability ... to refer patients in the same space or in the same room, and immediately [after our appointment], is really important." Over the course of Strong Start, awardees and sites did show increasing interest in and use of text messaging (Highlight Box 9), as well as Facebook groups to connect women to each other. In some cases, care managers were included and participated in these Facebook groups. Use of these methods appeared to be limited to a few sites.

## **HIGHLIGHT BOX 9**

#### Strong Start Care Managers Take Advantage of Text Messaging

At the Medical University of South Carolina (MUSC), RN care managers commonly used texting to contact participants. The care managers reported that this mode of communication could be a much more reliable than other types such as telephone calls, though the volume of texts could be overwhelming at times. Texting is especially effective for checking in with patients and for appointment reminders. Some topics, such as health education and guidance or sharing and explaining test results, are not appropriate for text messaging because they require a more nuanced discussion or more privacy.

Prenatal care providers at MUSC do not generally use texting to communicate directly with patients because the only text-capable phones they have are their personal mobile phones, but care managers had access to providers' mobile numbers and sometimes texted them about patient care during nonbusiness hours. According to one provider, this texting chain of communication was a "game changer" because it resulted in much faster resolution of patient problems. Occasionally, referrals to Strong Start also were made via text, to either the program coordinator or the care managers. The targeted and actual number of encounters Strong Start participants had with care managers/peer counselors varied widely among awardees (and sometimes across sites for a single awardee). The typical number of encounters as reported during the case study interviews ranged from "one to two" to about 10. A majority of Maternity Care Home awardees (nine) reported at least five encounters as typical, while among Birth Center sites, three to four encounters was most common, followed by at least five. (Both Birth Center and most Maternity Care Home awardees designed their programs to offer a minimum of four encounters.) One awardee reported that the frequency of encounters was based on a formal risk score, and many others noted that the number of encounters was driven at least in part by each participant's level of need. The number of encounters between care manager and Strong Start participant could also vary across sites. In the case of one Maternity Care Home awardee, one site reported having a single encounter; at another, care coordination staff reported that they were in contact with Strong Start enrollees as frequently as every week.

# **Birth Center-Specific Features**

The Year 4 case studies included examination of several Birth Center features that, as seen in earlier case studies, may be factors in whether women choose the Birth Center model of care. These features included (among others) sites' options related to in-hospital birth and the pain relief and comfort measures they offer. Data included in this subsection is from the web-based survey of AABC sites and the Year 4 case study phone interviews. See Appendix F for a full description of the survey results.

# **Options for In-Hospital Birth**

During the Year 1 through Year 3 case studies, the evaluation team learned that Strong Start Birth Centers offered a variety of options for where deliveries could take place, with some allowing patients to choose between delivery at the Birth Center or in a hospital. At sites offering these two options, Strong Start focus group participants seemed to appreciate having a choice, with some saying they planned to deliver (or had already delivered) at a local hospital with Birth Center midwives in attendance. Birth Center program staff also noted that patients often choose to give birth at a hospital if that is an option. For instance, program staff from AABC's Birth and Beyond site in rural Florida explained that women in the area seek the Birth Center out because it is conveniently located and offers Medicaid-funded prenatal care, but they typically choose a hospital delivery. These key informants cited "cultural" preferences for hospital births among the center's patient population, with one reporting that "most patients are not on board with the natural [birth] process." Key informants at this site also indicated that some patients view the hospital stay (often at least two days, compared with birth center stays of 24 hours or less) as a respite from a difficult home environment. In Year 4, more than half of AABC site survey respondents (22 of 38 total respondents) reported that patients at their Birth Center can choose a planned hospital delivery.<sup>30</sup> Of those, the majority (18) said Birth Center midwives can attend hospital births, and four respondents reported that while patients can plan a hospital delivery, center midwives do not have privileges at local hospitals to attend births (Figure 17).



FIGURE 17: AABC SITES' OPTIONS FOR PLANNED HOSPITAL DELIVERY WITH BIRTH CENTER MIDWIVES, DECEMBER 2016  $(N = 38)^{1}$ 

Source: AABC site survey, December 2016.

Notes: <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown may not accurately represent the distribution of hospital delivery options among Strong Start birth center sites.
 <sup>2</sup> Four of these 15 sites reported that birth center midwives have hospital privileges and could therefore offer provider continuity in the case of an emergency transfer during labor and delivery.

Fifteen respondents reported that their Birth Center does not offer a planned hospital delivery. Of these, 11 said Birth Center midwives do not have privileges at local hospitals and therefore cannot attend hospital births even for patients transferred to the hospital unexpectedly during labor. Four of the 15 respondents reported that, though patients could not plan a hospital delivery, midwives do have privileges at local hospitals and therefore could potentially attend deliveries for patients transferred to the hospital during labor.

<sup>&</sup>lt;sup>30</sup>Part of birth center licensing and accreditation (though specifics vary by state) involves having planned protocols with back-up physicians and hospitals for transfers in the case of an emergency. Thus in effect, all birth centers will allow an "unplanned birth" at a hospital.

AABC staff interviewed for the Year 4 case studies noted that the Birth Center sites' decision to offer a planned hospital birth option depended on multiple factors, including location, the number of midwives staffing the Birth Center and their ability to provide on-call coverage for two different birth locations (Birth Center and hospital), midwives' hospital privileges, and patient volume. These staff added that some centers encounter additional challenges in developing relationships with area hospitals and securing privileges to attend births there; for instance, hospitals see the Birth Center sites as competition or are otherwise antagonistic to midwifery practices.

# Pain Relief and Comfort Measures

Birth Center sites offer an extensive range of options for pain relief and comfort measures during labor and delivery that include pharmacological and non-pharmacological options (Figure 18 and Figure 19). For instance, all survey respondents indicated that their centers offer *nonpharmacological options* for comfort and pain relief to laboring women (Figure 18), with water labor and birth reported as the most popular options among women. Breathing techniques (reported by 35 respondents), massage (34 respondents), and aromatherapy (31 respondents) are the next most common comfort measures available at surveyed Birth Center sites.





Source: AABC site survey, December 2016.

*Note:* <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown may not accurately represent the distribution of nonpharmacological comfort measures available among Strong Start birth center sites.

More than two-thirds of survey respondents (27) reported that doula services are available to Birth Center patients, though it is not clear whether the services are included as part of the center's standard package of care or whether the Birth Center simply encourages use of or helps facilitate connections to doulas in the community. This applies to the other nonpharmacological services described here as well (e.g., "availability" may imply that patients can bring their own massage therapist or aromatic oils, or that the service is provided to all patients as the part of the standard package of care). Additional nonpharmacological options for comfort and pain relief include acupressure (21 respondents) and acupuncture (7 respondents). Fourteen survey respondents selected "other" nonpharmacological measures, which ranged from sterile water injections to eating and drinking as desired during labor.<sup>31</sup>

Figure 19 shows the *pharmacological options* that respondents reported as being available via the AABC site survey. In general, availability of these options is less common, with slightly less than half of respondents (16) reporting that they are offered at their Birth Center. Of the pharmacological options examined, 62 oxide was the most prevalent option, reported by 16 respondents. Of the respondents who identified systemic painkillers or narcotics as an option available to Birth Center patients, most reported using Stadol (7), followed by Nubain (6), morphine (5), fentanyl (3), and local anesthesia (1).<sup>32</sup>



FIGURE 19: PHARMACOLOGICAL OPTIONS FOR COMFORT AND PAIN RELIEF AVAILABLE AT AABC SITES, DECEMBER 2016 (*N* = 16)

Source: AABC site survey, December 2016.

*Notes:* All 16 birth centers included in this figure provide at least one pharmacological option, nitrous oxide. Some provide other options as well. Respondents are individuals, not individual birth centers, and therefore results shown may not accurately represent the distribution of pharmacological comfort measures available among Strong Start birth center sites.

<sup>&</sup>lt;sup>31</sup> Additional nonpharmacological options reported in the "Other" category heat/cold compresses, birth sling, birth ball, rebozo, birthing inflatables, yoga positions, movement, herbs, homeopathy, reflexology, acupuncture seeds, prayer, abdominal binding, allowing patients to bring their chiropractor, and encouraging friends and family to attend as support.

<sup>&</sup>lt;sup>32</sup> Although Demerol was one of the pharmacological options presented in the survey, no respondents indicated Demerol as one of the drugs offered. "Other" painkillers offered at Birth Centers represented in the survey include Vistaril and Lidocaine gel. One respondent commented that painkillers other than nitrous oxide are available but did not know which ones specifically; another added that narcotics are typically only used for a client who is having a long prodromal labor, and yet another respondent commented that nitrous oxide is used at certified nurse midwives' discretion only.

Key informants suggested during the Year 4 case study interviews that while several sites might offer nitrous oxide and narcotics, it is likely that only a small proportion of patients choose to use the pharmacological pain relief methods offered. Staff stated, "The fact they have [nitrous oxide and narcotics] doesn't mean that 40 percent of their clients use it. It's probably around 10 to 15 percent, maybe." This aligns with data collected during previous case study years, when focus group participants generally discussed nonpharmacological measures when asked about preparation for labor and delivery, and few mentioned pharmacological options. In addition, Birth Center sites staffed only by certified professional midwives (CPMs) cannot offer narcotic pain relief because their use is not in CPMs' scope of practice. At the same time, one AABC official noted during the Year 4 interviews that Birth Center sites staffed by CNMs may choose to offer pharmacological options help some women feel more confident about pain relief at the Birth Center even though they do not have the option of an epidural.

In summary, a wide range of pain relief measures are available at AABC's Strong Start sites, including pharmacological options at some centers. In comparison, a typical US hospital provides narcotics and epidural anesthesia but may not offer any other nonmedical pain relief measures as part of standard maternity care. For instance, evaluation case study findings from Years 1 through 4 (including information provided by key informants and focus group participants) indicate that hospitals usually do not have birthing tubs for water labor and birth and that hospital-based providers often do not have extensive experience in unmedicated childbirth and pain management techniques for women who prefer to avoid pharmaceutical pain relief.

## **Role of Aspirin Treatment to Prevent Preeclampsia**

A low-dose aspirin regimen is recommended treatment for women at moderate to high risk of preeclampsia, according to the American College of Obstetricians and Gynecologists (ACOG 2016) and US Preventive Services Task Force (2014). Some materials related to these recommendations have been included in the Strong Start newsletters that were emailed to awardees weekly through the Learning and Diffusion contractor, though aspirin treatment was not found by this study to be a specific part of any awardee's Strong Start intervention.

It was challenging to assess aspirin use to prevent preeclampsia in Year 4 because key informants representing a substantial number of awardees (14 in total) were not sure of their aspirin policies. However, several Maternity Care Home (5 out of 16) and Group Prenatal Care (6 out of 12) awardees reported prescribing aspiring to women at risk of preeclampsia, though specific criteria for its use and consistency of use varied widely. Reasons to prescribe sometimes focused on compliance with ACOG recommendations, though awardees varied in their criteria for use. For one awardee, virtually all enrollees were at high enough risk to receive aspirin, and key informants reported nearly universal use. For another, moderate to severe risk that necessitated other medications would also trigger aspirin treatment. Others reported that it would be used at the provider's discretion, and they could not comment on frequency or criteria. Key informants at one site were confident that aspirin use was "standard" but were not able to provide additional detail on criteria. Reasons not to prescribe included concerns about potential side effects and about evidence of effectiveness. For instance, a key informant at one site explained that the chief obstetrician "just doesn't do anything he's not absolutely sure will work," and therefore avoided it. An awardee that provided care to a large proportion of women with

high-risk pregnancies and, where many patients were presumed to be at risk for preeclampsia, reported frequent use of aspirin with a low threshold for use. Another awardee was participating in a study of aspirin use for a high-risk population but reported that aspirin use was not currently widespread at their clinics.

Reported aspirin use for women at risk of preeclampsia was slightly lower among Birth Center sites, with only three of eleven reporting they regularly use aspirin (though respondents at four sites were unsure; Table 23). This is possibly due to a combination of factors: Birth Center patients are likely to be at lower risk than Strong Start patients overall (e.g., Birth Center participants have particularly low rates of hypertension, which is both a risk factor and primary symptom of preeclampsia), and the Birth Center model of care is often oriented toward minimizing medical intervention. For example, one key informant at the Best Start Birth Center in California noted that she prefers to try to prevent preeclampsia though changes in diet or exercise and seeks to avoid aspirin because of potential bleeding risk associated with it. She said the center does not use it "because aspirin, in my opinion, increases their bleeding. We prefer to try to prevent preeclampsia through more nutrition, like good diet and exercise kind of things. I would say we don't do that aspirin piece because we don't want them to bleed too much at their birth." Another key informant noted that a patient who does develop preeclampsia would "risk out" of Birth Center care, though this did not appear to be the case at all sites. Birth Center sites that did report using aspirin prescribed it for women with a history or other risk of preeclampsia, or who already had the condition.

Strong Start Model	Aspirin Routinely Used to Treat Pregnant Women at Risk of Preeclampsia	Aspirin <u>Not</u> Routinely Used to Treat Pregnant Women at Risk of Preeclampsia	Key Informants Unsure About Aspirin Treatment
Maternity Care Home Awardees (n=16) <sup>1</sup>	5	4	7
Group Prenatal Care Awardees (n=12) <sup>2</sup>	6	3	3
Birth Center Sites (n=11)	3	4	4

#### TABLE 23: ASPIRIN TREATMENT FOR PREECLAMPSIA PREVENTION AMONG THE STRONG START AWARDEE/SITES

*Notes*: <sup>1</sup> Mississippi Primary Health Care Association was excluded from the table because the interview was conducted before the aspirin question was added to the protocol.

<sup>2</sup> University of Tennessee Health Sciences Center was excluded from the table because the interview was conducted before the aspirin question was added to the protocol.

# **MEDICAID SURVEY**

Between August and December 2016, the evaluation team conducted a telephone survey with Medicaid and CHIP officials in 20 states where Strong Start has been implemented. The survey was designed to gain additional information about the states' Medicaid/CHIP coverage of traditional and enhanced perinatal services, payment structure, and special initiatives and incentives related to improving maternal and infant outcomes. The survey responses provide context for the policy environments in which Strong Start was implemented, including potential barriers to and supports for Strong Start efforts and goals. While the 20 states surveyed may not be representative of all states and territories with a Strong Start program (a total of 30 states, DC, and Puerto Rico), they are diverse and generally encompass the various regions and economic and political climates in which Strong Start operated (Table 24). This chapter summarizes key findings from the survey; the survey instrument is in Appendix G.

State	Strong Start Model(s)
Alabama (AL)	Maternity Care Home; Group Prenatal Care
Alaska (AK)	Birth Center
California (CA)	Maternity Care Home; Birth Center
Connecticut (CT)	Birth Center
Washington D.C. (DC)	Maternity Care Home; Group Prenatal Care; Birth Center
Florida (FL)	Maternity Care Home; Birth Center
Georgia (GA)	Group Prenatal Care
Kansas (KS)	Birth Center
Louisiana (LA)	Group Prenatal Care
Maryland (MD)	Maternity Care Home
Michigan (MI)	Maternity Care Home; Group Prenatal Care
Minnesota (MN)	Birth Center
Mississippi (MS)	Maternity Care Home
Nevada (NV)	Group Prenatal Care
New Jersey (NJ)	Group Prenatal Care
Oklahoma (OK)	Group Prenatal Care
Oregon (OR)	Birth Center
Tennessee (TN)	Maternity Care Home; Group Prenatal Care; Birth Center
Texas (TX)	Group Prenatal Care; Birth Center
Virginia (VA)	Group Prenatal Care; Birth Center

## TABLE 24: STATES AND STRONG START MODELS SURVEYED

The evaluation team requested interviews with State Medicaid Directors in each state with an operational Strong Start awardee and asked for the interviews to include state officials who could speak to the various components of the survey tool. As a result, interviews included a variety of state Medicaid and/or CHIP officials as determined by the state. These officials described policies related to payment, access and covered services for pregnant women, and additional incentives and programs aligned with Strong Start goals. The results summarized below reflect the responses and perceptions of the state officials interviewed. Responses were not independently verified except where noted. Qualitative findings from the case study component of the Strong Start evaluation are included where relevant.

# **DELIVERY MODEL**

Most pregnant women eligible for Medicaid/CHIP are enrolled in managed care organizations (MCOs) in the majority of surveyed states (16 out of 20), with fee-for-service Medicaid limited to very small numbers of women or a very limited period of time (e.g., during the choice period of MCO selection). Mechanisms by which MCOs pay prenatal care providers vary and are negotiated between the MCO and the providers; in general, state officials were not able to fully describe these arrangements.

# ACCESS TO PRENATAL CARE

Many Medicaid policies have important implications for a woman's ability to access prenatal care during her pregnancy, potentially affecting outcomes. These include policies related to the ease and speed with which women can be determined eligible for and enroll in Medicaid and receive services, the number of prenatal care visits covered, the ability to continue care with the prenatal provider a woman was seeing prior to Medicaid/CHIP enrollment, and the availability of nonemergency transportation (NEMT) for travel to appointments. Table 25 highlights some of these policies.

## TABLE 25: ACCESS TO PRENATAL CARE AS REPORTED BY INTERVIEWEES: HIGHLIGHTS

Data Elements	Ν	%
Expedited Access to Prenatal Care	20	100%
Presumptive Eligibility	12	60%
Alternative mechanism	8	40%
Continuity of Care	10	50%
Full continuity with out-of-network provider	2	10%
Continuity for certain women (based on risk or stage of pregnancy) or with time limits (30-90 days)	8	40%
Unlimited Prenatal Care Visits	17	85%
No limits/cover all medically necessary for both normal and high-risk pregnancies	17	85%
Limitations for "normal" pregnancies only	1	5%
Limitations for "normal" and high-risk pregnancies	2	10%

*Policies to provide expedited access to prenatal care are in place, and there may be opportunities to track and increase early entry into prenatal care.* State officials in all states reported the availability of expedited access to prenatal care, either through presumptive Medicaid eligibility (PE), wherein qualified entities screen and immediately enroll pregnant women who appear to be eligible, allowing them to access pregnancy-related services before their application is fully processed,<sup>33</sup> or through an alternative mechanism that similarly accelerates Medicaid enrollment for pregnant women. Alternative mechanisms reported include hospital presumptive eligibility (an optional ACA provision wherein hospitals may provide presumptive eligibility for pregnant women and others), self-attestation of pregnancy, and/or expedited processing of applications by pregnant women. While these alternative mechanisms do not provide the same overarching access to immediate care, they can protect women against the sometimes lengthy standard application processing time. Half of states were unable to report the point at which most pregnant women enroll in Medicaid among women who enroll by virtue of pregnancy. Among the others, most states reported that women typically enroll in their first trimester (7), but some reported later entry (3). The evaluation's case study findings also indicated that

<sup>&</sup>lt;sup>33</sup> This rate mirrors national numbers, where 30 of 51 states (and D.C) offer presumptive eligibility for pregnant women. Kaiser State Health Facts: <u>http://kff.org/health-reform/state-indicator/presumptive-eligibility-in-medicaid-chip/?currentTimeframe=0&sortModel=%7B%22colld%22:%22Location%22,%22sort%22:%22asc%22%7D</u>

in multiple states, late entry into prenatal care was common. While survey responses may suggest the success of presumptive eligibility and other expedited options in fostering early entry into prenatal care, there may be opportunities for closer tracking of pregnancy stage at enrollment, as best practices to ensure that women know how to access early prenatal care.

Continuity-of-care provisions vary widely by state, but there is little perceived impact on access to pregnancy-related care. State contracts with MCOs often include general continuity-of-care provisions, allowing newly enrolled members to continue accessing care from an out-of-network provider (including OB providers) for a defined period or under certain circumstances. Overall, state officials did not indicate that the absence of or limits on continuity-of-care provisions were a barrier, noting they were applicable to very few pregnant women. They indicated it would be rare for a woman to access prenatal care prior to Medicaid enrollment; more often, pregnant women delay care until after a Medicaid eligibility determination for fear that they may be denied coverage and responsible for medical bills. This misperception further speaks to the need for broad education of the public about how women can access early prenatal care.

#### Most states do not limit the number of medically necessary prenatal care visits, with a few notable

*exceptions.* Per the guidelines set by the American Academy of Pediatrics (AAP) and the American College of Obstetricians and Gynecologists (ACOG),<sup>34</sup> the expected number of prenatal care visits for a "normal" pregnancy could be as many as 17, depending on gestational age when a woman enrolls in care and at what gestational age she delivers. Expected visits for high-risk pregnancies could easily surpass this number. Most states indicated that Medicaid had "no limit" on prenatal care visits, or that coverage included as many visits as were "medically necessary." Three states reported limits on the number of visits covered for "normal" and/or "high-risk" pregnancies (FL, KS, TX). In Florida, for example, Medicaid limits payment to only 10 visits for a "normal" and 14 for a "high-risk" pregnancy. Visit limits below medical guidelines may have important implications for pregnant women's ability to access all needed prenatal care and for provider willingness to accept Medicaid, and could be associated with outcomes.

Federal Medicaid guidelines require 60 days of postpartum coverage for pregnant women, and surveyed state officials reported meeting this standard, with some indicating that postpartum coverage extends through the end of the month after the 60th day as to better align with monthly managed care enrollment and payment processes. CHIP-enrolled women do not benefit from the same federal guidelines related to postpartum coverage, however, and at least one state (OK) reported that postpartum care is not covered in CHIP. Case study findings indicated that this may be true in other states as well, and recent research by the March of Dimes also found that unless postpartum care is included in a global maternity fee, the benefit may not be otherwise covered by CHIP.<sup>35</sup>

<sup>&</sup>lt;sup>34</sup> American Academy of Pediatrics, American College of Obstetricians and Gynecologists. Guidelines for perinatal care. 7th ed. Elk Grove Village (IL): AAP; Washington, DC: American College of Obstetricians and Gynecologists; 2012. p. 109-110, 160, 192-194, 248. <u>http://www.acog.org/Resources-And-Publications/Guidelines-for-Perinatal-Care</u>

<sup>&</sup>lt;sup>35</sup> March of Dimes Issue Brief: CHIP Coverage for Medicaid Women, October 30, 2013. <u>http://www.marchofdimes.org/materials/chip-coverage-for-pregnant-women-may-2014.pdf</u>

Mechanisms and rules for nonemergency Medicaid transportation (NEMT) vary, with implications for the utility of this service for pregnant women. Case study findings revealed that lack of reliable transportation is a significant barrier to attending prenatal care appointments for many women, and the inability to take transport services with their children posed a particular barrier to prenatal care attendance for women without child care alternatives. Interviews with state officials confirmed that all states cover NEMT, as federally required. States reported various policies and procedures in terms of how the NEMT benefit functioned, though most described an advance booking requirement, often three days in advance of the appointment. Half the states surveyed did not allow children to accompany a pregnant woman in the transport vehicle.

# CONTENT OF PRENATAL CARE

The interviews with state officials focused on coverage of enhanced maternity care services under state Medicaid and CHIP programs to inform the Strong Start evaluation's understanding of variation in services across states and among programs within a state (e.g., FFS vs. MCO and Medicaid vs. CHIP). In some instances, as described below, states noted that specific coverage policies were at the discretion of the MCO and/or indicated that bundled and capitated payments result in ambiguity in terms of what services are "covered" as part of prenatal care because services are not paid individually. Despite these ambiguities, state officials provided valuable insight into coverage policies for various prenatal care services in their states. Table 26 highlights key findings related to these policies.

Data Elements	Ν	%
Full-scope coverage (not limited to pregnancy-related services)	20	100%
Coverage of Midwifery Services		
Certified Nurse Midwife	20	100%
Certified Professional Midwife	15	75%
Direct Entry Midwife/Licensed Midwife (may be CNM or CPM)	4	20%
Coverage of Non-Professional Services		
Lactation consultants	5	25%
Doulas	2	10%
CHWs	2	10%
17P Coverage of Any Type	20	100%
Covered brand name and compounded versions consistently	15	75%
Coverage policies favor a single version	5	25%
Breast Pump Coverage	15	75%
Family Planning Coverage		
All types covered without prior authorization	17	85%
Provide separate reimbursement for post-delivery LARC placement	5	25%

#### TABLE 26: CONTENT OF PRENATAL CARE AS REPORTED BY INTERVIEWEES: HIGHLIGHTS

Note: Cells that contain a dash (-) indicate that count and percentage were not provided.

**Most women receive full-scope coverage.** For women who qualify for Medicaid by virtue of their pregnancy, all states indicated that women received full-scope coverage (benefits comparable to a Medicaid beneficiary who had qualified for Medicaid by other means, rather than a limited set of pregnancy-related services only). Federal guidelines limit presumptive eligibility to pregnancy-related services, however, so some women may receive a more limited scope of services until their full application is processed. Two states (OK, TX) noted that CHIP coverage included pregnancy-related services only, and another state (AL) indicated that full scope coverage started in November 2015 (so it was not in place during the full duration of the Strong Start enrollment period).

# COVERED PROVIDER, PLACE OF SERVICE, AND VISIT TYPES

**Coverage of midwifery services varies, as does payment rates for midwifery care in comparison to physicianbased care.** All surveyed states reported covering services provided by OB/GYNs (including maternal fetal medicine specialists), family practice doctors, family nurse practitioners, and certified nurse midwives (CNM). Coverage of other midwifery professionals varied by state, which may reflect variation in states' regulations for licensure and recognition of different types of midwives.<sup>3637</sup> Only 5 states (AL, FL, NV, TX, VA) reported that they did not cover services provided by certified professional midwives (CPMs). Beyond CPM coverage, four states also reported some coverage of direct entry midwives (AK, OR [only in FFS], FL, and TX cover licensed midwives).

States were divided among those that reported payment differentials between maternity provider types (8), and those that reported no payment differentials between midwives and physicians (7), at least for their (generally limited) FFS populations. It was not always clear if this was applicable to MCOs as well. Some states reporting payment differentials indicated generally that midwives were paid "less," while others reported specific percentages (between 70 and 92 percent of the rates paid to physicians for the same service).<sup>38</sup> However, in just as many states (7), state officials reported that the MCO negotiates these rates with providers, and it is unclear whether and to what extent payment differentials exist (among physicians and midwives, as well as among MCOs for these two provider types). Likewise, state officials in five states also reported payment differentials for uncomplicated vaginal deliveries occurring in birth centers versus hospitals, though hospital rates often varied by hospital, and so a single comparison point was not available. Three states reported that birth centers received "less" than hospitals, while only two states could quantify that amount: in Minnesota, birth centers were paid 70 percent of hospital rates, while in Oregon, birth centers were paid less than 15 percent of hospital rates.

*Most states do not cover nonclinical provider services.* The most common type of nonprofessional provider covered was lactation consultants (DC, MN, NJ, VA), while coverage for doulas (MN) and community

<sup>&</sup>lt;sup>36</sup> Types of midwives are defined by their education and certification/licensure. Certified Nurse Midwives (CNMs) have degrees in both nursing and midwifery, and are certified per American Midwifery Certification Board (AMCB) requirements. Direct Entry Midwives (DEMs) are a broad category of midwives who do not have nursing education as a prerequisite for midwifery training and may be certified under various organizations. They typically work in settings outside of formal medical care facilities. The most common certification for DEMs are Certified Professional Midwives (CPMs) Ultimately, however, midwifery is regulated at the state level, and many states require their own licensure of midwives (Licensed Midwife, or LM) to practice in the state. State regulations for licensure vary greatly, and may, for instance, require CPM certification.

<sup>&</sup>lt;sup>37</sup> Types of midwives are defined by their education and certification/licensure. Certified Nurse Midwives (CNMs) have degrees in both nursing and midwifery, and are certified per American Midwifery Certification Board (AMCB) requirements. Direct Entry Midwives (DEMs) are a broad category of midwives who do not have nursing education as a prerequisite for midwifery training and may be certified under various organizations. They typically work in settings outside of formal medical care facilities. The most common certification for DEMs are Certified Professional Midwives (CPMs) Ultimately, however, midwifery is regulated at the state level and many states require their own licensure of midwives (Licensed Midwife, or LM) to practice in the state. State regulations for licensure vary greatly, and may, for instance, require CPM certification.

<sup>&</sup>lt;sup>38</sup> Required under the ACA, certified nurse midwives (CNMs) must receive equitable reimbursement for their services in Medicare (100 percent of the Medicare Part B fee schedule). Federal Medicaid regulations contain no such provision.

health workers (CA,<sup>39</sup> MN) was rare.<sup>40</sup> One state (OR) indicated no direct coverage of lactation consultants and doulas, but an enhanced provider/hospital payment indirectly covered these services.

States did not report enhanced payment rates for alternative visit types such as home or group care visits, but states do ensure access to home visits for certain situations. Twelve states indicated that home visits were covered, though often limited to certain populations (e.g., high-risk pregnant women) or delivery types (e.g., home deliveries), or with certain stipulations (e.g., only with prior authorization). States did not indicate that they cover group visits per se, but these may be provided as billed as individual visits. No states indicated that they pay enhanced rates for alternative visit types (home visits or group prenatal care visits). The lack of enhanced funding for group visits is supported by case study findings, wherein Strong Start programs providing group prenatal care indicated that they were typically billing individual prenatal care visit rates for each group participant. However, there may be instances of enhanced payment to providers by MCOs not captured by this survey. While state officials interviewed were largely unable to speak to the payment arrangements between the MCOs in the state and their providers, case study data showed that at least one MCO (in LA) was paying enhanced per person rates for group prenatal care visits to its provider network.

# COVERED MEDICATIONS AND DEVICES PROMOTING STRONG START GOALS

Most states cover both brand name (Makena) and compounded versions of the 17P treatment for women with a prior preterm birth, but a few states have policies that encourage a "preferred" version of the drug. All 20 state Medicaid programs surveyed cover alpha-hydroxyprogesterone caproate (17P), a hormone injection that can reduce risk of premature birth in women with a history of preterm birth, with few states reporting that they require prior authorization. However, policies reported by a few states seem to encourage one version over the other (with potential access and cost implications),<sup>41</sup> either by covering just one type (e.g., AK and VA cover Makena only) or requiring prior authorization for just one type and not the other (e.g., AL requires prior authorization for the compounded version only, while NV requires prior authorization for Makena only). Two additional states noted differences by delivery model: In Louisiana, Makena is covered in both FFS and MCOs, while the compounded version is only covered by MCOs. In New Jersey, Makena is covered in both FFS and MCOs, but the compounded version is only covered by FFS.

Most states cover hospital-grade and electric breast pumps, and some also cover manual pumps. Of the 15 states that provide coverage for breast pumps, all cover hospital-grade and electric pumps (usually with prescriptions and prior authorization), and nine (9) also cover manual pumps (usually without prior authorization). No states indicated issues or perceived barriers to care related to how breast pumps are dispensed, or any school/work requirements. Only four states indicated they did not cover breast

<sup>&</sup>lt;sup>39</sup> State officials in CA indicated that the state covers "Comprehensive Perinatal Health Workers," functioning similarly to a Community Health Worker, in the state's Comprehensive Perinatal Services Program (CPSP).

<sup>&</sup>lt;sup>40</sup> Doulas and community health workers are covered in MN FFS, and state officials report that MCOs "generally cover the same."
<sup>41</sup> 17P comes in two forms: a compounded version, prepared individually by a pharmacist for each patient, and Makena, a brand-name patent. Mixed opinions exist regarding the preferable version based on safety (it is disputed whether compounded versions are as "safe" as commercial medications prepared by a pharmaceutical company), access (commercially prepared medications are more widely available than those needing a compounding pharmacist), cost (the compounded version is significantly less expensive than Makena) and legality (though the FDA has asserted that compounded versions are legal and Makena does not have an exclusive patent).

pumps (AL, AK, NV, OK), with some reporting that Medicaid/CHIP beneficiaries are referred to Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) for breast pumps.

Family planning services are covered broadly in Medicaid and CHIP. LARC coverage policies do not usually preclude post-delivery, in-hospital placement, though few states (5) indicated separate reimbursement for this type of placement. Most states indicated that all types of contraception were covered (19), with no prior authorization (17) and no constraints on placement of long-acting reversible contraceptives (16).<sup>42</sup> Few states could describe reimbursement procedures for post-delivery placement of LARCs, however, including whether LARC device and placement costs would be included in the bundled payment. This policy detail has significant implications on provider willingness to place a LARC post-delivery and, in effect, can create a barrier to LARC access. Only five states (LA, TN, OK, GA, TX) indicated they provide separate reimbursement for post-delivery placement. In VA, only one of several MCO pays for immediate postpartum LARC insertion. AK covers LARC placement in hospitals but only if at least 24 hours after delivery. Payment policies that encourage post-delivery placement could help ensure that women are receiving contraception and have implications for interpregnancy intervals/birth spacing. During the evaluation's case studies, for instance, Strong Start staff reiterated the importance of immediate postpartum access to highly-effective contraception; they reported that postpartum women who left the hospital without a contraceptive method in place sometimes experienced a rapid repeat pregnancy, arriving pregnant to their six-week postpartum checkup.

# **COVERED ENHANCED SERVICES**

State officials differed on whether they considered childbirth education and nutrition counseling covered services. Since most states, as previously noted, pay global fees for prenatal care or include it in their MCO capitation rate, the traditional definition of what is "covered" as prenatal care is somewhat ambiguous. Depending on interpretation, a respondent may have felt that a specific service is "covered" since it can be included in the prenatal care visit and prenatal care visits are paid for via capitation, or that a service is not "covered" since there is no payment tied to that explicit service. Nearly equal portions of surveyed states felt that childbirth education and nutrition counseling (1) are covered; (2) are not covered services because no direct payment is provided; or (3) are not explicitly covered as a separate visit (or series of visits), but are considered part of the content of care provided at a prenatal visit.<sup>43</sup> Other states reported limited coverage for these services (e.g., as part of a case management program or only for high-risk pregnancies). These results indicate states may not be prescribing the content of prenatal care visits covered under Medicaid, and MCOs or providers may have the discretion to determine what content is provided. In addition, while all pregnant and postpartum women are eligible for supplemental nutritional assistance and nutrition education provided by WIC, just under half of states reported coordinating with WIC for this service.

<sup>&</sup>lt;sup>42</sup> ACOG recommends the availability of immediate postpartum LARCs, reporting that they have the potential to reduce unintended and short-interval pregnancy. Immediate postpartum long-acting reversible contraception. Committee Opinion No. 670. American College of Obstetricians and Gynecologists. Obstet Gynecol 2016;128:e32–7.

<sup>&</sup>lt;sup>43</sup> In a cross-analysis of whether childbirth education was considered a covered service compared to the state delivery model or payment mechanisms, no correlations were found.

Most states cover care coordination/case management and psychosocial/social work counseling that can address emotional, social, and mental health needs impacting birth outcomes, at least for women with highrisk pregnancies. The majority of state officials (17) indicated that care coordination/case management and psychosocial counseling/social work are covered services. Some elaborated that the services were provided through a specific program or limited to women with high-risk pregnancies, which may be true for most states, given that case management is generally recommended for complex patients and conditions rather than the entire population. Care coordination and psychosocial counseling/social work have wider applicability, but the extent to which these services are provided to pregnant women is not clear. Some states noted it was the MCOs' role to provide care coordination/case management, or that psychosocial counseling/social work was not covered statewide but may be covered by some MCOs (TN) or that it will be covered within the next two years (AK).

# ADDITIONAL INCENTIVES AND PROGRAMS ALIGNED WITH STRONG START GOALS

In addition to the payment, enrollment, and coverage policies that govern the provision of maternity care to Medicaid/CHIP-enrolled women, most states surveyed reported additional payment incentives and programs intended to improve delivery and timeliness of perinatal care and birth outcomes. State officials described a variety of financial incentives, perinatal performance reporting and performance improvement projects (PIPs), and multistakeholder collaboratives that align with Strong Start goals to reduce the rate of preterm births, improve the health outcomes of pregnant women and newborns, and decrease the anticipated total cost of medical care.

*Most commonly, states use incentives to promote access to and early entry into prenatal care.* Half of states reported incentives to MCOs such as pay-for-performance (P4P) programs that include perinatal indicators, generally HEDIS Prenatal and Postpartum Care measures.<sup>44</sup> A majority (9) provide direct financial incentives to MCOs that meet certain benchmarks, while some also incentivize MCOs with larger enrollment by auto-assigning Medicaid members who do not choose a specific MCO to higher-performing health plans. Four states (FL, LA, OR, TN) impose financial penalties on MCOs or providers for not meeting standards for access or early entry into care.<sup>45</sup>

<sup>&</sup>lt;sup>44</sup> The Healthcare Effectiveness Data and Information Set (HEDIS) is a widely used and nationally recognized performance measurement set. Perinatal care-related measures include the *Timeliness of Prenatal Care* (the percentage of women that received a prenatal care visit within the first trimester or 42 days of enrollment), *Timeliness of Postpartum Care* (the percentage of deliveries that had a postpartum visit on or between 21 and 56 days after delivery), and *Frequency of Ongoing Prenatal Care* (the percentage of women that had 81 percent or higher of their expected prenatal care visits, based on gestation at the time of enrollment and estimated date of delivery). <u>http://www.ncga.org/hedis-quality-measurement/hedis-measures</u>

<sup>&</sup>lt;sup>45</sup> For example, under Florida's Achieved Savings rebate, the state offers shared savings to MCOs that achieved savings targets and an additional 1 percent of revenue if they meet the contractually-specified standards for identified HEDIS measures, including Prenatal Care (PNC), Frequency of Ongoing Prenatal Care (FPC), and Postpartum Care (PPC). Under the MCO contracts, if HEDIS PNC, FPC, and PPC measures are below 50th percentile for Medicaid plans nationally, the MCO is subject to liquidated damages of \$100 per member who did not receive the service they should have received, up to the 50th percentile rate.

A few states are actively promoting 17P and LARCs. Six states indicated that they had specific financial incentives or PIPs to promote use of 17P (Table 27). Two states described (and a third state is considering) LARC-related initiatives to promote insertion training for providers and encourage post-delivery placement, indicating that some states are aware of and working to address the barriers to post-delivery LARC placement when payments are bundled.

State	Type of Initiative	Brief Description of Initiative
AL	17P Performance Improvement	Recent PIP focused on 17P. Primary contractors evaluated medical records to identify members with a previous preterm delivery and flag these cases for doctors to evaluate whether the patients should receive 17P. <sup>46</sup>
СТ	17P Financial Incentive	P4P program beginning in 2013 provided incentives to participating practices to promote wrap- around pregnancy services including 17P, but program ceased in June 2016 when funding ended.
FL	LARC Performance Improvement	Medicaid agency is collaborating on two family planning initiatives. The LARC Quality Initiative is a statewide collaborative to offer LARC services immediately postpartum or before women leave the hospital. Planners are developing processes for staffing, training, and a statewide quality improvement program for the FFS system, as well as engaging MCOs in hopes that they will revise policies to support the effort. Also, the agency's quality bureau is working with the state health department to address barriers and increase access to family planning in local county health departments.
GA	17P Performance Improvement	Medicaid quality improvement program promotes 17P.
LA	17P Financial Incentive	Medicaid ties financial incentives to 8 quality measures including initiation of injectable 17P.
ок	17P and LARC Performance Improvement	Text 4 Baby customized messaging educates at-risk women about 17P. Medicaid agency recently started a LARC initiative to address healthy birth spacing. Grant dollars are used to promote to availability of LARCs to providers and offer training to providers on placement of LARCs.
VA	LARC Performance	Medicaid recently began studying the unbundling of LARC payments for immediate postpartum insertion and expanding access to outpatient LARC insertion.

#### TABLE 27: STATE INITIATIVES AND INCENTIVES TO PROMOTE 17P AND LARC USE

Many states promote lower costs and better birth outcomes by targeting medically unnecessary C-sections, early elective inductions, preterm birth, and low birthweight. Five states (AK, LA, MD, NV, OK) reported policies of no payment or "low" payment for medically unnecessary C-sections, including reimbursing the same rate for vaginal and C-section births. Other states tie provider reimbursement to standards including a C-section rate below 35 percent for Medicaid births (FL<sup>47</sup>) and average annual risk-adjusted costs that include C-section rate (TN<sup>48</sup>). One Medicaid agency (OK) monitors providers with C-section rates of 18 percent or above, and if medical necessity requirements are not met, it reimburses the

<sup>&</sup>lt;sup>46</sup> Alabama Medicaid's Maternity Care Program contracts with primary contractors, district entities that subcontract with providers, with routine maternity services paid through global capitation, and high risk and select enhanced services paid fee-forservice. In 2017 Alabama is transitioning to Medicaid contracts with regional care organizations with kick payments for maternity care.

<sup>&</sup>lt;sup>47</sup> Beginning in October 2016 under the Managed Medical Assistance (MMA) Physician Incentive Program, Florida's Medicaid MCOs must pay enhanced reimbursement (at least equivalent to the Medicare FFS rate) to Board Certified OB/GYNs who are recognized as a Patient-Centered Medical Home by an approved accrediting body or have met national standards on HEDIS Frequency of Ongoing Prenatal Care and Postpartum Care, and has a Cesarean Section rate below 35 percent for Medicaid births.

<sup>&</sup>lt;sup>48</sup> Tennessee's Medicaid MCOs have recently begun a "retrospective risk-based payment model" and gain-sharing program whereby the provider that attends the delivery is considered the "quarterback" and is accountable for cost and quality for the perinatal episode of care. Quarterbacks receive additional payments at the end of the annual accountability period if their average risk-adjusted costs are lower than a predetermined commendable level (which is established by each MCO) and they also meet specific quality measures including C-section rate. If their average risk-adjusted costs are above a predetermined acceptable level they are required to return some of their payment.

hospital and physician at the vaginal delivery rates. Similarly, some states report no payment or low payment for early elective inductions (GA, LA, NV, TX) to encourage full-term deliveries. Only three states (KS, MD, NJ) reported tying financial incentives directly to rates of preterm births or low birthweight (Table 28).

State	Brief Description of Policy or Program
KS	P4P program in 2014 and 2015 included financial incentive to reduce preterm delivery (babies born less than 37 weeks' gestation).
MD	10 percent bonus for regular birthweight births, and reduced delivery payment if there is a second low birthweight baby.
ŊЈ	Financial incentive through performance-based contracting for MCOs that improve their preterm birth rates.

#### TABLE 28: POLICIES DIRECTLY ADDRESSING PRETERM BIRTH AND LOW BIRTHWEIGHT

In sum, three-quarters of state officials described some combination of financial rewards/penalties and programs to MCOs or providers to incentivize better access to, timeliness of, and content of perinatal care and/or outcomes and cost (in addition to two states that had incentive programs that recently ended because of lack of funding).

# **ISSUES FOR FURTHER EXPLORATION**

The survey with Medicaid/CHIP officials, in tandem with case study findings, uncovered issues critical to understanding and improving Medicaid/CHIP provision of perinatal care that warrant further study. These issues, described in detail above, are summarized here:

## **MCO Payment and Coverage Policies**

- In general, state officials were not able to fully describe how MCOs pay prenatal care providers, nor whether MCOs provided enhanced prenatal care services (such as case management, childbirth education, nutrition counseling), often noting that these decisions were at the discretion of each MCO. Further study could examine MCOs' provider payment mechanisms and provision/coverage of enhanced services, best ways for states to monitor MCO activities to ensure appropriate access for pregnant women, and the impacts of different payment mechanisms and levels of access on MCH outcomes.
- States were mixed in terms of whether they made differential payment between midwives and OB physicians, and between birth centers and hospitals for deliveries, many noting that the MCOs have the freedom to negotiate payment rates (and determine differentials or not) with providers. Case study findings revealed that payment differentials are so significant in some states (FL, SC) as to make it very difficult for midwives to provide care to Medicaid members and remain financially viable. Further studies could compare states with and without payment differentials to explore their impact on access to midwifery and/or birth center care and on birth outcomes.

## Access to Prenatal Care

- While most states reported using presumptive eligibility or expedited Medicaid enrollment for pregnant women, many respondents were unable to report the stage of pregnancy most enrollment occurs (for women who enroll by virtue of their pregnancy). Further, case study findings included some reports that women were not entering care until late in their pregnancies. This suggests opportunities exist for closer tracking of pregnancy stage at enrollment, as well as education about how to access early prenatal care via available mechanisms and the benefits of doing so.
- While most states do not limit the number of medically necessary prenatal care visits a woman can receive, a few states did impose visit limitations for both "normal" and high-risk pregnancies, which may have important implications for pregnant women's ability to access all needed prenatal care and for associated outcomes. Further study could examine the extent to which these policies impact women and prevent them from accessing needed prenatal care.
- While the state officials interviewed predominantly focused on Medicaid policy, it was revealed that access to postpartum care for CHIP-enrolled women may be a challenge. This finding is supported by the case study findings as well as other research. A more in-depth look at the availability of postpartum services for CHIP-enrolled women (whether coverage ends at delivery, whether it is included in a global maternity fee, and whether it is otherwise offered) may be warranted.
- NEMT is universally covered by state Medicaid programs and MCOs. However, the case study findings strongly suggest that NEMT coverage alone does not alleviate transportation barriers for pregnant women. In part this may be because of NEMT rules and restrictions in some states (e.g., advance booking requirement, inability to transport children). Further examination of barriers for women using the NEMT service could shed light on ways the service could be improved or alternative services provided to ensure transportation needs are met.

# **Content of Prenatal Care**

- State coverage policies are not currently supporting the group prenatal care approach via enhanced payments for group visits, but according to Strong Start sites implementing group prenatal care, smaller groups do not have the same cost-effectiveness of larger groups, and uncertainty of group size may make providers reluctant to provide this service in absence of enhanced payment. In addition, case study findings showed that using a clinical facilitator for a two-hour group session takes the provider "off the grid" in ways that even seeing patients back-to-back for two hours may not (e.g., the provider is unavailable for quick questions or consultations), which impacts practice flow. Further studies could examine how to best demonstrate to states the benefits of group prenatal care visits and appropriate coverage and reimbursement policies.
- Few states indicate that placement of LARCs in the hospital after delivery is a separately reimbursable service. Case study findings revealed that some providers will not perform this service after delivery if it is only covered as part of the bundled payment, and will instead require that women return later for a separate procedure (so that separate payment can be provided). This payment rule effectively precludes access to the provision of LARCs after delivery, when women are insured, available, and often have had an epidural that would make

insertion painless. Further exploration could consider whether this barrier to care results in fewer post-delivery LARC payments in states where the service is not separately reimbursable, whether more women are lost to postpartum follow-up in these states, and whether it impacts interpregnancy intervals/birth spacing.

## Incentives and Programs to Promote Prenatal Care and Improve Outcomes

• The survey found that states are implementing or expanding incentives to improve perinatal care through a broader movement toward value-based payments. Additional research could assess the impact of various types of incentives specifically on maternal and newborn outcomes, to determine the most successful models or "best practices" that can be shared broadly.

# **TECHNICAL ASSISTANCE AND DATA ACQUISITION**

# INTRODUCTION

The 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 premature birth rates, low birth weight occurrences, and Medicaid costs through pregnancy and the first year after birth. The TA task is designed to "meet states where they are," either by facilitating the transmission of these data to the Urban Institute so that they can be linked, or by assisting states to conduct the linkage of these data sets themselves. Building on the progress made in prior years, during Year 4 we continued to (1) build and nurture 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; and (4) facilitate the transfer of data from state agencies to Urban.

# SUMMARY OF PROGRESS: DATA APPROVAL AND RECEIPT

In general, 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 infant health outcomes and participating in an evaluation that is designed to support this goal.

By the end of Year 4, we were productively 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 in two states, Tennessee and Texas, the only states that have large numbers of Strong Start enrollees insured through that program. In four states—California, Maryland, Nevada, and Virginia—if negotiations are completed successfully, the evaluation will receive only Medicaid eligibility data, not claims/encounter data, largely because of time lags that occurred during negotiations or because original data requests were too burdensome for the states. Among the states where negotiations are continuing, approximately two-thirds are choosing to link Medicaid and Vital Records data themselves to ensure confidentiality and privacy of their data, while about one-third are submitting their agency data to Urban so that the evaluation can complete the linkage process. Progress toward obtaining data is noted in Table 29.

The table organizes the states into four groups defined as follows:

1. **Group One**: States from which all data have been received, meaning that 2014, 2015, and 2016 birth certificate data and Medicaid eligibility and Medicaid claims/encounter data have been submitted to the Urban Institute and are ready for analysis. All data have been obtained from 4 states: Florida, Louisiana, Nevada, and South Carolina.

- 2. **Group Two**: States from which partial data have been received, meaning that only 2016 birth certificate data and Medicaid eligibility and Medicaid claims data still need to be submitted to the Urban Institute. In all cases, the delay in 2016 data relates to the timing of each state's data collection and ensuring a complete data set for all 2016 births. Six states have submitted partial data: Alabama, Arizona, District of Columbia, Georgia, Michigan, and Pennsylvania.
- Group Three: States where we expect to receive all data, meaning that approvals are in place for agencies to submit birth certificate and Medicaid eligibility and (in most cases) claims/encounter data to the Urban Institute and agencies are working on the data request. Five states are expected to submit these data: Maryland, Missouri, New Jersey, Tennessee, and Texas.
- 4. **Group Four**: States where data receipt is uncertain, meaning that these states' approval processes are delayed. The receipt of data is uncertain for five states: California, Illinois, Kentucky, Mississippi, and Virginia.

State	Linkage Responsibility	Receipt of 2014/2015 Birth Certificate and Medicaid Eligibility Data	Receipt of 2016 Birth Certificate Data	Receipt of Medicaid Claims/ Encounter Data	Linkage Status
Group 1: States	rom which all data	have been received (4)			
Florida	Urban	Yes	Yes	Yes	2014 and 2015 Complete
Louisiana	State	Yes	No	No	2014 and 2015 Complete
Nevada	Urban	Yes*	Yes	No*	2014 and 2015 Complete
South Carolina	State	Yes	Yes	Yes	Complete
Group 2: States t	rom which partial o	data have been received (6)			
Alabama	Urban	Yes	Yes	No	2014 and 2015 Complete
Arizona	State	Yes	No	No	2014 and 2015 Complete
District of Columbia	Urban	Yes	No	No	Data not received/ not started yet
Georgia	Urban	Yes	No	No	Data not received/ not started yet
Michigan	State	Yes	No	Yes	Not started yet
Pennsylvania	State	No	No	No	Data not received/ not started yet
Group 3: States	where we expect to	receive all data (5)			
Maryland	State	No*	No	No*	Unknown
Missouri	State	No**	No**	No**	Data not received/not started yet
New Jersey	State	No	No	No	2014 Complete
Tennessee	State	No	No	No	Unknown
Texas	State	No	No	No	Unknown
Group 4: States	where data receipt	is uncertain (5)			
California	State	No*	No	No*	Data not yet received/ not started yet
Illinois	N/A	No	No	No	N/A (Aggregate birth certificate data only)
Kentucky	N/A	No	No	No	N/A
Mississippi	State	No	No	No	Unknown
Virginia	State	No*	Yes	No*	Data not yet received/ not started yet

## TABLE 29: STATUS OF DATA ACQUISITION, BY STATE

*Notes:* Cells that contain one asterisk (\*) indicate only receiving eligibility data. Cells that contain two asterisks (\*\*) indicate test files were received from Medicaid agency and are currently under review, as well as received birth certificate data, but data set included social security numbers and requires resubmission of data.

# KEY CHALLENGES, SOLUTIONS, AND LESSONS LEARNED

As in prior years, the evaluation team continued to experience and address several challenges related to securing approval to receive and acquire data from state agencies, as summarized below.

# **Challenges and Solutions**

Despite states' overall support for the impact analysis, several key challenges have resulted in either delays in securing approval to access data or in receiving the requested data. These challenges are described below. In many cases, challenges are consistent with those experienced in previous years. Please refer to previous Annual Reports (Years 2 and 3) for more detail.<sup>49</sup> Challenges in Year 4 include:

- State agency staff face competing demands for their time to fulfill Strong Start data requests, requiring the need for ongoing communication and often gentle pressure to secure agreements. Managing this challenge has required patience and persistence on the part of the evaluation team, an ability to understand and accommodate states' constraints, and a deft ability to apply pressure when needed to move the process along without negatively impacting relationships with state officials.
- Differing state organizational structures inhibit using a standardized approach to secure approval. There is no one approach to requesting and obtaining state data; each state agency has their own process and expectations
- States' experiences sharing and linking data vary. More experienced states, including those participating in the MIHOPE Strong Start evaluation, tend to have existing and productive relationships between Vital Records and Medicaid agencies, and have experience sharing and/or linking data with outside entities for evaluation purposes. Less experienced states, in contrast, tend to require more education and support, including multiple meetings to answer questions and address concerns, particularly around data privacy and confidentiality.
- Privacy and confidentiality concerns can slow progress in some states. In two states, privacy
  and confidentiality concerns proved to be virtually insurmountable. In Illinois, a state statute
  prevents the Vital Records agency from sharing individual-level birth certificate data without
  the mother's written consent. Obtaining such consent from every mother in Illinois was
  (obviously) unfeasible. Therefore, the evaluation has negotiated instead to receive aggregate
  birth certificate data for Strong Start participants and all Medicaid-covered births in counties
  where Strong Start operates (to serve as a rough comparison group). (This result means that
  Illinois will not be included in the evaluation's formal Impact Analysis, though crude
  comparisons of Strong Start versus Medicaid outcomes will be made.) Similarly, in Kentucky,
  despite signing a Data Use Agreement and holding multiple meetings with the evaluation team
  to discuss strategies to ensure the privacy and confidentiality of the data, the Medicaid Agency
  opted not to share its data. As a result, data from Kentucky will not be included in the
  Impact Analysis.

<sup>&</sup>lt;sup>49</sup> <u>https://downloads.cms.gov/files/cmmi/strongstart-enhancedprenatalcare\_evalrptyr3v1.pdf;</u> <u>https://downloads.cms.gov/files/cmmi/strongstart-enhancedprenatalcare\_evalrptyr2v1.pdf</u>

• Challenges receiving the requested data in a timely manner can occur even when clear guidance is provided. Once data sharing agreements are fully executed, it is necessary to build relationships with the state data analysts and IT staff that are directly involved in developing and transferring the data files. These staff are likely not as familiar with the specifics of the data request and, thus, need to be brought "up to speed." In addition, similar to delays in receiving approval to access the data, competing demands at the state agencies often took priority over sending the data to the Urban Institute, requiring the evaluation team to persist and apply pressure when needed.

# **Lessons Learned**

From these experiences, it is possible to identify a number of lessons learned that can be helpful to policymakers, state officials, or other researchers involved in similar data acquisition and linkage efforts; these lessons are summarized below.

- Be prepared to provide considerable guidance and support to agencies as they prepare and submit data files. The evaluation team invested considerable time and effort to review and discuss the specific variables requested with the state agency staff. More specifically, the team used four strategies:
  - Creating and distributing documents that specifically laid out the requested birth certificate variables and/or data needed to create the Medicaid eligibility, claims, and encounter variables for the Impact Analysis. In many states, these documents were sent multiple times in an effort to reduce the likelihood of receiving incomplete data sets.
  - Reviewing data layout files to identify the specific variables needed to conduct the impact analysis. Again, this was done so that states would not need to resend data files with "missing" variables.
  - Requesting "test files" with de-identified data to identify any potential issues with the data prior to the state agency sending the complete file. As needed, the team would schedule calls to discuss any questions and request changes to the test files.
  - Reminders regarding the transfer requirements at multiple points in the process, emphasizing that PII and PHI be transferred in two separate files. Repeated reminders were often helpful or required to ensure that data were transferred securely.
- **Expect changes to the data sharing agreements.** Even after data sharing agreements are finalized and signed, state agencies may request amendments, depending on their resources and expertise. For example, the District of Columbia Medicaid agency initially preferred to merge its data with birth certificate data from the Vital Records agency to ensure data confidentiality and privacy. However, the agency later decided that it would be more burdensome for their staff to perform the merge and, thus, requested that the Urban Institute perform the merge. This required existing data sharing agreements between the agencies and evaluation to be revised and resubmitted.
- **Be flexible and offer alternatives, as needed.** State agencies can be underresourced and overwhelmed at times. Therefore, it is imperative to propose solutions and offer alternatives that help to ease the burden on states, such as offering to perform the data linkage or receiving Medicaid eligibility data, but not claims and encounter data.
## **IMPACT ANALYSIS**

The impact analysis compares outcomes for Strong Start participants to outcomes for nonparticipating Medicaid-enrolled 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 differences in outcomes that might otherwise be incorrectly attributed to Strong Start.

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

- What are the impacts of the care approaches and enhanced services supported by Strong Start relative to traditional Medicaid prenatal care on gestational age, birth weight, and cost?
- Do impacts differ across awardees and across the three Strong Start models? If so, how?

During Year 4, the impacts and Technical Assistance (TA) teams worked closely together to request birth certificate and Medicaid data from 20 states (as described in the previous section). We also prepared data in several states, determined the appropriateness of various analyses, and finalized and implemented our propensity score reweighting approach in four states.

This section first reviews the methodological approach and data sources associated with the impacts analysis. We then describe the major data preparation and analytic tasks that the impacts team finalized to move this component of the project forward. Finally, we discuss limitations to our approach and enhancements to the model that we will implement in the upcoming year.

#### ANALYTICAL APPROACH AND DATA SOURCES

Our team will analyze the impact of Strong Start and address the three evaluation questions outlined above after birth certificate and Medicaid data are obtained, merged, and used to create analysis files, as later described. In this section, we:

- Present the propensity score reweighting approach used to develop a comparison group for each site or awardee such that observable characteristics in the comparison group are nearly identical to those of the women participating in Strong Start.
- Describe how we select the comparison group and issues related to high-risk sites or areas.
- Present detailed information on the key outcomes and matching variables used for the propensity score reweighting approach.

The data come from birth certificates and Medicaid eligibility and claims files for both the Strong Start participants and a group of Medicaid enrolled women not participating in Strong Start in the same or similar geographic areas.

#### **Analytical Approach**

The analysis will be conducted by creating propensity-score-based weights, confirming there are no remaining meaningful differences in control variables between Strong Start participants and weighted comparison observations, and estimating impacts as the difference in outcomes between Strong Start participants and propensity-score weighted comparison group observations. The methods described below will enable us to control for observed differences in Strong Start participants and women in the comparison group.

Propensity score reweighting is very similar to traditional propensity score matching, except that it uses information from all eligible comparison group members rather than an arbitrary number of best matches for each member of the treatment group. In propensity score reweighting, comparison group members who are the most similar to treatment group members receive the largest statistical weights, and dissimilar comparison group members receive lower (or even zero) weights. After successful reweighting, there should be no remaining meaningful differences in the (mean) observed characteristics of the two groups.

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 of the Year 3 Annual Report.) We will perform separate analyses for each site with sufficient observations to support site-specific impact estimates, currently estimated at a minimum of 250 participants.<sup>50</sup> If a site has insufficient data for stand-alone analysis, it will be pooled with other sites using the same model within the same awardee. We will also pool all observations for an awardee and perform the analysis to produce awardee-specific impact estimates. In the rest of this section, we use the word "site" to refer to individual sites or the smallest aggregation of sites within an awardee that supports estimation of impacts.

<sup>&</sup>lt;sup>50</sup> In the original design plan report, we presented a prospective power analysis, with an array of assumptions, to estimate the minimum sample size likely required to reasonably detect effects of given sizes. Results from this analysis showed that it would take at least 400 enrollees to have an 80 percent probability of detecting effect sizes with two-sided tests as large as 4 to 6 percentage points. However, given the actual distribution of the data received, we will conduct site-level analyses in case where we have at least 250 strong start participants. While this sample size threshold is lower than the numbers in the power analysis, prior studies have found that propensity score reweighting can yield correct estimations of treatment effect even with small study samples in this range. See Pirracchio, R., Resche-Rigon, M., and Chevret, S. (2002). "Evaluation of the Propensity score methods for estimating marginal odds ratios in case of small sample size." *BMC Medical Research Methodology* 12(70), DOI: 10.1186/1471-2288-12-70

#### Computing Propensity Scores and Propensity-Score-Adjusted Weights

Strong Start participants and comparison group observations associated with the same site will be pooled to develop propensity scores. Propensity scores will be created by estimating a logistic regression where the dependent variable is a dummy variable (Strong Start) taking a value of 1 for Strong Start participants, and 0 for comparison group observations. The explanatory variables of the logistic regression are the control variables described later in Table 31. The propensity score is computed as the predicted probability of being a Strong Start participant.

Propensity-score-adjusted weights are developed as follows: Pregnant women enrolled in Strong Start receive a weight W of 1 and pregnant women not enrolled in Strong Start receive a weight that is calculated as W = PS/(1 - PS), where PS is the propensity score for each individual. With weights computed in this way, differences in (weighted) means between the treatment and comparison group are estimates of average treatment effects on the treated.<sup>51</sup> Propensity score weights would be constructed separately for each Strong Start awardee and site (where applicable).

By design, once reweighted, comparison group observations should look very similar to participants in terms of the distributions of control variables. We will confirm success of the procedure by inspecting the distribution of each control variable for participants and comparison group observations, and standardized differences in means. We will confirm that all remaining standardized differences are less than 10 percent, a commonly suggested threshold. In practice, we have observed that the remaining differences are typically negligible and reduced to much less than 10 percent.

If any standardized differences of 10 percent or more remain, the weights will be refined (e.g., by expanding the logistic model to include nonlinearities or interactions of control variables) until all standardized differences are less than 10 percent.

#### **Estimating Impacts**

*Site-Specific Impacts.* Once participants and comparison group observations are observationally similar after the propensity score reweighting process, and given that the main analysis is conducted at the site level, estimating site-specific impacts among those with sufficient sample size is very straightforward. We simply compare mean outcomes for participants and weighted comparison group observations. This could be done with a t-test of difference in means. Given the need to weight and to facilitate generalizing to other situations, it is convenient to use a linear regression similar to (1) to test for differences in mean outcomes:

(1) Outcome<sub>(i)</sub> =  $\beta_0 + \beta_1$ StrongStart +  $\epsilon$ ,

where Strong Start is an indicator taking the value of 1 for participants and 0 for comparison group observations. This regression would be estimated for each outcome (indexed by i) for each site, applying the weights. The regression coefficient  $\beta_1$  represents the impact of enrolling in enhanced prenatal care at a Strong Start Maternity Care Home, Group Prenatal Care site, or Birth Center (depending on site), relative to women of similar risk profiles served by traditional Medicaid providers.

<sup>&</sup>lt;sup>51</sup> Average treatment effects on the treated refer to the effect of enrolling in Strong Start for those who chose to participate.

**Overall Strong Start Impacts.** We will estimate an overall Strong Start impact by pooling all observations across all sites and estimating the following regression:

(2) Outcome<sub>(i)</sub> =  $\beta_0 + \beta_1$ StrongStart +  $\beta_2$ Site +  $\epsilon$ 

where Strong Start is an indicator taking the value of 1 for participants and 0 for comparison group observations. This regression would be estimated for each outcome (indexed by i), applying the weights. In this case,  $\beta_1$  measures the overall impact of Strong Start on the outcome across all sites. Site represents a vector of indicator variables, one for each site (less one). The indicator variable for a site takes the value of 1 for participants and comparison group observations associated with the site, and takes the value of zero otherwise. The site indicator variables control for potential differences in average levels of outcomes (common to both participants and nonparticipants) across sites that could be correlated with the site-specific impacts.

Numerically, coefficient  $\beta_1$  is the difference in the mean of the outcome between Strong Start participants and weighted comparison group members. From the standard error (and t-statistic) reported for the coefficient, we can determine the statistical significance of the impact. For binary outcome measures, we will estimate linear probability models for ease of interpretation but will also explore logistic regression models as a sensitivity test.

*Impacts by Strong Start Service Model.* To estimate impacts for each Strong Start model (Maternity Care Home, Group Prenatal Care, and Birth Center), we will pool observations from sites associated with each model in turn. We will estimate three separate regressions for each outcome--one for each model, of the same form as in equation (2). With this approach, we answer the main analytic question: Does the additional funding from Strong Start, in combination with care provided in a Maternity Care Home, a Group Prenatal Care practice, or a Birth Center, result in improved outcomes when compared to standard Medicaid maternity care practice?

In addition, we will test for statistically significant differences between the three pairs of models (Maternity Care Home vs. Group Prenatal Care, Maternity Care Home vs. Birth Center, Group Prenatal Care vs. Birth Center). The t-statistic for the difference in impact of any two models (A and B) is

(3)  $(Impact_a - Impact_b) / sqrt (SE_a^2 + SE_b^2),$ 

where  $SE_a$  and  $SE_b$  are the standard errors of the impact of model A and B respectively. For binary outcome measures, analogous pairwise or joint tests will be formulated in the context of logistic regression models.

*Impacts by Strong Start Awardee.* Continuing with the overall approach, we will estimate impacts for each awardee by pooling observations from all sites of an awardee and estimating regressions of the form of equation (1) for each outcome for each awardee. To visually assess the degree of variation in impacts across awardees for each outcome, we will create a graph that plots the magnitude of the impact on the y-axis, and line awardees up along the x-axis (optionally grouped by model type, and sorted by magnitude of impact). The graph would show both the point estimate and the confidence interval for the impacts of each awardee. The graph will show which awardees show statistically significant deviation from average (or other benchmark) impact levels. We will use F-tests within a

regression context to test whether, overall, there is statistically significant variation in impacts at the awardee level for each outcome.

**Contextual Factors.** Each site operates under a particular context. As a sensitivity analysis, we will explore how contextual factors associated each site influence the key outcomes. For example, there is tremendous variation in Medicaid program characteristics, including Medicaid eligibility characteristics and the extent to which the Medicaid program covered enhanced prenatal care services before Strong Start or what is covered during Strong Start. For example, beginning in 2014, some (but not all) states changed Medicaid eligibility thresholds to insure adults up to 138 percent of the federal poverty level (FPL). Medicaid eligibility thresholds for parents and childless adults in the year before conception and the presence of family planning waivers could affect the health of the mother and whether the pregnancy was planned, which could be correlated with birth outcomes.

For this analysis, we will assess whether the impact of Strong Start varies by these characteristics. To analyze whether Strong Start is more or less effective in states with different Medicaid program characteristics, we will interact variables representing Medicaid program characteristics with each of the Strong Start model types. There are a limited number of states in which we will conduct impact analyses, limiting our ability to parameterize all these state characteristics and incorporate them into one model because of limited degrees of freedom.

An illustrative example is coverage of parents and single adults under Medicaid, as some Strong Start states have taken up the ACA's Medicaid expansion and some have not. We could have a threelevel variable indicating coverage up to 133 percent of the federal poverty level, which would indicate whether no adults are eligible at this level, whether parents are covered at this level, or whether both parents and childless adults are covered. The following model will be estimated, separately for each of the three groups by their care model:

(4) Awardee Specific Impact<sub>(ii)</sub> =  $\beta_0 + \beta_1 Expand + \epsilon$ 

In this case, the  $\beta_1$  would capture the association between Medicaid expansion status and awardee-level impacts (indexed by j). Final awardee-level regression models will include the full set of contextual factors that are found to explain impacts. Care will be taken to prespecify hypothesized relationships to avoid data mining and overfitting the regressions.

#### Identifying Counties from Which to Draw Women for the Comparison Group

One of the most challenging issues for the evaluation is the identification of women who can serve as a comparison group for women enrolled in Strong Start. Specifically, we want to identify women who are receiving care in standard maternity practices but are otherwise similar to Strong Start enrollees, in order to estimate the impact of Strong Start as offered through one of the three alternative models of care (Maternity Care Homes, Group Prenatal Care, or Birth Centers). Standard Medicaid maternity care practices include 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.

Ideally, comparison group women would be drawn 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.

There are 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 county in the state that is as similar as possible 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 find comparison group 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 1, Year 2, and Year 3 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 each site location.

Table 30 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. We find that for 11 awardees, our comparison group can be pulled from the same counties where Strong Start participants reside. For 14 awardees, we 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 scenario 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 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.<sup>52</sup> Both of these sites are academic medical centers 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

<sup>&</sup>lt;sup>52</sup> 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.

group. Even with these comparison groups, we are concerned that we will not be able to identify an appropriate comparison group because of unmeasured risk factors that draw women into a high-risk clinic; there is no comparable area within the state to draw the comparison group from. The impacts team will continue to explore alternative approaches to address these situations.

	Decisio	n on Comparison	Reason for Using Matched Counties		
Awardee	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	Yes	No	No	N/A	N/A
Albert Einstein Healthcare Network	No	No	Yes	Yes	No
American Association of Birth Centers	No	No	Yes	Yes	No
Amerigroup Corporation	Yes	No	No	N/A	N/A
Central Jersey Family Health Consortium	No	No	Yes	Yes	No
Florida Association of Healthy Start Coalitions	No	Yes	No	Yes	No
Grady Memorial Hospital Corporation	No	No	Yes	Yes	No
Harris County Hospital District	Yes	No	No	N/A	N/A
Health Insight of Nevada	No	No	Yes	Yes	No
Johns Hopkins University	Yes	No	No	N/A	N/A
Los Angeles County Department of Health Services	No	No	Yes	Yes	No
Maricopa Integrated Health System	Yes	No	No	N/A	N/A
Medical University of South Carolina	No	Yes	No	Yes	Yes
Meridian Health Plan	No	Yes	No	Yes	No
Mississippi Primary Health Care Association	No	Yes	No	Yes	No
Providence Health Foundation of Providence Hospital	Yes	No	No	N/A	N/A
Signature Medical Group	No	No	Yes	Yes	No
St. John Providence Health System	Yes	No	No	N/A	N/A
Texas Tech University Health Sciences Center	No	Yes	No	Yes	No
United Neighborhood Health Services	Yes	No	No	N/A	N/A
University of Alabama at Birmingham	No	Yes	No	Yes	Yes
University of Kentucky Research Foundation	No	No	Yes	Yes	No
University of South Alabama	Yes	No	No	N/A	N/A
University of Tennessee Health Science Center	Yes	No	No	N/A	N/A
Virginia Commonwealth University	Yes	No	No	N/A	N/A

#### TABLE 30: SUMMARY OF COMPARISON GROUP COUNTY DECISIONS

We also developed and 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,<sup>53</sup> 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 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, and the Year 3 final report.

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

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, in 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 counties with few Strong Start enrollees for the sole purpose of accommodating a small fraction of a site's 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 Year 3, the impacts team developed the decision rule ("Rule A") to determine which counties we should collect data from and which counties we should exclude. 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.

Based on this approach, the impacts 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 socioeconomic 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. The details of this method and findings can be found in the Year 3 final report.

<sup>&</sup>lt;sup>53</sup> 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

#### Data

The prior sections laid out details of the analytic approach and key decisions related to the comparison group and sample of Strong Start enrollees. Here, we describe the key outcome and control variables that are constructed from birth certificate and Medicaid data files.

**Outcome Variables.** There are three major birth outcome categories of Strong Start that are studied in the impact analysis: gestational age, infant birth weight, and mother-infant costs of care during the first postpartum year (Table 31). The first two outcomes will come from the birth certificate and the last outcome will be estimated from the Medicaid claims/encounter data, when available. Gestational age and birth weight are defined as either continuous average variables or as dummy variables set to one for preterm birth (or very preterm birth) or incidence of low or very low birth weight, respectively.

Variable	Specification	Source
Key Birth Outcomes		
Calculated Gestational Age	Gestational age of infant calculated from date of last menses in weeks	Birth Certificate
Clinical Gestational Age	Gestational age of infant based on obstetrician's estimate in weeks	Birth Certificate
Preterm Birth	Clinical gestational age < 37 weeks	Birth Certificate
Very Preterm Birth	Clinical gestational age < 34 weeks	<b>Birth Certificate</b>
Birth Weight	Infant weight at birth in grams	Birth Certificate
Low Birth Weight	Infant birth weight < 2500 grams	<b>Birth Certificate</b>
Very Low Birth Weight	Infant birth weight < 1500 grams	Birth Certificate
Birth Process Outcomes		
Apgar Score	Apgar score at 5 minutes ≥7	<b>Birth Certificate</b>
Weekend Delivery	Infant delivered on Saturday or Sunday	Birth Certificate
Cesarean Section	Infant delivered by Cesarean section	<b>Birth Certificate</b>
Vaginal Birth After Cesarean	Infant delivered vaginally after previous cesarean section delivery	<b>Birth Certificate</b>
Cost and Utilization Outcomes		
Total Expenditures for Mother	Total Medicaid expenditures for mother from delivery date to first birthday	Medicaid
Total Expenditures for Infant	Total Medicaid expenditures for infant from delivery date to first birthday	Medicaid
Average Expenditures for Mother	Average monthly Medicaid expenditures for mother from delivery date to first birthday	Medicaid
Average Expenditures for Infant	Average monthly Medicaid expenditures for infant from delivery date to first birthday	Medicaid
Total Expenditure for Delivery period	Total Medicaid expenditure for delivery period	Medicaid
Number of Hospital visits for Mother	Number of hospitalizations for mother from delivery date to first birthday	Medicaid
Number of Hospital visits for Infant	Number of hospitalizations for infant from delivery date to first birthday	Medicaid
Nursery Days	Number of days infant was in normal nursery care	Medicaid
Intermediate NICU Days	Number of days infant was in intermediate NICU	Medicaid
High-Level NICU days	Number of days infant was in high-level NICU	Medicaid

#### TABLE 31: OUTCOME VARIABLES FOR THE IMPACT ANALYSIS

Several other process and outcome measures from the birth certificate are also examined. These include: whether the infant had a low APGAR score at five minutes; whether the baby was delivered on a weekend, which is a proxy for the extent to which early elective surgery is being scheduled;<sup>54</sup> whether the baby was delivered by vaginal birth or C-section; and whether the mother had a vaginal birth after a previous cesarean (VBAC).

There are substantial issues with obtaining cost data in states that have moved to managed care in their Medicaid programs (which the majority of states did). In states that are predominantly fee for service (e.g., Alabama, Louisiana, and Missouri), we will estimate the impact of Strong Start on actual costs for the mother-infant pair in the first year of life. We will assess the reliability of the cost data in states with extensive managed care penetration that have provided estimates of actual costs. If we do not find the cost data to be reliable, we will focus our cost analysis on use of services such as NICU days and hospital days, as described below. We believe that these data elements will be reliably reported in the cost data.

**Propensity Score Reweighting Variables.** Table 32 shows the variables that are used in the propensity score reweighting process and their sources. The birth certificate variables for reweighting include the mother's age, race, educational status, marital status, insurance status, and zip code, along with the infant's month or quarter of birth. Medicaid eligibility data are used for identifying which births are covered by Medicaid. In addition, these files contain information on the basis of eligibility (BOE) for women enrolled in Medicaid. The BOE will be used as a factor in our propensity score modeling to identify women who are eligible based on their disability or cash-assistance status, Section 1931 rules, poverty-related expansions for children, the ACA expansion, pregnancy only, or other eligibility mechanisms.

Variable	Specification	Source
Demographic Risk Factors		
Mother's Age	Age of mother in years	<b>Birth Certificate</b>
Mother's Race	White, Non-Hispanic; Black, Non-Hispanic; Other, Non-Hispanic; Hispanic; Race Unknown	Birth Certificate
Mother's Education	<ul> <li>High School; High School Degree/GED; Some College; Associate's Degree;</li> <li>Bachelor's Degree or Higher; Missing</li> </ul>	Birth Certificate
Infant's Month of Birth	Month that infant was born	<b>Birth Certificate</b>
Infant's Quarter of Birth	Quarter that infant was born	Birth Certificate
Infant's Year of Birth	Year that infant was born	<b>Birth Certificate</b>
Marital Status	Married; Unmarried	<b>Birth Certificate</b>
Basis of Medicaid Eligibility	Disabled; Foster Care; Low Income Families; Poverty-Related Children; CHIP; ACA Expansion; Poverty-Related Pregnant Women; Medically Needy; Medicare; Emergency Medicaid / CHIP for Unborn Children; Family Planning; Other; Not Enrolled	Medicaid
County	Mother's County of Residence	Birth Certificate
Census Tract / Zip Code	Census tract or zip code of Mother's residence	Birth Certificate

#### TABLE 32: PROPENSITY SCORE REWEIGHTING VARIABLES FOR IMPACT ANALYSIS

<sup>&</sup>lt;sup>54</sup> Most scheduled C-sections and inductions take place on weekdays because it is a more convenient time for medical staff (Burns, Geller, and Wholey 1995). <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3796112/#b7</u>

Variable	Specification	Source
Behavioral Risk Factors		
Smoking	Mother's smoking habits in 3 months prior to pregnancy	<b>Birth Certificate</b>
Prenatal Care Initiation	Trimester in which prenatal care began	<b>Birth Certificate</b>
Medical Risk Factors		
Plurality	Singleton; Twin; Triplet; Four or more	<b>Birth Certificate</b>
Parity	Number of previous live births	<b>Birth Certificate</b>
Previous Preterm Birth	Mother has had a precious preterm birth	<b>Birth Certificate</b>
Previous Other Poor Pregnancy Outcome	Mother has had another previous poor outcome	Birth Certificate
Interpregnancy Interval	Months between date of last birth and beginning of current pregnancy	<b>Birth Certificate</b>
Pre-pregnancy Diabetes	Mother had diabetes prior to pregnancy	<b>Birth Certificate</b>
Pre-pregnancy Hypertension	Mother had hypertension prior to pregnancy	<b>Birth Certificate</b>
Mother's BMI pre-pregnancy	Underweight; Normal Weight; Overweight; Obese	Birth Certificate
HEN Hospital	Hospital of delivery is in a Hospital Engagement Network	Birth Certificate

Behavioral risk factors include smoking and prenatal care use, and medical risk factors include plurality, parity, previous preterm birth, previous other poor pregnancy outcome, short interpregnancy interval, pre-pregnancy diabetes, pre-pregnancy hypertension, and mother's BMI pre-pregnancy.

The Strong Start initiative was implemented during the period when the 26 Hospital Engagement Networks (HEN) were reducing early elective deliveries at approximately 3,700 hospitals. We also include whether the Strong Start and comparison delivery was at a HEN hospital as a factor in the propensity score weighting algorithm.

#### DATA PREPARATION

During Year 4, the impacts team spent significant time obtaining and linking birth certificate and Medicaid eligibility data to identify comparison group women who had a birth covered by Medicaid but were not enrolled in Strong Start. By attaching the Medicaid ID to each Strong Start participant and comparison group woman, we can subsequently link Medicaid claims data to create key cost and utilization outcomes for each mother and infant. This section describes these processes along with the steps needed to make comparable analysis files across states.

#### Linking Birth Certificates to Medicaid Eligibility Data

So far, the impacts team has linked birth certificate and Medicaid eligibility data for Florida and Nevada and directly received linked data from Louisiana and South Carolina. Prior to the actual linkage, both the birth certificate and Medicaid eligibility files were cleaned and standardized so that matching variables had a common set of codes, structures, and well-understood crosswalks. For example, name variables were saved as separate variables for first, middle and last names, with strings transformed to all caps and any special characters (e.g., hyphens, spaces) removed. This step is essential and can be at least as time-consuming as the linking itself.

The linking methodology uses two types of variables: those used for blocking and those used for matching. Blocking variables are used to create bins within which matching is performed. A block is calculated by concatenating a set of variables together into a string. As we are linking two different datasets, it is integral that the blocking variables on each dataset have identical coding schemes to

ensure that we are comparing like values. Then, once separated into a subset of observations based on blocking, the algorithm uses name to find the best match.

When two datasets A and B are linked, one dataset, B, is read into memory in its entirety. As observations in B are read, the block is calculated. For example, if delivery date and mother's year and month of birth are used as the blocking variables then the block might have the value "20140101199906," where the delivery date is equal to "20140101" and mother's year and month of birth is equal to "199906". After all the observations in B are read, the records are sorted by block. Then, each observation in A is read one by one. As they are read, the block is calculated and the record in A is compared to all observations in B within the same block. The best links between A and B are kept, and if the Jaro-Winkler score<sup>55</sup> meets or exceeds a given threshold, then the observations are considered a match. The algorithm iterates over several different blocks to maximize the number of links found.

#### **Creating Standardized Variables Across States**

Appendix I lists the key variables created from the birth certificate and Medicaid eligibility files in the four states where we have completed the linking process. This exhibit highlights how we obtained all or most key variables in each state so far, with some exceptions. For example, in South Carolina, we were unable to obtain information on calculated gestational age, weekend delivery, infant's month of birth, and census tract/zip code due to data privacy restrictions the state imposed.

The impacts team also created comparable Medicaid eligibility groups based on the Medicaid eligibility data provided by these four states. Since pregnant women can be eligible under multiple categories during the 12 months prior to and after pregnancy, we created mutually exclusive categories based on the following hierarchy: disability, foster care, low-income families, poverty-related children, CHIP, ACA expansion, poverty-related pregnant women, medical need, dual eligibility for Medicare and Medicaid, emergency Medicaid/CHIP for unborn children, family planning, other, and not enrolled.

#### **Medicaid Claims Data**

In Year 5, the Impacts team will use claims data to estimate the impact of Strong Start on costs and utilization and will create supplemental variables to enhance the propensity score reweighting process (e.g., pre-pregnancy diagnoses and prenatal care site information). These variables, which come from the claims data, were not vetted in time to be included in the Year 4 analysis. However, in Year 4, the team developed a common set of variables, codes, and structures to make consistent claims file across states, began to receive Medicaid claims data, and engaged in extensive back-and-forth with states to ensure all data elements required to construct analytic variables were available, all essential but time consuming processes.

<sup>55</sup> Jaro-Winkler distance is a metric for measuring the edit distance (similarity) between two string sequences. See Jaro, M. A. (1989). "Advances in record linkage methodology as applied to the 1985 census of Tampa Florida". *Journal of the American Statistical Association*. 84 (406): 414–20. doi:10.1080/01621459.1989.10478785.

At the time of this writing, the team has received at least preliminary claims data from the four states in Appendix I, along with eight other states (AL, AZ, DC, GA, MI, MO, NJ, and PA). Some of the key cost and utilization outcomes that are being constructed from the claims files are listed in the bottom panel of Appendix I. As previously discussed, claims/encounter data for Nevada will not be available for this analysis.

#### LIMITATIONS OF THE DESIGN AND ENHANCEMENTS TO THE APPROACH

Given our analytic strategy that relies on cross-sectional data, a primary concern is whether the estimated impacts capture the true causal impact of Strong Start being implemented in the three alternative care models relative to traditional Medicaid maternity care practice. There are several sources of potential bias that could threaten the validity of impact estimates. Our approach to addressing limitations of the design is to conduct sensitivity analyses in Year 5 that will evaluate the potential for bias or offer alternative impact estimates that may correct for certain sources of bias.

#### Limitations

*Selection Bias.* There are several ways that selection could bias impact estimates. Selection happens both when women have multiple options and specifically select their site of care and when the sites select women into the program based on pregnancy risk. While some Strong Start sites, particularly some maternity care homes, will select some enrollees on the basis of elevated risk, others, particularly some birth centers, exclude some women at high medical risk.

In addition, according to Strong Start awardees' enrollment procedure portion of their operational plans, sites vary in terms of the procedures they use to enroll individuals in Strong Start, with some sites using opt-out and others opt-in strategies. Therefore, among those asked whether they want to participate, some enroll and some do not. To the extent that a large share of women in particular sites decline to enroll in Strong Start on the basis of unobserved factors not already accounted for by propensity score reweighting, our impact estimates could be biased.

Selection Bias Specific to Group Prenatal Care. In reviewing the case study reports to determine how comparison counties should be identified, we also assessed other issues that could limit the evaluation's ability to identify unbiased causal impacts in certain cases. In particular, we focused on whether or not sites used an opt-out or opt-in procedure for enrolling women into Strong Start, and the extent to which women who were given the option of enrollment in Strong Start (i.e., opt in) participated. While some awardees using an opt-in strategy reported that take-up upon offers of enrollment was low at first, many reported that take up improved once they changed their strategy to an opt-out policy (whereby all women were enrolled into Strong Start unless they actively chose to opt out of the intervention). Overall through the first year, it seemed that most sites ultimately had relatively high take-up among women who were offered enrollment in Strong Start.

The one exception to high take-up occurred among some sites that offered Group Prenatal Care. Many Group Prenatal Care sites also offer traditional care and, therefore, the decision to enroll in Group Prenatal Care may be affected by selection bias, a particularly great concern for sites where enrollment in Group Prenatal Care is low. Of the 13 awardees offering Group Prenatal Care in states where we are conducting impact analysis, four had high take-up in all sites, four had very low take-up in all their sites, and five had very low take-up in some sites. Table 33 presents data on which sites were using an opt-in or opt-out approach and the extent to which enrollment in group prenatal care among those offered was low.

Awardoo		# of	Enrollme	Selection	
Awardee	State	Sites	Opt-Out	Opt-In	lssue <sup>1</sup>
Albert Einstein Healthcare Network	PA	3	Yes	N/A	No
Amerigroup Corporation	LA	7	Yes	Yes	Yes*
Oschner St. Charles Uptown Clinic	LA	N/A	N/A	Yes	Yes
Woman's Hospital at Gonzales	LA	N/A	Yes	N/A	No
LSU New Orleans—Perdido Clinic	LA	N/A	N/A	Yes	Yes
LSU New Orleans—Carrolton	LA	N/A	N/A	Yes	Yes
LSU Shreveport	LA	N/A	N/A	Yes	Yes
Daughters of Charity—Gentilly	LA	N/A	N/A	Yes	Yes
Woman's Health Center for OB/GYN at Woman's Hospital	LA	N/A	N/A	Yes	Yes
Central Jersey Family Health Consortium	NJ	8	Yes	Yes	Yes*
Capital Health System	NJ	N/A	N/A	Yes	Yes
Newark Community Health Center	NJ	N/A	Yes	N/A	No
Jewish Renaissance Medical Center	NJ	N/A	N/A	Yes	Yes
JFK Medical Center	NJ	N/A	Yes	N/A	No
Jersey Shore University Hospital	NJ	N/A	N/A	Yes	Yes
Rutgers/NJ Medical School	NJ	N/A	N/A	Yes	Yes
Saint Peter's University Hospital	NJ	N/A	N/A	Yes	Yes
Southern Jersey Family Medical Center	NJ	N/A	N/A	Yes	Yes
Grady Memorial Hospital Corporation	GA	4	Yes	N/A	No
Harris Health System	ТΧ	7	N/A	Yes	Yes
Health Insight of Nevada	NV	3	N/A	Yes	No
Providence Hospital	DC	1	N/A	Yes	No
St. John Community Health Investment Corp.	MI	3	N/A	Yes	Yes
Texas Tech University Health Sciences Center	ТΧ	1	N/A	Yes	Yes
University of Kentucky	KY	7	Yes	Yes	Yes*
UK Good Samaritan Clinic	KY	N/A	N/A	Yes	Yes
UK Polk Dalton North Clinic	KY	N/A	N/A	Yes	Yes
Women's Care of the Bluegrass (Frankfort, KY)	KY	N/A	N/A	Yes	Yes
Baptist Health Inc. (Maidsonville, KY)	KY	N/A	N/A	Yes	Yes
Lake Cumberland District Health Department Wayne County Health Department	КY	N/A	Yes	N/A	No
Lake Cumberland District Health Department Russell County Health Department	KY	N/A	Yes	N/A	No
Lake Cumberland District Health Department McCreary County Health Department	КY	N/A	Yes	N/A	No
University of South Alabama	AL	2	N/A	Yes	Yes
University of Tennessee Health Science Center	TN	2	Yes	Yes	Yes*
Virginia Commonwealth University	VA	5	Yes	Yes	Yes

#### TABLE 33: GROUP PRENATAL CARE ENROLLMENT STRATEGIES

*Notes*: Cells that contain one asterisk (\*) indicate that there is only a selection issue at opt-in sites for these awardees. <sup>1</sup>Sites with greater than 25 percent of women declining to participate are considered to have a selection issue with implications for the impact analysis. The low take-up of Strong Start in some group prenatal care sites suggests that, in those sites, women who enroll in Group Prenatal Care may be different than those who choose not to enroll. In other words, estimates of the impact of enrolling in Strong Start at these Group Prenatal Care sites and awardees may be biased by selection even after adjusting for differences in observable characteristics. Moreover, it is not clear what the direction of the selection bias would be.

While we are concerned about selection bias generally in our impact analysis, we plan to conduct a sensitivity analysis that would use distance from the site as an instrumental variable (IV), as further discussed in the next section. We cannot employ the IV strategy in this case because the sites in question offer both group and traditional maternity care. This makes us concerned that estimates of the effects of Strong Start for these nine awardees will be biased. Consequently, we would not interpret the estimated effects as causal impacts, but rather as associations that adjust for observable differences. We will therefore only estimate impacts for the Group Prenatal Care awardees and sites that do not appear to have selection problems. Additional detail on selection bias can be found in the evaluation's Design Plan (Howell et al. 2014) and Comparison Group Feasibility Study (Dubay et al. 2014).

**Contamination Bias.** Our design relies on comparing Strong Start enrollees to pregnant women receiving prenatal care services in standard Medicaid maternity practices. This requires that we exclude pregnant women in sites where similar care models or even enhanced services are provided from the comparison group. It is not possible to exclude such women using only birth certificate and Medicaid data. To the extent women receiving intervention-type services end up in the comparison group, there would be a "contamination bias." Including such women in the impact analysis will reduce the size of the impact of Strong Start services, leading to overly conservative estimates of Strong Start's impact. Case studies indicate the places where this bias is more or less severe and can be used in interpreting site-specific and awardee-specific impact estimates.

**Omitted Variable Bias.** Problems of data quality limit the impact analysis in numerous ways as outlined above. In particular, the propensity score approach to selecting a comparison group offers limited capacity to control for risk because health conditions are underreported on birth certificates and other medical and social risk factors are not included on the birth certificates.

#### **Enhancements to the Approach**

During Year 5, we will implement the following two procedures to help address these limitations and improve the overall quality of our analytic approach.

Adding site of prenatal care and pre-pregnancy diagnoses to propensity score model. To better control for selection into Strong Start due to observable characteristics, we will add the site of prenatal care and pre-pregnancy diagnoses to the propensity score reweighting model in the subset of states where this information is available in the Medicaid claims/encounter files. These variables are not included in the main model because the birth certificate does not include this information. Including the prenatal care site as a control variable will improve the reweighting by helping us draw the comparison group from the universe of pregnant women receiving prenatal care services in "standard Medicaid maternity practices." We will also include various pre-pregnancy diagnoses variables—such as diabetes, hypertension, number of unique prenatal and non-prenatal care diagnoses from the CCS grouper, and

the first six most common diagnoses from delivery period for the mother and infant—to better control for selection of high-risk participants into Strong Start.

Implementing variables (IV) model based on distance to site. The propensity score reweighting approach does not control for selection into Strong Start based on unobservable characteristics. Therefore, it is critical that our analytic strategy address the issue of potential selection on unobservables. Instrumental variable analysis is a statistical approach that can estimate causal effects even in the presence of selection on unobservables. A good IV is correlated with treatment status but uncorrelated with the confounding unobserved factors. Prior health services research studies have used distance to health care providers as an IV. For example, Benatar and colleagues (2013) used the cube root of distance from the census track or zip code each woman lives in to the Birth Center as an instrumental variable for Birth Center use. The estimation is operationalized using bivariate weighted probit for binary variables and two stage weighted least squares for continuous variables. The IV approach resulted in impact estimates that were virtually identical to those obtained using only the propensity score reweighting methodology. We propose a special study that would use a similar IV approach in appropriate Strong Start sites as a sensitivity test of the main results. Importantly, only sites for which we draw the comparison group from the same county as Strong Start participants are feasible for this analysis.

# **Summary Conclusions**

Syntheses of findings through the fourth year of data collection allow us to make a number of observations about awardees' experiences implementing Strong Start, promising practices they adopted to overcome common challenges, and preliminary outcomes among Strong Start participants. With Participant Level Process Evaluation and Case Study data collection now complete, and efforts to obtain and link birth certificate and Medicaid data to support our impacts analysis ongoing, we present the following summary conclusions:

Strong Start awardees wrapped up service provision having served nearly 46,000 women over three to four years. Strong Start awardees received funding for a four-year period, originally comprising a three-year intervention period for implementation and service delivery, and a fourth year to complete program and evaluation data collection. Most awardees received no-cost extensions, allowing them to continue enrolling and serving participants for part or all of the fourth year of the program and continue data submission into a fifth year. Strong Start enrollment ended by December 2016, and the initiative's final deliveries for Strong Start-enrolled women occurred by March 2017. In all, 45,977 women were ever enrolled in Strong Start, representing nearly 80 percent of the target enrollment set by the awardees.

Strong Start participants appear to be less likely to develop gestational diabetes than other low-income populations, which could be connected to awardee efforts related to education and support for appropriate nutrition and activity during pregnancy. This evaluation's participant-level process data indicate that the rate of gestational diabetes is relatively low overall: 5.4 percent of Strong Start enrollees developed gestational diabetes during pregnancy. Though Hispanic women were more likely than other racial and ethnic groups to develop gestational diabetes during their Strong Start pregnancies, their rates were still lower than benchmarks for pregnant Medicaid beneficiaries overall, which are reportedly as high as 10 percent. As has been well documented in the literature, older participants are more likely to develop this condition, but the Strong Start population skews younger. Despite reports that few participants received formal nutritional counseling, key informants participating in our case studies perceived that their efforts to counsel women on healthy activity and nutrition on a less formal, ongoing basis during pregnancy helped lead to better outcomes.

Maternity Care Home participants are significantly more likely than either Birth Center or Group Prenatal Care participants to be using a moderately or highly effective form of contraception postpartum. Providing family planning counseling during pregnancy has been, to varying degrees, a focus of virtually all Strong Start awardees and sites. But regression analysis of participant level data suggests that Maternity Care Home models have been more successful than other Strong Start models in facilitating women's postpartum adoption of moderately or highly effective forms of contraception—including tubal ligations and LARCs, which include IUDs and implants (e.g., Nexplanon). This evaluation's case studies found that Group Prenatal Care participants experienced some discontinuity of care postpartum, with some not seeing the provider they had interacted with throughout their pregnancies at their postpartum check-up. This could contribute to higher no-show rates or discomfort discussing family planning with an unfamiliar provider. Birth Center providers, meanwhile, are frequently unable to insert IUDs or prescribe contraceptive implants, which could impede their ability to promote use of highly effective contraception. Additionally, tubal ligations cannot be conducted by midwives or at birth centers. It is

not precisely clear why Maternity Care Homes are more impactful on this measure. In addition to the model's emphasis on care coordination that may lead to a more effective linkage to family planning services postpartum, possible explanations include: variation in state Medicaid policies related to LARC access; greater reliance on physician providers that can offer the full scope of highly effective contraception; and differences in the types of organizations operating the Strong Start award (e.g., Maternity Care Homes are more likely to be large health systems and less likely to be religiously affiliated).

Strong Start enrollees in Group Prenatal Care and Birth Center models appear to experience better outcomes compared to their counterparts enrolled in Maternity Care Homes. Armed with a much larger sample of participant-level data, the evaluation repeated its regression analyses from Year 3 and compared outcomes among Strong Start participants across models. Once again, controlling for many demographic characteristics and medical and social risk factors, these analyses find that Maternity Care Home participants are significantly more likely to have a preterm birth or low birthweight birth than women receiving care under the Group Prenatal Care model or from Birth Centers. We also observe that, after controlling for observable risk factors and demographic characteristics, Maternity Care Home participants are significantly more likely than Birth Center participants to have a C-section delivery. These are not impact analyses and do not compare outcomes among Strong Start participants to women receiving "traditional" Medicaid prenatal care; that analysis is being carried out separately using linked birth certificate and Medicaid data for Strong Start women and propensity-scorereweighted comparison groups and will be available in the final evaluation report. Still, while there are likely unobservable differences in the populations served by each Strong Start model, these regression results suggest that the more transformative models of care implemented under Strong Start–Group Prenatal Care and Birth Center care—could be more successful in moving the needle on outcomes for low-income mothers than the Maternity Care Home model, which hews more closely to prenatal care typically provided to Medicaid beneficiaries.

A majority of Strong Start awardees are sustaining at least some components of their enhanced prenatal care services after the conclusion of their cooperative agreements. Year 4 case study findings indicate that slightly more than half of all Strong Start awardees and birth center sites are either fully or partially sustaining enhanced prenatal care models implemented under Strong Start. Maternity Care Home and Group Prenatal Care awardees are more likely to be sustaining their full Strong Start program, including nine out of 17 maternity care homes and seven out of 13 group prenatal care awardees. Moreover, most Maternity Care Home awardees are expanding their programs to additional sites or populations. All Birth Center sites, meanwhile, are continuing their pre-Strong Start midwifery models of prenatal care, and most have decided to continue, at least partially, peer counseling services added under Strong Start in some shape or form. A considerable proportion of awardees (including some not sustaining their models) reported that they have improved their standards of practice in delivering prenatal care in ways that can be directly attributed to their experiences with the Strong Start program. Most awardees sustaining Strong Start are partly or fully self-funding the services; that is, they are using internal practice or health system monies to fund the services now that Strong Start funding has ended. Generally speaking, awardees' commitment to sustaining Strong Start speaks to key informants' common belief that the program is benefiting women and their families, has advantages for health care provider sites, and is contributing to better maternal and newborn outcomes.

State Medicaid and CHIP policies generally support timely access to prenatal care, but coverage of enhanced prenatal care appears to be rare or variable. The evaluation's survey of state Medicaid/CHIP officials provided valuable context regarding the policy environments in which Strong Start was implemented, including identification of potential barriers to and supports for Strong Start efforts and goals. While state officials were not able to fully describe policies that were at the discretion of the Medicaid managed care organizations (MCOs), such as payment arrangements with providers and the specific content of prenatal care services delivered under bundled payment arrangements, they provided a high-level view that allowed assessment of policy variation among states implementing Strong Start. With some notable exceptions (e.g., limits on the number of medically necessary prenatal care visits in certain states and postpartum coverage for CHIP-enrolled women), few policies were perceived as barriers to timely access to care for pregnant women. Coverage and/or enhanced payment for enhanced prenatal care services was rare or variable, with the exception of contraception, 17P, and breast pumps, which were routinely covered. Most states described some combination of maternityrelated financial rewards/penalties and programs to MCOs or providers, most commonly to incentivize perinatal care, but sometimes directly targeting birth outcomes and cost. The survey, in tandem with case study findings, uncovered issues critical to understanding and improving Medicaid/CHIP provision of perinatal care that warrant further study, including a better understanding of how MCO policies impact prenatal care and birth outcomes, and how state-level policies and payment rates may impact the accessibility of services.

Challenges with maternity care provider continuity varied by model, and most awardees acknowledged that it was not common for Strong Start participants to have the same health care provider for pregnancy, delivery, and postpartum care. However, the Strong Start interventions improved continuity of care by providing consistent Strong Start staff throughout the maternity experience. Key informants broadly agreed that Strong Start had succeeded in improving continuity of care because participants had either a single care manager (Maternity Care Home), peer counselor (Birth Center models), or a consistent group facilitator (Group Prenatal Care model) throughout pregnancy. Meeting with the same facilitator (and, often, cofacilitating provider) for all group sessions reportedly promoted comfort and participants' willingness to share feelings, confidence to ask questions, and group bonding. However, this continuity did not typically extend to the delivery-deliveries were often attended by whoever was "on call" at the hospital and rarely included group facilitators—nor did it extend to postpartum care, since the model typically did not include such sessions. At most Maternity Care Home sites, continuity of obstetrical care providers was minimal throughout the maternity period; women may see a range of providers during prenatal visits and have little familiarity with their delivering provider, which made continuity of the Strong Start care manager all the more important, according to key informants. Maternity Care Home care managers provided continuous support and referrals to their patients that key informants described as critical for promoting trust and information-sharing. Meanwhile, Birth Center sites typically rotate midwives during prenatal visits so that women will be familiar with all midwives that could be on call for attending births. However, since midwifery visits are usually longer than OB visits, Birth Center patients have more time to become comfortable with each of the rotating midwives. Similar to Maternity Care Home care managers, Birth Center peer counselor continuity was described as instrumental in building trusting relationships and providing additional psychosocial support.

During Year 4, the evaluation team continued to make significant progress in pursuing, obtaining, and cleaning birth certificate and Medicaid data from the 20 states with Strong Start awards. As has been described in detail in previous annual reports, the evaluation team's Technical Assistance and Data Acquisition task involves the painstaking process of contacting state agencies, informing them of the goals of Strong Start and its evaluation, persuading them of the value of supporting the evaluation (by sharing state data), completing multiple lengthy applications requesting data, and then working closely with state officials to securely obtain files in the form necessary to carry out our Impacts analysis. In all cases, these efforts were required for both the states' vital records agencies (responsible for birth certificates) and Medicaid agencies (responsible for Medicaid eligibility and claims/encounter data). By the end of Year 4, the team had succeeded in obtaining all needed files from four states (FL, LA, NV, SC) and partial data from eight states (AL, AZ, DC, GA, MI, MO, NJ, PA). Furthermore, the evaluation expects to receive data from four states (CA, MD, TN, TX), leaving just four states where data receipt is uncertain (IL, KY, MS, VA).

During Year 4, the impacts team made significant progress in finalizing its analytic methods, linking birth certificate and Medicaid data, and conducing preliminary analyses. Specifically, the impacts and TA teams continued to work closely to obtain birth certificate and Medicaid data from 20 states with Strong Start awards. The impacts team also linked Medicaid eligibility and birth certificate data and prepared claims/encounter data in several states; assessed selection and comparison group challenges; determined the appropriateness of various analyses; and implemented its preliminary propensity score reweighting model in four states as a test. The preliminary propensity score models served as a "proof of concept" and allowed us to move on to identify methods for further refining the analyses. Moving forward, we will continue to collect, prepare, and analyze Medicaid and birth certificate data for remaining states and years; develop analytic claims files and finalize an approach to analyzing costs data; prepare final estimates on the impact of Strong Start on birth outcomes and costs/utilization (from claims data); implement enhancements to the propensity score reweighting approach by adding site of prenatal care and pre-pregnancy diagnoses to the model; and implement an instrumental variable model based on distance to site to further control for selection in preparation for presenting impacts results in the final report.

# Plans for Year 5

As mentioned above, by early 2017, all Strong Start awards had ceased operations and had either closed out their work or were in the process of doing so. Accordingly, by the end of Year 4 of the Strong Start for Mothers and Newborns evaluation (August 11, 2017), many data collection tasks in the project's scope of work had also been completed. In Year 4, a fourth and final round of case studies occurred, and reports on activities by all 27 awardees are synthesized in this report. Year 4 also saw the completion of participant-level process evaluation data collection for Quarters 2 through 4 2016, and Q1 2017 (though in this report, we only present analysis of data through Q4 2016). As part of the technical assistance and data acquisition task, the evaluation team continued to work with 20 states to request, gain approval, and obtain birth certificate and Medicaid data; ultimately, we received full datasets from four states (Florida, Louisiana, Nevada, and South Carolina) and partial data from six states (Alabama, Arizona, District of Columbia, Georgia, Michigan, and Pennsylvania) over the course of the project year. Requests were approved by additional state agencies that are expected to provide the data in the final project year. Finally, the impacts team worked to merge birth certificate and Medicaid data and applied its propensity score method of analysis to four states to produce preliminary impacts measures.

Year 5 is the final year of the evaluation, calling for a completion of the impact analysis, and the synthesis of findings from all three tasks across the five years of the evaluation. Specific plans for Year 5, by task, are summarized below.

### PARTICIPANT-LEVEL PROCESS EVALUATION

Throughout Year 5, awardees with missing participant data from the first four years of the evaluation will continue to be contacted, and all possible efforts will be made to complete their data submission. As described in this Year 4 Annual Report, the evaluation team has received and processed 92.6 percent of expected Intake Forms, 57.9 percent of Third Trimester Surveys, 56.4 percent of Postpartum Surveys, and more than 37,000 Exit Forms (or roughly 78 percent of women ever enrolled in Strong Start).

For the Year 5 Annual Report, all available participant-level data for the Strong Start evaluation will have been collected and compiled; final analyses will be presented, including the final quarter of data submission through Q1 2017 and any final missing data that were obtained. Given the end of the PLPE data submission, the team plans (subject to federal approval) to focus its time and resources on particular areas of interest and explore them more deeply in special studies.

### **CASE STUDIES**

Year 5 will not involve new case study data collection; instead, the research team hopes to conduct various special studies and cross-cutting analyses using the now complete set of case study data collected during the first four evaluation years in conjunction with the complete PLPE data and the impact analysis, as appropriate. The evaluation has found that the vast majority of providers and staff involved in implementing Strong Start believe the program should and can be replicated on a larger

scale. Therefore, one Year 5 analysis could delve into the factors that would make such replication possible. Another potential special study could summarize the most common successes and challenges that the Strong Start awardees experienced over the course of implementation. As in prior years, our case study data will be brought to bear in preparing for and analyzing results of our impacts analysis, shedding light on various implementation factors that may help explain impact results.

### **TECHNICAL ASSISTANCE AND DATA ACQUISITION**

During the first months of Year 5, the technical assistance and data acquisition team will continue to work with state vital records and Medicaid agencies with the goal of receiving all expected data by September 30. This deadline has been given to states and will allow the impact analysis team sufficient time to complete their comprehensive data analysis in time for the Year 5 Annual Report.

### **IMPACT ANALYSIS**

After obtaining either merged birth certificate and Medicaid data or data sets that we will then merge from the remaining states as possible, the impact analysis team with conduct its final propensity score impacts analyses as laid out in the Impacts Analysis chapter of this report. The team will explore whether these impacts differ across awardees, sites (when feasible), and the three Strong Start models. Specifically, using 2014–16 births, the team will examine the impact of Strong Start, relative to typical Medicaid prenatal care, on the key birth and process outcomes. For births occurring in 2014 and 2015, the team will use the claims/encounter data (when available) to assess the effects of Strong Start on Medicaid cost and utilization outcomes for the mother and infant one year after the delivery. (Claims and encounter data for 2016 births will not be ready for analysis before the end of the project period.) The impact analysis team will also add the site of prenatal care and pre-pregnancy diagnoses to the propensity score model and IV model based on distance to site, to improve the overall quality of the analytic approach. The evaluation's final Year 5 report will be prepared in draft by April 30, 2018. As time permits, additional refinements to the impacts analysis could be performed during the final months of the project and as the Year 5 report is finalized by August 2018.

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# **Technical Appendices**

## APPENDIX A: MEDICAID AND CHIP ELIGIBILITY, BY STRONG START STATE

Incom (Perce Location Pregna		ligibility of FPL) – Women	Medicaid Income Eligibility – Parents of	Medicaid Income Eligibility –	Family Planning	ACA Plans	
Location	Medicaid	CHIP	Dependent Children	Other Adults	Program	Medicaid	Marketplace
Alabama	146%	N/A	18%	Not Eligible	Yes	Not Participating	FFM
Alaska	205%	N/A	141%	138%	No	Not Participating	FFM
Arizona	161%	N/A	138%	138%	No	Participating	FFM
California	214%	N/A	138%	138%	Yes	Participating	SBM
District of Columbia	324%	N/A	221%	215%	No	Participating	SBM
Florida	196%	N/A	33%	Not Eligible	Yes <sup>1</sup>	Not Participating	FFM
Georgia	225%	N/A	37%	Not Eligible	Yes	Not Participating	FFM
Idaho	138%	N/A	26%	Not Eligible	No	Not Participating	SBM
Illinois	213%	N/A	138%	138%	No	Participating	Partnership
Kansas	171%	N/A	38%	Not Eligible	No	Not Participating	FFM <sup>2</sup>
Kentucky	200%	N/A	138%	138%	No	Participating	SBM-FP
Louisiana	138%	N/A	138%	138%	Yes	Not Participating	FFM
Maryland	264%	N/A	138%	138%	Yes	Participating	SBM
Michigan	200%	N/A	138%	138%	Yes	Participating <sup>3</sup>	Partnership
Minnesota	283%	N/A	138%	138%	Yes	Participating <sup>4</sup>	SBM
Mississippi	199%	N/A	27%	Not Eligible	Yes	Not Participating	FFM
Missouri	201%	N/A	22%	Not Eligible	Yes⁵	Not Participating	FFM
Nebraska	199%	N/A	63%	Not Eligible	No	Not Participating	FFM <sup>6</sup>
Nevada	165%	N/A	138%	138%	No	Participating	SBM <sup>7</sup>
New Jersey	199%	205%	138%	138%	No	Participating	FFM
New Mexico	255%	N/A	138%	138%	Yes	Participating	SBM-FP <sup>8</sup>
New York	223%	N/A	138%	138%	Yes	Participating	SBM
North Carolina	201%	N/A	44%	Not Eligible	Yes	Not Participating	FFM
Oklahoma	138%	N/A	44%	Not Eligible <sup>9</sup>	Yes	Not Participating	FFM
Oregon	190%	N/A	138%	138%	Yes	Participating	SBM-FP <sup>10</sup>
Pennsylvania	220%	N/A	138%	138%	Yes	Participating <sup>11</sup>	FFM
South Carolina	199%	N/A	67%	Not Eligible	Yes	Not Participating	FFM
Tennessee	200%	N/A	99%	Not Eligible	No	Not Participating	FFM
Texas	203%	N/A	18%	Not Eligible	Yes <sup>12</sup>	Not Participating	FFM
Virginia	148%	205%	38%	Not Eligible	Yes	Not Participating	FFM <sup>13</sup>

#### TABLE A.1: MEDICAID AND CHIP ELIGIBILITY POLICIES FOR CHILDBEARING WOMEN, BY STRONG START STATE

Source: Medicaid eligibility: http://www.kff.org/health-reform/state-indicator/medicaid-and-chip-income-eligibility-limits-forpregnant-women-as-a-percent-of-the-federal-poverty-level/; http://www.kff.org/health-reform/stateindicator/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://www.kff.org/healthreform/state-indicator/state-activity-around-expanding-medicaid-under-the-affordable-care-act/; http://www.kff.org/health-reform/state-indicator/state-health-insurance-marketplace-types/

*Notes:* <sup>1</sup>Florida will provide two years of family planning benefits to women losing coverage for any reason. <sup>2</sup>Kansas has received federal approval to conduct plan management activities to support certification of qualified health plans in FFMs.

<sup>3</sup>Michigan has approved Section 1115 waivers for Medicaid expansions.

<sup>4</sup> 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.

<sup>5</sup> Missouri provides coverage to women with incomes up to 185% FPL.

<sup>6</sup> Nebraska has received federal approval to conduct plan management activities to support certification of qualified health plans in FFMs.

<sup>7</sup> Nevada is operating SBMs with federal support.

<sup>8</sup> New Mexico is operating SBMs with federal support.

<sup>9</sup> 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.

<sup>10</sup>Oregon is operating SBMs with federal support.

<sup>11</sup> Pennsylvania has approved Section 1115 waivers for 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.

<sup>12</sup> Texas operates an entirely state-funded program that provides family planning services to women at least 18 years of age. Texas and Missouri provide coverage to women with incomes up to 185 percent FPL.

<sup>13</sup> Virginia has received federal approval to conduct plan management activities to support certification of qualified health plans in FFMs.

## APPENDIX B: PARTICIPANT-LEVEL PROCESS EVALUATION DATA SUBMITTED THROUGH Q1 2017

TABLE B.1: ENROLLMENT	, DELIVERIES, AND	FORM SUBMISSION,	BY MODEL AND OVERALL
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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 Q4 2016	N	17	121	133	271			
Total Enrolled through Q4 2016	Ν	8503	11353	26121	45977			
Number Women Delivered through Q4 2016	N	4747	7943	18019	30709			
Forms Received through Q4 2016	-		-					
Intake Forms Received through Q4 2016	Ν	7407	9821	25353	42581			
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	87.1	86.5	97.1	92.6			
Received in Q4 2016	Ν	12	23	142	177			
Third-Trimester Surveys Received through Q4 2016	N	5498	5862	15259	26619			
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	64.7	51.6	58.4	57.9			
Received in Q4 2016	N	110	42	527	679			
Postpartum Surveys Received through Q4 2016	N	5149	5684	15106	25939			
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	60.6	50.1	57.8	56.4			
Received in Q4 2016	Ν	403	212	1109	1724			
Exit Forms Received through Q4 2016	Ν	6401	8494	23070	37965			
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	75.3	74.8	88.3	82.6			
Received in Q4 2016	Ν	596	463	2878	3937			

TABLE B.2: SOCIOECONOMIC CHARACTERISTICS, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Sociodemographic Characteristics					
Mother's Age at Intake	Ν	7381	9663	25089	42133
Less than 18 years of age	%	2.8	7.0	5.6	5.4
18 and 19 years of age	%	6.5	12.6	9.6	9.7
Greater than or equal to 20 and less than 35 years of age	%	81.7	72.8	75.2	75.8
35 years of age or older	%	9.1	7.6	9.7	9.1
Race and Ethnicity	Ν	7345	9600	24929	41874
Hispanic	%	25.3	37.1	28.2	29.7
Non-Hispanic White	%	53.3	12.7	22.4	25.6
Non-Hispanic African American	%	16.1	45.1	45.2	40.1
Non-Hispanic Other Race or Non-Hispanic Multiple Races	%	5.3	5.1	4.3	4.7
Hispanic Women	Ν	1855	3562	7018	12435
Mexican, Mexican American, Chicana	%	52.6	35.5	55.8	49.5
Puerto Rican	%	12.5	30.4	3.3	12.4
Cuban	%	1.3	1.2	1.0	1.1
Other Hispanic, Latina, or Spanish origin	%	30.7	32.0	38.8	35.6
Multiple Hispanic, Latina, or Spanish origins	%	2.9	0.9	1.0	1.3
Living in Shelter or Homeless at Intake	Ν	7407	9821	25353	42581
Yes	%	1.3	1.8	1.5	1.5
Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
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Employed at Intake	Ν	7309	9397	24865	41571
Yes	%	42.2	35.9	40.1	39.5
Education Level at Intake	Ν	6623	7869	20975	35467
Less than High School	%	14.8	27.8	28.7	25.9
High School Graduate or GED	%	58.8	59.7	60.3	59.9
Bachelor's Degree	%	12.5	3.9	3.5	5.2
Other College Degree	%	14.0	8.6	7.5	9.0
Relationship Status at Intake	Ν	7310	8885	24688	40883
Married, living with spouse	%	40.3	18.3	18.6	22.5
Married, not living with spouse	%	1.7	2.0	2.0	2.0
Living with a partner	%	33.1	34.6	31.1	32.2
In a relationship but not living together	%	14.7	26.0	29.7	26.2
Not in a relationship right now	%	10.0	19.0	18.5	17.1
Smokes Cigarettes at Intake	Ν	6719	7854	23827	38400
Food Insecure at Intake	Ν	6956	8206	23060	38222
Yes	%	18.3	22.7	18.1	19.2

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	7194	8770	24227	40191
Yes	%	23.1	30.4	24.7	25.7
Exhibiting Symptoms of Anxiety at Intake	N	7202	8818	24254	40274
Yes	%	9.9	15.6	13.6	13.4
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Throw)	N	7260	8885	24242	40387
Yes	%	20.5	17.1	19.5	19.1
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	N	6874	7834	22052	36760
Yes	%	2.2	3.0	2.4	2.5
Mother's Weight					
BMI of Mother at First Prenatal Visit	N	6159	6099	18924	31182
Underweight at first prenatal visit (BMI < 18.5)	%	4.3	3.8	2.9	3.3
Normal weight at first prenatal visit (BMI ≥ 18.5 and BMI < 25)	%	46.3	34.0	31.0	34.6
Overweight at first prenatal visit (BMI ≥ 25 and BMI < 30)	%	25.4	27.6	25.4	25.8
Obese at first prenatal visit (BMI ≥ 30 and BMI < 40)	%	20.1	26.9	29.7	27.3
Very obese at first prenatal visit (BMI ≥ 40)	%	4.0	7.6	11.0	9.0
Pre-Pregnancy Diagnoses					
Pre-Pregnancy Diagnosis of Type I Diabetes	N	6375	7889	21339	35603
Yes	%	0.2	2.6	1.2	1.3
No	%	99.8	70.5	90.7	87.9
Not Known	%	0.0	26.9	8.1	10.8

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Pre-Pregnancy Diagnosis of Type II Diabetes	N	6370	7871	21318	35559
Yes	%	0.3	4.1	2.3	2.3
No	%	99.7	82.4	91.5	91.0
Not Known	%	0.0	13.6	6.2	6.7
Pre-Pregnancy Diagnosis of Hypertension	Ν	6376	7865	21350	35591
Yes	%	0.6	7.0	7.3	6.0
No	%	99.4	82.4	86.7	88.0
Not Known	%	0.0	10.6	6.0	5.9
Risk Factors from Past Pregnancies					
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	N	3876	4380	14364	22620
Yes	%	11.6	18.9	22.8	20.2
No	%	88.4	78.0	75.3	78.1
Not Known	%	0.0	3.1	1.9	1.8
Previous Birth < 2,500 grams	Ν	3798	3783	13150	20731
Yes	%	1.6	10.0	13.8	10.9
No	%	98.1	75.4	73.9	78.6
Not Known	%	0.3	14.6	12.2	10.5
Previous Miscarriage (< 20 weeks EGA)	Ν	4593	5031	15149	24773
Yes	%	32.0	23.7	33.6	31.3
No	%	67.9	64.6	59.6	62.1
Not Known	%	0.1	11.7	6.8	6.5
Previous Elective Termination	Ν	4607	5034	15143	24784
Yes	%	16.7	16.8	18.1	17.6
No	%	83.2	71.5	74.8	75.7
Not Known	%	0.1	11.6	7.1	6.7
Previous Still Birth (fetal death ≥ 20 weeks EGA)	Ν	3801	4085	13198	21084
Yes	%	0.8	1.9	3.6	2.8
No	%	99.1	85.3	88.4	89.7
Not Known	%	0.1	12.8	8.1	7.5
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	N	3142	3046	11163	17351
< 6 months	%	6.7	8.2	8.0	7.8
≥ 6 months and < 12 months	%	12.9	8.9	9.8	10.2
≥ 12 months and < 18 months	%	17.3	8.5	10.3	11.2
≥ 18 months	%	63.2	74.3	72.0	70.8

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	6365	7767	21168	35300
Yes	%	5.4	10.3	13.7	11.4
No	%	94.5	75.6	69.0	75.1
Not Known	%	0.1	14.1	17.3	13.5

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Cervical Incompetence	Ν	6359	7871	21180	35410
Yes	%	0.0	0.7	1.5	1.0
No	%	99.8	77.9	82.2	84.4
Not Known	%	0.1	21.4	16.3	14.5
Placenta Previa	Ν	6364	7866	21179	35409
Yes	%	0.3	0.8	1.4	1.0
No	%	99.6	86.0	82.6	86.4
Not Known	%	0.1	13.3	16.0	12.6
Placental Abruption	Ν	6368	7860	21167	35395
Yes	%	0.4	0.4	0.6	0.5
No	%	99.5	85.9	82.1	86.1
Not Known	%	0.1	13.7	17.3	13.4
Gestational Diabetes	Ν	6369	7866	21186	35421
Yes	%	2.5	5.4	6.3	5.4
No	%	97.5	81.2	79.1	82.9
Not Known	%	0.1	13.3	14.6	11.7
Pregnancy-Related Hypertension	Ν	6368	7857	21184	35409
Yes	%	1.3	7.4	6.2	5.6
No	%	98.6	79.2	79.3	82.8
Not Known	%	0.1	13.4	14.5	11.7
Preeclampsia	Ν	6368	7863	21175	35406
Yes	%	1.7	5.5	5.1	4.6
No	%	98.2	80.9	79.8	83.3
Not Known	%	0.1	13.7	15.1	12.1
Syphilis	Ν	6369	7848	21190	35407
Yes	%	0.0	0.4	0.4	0.3
No	%	5.2	87.0	89.4	73.7
Not Known	%	94.7	12.6	10.2	25.9
Human Immunodeficiency Virus (HIV)	N	6369	7869	21194	35432
Yes	%	0.0	0.7	0.5	0.4
No	%	99.9	79.2	90.4	89.6
Not Known	%	0.1	20.1	9.1	9.9
Congenital Abnormalities of the Fetus	N	6366	7852	21152	35370
Yes	%	1.2	1.3	1.7	1.5
No	%	98.7	77.4	82.4	84.2
Not Known	%	0.2	21.3	15.9	14.3
Maternal Weight Gain	Ν	3539	4826	15441	23806
Very low weight gain (<0.26 lbs./week)	%	12.4	18.6	23.6	21.0
Very high weight gain (≥1.74 lbs./week)	%	0.9	0.8	0.7	0.8
Average weight gain (≥0.26 and < 1.74 lbs./week	%	86.7	80.5	75.6	78.3
Using Birth Control when became Pregnant with this Pregnancy	N	7287	9193	24596	41076
Yes	%	7.3	8.6	11.1	9.8
No	%	84.8	85.0	84.5	84.7
Sometimes	%	7.9	6.4	4.4	5.5

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Births		-			
Total Number of Exit Forms with Valid Birth Information	N	6337	6825	19298	32460
Number of Fetuses Identified	Ν	6354	6894	19693	32941
Live Pirths	Ν	6314	6540	17929	30783
	%	99.4	94.9	91.0	93.4
Stillborn Infants	Ν	22	100	232	354
	%	0.3	1.5	1.2	1.1
Birth Status Missing	Ν	19	288	1552	1859
	%	0.3	4.2	7.9	5.6
Birth Outcomes: Estimated Gestational Age (EGA) and	Birth W	/eight	ſ	r	I
Estimated Gestational Age (EGA)	Ν	6289	6009	17002	29300
Very Preterm Births, 20 to 33 weeks, 6 days EGA	%	1.2	3.6	5.1	4.0
Preterm Births, 34 to 37 weeks, 6 days EGA	%	4.0	8.5	9.7	8.3
Early Term Births, 37 to 38 weeks, 6 days EGA	%	19.9	26.3	27.0	25.3
Term Births, 39 to 41 weeks, 6 days EGA	%	70.8	58.2	55.7	59.5
Late term Births, ≥42 weeks EGA	%	4.0	3.2	2.4	2.9
Birth Weight	Ν	6177	6164	16944	29285
Very Low Birth Weight, ,1500 grams	%	0.6	1.6	2.6	2.0
Low Birth Weight, 1500–2499 grams	%	3.3	9.1	10.6	8.8
Not Low Birth Weight, 2500–3999 grams	%	85.4	84.2	81.0	82.6
Macrosomia, >4000 grams	%	10.8	5.1	5.8	6.7
Preterm Labor Management	1	I	I		T
Antenatal Steroids	Ν	6326	7452	19549	33327
Yes	%	0.5	1.8	3.0	2.3
No	%	99.1	68.2	61.1	69.9
Not Known	%	0.5	30.0	35.8	27.8
Vaginal Progesterone	Ν	5955	7153	19549	32657
Yes	%	0.2	0.4	0.9	0.7
No	%	99.3	77.5	68.4	76.0
Not Known	%	0.5	22.1	30.7	23.3
Progesterone Injections	N	452	708	2930	4090
Yes	%	3.8	9.0	15.5	13.1
No	%	96.2	71.8	63.7	68.7
Not Known	%	0.0	19.2	20.8	18.2
Tocolytics	N	6321	7442	19533	33296
Yes	%	0.4	0.8	1.4	1.1
No	%	99.1	69.2	59.0	68.9
Not Known	%	0.6	30.0	39.6	30.0
Induction of Labor, excluding Planned Cesarean sections	Ν	6155	6899	17628	30682
Yes	%	16.4	27.4	23.3	22.8
No	%	83.1	44.1	42.1	50.8
Not Known	%	0.5	28.6	34.6	26.4

### TABLE B.5: BIRTH OUTCOMES AND PRETERM LABOR MANAGEMENT DATA, BY MODEL AND OVERALL

Data Elements	N or %	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Induction of labor with Pitocin, excluding planned Cesarean sections	Ν	5938	6224	15117	27279
Yes	%	7.6	25.2	21.5	19.3
No	%	91.6	50.5	50.9	59.7
Not Known	%	0.8	24.3	27.6	21.0
Delivery Method					•
Delivery Method, Based on Exit Data	Ν	6322	6457	17572	30351
Vaginal Only	%	87.0	71.0	68.1	72.7
C-Section Only	%	13.0	28.9	31.6	27.1
Both Vaginal and C-Section	%	0.0	0.1	0.3	0.2
Delivery Method Among Women with Previous C- Section	Ν	316	922	3027	4265
VBAC	%	28.8	23.6	16.4	18.9
Repeat C-section	%	71.2	76.4	83.6	81.1
Scheduled C-section	Ν	791	1796	5054	7641
Yes	%	18.3	30.7	37.3	33.8
No	%	34.4	49.1	45.9	45.5
Not Known	%	47.3	20.2	16.8	20.7
Multiples					
Multiples Pregnancy, based on Exit Data	Ν	6337	6825	19298	32460
Two or more identified fetuses	%	0.3	1.0	2.0	1.5
One identified fetus	%	99.7	99.0	98.0	98.5
Multiples Birth, based on Exit Data	Ν	6292	6416	17518	30226
Two or more infants born alive	%	0.3	1.0	1.8	1.3
One infant born alive	%	99.7	99.0	98.2	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
Received Individual Prenatal Visits	N	6339	7204	19645	33188
Yes	%	99.9	78.8	91.8	90.5
	N	6339	7204	19645	33188
Average and Median Number of Individual Prenatal Visits per Participant	Mean	11.03	4.21	8.72	8.18
	Median	11	4	9	9
Received Group Prenatal Visits	N	6339	7204	19645	33188
Yes	%	2.1	86.3	1.8	20.2
	N	6339	7204	19645	33188
Average and Median Number of Group Prenatal Visits per Participant	Mean	0.14	5.19	0.09	1.21
	Median	0	6	0	0
Enhanced Encounters	-	-	-	-	
	N	5800	2735	18486	27021
Enhanced encounters, average and median	Mean	3.90	2.41	4.80	4.36
	Median	3	2	4	3
Received Care Coordinator Encounters	N	6387	7916	21520	35823
Yes	%	97.9	38.3	90.3	80.2
No	%	2.0	42.3	6.9	13.8
Not Known	%	0.1	19.4	2.8	6.0

N 5793 2704 18422 26919
N 3775 2704 10422 2071
Average and Median Number of Care Mean 3.86 2.34 4.59 4.21
Median 3 2 3 3
Received Mental Health Encounters N 6370 7873 20972 35215
Yes % 0.8 2.7 8.1 5.6
No % 94.5 75.1 85.2 84.6
Not Known % 4.7 22.2 6.7 9.8
N 41 167 1550 1758
Average and Median Number of Mental Health         Mean         1.93         1.68         2.40         2.32
Encounters per Participant Median 1 1 2 2
Received Doula Encounters N 935 7872 20912 29715
Ves         %         740         02         07         29
No. % 245 762 936 869
Not Known % 15 236 57 103
NU 77 6 120 202
N     77     8     120     203       Average and Median Number of Doula     Maan     240     147     240     233
Encounters per Participant
Median Z I Z Z
Ennanced Services
Average and Median Number of Enhanced
Services per Participant Mean 1.43 2.19 4.02 3.30
Median 1 1 2 2
Received Health Education, not CenteringN17773981757825153
Yes % 16.4 9.3 26.2 21.2
No % 76.3 69.9 59.4 62.6
Not Known         %         7.3         20.8         14.3         16.2
N 13 409 3874 4296
Average and Median Number of Health EducationMean1.541.292.432.32
Median 1 1 1
Received Home Visits         N         3162         7398         17634         28194
Yes % 55.5 1.9 7.3 11.3
No % 44.3 73.1 86.7 78.4
Not Known % 0.3 25.0 6.1 10.4
N 1754 57 1060 2871
Average and Median Number of Home Visiting         Mean         1.42         1.26         1.57         1.49
Median 1 1 1 1
Received Self-Care, not Centering N 173 7376 17310 24859
Yes % 0.0 4.8 8.5 7.4
No % 86.1 61.1 76.2 71.8
Not Known % 13.9 34.1 15.3 20.8
N 0 179 1139 1318
Average and Median Number of Self-Care Mean N/A 1.19 3.93 3.56
Services per Participant Median N/A 1 2 2
Received Nutrition Counseling N 6202 7374 17529 31104
Yes % 0.4 212 30.1 22.1
No 94 58 4 410 471
Not         Not         Solid         Solid <thsolid< th="">         Solid         Soli</thsolid<>

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
	N	4	1008	4499	5511
Average and Median Number of Nutrition	Mean	1	1.52	2.08	1.98
Counseling Services per Participant	Median	1	1	1	1
Received Substance Abuse Services	N	6204	7157	17422	30783
Yes	%	0.1	2.3	2.6	2.0
No	%	94.9	85.9	87.8	88.8
Not Known	%	5.0	11.8	9.6	9.2
	N	0	60	385	445
Average and Median Number of Substance Abuse	Mean	N/A	4.17	2.25	2.51
	Median	N/A	1	1	1
Referrals					
Referrals for Nonmedical Services Outside of the Strong Start Program	N	6380	7844	21174	35398
Yes	%	2.7	28.1	47.9	35.4
No	%	92.6	56.8	38.4	52.2
Not Known	%	4.7	15.1	13.7	12.4
<b>Referrals for High-Risk Medical Services</b>	Ν	6365	7848	20775	34988
Yes	%	0.3	18.4	23.2	18.0
No	%	94.9	55.8	69.9	71.3
Not Known	%	4.7	25.8	6.9	10.8
Support Person	-				
Plan to have a support person	N	5060	5007	13471	23538
Yes	%	95.8	92.7	92.3	93.2
No	%	0.9	1.6	1.8	1.6
Unsure	%	3.2	5.7	5.9	5.3
Had a support person during labor	N	4731	4281	13006	22018
Yes	%	98.0	76.4	92.1	90.3
No	%	1.5	4.9	3.8	3.5
Unsure	%	0.5	18.7	4.2	6.2
Delivery Process	,				
Delivery Location, based on Exit Data	N	5979	6929	17363	30271
Hospital	%	48.9	98.6	99.1	89.1
Birth center	%	43.6	0.1	0.1	8.7
Home birth	%	6.9	0.0	0.2	1.5
Other	%	0.5	1.3	0.6	0.8
Prenatal Service Provider					
Routine Prenatal Service Provider, based on Exit Data	N	6381	7201	19285	32867
Obstetrician	%	2.3	30.3	63.5	44.4
Licensed Professional Midwife	%	18.5	2.5	0.9	4.6
Nurse Practitioner	%	0.1	23.3	5.5	8.4
Certified Nurse Midwife/Certified Midwife	%	77.0	39.3	18.7	34.6
Family Medicine Physician	%	1.9	2.9	1.3	1.8
Other Provider	%	0.2	1.8	10.0	6.3

Data Elements	N, % or Mean	Birth Center Model	Group Prenatal Care Model	Maternity Care Home Model	Total
Prenatal Visits	-	-	-	-	
Received Individual Prenatal Visits	N	6339	7204	19645	33188
Yes	%	99.9	78.8	91.8	90.5
No	%	0.1	21.2	8.2	9.5
Average and Median Number of Individual	N	6339	7204	19645	33188
	Mean	11.03	4.21	8.72	8.18
	Median	11	4	9	9
Received Group Prenatal Visits	N	6339	7204	19645	33188
Yes	%	2.1	86.3	1.8	20.2
No	%	97.9	13.7	98.2	79.8
	N	6339	7204	19645	33188
Average and Median Number of Group Prenatal Visits per Participant	Mean	0.14	5.19	0.09	1.21
	Median	0	6	0	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)	Ν	4650	4194	13047	21891
Yes	%	77.0	77.5	83.7	81.1
No	%	20.0	14.5	13.5	15.1
Unsure	%	3.0	7.9	2.7	3.8
Breastfeeding					
Breastfeeding Intention at Third Trimester	Ν	5396	5241	14991	25628
Breastfeed only	%	80.3	48.2	39.7	50.0
Formula feed only	%	4.0	10.3	15.6	12.1
Both breast and formula feed	%	10.9	32.1	32.9	28.1
I haven't decided	%	4.8	9.3	11.8	9.8
Breastfeeding after Delivery (Based on Postpartum Form Data)	N	4704	4226	13184	22114
Yes	%	91.6	77.3	72.6	77.5
No	%	7.6	14.7	24.5	19.1
Prefer not to answer	%	0.8	8.0	2.9	3.4
Satisfaction					
Satisfaction with Prenatal Care	Ν	5403	5138	14715	25256
Not at all satisfied	%	0.0	0.7	0.6	0.5
Slightly satisfied	%	0.5	1.0	1.5	1.2
Moderately satisfied	%	3.3	5.2	8.6	6.8
Very satisfied	%	29.7	39.9	43.6	39.9
Extremely satisfied	%	66.5	53.1	45.6	51.6
Satisfaction with Delivery Experience	Ν	4705	3481	12702	20888
Not at all satisfied	%	2.0	3.2	2.4	2.5
Slightly satisfied	%	3.0	4.0	3.0	3.2
Moderately satisfied	%	10.4	11.2	12.6	11.9
Very satisfied	%	28.9	43.7	45.4	41.4
Extremely satisfied	%	55.7	37.8	36.6	41.1

#### TABLE B.8: ENROLLMENT AND RECEIVED FORMS, BY AWARDEE

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
Newly Enrolled in Q4 2016	Ν	0	0	12	14	0	0	0	0	95	0	0	0	0	0	0	0	110	0	0	9	0	0	0	0	0	12	19	271
Total Enrolled through Q4 2016	Ν	2666	1512	8123	963	1193	1343	1121	1275	1069	1602	3203	958	1203	1809	2628	858	3284	1809	245	1105	1207	1289	696	928	1580	691	1617	45977
Number Women Delivered through Q4 2016	Ν	1952	1194	4445	624	943	1056	696	1046	587	1497	1679	670	1085	1572	1588	529	1760	1180	161	768	870	1162	544	689	1101	299	1012	30709
Intake Forms Received through Q4 2016	Ν	2668	1122	7027	897	1161	1343	678	1214	710	1627	3153	782	820	1804	2259	861	3462	1747	194	1058	1169	1324	696	908	1567	726	1604	42581
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	100.1	74.2	86.5	93.1	97.3	100.0	60.5	95.2	66.4	101.6	98.4	81.6	68.2	99.7	86.0	100.3	105.4	96.6	79.2	95.7	96.9	102.7	100.0	97.8	99.2	105.1	99.2	92.6
Third Trimester Surveys Received through Q4 2016	Ν	1907	404	5187	560	731	898	420	933	425	1136	1283	472	544	1167	1322	326	2657	905	144	646	585	684	381	599	874	716	713	26619
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	71.5	26.7	63.8	58.2	61.3	66.9	37.5	73.2	39.8	70.9	40.1	49.3	45.2	64.5	50.3	38.0	80.9	50.0	58.8	58.5	48.5	53.1	54.7	64.5	55.3	103.6	44.1	57.9
Postpartum Surveys Received through Q4 2016	Ν	1845	270	4864	530	624	992	139	1153	344	1367	968	309	798	1183	1394	320	2434	812	137	497	474	1092	292	414	817	714	1156	25939
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	69.2	17.9	59.9	55.0	52.3	73.9	12.4	90.4	32.2	85.3	30.2	32.3	66.3	65.4	53.0	37.3	74.1	44.9	55.9	45.0	39.3	84.7	42.0	44.6	51.7	103.3	71.5	56.4
Exit Forms Received through Q4 2016	Ν	1993	983	6029	782	998	1290	386	1250	391	1629	2474	959	877	1795	2523	727	2994	1770	177	437	1026	1322	640	742	1456	713	1602	37965
Received through Q4 2016 as a percentage of the number of women ever enrolled	%	74.8	65.0	74.2	81.2	86.0	96.1	34.4	98.0	36.6	101.7	77.2	100.1	72.9	99.2	96.0	84.7	91.2	97.8	72.2	39.5	85.0	102.6	92.0	80.0	92.2	103.2	99.1	82.6

#### TABLE B.9: SOCIODEMOGRAPHIC CHARACTERISTICS, BY AWARDEE

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
Mother's Age at Intake	Ν	2655	1098	7001	884	1157	1343	658	1214	708	1622	3151	782	820	1804	2257	858	3455	1739	194	886	1169	1322	673	908	1455	721	1599	42133
Less than 18 years of age	%	6.4	6.6	2.6	4.0	4.1	6.9	7.9	8.0	6.2	7.4	2.5	11.6	1.8	2.7	8.5	6.8	5.6	4.2	2.1	5.3	5.2	6.4	5.3	7.4	8.4	13.9	5.8	5.4
18 and 19 years of age	%	9.3	12.8	6.3	10.3	9.9	11.7	17.9	9.6	17.1	11.4	5.6	13.7	6.5	9.9	12.0	10.3	8.2	10.9	8.2	11.4	8.9	10.0	12.3	10.1	12.2	18.4	11.1	9.7

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
Greater than or equal to 20 and less than 35 years of age	%	71.0	76.0	81.9	80.1	77.7	74.8	71.4	68.8	71.2	73.2	73.7	68.4	82.1	83.0	74.2	74.2	75.6	78.6	79.4	76.1	74.1	76.6	75.5	68.3	73.8	64.8	73.4	75.8
35 years of age or older	%	13.3	4.6	9.2	5.7	8.4	6.6	2.7	13.6	5.5	8.0	18.2	6.3	9.6	4.4	5.3	8.7	10.6	6.4	10.3	7.2	11.8	7.0	6.8	14.2	5.6	2.9	9.8	9.1
Race and Ethnicity	Ν	2629	1104	6968	890	1137	1339	678	1210	695	1623	3044	777	816	1794	2226	854	3385	1717	194	1009	1150	1321	683	891	1557	670	1513	41874
Hispanic	%	51.4	16.5	26.3	7.6	49.0	22.1	4.3	83.4	40.3	8.1	66.3	64.6	3.9	3.4	1.2	42.3	27.8	3.4	1.5	59.2	51.9	2.4	33.1	97.9	1.7	1.2	22.3	29.7
Non-Hispanic White	%	5.0	8.8	56.1	16.6	9.7	29.9	4.3	2.4	24.9	13.1	5.8	13.1	24.8	83.7	8.9	17.9	1.2	77.8	5.7	23.2	11.5	19.5	50.5	1.8	34.2	1.8	15.1	25.6
Non-Hispanic African American	%	41.5	68.2	12.2	72.8	37.1	42.5	88.8	13.5	21.9	72.5	19.3	19.2	70.0	11.4	89.0	8.8	67.7	15.6	89.7	14.7	34.1	77.8	12.4	0.3	60.4	96.7	52.6	40.1
Non-Hispanic Other Race or Non-Hispanic Multiple Races	%	2.1	6.5	5.4	2.9	4.2	5.5	2.7	0.7	12.9	6.3	8.6	3.1	1.3	1.5	0.9	31.0	3.2	3.3	3.1	3.0	2.5	0.3	4.0	0.0	3.7	0.3	10.0	4.7
Ethnicity	Ν	1352	182	1833	68	557	296	29	1009	280	131	2017	502	32	61	26	361	941	58	3	597	597	32	226	872	27	8	338	12435
Mexican, Mexican American, Chicana	%	85.0	14.8	53.1	22.1	16.7	16.6	41.4	65.1	70.7	22.1	66.9	87.6	62.5	72.1	46.2	65.7	10.0	17.2	33.3	25.3	54.3	71.9	71.7	0.2	51.9	62.5	20.1	49.5
Puerto Rican	%	2.5	63.7	12.4	1.5	15.6	40.5	20.7	0.2	1.8	17.6	0.4	1.0	6.3	3.3	11.5	1.1	2.1	0.0	33.3	0.2	0.7	6.3	1.8	96.0	14.8	0.0	8.3	12.4
Cuban	%	0.2	2.2	1.3	7.4	1.4	14.2	10.3	1.1	0.7	3.1	0.3	0.4	3.1	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.5	3.1	0.4	0.5	11.1	0.0	1.5	1.1
Other Hispanic, Latina, or Spanish origin	%	10.9	15.9	30.3	66.2	64.5	21.3	27.6	33.6	25.4	57.3	31.7	10.4	28.1	23.0	42.3	31.9	87.0	81.0	33.3	74.0	44.4	15.6	25.7	2.8	14.8	37.5	68.9	35.6
Multiple Hispanic, Latina, or Spanish origins	%	1.4	3.3	2.9	2.9	1.8	7.4	0.0	0.0	1.4	0.0	0.6	0.6	0.0	1.6	0.0	1.4	0.5	1.7	0.0	0.2	0.2	3.1	0.4	0.6	7.4	0.0	1.2	1.3
Living in Shelter or Homeless at Intake	N	2668	1122	7027	897	1161	1343	678	1214	710	1627	3153	782	820	1804	2259	861	3462	1747	194	1058	1169	1324	696	908	1567	726	1604	42581
Yes	%	1.0	1.9	0.9	1.1	1.4	2.5	1.6	0.4	1.5	1.1	1.2	0.6	1.5	0.6	1.6	3.5	3.2	1.2	3.1	0.5	2.0	0.9	5.7	3.4	1.2	0.8	1.3	1.5
Employed at Intake	Ν	2640	1091	6934	807	1136	1335	668	1206	698	1621	3113	778	820	1793	2218	848	3423	1576	192	1026	1160	1320	687	894	1532	644	1411	41571
Yes	%	39.5	43.2	42.5	47.5	40.1	40.1	42.4	23.0	34.8	37.9	42.8	33.4	42.3	38.4	35.7	41.4	41.1	50.7	30.2	40.4	37.9	38.3	32.8	27.5	40.1	25.6	37.6	39.5
Education Level at Intake	Ν	2021	979	6287	726	885	1218	619	1096	632	1544	2664	653	787	1725	1766	664	2808	1308	167	701	829	1242	406	634	1406	551	1149	35467
Less than High School	%	34.0	22.0	14.4	21.6	17.5	35.1	24.6	65.6	32.8	31.4	30.8	41.5	24.4	24.3	21.6	36.0	28.5	13.2	24.0	25.1	39.3	25.3	0.0	11.2	28.9	24.9	26.1	25.9
High School Graduate or GED	%	54.5	69.9	58.6	64.2	64.6	53.4	64.3	32.9	58.5	62.2	57.4	51.1	62.1	65.4	68.0	50.5	59.9	68.7	69.5	60.5	51.1	66.7	84.5	51.1	60.8	71.9	60.5	59.9
Bachelor's Degree	%	3.5	2.8	12.7	5.0	6.9	1.4	3.7	0.6	2.7	2.6	6.2	1.5	3.9	3.1	1.7	4.4	4.8	5.8	1.2	2.4	4.0	1.9	4.9	8.2	1.8	0.9	5.0	5.2

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 College Degree	%	7.9	5.4	14.3	9.2	11.0	10.2	7.4	0.8	6.0	3.8	5.7	5.8	9.5	7.2	8.7	9.2	6.8	12.2	5.4	12.0	5.5	6.1	10.6	29.5	8.5	2.4	8.4	9.0
Relationship Status at Intake	N	2623	1051	6941	790	1102	1335	657	1206	691	1604	3134	774	818	1796	2142	839	3375	1562	194	1036	1154	1312	685	873	1499	353	1337	40883
Married, living with spouse	%	21.0	9.8	42.0	12.3	20.8	13.3	10.4	27.6	15.8	11.0	25.0	13.3	14.8	24.9	8.5	32.5	15.4	26.4	6.2	22.6	28.4	10.6	27.4	19.8	12.5	7.9	22.1	22.5
Married, not living with spouse	%	1.6	1.3	1.8	1.8	3.5	1.7	2.1	1.5	2.3	1.8	2.2	1.4	2.1	1.4	2.3	2.3	2.4	1.2	3.1	1.3	1.4	2.4	2.0	1.5	3.6	0.3	3.3	2.0
Living with a partner	%	32.5	32.6	33.6	39.7	28.3	35.7	31.1	35.8	44.4	35.0	35.4	37.1	25.9	30.2	19.6	34.2	28.4	35.9	26.8	34.1	34.3	24.5	38.1	46.2	27.4	26.6	28.3	32.2
In a relationship but not living together	%	28.7	34.1	13.6	28.6	28.7	29.8	32.9	18.2	19.4	29.9	27.5	30.9	41.3	27.5	44.0	16.9	32.4	21.6	23.2	19.6	21.6	38.4	19.3	18.0	31.6	43.3	24.2	26.2
Not in a relationship right now	%	16.2	22.2	9.1	17.6	18.7	19.6	23.6	16.9	18.1	22.3	9.8	17.3	15.9	15.9	25.7	14.1	21.5	15.0	40.7	22.5	14.3	24.1	13.1	14.5	24.9	21.8	22.1	17.1
Smokes Cigarettes at Intake	Ν	2533	913	6383	763	999	1329	609	1146	642	1494	3029	776	819	1785	1800	801	3198	1572	186	999	1140	1317	696	802	1445	137	1087	38400
Yes	%	7.9	14.8	10.6	8.9	3.8	17.1	5.6	0.9	9.7	17.3	4.4	9.8	12.7	23.7	18.4	11.0	6.7	20.2	8.1	11.6	11.0	19.6	32.8	3.1	21.8	13.9	14.2	12.1
Food Insecure at Intake	Ν	2494	912	6603	724	1020	1312	607	1186	637	1597	2783	730	808	1745	2107	813	3183	1244	183	907	1076	1280	641	813	1332	343	1142	38222
Yes	%	27.6	21.5	17.2	21.8	22.6	22.5	21.1	13.6	30.1	14.9	16.0	7.0	15.8	3.7	15.8	21.8	25.9	11.4	26.2	21.4	10.5	27.3	30.3	25.8	18.8	15.7	28.0	19.2

#### TABLE B.10: RISK FACTORS AT INTAKE, BY AWARDEE

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	Ν	2643	1055	6816	768	1078	1337	666	1211	676	1621	3108	773	814	1801	2180	842	3365	1303	193	933	1145	1306	673	838	1529	382	1135	40191
Yes	%	21.4	38.4	22.3	35.9	26.4	31.9	32.9	12.5	31.2	31.8	21.1	12.4	12.0	8.1	32.6	19.1	27.8	24.5	40.4	22.7	13.1	49.2	35.7	33.7	32.4	29.1	36.5	25.7
Exhibiting Symptoms of Anxiety at Intake	Ν	2639	1059	6825	775	1093	1338	664	1210	680	1619	3108	767	815	1800	2184	847	3384	1304	192	925	1138	1306	666	866	1518	373	1179	40274
Yes	%	11.9	24.3	9.6	20.4	13.6	20.0	18.8	5.0	18.2	18.3	12.6	5.0	4.8	5.3	18.8	10.9	13.7	16.6	20.3	14.3	5.9	21.1	15.6	15.5	16.6	10.2	16.6	13.4

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
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	N	2615	1059	6888	791	1106	1274	665	1211	694	1620	3080	774	816	1785	2222	851	3379	1306	191	936	1120	1318	664	885	1537	378	1222	40387
Yes Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Partney)	% N	17.6 2327	17.5 <b>959</b>	20.2 6538	14.8 715	15.6 922	34.9 1063	12.9 625	17.3 1058	22.9 619	14.6 <b>1549</b>	26.3 <b>3028</b>	22.7 698	10.3 768	15.0 1627	15.3 2039	20.0 779	16.7 <b>3056</b>	23.5 1154	25.1 143	20.0 753	14.9 <b>994</b>	27.6 1164	25.8 585	14.9 746	16.3 1422	<u>11.1</u> 364	15.9 1065	19.1 36760
Yes	%	3.4	3.2	2.1	3.4	3.8	2.7	2.6	1.2	1.8	2.3	3.2	0.4	1.7	0.1	2.8	1.5	3.2	2.9	6.3	1.1	1.1	2.0	5.6	4.4	2.0	1.9	2.8	2.5
BMI of Mother at First Prenatal Visit	N	1956	816	5807	486	989	1260	339	1241	360	1561	2180	938	769	842	1732	245	2587	1423	95	388	1016	1316	164	725	1446	408	93	31182
Underweight at first prenatal visit (BMI < 18.5)	%	2.2	3.4	4.4	4.9	2.8	3.9	5.3	1.7	6.4	2.7	2.6	3.3	2.1	3.0	2.8	6.1	2.2	3.0	2.1	2.1	3.3	3.3	3.7	6.8	3.6	2.7	5.4	3.3
Normal weight at first prenatal visit (BMI ≥ 18.5 and BMI < 25)	%	26.0	32.6	46.7	33.7	35.0	34.7	38.1	33.4	39.4	31.1	29.4	36.9	23.7	31.7	26.8	33.1	34.0	39.2	34.7	29.9	33.9	31.5	28.0	33.9	28.6	30.9	32.3	34.6
Overweight at first prenatal visit (BMI ≥ 25 and BMI < 30)	%	24.8	25.9	25.4	23.0	32.2	24.4	25.1	33.2	25.8	23.6	30.8	24.7	22.0	25.4	23.1	24.9	27.7	25.4	16.8	25.8	30.2	22.6	32.9	22.9	20.1	25.2	21.5	25.8
Obese at first prenatal visit (BMI ≥ 30 and BMI < 40)	%	33.5	28.4	20.0	28.0	24.3	26.4	23.9	27.0	23.1	29.1	30.0	28.0	33.8	29.3	32.7	26.1	27.8	23.7	29.5	34.3	26.3	29.6	27.4	27.0	33.5	30.1	29.0	27.3
Very obese at first prenatal visit (BMI ≥ 40)	%	13.4	9.7	3.6	10.3	5.8	10.6	7.7	4.7	5.3	13.5	7.2	7.0	18.5	10.6	14.5	9.8	8.3	8.6	16.8	8.0	6.3	13.1	7.9	9.4	14.2	11.0	11.8	9.0
Pre-Pregnancy Diagnos	es																												
Pre-Pregnancy Diagnosis of Type I Diabetes	N	1986	972	6029	525	985	1284	386	1229	376	1577	2406	925	870	1085	2389	409	2878	1522	176	419	1017	1305	640	739	1414	458	1602	35603
Yes	%	0.3	0.5	0.2	1.0	0.1	1.8	37.6	0.1	0.5	0.5	0.6	0.4	1.5	0.6	1.3	1.0	0.3	1.2	2.8	4.8	0.8	4.1	0.0	4.6	1.5	2.4	0.3	1.3
No	%	99.6	95.2	99.8	99.0	99.1	98.1	52.3	86.6	96.5	97.7	93.9	99.0	95.9	98.0	69.7	72.6	95.3	98.1	86.9	88.5	95.1	95.9	0.0	94.2	97.0	76.9	0.0	87.9
Not Known	%	0.1	4.3	0.0	0.0	0.8	0.1	10.1	13.3	2.9	1.8	5.5	0.5	2.6	1.5	29.0	26.4	4.4	0.7	10.2	6./	4.1	0.0	100.0	1.2	1.5	20.7	99./	10.8
Diagnosis of Type II Diabetes	N	1987	972	6024	523	985	1285	386	1229	375	1580	2406	926	870	1085	2382	411	2880	1501	176	418	1017	1304	625	739	1414	457	1602	35559
Yes	%	5.0	1.6	0.3	0.8	0.5	1.2	39.6	0.3	0.5	1.5	3.7	0.6	5.7	1.8	0.8	0.5	1.3	0.9	2.8	6.0	1.8	3.8	1.6	9.5	1.2	10.5	0.5	2.3
No Not Known	% %	95.0	94.1 4 2	99./	99.2	98.7	98.7	50.5	86.3	20	96./ 1 º	90.9	98./	91.6 24	96.9 1 2	70.2	72.5	94.2	98.5	87.5	87.6	94.1 1	96.2	98.4	89.3	97.3	68.9	51.1	91.0
Pre-Pregnancy	/0	0.1	4.Z	0.0	0.0	0.0	0.1	7.0	13.3	2.7	1.0	5.5	0.0	2.0	1.3	27.0	27.0	4.4	0.7	7./	0.5	4.1	0.0	0.0	1.2	1.5	20.0	40.4	0.7
Diagnosis of Hypertension	N	1984	971	6029	525	985	1284	383	1229	377	1585	2406	925	873	1085	2390	409	2881	1522	177	418	1017	1307	638	740	1413	436	1602	35591
Yes	%	6.0	6.4	0.6	6.7	3.0	7.4	49.6	0.2	4.0	8.4	5.3	5.5	17.6	4.1	9.9	2.0	3.7	2.8	10.7	7.7	5.6	13.1	0.9	14.1	11.4	10.1	4.4	6.0
Not Known	%	93.9	89.2	99.4	93.3	96.0	92.4	42.6	86.4	92.0	87.8 1.8	89.0 5.7	93.9	78.9	94.6 1.4	63.2 26.9	/2.1	91.9	96.5 0.7	9.1	8/.8	90.6 3.8	86.9	99.1	85.0	8/.0	08.1 21.9	01./ 33.0	5 9
	/0	0.2	7.4	0.0	0.0	0.7	0.2	1.0	10.0	- <del>1</del> .0	1.0	J./	0.5	5.4	1.4	20.7	∠J.7	7.J	0.7	7.0	ч.J	5.0	0.0	0.0	0.7	1.0	21.0	55.7	J.7

Data Elements	Nor%	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
<b>Risk Factors from Past</b>	Preg	nancies																											
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	N	1339	606	3642	384	369	791	138	780	180	1083	1219	571	612	1179	1523	429	1911	1084	131	308	682	808	398	456	861	283	853	22620
Yes	%	22.5	24.6	11.5	20.3	13.0	26.9	13.0	12.3	13.9	24.0	21.6	19.4	37.4	14.6	24.4	17.0	14.9	16.6	30.5	30.5	17.6	38.5	20.1	32.5	36.1	17.7	13.7	20.2
No	%	77.4	74.6	88.5	79.7	87.0	73.1	87.0	87.7	86.1	75.8	77.8	80.2	62.6	85.2	62.8	82.8	85.0	83.4	67.9	68.8	81.5	61.5	79.9	63.6	63.9	60.4	75.4	78.1
Not Known	%	0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.4	0.0	0.2	12.8	0.2	0.1	0.0	1.5	0.6	0.9	0.0	0.0	3.9	0.0	21.9	10.9	1.8
Previous Birth < 2,500 grams	Ν	1315	585	3637	272	357	784	135	771	164	1021	1179	560	603	692	1396	235	1726	975	128	297	668	796	14	455	843	270	853	20731
Yes	%	16.4	14.7	1.3	13.6	6.7	17.3	11.1	12.1	3.0	12.7	11.0	11.6	30.3	7.5	13.1	2.1	9.4	8.5	3.9	13.5	10.5	23.5	100.0	2.0	21.8	11.1	8.1	10.9
No	%	73.3	80.7	98.7	82.7	90.2	73.9	78.5	83.8	94.5	80.3	76.4	80.2	56.6	89.3	49.4	63.0	82.9	89.6	14.1	76.1	76.5	73.9	0.0	59.1	72.2	63.3	67.8	78.6
Not Known	%	10.3	4.6	0.0	3.7	3.1	8.8	10.4	4.2	2.4	7.0	12.6	8.2	13.1	3.2	37.5	34.9	7.8	1.8	82.0	10.4	13.0	2.6	0.0	38.9	5.9	25.6	24.2	10.5
Previous Miscarriage (< 20 weeks EGA)	N	1468	673	4390	334	540	893	188	845	213	1232	1559	634	674	788	1562	258	2009	1149	136	329	733	919	417	505	934	424	967	24773
Yes	%	32.9	25.1	31.9	29.3	32.6	38.2	33.5	32.5	28.6	35.1	37.8	34.7	38.4	32.6	21.2	22.9	33.2	35.5	34.6	40.4	31.0	43.0	1.0	19.0	35.5	5.4	21.9	31.3
No	%	65.8	71.2	68.1	70.1	65.9	59.6	63.8	63.9	70.0	62.8	58.4	64.7	58.6	63.7	40.1	50.8	62.8	64.1	53.7	59.3	61.8	56.9	99.0	46.1	63.5	60.6	56.0	62.1
Not Known	%	1.3	3.7	0.0	0.6	1.5	2.2	2.7	3.6	1.4	2.0	3.8	0.6	3.0	3.7	38.7	26.4	4.0	0.3	11.8	0.3	7.2	0.1	0.0	34.9	1.0	34.0	22.0	6.5
Previous Elective Termination	Ν	1466	674	4390	330	541	893	188	845	217	1244	1555	637	673	789	1557	256	2021	1151	135	328	729	917	417	505	930	429	967	24784
Yes	%	20.1	42.0	14.9	10.9	34.8	19.8	29.3	3.9	25.8	44.5	28.0	13.0	11.1	12.5	5.1	3.9	28.8	13.4	28.1	3.4	8.4	10.3	2.2	1.0	9.4	9.3	17.6	17.6
No	%	78.6	54.7	85.1	88.2	64.0	77.8	68.1	92.4	72.8	54.0	68.5	86.5	85.9	83.3	53.2	68.0	67.2	86.3	59.3	96.3	83.7	89.7	97.8	65.0	89.7	57.6	59.9	75.7
Not Known	%	1.3	3.3	0.0	0.9	1.3	2.4	2.7	3.7	1.4	1.4	3.5	0.5	3.0	4.2	41.7	28.1	4.0	0.3	12.6	0.3	8.0	0.0	0.0	34.1	1.0	33.1	22.5	6.7
Previous Still Birth (fetal death ≥ 20 weeks EGA)	N	1309	582	3637	277	359	784	135	773	162	1040	1177	554	607	700	1398	235	1723	1018	129	298	664	794	359	455	841	221	853	21084
Yes	%	1.2	3.3	0.7	3.6	3.9	3.7	0.7	0.1	1.2	3.6	5.5	2.3	10.4	2.6	3.0	0.9	2.0	2.0	0.8	10.1	2.6	7.6	2.5	1.8	3.9	1.8	1.1	2.8
No	%	97.4	93.0	99.3	95.3	95.0	94.4	95.6	95.9	96.9	94.0	90.0	97.3	88.6	94.1	52.5	70.2	92.4	97.6	66.7	89.3	88.3	92.3	97.5	60.7	95.0	62.4	72.9	89.7
Not Known	%	1.4	3.8	0.0	1.1	1.1	1.9	3.7	4.0	1.9	2.4	4.5	0.4	1.0	3.3	44.5	28.9	5.6	0.4	32.6	0.7	9.2	0.1	0.0	37.6	1.1	35.7	26.0	7.5
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	N	934	351	2950	324	270	753	111	595	138	887	576	447	520	1088	1028	350	1553	775	90	249	605	722	292	366	705	1	671	17351
< 6 months	%	7.0	8.0	6.8	5.6	5.6	9.4	8.1	4.9	13.0	7.0	4.5	6.7	6.9	8.4	9.2	8.0	5.1	12.8	15.6	8.8	7.1	8.9	13.7	12.3	9.9	0.0	8.3	7.8
≥ 6 months and < 12 months	%	8.6	9.1	13.2	9.9	3.7	12.1	10.8	6.1	13.0	8.2	7.1	13.9	11.0	9.8	12.3	8.3	6.9	12.6	5.6	12.9	6.9	9.1	9.2	12.0	12.6	0.0	9.1	10.2
≥ 12 months and < 18 months	%	8.8	6.8	17.6	6.8	10.0	12.4	14.4	7.4	10.1	8.2	6.4	10.5	9.8	14.6	11.7	8.9	8.9	13.3	8.9	13.3	8.1	9.8	8.9	6.8	10.4	0.0	9.2	11.2
≥ 18 months	%	75.7	76.1	62.4	77.8	80.7	66.1	66.7	81.7	63.8	76.6	81.9	68.9	72.3	67.2	66.8	74.9	79.1	61.3	70.0	65.1	77.9	72.2	68.2	68.9	67.1	100.0	73.3	70.8

#### TABLE B.11: RISK FACTORS FROM CURRENT PREGNANCY, BY AWARDEE

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
<b>Risk Factors During</b>	Curr	ent Pregr	nancy																										
Urinary Tract Infection(s) during Last 6 Months of Pregnancy	N	1983	960	6029	523	987	1284	385	1243	361	1546	2400	914	876	1081	2435	400	2872	1315	174	418	1024	1315	530	739	1445	459	1602	35300
Yes	%	22.2	10.8	5.3	12.8	23.1	6.3	31.7	2.7	3.9	15.8	15.3	20.9	17.1	11.3	15.9	3.0	6.8	9.7	21.8	31.3	5.9	13.5	12.5	3.5	16.0	2.8	5.6	11.4
No	%	77.8	78.2	94.7	82.6	69.0	83.7	63.1	83.8	87.3	80.3	63.5	57.0	68.4	81.8	51.6	57.3	74.1	87.8	31.6	59.8	61.0	80.6	87.5	96.2	60.5	67.3	51.0	75.1
Not Known	%	0.1	10.9	0.0	4.6	7.9	10.0	5.2	13.4	8.9	3.9	21.2	22.1	14.5	6.9	32.5	39.8	19.0	2.6	46.6	8.9	33.1	5.9	0.0	0.3	23.5	29.8	43.4	13.5
Cervical Incompetence	Ν	1981	956	6019	521	984	1285	385	1243	364	1543	2406	915	876	1080	2432	400	2879	1320	177	417	1024	1315	640	739	1447	460	1602	35410
Yes	%	3.2	1.7	0.0	1.2	1.0	1.2	0.0	0.2	0.8	1.4	1.6	0.7	6.3	0.3	0.6	0.3	0.6	1.6	4.5	1.4	0.6	2.4	0.0	1.8	0.5	0.2	0.2	1.0
No	%	96.7	88.3	100.0	94.4	91.0	92.7	94.5	86.4	89.8	94.6	78.8	79.9	79.5	94.4	63.6	61.3	90.9	96.5	85.3	93.0	35.9	94.8	0.0	98.0	80.2	73.5	56.4	84.4
Not Known	%	0.1	10.0	0.0	4.4	8.0	6.1	5.5	13.4	9.3	4.0	19.5	19.5	14.3	5.3	35.8	38.5	8.5	1.9	10.2	5.5	63.5	2.8	100.0	0.3	19.3	26.3	43.4	14.5
Placenta Previa	Ν	1978	963	6024	519	989	1284	385	1243	365	1543	2409	916	875	1079	2435	400	2879	1321	177	417	1022	1314	625	739	1447	459	1602	35409
Yes	%	1.1	0.9	0.1	0.6	1.5	3.1	1.0	0.6	1.9	0.9	1.8	0.2	3.3	4.9	0.5	0.3	1.1	2.3	0.6	1.4	1.4	0.1	0.5	0.5	0.1	0.0	0.5	1.0
No	%	98.8	88.9	99.9	94.8	90.5	91.4	93.2	86.0	88.8	95.1	78.1	88.2	82.3	89.7	63.9	60.8	90.2	95.8	89.8	93.0	37.2	95.5	99.5	99.2	80.6	74.1	56.1	86.4
Not Known	%	0.1	10.2	0.0	4.6	8.0	5.5	5.7	13.4	9.3	4.0	20.0	11.6	14.4	5.4	35.6	39.0	8.8	2.0	9.6	5.5	61.4	4.4	0.0	0.3	19.2	25.9	43.4	12.6
Placental Abruption	Ν	1978	957	6029	519	988	1284	385	1243	363	1543	2407	908	876	1078	2434	401	2878	1318	177	416	1024	1315	625	739	1448	460	1602	35395
Yes	%	0.4	0.2	0.4	0.6	0.6	0.2	0.5	0.0	0.3	0.1	0.3	1.0	1.0	1.4	0.1	0.0	0.6	1.0	1.7	1.7	0.2	1.1	0.2	0.5	0.8	1.3	0.2	0.5
No	%	99.6	87.7	99.6	94.6	90.5	94.0	94.0	86.6	90.4	95.7	79.2	67.8	84.2	93.3	64.1	61.3	90.8	97.3	88.7	92.3	34.0	92.5	99.8	99.2	79.8	72.2	56.4	86.1
Not Known	%	0.1	12.1	0.0	4.8	8.9	5.8	5.5	13.4	9.4	4.2	20.4	31.2	14.7	5.3	35.8	38.7	8.7	1.7	9.6	6.0	65.8	6.5	0.0	0.3	19.4	26.5	43.4	13.4
Gestational Diabetes	Ν	1979	963	6029	522	988	1285	382	1238	363	1539	2409	913	876	1080	2433	402	2879	1333	177	416	1022	1314	625	739	1448	465	1602	35421
Yes	%	7.6	2.8	2.5	5.2	8.4	10.3	3.7	9.0	3.6	7.1	10.0	5.0	6.7	5.7	3.4	3.7	3.8	5.7	7.9	12.3	4.6	6.8	4.8	9.2	4.2	1.5	2.3	5.4
No	%	92.4	85.9	97.5	90.2	83.9	84.4	91.1	77.5	87.1	88.3	70.5	73.9	79.1	89.1	62.6	58.7	87.9	92.6	72.9	81.0	67.4	89.0	95.2	90.5	76.8	74.2	54.3	82.9
Not Known	%	0.0	11.3	0.0	4.6	7.7	5.4	5.2	13.5	9.4	4.5	19.6	21.0	14.2	5.2	34.0	37.6	8.3	1.7	19.2	6.7	28.0	4.2	0.0	0.3	19.0	24.3	43.4	11.7
Pregnancy-Related Hypertension	Ν	1980	955	6029	520	988	1284	383	1243	365	1541	2401	911	875	1079	2422	402	2879	1349	177	417	1024	1313	625	738	1448	459	1602	35409
Yes	%	5.3	8.8	1.2	8.3	8.9	4.3	20.9	8.4	3.0	10.7	5.0	10.1	6.4	3.8	10.9	2.2	3.1	5.3	14.1	10.1	3.4	5.6	2.2	5.7	5.4	12.4	3.7	5.6
No	%	94.7	79.0	98.8	87.3	83.2	90.2	73.9	78.2	87.7	85.4	75.0	61.8	79.1	90.8	58.9	60.4	88.5	93.1	76.8	84.9	68.3	87.8	97.8	94.0	75.8	63.2	52.9	82.8
Not Known	%	0.1	12.3	0.0	4.4	7.9	5.5	5.2	13.4	9.3	3.9	20.0	28.1	14.5	5.4	30.1	37.3	8.4	1.6	9.0	5.0	28.3	6.5	0.0	0.3	18.9	24.4	43.4	11.7
Preeclampsia	N	1978	957	6029	522	988	1284	383	1243	364	1534	2402	908	876	1079	2436	401	2878	1340	177	418	1022	1314	625	739	1446	461	1602	35406
Yes	%	3./	6./	1.6	/.1	3.6	3./	14.1	7.6	1.9	5./	6.4	/.0	7.3	2.0	2.1	1.0	3.0	5.0	10.2	6.9	2.5	12.2	2.6	3.9	10.9	/.4	3.1	4.6
No	%	96.2	81.1	98.4	88.3	86.9	90.6	80.7	/9.0	88.7	90.2	/2.9	62.8	/8.4	92.7	64.8	61.1	88.6	93.4	80.8	88.0	68.8	81.2	97.4	95.8	/0.1	67.5	53.5	83.3
INOT KNOWN	%	0.1	12.2	0.0	4.6	9.4	5./	5.2	13.4	9.3	4.1	20.7	30.2	14.3	5.3	33.2	3/.9	8.5	1.6	9.0	5.0	28./	0.6	0.0	0.3	19.1	25.2	43.4	12.1
Syphilis	IN Of	1978	953	6029	517	983	1283	383	1242	364	1540	2408	910	8/6	10/9	2433	401	28/9	1337	1//	410	1023	1315	025	/39	1447	462	1602	35407
res	%	0.1	0.2	0.0	1.0	0.4	0.8	04.2	0.1	0.3	1.0	0.5	0.4	0.7	0.0	0.5	0.0	0.3	0.1	1./	1.0	0.3	0.3	0.5	0.9	0.3	0.6	0.1	0.3
Not Known	% 0/	77.7	00.7 10.0	100.0	94.0	90.8	74.9	5 2	80.5 12.4	90.4	75.I	87.7 11.5	90.Z	δ/.Z	74.D	82.4 17.1	01.0	88.7 10.9	98.Z	/0.3	75.7 21	/3./	70.0 2.1	77.5 0.0	78.8 0.2	75.0	74.9	0.0C	/3./
Human	/0	0.0	10.7	100.0	4.4	0.7	4.3	J.Z	13.4	7.3	3.7	11.5	3.4	12.1	5.5	1/.1	30.2	10.0	1.0	22.0	3.1	20.0	3.1	0.0	0.3	4.1	24.3	43.4	ZJ.7
Immunodeficiency Virus (HIV)	N	1978	954	6029	518	984	1284	383	1243	365	1542	2410	917	876	1079	2431	403	2880	1337	177	415	1022	1314	640	739	1447	463	1602	35432
Yes	%	0.5	0.5	0.0	0.6	0.2	1.2	0.3	0.0	0.3	0.2	0.3	0.3	0.8	0.1	0.5	0.0	0.5	0.1	0.6	0.7	0.0	1.4	0.0	5.0	0.6	0.4	0.2	0.4
No	%	99.5	88.5	100.0	95.0	95.2	95.0	95.0	86.6	90.4	95.8	88.3	96.1	95.4	94.3	84.4	63.0	91.5	98.3	78.0	95.9	74.6	96.4	0.0	94.7	95.5	76.2	56.4	89.6
Not Known	%	0.0	11.0	0.0	4.4	4.6	3.8	4.7	13.4	9.3	4.0	11.4	3.6	3.8	5.7	15.2	37.0	8.1	1.6	21.5	3.4	25.4	2.2	100.0	0.3	3.9	23.3	43.4	9.9

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
Congenital Abnormalities of the Fetus	N	1976	949	6029	518	983	1284	382	1242	363	1540	2392	911	876	1078	2426	402	2872	1336	175	416	1023	1314	640	738	1446	457	1602	35370
Yes	%	0.8	1.2	1.2	2.1	2.2	2.6	0.0	0.2	0.0	2.8	2.6	2.7	4.5	0.9	0.5	0.2	0.5	1.9	4.6	3.1	0.6	2.0	0.0	6.2	2.1	0.2	0.2	1.5
No	%	99.2	87.8	98.7	92.9	91.0	91.1	94.8	86.3	90.6	93.2	75.5	81.3	85.6	93.7	65.7	62.2	90.8	96.5	80.0	89.7	42.1	95.1	0.0	93.5	77.2	75.9	56.4	84.2
Not Known	%	0.1	11.1	0.1	5.0	6.7	6.2	5.2	13.5	9.4	4.0	21.8	15.9	9.9	5.4	33.8	37.6	8.7	1.6	15.4	7.2	57.3	3.0	100.0	0.3	20.7	23.9	43.4	14.3
Maternal Weight Gain	Ν	1443	680	3250	416	823	738	315	1113	310	1334	1288	661	700	923	1751	252	2307	1264	94	285	708	1233	38	686	1058	0	136	23806
Very low weight gain (<0.26 lbs./week)	%	23.0	22.5	11.9	18.3	11.8	19.8	12.4	14.5	17.4	24.8	22.3	18.0	24.0	17.3	31.9	20.6	21.3	14.2	12.8	55.1	38.3	20.4	34.2	33.8	22.3	0.0	19.9	21.0
Very high weight gain (≥1.74 lbs./week)	%	0.5	1.5	0.9	0.5	1.2	1.2	0.6	0.1	1.9	0.4	0.4	1.1	0.4	0.8	0.7	1.6	0.3	1.3	6.4	0.4	0.1	1.3	0.0	0.6	0.9	0.0	1.5	0.8
Average weight gain (≥0.26 and < 1.74 lbs./week)	%	76.5	76.0	87.2	81.3	87.0	79.0	87.0	85.4	80.6	74.7	77.3	80.9	75.6	81.9	67.4	77.8	78.4	84.6	80.9	44.6	61.6	78.3	65.8	65.6	76.7	0.0	78.7	78.3
Using Birth Control when became Pregnant with this Pregnancy	N	2631	1080	6922	810	1115	1327	665	1192	698	1576	3111	773	816	1797	2173	844	3387	1414	190	1026	1151	1313	683	888	1516	374	1604	41076
Yes	%	9.2	8.1	7.3	8.1	9.1	9.7	7.2	12.8	7.6	9.9	14.6	9.2	6.3	10.9	17.8	12.6	9.5	8.8	11.6	13.1	8.1	11.3	11.9	5.7	8.2	6.7	6.8	9.8
No	%	84.8	87.7	84.5	87.3	87.0	87.6	88.1	77.4	86.7	87.3	80.8	90.0	91.1	85.8	70.2	83.4	86.2	90.7	87.4	85.9	91.4	87.1	86.4	93.6	86.8	92.0	73.5	84.7
Sometimes	%	6.0	4.3	8.1	4.6	3.9	2.7	4.7	9.8	5.7	2.8	4.6	0.8	2.7	3.4	12.0	4.0	4.3	0.5	1.1	1.1	0.5	1.6	1.8	0.7	5.0	1.3	19.7	5.5

### TABLE B.12: BIRTH OUTCOMES, BY AWARDEE

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
Total Number of Exit Forms with Valid Birth Information	N	1981	844	6021	546	990	1067	364	1074	326	1525	1715	682	868	1594	2155	347	2485	1505	164	415	1018	1217	511	699	1120	392	835	32460
Number of Fetuses Identified	Ν	2019	852	6037	551	997	1103	364	1080	329	1545	1749	689	905	1614	2204	362	2514	1526	169	423	1031	1256	517	722	1144	393	846	32941
Live births	N %	1484	806 94.6	6008	490 88.9	866	1022 92.7	344 94 5	1079	319 97.0	1513	1556	670 97.2	838	1587 98 3	1917 87.0	339	2414	1487 974	168 994	396 93.6	728	1213	517	691 95.7	1134 99.1	368	829 98.0	30783 93.4
Stillborn Infants	N	28	11	20	11	7	14	23	1	0	11	20	7	18	7	29	15	19	9	1	9	4	39	0	30	10	2	9	354
Stillborn mailts	%	1.4	1.3	0.3	2.0	0.7	1.3	6.3	0.1	0.0	0.7	1.1	1.0	2.0	0.4	1.3	4.1	0.8	0.6	0.6	2.1	0.4	3.1	0.0	4.2	0.9	0.5	1.1	1.1
Birth Status Missing	N %	508	40	9	56	125	66	15	0	12	22	174	14	49	25	267	7	84	32	0	18	298	4	0	2	0	24	8	1859
itiissiilig	/0	ZJ.Z	4./	0.1	10.2	12.5	0.0	4.1	0.0	3.0	1.4	7.7	2.0	J.4	1.5	12.1	1.7	3.3	2.1	0.0	4.3	20.7	0.5	0.0	0.3	0.0	0.1	0.7	J.0

TECHNICAL APPENDICES

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
Estimated Gestational Age (EGA)	N	1447	734	5992	425	802	1018	314	1068	307	1363	1357	660	831	1532	1744	294	2361	1410	165	307	713	1207	514	687	1089	271	688	29300
Very Preterm Births, 20 to 33 weeks, 6 days EGA	%	4.4	5.3	1.3	3.1	1.9	6.1	2.9	2.1	1.6	5.1	6.0	4.4	9.3	3.6	6.3	2.7	2.2	2.5	7.3	5.2	4.5	8.9	3.5	7.6	6.3	6.3	3.5	4.0
Preterm Births, 34 to 37 weeks, 6 days EGA	%	10.0	10.5	3.9	7.5	5.6	9.5	6.1	6.6	5.2	10.1	11.1	8.3	14.4	6.9	12.4	3.4	6.1	7.3	12.7	9.4	9.4	13.2	7.0	15.0	11.3	14.8	9.2	8.3
Early Term Births, 37 to 38 weeks, 6 days EGA	%	27.2	25.1	19.7	28.9	23.8	29.2	24.5	31.9	20.2	28.6	26.2	30.2	34.1	22.3	30.2	20.7	21.8	25.0	30.9	30.9	24.7	28.3	24.9	32.8	28.3	19.6	24.1	25.3
Non-Preterm Births, 37 to 41 weeks, 6 days EGA	%	57.6	55.7	71.0	57.4	66.2	53.1	65.0	58.1	69.1	53.9	53.2	55.0	41.8	65.1	48.4	67.7	65.9	64.6	42.4	51.5	55.8	46.8	61.7	40.3	53.4	51.3	57.3	59.5
Late Term Births, ≥42 weeks EGA	%	0.8	3.4	4.0	3.1	2.5	2.1	1.6	1.3	3.9	2.4	3.6	2.1	0.5	2.1	2.8	5.4	3.5	0.6	6.7	2.9	5.6	2.7	2.9	2.9	0.7	8.1	6.0	2.9
Birth Weight	N	1438	764	5879	468	803	989	330	1074	308	1480	1480	658	830	1364	1665	292	2319	1365	166	393	705	1200	494	673	1126	253	769	29285
Very Low Birth Weight, <1500 grams	%	2.5	1.8	0.6	1.1	0.6	2.7	1.5	0.8	0.6	2.4	3.1	4.1	5.3	1.3	2.3	1.0	1.3	0.8	3.6	2.3	1.6	4.8	1.2	3.3	4.0	3.6	2.2	2.0
Low Birth Weight, 1500–2499 grams	%	9.7	10.7	3.1	10.9	6.8	11.9	8.5	5.0	6.8	12.2	8.2	7.8	16.9	7.3	13.6	4.8	8.8	7.3	14.5	7.6	7.9	17.4	9.1	17.4	10.7	11.5	8.1	8.8
Not Low Birth Weight: 2500– 3999 grams	%	81.8	84.0	85.3	83.5	86.9	79.0	87.6	87.5	89.9	79.8	82.0	83.7	73.9	83.4	81.6	88.0	83.5	85.0	80.1	85.5	82.1	72.7	83.2	75.0	79.2	79.1	83.2	82.6
Macrosomia, >4000 grams	%	6.0	3.4	11.0	4.5	5.6	6.4	2.4	6.6	2.6	5.6	6.7	4.4	4.0	7.9	2.5	6.2	6.3	6.9	1.8	4.6	8.4	5.1	6.5	4.3	6.0	5.9	6.5	6.7
Preterm Labor Mana	gem	ent	000	(020	407	0(1	110/	204	1074	242	4545	2407	010	074	10/7	2227	2(2	2/1/	1040	477	426	040	1004	(40	(0)	107(	405	1(00	00007
	IN 9/	1472	20	0.4	470 20	<b>701</b>	1100	10	0.2	1.0	1515	219/	3.0	0/1 85	1.007	0.4	302	2010	1043	10.0	430	0.4	11 4	040	65	12/0	435	1 1	22
No	70 %	0.0	2.7 521	0.4 90 A	2.0 91.1	86.7	J.∠ 71 Q	84.5	87.2	2.2	88.8	64.9	75 Q	0.J 81.4	1.2 70.0	36.9	52.0	473	0.1 0 A Q	61.0	96.6	51.4	875	0.0	0.J 80.1	- <del>1</del> .7 80.3	2.1 52.1	40.3	60.0
NotKnown	70 0/	00.0	42.0	77.0	/1.1	105	25.0	14.4	125	10.0	5 D	22.5	21.0	01.0	10.0	40.7	17.0	47.J	1.0	10.0	20.0	47.0	07.5	100.0	07.1	14.0	44.0	40.3 E0.4	07.7
Vaginal	N	1490	43.9 <b>897</b>	5658	496	961	1107	381	1074	342	1514	2198	908	871	19.0	2243	362	2620	1336	17.2	436	950	1225	338	4.5 696	14.0 1276	44.0	1602	32657
progesterone	0/	1.0	0.2	0.1	0.9	0.4	0.0	0.0	0.1	1 5	10	0.5	0.0	47	10	0.2	0.0	0.2	0.0	0.6	0.0	0.1	0.1	0.6	0.2	0.2	0.0	0.6	0.7
Ne	70 0/	1.9	57.2	0.1	0.0	0.4	0.0	0.0	0.1	1.5	1.0	47.0	70.7	0.7	1.0	0.2	52.0	0.2	0.0	0.0 70 E	0.0	0.1 E1 0	0.1	0.0	0.5	0.3	0.0 E.4.1	0.0	74.0
Not Known	/0 %	77.7	125	77.7	73.0 5.4	12.0	20.4	1//	12.5	9.6	73.0	32.5	20.2	04.0	18.8	62.6	JZ.0	77.2	77.3	20.9	7/.Z	J1.0 /18 1	77.3	77.4	73.4	1/ 8	J4.1 45.9	58.8	22.2
Progesterone	N	240	42.5 144	427	56	51	191	14.4	88	24	247	243	103	232	10.0	350	47.2	239	135	42	96	111	301	15	141	283	43.7 36	126	4090
Vec	%	22.0	17/	28	19.6	5.9	26.7	0.0	10.2	12	10.8	10.0	6.8	12.2	12.8	03	0.0	63	17.0	18	0.0	1.8	23.0	40.0	2.8	71	0.0	5.6	13.1
No	%	77 1	52.1	97.0	78.6	78.4	63.4	83.3	83.0	83.3	76.9	56.0	75.7	52.6	68.8	37.4	52.4	49.8	80.0	81.0	96.9	52.3	75.7	60.0	2.0 90.8	78.8	55.6	38.1	68.7
Not Known	%	0.0	30.6	0.0	1.8	15.7	9.9	167	68	12.5	32	24.3	17.5	52.0	18.3	62.3	47.6	43.9	30	14.3	31	45.9	03	0.0	64	14.1	44.4	56.3	18.2
Tocolytics	70 N	1402	00.0	6024	1.0	050	1104	20.7	1074	242	1505	24.3	17.5	971	10.5	22.0	-77.0		1224	177	J.1 426	950	1225	640	405	1076	494	1602	22204
Voc	IN 0/	1472	072	0.4	472	0.7	1.04	0.9	0.5	242	10	17	209	57	0.7	0.1	301	2019	1334	0.4	430	930	1225	040	073	20	434	1 1	1 1
No	70 0/	0.0	54.2	0.4	0.0	0.7	1.4	0.0	0.5	2.0	1.7	1./	2.0	D./	0.7	27.0	0.0	0.3	0.0	7.0	1.0 0E /	52.0	1.0	0.0	0.3	2.7	544	1.1	40.0
Not Known	/0 0/	0.1	14.0	77.5	73.5	12.0	0.0	14.0	125	07.7	72.7	22.7	20.0	04.0	10.0	37.0	JJ.Z	47.5	77.3	20.2	73.4	10.0	77.3	100.0	73.3	02.4	J4.0	40.0	20.7
NULKIUWI	/0	77.7	44.2	0.1	J.7	13.0	07.7	14.2	12.3	7.0	J.Z	32.1	20.7	7.0	17.0	02.7	40.3	JZ.Z	1.7	20.3	2.0	40.0	0.7	100.0	4.5	14./	45.4	J0.Z	30.0

Data Elements	Nor %	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, excluding Planned Cesarean sections	N	1268	809	5863	437	884	1005	359	995	311	1355	1972	861	752	931	2051	334	2457	1151	154	405	880	1094	640	546	1149	417	1602	30682
Yes	%	23.5	21.3	16.5	32.5	29.5	12.9	46.5	56.8	20.6	31.4	32.8	20.2	34.3	25.9	6.4	19.8	10.0	48.2	23.4	24.7	13.6	40.6	0.0	32.8	27.9	24.5	11.9	22.8
No	%	67.4	45.1	83.5	60.2	48.6	7.4	39.6	40.1	69.1	62.1	30.4	48.9	57.4	50.1	24.9	38.3	38.6	49.1	65.6	72.3	34.3	58.0	0.0	59.7	56.6	34.5	35.7	50.8
Not Known	%	9.1	33.6	0.0	7.3	21.8	79.7	13.9	3.1	10.3	6.5	36.8	30.9	8.2	24.1	68.7	41.9	51.4	2.7	11.0	3.0	52.0	1.4	100.0	7.5	15.5	41.0	52.4	26.4
Induction of Labor with Pitocin, excluding Planned Cesarean sections	N	1179	748	5652	430	854	270	310	968	307	1305	1848	782	689	798	1595	320	2249	1099	134	402	824	1083	640	505	1115	411	762	27279
Yes	%	19.8	8.7	7.6	31.4	27.5	20.4	50.3	50.0	18.2	30.0	30.5	11.1	25.5	23.2	4.9	12.5	6.0	43.7	22.4	22.9	7.6	40.9	0.0	34.9	24.8	23.6	14.6	19.3
No	%	73.5	59.5	92.4	62.3	52.8	29.3	47.7	43.5	69.4	66.3	35.7	64.1	65.6	60.3	32.3	40.9	42.1	50.9	73.9	73.6	38.0	58.6	0.0	56.6	62.1	33.6	78.1	59.7
Not Known	%	6.7	31.8	0.0	6.3	19.7	50.4	1.9	6.5	12.4	3.8	33.8	24.8	8.9	16.5	62.8	46.6	51.8	5.5	3.7	3.5	54.4	0.5	100.0	8.5	13.1	42.8	7.3	21.0
Delivery Method																													
Delivery Method, based on Exit Data	N	1477	804	6021	482	849	962	346	1073	319	1480	1531	682	818	1578	1826	329	2365	1457	161	384	717	1214	442	695	1117	350	872	30351
Vaginal Only	%	68.0	72.4	87.5	68.7	66.9	63.2	72.8	77.2	72.1	65.9	64.9	80.8	61.5	68.4	64.1	70.5	71.8	70.9	66.5	77.9	71.3	71.2	79.6	53.5	67.2	70.3	74.5	72.7
C-Section Only	%	32.0	27.5	12.5	31.1	33.1	36.7	27.2	22.7	27.6	34.0	35.0	19.2	38.5	31.5	35.8	29.2	26.9	28.9	32.9	22.1	28.6	28.3	20.4	46.5	32.8	29.7	25.5	27.1
Both Vaginal and C-Section	%	0.0	0.1	0.0	0.2	0.0	0.1	0.0	0.1	0.3	0.1	0.1	0.0	0.0	0.1	0.1	0.3	1.3	0.2	0.6	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.2
Delivery Method among Women with Previous C-section	N	297	147	288	76	96	191	32	137	35	291	282	89	203	139	283	37	323	263	38	81	132	209	12	208	220	38	118	4265
VBAC	%	17.5	25.2	26.4	22.4	11.5	9.9	21.9	33.6	25.7	17.2	20.9	34.8	15.3	12.9	7.4	18.9	22.9	9.9	23.7	28.4	17.4	23.0	100.0	18.8	9.1	13.2	30.5	18.9
Repeat C-section	%	82.5	74.8	73.6	77.6	88.5	90.1	78.1	66.4	74.3	82.8	79.1	65.2	84.7	87.1	92.6	81.1	77.1	90.1	76.3	71.6	82.6	77.0	0.0	81.3	90.9	86.8	69.5	81.1
Scheduled C-section	Ν	469	213	753	131	264	350	93	237	85	464	524	126	307	214	593	85	569	406	54	79	195	344	90	320	358	96	222	7641
Yes	%	46.7	46.0	18.1	41.2	27.7	28.6	21.5	31.2	37.6	34.9	42.2	30.2	38.1	57.0	31.2	35.3	27.9	48.3	35.2	39.2	33.8	37.2	0.0	46.9	36.0	22.9	0.0	33.8
No	%	48.0	44.6	32.7	57.3	66.3	32.3	75.3	65.0	62.4	62.5	55.0	67.5	59.6	34.1	22.3	35.3	37.3	50.0	59.3	60.8	23.6	62.2	0.0	49.4	64.0	47.9	0.0	45.5
Not Known	%	5.3	9.4	49.3	1.5	6.1	39.1	3.2	3.8	0.0	2.6	2.9	2.4	2.3	8.9	46.5	29.4	34.8	1.7	5.6	0.0	42.6	0.6	100.0	3.8	0.0	29.2	100.0	20.7
Multiples Multiples				(004	E44	000	10/7	2(4	4074	326	1525	1715	682	868	1594	2155	347	2485	1505	164	415	1018	1217	511	699	1120	392	835	32460
Pregnancy, based on Exit Data	n N	1981	844	6021	540	990	1067	304	1074	520	1525	1/10																	
Pregnancy, based on Exit Data Two or more identified fetuses	• N %	<b>1981</b> 1.7	844 0.9	0.3	0.9	0.7	3.4	0.0	0.6	0.9	1.3	1.8	1.0	3.9	1.3	2.3	4.3	1.2	1.4	3.0	1.9	1.3	3.2	1.2	3.4	2.1	0.3	1.3	1.5
Pregnancy, based on Exit Data Two or more identified fetuses One identified fetus	• N % %	<b>1981</b> 1.7 98.3	844 0.9 99.1	0.3 99.7	0.9 99.1	990 0.7 99.3	3.4 96.6	0.0 100.0	0.6 99.4	0.9	1.3 98.7	1.8 98.2	1.0 99.0	3.9 96.1	1.3 98.7	2.3 97.7	4.3 95.7	1.2 98.8	1.4 98.6	3.0 97.0	1.9 98.1	1.3 98.7	3.2 96.8	1.2 98.8	3.4 96.6	2.1 97.9	0.3 99.7	1.3 98.7	1.5 98.5
Pregnancy, based on Exit Data Two or more identified fetuses One identified fetus Multiples Birth, based on Exit Data	n N % % N	<b>1981</b> 1.7 98.3 <b>1460</b>	844 0.9 99.1 785	0.3 99.7 <b>5986</b>	0.9 99.1 479	990 0.7 99.3 846	3.4 96.6 <b>990</b>	0.0 100.0 339	0.6 99.4 1069	0.9 99.1 <b>313</b>	1.3 98.7 1490	1.8 98.2 1516	1.0 99.0 661	3.9 96.1 <b>803</b>	1.3 98.7 <b>1558</b>	2.3 97.7 <b>1861</b>	4.3 95.7 <b>334</b>	1.2 98.8 <b>2377</b>	1.4 98.6 <b>1459</b>	3.0 97.0 <b>163</b>	1.9 98.1 <b>390</b>	1.3 98.7 <b>711</b>	3.2 96.8 <b>1175</b>	1.2 98.8 <b>510</b>	3.4 96.6 668	2.1 97.9 <b>1103</b>	0.3 99.7 <b>362</b>	1.3 98.7 <b>818</b>	1.5 98.5 <b>30226</b>
Pregnancy, based on Exit Data Two or more identified fetuses One identified fetus Multiples Birth, based on Exit Data Two or more infants born alive One infant	<ul> <li>N</li> <li>%</li> <li>N</li> <li>%</li> </ul>	1981         1.7         98.3         1460         1.2	844 0.9 99.1 785 1.0	0.3 99.7 <b>5986</b> 0.3	0.9           99.1           479           1.0	990 0.7 99.3 846 0.8	3.4 96.6 <b>990</b> 2.9	0.0 100.0 339 0.0	0.6 99.4 1069 0.6	0.9 99.1 <b>313</b> 1.3	1.3 98.7 <b>1490</b> 1.2	1.8 98.2 <b>1516</b> 1.8	1.0 99.0 661 1.1	3.9 96.1 <b>803</b> 3.7	1.3 98.7 <b>1558</b> 1.3	2.3 97.7 <b>1861</b> 2.0	4.3 95.7 <b>334</b> 0.6	1.2 98.8 <b>2377</b> 1.1	1.4 98.6 <b>1459</b> 1.4	3.0 97.0 <b>163</b> 3.1	1.9 98.1 <b>390</b> 1.5	1.3 98.7 <b>711</b> 1.7	3.2 96.8 <b>1175</b> 2.8	1.2 98.8 <b>510</b> 1.2	3.4 96.6 <b>668</b> 2.7	2.1 97.9 <b>1103</b> 2.2	0.3 99.7 <b>362</b> 0.3	1.3 98.7 <b>818</b> 1.2	1.5 98.5 <b>30226</b> 1.3

#### TABLE B.13: SERVICE UTILIZATION

Data Elements	N, %, Mean, or Median	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 Individual Prenatal Visits	N	1451	909	6027	627	824	1014	382	1123	376	1416	2474	672	814	1660	2112	536	2682	1604	165	422	746	1239	525	741	1082	359	1206	33188
Yes	%	99.8	89.7	99.9	82.8	98.4	99.4	100.0	99.5	70.5	99.9	90.6	100.0	89.9	60.5	92.3	47.0	98.7	96.4	52.7	91.7	99.5	99.4	0.0	98.2	98.6	0.0	78.5	90.5
No	%	0.2	10.3	0.1	17.2	1.6	0.6	0.0	0.5	29.5	0.1	9.4	0.0	10.1	39.5	7.7	53.0	1.3	3.6	47.3	8.3	0.5	0.6	100.0	1.8	1.4	100.0	21.5	9.5
	N	1451	909	6027	627	824	1014	382	1123	376	1416	2474	672	814	1660	2112	536	2682	1604	165	422	746	1239	525	741	1082	359	1206	33188
Average and Median	Mean	9.88	3.93	11.15	3.89	6.04	11.56	4.56	6.16	3.70	9.04	6.85	9.84	9.68	6.58	9.19	3.47	7.76	10.16	4.20	9.62	6.79	11.41	0.00	3.23	9.52	0.00	5.85	8.18
Number	Median	10	3	12	4	5	11	4	6	3	9	7	10	11	8	10	0	8	11	3	10	7	12	0	3	10	0	6	9
Received Group Prenatal Care Visits	N	1451	909	6027	627	824	1014	382	1123	376	1416	2474	672	814	1660	2112	536	2682	1604	165	422	746	1239	525	741	1082	359	1206	33188
Yes	%	4.0	95.0	2.1	83.6	97.9	0.0	97.9	98.2	97.1	0.0	0.0	0.0	7.2	1.4	0.3	21.5	3.8	0.0	0.0	7.6	0.0	0.0	86.5	99.7	10.7	0.0	68.7	20.2
No	%	96.0	5.0	97.9	16.4	2.1	100.0	2.1	1.8	2.9	100.0	100.0	100.0	92.8	98.6	99.7	78.5	96.2	100.0	100.0	92.4	100.0	100.0	13.5	0.3	89.3	100.0	31.3	79.8
	Ν	1451	909	6027	627	824	1014	382	1123	376	1416	2474	672	814	1660	2112	536	2682	1604	165	422	746	1239	525	741	1082	359	1206	33188
Average and Median	Mean	0.20	3.90	0.15	4.98	5.91	0.00	5.23	7.21	5.43	0.00	0.00	0.00	0.34	0.09	0.02	0.99	0.25	0.00	0.00	0.90	0.00	0.00	6.57	7.20	0.64	0.00	3.08	1.21
Number	Median	0	3	0	6	6	0	5	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	8	7	0	0	3	0
Enhanced Encounters	S																												
Enhanced	N	1987	472	5455	36	473	1290	70	1057	60	1475	2413	956	877	1019	1302	67	2498	1331	133	351	970	1297	0	33	1084	69	246	27021
and median number	Mean	5.31	1.84	3.72	1.61	1.51	7.41	1.44	2.88	1.78	6.18	3.90	6.76	11.92	3.10	2.79	6.22	5.10	4.39	3.68	2.88	4.29	1.84	N/A	1.06	2.10	3.04	2.98	4.36
per participant	Median	5	1	3	1	1	7	1	3	1	5	3	6	8	3	2	6	4	4	3	2	4	1	N/A	1	2	2	1	3
Received Care Coordinator Encounters	N	1990	974	6027	537	996	1289	382	1247	367	1580	2429	958	874	998	2470	394	2941	1614	146	387	1021	1316	640	738	1451	455	1602	35823
Yes	%	100.0	49.5	97.9	10.1	65.5	100.0	18.6	86.0	17.2	97.5	99.5	100.0	100.0	93.6	70.8	32.0	95.1	91.6	91.1	99.7	95.5	99.6	0.0	6.4	74.7	14.9	16.7	80.2
No	%	0.0	40.8	2.0	83.2	31.1	0.0	81.2	12.5	80.1	2.3	0.2	0.0	0.0	5.3	22.9	26.4	4.5	8.1	8.9	0.3	4.5	0.4	0.0	93.1	23.8	58.2	33.1	13.8
Not Known	%	0.0	9.8	0.1	6.7	3.4	0.0	0.3	1.5	2.7	0.2	0.2	0.0	0.0	1.1	6.3	41.6	0.5	0.4	0.0	0.0	0.0	0.0	100.0	0.5	1.4	26.8	50.1	6.0
Average and Median Number of Care	N	1985	467	5455	28	470	1290	70	1057	60	1469	2413	956	877	1019	1302	66	2488	1289	133	351	969	1294	0	33	1084	66	228	26919
Coordination Encounters per	Mean	5.15	1.78	3.72	1.36	1.38	7.41	1.44	2.78	1.78	6.05	3.62	6.76	11.65	2.78	2.79	5.88	4.90	3.33	3.68	2.87	4.21	1.68	N/A	1.06	2.10	3.11	2.77	4.21
Participant	Median	5	1	3	1	1	7	1	3	1	5	3	6	8	2	2	6	4	3	3	2	4	1	N/A	1	2	2	1	3
Received Mental Health Encounters	Ν	1986	954	6024	531	994	1276	378	1247	368	1556	2378	940	877	1039	2431	395	2901	1598	143	1	1006	1310	640	740	1451	449	1602	35215
Yes	%	7.7	4.8	0.2	3.0	7.2	0.0	0.0	3.6	0.3	8.4	9.7	0.0	13.7	1.4	0.9	4.6	4.2	46.1	0.0	0.0	5.7	9.3	0.0	0.0	0.0	1.1	2.6	5.6
No	%	92.2	73.2	95.0	89.3	84.7	99.6	99.7	94.9	97.3	85.0	77.0	99.9	69.0	88.5	90.4	45.3	94.3	53.4	100.0	100.0	92.9	89.8	0.0	99.3	97.5	71.9	45.9	84.6
Not Known	%	0.1	22.0	4.9	7.7	8.0	0.4	0.3	1.5	2.4	6.6	13.3	0.1	17.3	10.1	8.7	50.1	1.6	0.5	0.0	0.0	1.4	0.8	100.0	0.7	2.5	26.9	51.4	9.8
	Z	153	32	0	9	60	0	0	43	0	52	219	0	76	57	3	14	115	735	0	0	55	101	0	0	0	4	30	1758
Average and Median Number of Mental	Mean	1.82	1.22	N/A	2.22	1.10	N/A	N/A	2.40	N/A	4.13	3.02	N/A	3.12	2.19	1.00	1.57	3.23	2.11	N/A	N/A	1.64	2.12	N/A	N/A	N/A	1.25	2.50	2.32
per Participant	Median	1	1	N/A	1	1	N/A	N/A	2	N/A	2	2	N/A	2	2	1	1	2	2	N/A	N/A	1	1	N/A	N/A	N/A	1	2	2
Received Doula Encounters	N	1979	954	612	532	994	1276	378	1244	367	1559	2369	938	876	997	2427	395	2874	1604	143	2	1004	1310	640	739	1452	452	1602	29719
Yes	%	0.9	0.6	100.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	3.9	1.8	2.8	0.0	0.0	50.0	0.0	0.2	0.0	0.0	0.0	0.2	1.3	2.9
No	%	99.1	59.7	0.0	93.0	96.9	99.5	99.7	98.6	97.5	93.1	95.0	99.9	84.1	92.2	86.5	49.9	95.2	99.8	100.0	50.0	98.5	98.9	0.0	98.6	97.6	75.0	46.9	86.9
Not Known	%	0.1	39.6	0.0	7.0	3.1	0.4	0.3	1.4	2.5	6.7	5.0	0.1	15.8	7.8	9.6	48.4	2.0	0.2	0.0	0.0	1.5	0.8	100.0	1.4	2.4	24.8	51.8	10.3

TECHNICAL APPENDICES

ata Elements	Mean, or Median	ess Community ealth Network	lbert Einstein ealth Network	can Association of 3irth Centers	group Corporation	ral Jersey Family alth Consortium	da Association of ny Start Coalitions	Memorial Hospital :iation DBA Grady lealth System	Harris County ospital District	Insight of Nevada	Hopkins University	Angeles County tepartment of ealth Services	opa Special Health Care District	ical University of outh Carolina	idian Health Plan	sissippi Primary h Care Association	lahoma Health are Authority	widence Health oundation of vidence Hospital	ure Medical Group	ohn Community I Investment Corp.	s Tech University h Sciences Center	ed Neighborhood ealth Services	ersity of Alabama t Birmingham	ersity of Kentucky arch Foundation	rersity of Puerto Rico Medical iences Campus	University of outh Alabama	rsity of Tennessee 1edical Group	ia Commonwealth University	Total
	N, %,	Acc H	⊲ I	Ameri	Ameri	Cent	Flori Healt	Grady Assoc F	ŤÍ	Healt	suhol	H Fos	Maric	Med S	Mer	Mis Healt	<u>5</u> 0	Prc Pro	Signat	St. J Healtl	Texa Healt	Unit	Univ a	Unive Rese	Uni Sc	S	Unive N	Virgin	
Average and Median	N	16	2	0	0	0	1	0	0	0	1	0	0	0	86	0	7	78	0	0	1	0	1	0	0	0	0	10	203
Number of Doula Encounters per	Mean	3.19	1.00	N/A	N/A	N/A	1.00	N/A	N/A	N/A	2.00	N/A	N/A	N/A	2.41	N/A	1.00	2.19	N/A	N/A	6.00	N/A	1.00	N/A	N/A	N/A	N/A	2.50	2.33
Participant	Median	1.5	1	N/A	N/A	N/A	1	N/A	N/A	N/A	2	N/A	N/A	N/A	2	N/A	1	2	N/A	N/A	6	N/A	1	N/A	N/A	N/A	N/A	1.5	2
Average and Median	N	474	277	1752	14	634	0	0	122	23	295	392	0	185	317	1311	38	803	695	50	168	92	736	0	36	899	60	0	9373
Number of	Mean	3.42	1.79	1.42	1.86	2.38	N/A	N/A	1.34	5.83	2.82	2.30	N/A	1.71	4.39	7.59	8.68	3.65	5.77	8.26	1.52	3.61	2.20	N/A	1.06	1.07	3.32	N/A	3.30
per Participant	Median	3	1	1	1	2	N/A	N/A	1	4	2	1	N/A	1	2	3	5	2	5	7	1	2	2	N/A	1	1	3	N/A	2
Enhanced Services																				l								-	
Received Health Education, not Centering	N	1982	950	0	423	996	109	6	1247	365	1574	2359	942	378	821	2415	390	1647	1515	119	175	1008	848	640	740	1450	452	1602	25153
Yes	%	23.5	1.6	0.0	4.0	45.0	0.0	0.0	7.0	17.0	0.9	4.2	0.0	32.8	0.9	56.2	16.2	56.7	39.8	42.0	100.0	5.4	81.8	0.0	0.3	0.0	4.2	2.1	21.2
No	%	76.4	64.8	0.0	87.0	49.7	100.0	100.0	91.6	80.0	92.6	56.5	99.9	30.4	14.7	34.9	31.0	42.0	59.7	58.0	0.0	94.1	17.9	0.0	99.5	97.8	68.6	65.7	62.6
Not Known	%	0.1	33.6	0.0	9.0	5.3	0.0	0.0	1.4	3.0	6.5	39.3	0.1	36.8	84.4	8.9	52.8	1.3	0.5	0.0	0.0	0.5	0.2	100.0	0.3	2.2	27.2	32.2	16.2
	N	466	11	0	6	276	0	0	84	11	10	101	0	121	93	985	34	608	599	50	82	53	689	0	0	0	17	0	4296
Average and Median Number of Health	Maar	2.24	4.55		1.50	1 1 4	N1/A		1.01	2.00	1.40	0.17	N1/A	1 10	0.40	2.44	2.04	1.05	0.10	2.04	1 4 4	4.47	1.00	N1/A	N1/A	N1/A	0.47	N1/A	2.22
Education Services per Participant	Median	3.24	1.55	N/A	1.50	1.14	N/A	N/A	1.21	2	1.40	2.17	N/A	1.10	2.42	3.44	3.94	1.65	2.12	3.94	1.44	4.17	1.52	N/A	N/A	N/A	1	N/A	1
Received Home	N	1001	050	2007	440	005	100	,	1040	2/5	4575	2205	040	070	004	0074	200	4/4/	4547	404	207	1015	054	(40	700	1450	455	1/02	20104
Visits	IN	1901	952	2900	410	995	109	0	1240	305	1575	2395	942	3/0	021	23/1	307	1040	107	121	227	1015	001	040	739	1450	455	1002	20174
No	%	4.Z 95.8	2.5 51.9	58.7 41.3	1.4 86.1	6.5 69.4	100.0	100.0	98.6	96.2	7.0	0.1 93.9	0.0 99.9	16.9 45.0	23.3 75.0	80.1	38.8	0.4 97.4	18.7	99.2	98.2 1.8	2.3	0.2 99.1	0.0	0.0 99.7	97.7	2.6	66.7	78.4
Not Known	%	0.0	45.6	0.0	12.4	24.0	0.0	0.0	1.4	3.0	5.9	6.1	0.1	38.1	1.7	8.7	51.7	2.2	0.7	0.8	0.0	0.5	0.7	100.0	0.3	2.3	27.0	32.2	10.4
Average and Median	N	85	3	1752	0	38	0	0	0	3	94	2	0	2	277	173	21	7	281	0	96	23	2	0	0	0	12	0	2871
Visiting Services per	Mean	1.22	1.33	1.42	N/A	1.05	N/A	N/A	N/A	2.33	1.74	1.50	N/A	1.50	1.82	1.09	5.05	2.00	1.57	N/A	1.21	1.04	1.00	N/A	N/A	N/A	1.67	N/A	1.47
Participant	Median	1	1	1	N/A	1	N/A	N/A	N/A	2	1	1.5	N/A	1.5	2	1	4	1	1	N/A	1	1	1	N/A	N/A	N/A	1	N/A	1
Received Self-Care, not Centering	Ν	1982	945	0	421	994	109	5	1248	361	1573	2394	942	378	821	2285	385	1632	1514	120	2	1012	850	640	740	1450	454	1602	24859
Yes	%	0.0	0.7	0.0	2.4	30.0	0.0	0.0	0.1	9.1	0.0	0.0	0.0	0.5	0.0	25.1	6.8	10.8	42.3	40.0	50.0	1.2	0.0	0.0	0.3	0.0	0.4	0.0	7.4
No Not Known	%	100.0	54.5	0.0	87.9	62.3	100.0	100.0	98.5	28	93.9	68.8	99.9	55.8 43.7	15.8	65.3 9.6	39.0	85.4	57.2	60.0	50.0	98.3	99.3	0.0	99.5	97.8	71.1	0.0	71.8
	<sup>70</sup>	0.0	44.0	0.0	2	164	0.0	0.0	1.4	2.0	0.1	0	0.1	43.7	86	254	7	90	638	<u>49</u>	1	13	0.7	0	0.3	0	20.4	0.001	1318
Number of Self-Care	Mean	N/A	1 50	N/A	1.00	1 10	N/A	N/A	2.00	3.00	N/A	N/A	N/A	200	2 27	9.15	4.84	2.57	2.20	3 00	1.00	2 15	N/A	N/A	N/A	N/A	2 50	N/A	3 5 4
Services per	Madia		1.50		1.00	1.10			2.00	3.00				2.00	2.37	7.15	4.00	2.57	2.27	3.70	1.00	2.13					2.50		3.50
Received Nutrition	N	1980	949	6029	426	994	109	5	2 1242	3	1578	2414	942	∠ 378	∠ 869	9 2416	389	∠ 1642	1514	3 121	8	2 1009	851	640	736	1449	447	1602	∠ 31105
Yes	%	0.2	24.3	0.1	16.7	79.6	0.0	0.0	4.1	22.4	15.1	13.0	0.0	21.7	4.0	67.7	13.4	66.3	25.0	19.8	87.5	4.3	54.1	0.0	10.7	62.4	12.5	14.7	22.1
No	%	99.8	43.5	94.9	73.7	16.2	100.0	100.0	94.4	76.0	79.0	61.2	99.9	35.7	88.6	24.2	34.2	32.6	74.4	80.2	12.5	95.2	45.8	0.0	89.0	36.5	61.1	53.1	67.1
Not Known	%	0.0	32.1	5.0	9.6	4.2	0.0	0.0	1.4	1.6	5.9	25.7	0.1	42.6	7.4	8.2	52.4	1.2	0.6	0.0	0.0	0.5	0.1	100.0	0.3	1.1	26.4	32.2	10.9

Data Elements	N, %, Mean, or Median	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
Average and Median	N	3	220	0	11	607	0	0	50	18	198	281	0	81	120	1249	16	768	373	24	7	41	456	0	36	899	53	0	5511
Number of Nutrition Counseling Services	Mean	2.00	1.13	N/A	1.27	1.60	N/A	N/A	1.18	3.28	2.90	2.12	N/A	1.07	2.08	3.16	3.50	2.01	1.84	1.04	2.57	1.37	1.32	N/A	1.06	1.07	2.38	N/A	1.98
per Participant	Median	2	1	N/A	1	1	N/A	N/A	1	3.5	2	1	N/A	1	2	1	2.5	2	2	1	1	1	1	N/A	1	1	2	N/A	1
Received Substance Abuse Services	N	1982	947	6029	421	993	109	5	1247	361	1567	2418	942	378	854	2359	386	1631	1504	119	1	1015	848	430	739	1449	447	1602	30783
Yes	%	0.0	4.8	0.0	0.7	0.4	0.0	0.0	0.2	8.9	4.7	1.8	0.0	4.8	0.5	4.2	0.3	2.4	7.0	0.0	100.0	0.4	8.1	10.5	0.0	0.0	0.7	2.4	2.0
No	%	98.2	71.5	95.0	90.0	90.1	100.0	100.0	98.3	88.4	89.5	72.4	99.9	53.4	92.3	86.6	46.1	94.5	92.5	99.2	0.0	98.2	91.5	89.5	99.7	98.1	73.2	65.4	88.8
Not Known	%	1.8	23.8	5.0	9.3	9.5	0.0	0.0	1.5	2.8	5.7	25.8	0.1	41.8	7.3	9.2	53.6	3.1	0.5	0.8	0.0	1.4	0.4	0.0	0.3	1.9	26.2	32.2	9.2
Average and Median Number of	N	0	43	0	1	4	0	0	1	8	10	33	0	6	90	76	0	8	104	0	1	3	54	0	0	0	3	0	445
Substance Abuse Services per	Mean	N/A	5.14	N/A	1.00	1.25	N/A	N/A	1.00	2.00	8.00	2.58	N/A	15.33	2.31	1.39	N/A	2.63	1.53	N/A	2.00	1.00	2.02	N/A	N/A	N/A	2.00	N/A	2.51
Participant	Median	N/A	1	N/A	1	1	N/A	N/A	1	1	2	2	N/A	11.5	2	1	N/A	2.5	1	N/A	2	1	1	N/A	N/A	N/A	1	N/A	1
Referrals	1				-		1					1																	
Referrals for Nonmedical Services Outside of the Strong Start Program	N	1986	941	6029	520	995	1289	383	1244	364	1565	2431	957	875	995	2419	390	2917	1597	144	172	1023	1292	640	733	1443	452	1602	35398
Yes	%	0.3	6.4	0.4	8.8	59.3	63.5	0.0	47.6	34.1	15.8	86.4	99.0	73.3	41.1	27.6	5.9	49.4	77.5	49.3	100.0	63.3	21.4	100.0	0.3	44.0	15.0	2.4	35.4
No	%	3.3	60.6	94.6	83.7	35.9	36.5	99.2	49.9	64.6	78.3	11.5	1.0	26.5	55.8	61.1	44.4	48.5	22.3	50.0	0.0	35.5	77.9	00	99.6	52.2	58.8	45.0	52.2
Not Known	%	96.4	33.0	F 0	75	4.0	0.0	0.8	25					20.5										0.0	//.0	53.Z			12.4
Referrals for High- Risk Medical				5.0	7.5	4.0	0.0	0.0	Z.3	1.4	5.8	2.1	0.0	0.2	3.1	11.3	49.7	2.1	0.3	0.7	0.0	1.2	0.8	0.0	0.1	2.8	26.1	52.6	
Services	N	1979	958	6029	537	4.0 991	1206	383	1226	1.4 364	5.8 <b>1571</b>	2.1 2401	0.0 942	0.2 877	3.1 996	11.3 2429	49.7 386	2.1 2894	0.3 <b>1527</b>	0.7 113	0.0 3	1.2 1011	0.8 1296	0.0 0.0 640	0.1 736	2.8 1447	26.1 444	52.6 1602	34988
Services Yes	N %	<b>1979</b> 46.4	<b>958</b> 18.8	6029	<b>537</b> 38.9	4.0 991 40.0	<b>1206</b> 8.5	<b>383</b>	<b>1226</b> 19.2	1.4 364 9.3	5.8 <b>1571</b> 27.1	2.1 2401 43.1	0.0 942 18.3	0.2 877 43.8	3.1 996 15.1	11.3 2429 7.2	49.7 386 6.2	2.1 2894 11.7	0.3 <b>1527</b> 9.0	0.7 113 0.0	0.0 3 100.0	1.2 1011 11.0	0.8 <b>1296</b> 31.7	0.0 0.0 640 0.0	0.1 736 28.4	2.8 1447 37.4	26.1 444 2.9	52.6 1602 5.0	<b>34988</b> 18.0
Services Yes No	N % %	<b>1979</b> 46.4 53.6	<b>958</b> 18.8 49.2	6029 0.0 95.0	7.5 537 38.9 57.0	4.0 991 40.0 53.9	8.5 89.1	0.5 383 0.5 98.7	1226 19.2 67.8	1.4 364 9.3 89.0	5.8 <b>1571</b> 27.1 67.3	2.1 2401 43.1 48.8	0.0 942 18.3 81.5	0.2 877 43.8 50.1	3.1 996 15.1 77.9	11.3 2429 7.2 80.0	49.7 386 6.2 47.7	2.1 2894 11.7 86.2	0.3 1527 9.0 90.7	0.7 <b>113</b> 0.0 99.1	0.0 3 100.0 0.0	1.2 1011 11.0 81.0	0.8 <b>1296</b> 31.7 67.8	0.0 0.0 640 0.0 0.0	0.1 736 28.4 71.3	33.2           2.8           1447           37.4           60.8	26.1 444 2.9 71.2	52.6 1602 5.0 29.8	<b>34988</b> 18.0 71.3
Services Yes No Not Known	N % %	<b>1979</b> 46.4 53.6 0.1	<b>958</b> 18.8 49.2 32.0	6029 0.0 95.0 5.0	7.5 537 38.9 57.0 4.1	4.8 991 40.0 53.9 6.2	8.5 89.1 2.4	0.5 383 0.5 98.7 0.8	19.2 19.2 67.8 13.1	1.4 364 9.3 89.0 1.6	5.8 <b>1571</b> 27.1 67.3 5.7	2.1 2401 43.1 48.8 8.1	0.0 942 18.3 81.5 0.2	0.2 877 43.8 50.1 6.2	3.1 996 15.1 77.9 7.0	11.3 2429 7.2 80.0 12.7	49.7 386 6.2 47.7 46.1	2.1 2894 11.7 86.2 2.1	0.3 <b>1527</b> 9.0 90.7 0.3	0.7 <b>113</b> 0.0 99.1 0.9	0.0 3 100.0 0.0 0.0	1.2 1011 11.0 81.0 8.0	0.8 <b>1296</b> 31.7 67.8 0.5	0.0 640 0.0 0.0 100.0	0.1 736 28.4 71.3 0.3	33.2 2.8 1447 37.4 60.8 1.8	26.1 444 2.9 71.2 25.9	52.6 <b>1602</b> 5.0 29.8 65.2	34988 18.0 71.3 10.8
Services Yes No Not Known Plan to Have a Support Person	N % % N	<b>1979</b> 46.4 53.6 0.1 <b>1677</b>	958 18.8 49.2 32.0 354	6029 0.0 95.0 5.0 4829	7.5 537 38.9 57.0 4.1 507	4.8 991 40.0 53.9 6.2 619	1206 8.5 89.1 2.4 773	0.5 98.7 0.8 397	1226 19.2 67.8 13.1 856	1.4 364 9.3 89.0 1.6 380	5.8 <b>1571</b> 27.1 67.3 5.7 <b>939</b>	2.1 2401 43.1 48.8 8.1 1143	0.0 942 18.3 81.5 0.2 352	0.2 877 43.8 50.1 6.2 430	3.1 996 15.1 77.9 7.0 1062	11.3 2429 7.2 80.0 12.7 1122	49.7 386 6.2 47.7 46.1 270	2.1 2894 11.7 86.2 2.1 2327	0.3 1527 9.0 90.7 0.3 889	0.7 <b>113</b> 0.0 99.1 0.9 <b>113</b>	0.0 3 100.0 0.0 600	1.2 1011 11.0 81.0 8.0 475	0.8 1296 31.7 67.8 0.5 634	0.0 640 0.0 0.0 100.0 378	0.1 736 28.4 71.3 0.3 570	33.2 2.8 1447 37.4 60.8 1.8 838	26.1 444 2.9 71.2 25.9 <b>317</b>	52.6 1602 5.0 29.8 65.2 687	34988 18.0 71.3 10.8 23538
Services Yes No Not Known Plan to Have a Support Person Yes Not	N % % N %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9	958 18.8 49.2 32.0 354 93.2	6029 0.0 95.0 5.0 4829 96.0	7.5           537           38.9           57.0           4.1           507           94.7           1.4	4.8 991 40.0 53.9 6.2 619 95.2	1206           8.5           89.1           2.4           773           95.0	0.5 98.7 0.8 <b>397</b> 97.2	19.2 67.8 13.1 856 95.0	1.4       364       9.3       89.0       1.6       380       95.3	5.8 1571 27.1 67.3 5.7 939 96.4	2.1 2401 43.1 48.8 8.1 1143 95.3	0.0 942 18.3 81.5 0.2 352 96.6	20.3           0.2           877           43.8           50.1           6.2           430           96.5           1.4	3.1 996 15.1 77.9 7.0 1062 97.3	11.3 2429 7.2 80.0 12.7 1122 85.4	49.7 386 6.2 47.7 46.1 270 97.0	2.1 2894 11.7 86.2 2.1 2327 87.5	0.3 <b>1527</b> 9.0 90.7 0.3 <b>889</b> 98.5	0.7 <b>113</b> 0.0 99.1 0.9 <b>113</b> 90.3 2.7	0.0 3 100.0 0.0 600 96.8	1.2 1011 11.0 81.0 8.0 475 94.7	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4	0.0 640 0.0 0.0 100.0 378 93.4	0.1 736 28.4 71.3 0.3 570 92.3	33.2 2.8 1447 37.4 60.8 1.8 838 93.9	26.1 444 2.9 71.2 25.9 317 97.8	52.6 1602 5.0 29.8 65.2 687 59.0 4.6	34988 18.0 71.3 10.8 23538 93.2
Services           Yes           No           Not Known           Plan to Have a           Support Person           Yes           No           Llawing	N % % N % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1	<b>958</b> 18.8 49.2 32.0 <b>354</b> 93.2 0.8	5.0 6029 0.0 95.0 5.0 4829 96.0 0.9	7.5           537           38.9           57.0           4.1           507           94.7           1.4           2.0	4.8 991 40.0 53.9 6.2 619 95.2 1.1	8.5 89.1 2.4 773 95.0 2.1	0.5 383 0.5 98.7 0.8 397 97.2 0.3 25	19.2 67.8 13.1 <b>856</b> 95.0 1.4	1.4           364           9.3           89.0           1.6           380           95.3           1.1           27	5.8 <b>1571</b> 27.1 67.3 5.7 <b>939</b> 96.4 1.6 200	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 2.1	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6	<ul> <li>23.3</li> <li>0.2</li> <li>877</li> <li>43.8</li> <li>50.1</li> <li>6.2</li> <li>430</li> <li>96.5</li> <li>1.6</li> <li>1.0</li> </ul>	3.1 996 15.1 77.9 7.0 1062 97.3 0.5	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1	49.7 386 6.2 47.7 46.1 270 97.0 1.1	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8	0.3 <b>1527</b> 9.0 90.7 0.3 <b>889</b> 98.5 0.9 0.4	0.7 <b>113</b> 0.0 99.1 0.9 <b>113</b> 90.3 2.7 7.1	0.0 3 100.0 0.0 0.0 600 96.8 0.7 25	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         22	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 25	0.0 640 0.0 100.0 378 93.4 2.6	77.6           0.1           736           28.4           71.3           0.3           570           92.3           4.0           2.7	33.2 2.8 1447 37.4 60.8 1.8 838 93.9 2.0	26.1 444 2.9 71.2 25.9 317 97.8 0.3	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 20.4	34988 18.0 71.3 10.8 23538 93.2 1.6
Services           Yes           No           Not Known           Plan to Have a           Support Person           Yes           No           Unsure           Had a Support	N % % % N % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1	<b>958</b> 18.8 49.2 32.0 <b>354</b> 93.2 0.8 5.9	5.0           6029           0.0           95.0           5.0           4829           96.0           0.9           3.0	7.5           537           38.9           57.0           4.1           507           94.7           1.4           3.9	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7	1206 8.5 89.1 2.4 773 95.0 2.1 3.0	0.5 98.7 0.8 <b>397</b> 97.2 0.3 2.5	19.2           67.8           13.1           856           95.0           1.4           3.6	1.4       364       9.3       89.0       1.6       380       95.3       1.1       3.7	5.8         1571         27.1         67.3         5.7         939         96.4         1.6         2.0	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6	23.3           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8	0.3 <b>1527</b> 9.0 90.7 0.3 <b>889</b> 98.5 0.9 0.6	0.7 <b>113</b> 0.0 99.1 0.9 <b>113</b> 90.3 2.7 7.1	0.0 3 100.0 0.0 600 96.8 0.7 2.5	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5	0.0 640 0.0 0.0 100.0 378 93.4 2.6 4.0	736           0.1           736           28.4           71.3           0.3           570           92.3           4.0           3.7	33.2           2.8           1447           37.4           60.8           1.8           838           93.9           2.0           4.1	26.1 444 2.9 71.2 25.9 <b>317</b> 97.8 0.3 1.9	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor	N % % N % % N	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 023.8	<b>958</b> 18.8 49.2 32.0 <b>354</b> 93.2 0.8 5.9 <b>118</b>	5.0           6029           0.0           95.0           5.0           4829           96.0           0.9           3.0           4460           08.2	7.5           537           38.9           57.0           4.1           507           94.7           1.4           3.9           340	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542	1206 8.5 89.1 2.4 773 95.0 2.1 3.0 698	0.5 98.7 0.8 397 97.2 0.3 2.5 138 1000	2.5 1226 19.2 67.8 13.1 856 95.0 1.4 3.6 815 815	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7	5.8 1571 27.1 67.3 5.7 939 96.4 1.6 2.0 981 95.1	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303	0.2         0.2           877         43.8           50.1         6.2           430         96.5           1.6         1.9           620         04.8	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.2	49.7 <b>386</b> 6.2 47.7 46.1 <b>270</b> 97.0 1.1 1.9 <b>288</b> 07.2	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 97.2	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 2022	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 0.2.0	0.0 3 100.0 0.0 600 96.8 0.7 2.5 481	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2         427         97.0	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5 <b>737</b> 06.2	0.0 640 0.0 100.0 378 93.4 2.6 4.0 292	7.3         0.1           736         28.4           71.3         0.3           570         92.3           4.0         3.7           409         605	33.2 2.8 1447 37.4 60.8 1.8 838 93.9 2.0 4.1 618	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No	N % % N % % % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 93.8 5.0	<b>958</b> 18.8 49.2 32.0 <b>354</b> 93.2 0.8 5.9 <b>118</b> 96.6 0.8	5.0 6029 95.0 5.0 4829 96.0 0.9 3.0 4460 98.3 1.2	7.5           537           38.9           57.0           4.1           507           94.7           1.4           3.9           340           84.1           3.2	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 18	1206           8.5           89.1           2.4           773           95.0           2.1           3.0           698           95.1	0.5 98.7 0.8 <b>397</b> 97.2 0.3 2.5 <b>138</b> 100.0	1226           19.2           67.8           13.1           856           95.0           1.4           3.6           815           95.5	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7         2.4	5.8 1571 27.1 67.3 5.7 939 96.4 1.6 2.0 981 95.1 4.7	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0	23.3           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 105 2.3 1177 98.6	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.3 4.0	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9 288 97.2 10	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4	0.7 <b>113</b> 0.0 99.1 0.9 <b>113</b> 90.3 2.7 7.1 <b>82</b> 93.9 61	0.0 3 100.0 0.0 0.0 600 96.8 0.7 2.5 481 96.3 33	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2         427         97.0         3.0	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5 <b>737</b> 96.2 38	0.0         0.0           640         0.0           0.0         0.0           100.0         378           93.4         2.6           4.0         292           91.8         0.0	7.3         0.1           736	33.2 2.8 1447 37.4 60.8 1.8 838 838 93.9 2.0 4.1 618 96.0	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 11	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Lingure	N % % N % % % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 93.8 5.0 1.2	958           18.8           49.2           32.0           354           93.2           0.8           5.9           118           96.6           0.8           2.5	5.0           6029           0.0           95.0           5.0           4829           96.0           0.9           3.0           4460           98.3           1.2           0.5	7.5 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7	1206           8.5           89.1           2.4           773           95.0           2.1           3.0           698           95.1           4.4           0.4	0.5 98.7 0.8 <b>397</b> 97.2 0.3 2.5 <b>138</b> 100.0 0.0	2.3 <b>1226</b> 19.2 67.8 13.1 <b>856</b> 95.0 1.4 3.6 <b>815</b> 95.5 4.0 0.5	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7         2.4         0.9	5.8           1571           27.1           67.3           5.7           939           96.4           1.6           2.0           981           95.1           4.7           0.2	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0	26.5           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1           0.2	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 0.0	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.3 4.0 15.7	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9 288 97.2 1.0 1.7	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 0.3	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 00	0.0 3 100.0 0.0 96.8 0.7 2.5 481 96.3 3.3 0.4	1.2           1011           11.0           81.0           8.0           475           94.7           2.1           3.2           427           97.0           3.0	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5 <b>737</b> 96.2 3.8 0.0	0.0         0.0           640         0.0           0.0         0.0           100.0         378           93.4         2.6           4.0         292           91.8         0.0           0.8         2	7.3         0.1           0.1         736           28.4         71.3           71.3         0.3           570         92.3           4.0         3.7           409         68.5         31.3           0.2         0.2         0.2	33.2         2.8           2.8         1447           37.4         60.8           1.8         838           93.9         2.0           4.1         618           96.0         0.0	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3 0.7	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Unsure Delivery Process	N % % N % % % %	1979           46.4           53.6           0.1           1677           92.9           2.0           5.1           1690           93.8           5.0           1.2	958           18.8           49.2           32.0           354           93.2           0.8           5.9           118           96.6           0.8           2.5	5.0           6029           0.0           95.0           5.0           4829           96.0           0.9           3.0           4460           98.3           1.2           0.5	7.5 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7	1206           8.5           89.1           2.4           773           95.0           2.1           3.0           698           95.1           4.4           0.4	0.5         98.7           0.8         397           97.2         0.3           2.5         138           100.0         0.0           0.0         0.0	2.3 19.2 67.8 13.1 <b>856</b> 95.0 1.4 3.6 <b>815</b> 95.5 4.0 0.5	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7         2.4         0.9	5.8           1571           27.1           67.3           5.7           939           96.4           1.6           2.0           981           95.1           4.7           0.2	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0	0.2         0.2           877         43.8           50.1         6.2           430         96.5           1.6         1.9           620         96.8           3.1         0.2	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 0.0	11.3         2429         7.2         80.0         12.7         1122         85.4         2.5         12.1         1201         80.3         4.0         15.7	49.7           386           6.2           47.7           46.1           270           97.0           1.1           1.9           288           97.2           1.0           1.7	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 0.3	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 0.0	0.0 3 100.0 0.0 0.0 600 96.8 0.7 2.5 481 96.3 3.3 0.4	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2         427         97.0         3.0         0.0	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5 <b>737</b> 96.2 3.8 0.0	0.0         0.0           640         0.0           0.0         0.0           100.0         378           93.4         2.6           4.0         292           91.8         0.0           8.2	7.3         0.1           0.1         736           28.4         71.3           71.3         0.3           570         92.3           4.0         3.7           409         68.5           31.3         0.2	33.2         2.8           2.8         1447           37.4         60.8           1.8         838           93.9         2.0           4.1         618           96.0         4.0           0.0         0	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3 0.7	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Unsure Delivery Process Delivery Location, Based on Exit Data	N % % N % % % % % % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 93.8 5.0 1.2 <b>1488</b>	958 18.8 49.2 32.0 354 93.2 0.8 5.9 118 96.6 0.8 2.5 901	5.0           6029           0.0           95.0           5.0           4829           96.0           0.9           3.0           4460           98.3           1.2           0.5           5674	7.3 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6 491	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7 877	1206           8.5           89.1           2.4           773           95.0           2.1           3.0           698           95.1           4.4           0.4           10004	0.5 98.7 0.8 397 97.2 0.3 2.5 138 100.0 0.0 0.0 348	2.3 1226 19.2 67.8 13.1 <b>856</b> 95.0 1.4 3.6 <b>815</b> 95.5 4.0 0.5 <b>1074</b>	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7         2.4         0.9         322	5.8       1571       27.1       67.3       5.7       939       96.4       1.6       2.0       981       95.1       4.7       0.2       1507	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2 1555	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0 697	0.2           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1           0.2           821	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 0.0 98.6	11.3         2429         7.2         80.0         12.7         1122         85.4         2.5         12.1         1201         80.3         4.0         15.7         1968	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9 288 97.2 1.0 1.7 344	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5 2453	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 0.3 1396	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 0.0 173	0.0 3 100.0 0.0 600 96.8 0.7 2.5 481 96.3 3.3 0.4 435	1.2         1011         11.0         81.0         475         94.7         2.1         3.2         427         97.0         3.0         0.0	0.8 1296 31.7 67.8 0.5 634 96.4 1.1 2.5 737 96.2 3.8 0.0 1220	0.0           0.0           640           0.0           0.0           0.0           0.0           378           93.4           2.6           4.0           292           91.8           0.0           8.2           640	7.3           0.1           736           28.4           71.3           0.3           570           92.3           4.0           3.7           409           68.5           31.3           0.2           715	33.2           2.8           1447           37.4           60.8           1.8           838           93.9           2.0           4.1           618           96.0           4.0           0.0           1121	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3 0.7 416	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4 937	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2 30271
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Unsure Delivery Process Delivery Location, Based on Exit Data Hospital	N % % N % % % % % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 93.8 5.0 1.2 <b>1488</b> 99.7	958 18.8 49.2 32.0 354 93.2 0.8 5.9 118 96.6 0.8 2.5 901 90.9	3.0 6029 95.0 5.0 4829 96.0 0.9 3.0 4460 98.3 1.2 0.5 5674 46.5	7.3 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6 491 99.6	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7 877 99.7	1206 8.5 89.1 2.4 773 95.0 2.1 3.0 698 95.1 4.4 0.4 1004 99.5	0.5 98.7 0.8 397 97.2 0.3 2.5 138 100.0 0.0 0.0 348 100.0	2.3 1226 19.2 67.8 13.1 856 95.0 1.4 3.6 815 95.5 4.0 0.5 1074 99.4	1.4         364         9.3         89.0         1.6         380         95.3         1.1         3.7         333         96.7         2.4         0.9         322         99.4	5.8 1571 27.1 67.3 5.7 939 96.4 1.6 2.0 981 95.1 4.7 0.2 1507 99.5	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2 1555 98.5	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0 96.0 4.0 0.0	0.2           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1           0.2           821           99.6	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 0.0 9864 9864 99.4	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.3 4.0 15.7 1968 99.2	49.7 386 6.2 47.7 46.1 270 97.0 1.1 97.0 1.1 97.2 1.0 1.7 344 98.3	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5 2453 98.1	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 0.3 1396 99.3	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 0.0 173 92.5	0.0 3 100.0 0.0 600 96.8 0.7 2.5 481 96.3 3.3 0.4 435 92.8	1.2 1011 11.0 81.0 475 94.7 2.1 3.2 427 97.0 3.0 0.0 730 99.5	0.8 <b>1296</b> 31.7 67.8 0.5 <b>634</b> 96.4 1.1 2.5 <b>737</b> 96.2 3.8 0.0 <b>1220</b> 99.1	0.0           0.0           640           0.0           0.0           0.0           378           93.4           2.6           4.0           292           91.8           0.0           8.2           640           100.0	7.3           0.1           736           28.4           71.3           0.3           570           92.3           4.0           3.7           409           68.5           31.3           0.2           715           99.9	33.2           2.8           1447           37.4           60.8           1.8           838           93.9           2.0           4.1           618           96.0           4.0           0.0           1121           99.8	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3 0.7 416 100.0	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4 937 99.5	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2 30271 89.1
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Unsure Delivery Process Delivery Location, Based on Exit Data Hospital Birth Center	N % % N % % % % % % %	<b>1979</b> 46.4 53.6 0.1 <b>1677</b> 92.9 2.0 5.1 <b>1690</b> 93.8 5.0 1.2 <b>1488</b> 99.7 0.0	958 18.8 49.2 32.0 354 93.2 0.8 5.9 118 96.6 0.8 2.5 901 90.9 0.0	5.0 6029 95.0 5.0 4829 96.0 0.9 3.0 4460 98.3 1.2 0.5 5674 46.5 45.7	7.5 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6 491 99.6 0.0	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7 877 99.7 0.0	1206 8.5 89.1 2.4 773 95.0 2.1 3.0 698 95.1 4.4 0.4 1004 99.5 0.2	383           0.5           98.7           0.8           397           97.2           0.3           2.5           138           100.0           0.0           348           100.0           0.0	2.3 1226 19.2 67.8 13.1 856 95.0 1.4 3.6 815 95.5 4.0 0.5 1074 99.4 0.2	1.4 364 9.3 89.0 1.6 380 95.3 1.1 3.7 333 96.7 2.4 0.9 322 99.4 0.0	5.8 1571 27.1 67.3 5.7 939 96.4 1.6 2.0 981 95.1 4.7 0.2 1507 99.5 0.0	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2 1555 98.5 0.0	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0 96.0 4.0 0.0 97.7 0.0	0.2           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1           0.2           821           99.6           0.1	3.1 9996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 0.0 98.6 1.4 0.0 99.4 0.4	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.3 4.0 15.7 1968 99.2 0.0	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9 288 97.2 1.0 1.7 344 98.3 0.3	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5 2453 98.1 0.6	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 1396 99.3 0.1	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 0.0 173 92.5 0.0	0.0 3 100.0 0.0 600 96.8 0.7 2.5 481 96.3 3.3 3.3 3.3 94.3 435 99.8 0.2	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2         427         97.0         3.0         0.0         730         99.5         0.0	0.8 1296 31.7 67.8 0.5 634 96.4 1.1 2.5 737 96.2 3.8 0.0 00 1220 99.1 0.0	0.0         0.0           640         0.0           0.0         0.0           100.0         378           93.4         2.6           4.0         292           91.8         0.0           8.2         640           100.0         0.0	7.3         0.1           0.1         736           28.4         71.3           71.3         0.3           570         92.3           4.0         3.7           409         68.5           31.3         0.2           715         99.9           0.0         0.0	33.2         2.8           2.8         1447           37.4         60.8           1.8         838           93.9         2.0           4.1         618           96.0         4.0           0.0         1121           99.8         0.0	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 1.41 95.0 4.3 0.7 4.3 0.7 4.4 416	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4 937 99.5 0.3	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2 30271 89.1 8.7
Services Yes No Not Known Plan to Have a Support Person Yes No Unsure Had a Support Person During Labor Yes No Unsure Delivery Process Delivery Location, Based on Exit Data Hospital Birth Center Home Birth	N % % N % % % % % % % %	1979           46.4           53.6           0.1           1677           92.9           2.0           5.1           1690           93.8           5.0           1.2           1488           99.7           0.0           0.1	<b>958</b> 18.8 49.2 32.0 <b>354</b> 93.2 0.8 5.9 <b>118</b> 96.6 0.8 2.5 <b>901</b> 90.9 <b>90.9</b> 0.0 0.1	5.0 6029 95.0 5.0 4829 96.0 0.9 3.0 4460 98.3 1.2 0.5 5674 46.5 5674	7.5 537 38.9 57.0 4.1 507 94.7 1.4 3.9 340 84.1 3.2 12.6 <b>491</b> 99.6 0.0 0.0	4.8 991 40.0 53.9 6.2 619 95.2 1.1 3.7 542 97.4 1.8 0.7 877 99.7 0.0 0.0	1206 8.5 89.1 2.4 773 95.0 2.1 3.0 698 95.1 4.4 0.4 1004 99.5 0.2 0.0	383 0.5 98.7 0.8 397 97.2 0.3 2.5 138 100.0 0.0 0.0 348 100.0 0.0 0.0	2.3 1226 19.2 67.8 13.1 856 95.0 1.4 3.6 815 95.5 4.0 0.5 1074 99.4 0.2	1.4           364           9.3           89.0           1.6           380           95.3           1.1           3.7           333           96.7           2.4           0.9           322           99.4           0.0           0.0	5.8 <b>1571</b> 27.1 67.3 5.7 <b>939</b> 96.4 1.6 2.0 <b>981</b> 95.1 4.7 0.0 <b>1507</b> 99.5 0.0 0.5	2.1 2401 43.1 48.8 8.1 1143 95.3 1.7 3.1 929 95.5 4.3 0.2 1555 98.5 0.0 0.3	0.0 942 18.3 81.5 0.2 352 96.6 0.9 2.6 303 96.0 4.0 0.0 96.0 4.0 0.0	0.2           0.2           877           43.8           50.1           6.2           430           96.5           1.6           1.9           620           96.8           3.1           0.2           821           99.6           0.1	3.1 996 15.1 77.9 7.0 1062 97.3 0.5 2.3 1177 98.6 1.4 98.6 1.4 99.4 994 994	11.3 2429 7.2 80.0 12.7 1122 85.4 2.5 12.1 1201 80.3 4.0 15.7 1968 99.2 0.0 0.0	49.7 386 6.2 47.7 46.1 270 97.0 1.1 1.9 288 97.2 1.0 1.7 344 98.3 0.3 0.3	2.1 2894 11.7 86.2 2.1 2327 87.5 2.8 9.8 2295 87.3 5.2 7.5 2453 98.1 0.6 0.4	0.3 1527 9.0 90.7 0.3 889 98.5 0.9 0.6 763 99.3 0.4 0.3 1396 99.3 0.1 1396	0.7 113 0.0 99.1 0.9 113 90.3 2.7 7.1 82 93.9 6.1 0.0 173 92.5 0.0 0.6	0.0 3 100.0 0.0 96.8 0.7 2.5 481 96.3 3.3 0.4 9435 99.8 0.2 0.0	1.2         1011         11.0         81.0         8.0         475         94.7         2.1         3.2         427         97.0         3.0         0.0         730         99.5         0.0         0.1	0.8 1296 31.7 67.8 0.5 634 96.4 1.1 2.5 737 96.2 3.8 0.0 1220 99.1 0.0 0.5	0.0           0.0           640           0.0           0.0           100.0           378           93.4           2.6           4.0           292           91.8           0.0           8.2           640           100.0           0.0           0.0	7.13         0.1           7.36         28.4           71.3         0.3           570         92.3           4.0         3.7           409         68.5           31.3         0.2           715         99.9           0.0         0.0	33.2         2.8           2.8         1447           37.4         60.8           1.8         838           93.9         2.0           4.1         618           96.0         4.0           0.0         1121           99.8         0.0           0.2         2.2	26.1 444 2.9 71.2 25.9 317 97.8 0.3 1.9 141 95.0 4.3 0.7 4.3 0.7 4.16 100.0 0.0	52.6 1602 5.0 29.8 65.2 687 59.0 1.6 39.4 1140 23.4 1.1 75.4 937 99.5 0.3 0.2	34988 18.0 71.3 10.8 23538 93.2 1.6 5.3 22018 90.3 3.5 6.2 30271 89.1 8.7 1.5

Data Elements	N, %, Mean, or Median	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
Routine Prenatal Service Provider, Based on Exit Data	N	1988	948	6028	505	986	1278	364	1146	300	1515	1483	942	861	980	2123	313	2829	1415	65	437	963	1310	608	717	1422	382	959	32867
Obstetrician	%	61.5	3.0	2.5	65.0	13.5	88.3	0.0	2.1	13.7	70.2	56.8	50.2	48.1	96.3	94.3	50.2	31.4	100.0	27.7	99.8	56.6	1.1	73.8	100.0	54.1	30.6	27.4	44.4
Licensed Professional Midwife	%	0.0	0.1	19.6	1.2	1.5	0.0	0.0	0.6	1.7	0.2	0.9	0.0	0.0	0.0	0.1	0.0	1.9	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.3	7.1	21.2	4.6
Nurse Practitioner	%	0.0	84.6	0.0	20.4	0.4	10.1	14.3	16.7	38.3	11.0	7.8	3.0	0.0	0.2	1.4	34.5	0.5	0.0	0.0	0.2	18.3	0.1	0.0	0.0	26.4	22.0	26.3	8.4
Certified Nurse Midwife/Certified Midwife	%	25.7	0.1	76.0	12.7	64.8	1.6	85.7	79.8	46.3	16.8	28.7	46.0	33.9	3.5	1.5	12.8	64.9	0.0	0.0	0.0	1.9	0.0	26.2	0.0	19.1	38.7	24.7	34.6
Family Medicine Physician	%	0.0	0.0	1.7	0.0	19.8	0.0	0.0	0.8	0.0	0.0	0.1	0.4	0.6	0.0	0.0	1.6	1.2	0.0	0.0	0.0	23.1	0.0	0.0	0.0	0.1	0.5	0.1	1.8
Other Drewider	0/	120	122	0.2	0.8	00	00	00	01		1.8	5.8	04	17/		27	10	0.1	00	723	00	00	000	00	00	00	10	03	63

TABLE B.14: FAMILY PLANNING, BREASTFEEDING, AND SATISFACTION, BY AWARDEE

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
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	N	1699	113	4375	314	524	685	137	814	325	990	904	302	623	1173	1186	283	2289	770	80	488	444	820	292	394	593	134	1140	21891
Yes	%	78.6	80.5	76.2	91.1	65.8	84.1	93.4	87.0	75.4	95.4	90.3	81.8	98.2	71.1	81.5	84.5	74.5	93.1	87.5	82.4	82.0	96.2	87.0	57.4	96.0	97.0	72.0	81.1
No	%	18.1	17.7	20.7	8.0	31.9	14.2	5.1	12.2	20.3	4.2	8.7	17.9	1.4	27.8	12.6	12.0	20.7	6.5	10.0	17.0	13.1	3.4	0.0	41.1	3.7	3.0	2.6	15.1
Unsure	%	3.2	1.8	3.1	1.0	2.3	1.8	1.5	0.9	4.3	0.4	1.0	0.3	0.3	1.1	5.9	3.5	4.8	0.4	2.5	0.6	5.0	0.4	13.0	1.5	0.3	0.0	25.4	3.8
Breastfeeding				-				1		1			-				1			1	-								
Breastfeeding Intention at Third Trimester	N	1874	362	5096	520	693	884	403	929	401	1116	1245	467	539	1161	1272	319	2607	884	138	642	571	679	375	571	860	322	698	25628
Breastfeed only	%	34.8	42.8	82.2	36.2	56.4	43.4	47.4	52.4	61.1	23.3	64.1	57.2	54.7	61.3	8.2	70.5	32.3	72.6	39.9	55.6	31.9	30.9	53.9	50.6	19.7	28.3	32.8	50.0
Formula feed only	%	12.9	14.9	3.7	21.0	3.0	15.4	5.2	4.3	6.2	25.6	4.8	10.9	9.6	19.4	25.4	4.7	9.7	10.7	17.4	16.5	17.0	22.7	13.9	10.2	29.9	24.8	10.6	12.1
Both breast and formula feed	%	40.8	30.4	9.8	37.7	30.7	29.4	38.5	40.9	21.9	35.3	25.3	25.7	26.3	11.4	40.6	16.6	43.5	13.7	29.0	19.6	46.4	39.8	26.1	31.5	40.9	30.7	26.1	28.1
I haven't decided	%	11.5	11.9	4.4	5.2	9.8	11.8	8.9	2.4	10.7	15.8	5.8	6.2	9.3	7.9	25.8	8.2	14.6	2.9	13.8	8.3	4.7	6.6	6.1	7.7	9.5	16.1	30.5	9.8

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 after Delivery (Based on Postpartum Form Data)	Ν	1749	114	4429	320	530	704	138	816	327	993	932	306	617	1174	1179	284	2317	765	80	494	451	827	292	398	594	144	1140	22114
Yes	%	76.4	82.5	91.8	70.9	89.4	75.0	86.2	93.3	92.0	59.7	91.3	79.4	74.6	73.9	45.1	88.0	80.4	77.4	77.5	73.9	82.5	70.5	71.9	74.1	63.6	69.4	54.6	77.5
No	%	22.9	16.7	7.4	28.8	9.8	24.7	12.3	6.6	5.5	39.9	8.4	20.6	25.4	26.1	38.8	11.6	15.0	22.4	22.5	25.9	16.6	29.5	0.0	25.4	35.9	29.9	20.5	19.1
Prefer not to answer	%	0.7	0.9	0.9	0.3	0.8	0.3	1.4	0.1	2.4	0.4	0.3	0.0	0.0	0.0	16.1	0.4	4.5	0.3	0.0	0.2	0.9	0.0	28.1	0.5	0.5	0.7	24.9	3.4
Satisfaction				1	1	1	1		1			-	1	1				-			1			1					
Satisfaction with	N	4074			50/	101	004				4400	4057					017	2400	074	4.40	(07		101						
Prenatal Care		1871	359	5094	506	696	884	400	932	404	1122	1257	464	540	1160	1277	317	2400	874	140	627	564	684	369	565	852	321	577	25256
Not at all satisfied	%	1871	359 1.4	<b>5094</b> 0.0	0.2	0.9	<b>884</b> 0.5	<b>400</b> 0.3	<b>932</b> 0.2	<b>404</b> 0.0	0.5	1257	<b>464</b> 0.2	<b>540</b> 0.0	0.3	1277 0.3	0.0	0.5	<b>874</b> 0.2	140 3.6	0.3	<b>564</b> 0.4	684 1.3	<b>369</b> 0.3	565 1.8	852 0.9	321 0.3	<b>577</b> 2.1	0.5
Not at all satisfied Slightly satisfied	%	1871 1.0 1.3	359 1.4 1.1	0.0 0.4	0.2 0.8	0.9 0.9	0.5 2.1	400 0.3 1.0	932 0.2 0.6	<b>404</b> 0.0 1.2	0.5 2.2	1257 1.0 2.5	464 0.2 1.1	0.0 0.5	0.3 0.9	0.3 0.9	0.0 0.9	0.5 1.8	0.2 0.1	3.6 6.4	0.3 1.9	0.4 0.2	684 1.3 1.5	0.3 0.8	565 1.8 1.8	852 0.9 1.8	321 0.3 1.2	<b>577</b> 2.1 1.4	0.5 1.2
Not at all satisfied Slightly satisfied Moderately satisfied	% % %	1871 1.0 1.3 6.4	359 1.4 1.1 8.4	5094           0.0           0.4           3.0	0.2 0.8 4.2	0.9 0.9 0.9 3.6	0.5 2.1 10.0	400           0.3           1.0           7.0	932 0.2 0.6 2.8	<b>404</b> 0.0 1.2 6.7	0.5 2.2 6.5	1257 1.0 2.5 10.6	<b>464</b> 0.2 1.1 4.7	540           0.0           1.5           5.9	0.3 0.9 7.3	0.3 0.9 7.7	0.0 0.9 4.4	0.5 1.8 9.3	0.2 0.1 2.4	3.6 6.4 15.7	0.3 1.9 16.1	0.4 0.2 11.7	684 1.3 1.5 9.5	369 0.3 0.8 5.1	565           1.8           1.8           4.8	852 0.9 1.8 6.1	321 0.3 1.2 4.4	2.1 1.4 21.5	0.5 1.2 6.8
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied	% % %	1871       1.0       1.3       6.4       48.8	359 1.4 1.1 8.4 42.3	5094           0.0           0.4           3.0           28.8	0.2           0.8           4.2           26.7	0.9 0.9 3.6 50.6	884           0.5           2.1           10.0           38.0	400 0.3 1.0 7.0 32.5	932 0.2 0.6 2.8 43.1	<b>404</b> 0.0 1.2 6.7 38.1	0.5 2.2 6.5 43.7	1257 1.0 2.5 10.6 47.3	464 0.2 1.1 4.7 18.8	0.0 1.5 5.9 53.9	1160           0.3           0.9           7.3           34.4	1277           0.3           0.9           7.7           49.9	0.0 0.9 4.4 27.1	0.5 1.8 9.3 54.9	874           0.2           0.1           2.4           26.1	140           3.6           6.4           15.7           40.7	0.3 1.9 16.1 46.3	0.4           0.2           11.7           48.6	684 1.3 1.5 9.5 31.4	369 0.3 0.8 5.1 55.3	565           1.8           1.8           4.8           34.7	852 0.9 1.8 6.1 35.1	321 0.3 1.2 4.4 37.1	577           2.1           1.4           21.5           42.3	25256 0.5 1.2 6.8 39.9
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied Extremely satisfied	% % % %	1871       1.0       1.3       6.4       48.8       42.6	359           1.4           1.1           8.4           42.3           46.8	5094           0.0           0.4           3.0           28.8           67.6	0.2           0.8           4.2           26.7           68.2	0.9           0.9           3.6           50.6           44.1	884           0.5           2.1           10.0           38.0           49.4	400           0.3           1.0           7.0           32.5           59.3	932           0.2           0.6           2.8           43.1           53.2	404       0.0       1.2       6.7       38.1       54.0	1122           0.5           2.2           6.5           43.7           47.1	1.0           2.5           10.6           47.3           38.6	464           0.2           1.1           4.7           18.8           75.2	540           0.0           1.5           5.9           53.9           38.7	1160           0.3           0.9           7.3           34.4           57.1	1277           0.3           0.9           7.7           49.9           41.2	0.0           0.9           4.4           27.1           67.5	0.5 1.8 9.3 54.9 33.5	874           0.2           0.1           2.4           26.1           71.2	140           3.6           6.4           15.7           40.7           33.6	627           0.3           1.9           16.1           46.3           35.4	564           0.4           0.2           11.7           48.6           39.2	684           1.3           1.5           9.5           31.4           56.3	369           0.3           0.8           5.1           55.3           38.5	565           1.8           1.8           4.8           34.7           57.0	852           0.9           1.8           6.1           35.1           56.1	321           0.3           1.2           4.4           37.1           57.0	577           2.1           1.4           21.5           42.3           32.8	25256 0.5 1.2 6.8 39.9 51.6
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied Extremely satisfied Satisfaction with Delivery Experience	% % % % %	1871         1.0         1.3         6.4         48.8         42.6         1704	359           1.4           1.1           8.4           42.3           46.8           116	5094         0.0         0.4         3.0         28.8         67.6         4425	0.2           0.8           4.2           26.7           68.2           264	0.9           0.9           3.6           50.6           44.1           542	0.5         2.1         10.0         38.0         49.4         693	400       0.3       1.0       7.0       32.5       59.3       138	932           0.2           0.6           2.8           43.1           53.2           811	404       0.0       1.2       6.7       38.1       54.0       335	1122           0.5           2.2           6.5           43.7           47.1           999	1257           1.0           2.5           10.6           47.3           38.6           930	<ul> <li>464</li> <li>0.2</li> <li>1.1</li> <li>4.7</li> <li>18.8</li> <li>75.2</li> <li>304</li> </ul>	540           0.0           1.5           5.9           53.9           38.7           622	1160         0.3         0.9         7.3         34.4         57.1         1178	1277         0.3         0.9         7.7         49.9         41.2         1186	317           0.0           0.9           4.4           27.1           67.5           281	2400           0.5           1.8           9.3           54.9           33.5           2107	0.2         0.1         2.4         26.1         71.2         768	140       3.6       6.4       15.7       40.7       33.6       81	0.3 1.9 16.1 46.3 35.4 <b>487</b>	564         0.4         0.2         11.7         48.6         39.2         441	684           1.3           1.5           9.5           31.4           56.3           737	369 0.3 0.8 5.1 55.3 38.5 269	565           1.8           1.8           34.7           57.0           412	852           0.9           1.8           6.1           35.1           56.1           621	321 0.3 1.2 4.4 37.1 57.0 141	577         2.1         1.4         21.5         42.3         32.8         296	0.5 1.2 6.8 39.9 51.6 <b>20888</b>
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied Extremely satisfied Satisfaction with Delivery Experience Not at all satisfied	%           %           %           %           %           %           %           %           %           %	1871         1.0         1.3         6.4         48.8         42.6         1704         3.3	359           1.4           1.1           8.4           42.3           46.8           116           0.0	5094           0.0           0.4           3.0           28.8           67.6           4425           1.9	306           0.2           0.8           4.2           26.7           68.2           264           1.5	696           0.9           0.9           3.6           50.6           44.1           542           1.7	884           0.5           2.1           10.0           38.0           49.4           693           2.9	400 0.3 1.0 7.0 32.5 59.3 138 3.6	932           0.2           0.6           2.8           43.1           53.2           811           0.9	404         0.0         1.2         6.7         38.1         54.0         335         0.3	0.5           2.2           6.5           43.7           47.1           999           2.3	1257           1.0           2.5           10.6           47.3           38.6           930           3.7	<ul> <li>464</li> <li>0.2</li> <li>1.1</li> <li>4.7</li> <li>18.8</li> <li>75.2</li> <li>304</li> <li>1.3</li> </ul>	540           0.0           1.5           5.9           53.9           38.7           622           1.4	1160           0.3           0.9           7.3           34.4           57.1           1178           1.1	1277           0.3           0.9           7.7           49.9           41.2           1186           1.3	317           0.0           0.9           4.4           27.1           67.5           281           1.8	2400           0.5           1.8           9.3           54.9           33.5           2107           2.5	874           0.2           0.1           2.4           26.1           71.2           768           0.5	140           3.6           6.4           15.7           40.7           33.6           81           8.6	0.3           1.9           16.1           46.3           35.4           487           3.1	564           0.4           0.2           11.7           48.6           39.2           441           0.5	684           1.3           1.5           9.5           31.4           56.3           737           4.9	369           0.3           0.8           5.1           55.3           38.5           269           3.3	565           1.8           1.8           4.8           34.7           57.0           412           9.5	852           0.9           1.8           6.1           35.1           56.1           621           3.4	321           0.3           1.2           4.4           37.1           57.0           141           2.8	577         2.1         1.4         21.5         42.3         32.8         296         11.5	25256 0.5 1.2 6.8 39.9 51.6 20888 2.5
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied Extremely satisfied Satisfaction with Delivery Experience Not at all satisfied Slightly satisfied	%           %           %           %           %           %           %           %           %           %           %           %           %           %	1871         1.0         1.3         6.4         48.8         42.6         1704         3.3         3.6	359           1.4           1.1           8.4           42.3           46.8           116           0.0           3.4	5094           0.0           0.4           3.0           28.8           67.6           4425           1.9           2.9	306           0.2           0.8           4.2           26.7           68.2           264           1.5           0.8	696           0.9           0.9           3.6           50.6           44.1           542           1.7           2.8	884           0.5           2.1           10.0           38.0           49.4           693           2.9           5.1	400 0.3 1.0 7.0 32.5 59.3 138 3.6 2.9	932           0.2           0.6           2.8           43.1           53.2           811           0.9           2.6	404         0.0         1.2         6.7         38.1         54.0         335         0.3         1.5	1122           0.5           2.2           6.5           43.7           47.1           999           2.3           4.2	1257         1.0         2.5         10.6         47.3         38.6         930         3.7         6.2	<ul> <li>464</li> <li>0.2</li> <li>1.1</li> <li>4.7</li> <li>18.8</li> <li>75.2</li> <li>304</li> <li>1.3</li> <li>1.0</li> </ul>	540           0.0           1.5           5.9           53.9           38.7           622           1.4           1.4	1160           0.3           0.9           7.3           34.4           57.1           1178           1.1           1.4	1277           0.3           0.9           7.7           49.9           41.2           1186           1.3           1.5	317           0.0           0.9           4.4           27.1           67.5           281           1.8           2.1	2400 0.5 1.8 9.3 54.9 33.5 <b>2107</b> 2.5 3.4	8/4           0.2           0.1           2.4           26.1           71.2           768           0.5           1.4	140           3.6           6.4           15.7           40.7           33.6           81           8.6           7.4	0.3           1.9           16.1           46.3           35.4           487           3.1           2.9	564           0.4           0.2           11.7           48.6           39.2           441           0.5           1.6	684           1.3           1.5           9.5           31.4           56.3           737           4.9           3.4	369 0.3 0.8 5.1 55.3 38.5 269 3.3 4.5	565           1.8           1.8           4.8           34.7           57.0           412           9.5           10.0	852           0.9           1.8           6.1           35.1           56.1           621           3.4           3.2	321           0.3           1.2           4.4           37.1           57.0           141           2.8           2.1	577           2.1           1.4           21.5           42.3           32.8           296           11.5           8.4	25256 0.5 1.2 6.8 39.9 51.6 20888 2.5 3.2
Not at all satisfied         Not at all satisfied         Slightly satisfied         Moderately         satisfied         Very satisfied         Extremely satisfied         Satisfaction with         Delivery Experience         Not at all satisfied         Slightly satisfied         Slightly satisfied         Moderately         satisfied	%           %           %           %           %           %           %           %           %	1871         1.0         1.3         6.4         48.8         42.6         1704         3.3         3.6         14.2	359           1.4           1.1           8.4           42.3           46.8           116           0.0           3.4           15.5	5094           0.0           0.4           3.0           28.8           67.6           4425           1.9           2.9           10.3	306           0.2           0.8           4.2           26.7           68.2           264           1.5           0.8           6.4	0.9         0.9           0.9         3.6           50.6         44.1           542         1.7           2.8         16.1	884           0.5           2.1           10.0           38.0           49.4           693           2.9           5.1           13.6	400 0.3 1.0 7.0 32.5 59.3 <b>138</b> 3.6 2.9 13.8	932           0.2           0.6           2.8           43.1           53.2           811           0.9           2.6           9.5	404         0.0         1.2         6.7         38.1         54.0         335         0.3         1.5         8.7	1122           0.5           2.2           6.5           43.7           47.1           999           2.3           4.2           11.4	1257           1.0           2.5           10.6           47.3           38.6           930           3.7           6.2           13.9	<ul> <li>464</li> <li>0.2</li> <li>1.1</li> <li>4.7</li> <li>18.8</li> <li>75.2</li> <li>304</li> <li>1.3</li> <li>1.0</li> <li>8.6</li> </ul>	540           0.0           1.5           5.9           53.9           38.7           622           1.4           1.4           1.1.7	1160           0.3           0.9           7.3           34.4           57.1           1178           1.1           1.4           11.3	1277           0.3           0.9           7.7           49.9           41.2           1186           1.3           1.5           11.0	317           0.0           0.9           4.4           27.1           67.5           281           1.8           2.1           6.4	2400 0.5 1.8 9.3 54.9 33.5 2107 2.5 3.4 13.5	874           0.2           0.1           2.4           26.1           71.2           768           0.5           1.4           6.0	140           3.6           6.4           15.7           40.7           33.6           81           8.6           7.4           11.1	0.3           1.9           16.1           46.3           35.4           487           3.1           2.9           22.4	564           0.4           0.2           11.7           48.6           39.2           441           0.5           1.6           12.0	684           1.3           1.5           9.5           31.4           56.3           737           4.9           3.4           13.7	369         0.3         0.8         5.1         55.3         38.5         269         3.3         4.5         6.3	565           1.8           1.8           4.8           34.7           57.0           412           9.5           10.0           15.5	852           0.9           1.8           6.1           35.1           56.1           621           3.4           3.2           9.7	321           0.3           1.2           4.4           37.1           57.0           141           2.8           2.1           8.5	577           2.1           1.4           21.5           42.3           32.8           296           11.5           8.4           20.6	25256 0.5 1.2 6.8 39.9 51.6 20888 2.5 3.2 11.9
Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied Extremely satisfied Satisfaction with Delivery Experience Not at all satisfied Slightly satisfied Moderately satisfied Very satisfied	%           %           %           %           %           %           %           %           %           %           %           %           %           %           %           %           %           %           %	1871           1.0           1.3           6.4           48.8           42.6           1704           3.3           3.6           14.2           49.9	359           1.4           1.1           8.4           42.3           46.8           116           0.0           3.4           15.5           44.8	5094           0.0           0.4           3.0           28.8           67.6           4425           1.9           2.9           10.3           28.2	306           0.2           0.8           4.2           26.7           68.2           264           1.5           0.8           6.4           25.0	0.9         0.9           0.9         3.6           50.6         44.1           542         1.7           2.8         16.1           56.6         46.1	884           0.5           2.1           10.0           38.0           49.4           693           2.9           5.1           13.6           39.5	400 0.3 1.0 7.0 32.5 59.3 138 3.6 2.9 13.8 37.7	932           0.2           0.6           2.8           43.1           53.2           811           0.9           2.6           9.5           47.0	404         0.0         1.2         6.7         38.1         54.0         335         0.3         1.5         8.7         42.4	1122           0.5           2.2           6.5           43.7           47.1           999           2.3           4.2           11.4           39.2	1257           1.0           2.5           10.6           47.3           38.6           930           3.7           6.2           13.9           48.1	<ul> <li>464</li> <li>0.2</li> <li>1.1</li> <li>4.7</li> <li>18.8</li> <li>75.2</li> <li>304</li> <li>1.3</li> <li>1.0</li> <li>8.6</li> <li>31.9</li> </ul>	540           0.0           1.5           5.9           53.9           38.7           622           1.4           1.4           1.1.7           50.0	1160           0.3           0.9           7.3           34.4           57.1           1178           1.1           1.4           11.3           37.3	1277           0.3           0.9           7.7           49.9           41.2           1186           1.3           1.5           11.0           48.2	317           0.0           0.9           4.4           27.1           67.5           281           1.8           2.1           6.4           31.3	2400 0.5 1.8 9.3 54.9 33.5 2107 2.5 3.4 13.5 57.2	874           0.2           0.1           2.4           26.1           71.2           768           0.5           1.4           6.0           31.1	140           3.6           6.4           15.7           40.7           33.6           81           8.6           7.4           11.1           32.1	0.3           1.9           16.1           46.3           35.4           487           3.1           2.9           22.4           47.4	564           0.4           0.2           11.7           48.6           39.2           441           0.5           1.6           12.0           50.3	684           1.3           1.5           9.5           31.4           56.3           737           4.9           3.4           13.7           41.4	369 0.3 0.8 5.1 55.3 38.5 269 3.3 4.5 6.3 58.4	565           1.8           1.8           4.8           34.7           57.0           412           9.5           10.0           15.5           31.1	852           0.9           1.8           6.1           35.1           56.1           621           3.4           3.2           9.7           39.3	321 0.3 1.2 4.4 37.1 57.0 141 2.8 2.1 8.5 56.7	577           2.1           1.4           21.5           42.3           32.8           296           11.5           8.4           20.6           28.4	25256 0.5 1.2 6.8 39.9 51.6 20888 2.5 3.2 11.9 41.4

# APPENDIX C: DATA QUALITY REPORT

## TABLE C.1: MISSING DATA ELEMENTS BY MODEL

### TABLE C.1.1: SOCIODEMOGRAPHIC CHARACTERISTICS

Data Elements	Туре	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Sociodemographic Characteristics					
Mother's Age at Intake	%	0.4	1.6	1.0	1.1
Race and Ethnicity	%	0.8	2.3	1.7	1.7
Employed at Intake	%	1.3	4.3	1.9	2.4
Education Level at Intake	%	10.6	19.9	17.3	16.7
Relationship Status at Intake	%	1.3	9.5	2.6	4.0
Smokes Cigarettes at Intake	%	9.3	20.0	6.0	9.8
Food Insecure at Intake	%	6.1	16.4	9.0	10.2

## TABLE C.1.2: RISK FACTORS FROM PAST PREGNANCIES

Data Elements	Туре	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	%	2.9	10.7	4.4	5.6
Exhibiting Symptoms of Anxiety at Intake	%	2.8	10.2	4.3	5.4
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	%	2.0	9.5	4.4	5.2
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	%	7.2	20.2	13.0	13.7
Mother's Weight					
BMI of Mother at First Prenatal Visit	%	3.8	28.2	18.0	17.9
Pre-Pregnancy Diagnoses					
Pre-Pregnancy Diagnosis of Type I Diabetes	%	0.4	7.1	7.5	6.2
Pre-Pregnancy Diagnosis of Type II Diabetes	%	0.5	7.3	7.6	6.3
Pre-Pregnancy Diagnosis of Hypertension	%	0.4	7.4	7.5	6.3
Risk Factors from Past Pregnancies					
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	%	0.1	1.7	0.4	0.6
Previous Birth < 2,500 grams	%	2.1	15.1	8.8	8.9
Previous Miscarriage (< 20 weeks EGA)	%	3.3	11.2	9.1	8.5
Previous Elective Termination	%	3.1	11.1	9.2	8.5
Previous Still Birth (fetal death ≥ 20 weeks EGA)	%	2.0	8.4	8.5	7.3
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	%	19.0	31.7	22.6	23.7

TABLE C.1.3:	RISK FACTORS	FROM CURRENT	PREGNANCY
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Data Elements	Туре	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	%	0.6	8.6	8.2	7.0
Cervical Incompetence	%	0.7	7.3	8.2	6.7
Placenta Previa	%	0.6	7.4	8.2	6.7
Placental Abruption	%	0.5	7.5	8.2	6.8
Gestational Diabetes	%	0.5	7.4	8.2	6.7
Pregnancy-Related Hypertension	%	0.5	7.5	8.2	6.7
Preeclampsia	%	0.5	7.4	8.2	6.7
Syphilis	%	0.5	7.6	8.1	6.7
Human Immunodeficiency Virus (HIV)	%	0.5	7.4	8.1	6.7
Congenital Abnormalities of the Fetus	%	0.5	7.6	8.3	6.8
Maternal Weight Gain <sup>1</sup>	%	44.7	43.2	33.1	37.3
Using Birth Control when became Pregnant with this Pregnancy	%	1.6	6.4	3.0	3.5

*Note:* <sup>1</sup>Maternal weight gain relies on respondents reporting initial and final weight, which is often missing if women are lost to follow-up, miscarry, or terminate their pregnancies.

## TABLE C.1.4: BIRTH OUTCOMES

			Current	Matautha	
Data Elements	Туре	Birth Center Model Rate of Missing	Prenatal Care Model Rate of Missing	Care Home Model Rate of Missing	Total Rate of Missing
Birth Outcomes: Estimated Gestational Age (EGA) and Birth Wei	ight				
Estimated Gestational Age (EGA)	%	0.3	7.4	4.8	4.4
Birth Weight	%	2.1	5.0	5.1	4.5
Preterm Labor Management					
Antenatal Steroids	%	1.2	12.3	15.3	12.2
Vaginal Progesterone	%	7.0	15.8	15.3	14.0
Progesterone Injections	%	6.6	18.3	13.3	13.5
Tocolytics	%	1.2	12.4	15.3	12.3
Induction of Labor, excluding Planned Cesarean sections	%	1.6	13.1	16.7	13.2
Induction of Labor with Pitocin, excluding Planned Cesarean sections	%	5.1	21.6	28.6	22.8
Delivery Method					
Delivery method, based on exit data	%	1.2	24.0	23.8	20.1
Scheduled C-section	%	3.5	4.1	9.7	7.8
Multiples					
Multiples Pregnancy, based on Exit Data	%	1.0	19.6	16.4	14.5
Multiples Birth, based on Exit Data	%	1.7	24.5	24.1	20.4

#### TABLE C.1.5: SERVICE UTILIZATION

Data Elements	Туре	Birth Center Model Rate of Missing	Group Prenatal Care Model Rate of Missing	Maternity Care Home Model Rate of Missing	Total Rate of Missing
Prenatal Visits					
Received Individual Prenatal Visits	%	1.0	15.2	14.8	12.6
Received Group Prenatal Visits	%	1.0	15.2	14.8	12.6
Enhanced Encounters					
Received Care Coordinator Encounters	%	0.2	6.8	6.7	5.6
Received Mental Health Encounters	%	0.5	7.3	9.1	7.2
Received Doula Encounters	%	85.4	7.3	9.4	21.7
Enhanced Services					
Received Health Education, not Centering	%	97.2	12.9	23.8	33.7
Received Home Visits	%	50.6	12.9	23.6	25.7
Received Self-Care, not Centering	%	97.3	13.2	25.0	34.5
Received Nutrition Counseling	%	3.1	13.2	24.0	18.1
Received Substance Abuse Services	%	3.1	15.7	24.5	18.9
Referrals					
Referrals for Nonmedical Services Outside of the Strong Start Program	%	0.3	7.7	8.2	6.8
Referrals for high-risk medical services	%	0.6	7.6	9.9	7.8
Support Person					
Plan to have a support person	%	8.0	14.6	11.7	11.6
Had a support person during labor	%	8.1	24.7	13.9	15.1
Delivery Process					
Delivery Location, based on Exit Data	%	6.6	18.4	24.7	20.3
Prenatal Service Provider					
Routine Prenatal Service Provider, based on Exit Data	%	0.3	15.2	16.4	13.4

TABLE C.1.6: FAMILY PLANNING, BREASTFEEDING, AND SATISFACTION

Data Elements	Туре	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 Control Counseling					
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	%	9.7	26.2	13.6	15.6
Breastfeeding					
Breastfeeding Intention at Third Trimester	%	1.9	10.6	1.8	3.7
Breastfeeding after Delivery (Based on Postpartum Form Data)	%	8.6	25.7	12.7	14.7
Satisfaction					
Satisfaction with Prenatal Care	%	1.7	12.4	3.6	5.1
Satisfaction with Delivery Experience	%	8.6	38.8	15.9	19.5

# TABLE C.2: MISSING DATA ELEMENTS BY AWARDEE

#### TABLE C.2.1: SOCIODEMOGRAPHIC CHARACTERISTICS

Data Elements	Nor%	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	%	0.5	2.1	0.4	1.4	0.3	0.0	2.9	0.0	0.3	0.3	0.1	0.0	0.0	0.0	0.1	0.3	0.2	0.5	0.0	16.3	0.0	0.2	3.3	0.0	7.1	0.7	0.3	1.1
Race and Ethnicity	%	1.5	1.6	0.8	0.8	2.1	0.3	0.0	0.3	2.1	0.2	3.5	0.6	0.5	0.6	1.5	0.8	2.2	1.7	0.0	4.6	1.6	0.2	1.9	1.9	0.6	7.7	5.7	1.7
Employed at Intake	%	1.0	2.8	1.3	10.0	2.2	0.6	1.5	0.7	1.7	0.4	1.3	0.5	0.0	0.6	1.8	1.5	1.1	9.8	1.0	3.0	0.8	0.3	1.3	1.5	2.2	11.3	12.0	2.4
Education Level at Intake	%	24.3	12.7	10.5	19.1	23.8	9.3	8.7	9.7	11.0	5.1	15.5	16.5	4.0	4.4	21.8	22.9	18.9	25.1	13.9	33.7	29.1	6.2	41.7	30.2	10.3	24.1	28.4	16.7
Relationship Status at Intake	%	1.7	6.3	1.2	11.9	5.1	0.6	3.1	0.7	2.7	1.4	0.6	1.0	0.2	0.4	5.2	2.6	2.5	10.6	0.0	2.1	1.3	0.9	1.6	3.9	4.3	51.4	16.6	4.0
Smokes Cigarettes at Intake	%	5.1	18.6	9.2	14.9	14.0	1.0	10.2	5.6	9.6	8.2	3.9	0.8	0.1	1.1	20.3	7.0	7.6	10.0	4.1	5.6	2.5	0.5	0.0	11.7	7.8	81.1	32.2	9.8
Food Insecure	%	6.5	18.7	6.0	19.3	12.1	2.3	10.5	2.3	10.3	1.8	11.7	6.6	1.5	3.3	6.7	5.6	8.1	28.8	5.7	14.3	8.0	3.3	7.9	10.5	15.0	52.8	28.8	10.2

#### TABLE C.2.2: RISK FACTORS FROM PAST PREGNANCIES

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	%	0.9	6.0	3.0	14.4	7.1	0.4	1.8	0.2	4.8	0.4	1.4	1.2	0.7	0.2	3.5	2.2	2.8	25.4	0.5	11.8	2.1	1.4	3.3	7.7	2.4	47.4	29.2	5.6
Exhibiting Symptoms of Anxiety at Intake	%	1.1	5.6	2.9	13.6	5.9	0.4	2.1	0.3	4.2	0.5	1.4	1.9	0.6	0.2	3.3	1.6	2.3	25.4	1.0	12.6	2.7	1.4	4.3	4.6	3.1	48.6	26.5	5.4
Have Experienced Intimate Partner Violence in a Relationship (measured by Slapped, Threatened, and Thrown)	%	2.0	5.6	2.0	11.8	4.7	5.1	1.9	0.2	2.3	0.4	2.3	1.0	0.5	1.1	1.6	1.2	2.4	25.2	1.5	11.5	4.2	0.5	4.6	2.5	1.9	47.9	23.8	5.2

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
Experiencing Intimate Partner Violence at Intake (measured by Women's Experience of Battery)	%	12.8	14.5	7.0	20.3	20.6	20.8	7.8	12.9	12.8	4.8	4.0	10.7	6.3	9.8	9.7	9.5	11.7	33.9	26.3	28.8	15.0	12.1	15.9	17.8	9.3	49.9	33.6	13.7
Mother's Weight BMI of Mother at First Prenatal Visit	%	1.9	17.0	3.7	37.9	0.9	2.3	12.2	0.7	7.9	4.2	11.9	2.2	12.3	53.1	31.4	66.3	13.6	19.6	46.3	11.2	1.0	0.5	74.4	2.3	0.7	42.8	94.2	17.9
Pre-Pregnancy Diagnos	<b>e</b> c		-		-																		-		-				
Pre-Pregnancy Diagnosis of Type I Diabetes	cs %	0.4	1.1	0.0	32.9	1.3	0.5	0.0	1.7	3.8	3.2	2.7	3.5	0.8	39.6	5.3	43.7	3.9	14.0	0.6	4.1	0.9	1.3	0.0	0.4	2.9	35.8	0.0	6.2
Pre-Pregnancy Diagnosis of Type II Diabetes	%	0.3	1.1	0.1	33.1	1.3	0.4	0.0	1.7	4.1	3.0	2.7	3.4	0.8	39.6	5.6	43.5	3.8	15.2	0.6	4.3	0.9	1.4	2.3	0.4	2.9	35.9	0.0	6.3
Pre-Pregnancy Diagnosis of Hypertension	%	0.5	1.2	0.0	32.9	1.3	0.5	0.8	1.7	3.6	2.7	2.7	3.5	0.5	39.6	5.3	43.7	3.8	14.0	0.0	4.3	0.9	1.1	0.3	0.3	3.0	38.8	0.0	6.3
Risk Factors from Past F	Preg	nancies																											
Previous Preterm Birth(s) between 20 and 36 weeks, 6 days EGA	%	0.1	0.5	0.0	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.4	0.8	1.4	0.3	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	0.0	0.6
Previous Birth < 2,500 grams	%	1.9	3.9	0.1	29.5	3.3	1.0	2.2	1.3	8.9	5.7	3.4	2.1	1.5	41.6	9.1	46.0	10.0	11.8	2.3	3.6	2.1	1.5	96.5	0.2	2.1	23.9	0.0	8.9
Previous Miscarriage (< 20 weeks EGA)	%	4.2	6.0	1.7	28.3	5.9	1.3	8.3	6.6	12.7	3.9	4.9	3.1	0.4	39.9	11.0	46.8	11.4	8.5	7.5	3.8	3.0	2.4	0.0	0.4	3.5	39.9	0.0	8.5
Previous Elective Termination	%	4.3	5.9	1.7	29.2	5.7	1.3	8.3	6.6	11.1	3.0	5.1	2.6	0.6	39.9	11.3	47.2	10.9	8.4	8.2	4.1	3.6	2.7	0.0	0.4	3.9	39.1	0.0	8.5
Previous Still Birth (fetal death ≥ 20 weeks EGA)	%	2.3	4.4	0.1	28.2	2.7	1.0	2.2	1.0	10.0	4.0	3.5	3.1	0.8	40.9	8.9	46.0	10.1	8.0	1.5	3.2	2.6	1.7	9.8	0.2	2.3	37.7	0.0	7.3
Short Inter-Pregnancy Interval with Current Pregnancy since Last Birth	%	30.3	42.4	19.0	16.1	26.8	4.9	19.6	23.8	23.3	18.1	52.8	21.9	15.0	8.1	33.0	19.5	19.0	29.9	31.3	19.2	11.3	10.6	26.6	19.7	18.1	99.7	21.3	23.7

#### TABLE C.2.3: 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
<b>Risk Factors During C</b>	Curre	ent Pregn	ancy																										
Urinary Tract Infection(s) during Last 6 Months of Pregnancy	%	0.5	2.3	0.0	33.1	1.1	0.5	0.3	0.6	7.7	5.1	3.0	4.7	0.1	39.8	3.5	45.0	4.1	25.7	1.7	4.3	0.2	0.5	17.2	0.4	0.8	35.6	0.0	7.0
Cervical Incompetence	%	0.6	2.7	0.2	33.4	1.4	0.4	0.3	0.6	6.9	5.3	2.7	4.6	0.1	39.8	3.6	45.0	3.8	25.4	0.0	4.6	0.2	0.5	0.0	0.4	0.6	35.5	0.0	6.7
Placenta Previa	%	0.8	2.0	0.1	33.6	0.9	0.5	0.3	0.6	6.6	5.3	2.6	4.5	0.2	39.9	3.5	45.0	3.8	25.4	0.0	4.6	0.4	0.6	2.3	0.4	0.6	35.6	0.0	6.7
Placental Abruption	%	0.8	2.6	0.0	33.6	1.0	0.5	0.3	0.6	7.2	5.3	2.7	5.3	0.1	39.9	3.5	44.8	3.9	25.5	0.0	4.8	0.2	0.5	2.3	0.4	0.5	35.5	0.0	6.8
Gestational Diabetes	%	0.7	2.0	0.0	33.2	1.0	0.4	1.0	1.0	7.2	5.5	2.6	4.8	0.1	39.8	3.6	44.7	3.8	24.7	0.0	4.8	0.4	0.6	2.3	0.4	0.5	34.8	0.0	6.7
Pregnancy-Related Hypertension	%	0.7	2.8	0.0	33.5	1.0	0.5	0.8	0.6	6.6	5.4	3.0	5.0	0.2	39.9	4.0	44.7	3.8	23.8	0.0	4.6	0.2	0.7	2.3	0.5	0.5	35.6	0.0	6.7
Preeclampsia	%	0.8	2.6	0.0	33.2	1.0	0.5	0.8	0.6	6.9	5.8	2.9	5.3	0.1	39.9	3.4	44.8	3.9	24.3	0.0	4.3	0.4	0.6	2.3	0.4	0.7	35.3	0.0	6.7
Syphilis	%	0.8	3.1	0.0	33.9	1.5	0.5	0.8	0.6	6.9	5.5	2.7	4.5	0.1	39.9	3.6	44.8	3.8	24.5	0.0	4.8	0.3	0.5	2.3	0.4	0.6	35.2	0.0	6.7
Human Immunodeficiency Virus (HIV)	%	0.8	3.0	0.0	33.8	1.4	0.5	0.8	0.6	6.6	5.3	2.6	4.4	0.1	39.9	3.6	44.6	3.8	24.5	0.0	5.0	0.4	0.6	0.0	0.4	0.6	35.1	0.0	6.7
Congenital Abnormalities of the Fetus	%	0.9	3.5	0.0	33.8	1.5	0.5	1.0	0.6	7.2	5.5	3.3	5.0	0.1	39.9	3.8	44.7	4.1	24.5	1.1	4.8	0.3	0.6	0.0	0.5	0.7	35.9	0.0	6.8
Maternal Weight Gain	%	27.6	30.8	46.1	46.8	17.5	42.8	18.4	11.0	20.7	18.1	47.9	31.1	20.2	48.6	30.6	65.3	22.9	28.6	46.9	34.8	31.0	6.7	94.1	7.5	27.3	100.0	91.5	37.3
Using Birth Control when became Pregnant with this Pregnancy	%	1.4	3.7	1.5	9.7	4.0	1.2	1.9	1.8	1.7	3.1	1.3	1.2	0.5	0.4	3.8	2.0	2.2	19.1	2.1	3.0	1.5	0.8	1.9	2.2	3.3	48.5	0.0	3.5

#### TABLE C.2.4: 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
Birth Outcomes: Estir	mat	ed Gesta	tional A	ge (EGA)	and Birt	h Weight	i i									1								1	1				
Estimated Gestational Age (EGA)	%	2.2	7.4	0.2	12.2	6	0.1	7.4	0.7	3.5	9.6	12.3	1.2	0.6	2.9	8.1	12.5	2.1	4.7	1.8	22.5	1.4	0.1	0.4	1.2	3.4	25.3	16.9	4.4
Birth Weight	%	2.8	3.7	2	3.3	5.9	2.9	2.7	0.1	3.1	1.9	4.3	1.5	0.7	13.6	12.3	13.1	3.9	7.8	1.2	0.8	2.5	0.7	4.3	3.2	0.1	30.3	7.1	4.5
Preterm Labor Manag	gem	ent															<u>,</u>							1	1				
Antenatal Steroids	%	25.1	9.3	0.0	36.6	3.7	14.3	1.3	14.1	12.3	7.0	11.2	5.1	0.7	40.6	11.3	50.2	12.6	24.1	0.0	0.2	7.5	7.4	0.0	6.2	12.4	39.0	0.0	12.2
Vaginal Progesterone	%	25.2	8.7	6.2	36.6	3.7	14.2	1.3	14.1	12.5	7.1	11.2	5.3	0.7	40.7	11.1	50.2	12.5	24.5	0.0	0.2	7.4	7.3	47.2	6.2	12.4	39.1	0.0	14.0
Progesterone Injections	%	21.8	8.3	4.9	31.7	1.9	11.2	5.3	10.2	14.3	7.8	11.6	8.8	0.4	37.4	11.4	44.7	19.0	25.4	0.0	1.0	9.8	6.8	81.3	6.6	11.0	33.3	0.0	13.5
Tocolytics	%	25.1	9.3	0.1	37.1	3.9	14.4	1.3	14.1	12.5	7.6	11.2	5.2	0.7	40.6	11.2	50.3	12.5	24.6	0.0	0.2	7.4	7.3	0.0	6.3	12.4	39.1	0.0	12.3
Induction of Labor, excluding Planned Cesarean sections	%	28.4	8.6	0.5	40.0	4.3	15.5	1.9	15.4	13.4	7.6	12.4	6.5	1.1	43.8	12.3	52.1	13.3	26.8	2.5	0.2	8.2	8.3	0.0	7.6	13.4	39.6	0.0	13.2
Induction of Labor with Pitocin, excluding Planned Cesarean sections	%	33.5	15.5	4.1	40.9	7.6	77.3	15.3	17.7	14.5	11.0	17.9	15.1	9.3	51.8	31.8	54.1	20.6	30.1	15.2	1.0	14.1	9.2	0.0	14.6	16.0	40.4	52.4	22.8
Delivery Method	1 1				r			T			r					r	1	r	I					r	r				
Delivery Method, based on Exit Data	%	25.9	18.2	0.1	38.4	14.9	25.4	10.4	14.2	18.4	9.1	38.1	28.9	6.7	12.1	27.6	54.7	21.0	17.7	9.0	12.1	30.1	8.2	30.9	6.3	23.3	50.9	45.6	20.1
Scheduled C-section	%	0.8	4.1	0.0	13.2	6.0	1.1	1.1	3.3	4.5	7.9	2.4	3.8	2.5	57.0	9.5	12.4	14.7	4.2	0.0	7.1	5.3	1.7	0.0	0.9	2.2	7.7	0.0	7.8
Multiples																													
Multiples Pregnancy, based on Exit Data	%	0.6	14.1	0.1	30.2	0.8	17.3	5.7	14.1	16.6	6.4	30.7	28.9	1.0	11.2	14.6	52.3	17.0	15.0	7.3	5.0	0.8	7.9	20.2	5.8	23.1	45.0	47.9	14.5
Multiples Birth, based on Exit Data	%	26.7	20.1	0.7	38.7	15.2	23.3	12.2	14.5	19.9	8.5	38.7	31.1	8.4	13.2	26.2	54.1	20.6	17.6	7.9	10.8	30.7	11.1	20.3	10.0	24.2	49.2	48.9	20.4

#### TABLE C.2.5: SERVICE UTILIZATION

Data Elements	N, %, Mean, or Median	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	%	27.2	7.5	0.0	19.8	17.4	21.4	1.0	10.2	3.8	13.1	0.0	29.9	7.2	7.5	16.3	26.3	10.4	9.4	6.8	3.4	27.3	6.3	18.0	0.1	25.7	49.6	24.7	12.6
Received Group Prenatal Visits	%	27.2	7.5	0.0	19.8	17.4	21.4	1.0	10.2	3.8	13.1	0.0	29.9	7.2	7.5	16.3	26.3	10.4	9.4	6.8	3.4	27.3	6.3	18.0	0.1	25.7	49.6	24.7	12.6
Enhanced Encounters																													
Received Care Coordinator Encounters	%	0.2	0.9	0.0	31.3	0.2	0.1	1.0	0.2	6.1	3.0	1.8	0.1	0.3	44.4	2.1	45.8	1.8	8.8	17.5	11.4	0.5	0.5	0.0	0.5	0.3	36.2	0.0	5.6
Received Mental Health Encounters	%	0.4	3.0	0.1	32.1	0.4	1.1	2.1	0.2	5.9	4.5	3.9	2.0	0.0	42.1	3.6	45.7	3.1	9.7	19.2	99.8	1.9	0.9	0.0	0.3	0.3	37.0	0.0	7.2
Received Doula Encounters	%	0.7	3.0	89.8	32.0	0.4	1.1	2.1	0.5	6.1	4.3	4.2	2.2	0.1	44.5	3.8	45.7	4.0	9.4	19.2	99.5	2.1	0.9	0.0	0.4	0.3	36.6	0.0	21.7
Enhanced Services																													
Received Health Education, not Centering	%	0.6	3.4	100.0	45.9	0.2	91.6	98.4	0.2	6.6	3.4	4.6	1.8	56.9	54.3	4.3	46.4	45.0	14.4	32.8	60.0	1.8	35.9	0.0	0.3	0.4	36.6	0.0	33.7
Received Home Visits	%	0.6	3.2	50.5	46.5	0.3	91.6	98.4	0.2	6.6	3.3	3.2	1.8	56.9	54.3	6.0	46.5	45.0	14.3	31.6	48.1	1.1	35.6	0.0	0.4	0.4	36.2	0.0	25.7
Received Self-Care, not Centering	%	0.6	3.9	100.0	46.2	0.4	91.6	98.7	0.2	7.7	3.4	3.2	1.8	56.9	54.3	9.4	47.0	45.5	14.5	32.2	99.5	1.4	35.7	0.0	0.3	0.4	36.3	0.0	34.5
Received Nutrition Counseling	%	0.7	3.5	0.0	45.5	0.4	91.6	98.7	0.6	6.4	3.1	2.4	1.8	56.9	51.6	4.2	46.5	45.2	14.5	31.6	98.2	1.7	35.6	0.0	0.8	0.5	37.3	0.0	18.1
Received Substance Abuse Services	%	0.6	3.7	0.0	46.2	0.5	91.6	98.7	0.2	7.7	3.8	2.3	1.8	56.9	52.4	6.5	46.9	45.5	15.0	32.8	99.8	1.1	35.9	32.8	0.4	0.5	37.3	0.0	18.9
Referrals										1															- 1				
Referrals for Nonmedical Services Outside of the Strong Start Program	%	0.4	4.3	0.0	33.5	0.3	0.1	0.8	0.5	6.9	3.9	1.7	0.2	0.2	44.6	4.1	46.4	2.6	9.8	18.6	60.6	0.3	2.3	0.0	1.2	0.9	36.6	0.0	6.8
Referrals for High-Risk Medical Services	%	0.7	2.5	0.0	31.3	0.7	6.5	0.8	1.9	6.9	3.6	3.0	1.8	0.0	44.5	3.7	46.9	3.3	13.7	36.2	99.3	1.5	2.0	0.0	0.8	0.6	37.7	0.0	7.8
Support Person																													
Plan to Have a Support Person	%	12.1	12.4	6.9	9.5	15.3	13.9	5.5	8.3	10.6	17.3	10.9	25.4	21.0	9.0	15.1	17.2	12.4	1.8	21.5	7.1	18.8	7.3	0.8	4.8	4.1	55.7	3.6	11.6
Had a Support Person During Labor	%	8.4	56.3	8.3	35.8	13.1	29.6	0.7	29.3	3.2	28.2	4.0	1.9	22.3	0.5	13.8	10.0	5.7	6.0	40.1	3.2	9.9	32.5	0.0	1.2	24.4	80.3	1.4	15.1
Delivery Process																													
Delivery Location, Based on Exit Data	%	25.3	8.3	5.9	37.2	12.1	22.2	9.8	14.1	17.6	7.5	37.1	27.3	6.4	46.3	22.0	52.7	18.1	21.1	2.3	0.5	28.8	7.7	0.0	3.6	23.0	41.7	41.5	20.3
Prenatal Service Prov	ider																												
коиtine Prenatal Service Provider, Based on Exit Data	%	0.3	3.6	0.0	35.4	1.2	0.9	5.7	8.3	23.3	7.0	40.1	1.8	1.8	45.4	15.9	56.9	5.5	20.1	63.3	0.0	6.1	0.9	5.0	3.4	2.3	46.4	40.1	13.4

#### TABLE C.2.6: FAMILY PLANNING, BREASTFEEDING, AND 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
<b>Birth Control Counse</b>	ling																												
Had Birth Control Counseling after Delivery (Based on Postpartum Form Data)	%	7.9	58.1	10.1	40.8	16.0	30.9	1.4	29.4	5.5	27.6	6.6	2.3	21.9	0.8	14.9	11.6	6.0	5.2	41.6	1.8	6.3	24.9	0.0	4.8	27.4	81.2	1.4	15.6
Breastfeeding								•	•				•					•	-		•			•					
Breastfeeding Intention at Third Trimester	%	1.7	10.4	1.8	7.1	5.2	1.6	4.0	0.4	5.6	1.8	3.0	1.1	0.9	0.5	3.8	2.1	1.9	2.3	4.2	0.6	2.4	0.7	1.6	4.7	1.6	55.0	2.1	3.7
Breastfeeding after Delivery (Based on Postpartum Form Data)	%	5.2	57.8	8.9	39.6	15.1	29.0	0.7	29.2	4.9	27.4	3.7	1.0	22.7	0.8	15.4	11.3	4.8	5.8	41.6	0.6	4.9	24.3	0.0	3.9	27.3	79.8	1.4	14.7
Satisfaction																													
Satisfaction with Prenatal Care	%	1.9	11.1	1.8	9.6	4.8	1.6	4.8	0.1	4.9	1.2	2.0	1.7	0.7	0.6	3.4	2.8	9.7	3.4	2.8	2.9	3.6	0.0	3.1	5.7	2.5	55.2	19.1	5.1
Satisfaction with Delivery Experience	%	7.6	57.0	9.0	50.2	13.1	30.1	0.7	29.7	2.6	26.9	3.9	1.6	22.1	0.4	14.9	12.2	13.4	5.4	40.9	2.0	7.0	32.5	7.9	0.5	24.0	80.3	74.4	19.5

# APPENDIX D: PARTICIPANT-LEVEL DATA MEASURES: SCORING PROCEDURES

# CES-D

The shortened version of the Center for Epidemiological Studies—Depression (CES-D) scale used on Strong Start for Mothers and Newborn Intake Form, which can be found here (<u>https://downloads.cms.gov/files/cmmi/strongstart-enhancedprenatalcare\_evalrptyr3v1.pdf</u> is a four-category response form with 10 items developed by Andresen and colleagues [1994]).<sup>56</sup> Each item has a value of 0 to 3, which corresponds to the frequency over the past week the respondent has felt a particular way:

- 0 = Rarely or none of the time (less than 1 day)
- 1 = Some or a little of the time (1-2 days)
- 2 = Occasionally or moderate amount of time (3–4 days)
- 3 = Most of the time (5-7 days)

The "positive mood" items (items d ["I was happy"] and g ["I enjoyed life"]) are reverse scored.

The score is then the sum of all item scores, resulting in a range of 0 to 30. The threshold for characterizing individuals as having depressive symptoms varies across studies, with typical cutoffs of 8, 9, or 10. For Strong Start for Mothers and Newborns, individuals who score 8 or higher on the CES-D 10 will be characterized as exhibiting depressive symptoms.

## FOOD SUFFICIENCY

We are using a USDA six-item scale that can have distinguished different levels of food security.<sup>57</sup> The sum of Participants with a raw score 0-1 are considered to be experiencing food insecurity.

## WOMEN'S EXPERIENCE OF BATTERY (WEB)

The Strong Start Intake Form includes a six-item scale (short form of the 10-item WEB).

The scoring includes the following steps:

- Score each item from 1-6 (1 for strongly disagree, 6 for strongly agree)
- This creates a range from 6–36, with higher scores meaning higher psychological vulnerability (i.e., more battered).
- To dichotomize the scores, women who score 12 or lower are not battered.

<sup>&</sup>lt;sup>56</sup> Björgvinsson, T., Kertz, S.J., Bigda-Peyton, J.S., McCoy, K.L., Aderka, I.M. (2013). Psychometric properties of the CES-D-10 in a psychiatric sample. Assessment, 20, 429-436.

<sup>&</sup>lt;sup>57</sup> https://www.ers.usda.gov/media/8282/short2012.pdf

# APPENDIX E: QUALITATIVE CASE STUDY METHODOLOGY

# DATA COLLECTION

The evaluation's qualitative case studies involved five primary methods of data collection:

- Document review to inform the analytical framework used to describe program design components, understand policy background, and consider potential implementation issues.
- Interviews with a variety of key informants (e.g., Strong Start awardee and site-level program staff, prenatal care providers, and community partners) to document program implementation and key features of the Strong Start interventions, perspectives on outcomes, and Strong Start-related successes and challenges. Interviewers relied on semistructured protocols tailored to the type of respondent, and which allowed for both flexibility and thoroughness. (See the Year 4 Case Study Interview Protocol.)
- Focus groups with pregnant and postpartum Strong Start enrollees (and, in the first evaluation year, a limited number of pregnant Medicaid/CHIP beneficiaries not enrolled in the program) to obtain information about women's experiences in Strong Start and how they compared to experiences with traditional prenatal care. Researchers used semistructured moderator's guides tailored to each type of group (e.g., pregnant or postpartum, enrolled in Strong Start or not).
- Structured observations to collect data on the content and structure of enhanced prenatal services (e.g., how, when, and where services were delivered). This method was most often used to observe group prenatal care sessions, and researchers used a standardized form to record their observations.

The case study team collected data annually during the first four years of the Strong Start evaluation. The first (2013–14) and third (2015–16) case study rounds included all five types of data collection: document review, key informant interviews, focus groups, and structured observations. Most data collection was in person for these rounds. The second (2015) and fourth (2016–17) case study rounds included document review and key informant interviews, and nearly all data collection was by phone.

## **CODING AND ANALYSIS**

The key informant interviews and focus groups were recorded and transcribed, and the resulting text files were analyzed using qualitative software NVivo version 10.0. Before uploading and coding the files, personally identifiable information was removed. Researchers used a comprehensive coding structure (included in this appendix, after the interview guide) to organize data based on interview and focus group guide themes, as well as key informant or group participant type, state, awardee and intervention model type, and implementation year. The structure was updated with each round of data collection to ensure that all interview and focus group topics were represented. All coders attended a uniform training session on NVivo and the Strong Start evaluation coding structure, and multiple rounds of testing were conducted using several coders to obtain high inter- and intra-coder reliability. Using the coding structure, researchers queried the qualitative database to identify themes across models, key informant types, and data collection type, and key features present or absent in awardees' Strong Start interventions. Qualitative findings have been reported in awardee-specific (and in some cases site-specific) memos for each round of case studies, and via cross-cutting analyses included in each evaluation annual report.
#### YEAR 4 CASE STUDY INTERVIEW PROTOCOL

#### **Current Status and Sustainability**

- 1. First, please update us on the current status of your Strong Start award.
  - a. When did/will enrollment end?
  - b. Are any participants still receiving services? If so, how many?
  - c. When [month/year] did/will the last Strong Start deliveries occur?
  - d. When did/will you submit the last data you have for the evaluation (forms and surveys)?
- 2. Could you please update us on your plans for sustaining Strong Start after the award period is over? Last year, you told us [Summarize sustainability plans from Year 3 memo, in one or two sentences.]
  - a. Which enhanced services will you sustain, if any?
    - i. Which sites will offer the services?
    - ii. Which population(s) will receive the services?
    - iii. Who will deliver the services?
    - iv. Are you making any [other] modifications to the way services are structured?
  - b. Are there any elements of Strong Start data collection that you plan to continue?
    - i. For example, using the Intake form as an initial risk assessment?
  - c. [If relevant] How will you fund the services/additional data collection?
- 3. [*If relevant*] If you are <u>not</u> planning to sustain Strong Start enhanced services or data collection, which factors have most influenced this decision?
  - a. For example, lack of funding or lack of provider or administrator support? Or have you determined that Strong Start services were not effective?

#### Replicability

- 4. Beyond the sustainability of your own program, we'd like your thoughts on whether a Strong Start program like yours could be replicated on a larger scale. First, do you think a program like yours *should* be replicated? Why or why not?
- 5. We're interested in which factors you think are most important when it comes to successful program replication, based on your experiences implementing Strong Start at various sites. These factors could be related to the specific way you implemented your Strong Start intervention, or they might be related to the environment in which your sites are operating. As we explore these different factors, we'd like you to consider whether your program can be replicated in other parts of your state or the country, or in settings that are not like yours.
  - a. First, at the <u>practice level</u>, which factors make a difference in whether a program like Strong Start succeeds?

- i. Prompts: For example, clinic's location, physical space, patient volume, clinic workflow, presence and/or use of an Electronic Medical Record (EMR), having a provider or other leadership "champion"
- b. At the provider level, which factors make a difference?
  - i. Prompts: For example, type and qualifications of the health care provider (or other individual) delivering Strong Start services, whether there is provider continuity throughout prenatal, delivery, and postpartum care
- c. At the patient level, which factors make a difference?
  - i. Prompts: For example, social and medical risk-levels, how engaged patients are in their care, attendance rates, the degree to which patients experience barriers to care
- d. Finally, at the community or policy level, which factors make a difference?
  - i. Prompts: For example, Medicaid or CHIP reimbursement, managed care policies, maternity care market, availability of community resources
- e. Are there other factors we haven't mentioned that you feel are important?
- 6. Have you seen any evidence that enhanced prenatal care programs like Strong Start are becoming more prevalent in your area? Please explain.

#### **Program Outcomes**

7. Last year during our interviews with you and your Strong Start team, we spent a lot of time discussing specific program outcomes. Your team told us: [Summarize perceptions of impacts on outcomes from Year 3 memo, in a few sentences.]

Does this still seem right to you? Do you have anything to add about whether and how your Strong Start program has influenced maternal and newborn outcomes?

- a. [If relevant] Do you have any specific evidence of this impact, or is it more of a gut feeling?
  - i. [If evidence indicated] What is the evidence? Can you share it with us?
- b. [*If relevant*] Which parts of the program do you think are most responsible for the improvements in outcomes you just discussed?
- 8. [*If Strong Start services have ceased*] Have you observed any changes in maternal and newborn outcomes among your Medicaid/CHIP patient population since you stopped offering Strong Start services? Please explain.
  - a. Do you have any specific evidence of changes, or is it more of a gut feeling?
    - i. [If evidence indicated] What is the evidence? Can you share it with us?

- 9. Do you think your Strong Start program has resulted in any cost savings? If so, where do you think those savings come from? How exactly did Strong Start services contribute to these savings?
  - a. Prompts: For example, keeping prenatal patients out of the emergency room; reducing hospital readmissions; reduced NICU costs; improved maternal health; reduced C-section rates or other labor and delivery interventions.

#### **Program Features**

#### For Maternity Care Home Awardees/Sites

- 10. Do maternity care home participants see the same prenatal care providers at each visit? Do the same providers that provide prenatal care also attend the deliveries of the participants? Do they provide their postpartum care?
  - a. If not, which providers attend deliveries? Which providers are responsible for postpartum care?
    - i. Do patients have a prior relationship with these providers? When does the transfer of care occur?
  - b. Do you think having provider continuity—meaning a consistent provider throughout pregnancy, delivery, and postpartum—makes a difference in patient outcomes or patient experience?
  - c. Has Strong Start in any way influenced or improved provider continuity?
- 11. A common feature of Strong Start maternity care homes is adding a "care manager" to the traditional prenatal care approach, but we found that the qualifications of these "care managers" vary from one awardee to the next. Considering your experiences, which qualifications do you think are most important for a prenatal "care manager" to be effective?
  - a. Prompts: For example, medical training, social work, prior experience with prenatal population, personality attributes.
- 12. The Strong Start maternity care home awardees have taken different approaches to "care manager" encounters, both in how often these encounters occur and in whether they are inperson or by some other means (e.g., telephone or text message). Our understanding is that your "care managers" [Summarize encounters based on Y1-Y3 memos, in one to two sentences. Include average number or range of encounters and whether encounters were in-person, by phone, or text/email.]

In hindsight, would you make different decisions about how you structured the "care manager" encounters? Please explain.

#### For Group Prenatal Care Awardees/Sites

- 13. Do the same providers that participate in group prenatal care sessions also attend the deliveries of the group participants? Do they provide their postpartum care?
  - a. If not, which providers attend deliveries for group prenatal care members? Which providers are responsible for their postpartum care?
    - *i.* Do group members have a prior relationship with these providers? When does the transfer of care occur?
  - b. Do you think having provider continuity—meaning a consistent provider throughout pregnancy, delivery, and postpartum—makes a difference in patient outcomes or patient experience?
  - c. Has Strong Start in any way influenced or improved provider continuity?
- 14. Either before or during Strong Start, did you reach out to the Centering Healthcare Institute (CHI) for technical assistance or guidance on implementing group prenatal care? If yes, please explain.
  - a. Did you think this made a difference in your implementation success? Why/why not?
- 15. Most Strong Start group prenatal care awardees have followed CHI's CenteringPregnancy model to some degree. Considering your experiences, which aspects of the Centering model do you think are most important to "keep" when implementing group prenatal care, and which ones can be modified and still allow for successful program implementation?
  - a. Prompts: For example, using 10 sessions, grouping women by gestational age, using the Centering educational curriculum, three-part format of self-care/individual health assessment/facilitated discussion, partner involvement, space requirements.

#### For Birth Center Awardees/Sites

- 16. We are asking awardees and sites about provider continuity throughout prenatal, labor and delivery, and postpartum care. How would you describe continuity in the birth center model?
  - a. What role, if any, does provider continuity play in women's decision to choose birth center care?
  - b. Has Strong Start in any way influenced or improved provider continuity?
- 17. We found that the qualifications of peer counselors/navigators varied from one birth center site to the next. Considering your experiences, which qualifications do you think are most important for a prenatal peer counselor to be effective?
  - a. Prompts: For example, medical training, social work, prior experience with prenatal population, personality attributes.

18. Birth center sites have also taken different approaches to peer counselor/navigator encounters, both in how often these encounters occur and in whether they are in-person or by some other means (e.g., telephone or text message). Our understanding is that your peer counselor/navigator(s) [Summarize encounters based on Y1-Y3 memos, in one to two sentences. Include average number or range of encounters and whether encounters were in-person, by phone, or text/email.]

In hindsight, would you make different decisions about how you structured the peer counselor/navigator encounters? Please explain.

#### For ALL Awardees/Sites

- 19. We're trying to learn more about the use of aspirin treatment for women at risk for preeclampsia during pregnancy. What role, if any, does aspirin play in your prenatal care approach?
  - a. Additional Detail (Use if Needed): We are asking about this because a low-dose aspirin regimen is recommended treatment for women of moderate to high risk of preeclampsia, according to the American Congress of Obstetricians and Gynecologists (ACOG) and U.S. Preventive Services Task Force. We understand that some materials related to these recommendations have been included in the Strong Start newsletters that are emailed to awardees regularly.

#### Lessons

- 20. Looking back at the last three years, which part of your Strong Start program are you most proud of?
- 21. What was the most challenging aspect of Strong Start implementation?
  - a. Were you able to overcome this challenge? If yes, how? If not, why?
- 22. If you had to identify a single factor that had the biggest impact on how well your Strong Start program worked, what would it be? Would you do anything differently?

#### STRONG START QUALITATIVE CODING STRUCTURE

#### **Overarching (Whole Document) Codes:**

#### Data Collection Method

- Key Informant Interview
  - Awardee Staff
  - Site Staff (Program and Provider)
  - Non-Strong Start Provider
  - Community Partner
- Focus Group
  - Strong Start Participants
    - Pregnant
    - Postpartum
  - Strong Start Non-Participants
    - Pregnant
    - Postpartum

#### State

#### Model

- Maternity Care Home
- Group Prenatal Care
- Birth Center

#### Year

- Year 1
- Year 2
- Year 3
- Year 4

#### Mode of Data Collection

- In Person
- Phone

#### **Substantive Text Codes**

#### Key Informant Interview (KII) Codes

#### **Background**

• Provider Site Overview

#### Strong Start Program Implementation

- Enhanced Services
- Changes Needed to Implement
- Other Strong Start-Like Services
- Strong Start Patient Population
- Preterm Risk Factors and Eligibility Criteria
- Outreach
- Enrollment
- Retention
- Consistency in Implementation Across Sites
- 17P
- Depression
- Provider Continuity
- Links to CenteringPregnancy
- Aspiring Treatment to Treat Preeclampsia

#### Strong Start Program Outcomes

- Preterm Birth
- Low Birth Weight
- Breastfeeding
- Delivery Method
- Family Planning
- Health Care Costs
- Other Outcomes

#### Barriers to Care

- Transportation
- Childcare
- Communication

#### Lessons Learned and Best Practices

- Successes
- Challenges
- Recommendations for CMS and Evaluators

#### **Sustainability**

#### **Replicability**

- Opinion About Replicability of Own Program
- Practice Level Factors
- Provider Level Factors
- Patient Level Factors
- Community of Policy Level Factors
- Any Other Factors

#### Medicaid/CHIP Policy

#### Affordable Care Act

#### Focus Group (FG) Codes

**Background** 

Health Care Provider Choice

#### **Barriers to Care**

- Transportation
- Childcare
- Communication

#### Maternity Care Experience

- Enrollment
- Strong Start Enhanced Services

#### Comparison to Previous Maternity Care Experiences

#### **Birth Experience**

#### Postpartum Experience

- Breastfeeding
- Family Planning
- Coverage Continuity

#### **Satisfaction**

#### **Recommendations**

# APPENDIX F: SUMMARY OF FINDINGS FROM 2016 AABC STRONG START SITE-LEVEL SURVEY

#### BACKGROUND

The American Association of Birth Centers or AABC is the national trade association for birth centers in the United States, with a mission to support and promote birth centers as a model of maternity care. AABC operates the largest number of Strong Start sites (50 sites that ever participated, of which 36 sites were active in January 2017) including all but one of the Strong Start sites implementing the birth center approach. Under Strong Start, AABC sites provided the midwifery model of care supplemented by at least four encounters with a peer counselor during pregnancy and postpartum.

For the first three rounds of the Strong Start evaluation's case studies, the evaluation team collected data from a subset of active AABC sites (21 sites in Y1, 15 sites in Y2, and 18 sites in Y3). The fourth and final round of data collection includes two forms of data collection: (1) an Internet survey fielded to all AABC sites in December 2016; and (2) telephone interviews with a set of 10 sites between February and May 2017. This memo summarizes findings from the 2016 Internet survey.

#### SURVEY METHODS

The Internet-based survey was developed in partnership with AABC and was fielded using the Survey Monkey® program. The survey link was emailed to 157 individuals from a total of 50 sites in December 2016. We received responses from 38 individuals (24 percent response rate), 35 who completed the survey in full and 3 who partially completed the survey. To preserve respondents' anonymity, we did not ask survey participants to identify the birth center site they were associated with and thus we do not know how many total sites were represented among the 38 individuals who participated in the survey. However, we did ask respondents to identify the state in which they work. For the three incomplete surveys, we do not have information on the birth centers' location. For respondents who identified the state in which their birth center operates, we received at least one response from sites in the following seventeen states: Alaska, Arizona, California, Connecticut, Florida, Idaho, Illinois, Kansas, Maryland, New York, North Carolina, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, and Wisconsin. States with AABC Strong Start sites that may not be represented in the survey because either no birth centers from that state responded to the survey or those who responded did not identify their state are Minnesota, Missouri, Nebraska, New Mexico, Virginia, and West Virginia.

Below is a summary of responses organized by survey question. The survey instrument (with the full text of each question and response options) is attached to this memo.

#### FINDINGS

#### **Delivery Options**

*Survey Question:* Which situation best describes your birth center's current approach to hospital-based deliveries and midwives' hospital privileges? (Choose one.)

*Summary of Responses:* More than half of the respondents (22 of 38 total respondents) reported that their patients can choose a planned hospital delivery; of those, the majority (18) said birth center midwives can attend hospital births and 4 respondents reported that while patients can plan a hospital delivery, center midwives do not have privileges at local hospitals to attend births (Figure F.1).

Fifteen respondents reported their birth center does not offer a planned hospital delivery. Of these, 11 said birth center midwives do not have privileges at local hospitals and therefore could not attend hospital births even for patients transferred to the hospital unexpectedly during labor. Four of the 15 respondents reported that though patients could not plan a hospital delivery, midwives do have privileges at local hospitals and therefore could potentially attend deliveries for patients transferred to the hospital during labor (not shown in Figure F.1). One respondent who selected 'other' described the approach to hospital deliveries as a "co-care" model, where patients can receive most prenatal care at the birth center but also have appointments with an obstetrician at the hospital close to their due date and deliver at the hospital.





*Source*: AABC site survey, December 2016.

Notes: <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of hospital delivery options among Strong Start birth center sites.
<sup>2</sup> Four of these 15 sites reported that birth center midwives have hospital privileges and could therefore offer provider continuity in the case of an emergency transfer during labor and delivery.

#### **Pain Relief and Comfort Measures**

*Survey Question:* What pain relief options do patients have when they are giving birth at your center? (Choose all that apply.)

Summary of Responses for Non-Pharmacological Options: As shown in Figure F.2, all survey respondents reported that their birth center offers nonpharmacological options for comfort and pain relief to laboring women, with water labor and birth being the most popular options reported by all survey respondents, though 2 of the 38 respondents reported that water birth is not available. Breathing techniques (reported by 35 respondents), massage (reported by 34 respondents), and aromatherapy (reported by 31 respondents) are the next most common comfort measures available at birth center sites.

More than two-thirds of survey respondents (27) reported that doula services are available to birth center patients, though it is not clear whether the services are included as part of the birth center's standard package of care or whether the birth center simply encourages use of or helps facilitate connections to doulas in the community. This applies to the other non-pharmacological services described here (e.g., "availability" may imply that patients can bring their own massage therapist or aromatic oils, or that the service is provided to all patients as the part of the standard package of care). Other popular non-pharmacological options for comfort and pain relief include acupressure (21 respondents) and acupuncture (7 respondents).





*Source:* AABC Site Survey, December 2016

*Note:* <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of non-pharmacological comfort measures available among Strong Start birth center sites.

Fourteen respondents selected "other" non-pharmacological measures, which they identified as including sterile water injections, heat/cold compresses, birth sling, birth ball, rebozo, birthing inflatables, yoga positions, movement, herbs, homeopathy, reflexology, acupuncture seeds, prayer, abdominal binding, allowing patients to bring their chiropractor, encouraging friends and family to attend as support, and eating and drinking as desired during labor.

*Summary of Responses for Pharmacological Options:* Availability of pharmacological options such as nitrous oxide and narcotics is less common, with slightly less than half of respondents (16) noting these options are offered at their birth center (Figure F.3). Of these, nitrous oxide was the most prevalent option, reported by 16 respondents. Of the respondents who identified systemic painkillers or narcotics as an option available to birth center patients, most reported using Stadol (7), followed by Nubain (6), morphine (5), fentanyl (3), and local anesthesia (1). Although Demerol was one of the pharmacological options presented in the survey, no one indicated Demerol as one of the drugs offered (not shown in Figure F.3). Other painkillers offered at birth centers represented in the survey include Vistaril and Lidocaine gel. One respondent commented that painkillers other than nitrous oxide are available but did not know which ones specifically; another added that narcotics are typically only used for a client who is having a long prodromal labor, and yet another respondent commented that nitrous oxide is used at certified nurse-midwives' discretion only.



FIGURE F.3: PHARMACOLOGICAL OPTIONS FOR COMFORT AND PAIN RELIEF AVAILABLE AT AABC SITES, DECEMBER 2016<sup>1</sup> (N=16 RESPONDENTS)<sup>2</sup>

*Source*: AABC site survey, December 2016.

*Notes:* <sup>1</sup>All 16 birth centers included in this figure provide at least one pharmacological option, nitrous oxide. Some provide other options as well.

<sup>2</sup>Respondents are individuals, not individual birth centers, and therefore results shown may not accurately represent the distribution of pharmacological comfort measures available among Strong Start birth center sites.

We were particularly interested in the use of nitrous oxide, also known as laughing gas, among birth centers due to its growing popularity in the US and reputation as one of safest medical interventions for labor. Nitrous oxide is commonly used during labor in other countries. Although we did not ask survey participants to comment on why they may or may not offer nitrous or narcotics for pain relief during labor, an AABC official noted during our follow-up interview that some birth centers may choose to offer pharmacological measures to attract more women to the birth center model of care. She explained that these offerings help some women feel they have other options for pain relief at the birth center even though they do not have the option of an epidural.

In summary, a wide range of pain relief measures are available at AABC's Strong Start sites, including pharmacological options at some centers. In comparison, a typical U.S. hospital provides narcotics and epidural anesthesia, but might not offer any other pain relief measures as part of standard maternity care. For instance, birth center staff interviewed for the Strong Start evaluation case studies indicated

that hospitals usually do not have birthing tubs for water labor and birth, and that hospital-based providers often do not have extensive experience in natural childbirth and pain management techniques for women who prefer to avoid pharmaceutical pain relief.

#### **Maternity Care Options**

*Survey Question:* Other than your birth center, what maternity care options are available to Medicaid beneficiaries in your area (i.e., within a 30-mile radius)? (Choose all that apply.)

*Summary of Responses:* All survey respondents who answered this question (37 out of 38) reported that their patients have other, usually multiple, maternity care options in the area available besides their birth center (Figure F.4). The most commonly reported option is a hospital-based obstetric (OB) practice with physicians only (reported by 28 respondents), followed by a hospital-based OB practice that includes midwives (25). A private OB practice is also frequently available; private practices with physicians only (reported by 22 respondents) were only slightly more common options than private practices that include both physicians and midwives (21). Only 9 respondents reported that patients had the option of getting care at a private practice run solely by midwives. Besides obstetric practices, survey respondents report that Medicaid beneficiaries can obtain maternity care at health department/public health clinics (reported by 21 respondents), other birth centers (13), and Federally-Qualified Health Centers (FQHCs)/Community Health Centers (CHCs) (11). One respondent in Florida selected the 'other' category, reporting that a home birth midwife is available to Medicaid patients in the area. One respondent did not answer the question.



### FIGURE F.4: MATERNTIY CARE OPTIONS NEAR AABC SITES THAT ARE AVAILABLE TO MEDICAID BENEFICIARIES, DECEMBER 2016 (N=37 RESPONDENTS)<sup>1</sup>

Source: AABC Site Survey, December 2016

*Notes:* <sup>1</sup>Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of maternity care options in the area available to Medicaid beneficiaries among Strong Start birth center sites

#### **Sustaining Peer Counseling**

*Survey Question:* Will you continue to provide peer counseling services to birth center patients after you have completed participation in Strong Start? (Choose one.)

**Summary of Responses:** Most respondents were either not sure (13) or said their birth center would not continue to provide peer counseling services to patients (12) as they had under the Strong Start program. Ten respondents reported that peer counseling services will be sustained, with seven of those indicating that the service would be provided by full-time staff with other duties besides peer counseling, and one respondent each reporting that either a full-time dedicated peer counselor, part-time dedicated peer counselor, or part-time staff with other duties would provide the service (Figure F.5).

One California respondent from a center sustaining a full-time dedicated peer counselor added that they will be using the evidence-based Healthy Families America (HFA)<sup>58</sup> home visitation program to deliver the services. HFA's program can begin as early as the prenatal period and continues until the child's 4th birthday.

Of the respondents who selected the 'other' category, one said their birth center has always provided peer counseling (implying that this aspect of care will not change), and another indicated that peer counseling will continue to be incorporated into standard prenatal care visits, where either the nurse or midwife assesses and make referral to meet psychosocial needs. One respondent did not answer this question.



#### FIGURE F.5: AABC SITES' PLANS TO SUSTAIN PEER COUNSELING, DECEMBER 2016 (N=37 RESPONDENTS)<sup>1</sup>

*Source*: AABC survey, December 2016.

*Note:* <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of peer counseling services among Strong Start birth center sites.

<sup>&</sup>lt;sup>58</sup> The HFA model is included in evaluation of MIHOPE-Strong Start, a separate arm of the Strong Start for Mothers and Newborns evaluation.

#### **Relationship with Traditional Medical Community**

*Survey Question:* How would you describe your relationship with the traditional medical community in your area? (Choose one.)

*Summary of Responses:* More than half of respondents (24) described their relationship with the traditional medical community as cooperative and supportive (Figure F.6). Nine characterized the relationship as neutral, and four said it was not cooperative or supportive. One respondent did not answer this question.

Of six respondents who provided additional comments, three praised the level of support from the traditional medical community, two noted that the level of support and collaboration varies, and one said that other providers are not supportive and treat the birth center as a competitor.



FIGURE F.6: AABC SITES' RELATIONSHIP WITH TRADITIONAL MEDICAL COMMUNITY, DECEMBER 2016 (N=37 RESPONDENTS)<sup>1</sup>

Source: AABC Survey, December 2016.

*Note:* <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of perceptions about relationship with traditional medical community among Strong Start birth center sites.

#### Influence of Medicaid Policies

*Survey Question:* Describe the influence of your state's Medicaid policies on your birth center. (Choose all that apply.)

**Summary of Responses:** Few survey respondents (6) selected multiple options to describe the influence of Medicaid policies on their birth center and these generally concentrated around negative influences (Figure F.7). Overall, more than half of respondents reported a negative influence of Medicaid policies on their birth centers. Seven respondents said that inadequate Medicaid reimbursement had prompted the birth center to restrict the volume of Medicaid patients, six respondents said that inability to get contracts with Medicaid Managed Care Organizations (MCOs) had limited their ability to participate in the Medicaid program, and nine indicated that Medicaid policies had some other type of negative influence on their birth center. Around a quarter of respondents each reported that Medicaid policies had a positive influence (8) or no noticeable or a neutral influence (10) on their birth center's ability to serve Medicaid patients. Two respondents stated they had no knowledge to answer this question, and another four chose not to answer this question.

Slightly more than half of respondents (19) provided additional comments on their choices, with most sharing concerns about poor Medicaid reimbursement and difficulty engaging MCOs. Two respondents in Florida (possibly from the same site) reported that their birth center may implement the CenteringPregnancy model of group prenatal care to offset inadequate Medicaid reimbursement.



FIGURE F.7: INFLUENCE OF STATE'S MEDICAID POLICIES ON AABC SITES, DECEMBER 2016 (N=34 RESPONDENTS)<sup>1</sup>

*Source*: AABC Site Survey, December 2016.

*Note:* <sup>1</sup> Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of midwifery professionals working at Strong Start birth center sites.

#### **Birth Center Staffing**

Survey Question: Midwifery providers in your birth center (Choose all that apply.)

**Summary of Responses:** Figure F.8 shows the distribution of professionals providing prenatal care at AABC sites, as reported by survey respondents who provided this information (35 out of 38). By far, the most common types of providers, reported by 31 respondents, are certified nurse midwives (CNM) or

certified midwives (CM).<sup>59</sup> Eleven respondents reported their birth center employs certified professional midwives (CPM) and nine reported licensed midwives (LM).<sup>60</sup> The least common prenatal care providers were obstetricians, reported by 2 respondents, and one respondent indicated there is a family physician at their birth center.

Three respondents indicated that other types of providers work at their birth center sites, including doulas, certified dietary managers (CDM), or nurse practitioners (NP). Three respondents chose not to answer this question.



FIGURE F.8: MIDWIFERY PROVIDERS WORKING AT THE AABC SITES, DECEMBER 2016 (N=35 RESPONDENTS)<sup>1</sup>

Source: AABC Site Survey, December 2016

*Note:* <sup>1</sup>Respondents are individuals, not individual birth centers, and therefore results shown here may not accurately represent the distribution of midwifery professionals working at Strong Start birth center sites.

<sup>&</sup>lt;sup>59</sup> Certified nurse-midwives (CNM) are registered nurses who have graduated from a nurse-midwifery education program accredited by the Accreditation Commission for Midwifery Education (ACME) (<u>http://www.midwife.org/acme.cfm</u>) and passed a national certification examination to receive the professional designation of certified nurse-midwife. Certified midwives (CM) are individuals who have or receive a background in a health-related field other than nursing and graduate from a midwifery education program accredited by ACME. <sup>60</sup> Certified professional midwives (CPM) are knowledgeable, skilled and professional independent midwifery practitioners who

<sup>&</sup>lt;sup>60</sup> Certified professional midwives (CPM) are knowledgeable, skilled and professional independent midwifery practitioners who have met the standards for certification set by the North American Registry of Midwives (NARM) and are qualified to provide the Midwives Model of Care. Licensed midwives (LM) are midwives recognized and licensed by state authorities to practice midwifery in their respective state. For more information about midwifery practitioners see <a href="http://cfmidwifery.org/midwifery/fag.aspx">http://cfmidwifery/fag.aspx</a>.

# AABC SITE SURVEY (STRONG START EVALUATION CASE STUDIES) AND AABC EXIT SURVEY

#### Final Survey Instrument–December 2016

#### Services Offered-Typical Prenatal Care

- 1. Which situation best describes your birth center's current approach to hospital-based deliveries and midwives' hospital privileges? [Choose one]
  - a. Patients can choose a planned hospital delivery, attended by birth center midwives
  - b. Patients cannot choose a planned hospital delivery, though birth center midwives do have privileges at local hospital(s)
  - c. Patients cannot choose a planned hospital delivery, and birth center midwives do not have privileges at local hospital(s)
  - d. Other [please specify]
- 2. What pain relief options do patients have when they are giving birth at your center? [Choose all that apply]
  - a. Water labor
  - b. Water birth
  - c. Nitrous oxide
  - d. Systemic painkillers/narcotics
  - e. Non-pharmacological comfort measures
  - f. Doula services
  - g. Other [please specify]
- 3. If you chose systemic painkillers/narcotics above, please specify. [Choose all that apply]
  - a. Demerol
  - b. Fentanyl
  - c. Morphine
  - d. Nubain
  - e. Stadol
  - f. Local anesthesia
  - g. Other [please specify]

- 4. If you chose non-pharmacological comfort measures above, please specify. [Choose all that apply]
  - a. Breathing techniques
  - b. Massage
  - c. Acupuncture
  - d. Acupressure
  - e. Aromatherapy
  - f. Other [please specify]
- 5. Other than your birth center, what maternity care options are available to Medicaid beneficiaries in your area (i.e., within a 30-mile radius)? [Choose all that apply]
  - a. None, just our birth center
  - b. Other birth center(s)
  - c. Federally Qualified Health Center (FQHC)/Community Health Center (CHC)
  - d. Health department/Public health clinic
  - e. Hospital-based obstetric practice-physicians only
  - f. Hospital-based obstetric practice-includes midwives
  - g. Private practice-physicians only
  - h. Private practice-midwives only
  - i. Private practice-includes physicians and midwives
  - j. Other [please specify]

#### Services Offered—Strong Start Care

- 6. Will you continue to provide peer counseling services to birth center patients after you've completed participation in Strong Start? [Choose one]
  - a. Yes, with a full-time dedicated peer counselor
  - b. Yes, with a full-time staff person who has other duties besides peer counseling
  - c. Yes, with a part-time dedicated peer counselor
  - d. Yes, with a part-time staff person who has other duties besides peer counseling
  - e. Unsure at this time whether peer counseling will continue
  - f. No, peer counseling services will not continue
  - g. Other [please specify]

#### **Practice and Policy Environment**

- 7. How would you describe your relationship with the traditional medical community in your area?
  - a. Choose one:
    - i. Mostly cooperative/supportive
    - ii. Neutral-neither cooperative/supportive or uncooperative/unsupportive
    - iii. Mostly uncooperative/unsupportive
  - b. Please describe your choice in a few sentences
- 8. Which of these statements, if any, describe the influence of your state's Medicaid policies on your birth center? [Choose all that apply]
  - a. Inadequate Medicaid reimbursement has prompted the birth center to restrict the number of Medicaid-covered patients it serves
  - b. Inability to get contracts with Medicaid managed care organizations has limited the birth center's participation in Medicaid
  - c. Other Medicaid-related policies or processes have had a **negative** influence on the birth center's ability to serve Medicaid-covered patients
  - d. Medicaid-related policies or processes have had a **positive** influence on the birth center's ability to serve Medicaid-covered patients
  - e. Medicaid-related policies or processes have not had a noticeable influence or have had a **neutral** influence on the birth center's ability to serve Medicaid-covered patients
  - f. Please explain your choice(s)

#### **AABC Exit Interview Questions**

#### **Training and Support**

- Thinking about all the years of the Strong Start project, was the training and support that AABC provided sufficient for your work with Strong Start? (Yes, No, not sure)
   If not, what additional training would have been helpful to you? (open ended)
- 10. Please rate your satisfaction with the support you received from AABC. (Likert scale)
  - a. For program implementation?
  - b. For Perinatal Data Registry (PDR) startup and support?
  - c. For Administration (i.e., processing invoices and evaluation forms, payment, communication)?

- d. For each part of this question:
  - i. Very satisfied
  - ii. Satisfied
  - iii. Neutral
  - iv. Slightly Satisfied
  - v. Not satisfied
- 11. Was the money you received from Strong Start enough of an incentive? (Yes, No) Would you have been willing and/or able to participate without the money? (Yes, No, Other) Please specify (open-ended)

#### **Client Experience**

- 12. In thinking about your clients, was Strong Start a positive program for your birth center? (Yes, No, Not sure) How did it enhance your practice? (open-ended)
- 13. What would have made Strong Start a better experience for your birth center and clients? (open-ended)
- 14. AABC will be analyzing and reporting the qualitative data from the Maternity Surveys. How important do you feel it is for AABC to continue to collect client-experience data in some way?
  - a. Very important
  - b. Important
  - c. Neutral
  - d. Slightly important
  - e. Not important

#### **Birth Center Operations**

- 15. Midwifery providers in your birth center [Choose all that apply]
  - a. Certified Professional Midwife (CPM)
  - b. Certified Nurse-Midwife (CNM) or Certified Midwife (CM)
  - c. Licensed Midwife (LM)
  - d. Obstetrician
  - e. Family Physician
  - f. Naturopath
- 16. State [Drop down menu of states]

# APPENDIX G: INTERVIEW GUIDE FOR THE SURVEY OF STATE MEDICAID POLICIES RELATED TO STRONG START

#### **INTERVIEWEE BACKGROUNDS**

- 1. Could you please tell us each of your names, titles, and roles within the Medicaid agency?
  - a. To what extent do you also fulfill these roles for your state's CHIP program?

#### ELIGIBILITY/ENROLLMENT PROCESS

- 1. Do you have presumptive eligibility for pregnant women?
  - a. If not, do you have an expedited process for enrolling pregnant women in Medicaid coverage (e.g., self-declaration of pregnancy, shortened application or reduced application processing time)?
- 2. For women enrolling in Medicaid/CHIP as a result of pregnancy, how are most women enrolling?
  - a. At what point in their pregnancy do most women enroll?
  - b. How quickly are women able to start getting covered prenatal services, after they apply for Medicaid or CHIP?
- 3. For those women who will be enrolled in a managed care plan, must a woman choose a managed care organization (MCO) or be auto-assigned to an MCO as part of the application process? If not, is there a delay in getting prenatal care if the woman doesn't select an MCO when she applies (i.e., is she prevented from getting prenatal services until she selects an MCO)?
  - a. Could PCP selection potentially cause a delay?
- 4. What are State MCO contract requirements for providing continuity of care protections for pregnant women (e.g., if a woman starts prenatal care with a FFS provider, will she have to switch providers if she is then enrolled in an MCO and the FFS provider she was seeing is not innetwork)?
  - a. What are the continuity of care provisions and how long do they last (e.g., 30 days, 90 days, etc.)?

#### BENEFITS

Next, we'd like to confirm and fill in gaps in information that we've collected on coverage of maternity care services under your Medicaid/CHIP program(s). Besides making sure that we have accurate information about these services, we are also interested in knowing whether coverage for these services differs for pregnant women enrolled in an MCO versus in FFS Medicaid, or if covered services differ from one MCO compared to another.

#### TABLE G.1: SERVICES COVERED

Service	Coverage	Notes/Probing Questions
Level of coverage: Do women who qualify for Medicaid by virtue of their pregnancy receive full-scope coverage or a limited set of pregnancy-related services only?	[Full-scope vs. pregnancy-related services only]	N/A
Number of prenatal care visits	[#]	Does it vary based on member need (i.e., high risk)?
Postpartum services	[duration]	N/A
Types of maternity care providers	[Types such as OB/GYNs (including maternal fetal medicine specialists), family practice doctors, certified nurse midwife, certified professional midwife, and family nurse practitioners]	N/A
Alternative visit types	[Types (e.g., group visits, home visits)]	N/A
Non-professional services (such as care navigators, doulas, lactation consultants, promotoras and other health workers who are not licensed as nurses or social workers)	[Types]	N/A
17 alpha-hydroxyprogesterone caproate, (commonly referred to as "17P"	[Types (e.g., compounded version, Makena]	Prior Authorization (PA) or certificate of medical necessity requirement? [Y/N]
Breast pumps	[Type]	Prior Authorization requirement? [Y/N] How are they supplied—for example, can a provider/hospital dispense, or a DME pharmacy only? Are there requirements that beneficiaries be enrolled in full-time school or have a full-time job, to qualify for covered breast pumps and supplies?
Contraception	[Types]	Prior Authorization requirement? [Y/N] Constraints on administration/placement based on type of provider/setting? Varied reimbursement based on type of provider/setting (e.g., can LARCs be placed post- delivery while the woman is still in the hospital for her maternity stay?)
Childbirth education	[Y/N]	N/A
Nutrition services	[Y/N]	Are there limitations or restrictions (e.g., only women with gestational diabetes mellitus)? Before and/or after pregnancy? Is your Medicaid/CHIP program coordinated in any way with the Women Infants and Children (WIC) program, which offers nutritional assistance to women throughout their pregnancy and postpartum? Please explain.
Care coordination/case management	[Y/N]	N/A
Social work/psychosocial counseling	[Y/N]	N/A
Non-emergency transportation (NET/NEMT)	[Y/N]	How are trips booked (e.g., can women book themselves, or does the MCO or some other professional? Must it be booked over the phone or are there other options)? What are the time windows? Can children accompany the mother? Can a partner/adult? Is this contracted on a state level, or subcontracted by MCO?

#### **PAYMENT AND INCENTIVES**

- 1. What is your current approach to payment for maternity care services?
  - a. Check all that apply (comment as needed):
    - i. Capitated MCO payments that are inclusive of obstetrical care;
    - ii. Supplementary payments to MCOs for obstetrical care (such as global obstetrical fees paid outside of managed care arrangements);
    - iii. FFS payments for obstetrical care (including fees paid for prenatal care physician (or other provider) visits, "enhanced prenatal care" visits, 17P, etc.); or
    - iv. Other payment arrangements.
  - b. If a patient switches providers, how are payments affected? If it was a bundled payment, is it split among the providers, or does the full payment go to the most recent provider? If split, how does this split occur?
- 2. How do maternity care payments compare between different provider types? (Explain the reasoning behind these differences, if known.) Specifically:
  - a. How do per visit provider fees compare between physicians and midwives?
  - b. How does Medicaid reimbursement for labor and delivery services compare between birth centers and hospitals, for an uncomplicated vaginal delivery?
- 3. Have there been delays with timely payment for prenatal care services, beyond state requirements for timely payment? If so, has this impacted provider willingness to accept Medicaid patients?
- 4. Are there performance improvement programs or initiatives related to perinatal care (e.g., initiatives to reduce or eliminate early elective deliveries)? Are these programs and initiatives mandatory or voluntary?
  - a. Do managed care plans or providers receive incentive payments for meeting performance metrics related to perinatal care (e.g., percentage of women receiving their first prenatal care visit within a specified number of days of enrollment/pregnancy determination)?
  - b. Do managed care plans or providers receive incentive payments for meeting performance metrics related to improving outcomes, such as low birthweight and pre-term births?
  - c. What MCO quality performance measures are used?
- 5. Is the managed care plan or provider otherwise incentivized (i.e., nonfinancially) to provide specific services or meet certain goals?
- 6. Are any incentives used to discourage undesired care, such as altering payments for providers with less desirable outcomes like frequent C-sections or early elective inductions?

#### MEDICAID MONITORING AND OVERSIGHT

- 1. Which area within the agency tracks and organizes maternal and child health services?
- 2. How do Medicaid managed care plans communicate/coordinate with the agency about any programs the plans initiate to improve birth outcomes?
- 3. Have there been issues with health plans or providers meeting the access standards for prenatal care, as defined by state standards? Please explain.
- 4. What types of complaints/performance issues are most common from maternity care providers? Which type of providers are having these challenges?
- 5. Does the state have performance standards in place for transportation vendors or the provision of transportation services among plans that operate in the state? How are they monitored? How do plans and/or the state perform in regard to standards?

#### **OTHER PROGRAMS**

- 1. Are there any statewide or pilot Medicaid initiatives to improve prenatal care for high-risk women and/or reduce preterm births and LBW, aside from Strong Start?
- 2. Before we end this interview, are there any other Medicaid/Medicaid managed care initiatives designed to improve prenatal care and/or birth outcomes that we have not yet discussed?

# APPENDIX H: TECHNICAL ASSISTANCE STATUS TRACKER

#### TABLE H.1: STRONG START TA STATUS CHART AS OF JULY 14, 2017 – DATA ACQUISITION PROCESS

State	Agency	Initial Contact	State Officials Receptive	Data Application in Progress	Data Application Submitted	Data Request Approved	IRB	DUA/BAA in Progress	DUA/BAA Submitted	DUA/BAA Signed	Data Transferred	Stipend Requested	Fees	Linkage Responsibility
	Medicaid	3/26/2015	Yes	N/A	N/A	6/19/2015	N/A	N/A	N/A	N/A	Yes (2014 & 2015	Yes	3,000	
AL	Vital Records	3/19/2015	Yes	Yes	4/27/2015	7/11/2016	N/A	Yes	N/A	7/11/2016	Yes (2014-16)	N/A	N/A	UI
۵7	Medicaid	Various	Yes	Yes	N/A	7/18/2016	N/A	Yes	Yes	6/22/2016	Yes (2014 &	N/A	\$25,000 over the course of three years for obtaining & matching data	State (CHiR)
712	Vital Records	Various	Yes	N/A	Yes	7/19/2016	N/A	Yes	Yes	N/A	2015)	N/A	N/A	
	Medicaid	12/18/2014	Yes	Yes	3/13/2015	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A	
CA	CPHS	12/18/2015	Yes	Yes	3/6/2015	4/3/2015	N/A	N/A	N/A	N/A	No	N/A	N/A	State
	Vital Records	N/A	N/A	Yes	3/27/2015 (resubmitted 6/10/15 per VSAC request)	N/A	N/A	N/A	N/A	N/A	Yes (2014 & 2015)	Yes	N/A	
DC	Medicaid	4/29/2015	Yes	N/A	N/A	N/A	TBD	N/A	1/16/2017	2/14/2017	Yes (2014 & 2015)	Yes	N/A	- UI
DC	Vital Records	N/A	Yes	Yes	7/22/2015	8/18/2015	N/A	N/A	N/A	10/22/2015	Yes (2014 & 2015)	N/A	N/A	
FI	Medicaid	Various	Yes	Yes	4/30/2015	N/A	N/A	N/A	N/A	5/17/2016	Yes (2014- 2016)	N/A	Nominal Fee for processing of application of \$250	
	Vital Records	Various	Yes	Yes	5/1/2015	N/A	Approved (8/16/2016)	Yes	8/1/2016	8/12/2016	Yes (2014-16)	N/A	N/A	
	Medicaid	6/2/2015	Yes	N/A	N/A	N/A	N/A	Yes	8/15/2016	N/A	Yes (2014- 2015)	N/A	N/A	
GA	Vital Records	2/20/2015	Yes	N/A	7/16/2015	7/8/2016	Approved (7/1/2016)	N/A	N/A	N/A	Yes (2014- 2015)	Yes	One Time Fee for processing of application of \$200, plus (# Records * 23 Variables = Total Cost) Cost per Year of Data	UI
	Medicaid	1/7/2015	Yes	Yes	2/23/2015	4/16/2015	N/A	N/A	N/A	N/A	No Medicaid Data	N/A	N/A	
IL	Vital Records	1/21/2015	Yes	Yes	3/18/2015	Not approved— cannot provide individual- level data	Submitted	N/A	N/A	N/A	N/A	N/A	N/A	N/A

State	Agency	Initial Contact	State Officials Receptive	Data Application in Progress	Data Application Submitted	Data Request Approved	IRB	DUA/BAA in Progress	DUA/BAA Submitted	DUA/BAA Signed	Data Transferred	Stipend Requested	Fees	Linkage Responsibility
	Medicaid	N/A	N/A	Yes	11/13/2015	10/10/2016	N/A	Yes	N/A	N/A	N/A	N/A	N/A	
КY	Vital Records	5/21/2015	Yes	Yes	3/9/2016	5/16/2016 (The IRB approved our app, but the State Registrar still needs to approve it)	Approved	N/A	N/A	11/7/2016	N/A	Yes	N/A	N/A
	Medicaid	3/25/2015	Yes	Yes	N/A	N/A	Approved (8/8/2016)	N/A	N/A	N/A	Yes (2014 & 2015)	N/A	N/A	
LA	Vital Records	3/31/2015	Yes	Yes	7/20/2015	N/A	N/A	N/A	N/A	N/A	Yes (2014 & 2015)	Yes	Staff time is charged at \$20 an hour, & vital records usually charges for 2-3 hours to make a file.	Medicaid (ULM)
MD	Medicaid	4/27/2015	Yes	Yes	5/27/2016 (Resubmitted on 1/10/17)	N/A	Approved (2/24/17)	N/A	N/A	N/A	No	Yes	N/A	Madiaaid
MD	Vital Records	3/27/2015	No	Yes	4/21/2015	N/A	N/A	N/A	N/A	N/A	No	Ν	N/A	Medicald
МІ	Medicaid & Vital Records	1/6/2015	Yes	N/A	6/1/2015	6/1/2015 (4/11/16–We submitted additional IRB materials)	Approved (9/1/16)	N/A	N/A	N/A	Yes (2014- 2016)	N/A	N/A	State
MC	Medicaid	4/14/2015	Maybe	N/A	N/A	N/A	N/A	Yes	N/A	N/A	No	N/A	N/A	Vital Records
1712	Vital Records	3/26/2015	Yes	N/A	N/A	N/A	N/A	Yes	N/A	1/15/2016	No	Yes	N/A	
мо	Medicaid	8/20/2015	Maybe	Yes	4/7/2016	6/7/2016	N/A	N/A	N/A	N/A	No	Yes	N/A	
MO	Vital Records	5/4/2015	Maybe	Yes	3/10/2016	N/A	Submitted	N/A	N/A	N/A	No	Yes	N/A	Vital Records
NIV	Medicaid	2/19/2015	Yes	N/A	N/A	N/A	N/A	Yes	6/15/2015	7/11/2015	Yes (2014 & 2015 eligibility)	N/A	N/A	
	Vital Records	2/23/2015	Yes	Yes	3/20/2015	N/A	N/A	N/A	N/A	3/18/2016	Yes (2014- 2016)	Yes	N/A	01
NI	Medicaid	3/10/2015	Yes	N/A	N/A	N/A	N/A	N/A	N/A	3/1/2016	Ves (2014 only)	N/A	N/A	State
115	Vital Records	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	103 (2014 01119)	N/A	N/A	
PΔ	Medicaid	3/11/2015	Yes	N/A	N/A	N/A	N/A	Yes	4/9/2015	N/A	No	Yes	N/A	PA Medicaid
	Vital Records	2/18/2015	Yes	Yes	3/20/2015	4/14/2015	N/A	N/A	N/A	N/A	No	N/A	N/A	TANCulcalu
sc	Medicaid	2/18/2015	Yes	Yes	3/27/2015	7/21/2015	N/A	N/A	N/A	N/A	Yes (2014- 2016)	N/A	N/A	State
	Vital Records	1/12/2015	Yes	Yes	3/27/2015	7/29/2015	N/A	Yes	7/29/2015	7/29/2015	Yes (2014- 2016)	N/A	N/A	State
	Medicaid	4/29/2015	Yes	Yes	N/A	N/A	N/A	N/A	N/A	N/A	No	N/A	N/A	
TN	Vital Records	4/8/2015	Yes	Yes	6/19/2015	N/A	Approved (9/29/16)	Yes	Yes	We received an approval letter on 9/29/16	No	Yes	N/A	Medicaid

TECHNICAL APPENDICES

State	Agency	Initial Contact	State Officials Receptive	Data Application in Progress	Data Application Submitted	Data Request Approved	IRB	DUA/BAA in Progress	DUA/BAA Submitted	DUA/BAA Signed	Data Transferred	Stipend Requested	Fees	Linkage Responsibility
тх	Medicaid	3/11/2015	Yes	N/A	N/A	N/A	N/A	Yes	9/15/16	N/A	No	N/A	\$21,000 over the course of three years of evaluation	State
	Vital Records	5/1/2015	Yes	Yes	N/A	N/A	Submitted 8/31	N/A	N/A	N/A	No	N/A	N/A	State
	Medicaid	5/11/2015	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	No	N/A	N/A	Vital Daganda
VA	Vital Records	5/11/2015	N/A	N/A	11/12/2015	N/A	N/A	Yes	N/A	4/25/2016	Yes	Yes	N/A	VILAI RECORDS

# APPENDIX I: KEY VARIABLES CREATED FOR THE IMPACT ANALYSIS

#### TABLE I.1: VARIABLES BY STATE AVAILABILITY

Variable	Florida	Louisiana	Nevada	South Carolina
Birth Certificate Data				
Outcomes				
Birth Weight	Available	Available	Available	Available
Calculated Gestational Age	Available	Available	Available	Not Available
Clinical Gestational Age	Available	Available	Available	Available
Apgar Score	Available	Available	Available	Available
Weekend Delivery	Available	Available	Available	Not Available
Cesarean Section	Available	Available	Available	Available
Vaginal Birth after Cesarean	Available	Available	Available	Available
Propensity Score Matching Variables		·		
Infant's Month of Birth	Available	Available	Available	Not Available
Infant's Quarter of Birth	Available	Available	Available	Not Available
Infant's Year of Birth	Available	Available	Available	Available
Mother's Age	Available	Available	Available	Available
Mother's Race	Available	Available	Available	Available
Mother's Education	Available	Available	Available	Available
Mother's Marital Status	Available	Available	Available	Available
Mother's County of Residence	Available	Available	Available	Available
Census Tract / Zip Code	Available	Available	Available	Not Available
Smoking	Available	Available	Available	Available
Prenatal Care Initiation	Available	Available	Available	Available
Plurality	Available	Available	Available	Available
Parity	Available	Available	Available	Available
Previous Preterm Birth	Available	Available	Available	Available
Previous Other Poor Pregnancy Outcome	Available	Available	Available	Available
Interpregnancy Interval	Available	Available	Available	Available
Pre-pregnancy Diabetes	Available	Available	Available	Available
Pre-pregnancy Hypertension	Available	Available	Available	Available
Mother's BMI pre-pregnancy	Available	Available	Available	Available
HEN Hospital	Available	Available	Not Available	Available
Medicaid Eligibility Data				
Mother's Basis of Medicaid Eligibility, 12 months prior to delivery	Available	Available	Available	Available
Mother's Basis of Medicaid Eligibility, 12 months following delivery	Available	Available	Available	Available
Infant's Basis of Medicaid Eligibility, 12 months following delivery	Available	Available	Available	Available

Variable	Florida	Louisiana	Nevada	South Carolina
Claims Data	•			
Cost Outcomes				
Total Expenditures for Mother	Not Available	Not Available	Not Available	Not Available
Total Expenditures for Infant	Not Available	Not Available	Not Available	Not Available
Average Expenditures for Mother	Not Available	Not Available	Not Available	Not Available
Average Expenditures for Infant	Not Available	Not Available	Not Available	Not Available
Total Expenditure for Delivery period	Not Available	Not Available	Not Available	Not Available
Utilization Outcomes				
Number of Hospital visits for Mother	Not Available	Not Available	Not Available	Not Available
Number of Hospital visits for Infant	Not Available	Not Available	Not Available	Not Available
Nursery Days	Not Available	Not Available	Not Available	Not Available
Intermediate NICU Days	Not Available	Not Available	Not Available	Not Available
High Level NICU days	Not Available	Not Available	Not Available	Not Available
Days in Unknown Level of Care	Not Available	Not Available	Not Available	Not Available



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