

This work was written as part of one of the author's official duties as an Employee of the United States Government and is therefore a work of the United States Government. In accordance with 17 U.S.C. 105, no copyright protection is available for such works under U.S. Law. Access to this work was provided by the University of Maryland, Baltimore County (UMBC) ScholarWorks@UMBC digital repository on the Maryland Shared Open Access (MD-SOAR) platform.

Please provide feedback

Please support the ScholarWorks@UMBC repository by emailing scholarworks-group@umbc.edu and telling us what having access to this work means to you and why it's important to you. Thank you.

DOI: 10.1377/hlthaff.2019.01042
HEALTH AFFAIRS 39,
NO. 6 (2020): 1042–1050
©2020 Project HOPE—
The People-to-People Health
Foundation, Inc.

By Lisa Dubay, Ian Hill, Bowen Garrett, Fredric Blavin, Emily Johnston, Embry Howell, Justin Morgan, Brigitte Courtot, Sarah Benatar, and Caitlin Cross-Barnet

Improving Birth Outcomes And Lowering Costs For Women On Medicaid: Impacts Of ‘Strong Start For Mothers And Newborns’

Lisa Dubay (ldubay@urban.org) is a senior fellow in the Health Policy Center, Urban Institute, in Washington, D.C.

Ian Hill is a senior fellow in the Health Policy Center, Urban Institute.

Bowen Garrett is a senior fellow in the Health Policy Center, Urban Institute.

Fredric Blavin is a principal research associate in the Health Policy Center, Urban Institute.

Emily Johnston is a research associate in the Health Policy Center, Urban Institute.

Embry Howell is a nonresident fellow in the Health Policy Center, Urban Institute.

Justin Morgan is a PhD student at the Harvard T. H. Chan School of Public Health. At the time this research was conducted, he was a research analyst at the Urban Institute.

Brigitte Courtot is a principal research associate in the Health Policy Center, Urban Institute.

Sarah Benatar is a principal research associate in the Health Policy Center, Urban Institute.

Caitlin Cross-Barnet is a social science research analyst at the Center for Medicare and Medicaid Innovation, in Baltimore, Maryland.

ABSTRACT The federal Strong Start for Mothers and Newborns initiative supported alternative approaches to prenatal care, enhancing service delivery through the use of birth centers, group prenatal care, and maternity care homes. Using propensity score reweighting to control for medical and social risks, we evaluated the impacts of Strong Start’s models on birth outcomes and costs by comparing the experiences of Strong Start enrollees to those of Medicaid-covered women who received typical prenatal care. We found that women who received prenatal care in birth centers had lower rates of preterm and low-birthweight infants, lower rates of cesarean section, and higher rates of vaginal birth after cesarean than did the women in the comparison groups. Improved outcomes were achieved at lower costs. There were few improvements in outcomes for participants who received group prenatal care, although their costs were lower in the prenatal period, and no improvements in outcomes for participants in maternity care homes.

The United States has some of the worst maternal and infant outcomes among high-income countries.¹ In 2017 one in ten US infants were born preterm, and one in twelve were low birthweight.² Compared with women covered by private insurance, Medicaid-covered women experience higher rates of preterm and low-birthweight births and have greater medical and social risks.^{3,4}

The Strong Start for Mothers and Newborns initiative’s strategy for enhanced prenatal care models was funded under Section 1115 of the Social Security Act and tested by the Center for Medicare and Medicaid Innovation. Strong Start aimed to improve maternal and infant outcomes, preserve or enhance the quality of care, and reduce expenditures for women covered by Medicaid and the Children’s Health Insurance Program (for simplicity, hereafter we say only “Medicaid”). Strong Start supported the delivery of en-

hanced services in three prenatal care models—birth centers, group prenatal care, and maternity care homes—through 27 awardees and 211 providers across 32 states, the District of Columbia, and Puerto Rico.^{5,6} This study examined the impacts of receiving care in each model as implemented through Strong Start on birth outcomes, care processes, and Medicaid expenditures by comparing the experiences of Strong Start enrollees with those of women in Medicaid who received “typical” prenatal care.

Medicaid maternity care is generally provided by physicians, federally qualified health centers, and hospital outpatient department clinics and is financed through prepaid managed care. Typical prenatal care in the US has been criticized as overly medicalized and not sufficiently patient centered.^{7–9} For instance, rates of cesarean section and labor induction in typical care are higher than is medically necessary.^{10,11} Appointments often do not allow time to address psycho-

social risks that contribute to poor birth outcomes¹² or to provide meaningful education on numerous issues regarding pregnancy, childbirth, and parenting.^{13–16} Women usually see many practitioners, which undermines continuity and trusting relationships.¹⁷ Strong Start programs went beyond typical medically focused prenatal care.

Birth centers, which were all freestanding, practiced the midwifery model of care—a holistic and time-intensive approach¹⁸—supplemented by peer counselors who provided psychosocial support, health education, and referrals to community resources. Many birth centers allowed women to choose either birth center or midwife-attended hospital delivery (unless medical conditions required hospital transfers or physician-attended births), and 50 percent of women who received birth center prenatal care delivered their babies in a hospital. The birth center model was implemented by two awardees in forty-seven sites and served approximately 20 percent of all participants in Strong Start.

Group prenatal care engaged groups of approximately ten women over their pregnancies and provided both clinical care and in-depth education during two-hour facilitated sessions, usually following the CenteringPregnancy model.¹⁹ Group prenatal care was implemented by fifteen awardees in sixty sites and served approximately 23 percent of Strong Start participants. Facilitated sessions covered a broad range of issues, including nutrition and exercise, stress reduction, family planning, parenting, domestic violence, and childbirth preparation. Group prenatal care awardees were also uniform in their emphasis on building strong peer relationships among enrolled pregnant women.

Maternity care homes augmented typical prenatal care with the addition of “care managers” to facilitate care coordination and provide psychosocial supports. Maternity care homes were implemented by 17 awardees at 112 sites, served the largest proportion of Strong Start enrollees (57 percent), and were the most varied in their approaches and the intensity of interventions among the Strong Start models.

Strong Start’s enhanced services varied across individual awardees, but common elements included comprehensive patient education; referrals to nonmedical services; and psychosocial support provided by peer counselors, care managers, and group care facilitators. All models emphasized relationship-based care and continuity through more time spent with participants by midwives, peer counselors, group care facilitators, or care managers.

Providers who served Strong Start participants were usually part of existing practices that al-

ready served Medicaid enrollees and conducted little outreach for Strong Start. Some providers followed an “opt in” approach to enrollment, offering Strong Start services to their pregnant patients when they entered prenatal care. However, other providers transformed their practices and offered a Strong Start model to all new patients. In these cases, patients had to “opt out” of Strong Start. Strong Start programs administered a risk assessment at intake to all program enrollees. If women presented any medical risks at entry into prenatal care that could not be addressed within the model, they were referred to appropriate care elsewhere.

Previous Literature

Prior research has examined the effects of alternative approaches to prenatal care similar to those tested by Strong Start. Reviews of midwifery care in birth centers have found that women who received this model of prenatal care were less likely to have a cesarean section.^{20,21} One study that focused on Medicaid-covered women found that those who received care at a birth center in the District of Columbia were more likely to carry to term and less likely to have a cesarean than a propensity-score-reweighted comparison group, whose members received typical care.²²

There is some evidence on the effectiveness of group prenatal care. A Cochrane review of four group prenatal care trials found no effect on birth outcomes.²³ However, among eight reviewed studies of the effects of group prenatal care on birth outcomes, four found that the model was associated with reduced rates of preterm birth and low birthweight.²⁴ A systematic review of fourteen studies concluded that group prenatal care had no effect on preterm birth but lowered the rate of low birthweight.²⁵ Two studies of South Carolina Medicaid beneficiaries found that participating in CenteringPregnancy reduced the risk of preterm birth and incidence of low birthweight, with one study showing cost savings compared with Medicaid women who received typical prenatal care.^{26,27}

There is no universal definition for the maternity care home model, but researchers have evaluated the benefits of coordinating patient care during the prenatal period and supplementing clinical care with support services such as nutritional or psychosocial counseling and health education. Some observational studies of case management programs have found that they improve birth outcomes, including rates of low birthweight and infant mortality.^{28–30}

Study Data And Methods

This analysis focused on the impact of enrollment in Strong Start—receiving prenatal care in a birth center, group prenatal care practice, or maternity care home—on birth outcomes, care processes, and spending. We compared women who participated in Strong Start with Medicaid-covered women who received typical prenatal care in the same geographic areas. Following the work of Sarah Benatar and colleagues,²² we used propensity score reweighting to develop comparison groups of women with risk profiles observably similar to those of Strong Start women.³¹

We considered the impact of enrollment in Strong Start on birth outcomes (preterm birth and low birthweight), care processes (cesarean section and vaginal birth after cesarean section), and mother and infant care costs during the prenatal period (eight months before birth), the delivery period (the time between the woman's entrance into the hospital or birth center for delivery and discharge of the infant), and the delivery period together with the postdelivery period (the eleven months after the delivery month).

DATA We obtained birth certificate data, Medicaid eligibility data, and Medicaid claims and encounter data (hereafter, claims data) from states. This analysis focused on sites in states where we could obtain birth certificate data and Medicaid eligibility data for 2014–16 (Alabama, Arizona, Florida, Louisiana, Maryland, Mississippi, Missouri, Nevada, New Jersey, Pennsylvania, South Carolina, Tennessee, and the District of Columbia) and Medicaid claims data for 2014–15 (the abovementioned states excluding Maryland, Mississippi, Nevada, and Pennsylvania). We obtained claims only for 2014–15 because of time lags on claims processing.

We linked mothers' and infants' Medicaid eligibility data to birth certificates to identify Medicaid-covered pregnant women and their infants and create a file that contained only Medicaid-covered births. We linked this file to Medicaid claims data through unique Medicaid identifiers. Strong Start participant lists were used to identify participants.³²

There were 45,270 Strong Start participants, 24,410 of whom were in states for which we obtained birth certificate data and Medicaid data and were thus eligible for linkage. Of these, 17,848 participants were linked to state data. We excluded an additional 3,038 participants because of concerns that we could not find appropriate comparison groups. (See the "Detailed Methods" section in the online appendix for more information.)³³

Our analytic sample included 14,810 partici-

Strong Start's birth centers improved all key birth outcomes while reducing Medicaid costs by a large margin.

pants and represented participants from 52 percent of all Strong Start awardees; participants from 39 percent of all sites (twenty-one birth center sites, eleven group prenatal care sites, and fifty-three maternity care home sites); and 33 percent of all participants (3,314 women in birth centers, 2,393 women in group prenatal care, and 9,103 women in maternity care homes, for a total of 14,810 participating women). We used an intent-to-treat approach, including all women who enrolled in Strong Start in the treatment group.

COMPARISON GROUPS AND PROPENSITY SCORE REWEIGHTING For each of the three models, we identified a comparison group of Medicaid-covered women who received care in typical Medicaid maternity care practices and resided in the same counties as Strong Start participants did. We created propensity scores by estimating logistic regressions in which the dependent variable indicated whether the woman was a Strong Start participant or in a comparison group. The regressions controlled for observed factors (listed in appendix table 1),³³ including demographic characteristics, behavioral and medical risk factors, Medicaid eligibility type, and hospital characteristics. We used the predicted probabilities from these models to construct weights for the comparison-group observations. After reweighting, comparison-group observations were balanced along control variables compared to participants, with standardized differences less than 2 percent (see the "Detailed Methods" section in the appendix).³³

ESTIMATING IMPACTS With propensity score reweighting, differences in weighted means between the treatment and comparison groups represented the average effects of treatment for those women who enrolled in Strong Start. We estimated impacts separately for each Strong Start model. We combined the weighted observations from awardees associated with each model. We then implemented a *t*-test by estimating

Given that Medicaid paid for 43 percent of all deliveries in 2017, our results have important implications for the nation's health.

model-specific weighted linear regressions for each outcome. The estimated differences reflected the impact of each model of care as implemented through Strong Start, relative to women of similar risk profiles served by typical Medicaid providers.

We were concerned that birth certificate information might not sufficiently capture health status differences between the treatment and comparison groups. As a sensitivity analysis, we estimated alternative models that added diagnoses reported on the claims data—both the presence of specific conditions not related to pregnancy and the number of those conditions—to the propensity score reweighting models to better account for health status (for the list of specific conditions included, see appendix table 1).³³ We excluded complications from pregnancy and conditions that originated during pregnancy because they could have been affected by the intervention.

Since we could conduct this analysis only in the states and years for which we had claims data, we first estimated the main model on this sample to ensure that any observed differences were due to the inclusion of the diagnoses from claims data and not differences in the sample. We then estimated the alternative model that added controls in the propensity score regressions for conditions from the claims data.

LIMITATIONS Our study had several limitations. First, it was observational in nature, and enrollment in Strong Start was not random. The research design controlled for demographic and behavioral characteristics and certain medical risk factors. However, if the factors that influenced selection into each type of care or into the Strong Start program were unobserved and correlated with outcomes, our results may be biased to the extent that any unobserved factors were not fully correlated with the control variables.

Second, the available data did not allow either for analysis at a geographic area smaller than the county or, third, for differentiating between elective and medically indicated cesarean sections.

Fourth, the research design could not attribute the effects to the provision of specific services enhanced by Strong Start providers separately from the overall model effects.

Fifth, if women in the comparison groups received services similar to those provided in Strong Start, our analysis could have underestimated Strong Start's effects. This bias is unlikely to be large, given that nationally 0.3 percent of births take place in birth centers—although more women may receive care in birth centers but deliver in hospitals—and about 50,000 women receive CenteringPregnancy care annually.^{34,35}

Finally, the analysis did not include all Strong Start participants. Most excluded enrollees were in states for which we did not obtain birth certificate and Medicaid data. Our ability to obtain data in these states is unlikely related to our outcomes.

Study Results

BIRTH CENTERS Across most outcomes, women enrolled in Strong Start who received birth center care had more positive outcomes than did women in the comparison groups (exhibits 1 and 2). Infants born to women in Strong Start birth centers were 2.2 percentage points less likely to be preterm than infants born to comparison-group women (6.3 percent versus 8.5 percent). Consistent with fewer preterm births, infants born to Strong Start women were 1.5 percentage points less likely to be low birthweight than infants in the comparison groups (5.9 percent versus 7.4 percent).

Cesarean rates were 11.5 percentage points lower for women in Strong Start who received prenatal care in a birth center than for women in the comparison groups (17.5 percent versus 29.0 percent). Similarly, rates of vaginal birth after cesarean section were 11.6 percentage points higher for Strong Start women, compared with women in the comparison groups (24.2 percent versus 12.5 percent).

The average delivery cost for Strong Start women and their infants was \$6,527, which was \$1,759 less than the cost for women and their infants in the comparison groups (exhibits 1 and 3). Total expenditures for mothers and infants during the delivery and postdelivery periods were \$10,562 for women enrolled in Strong Start and their infants and \$12,572 for women and infants in the comparison groups, a difference of \$2,010.

GROUP PRENATAL CARE There were no significant differences in reported birth and process

EXHIBIT 1

Birth and process outcome rates in 2014–16 and expenditures in 2014–15 for participants in the Strong Start for Mothers and Newborns initiative and the comparison groups, by initiative model

Model	Participants	Comparison group for model		Difference between participants and reweighted comparison group (percentage points)
		Unweighted	Reweighted	
BIRTH CENTERS				
Birth and process outcome rates ^a (%)				
Preterm birth	6.3	9.3	8.5	−2.2***
Low birthweight	5.9	8.6	7.4	−1.5**
Cesarean section	17.5	30.3	29.0	−11.5****
VBAC ^b	24.2	11.1	12.5	11.6***
Expenditures ^c (\$)				
During the prenatal period	2,203	2,585	2,192	10
During the delivery period ^d	6,527	8,513	8,286	−1,759****
During the delivery and postdelivery periods ^d	10,562	12,953	12,572	−2,010****
GROUP PRENATAL CARE				
Birth and process outcome rates ^e (%)				
Preterm birth	10.4	10.7	10.0	0.4
Low birthweight	10.9	10.2	10.4	0.5
Cesarean section	30.5	31.6	29.5	1.1
VBAC ^b	20.7	16.4	17.7	3.1*
Expenditures ^f (\$)				
During the prenatal period	2,637	2,238	3,064	−427**
During the delivery period ^d	11,645	10,675	12,282	−637
During the delivery and postdelivery periods ^d	16,286	15,587	17,464	−1,177
MATERNITY CARE HOMES				
Birth and process outcome rates ^g (%)				
Preterm birth	11.9	10.8	11.3	0.5
Low birthweight	11.7	9.9	10.9	0.8*
Cesarean section	30.9	31.2	31.5	−0.7
VBAC ^b	13.2	10.9	12.5	0.7
Expenditures ^h (\$)				
During the prenatal period	2,512	2,412	2,527	−15
During the delivery period ^d	9,071	8,401	8,526	546
During the delivery and postdelivery periods ^d	13,958	12,876	12,968	991*

SOURCE Authors' analysis of merged birth certificate and Medicaid data. **NOTES** The comparison group was reweighted as explained in the text. Reported sample sizes for birth and process outcome rates refer to the number of cases for which gestational age and birthweight were reported. For the expenditure analysis, awardees in Maryland and Pennsylvania were excluded because neither state could provide Medicaid claims data. The sample for analysis of expenditures excluded 2016 births, multiples births, and births with missing delivery claims. The prenatal, delivery, and postdelivery periods are defined in the text. Sample sizes for birth and process outcomes vary slightly because of differences in item nonresponse rates. All standard errors in the model-level analysis are clustered at the county level. *Participants: 3,432; comparison group: 325,647. ^bEstimated rates of vaginal birth after cesarean section (VBAC) are among women with a previous cesarean section. The sample sizes by model are as follows: for birth centers, 1,512 participants and 58,860 in the comparison group; for group prenatal care, 362 and 28,671, respectively; and for maternity care homes, 1,512 and 58,860, respectively. ^cParticipants: 1,853; comparison group: 114,409. ^dIncludes expenditures for the mother and infant. ^eParticipants: 2,436; comparison group: 176,822. ^fParticipants: 529; comparison group: 39,618. ^gParticipants: 9,252; comparison group: 372,905. ^hParticipants: 3,358; comparison group: 147,143. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

outcome rates between Strong Start women who received group prenatal care and women in the comparison groups (exhibit 1). For these Strong Start women, average expenditures in the prenatal period were \$2,637, which was \$427 less than the average for women in the comparison groups. We observed no significant differences between Strong Start women and women in the comparison groups for expenditures in the delivery period alone or in the delivery and postdelivery periods together.

MATERNITY CARE HOMES Enrollment in a Strong Start maternity care home had no positive and significant effects on birth outcomes, care

processes, or expenditures.

ALTERNATIVE MODEL Exhibit 4 presents the estimated differences between Strong Start women and the comparison group in birth outcomes for the main model, the main model estimated on the claims sample, and the alternative specification model—which included extensive controls for health status. For most outcomes across all three models, the direction, magnitude, and significance levels are virtually identical. The robustness of these estimates suggests that the main analysis results were unlikely to have been biased by unobserved aspects of health status.

Discussion

The Strong Start initiative tested whether prenatal care provided in three alternative delivery models—birth centers, group prenatal care, and maternity care homes—could improve birth outcomes, preserve or enhance the quality of care, and reduce expenditures for pregnant women and infants covered by Medicaid.

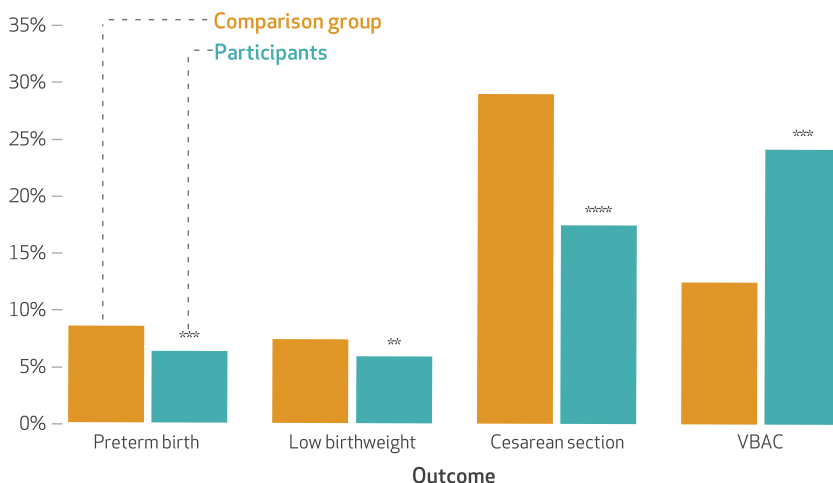
Strong Start's birth centers significantly improved all key birth outcomes while reducing Medicaid costs by a large margin. These large impacts likely represent meaningful improvements in health and process outcomes that have been targeted by Healthy People 2020 and other public health efforts. Lower rates of cesarean section and higher rates of vaginal birth after cesarean section drove lower costs, as did lower payments to midwives and birth centers for prenatal and delivery care, compared to those to physicians and hospitals. Since the effects of preterm birth and low birthweight can last a lifetime, savings from improved outcomes among infants born to birth center model participants may accrue well past the infant's first year. Birth centers' holistic midwifery model of care, which devotes substantial time to education and psychosocial support, may be the primary driver of these positive results.

Our results were consistent across alternative models that attempted to better control for health status. Moreover, women in the comparison group for birth center participants had better outcomes than did women in the comparison groups for the other two models, which suggests that our reweighting did indeed match birth center participants to healthier Medicaid-covered women. In addition, in other components of the evaluation we found that the birth center results were generally consistent across sites and similar to the results in the main study model, which suggests that these results were not driven by a few unique birth centers. Finally, the birth outcome results presented here are similar to those found by Benatar and coauthors,²² who examined one birth center in the District of Columbia. This suggests that our results were unlikely to have been biased by the sample we analyzed or the methods we used. These factors make us confident in the robustness of our results.

Nonetheless, if women enrolled in Strong Start birth centers were healthier and had fewer medical and social risks than did women in the comparison groups in ways that were unmeasured and not fully captured by the factors we controlled for, our results could have overstated the impact of birth center care on outcomes. Also, our analysis could not disentangle the effects of Strong Start peer counselors from the

EXHIBIT 2

Birth and process outcomes for participants in the Strong Start for Mothers and Newborns initiative's birth center model and the comparison group, 2014–16



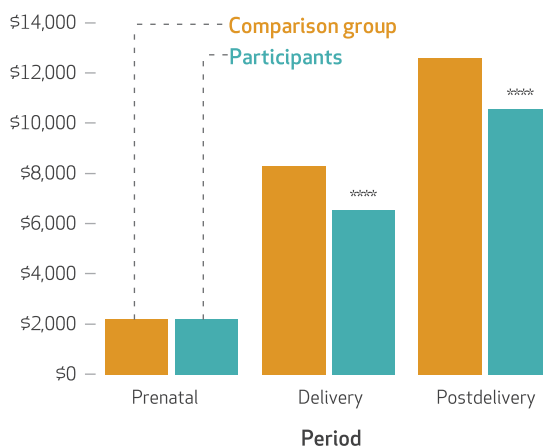
SOURCE Authors' analysis of merged birth certificate and Medicaid data. **NOTES** The comparison group was reweighted as explained in the text. Estimated percentages of vaginal birth after cesarean section (VBAC) are among women who had a previous cesarean section. ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

effects of midwifery care in birth centers more generally, because all birth centers had peer counselors.

Group prenatal care, though qualitatively different from typical clinical prenatal care, produced no improvements in rates of preterm and low-birthweight infants in our main analy-

EXHIBIT 3

Expenditures for participants in the Strong Start for Mothers and Newborns initiative's birth center model and the comparison group, by period, 2014–15



SOURCE Authors' analysis of merged birth certificate and Medicaid data. **NOTES** The comparison group was reweighted as explained in the text. The prenatal, delivery, and postdelivery periods are defined in the text. **** $p < 0.001$

EXHIBIT 4

Birth and process outcome rates for participants in the Strong Start for Mothers and Newborns initiative versus those for the comparison groups, by initiative model, using the main and alternative study models, 2014–15

Initiative model/outcome	Difference between participants and comparison groups (percentage points)		
	Main study model	Main study model estimated on the claims sample	Alternative study model with controls for health status
BIRTH CENTERS			
Preterm birth	−2.2***	−2.7****	−2.5****
Low birthweight	−1.5**	−1.5**	−1.2*
Cesarean section	−11.5****	−11.7****	−11.3****
VBAC	11.6***	11.5***	11.0***
GROUP PRENATAL CARE			
Preterm birth	0.4	1.6	1.5
Low birthweight	0.5	0.4	0.2
Cesarean section	1.1	0.2	−0.5
VBAC	3.1*	0.2	0.0
MATERNITY CARE HOMES			
Preterm birth	0.5	0.7	0.4
Low birthweight	0.8*	0.7	0.4
Cesarean section	−0.7	0.0	−0.3
VBAC	0.7	−0.6	−0.3

SOURCE Authors' analysis of merged birth certificate and Medicaid data. **NOTES** The claims sample excludes 2016 births, multiples births, and births with missing delivery claims. The sample sizes by model are: birth centers, 1,853 participants and 114,409 comparison-group women; group prenatal care, 529 and 39,618 women, respectively; and maternity care homes, 3,358 and 147,143 women, respectively. Estimated percentages of vaginal birth after cesarean section (VBAC) are among women who had a previous cesarean section. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

sis, but it did reduce Medicaid's costs during the prenatal period. The evaluation's case studies help explain this result: Some participants found it hard to commit to fixed schedules of two-hour sessions because of varying work schedules, or they had trouble securing reliable transportation to appointments and child care for older children (who were not usually permitted to come to group visits). Women, on average, attended just six of the ten visits prescribed by most group prenatal care awardees. Though many of the women enrolled in any of the Strong Start models did not receive the full "dose" of prenatal care as intended, missing appointments may be more problematic in group prenatal care because specific health education topics are covered on a fixed schedule.³² Our site-specific estimates did show that some group prenatal care practices had improved outcomes, relative to those among women who received typical care.³⁶ Understanding the factors that contributed to better outcomes is important for the field.

The maternity care home is the model that would be easiest to implement in many prenatal care practices, because it layered care management onto more typical clinical prenatal care. However, we found that maternity care homes

did not improve birth outcomes or lower costs, results that were consistent across sites. This may be due in part to challenges both inside and outside the health care system that make it difficult to address profound social, physical, and mental health problems faced by pregnant Medicaid beneficiaries—especially those at higher risk—through the primarily clinical model of the maternity care home.

Conclusion

Given that Medicaid paid for 43 percent of all deliveries in 2017, our results have important implications for the nation's health and meeting Healthy People 2020 objectives, and they indicate important opportunities for policy change.² Birth centers are limited in number, and, consequently, increasing the use of this model presents serious challenges. In 2017 just 19,900 total deliveries occurred in freestanding birth centers nationally.³⁴ To increase the use of birth centers would likely require broadening Medicaid managed care networks and increasing payments, reducing state licensing barriers for birth centers, and revising scope-of-practice regulations that limit how midwives can practice in some states. If progress could be made in addressing these barriers, more Medicaid-covered pregnant women (especially those at lower medical risk) could have better birth experiences, more infants born to Medicaid mothers could start their lives healthy, and the Medicaid program could reap significant savings.

Across all three models, women praised Strong Start's midwives, peer counselors, group care facilitators, and care managers for spending more time with them than providers usually do and for focusing on health education and psychosocial support services—areas often not addressed in typical clinical visits.³² However, providers reported struggling to address participants' most pressing needs, especially for mental health care, opioid and other substance use treatment, stable housing, healthy food, transportation, and protection against intimate partner violence, because resources to address these needs were often scarce in their communities. With high medical and social risk among many Medicaid-enrolled women and insufficient community resources, small additions to clinical practice were not sufficient to improve birth outcomes.

Moving forward, comprehensively attending to low-income women's diverse needs may be necessary to improve birth outcomes. The holistic midwifery model practiced in birth centers and tested by Strong Start shows considerable promise for serving Medicaid-covered women.

The midwifery model of care, which can be practiced by any provider in any setting, may offer lessons on how to structure prenatal care to improve outcomes for women who face poverty, relationship instability, depression, and a host of other life challenges. It is difficult to address the myriad needs of Medicaid-enrolled women, particularly those at higher risk, without robust community and social support systems. The Cen-

ters for Medicare and Medicaid Services is testing models—such as Accountable Health Communities, which screen patients for health-related social needs and connect beneficiaries to community-based services, and Section 1115 waivers, which allow Medicaid to pay for specific nonmedical services—that may provide new lessons on how to address these issues more directly. ■

An earlier version of this article was presented at the AcademyHealth Annual Research Meeting in Washington, D.C., June 2, 2019; the Annual Meeting of the American Society of Health Economists in Washington, D.C., June 26, 2019; and the Annual Meeting of the Association

of Public Policy and Management in Denver, Colorado, November 9, 2019. This research was conducted under Contract No. HHS-500-T0004 from the Center for Medicare and Medicaid Innovation at the Department of Health Human Services to the Urban Institute.

The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the Department of Health and Human Services or any of its agencies or of the Urban Institute.

NOTES

- 1 UnitedHealth Foundation. America's health rankings: health of women and children report [Internet]. Minnetonka (MN): UnitedHealth Foundation; 2016 Sep [cited 2020 Apr 2]. Available from: https://assets.americashealthrankings.org/app/uploads/hwc-fullreport_v2.pdf
- 2 Martin JA, Hamilton BE, Osterman MJK, Driscoll AK, Drake P. Births: final data for 2017 [Internet]. Hyattsville (MD): National Center for Health Statistics; 2018 Nov 7 [cited 2020 Apr 2]. (National Vital Statistics Reports, Vol. 67, No. 8). Available from: https://www.cdc.gov/nchs/data/nvsr/nvsr67/nvsr67_08-508.pdf
- 3 Anum EA, Retchin SM, Strauss JF 3rd. Medicaid and preterm birth and low birth weight: the last two decades. *J Womens Health (Larchmt)*. 2010;19(3):443–51.
- 4 Kowlessar NM, Jiang HJ, Steiner C. Hospital stays for newborns, 2011 [Internet]. Rockville (MD): Agency for Healthcare Research and Quality; 2013 Oct [cited 2020 Apr 21]. (HCUP Statistical Brief No. 163). Available from: <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb163.jsp>
- 5 CMS.gov. Strong Start for Mothers and Newborns initiative: general information [Internet]. Baltimore (MD): Centers for Medicare and Medicaid Services; [last updated 2020 Mar 12; cited 2020 Apr 2]. Available from: <https://innovation.cms.gov/initiatives/strong-start/>
- 6 The Center for Medicare and Medicaid Innovation issued a Funding Opportunity Announcement in June 2012. Over 100 applications were received from potential awardees and were reviewed and ranked by independent expert panels. Scoring criteria included project design; administration, organization, and staffing; and budget. The top-ranked applications then were reviewed by the center for compliance with federal requirements. Sites or providers were identified by the awardee in the application.
- 7 Sakala C, Newburn M. Meeting needs of childbearing women and newborn infants through strengthened midwifery. *Lancet*. 2014; 384(9948):e39–40.
- 8 Miller S, Abalos E, Chamillard M, Ciapponi A, Colaci D, Comandé D, et al. Beyond too little, too late and too much, too soon: a pathway towards evidence-based, respectful maternity care worldwide. *Lancet*. 2016;388(10056):2176–92.
- 9 Declercq ER, Sakala C, Corry MP, Applebaum S, Herrlich A. Major survey findings of Listening to Mothers(SM) III: Pregnancy and Birth, report of the third national U.S. survey of women's childbearing experiences. *J Perinat Educ*. 2014; 23(1):9–16.
- 10 Carlson NS, Corwin EJ, Hernandez TL, Holt E, Lowe NK, Hurt KJ. Association between provider type and cesarean birth in healthy nulliparous laboring women: a retrospective cohort study. *Birth*. 2018;45(2): 159–68.
- 11 Kjerulff KH, Attanasio LB, Edmonds JK, Kozhimannil KB, Repke JT. Labor induction and cesarean delivery: a prospective cohort study of first births in Pennsylvania, USA. *Birth*. 2017;44(3):252–61.
- 12 Hogan VK, Rowley D, Bennett T, Taylor KD. Life course, social determinants, and health inequities: toward a national plan for achieving health equity for African American infants—a concept paper. *Matern Child Health J*. 2012;16(6):1143–50.
- 13 Lucas C, Charlton KE, Yeatman H. Nutrition advice during pregnancy: do women receive it and can health professionals provide it? *Matern Child Health J*. 2014;18(10): 2465–78.
- 14 Kennedy HP, Doig E, Tillman S, Strauss A, Williams B, Pettker C, et al. Perspectives on promoting hospital primary vaginal birth: a qualitative study. *Birth*. 2016; 43(4):336–45.
- 15 Cross-Barnet C, Augustyn M, Gross S, Resnik A, Paige D. Long-term breastfeeding support: failing mothers in need. *Matern Child Health J*. 2012;16(9):1926–32.
- 16 Cross-Barnet C, Courtot B, Hill I, Benatar S, Cheeks M, Markell J. Facilitators and barriers to healthy pregnancy spacing among Medicaid beneficiaries: findings from the national Strong Start initiative. *Womens Health Issues*. 2018;28(2): 152–7.
- 17 Davey MA, Brown S, Bruinsma F. What is it about antenatal continuity of caregiver that matters to women? *Birth*. 2005;32(4):262–71.
- 18 American Association of Birth Centers. Standards for birth centers [Internet]. Perkiomenville (PA): The Association; 2017 [cited 2020 Apr 2]. Available from: <http://cdn.ymaws.com/www.birthcenters.org/resource/resmgr/AABC-STANDARDS-RV2017.pdf>
- 19 Centering Healthcare Institute. Improving health by transforming care through Centering groups [home page on the Internet]. Boston (MA): Centering Healthcare Institute; [cited 2020 Apr 2]. Available from: <https://www.centeringhealthcare.org>
- 20 Walsh D, Downe SM. Outcomes of free-standing, midwife-led birth centers: a structured review. *Birth*. 2004;31(3):222–9.
- 21 Alliman J, Phillippi JC. Maternal outcomes in birth centers: an integrative review of the literature. *J Midwifery Womens Health*. 2016; 61(1):21–51.
- 22 Benatar S, Garrett AB, Howell E, Palmer A. Midwifery care at a free-standing birth center: a safe and effective alternative to conventional

- maternity care. *Health Serv Res.* 2013;48(5):1750–68.
- 23 Catling CJ, Medley N, Foureur M, Ryan C, Leap N, Teate A, et al. Group versus conventional antenatal care for women. *Cochrane Database Syst Rev.* 2015;(2):CD007622.
 - 24 Manant A, Dodgson JE. Centering-Pregnancy: an integrative literature review. *J Midwifery Womens Health.* 2011;56(2):94–102.
 - 25 Carter EB, Temming LA, Akin J, Fowler S, Macones GA, Colditz GA, et al. Group prenatal care compared with traditional prenatal care: a systematic review and meta-analysis. *Obstet Gynecol.* 2016;128(3):551–61.
 - 26 Gareau S, López-De Fede A, Loudermilk BL, Cummings TH, Hardin JW, Picklesimer AH, et al. Group prenatal care results in Medicaid savings with better outcomes: a propensity score analysis of CenteringPregnancy participation in South Carolina. *Matern Child Health J.* 2016;20(7):1384–93.
 - 27 Abshire C, McDowell M, Crockett AH, Fleischer NL. The impact of CenteringPregnancy group prenatal care on birth outcomes in Medicaid eligible women. *J Womens Health (Larchmt).* 2019;28(7):919–28.
 - 28 Buescher PA, Roth MS, Williams D, Goforth CM. An evaluation of the impact of maternity care coordination on Medicaid birth outcomes in North Carolina. *Am J Public Health.* 1991;81(12):1625–9.
 - 29 Hillemeier MM, Domino ME, Wells R, Goyal RK, Kum HC, Cilenti D, et al. Effects of maternity care coordination on pregnancy outcomes: propensity-weighted analyses. *Matern Child Health J.* 2015;19(1):121–7.
 - 30 Van Dijk JW, Anderko L, Stetzer F. The impact of prenatal care coordination on birth outcomes. *J Obstet Gynecol Neonatal Nurs.* 2011;40(1):98–108.
 - 31 Hirano K, Imbens GW, Ridder G. Efficient estimation of average treatment effects using the estimated propensity score. *Econometrica.* 2003;71(4):1161–89.
 - 32 Hill I, Dubay L, Courtot B, Benatar S, Garrett B, Blavin F, et al. Strong Start for Mothers and Newborns evaluation: year 5 project synthesis, volume 1: cross-cutting findings [Internet]. Baltimore (MD): Centers for Medicare and Medicaid Services; 2018 Oct [cited 2020 Apr 2]. Available from: <https://downloads.cms.gov/files/cmmt/strongstart-prenatal-finalvalrpt-v2.pdf>
 - 33 To access the appendix, click on the Details tab of the article online.
 - 34 Dekker R. Evidence confirms birth centers provide top-notch care [Internet]. Perkiomenville (PA): American Association of Birth Centers; 2013 Jan 31 [cited 2020 Apr 2]. Available from: <https://www.birthcenters.org/page/NBCSII#top>
 - 35 Centering Healthcare Institute. Improving health by transforming care through Centering groups [Internet]. Boston (MA): The Institute; [cited 2020 Apr 2]. Available from: <https://www.centeringhealthcare.org/uploads/files/CHI-Fact-Sheet-Set.pdf>
 - 36 Hill I, Dubay L, Courtot B, Benatar S, Garrett B, Blavin F, et al. Strong Start for Mothers and Newborns evaluation: year 5 project synthesis, volume 2: awardee-specific reports [Internet]. Baltimore (MD): Centers for Medicare and Medicaid Services; 2018 Oct [cited 2020 Apr 2]. Available from: <https://downloads.cms.gov/files/cmmt/strongstart-prenatal-finalvalrpt-v2.pdf>