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Group Prenatal Care Results in Medicaid Savings with Better Outcomes: A Propensity Score Analysis of CenteringPregnancy Participation in South Carolina

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Abstract *Objectives* This study was undertaken to determine the cost savings of prevention of adverse birth outcomes for Medicaid women participating in the CenteringPregnancy group prenatal care program at a pilot program in South Carolina. *Methods* A retrospective five-year cohort study of Medicaid women was assessed for differences in birth outcomes among women involved in CenteringPregnancy group prenatal care ($n = 1262$) and those receiving individual prenatal care ($n = 5066$). The study outcomes examined were premature birth and the related outcomes of low birthweight (LBW) and neonatal intensive care unit (NICU) visits. Because women were not assigned to the CenteringPregnancy group, a propensity score analysis ensured that the inference of the estimated difference in birth outcomes between the treatment groups was adjusted for nonrandom assignment based on age, race, Clinical Risk Group, and plan type. A series of generalized linear models were run to estimate the difference between the proportions of individuals with adverse birth outcomes, or the risk differences, for CenteringPregnancy group prenatal care participation. Estimated risk differences, the coefficient on the CenteringPregnancy group indicator variable from identity-link binomial variance generalized linear models, were then used to calculate potential cost savings due to participation in the CenteringPregnancy group. *Results* This study estimated that CenteringPregnancy participation reduced the risk of premature birth (36 %, $P < 0.05$). For every premature birth prevented, there was an average savings of $22,667 in health expenditures. Participation in CenteringPregnancy reduced the incidence of delivering an infant that was LBW (44 %, $P < 0.05$, $29,627). Additionally, infants of CenteringPregnancy participants had a reduced risk of a NICU stay (28 %, $P < 0.05$, $27,249). After considering the state investment of $1.7 million, there was an estimated return on investment of nearly $2.3 million. *Conclusions* Cost savings were achieved with better outcomes due to the participation in CenteringPregnancy among low-risk Medicaid beneficiaries.

Keywords CenteringPregnancy · Medicaid · Cost savings · Birth outcomes · Preterm birth · Low birthweight · Neonatal intensive care

Significance

This study quantifies cost savings attributed to the prevention of poor birth outcomes due to participation of low-risk Medicaid women in CenteringPregnancy. We found a positive return on investment, which is important as Medicaid is a predominant payer for births in the United States. CenteringPregnancy participation reduced the risk of prematurity, LBW infants, and NICU stays with savings of nearly $457,842 per year from just one facility.

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Introduction

The adverse health outcomes resulting from preterm birth (<37 weeks gestational age) are dramatic. The consequences of preterm birth may include low birthweight (LBW) (<2500 g), a stay in the neonatal intensive care unit (NICU), and higher rates of serious disability and infant mortality [3, 19]. The initial hospitalization costs of a preterm infant are nearly always double the cost of a term infant [23]. Average medical costs for the first year of life were approximately $32,000 for preterm infants compared to $3000 for a full-term infant [14]. State Medicaid agencies are more likely to cover this burden, especially in the South where 50 % of all births are covered by public insurance, as these newborns have higher incidence rates of prematurity [15].

One intervention that has shown potential to reduce rates of preterm birth and LBW is the CenteringPregnancy group prenatal care (GPNC) model. The trademarked curriculum, developed by the Centering Healthcare Institute (Boston, MA), involves ten 2-hour group sessions with 8–12 low-risk pregnant women over a 6-month period. The CenteringPregnancy model provides an "integrated approach to prenatal care in a group setting, incorporating family members, peer support, and education" [8]. Studies solely examining birth outcomes have found that participation in CenteringPregnancy has been associated with a reduction in the number of preterm deliveries or longer weeks of gestation and may improve both prematurity and LBW rates [1, 8, 10–13, 21, 28, 33].

Background

Ranking 47th for premature births, 47th for LBW, and 42nd for infant mortality [35], the state of South Carolina Department of Health and Human Services (SC DHHS) seeks to support financially through SC Healthy Connections Medicaid innovative approaches to improve the health of mothers and newborns. In 2009, with a grant of $1.7 million over four years, SC DHHS began one of the largest state-level public investments of CenteringPregnancy through its support of a pilot program at Greenville Health System (GHS). GHS is an upstate region perinatal level III facility which supports deliveries of more SC Medicaid beneficiaries than any other hospital (approximately 3000 per year). The grant provided implementation funding and incentivized payments to obstetric providers adopting CenteringPregnancy.

The initial evaluation of the GHS program revealed both a promising reduction in preterm delivery prior to 37 weeks and increased participation in postpartum family-planning services [9, 25]. However, SC DHHS was also interested in understanding whether the program had met cost neutrality. Such an analysis was not only needed for state decision makers who have since supported a statewide scale-up of GPNC to 14 sites, but also for other states who have observed the GHS program as a model and are considering implementing a similarly incentivized payment system. Sustainable funding through payment reform has been presented by GHS leaders nationally as one benefit to practices of implementing CenteringPregnancy [24, 29]. The United States DHHS is now testing this approach through Strong Start for Mothers and Newborns, a four-year initiative to evaluate enhanced prenatal care interventions for women enrolled in Medicaid who are at risk of having a preterm birth [4].

There have been five cost studies previously conducted on CenteringPregnancy. Ickovics et al. [12] found no significant cost differences between GPNC and individual prenatal care (IPNC) in a high-risk sample of young, urban, minority women. Using breakeven analysis, Mooney et al. [18] discovered that utilization of certified nurse midwives was more efficient and cost less than using physicians in GPNC in a critical access hospital. Ohno et al. [22] applied a decision-analytic cost-effectiveness analysis model and determined that CenteringPregnancy was less costly and slightly more effective (measured by QALYs) in decreasing preterm births than IPNC. Nguyen et al. [20] applied a decision-analytic model to compare outcomes and costs for mothers with pre-gestational type II diabetes mellitus (DM). GPNC remained cost-effective when considering quality-adjusted life years gained from better outcomes for these mothers. Cost-benefit modeling was also used by Rowley et al. [27] to demonstrate that GPNC can be financially sustainable and possibly an income generator for outpatient clinics.

This study will expand and contribute to this existing literature through modeling and quantifying the cost savings attributed to prevention of poor birth outcomes due to participation in CenteringPregnancy among a larger, more diverse sample. Only one previous study took this analytic approach, and it was limited to mothers with type II diabetes mellitus [20]. Our study is also unique in its focus on improved birth outcomes for Medicaid beneficiaries, an important socioeconomic indicator that allowed us to assess cost savings to public payers of obstetric care for low-income women.

Data and Methods

The initial study sample included 1290 Medicaid beneficiaries who were not randomized, but rather chose to participate in CenteringPregnancy after being offered both

GPNC and IPNC. These Medicaid beneficiaries participated in at least one CenteringPregnancy session during the calendar years 2009–2013. Because the CenteringPregnancy model is designed for medically low-risk women, medically high-risk women identified through prior claims as having hypertension, diabetes, gestational diabetes, obesity, and drug addictions were excluded from the analysis. Although CenteringPregnancy participation is not limited to nulliparous mothers, this analysis was also restricted to first-time mothers to align better with other SC DHHS initiative evaluations. Women who could not match on all demographic variables or who had multiple gestations were removed resulting in an initial sample of 1265.

From the SC Medicaid claims data, a comparison sample was drawn from 6545 mothers who had received at least one traditional IPNC visit, were not included in our CenteringPregnancy sample, and delivered with GHS during the calendar years 2009–2013. As vital records data were not utilized for this study, the mother's first birth recorded in a linked mother–child dataset was included as a proxy for nulliparous status. Again, medically high-risk women were excluded as were mothers under the age of 16, the cut-off for CenteringPregnancy participation.

Data and Key Variables

To conduct this study, University of South Carolina's institutional review board granted approval in April 2012 for analysis of retrospective data from patient records. The study utilized data from Medicaid claims data stored at the University of South Carolina's Institute for Families in Society, as well as attendance data compiled by GHS staff. The mother dataset included the participant's Medicaid unique identifier, race, age (calculated at year of delivery), plan type, Medicaid qualifying and assistant payment categories, 3M^{TM} Clinical Risk Group (CRG) category, and Rural–Urban Commuting Area (RUCA) code. Additionally, all fee-for-service and managed care paid claims dating from one year before each mother's delivery date and one year from the mother's delivery date were included.

For the CenteringPregnancy mothers, the attendance data were used to determine the median number of visits ($n = 5$) and to group participants into two categories: those who had attended 1–4 visits and those who had attended 5–12 visits. The RUCA coding was not included in the models as all mothers were within commuting distance to an urban center. The paid claims, payment categories, and CRG were utilized to ensure that high-risk mothers were not included in the study. Two CenteringPregnancy women participating in the breast and cervical cancer waiver program were removed. A small number of high-level clinical risk patients were also identified and removed from the sample ($n = 1$ for CenteringPregnancy and $n = 17$ for Comparison) resulting in final samples of 1262 for CenteringPregnancy and 6528 for IPNC.

A linked mother–child dataset was used to pull a second dataset which included the participant's newborn's claims for the first year of life. All fee-for-service and managed care paid claims were pulled. These data were used to determine maternal year of delivery based on the baby's date of birth and to examine birth outcomes and associated costs. Having the claims data allowed us to pull actual payments rather than charges or national estimates of cost, which are generally an overestimate for SC Medicaid recipients.

Outcomes Examined

Birth outcomes post-delivery were examined. The variable of interest was whether or not the baby was born premature, as specified by ICD9 codes related to preterm birth, fetal immaturity, and gestation <37 weeks. Related possible consequences of preterm birth, including a stay in the NICU and whether or not the baby was born with LBW, were also examined. Revenue codes specifying NICU or CPT codes specifying neonatal critical care were used to determine whether the newborn had a stay in the NICU. LBW births were identified through ICD9 codes related to fetal malnutrition, slow fetal growth, and weight <2500 g. All specific codes used can be found in the appendix.

Analysis

CRG category assignment was missing for 303 of the 1262 women in the CenteringPregnancy group. We utilized multiple imputations to generate 50 imputed datasets based on an ordinal logistic regression of CRG category based on health plan type; centering level of visits; race; and indicators of hypertension, obesity, and diabetes. All models were estimated across the 50 imputed (full) datasets, and results of each fitted model were combined. As expected, given data cleaning efforts to remove high-risk mothers, all mothers were assigned either low- or medium-risk CRG. We also noted that the inference drawn from analyzing the complete data subset did not differ from the results of the imputation analysis. Once the imputation analysis was complete, frequency tables were run (see Table 1).

A propensity score analysis was conducted to validate that the difference in birth outcomes among CenteringPregnancy participants versus the comparison group (those who had received IPNC) was attributed to CenteringPregnancy participation [2, 16, 26]. Propensity scores (predicted probabilities of assignment to the CenteringPregnancy treatment group) were included in analyses

Table 1 Characteristics of the study participants

Characteristic	CenteringPregnancy		Comparison	
	Total ($n = 1262$)		Total ($n = 6528$)	
	n	%	*n*	%
CenteringPregnancy group prenatal care visits[a]				
1–4 visits	271	21.47	N/A	
5–12 visits	991	78.53		
Age categories[b]				
16–21	181	14.34	1655	25.35
22–34	995	78.84	4256	65.2
35–48	86	6.81	617	9.45
Race				
Black	526	41.68	2572	39.4
White	600	47.54	1713	26.24
Latino	113	8.95	1993	30.53
Other races	23	1.82	249	3.81
Missing	0	0	1	0.02
CRG status[c]				
Low-level clinical risk	1085	85.97	4244	65.01
Medium-level clinical risk	177	14.03	822	12.59
High-level clinical risk	0	0	0	0
Missing	0	0	1462	22.4
Plan type				
Fee-for-service	756	59.9	4222	64.68
Managed care organization	506	40.1	2306	35.32
Delivery year				
2009	63	4.99	1010	15.47
2010	238	18.86	1579	24.19
2011	327	25.91	1342	20.56
2012	302	23.93	1316	20.16
2013	332	26.31	1281	19.62

[a] Four models were run with various dosing levels. Two levels of dosing made the most sense for interpretation

[b] Age was treated as continuous in the propensity score analysis due to the lack of variance in this demographic. The resulting models provided the most conservative estimates of risk

[c] Multiple imputation was performed on Clinical Risk Groups for the Centering group to address missing data. The results of the multiple imputation are reported rather than the results from the raw data

to ensure that birth outcomes differed between the two groups due to the effect of CenteringPregnancy, not due to prior patient conditions, characteristics, or the non-randomization of the study. The propensity score function relating treatment group assignment was estimated for age (treated as continuous due to lack of variance in the measure), race, CRG status, and plan type.

The authors used quantile regression to regress outcome variables of NICU stays, LBW, and prematurity at the 5th, 25th, 50th, 75th, and 95th percentiles. We found good evidence of overlap in all cases except at the 25th percentile on NICU stays, the 25th and 50th percentiles of LBW, and the 25th percentile on prematurity. Overlap was also found to be sufficient (Fig. 1). The propensity score did not allow for a complete match; so, the final analytical sample consisted of the same number of patients in the CenteringPregnancy group ($n = 1262$) and a smaller comparison group ($n = 5066$) for a total of 1462 cases removed from the overall dataset (see Table 2).

To calculate the potential cost savings of CenteringPregnancy, models estimating risk differences were estimated from generalized linear models which included measures of age, race, CRG status, and plan type. From the risk difference, the number needed to treat, the absolute

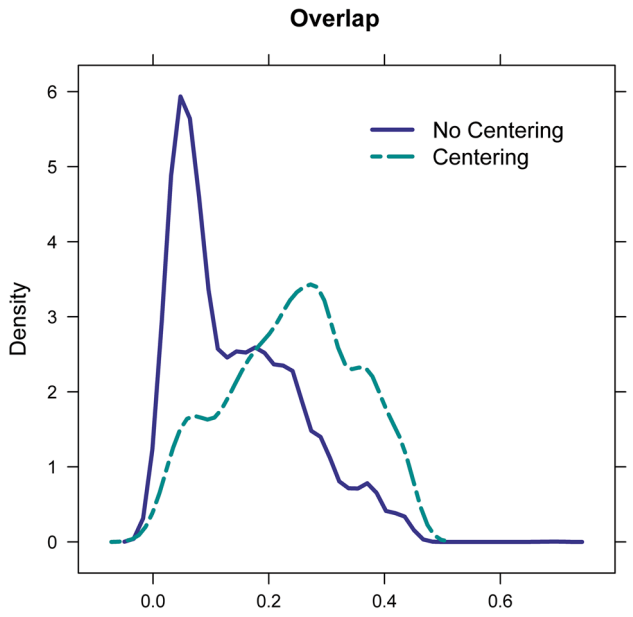

Fig. 1 Overlap of propensity scores in the adjusted model

value of the inverse of the risk difference, was calculated. The number needed to treat has been shown to be a useful measure of the clinical treatment effect used numerous times in a broad range of cost studies to estimate cost savings [5, 6]. The number needed to treat describes the number of patients that needed to participate in CenteringPregnancy versus traditional IPNC to prevent a single poor birth outcome and its related cost.

The mean direct professional and inpatient medical costs associated with each birth outcome for CenteringPregnancy and IPNC newborns ages 0–11 months from 2009–2014 were analyzed from the paid claims data. These data were used to calculate a mean cost per newborn for each outcome. We also calculated the average cost of treating a newborn without one of these complications and subtracted this from the average payment for each measure (see Table 3). The number needed to treat was then used to determine how many negative birth outcomes were avoided based on the CenteringPregnancy sample of 1262, and this number was multiplied by the average cost. Cost savings was determined based on whether the total savings was $<$ the $1.7 million invested.

Results

Characteristics of the Study Participants

Descriptive statistics for the study participants are shown in Table 1. The CenteringPregnancy mothers were more likely to be White (47.54 %) and less likely to be Latino (8.95 %) than the IPNC mothers (26.24 and 30.53 %, respectively). Only a small percentage of CenteringPregnancy mothers were ages 16–21 (14.34 %) or 35–48 (6.81 %), although these percentages were slightly higher for the comparison group (25.35 and 9.45 %, respectively). Plan type was similar across both groups with 59.90 % of CenteringPregnancy mothers and 64.68 % of IPNC mothers enrolled in fee-for-service, and 40.10 % of CenteringPregnancy mothers and 35.32 % of IPNC mothers enrolled in managed care. The majority of both groups were classified as low-level clinical risk for their CRG status (85.97 % of CenteringPregnancy mothers and 65.01 % of IPNC mothers) with 14.03 % of CenteringPregnancy and 12.59 % of IPNC mothers identified as medium-level clinical risk. Nearly 23 % of the IPNC sample was missing CRG, as the imputation was only applied to the CenteringPregnancy mothers. However, these individuals were omitted from the analytic sample due to not having a match resulting in almost the same percentage of low-risk mothers in both groups (see Table 2). Most other demographic shifts after matching were negligible.

The configuration of the CenteringPregnancy sample over time is necessary to note as more groups were added after 2009. Only 4.99 % of CenteringPregnancy mothers delivered in 2009. After 2009, the percentage remained relatively stable, and once enrolled, 78.53 % of mothers had attended five or more CenteringPregnancy visits.

Propensity Score Analysis

Table 4 shows the propensity score analysis results for CenteringPregnancy versus traditional IPNC. The results illustrate an association of cost savings with participation in CenteringPregnancy GPNC among low-risk Medicaid beneficiaries. Compared to mothers who had participated in IPNC, CenteringPregnancy GPNC participation improved the rate of premature birth and the possible subsequent outcomes of LBW and NICU stay. CenteringPregnancy GPNC participation reduced the risk of having a premature infant by 36 % ($P < 0.05$) compared to a mother who had IPNC. For mothers who had participated in CenteringPregnancy GPNC, the relative risk of having a LBW infant was reduced by 44 % ($P < 0.05$) and the risk of having an infant with a NICU stay by 28 % ($P < 0.05$).

Risk differences are coefficients of a binomial variance identity-link generalized linear model of the likelihood of a given outcome; they are a direct estimate of a difference in probability. The risk differences of CenteringPregnancy GPNC are presented in Table 5. Using the adjusted model, only 22 mothers needed to be treated to avoid a LBW baby, and 25 mothers needed to be treated to prevent a premature birth. One NICU visit was also prevented when 30 patients participated in CenteringPregnancy.

Table 2 Characteristics of women included and omitted from the analytical sample

Characteristic	Analytic sample				Omitted	
	CenteringPregnancy		Comparison		Comparison	
	Total ($n = 1262$)		Total ($n = 5066$)		Total ($n = 1462$)	
	n	%	*n*	%	*n*	%
CenteringPregnancy group prenatal care visits						
1–4 visits	271	21.47	N/A		N/A	
5–12 visits	991	78.53				
Age categories[a]						
16–21	181	14.34	1329	26.23	326	22.3
22–34	995	78.84	3248	64.11	1008	68.95
35–48	86	6.81	489	9.65	128	8.76
Race						
Black	526	41.68	1919	37.88	653	44.6
White	600	47.54	1287	25.4	426	29.14
Latino	113	8.95	1659	32.75	334	22.85
Other races	23	1.82	201	3.97	48	3.28
Missing	0	0	0	0	1	0.07
CRG status						
Low-level clinical risk	1085	85.97	4244	83.77	0	0.00
Medium-level clinical risk	177	14.03	822	16.23	0	0.00
High-level clinical risk	0	0.00	0.00	0.00	0	0.00
Missing	0	0.00	0.00	0.00	1462	100
Plan type						
Fee-for-service	756	59.9	3359	66.3	863	59.03
Managed care organization	506	40.1	1707	33.7	599	40.97
Delivery year						
2009	63	4.99	752	14.84	258	17.65
2010	238	18.86	1173	23.15	406	27.77
2011	327	25.91	950	18.75	392	26.81
2012	302	23.93	916	18.08	400	27.36
2013	332	26.31	1275	25.17	6	0.41

[a] Age was treated as continuous in the propensity score analysis due to the lack of variance in this demographic. The resulting models provided the most conservative estimates of risk

Table 3 2008–2014 costs of adverse birth outcomes during the baby's first year of life

Mean payment per newborn[a]						
	Low birthweight		Prematurity		Neonatal Intensive Care Unit Visit	
	CenteringPregnancy	Comparison	CenteringPregnancy	Comparison	CenteringPregnancy	Comparison
Prior to Adjustment	$33,302	$33,662	$26,342	$27,948	$30,924	$36,493
After Adjustment[b]	$29,627	$29,919	$22,667	$24,205	$27,249	$32,750

[a] Cost per infant dollar amounts were rounded to whole numbers. These payments include professional and inpatient paid claims pulled from SC Medicaid paid claims data as of January, 2016. Costs for transportation services, non-professional outpatient, and prescriptions were not included. Therefore, total mean payments are likely higher

[b] The mean cost during the first year of life for a baby without any of these complications ($3675 for CenteringPregnancy and $3743 for Comparison) was removed

Table 4 Propensity score analysis for group versus traditional prenatal care (relative risk is the exponentiated coefficient of a log-link binomial variance generalized linear model)

Outcome variables	CenteringPregnancy		IPNC	
	RR (95 % CI)	*p* value	RR (95 % CI)	*p* value
Neonatal intensive Care Unit visit	0.72 (0.60, 0.88)	0.001*	0.76 (0.62, 0.94)	0.012*
Prematurity	0.64 (0.52, 0.79)	0.000*	0.73 (0.59, 0.92)	0.007*
Low birthweight	0.56 (0.44, 0.71)	0.000*	0.70 (0.54, 0.90)	0.006*

* Significance at alpha level = 0.05

Table 5 Risk differences of group care within an adjusted model and an unadjusted model (the risk difference is the coefficient of the CenteringPregnancy group indicator in an identity-link binomial variance generalized linear model)

Outcome variables	CenteringPregnancy—adjusted			CenteringPregnancy—unadjusted		
	RD (95 % CI)	*p* value	Number needed to treat	RD (95 % CI)	*p* value	Number needed to treat
Neonatal Intensive Care Unit visit	−0.033 (−0.052, − 0.014)	0.001*	30 (19, 71)	−0.030 (−0.048, −0.012)	0.001*	33 (21, 83)
Prematurity	−0.040 (−0.058, −0.023)	0.000*	25 (17, 43)	−0.034 (−0.051, −0.018)	0.000*	29 (20, 56)
Low Birthweight	−0.045 (−0.060, −0.030)	0.000*	22 (17, 33)	−0.034 (−0.048, −0.019)	0.000*	29 (21, 53)

RD risk difference

* Significance at alpha level = 0.05

Cost Savings

Based on the final CenteringPregnancy sample of 1262, the numbers needed to treat equate to 57 LBW, 51 premature, and 42 NICU babies prevented from 2009–2013. As we are aware that more informed mothers may be more likely to self-select into CenteringPregnancy [17], we applied the lower CenteringPregnancy costs detailed in Table 3 to determine cost savings. The estimated savings from avoiding these poor outcomes was $1,688,739 for LBW; $1,156,017 for prematurity; and $1,144,458 for NICU for a total of $3,989,214 saved. Considering the SC DHHS investment of $1,700,000, the return on investment was $2,289,214, a conservative estimate given that only professional and inpatient costs were considered. If we had assumed that IPNC mothers participating in CenteringPregnancy would have had lower costs due to participation and used the higher comparison values, the total saved would have been $4,315,338 for a return on investment of $2,615,338.

Discussion

Limitations

The quasi-experimental design, as well as the focus on low-income Medicaid participants in only one region of the state in a hospital serving urban patients known for better outcomes, limits the generalizability of this study. Now that the initiative has expanded statewide, we are interested in replicating this study with a much larger sample to ensure findings hold true for rural and more diverse women. However, given that the GHS program is serving as a model for other states and U.S. DHHS, the pilot results do have policy and practice implications.

Our propensity score analysis does not fully address the issue of self-selection, the patient's voluntary decision making regarding type and quantity of prenatal care. Two methodological approaches to address these issues, modeling for a count treatment variable and identifying an instrument variable, were not feasible for this study, but are important considerations for future work. We attempted to address this issue by ensuring that there was overlap of propensity scores in our model, treating age as continuous, and providing more conservative estimates of cost savings by using the lower CenteringPregnancy costs. Our model could have also been strengthened by consideration of other demographic characteristics, such as educational level, smoking, and socioeconomic status, factors that were not accessible from the Medicaid claims data.

The costs of CenteringPregnancy vary based on provider type and levels of in kind support. GHS providers are also reimbursed a higher rate per visit to incentivize CenteringPregnancy. Having full access to the administrative Medicaid claims data and clinical record reviews are strengths of this study, but these costs could not be ascertained from our data. Therefore, our analysis focused on agency cost rather than costs secured by the hospital or providers. Given this focus on a public payer, more research is needed on outcomes for commercial private payers.

The total savings was calculated treating each outcome as discreet when a single newborn might have 0 negative birth outcomes or might have all three. Modeling every possible combination would have made interpretation challenging; so, we chose this simpler method, which might overestimate savings. Additionally, this focus on outcomes/costs of newborns neglects maternal complications and costs, which is another area for future research.

Implications

We found that the incidence of premature birth and subsequent birth outcomes such as LBW and NICU visits can be reduced in low-risk populations due to participation in CenteringPregnancy GPNC. The savings associated with this reduction was an estimated $2.3 million, which equates to $457,842 saved by the state per year from just one facility. These are measurable savings that can be used to invest in other maternal and child health initiatives and will only increase given inflation and increased enrollment in the program. In states such as SC with premature births higher than the national average, the potential monetary impact of increased CenteringPregnancy participation is significant.

The cost savings calculated in this study were limited to the first year of life. The literature that has followed premature babies through time has shown that premature babies have a higher probability of becoming children with chronic disease and developmental problems [23]. A study that uses a longer term time horizon could show that the benefits of GPNC are even higher in the long run. This could allow for further study on whether CenteringPregnancy participation leads to increased initiation of breastfeeding, increased attendance at postpartum follow-up visits, and higher patient satisfaction as other studies have shown [1, 7, 11, 30–32, 34].

Conclusions

The costs of providing CenteringPregnancy are borne by the obstetric provider, but the savings accrue to payers. This represents a unique opportunity for partnership between obstetric care providers and third-party payers and is emblematic of the paradigm shift which is occurring in the broader health care field. The traditional, volume-driven, fee-for-service model of reimbursement is shifting toward a "value-driven" model in which patient outcomes are increasingly important. The creation of accountable care organizations as part of the Affordable Care Act of 2010 is one example of health care providers being asked to share financial risk with third-party payers. Investment in programs like CenteringPregnancy, which breaks down traditional silos of inpatient vs. outpatient costs and obstetric vs. pediatric outcomes, is a natural evolution in which third-party payers can help physicians deliver the highest quality of care by providing incentives to move to improved care models such as GPNC.

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Appendix of Codes

Preterm Birth

ICD-9 Codes

765.01–765.09: Disorders relating to extreme immaturity of an infant
765.11–765.19: Disorders relating to other preterm infants
765.21–765.28: 36 weeks or less of gestation

Low Birthweight

ICD-9 Codes

764.00–764.08: Light for dates without fetal malnutrition, <2500 g
764.10–764.18: Light for dates with fetal malnutrition, <2500 g
764.91–764.98: Fetal growth retardation, <2500 g
V21.3-V21.34: Low birthweight status

Neonatal Intensive Care Unit Visit

Revenue Codes

0173, 0174: Special care or Neonatal Intensive Care Unit

CPT Codes

99291–99296, 99298, 99300, 99468–99469, 99477–99482: Pediatric or neonate critical care

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