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Coverage of immediate postpartum long acting reversible contraception has improved birth intervals for at risk populations

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Abstract

Background—In 2012, South Carolina revised Medicaid policy to cover reimbursement for immediate postpartum long acting, reversible contraception. Immediate postpartum long acting. reversible contraception may improve health outcomes for populations at risk with a subsequent short interval pregnancy.

Objectives—We examined the impact of the Medicaid policy change on initiation of long acting and reversible contraception (immediate postpartum and postpartum) within key populations. We determined whether immediate postpartum long acting and reversible contraception use varied by adequate prenatal care (>7 visits), metropolitan location, and medical comorbidities. We also tested the association of immediate postpartum and postpartum long acting, reversible contraception on inter-pregnancy interval of less than 18 months.

Study Design—We conducted a historical cohort study of live births among Medicaid recipients in South Carolina between 2010–2017, two years before and five years after the policy change. We used birth certificate data linked with Medicaid claims. Our primary outcome was immediate postpartum long acting and reversible contraception and our secondary outcome was short interpregnancy interval. We characterize trends in long acting and reversible contraception use and interpregnancy interval over the study period). We used logistic regression models to test the association of key factors (rural, inadequate prenatal care and medical comorbidities) with immediate and outpatient post-partum long acting and reversible contraception following the policy change and to test the association of immediate postpartum and postpartum long acting and reversible contraception with short interpregnancy interval.

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Results—Our sample included 187,438 births to 145,973 women. Overall, 44.7% of the sample was white with a mean age of 25.0 years. A majority (61.5%) of the sample was multiparous and resided in metropolitan areas (79.5%). The odds of receipt of immediate postpartum long acting and reversible contraception use increased post-policy change (aOR 1.39, 95% CI 1.34–1.43). Women with inadequate prenatal care (aOR 1.50, 95% CI 1.31, 1.71) and medically complex pregnancies had higher odds of receipt of immediate postpartum long acting and reversible contraception following the policy change (aOR 1.47, 95% CI 1.29–1.67) compared with women with adequate prenatal care and normal pregnancies. Women residing in rural areas were less likely to receive immediate postpartum long acting and reversible contraception (aOR 0.36, 95% CI 0.30–0.44) than women in metropolitan areas. Utilization of immediate postpartum long acting and reversible contraception was associated with decreased odds of a subsequent short interpregnancy interval (aOR 0.62, 95% CI 0.44–0.89).

Conclusion—Women at risk of subsequent pregnancy and complications (inadequate prenatal care and medical comorbidities), are more likely to receive immediate postpartum long acting and reversible contraception following the policy change. Efforts are needed to improve access in rural areas.

Condensation

Medicaid reimbursement for immediate postpartum LARC increased utilization of LARC and is associated with decreased odds of a short interpregnancy interval.

Keywords

Immediate postpartum LARC; Implant; IUD; short interpregnancy intervals; Medicaid policy

Introduction

Over a third of all second or higher order births in the United States (US) occur after a short inter-pregnancy interval (IPI).[1]A short IPI is defined as an interval of fewer than 18 months between a delivery and subsequent conception.[1] Short IPI is associated with meaningful adverse maternal and fetal outcomes. Women who become pregnant within 18 months from their last birth are more likely to experience chronic diseases, such as obesity and gestational diabetes. [2,3] Infants born following a short IPI are more likely to be premature, low birth weight, and incur higher mortality. [4,5] While some short IPI pregnancies are desired, the majority (55%) are not planned· [6,7]

Important disparities in unplanned pregnancy exist across racial, ethnic, and socioeconomic lines. [8] Minority and low-income women are more likely to have short IPI as a result of unintended pregnancies than are white or middle-income women·[1,9]

Improving effective contraceptive use to reduce short IPI is a Healthy People 2020 priority. Improving access to the most effective forms of long acting, reversible contraception (LARC) is thus a key strategy to reduce health disparities. [10]Women using LARC (intrauterine device and implant) have almost four times the odds of achieving an optimal IPI than women using less effective methods. [11]However, only 6% of US women are using these methods at three months postpartum. [7,11] Rural disparities in LARC use have been

identified: women living in rural areas are less likely to be using LARC than their urban counterparts.[12, 13]

A key barrier to use of effective contraception is poor attendance at postpartum visits, and attendance is lowest among populations with limited resources. Among Medicaid recipients, up to 50% of women do not attend their postpartum visit where contraception has historically been provided.[14,15] One strategy to increase access to LARC is offering placement prior to hospital discharge from childbirth. Providing contraception in the immediate postpartum period (IPP) is a safe and effective strategy for preventing unintended pregnancy.[16]Leading public health organizations, including the American College of Obstetricians and Gynecologists (ACOG) recognize IPP LARC as a critical means to optimize maternal health.[16] However, historically Medicaid reimbursement policy has limited the provision of IPP LARC.[17] On March 1st, 2012, South Carolina became the first state to implement a policy change facilitating Medicaid reimbursement for LARC placed in the IPP as part of a state-wide initiative to improve perinatal health. Following South Carolina's lead, 47 states have subsequently implemented similar policies.

Previous research has suggested that the policy change was associated with increased IPP LARC utilization and decreased births with a short IPI among adolescents.[18] Limited data on the characteristics of women benefiting from this policy change exists. It is important to know if IPP LARC is being provided to women who would not otherwise have access to LARC, such as at the traditional six week postpartum visit. Similarly, we do not know if implementation has been uniform across the state, with women in rural areas as likely to utilize IPP LARC as women in metropolitan areas. Data on whether women who are most at risk for medical complications with a subsequent short IPI pregnancy (e.g diabetes, chronic hypertension, cesarean delivery) in a subsequent pregnancy are receiving IPP LARC is similarly not available.

Lessons learned from South Carolina have national relevance. We sought to to investigate the association of Medicaid policy covering IPP LARC on uptake of LARC and on short IPI in South Carolina. We first examined whether IPP LARC was simply a substitute for LARC that would have been received at the traditional six week postpartum visit. We next examined whether IPP LARC utilization varied by adequate prenatal care (>7 visits), medical comorbidities, and rural location. Finally, we tested the association of LARC (IPP and postpartum) with short IPI.

Materials and Methods

We conducted a historical cohort study using linked Medicaid claims and birth certificate data. We included all Medicaid births between January 1, 2010 and July 31, 2017, allowing for 26 months before and 63 months after the March 1, 2012 policy change. We excluded multi-fetal gestations, gestational age <23 weeks, and births covered by Emergency Medicaid only. We excluded EM recipients because most lose coverage following birth and are not available for follow up to ascertain outcomes. Data were obtained under data use agreements with the state of South Carolina. Institutional Review Board approval was obtained from Oregon Health & Science University.

Outcomes

We had two study outcomes: receipt of LARC (IPP and postpartum) and short IPI. We classified LARC as IPP or postpartum depending on the date of insertion; our outcome variable had three categories (no LARC, IPP LARC, postpartum LARC). A woman with no evidence of LARC insertion in the first 60 days following a birth was categorized as "no LARC." IPP LARC included all women who received an IUD or implant during the same admission for their birth. Postpartum LARC included any LARC claims in the outpatient setting up to two months after the date of delivery. We also assessed LARC as a continuous percent of births with evidence of IPP or postpartum LARC.

Our second outcome was short IPI. We created a binary indicator of short IPI (less than 18 months [19]) by calculating the time in months between an index delivery and the estimated date of conception of the subsequent pregnancy. The estimated date of conception was calculated by subtracting the gestational age from the birthdate. Both outcomes (IPP LARC and short IPI) were derived from Medicaid claims data. We used International Classification of Disease (ICD)-9 & 10 codes and Current Procedural Terminology (CPT) codes to define receipt of IPP LARC, including both IUD and implants (Supplemental Appendix A: code list).

Independent variable

Our independent variable for our first outcome (LARC) was time: years after the policy change (March 1, 2012). Our independent variable for our second outcome (short IPI) was receipt of LARC (IPP and Postpartum vs none).

We evaluated the role of geography on receipt of IPP LARC and short IPI by classifying maternal county of residence as metropolitan or non-metropolitan using 2013 Rural-Urban Continuum Codes.[20]

We included relevant clinical and pregnancy characteristics. Attendance at prenatal care and postpartum visits have previously been shown to be associated with postpartum contraceptive use.[21] We extracted prenatal care visits from the birth certificate record, and defined inadequate prenatal care as less than 7 visits. We chose to use attendance of at least 7 visits instead of the Kotelchuck Index, due to a significant portion of births without the Kotelchuck Index data available in the pre-policy period (49.3%). For births with the Kotelchuck Index data available, adequate prenatal care was highly correlated with attendance of at least 7 prenatal visits confirming this as an appropriate proxy of prenatal care utilization.

We created a binary variable to capture pregnancies with medical comorbidities as these women may receive differential counseling regarding contraception. Birth certificate data were used to identify pregnancies with any of the following: chronic hypertension, hypertensive disorders of pregnancy, pre-existing diabetes or gestational diabetes. Presence of any of the aforementioned conditions defined a medically complicated pregnancy.

Covariates

We extracted key demographic variables from the birth certificate including maternal age (<20 years old, 20–34, 35+), parity, race/ethnicity (white, black, Hispanic or other) and county of residence.

We extracted gestational age from the birth certificate and made a binary indicator for preterm (<37 weeks) versus full term deliveries. We extracted mode of delivery (vaginal or cesarean) from the birth certificate.

Attendance at prenatal visits is a predictor for postpartum care receipt.21We made a binary indicator for receipt of a postpartum visit, defined using claims data as an outpatient appointment before the end of the second month following the birth event.

Analyses

First we described woman-level characteristics of all included pregnancies stratified by pre- or post-policy period, and tested for differences using chi-square or t-tests as appropriate. Our unit of analysis is the pregnancy; a woman could appear more than once if she had more than one delivery during the study period.

Next we described uptake of IPP and postpartum LARC over the study period. We wanted to determine whether IPP LARC was replacing LARC use at a six week postpartum visit. We calculated the percent of birth events with an associated IPP or PP LARC by quarter. We fit a linear regression to IPP and postpartum LARC trends separately, to test whether IPP LARC displaced postpartum LARC use. This allowed us to examine whether the slope of postpartum LARC utilization changed after Medicaid reimbursement for IPP LARC began.

To test whether the policy was associated with changes in uptake of either IPP or postpartum LARC, we developed two logistic regression models (IPP LARC vs no LARC and postpartum LARC vs no LARC. We chose to use two logistic models instead of a multinomial model because IPP LARC is a relatively rare outcome and produced spurious highly significant estimates for all covariates. Two binary logistic models yield similar results to the multinomial logistic model making that modeling approach an acceptable alternative to rare outcomes like IPP LARC utilization.[22]

We included our key independent variables: year post-policy, metropolitan (vs not) location, adequacy of prenatal care, and an indicator for pregnancies complicated by medical comorbidities. Based on previous literature [1,8] we also included: age, parity, race/ethnicity, gestational age, and mode of delivery. We did not include attendance of a postpartum visit given collinearity with receipt of postpartum LARC. This model was restricted to all births occurring between January 1st 2012 and July 31, 2017. We were unable to model IPP LARC prior to the policy change due to very small numbers. We excluded observations missing mode of delivery (0.002%), race/ethnicity (4.4%), and maternal residence (1.1%) from multivariable analyses.

To evaluate IPI, we first calculated the annual percent of short interval pregnancies among women with Medicaid over time. We used American Community Survey one-year estimates

for the number of women aged 18–34 years insured by Medicaid as our denominator for IPI, [23] and not actual Medicaid births. Utilizing Medicaid births as the denominator would artificially inflate short IPI, as women who do not experience a subsequent birth do not appear in our dataset.

Next, we developed a logistic regression model to test the association of receipt of IPP or postpartum LARC and short IPI. This model was restricted to births occurring between January 1, 2010 and December 31, 2015. We excluded the last 18 months of data in order to prevent overrepresentation of short IPI (the only repeat births that would appear in the data would all be short IPI, thus inflating the estimate of short IPI). We included the same covariates as above.

We used R for all analyses (R Core Team, 2019) and GraphPad Prism version 7.00 (GraphPad Software, La Jolla California USA, www.graphpad.com) for figures.

Results

The sample included 187,438 birth events occurring to 145,973 women during the study period (Table 1). Approximately 70% of the birth events (n=129,569) occurred after the policy change. There were 51,320 inter-pregnancy intervals represented. Women giving birth post-policy were more often multiparous (59.4% vs. 62.6% post-policy; p<0.01) and less frequently Latina (6.1% vs. 2.5% post-policy). No meaningful difference was seen pre- and post-policy in the proportion of births that occurred to younger and rural women. Post-policy, slightly more women were diagnosed with comorbidities of pregnancy, although not to a level thought to be clinically meaningful (13% vs 17.1%) Rates of health care utilization during pregnancy (prenatal and postpartum care) remained stable before and after the policy change.

Overall during our study period 12.3% of women (n=23,028) received a postpartum LARC, while 0.1% (1,646) received an IPP LARC. Both IPP and postpartum LARC utilization increased after the policy change in 2012 (Figure 1). Pre-policy, IPP LARC was rare, with only 42 IPP LARC devices placed prior to the policy change. Pre-policy 8.8% of births were followed by a postpartum LARC. The rate of increase in postpartum LARC utilization was stable over time: it was not significantly different between the pre- and post-policy periods (m=1.38, 95%CI 1.04–1.71 pre-policy vs. m=1.58, 95%CI 0.46–2.70 post-policy, p=0.74). Over the entire study period, there was a mean increase of an additional 1.39% of births utilizing postpartum LARC per quarter (95% CI 0.97–1.40). Following the policy change, IPP LARC increased steadily at a mean rate of an additional 0.39% of births accessing IPP LARC per quarter.

Both IPP and postpartum LARC utilization increased over time; year post-policy was significantly and positively associated with uptake of both IPP LARC (aOR 1.39, 95% CI 1.34–1.43) and postpartum LARC (aOR 1.10, 95% CI 1.09–1.11), controlling for covariates. Women with inadequate prenatal care had higher odds of IPP LARC compared with women with seven or more prenatal care visits (aOR 1.47 95%CI 1.29, 1.66). Similarly, women experiencing a pregnancy with medical comorbidities had higher odds of IPP LARC than

women with low risk pregnancies (aOR 1.5, 95% CI 1.31–1.71). Geography was associated with use of IPP LARC. Women giving birth in a non-metropolitan county had lower odds of IPP LARC than their urban counterparts (aOR 0.36, 95% CI 0.30–0.44).

Following the change in Medicaid reimbursement policy, we observed a decrease in the proportion of births with a short IPI (Figure 2). The annual percentage of reproductive age women (18–34 years) insured by Medicaid who experienced short IPI prior to the policy change ranged from 4.5% to 5.1%. Following the implementation of Medicaid coverage of IPP LARC, the proportion of women experiencing short IPI decreased from 4.4% in 2012 to 3% in 2015.

We then examined the association of LARC use (IPP and postpartum) with short IPI adjusting for key demographic and clinical covariates (Table 3). We found that both IPP (aOR 0.62, 95% CI 0.44–0.89) and postpartum LARC (aOR 0.31, 95% CI 0.28–0.33) were associated with lower odds of short IPI. Inadequate prenatal care was associated with higher odds of short IPI (aOR 1.20, 95%CI 1.13,1.26). Giving birth in a non-metropolitan county was not associated with short IPI (aOR 0.98, 95% CI 0.94–1.02) when controlling for LARC use. Experience of a pregnancy complicated by medical comorbidities was also not significantly associated with short IPI (aOR 1.01, 95% CI 0.96–1.07), controlling for LARC use.

Comment

Our study provides important evidence of the public health benefit of Medicaid coverage for IPP LARC. We found that the policy change was associated with an increase in both IPP and postpartum LARC use, suggesting that the women receiving IPP LARC were distinct from those accessing it at a traditional postpartum visit. Our findings do not support the hypothesis that IPP LARC is simply a replacement for women who would have obtained it at a postpartum visit. We saw no decrease in postpartum LARC use associated with the policy change.

We found that women experiencing medical comorbidities of pregnancy had higher odds of receipt of IPP LARC, suggesting that the policy is effectively reaching women with known risk factors for short IPI and medical complications. We also identified persistent disparities among rural women regarding LARC utilization: despite multiple state initiatives, women in non-metropolitan areas still have lower odds of receipt of IPP LARC than their urban counterparts.

Improved utilization of IPP LARC translated to measurable public health benefits: women receiving IPP LARC had lower odds of a short IPI (aOR 0.62, 95% CI 0.44–0.89). This association was even stronger among women receiving postpartum LARC (aOR 0.31, 0.28–0.33). This finding may reflect the increased risk of expulsion with IPP IUD placement or distinct individual preferences. We build upon previous work, which demonstrated an overall association with decreased odds of short IPI, by including key demographic and clinical variables which allowed us to assess this relationship in high risk populations.[18] Our results support the conclusion that IPP LARC is complementary to postpartum LARC services, not

a replacement. We found that IPP LARC was being utilized by a distinct population of women with risk factors for a rapid, repeat pregnancy and associated complications. We found that IPP LARC was associated with lower odds of short IPI among younger women, women with medical comorbidities of pregnancy and women of color. We did not identify a significant difference in short IPI among women living in non-metropolitan areas, suggesting areas for improved program implementation and patient counseling.

Our findings have national relevance. Since South Carolina's change in Medicaid policy, 47 other states have instituted amendments allowing for Medicaid reimbursement for LARC placed during an inpatient stay for childbirth.[24] Preliminary evidence from other states support our finding that the policy change is associated with an increase in LARC utilization. Both Iowa and Louisiana expanded Medicaid coverage to include IPP LARC in 2014.[25] Early data demonstrates the significant efforts that are needed to incorporate policy change into health care systems. In the first year following the policy change in Lousiana, only 476 IPP LARC devices were placed. Similar low utilization was seen in Iowa, where 73 devices were placed in the year following the policy change. While IPP LARC utilization started off slowly in South Carolina, the state has benefited from several concerted public health initiatives to improve perinatal outcomes.[26] Incorporating IPP LARC into routine obstetrical care requires engagement with multiple stakeholders; physicians, nurses, lactation consultants and pharmacists.[27]Patient-centered contraceptive counseling that includes access to IPP LARC can help support women's reproductive goals.[28,29]

Findings from our study should be interpreted with the following limitations in mind. First, similar to all health systems research, our findings are limited by our data sources. Relying on administrative data for disease and procedure identification under identifies many key health outcomes, biasing our results towards the null.[30] To address this limitation, we corroborated claims data with birth certificate data where possible. Similarly, our study is limited by an imprecise denominator for determining short IPI. Including all pregnancies in our data set as the denominator would have artificially increased the chance of observing short IPI post policy, as only women with a subsequent pregnancy appear in our dataset. We opted for a conservative approach, and used all women ages 18–34 insured by Medicaid as our denominator. This biases our results towards the null, since not all women covered by Medicaid are at risk of pregnancy. As an observational study, we cannot discount the fact that residual confounding may explain part of our findings. For example, nationally, LARC placement (both delayed postpartum and outside of pregnancy) has increased during our study period. [31] This increase is believed to be due to the improved coverage by insurance, increased awareness of LARC, availability of new methods, and a broadening of the indications for use. This would bias our result towards a stronger association. However, our analysis of LARC trends over time in our study population demonstrate stable incidence of postpartum placement, and a rapid increase in IPP LARC placement following the policy change covering IPP LARC. This supports the policy change as the main driver of IPP LARC utilization. Additionally, there is the potential for biased counseling about availability and indication for IPP LARC. It is possible that women perceived at-risk in some capacity were more often counseled about IPP LARC availability.[28] If the women most at risk of short IPI were more often counseled towards IPP LARC, this could increase the strength of

the effect observed in this study. Strengths of our study include a large and diverse study population and linked datasets that provide detailed demographic and health information.

IPP LARC is an important strategy for improving maternal and newborn health and reducing health inequities. We present promising data from South Carolina of the association between policy change, uptake of IPP LARC, and a reduction in short IPI. Work is needed to ensure that policy change translates to equitable access to care in all geographic settings, in particular in non-metropolitan settings. It is essential that efforts to promote IPP LARC do so from within a patient centered approach and are supportive of reproductive justice.

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References

1. Gemmill A, Lindberg LD. Short interpregnancy intervals in the United States. Obstet Gynecol 2013;122:64–71. [PubMed: 23743455]
2. Davis EM, Babineau DC, Wang X, et al. Short inter-pregnancy intervals, parity, excessive pregnancy weight gain and risk of maternal obesity. Matern Child Health J 2014;18:554–62. [PubMed: 23595566]
3. Hanley GE, Hutcheon JA, Kinniburgh BA, Lee L. Interpregnancy Interval and Adverse Pregnancy Outcomes: An Analysis of Successive Pregnancies. Obstet Gynecol 2017;129:408–15. [PubMed: 28178044]
4. McKinney D, House M, Chen A, Muglia L, DeFranco E. The influence of interpregnancy interval on infant mortality. Am J Obstet Gynecol 2017;216:316 e1–e9. [PubMed: 28034653]
5. Conde-Agudelo A, Rosas-Bermúdez A, Kafury-Goeta A. Birth Spacing and Risk of Adverse Perinatal Outcomes A Meta-analysis. JAMA 2006;295:1809–23. [PubMed: 16622143]
6. Masinter LM, Dina B, Kjerulff K, Feinglass J. Short Interpregnancy Intervals: Results from the First Baby Study. Womens Health Issues 2017;27:426–33. [PubMed: 28410974]
7. White K, Teal SB, Potter JE. Contraception after delivery and short interpregnancy intervals among women in the United States. Obstet Gynecol 2015;125:1471–7. [PubMed: 26000519]
8. Finer LB, Henshaw SK. Disparities in rates of unintended pregnancy in the United States, 1994 and 2001. Perspect Sex Reprod Health 2006;38:90–6. [PubMed: 16772190]
9. Zhu BP, Haines KM, Le T, McGrath-Miller K, Boulton ML. Effect of the interval between pregnancies on perinatal outcomes among white and black women. Am J Obstet Gynecol 2001;185:1403–10. [PubMed: 11744916]
10. Parks C, Peipert JF. Eliminating health disparities in unintended pregnancy with long-acting reversible contraception (LARC). Am J Obstet Gynecol 2016;214:681–8. [PubMed: 26875950]
11. Thiel de Bocanegra H, Chang R, Howell M, Darney P. Interpregnancy intervals: impact of postpartum contraceptive effectiveness and coverage. Am J Obstet Gynecol 2014;210:311.e1–.e8. [PubMed: 24334205]
12. Bornstein M, Carter M, Zapata L, Gavin L, Moskosky S. Access to long-acting reversible contraception among US publicly funded health centers. Contraception 2018;97:405–10. [PubMed: 29253581]

13. Satterwhite CL, French V, Allison M, Honderick T, Ramaswamy M. Access to contraception in local health departments, four Midwest states, 2017–2018. Contraception 2019;99:363–7. [PubMed: 30871935]
14. Masho SW, Cha S, Karjane N, et al. Correlates of Postpartum Visits Among Medicaid Recipients: An Analysis Using Claims Data from a Managed Care Organization. J Womens Health (Larchmt) 2018;27:836–43. [PubMed: 29451839]
15. Tang JH, Dominik R, Re S, Brody S, Stuart GS. Characteristics associated with interest in long-acting reversible contraception in a postpartum population. Contraception 2013;88:52–7. [PubMed: 23158805]
16. Woo I, Seifert S, Hendricks D, Jamshidi RM, Burke AE, Fox MC. Six-month and 1-year continuation rates following postpartum insertion of implants and intrauterine devices. Contraception 2015;92:532–5. [PubMed: 26408376]
17. Rodriguez MI, Evans M, Espey E. Advocating for immediate postpartum LARC: increasing access, improving outcomes, and decreasing cost. Contraception 2014;90:468–71. [PubMed: 25107639]
18. Steenland MW, Pace LE, Sinaiko AD, Cohen JL. Association Between South Carolina Medicaid's Change in Payment for Immediate Postpartum Long-Acting Reversible Contraception and Birth Intervals. Jama 2019.
19. Zhu BP, Rolfs RT, Nangle BE, Horan JM. Effect of the interval between pregnancies on perinatal outcomes. N Engl J Med 1999;340:589–94. [PubMed: 10029642]
20. Rural-Urban Continuum Codes. 2013 at https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/.)
21. Simmons KB, Edelman AB, Li H, Yanit KE, Jensen JT. Personalized contraceptive assistance and uptake of long-acting, reversible contraceptives by postpartum women: a randomized, controlled trial. Contraception 2013;88:45–51. [PubMed: 23218851]
22. Hosmer DW, Lemeshow S. Applied Logistic Regression, Textbook and Solutions Manual, 2nd Edition: John Wiley & Sons; 2001.
23. U.S. Census Bureau, 2017 American Community Survey 1-Year Estimates. 2017 2019, at https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_1YR_B27007&prodType=table.)
24. Medicaid Reimbursement for Postpartum LARC by State. American College of Obstetricians and Gynecologists 2016 at https://www.acog.org/About-ACOG/ACOG-Departments/Long-Acting-Reversible-Contraception/Immediate-Postpartum-LARC-Medicaid-Reimbursement.)
25. Okoroh EM, Kane DJ, Gee RE, et al. Policy change is not enough: engaging provider champions on immediate postpartum contraception. Am J Obstet Gynecol 2018;218:590 e1–e7. [PubMed: 29530670]
26. The South Carolina Postpartum LARC Toolkit. Choose Well Initiative and the South Carolina Birth Outcomes Initiative (SCBOI), 2016 at https://static.nichq.org/prevention-toolkit/resources/postpartum_larc_toolkit.pdf.)
27. Hofler LG, Cordes S, Cwiak CA, Goedken P, Jamieson DJ, Kottke M. Implementing Immediate Postpartum Long-Acting Reversible Contraception Programs. Obstet Gynecol 2017;129:3–9. [PubMed: 27926643]
28. Mann ES, White AL, Rogers PL, Gomez AM. Patients' experiences with South Carolina's immediate postpartum Long-acting reversible contraception Medicaid policy. Contraception 2019;100:165–71. [PubMed: 31028752]
29. Byrne EH, Anahtar MN, Cohen KE, et al. Association between injectable progestin-only contraceptives and HIV acquisition and HIV target cell frequency in the female genital tract in South African women: a prospective cohort study. The Lancet Infectious Diseases 2016;16:441–8. [PubMed: 26723758]
30. Goff SL, Pekow PS, Markenson G, Knee A, Chasan-Taber L, Lindenauer PK. Validity of using ICD-9-CM codes to identify selected categories of obstetric complications, procedures and co-morbidities. Paediatr Perinat Epidemiol 2012;26:421–9. [PubMed: 22882786]
31. Kavanaugh ML, Jerman J. Contraceptive method use in the United States: trends and characteristics between 2008, 2012 and 2014. Contraception 2018;97:14–21. [PubMed: 29038071]

AJOG at a Glance

A. Why was this study conducted?

- To determine if a policy change reimbursing for immediate postpartum LARC is associated with at risk populations utilizing the service, and improved interpregnancy intervals.

B. What are the key findings?

- Women at risk of short interpregnancy interval are benefiting from receiving immediate postpartum LARC. Women with inadequate prenatal care and women with medically complex pregnancies have increased odds of receiving immediate postpartum LARC.

C. What does this study add to what is already known?

- Immediate postpartum LARC is not a replacement for LARC placement at the traditional six week postpartum visit. Both types of LARC use increased steadily through our study period; distinct populations of women have benefited from each approach.
- Implementation of IPP LARC services has not been even across the state: efforts are needed to improve IPP LARC access in rural areas.

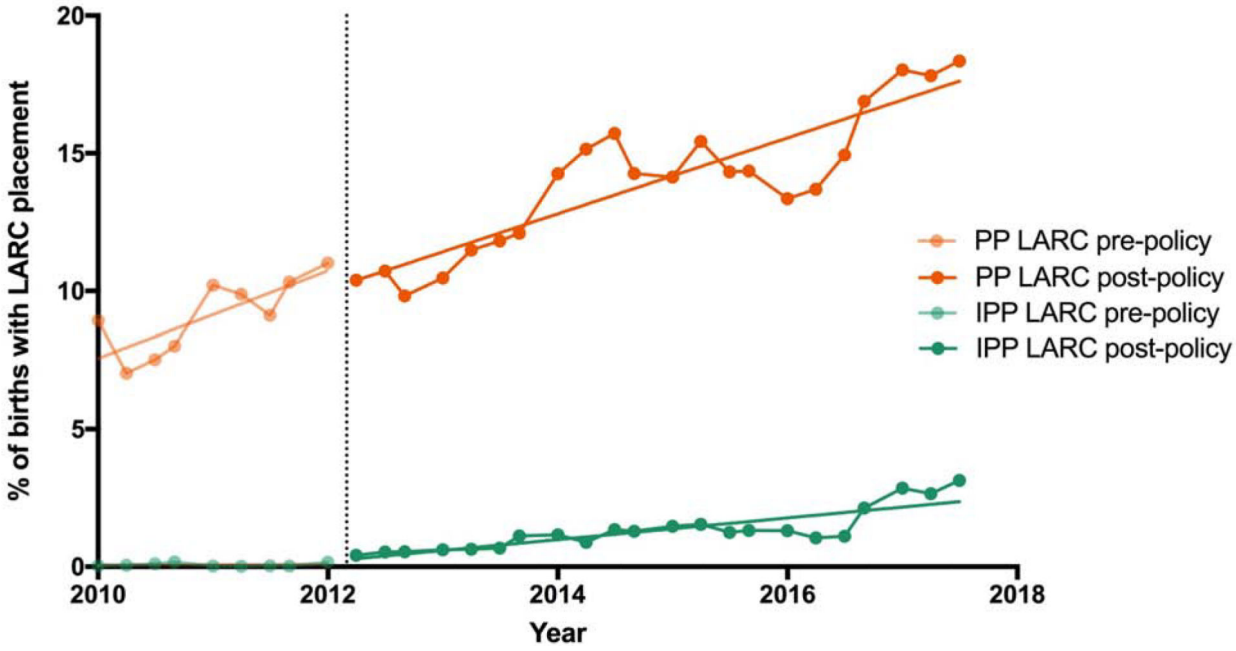

Figure 1:

The percent of women receiving a LARC device over time by LARC placement in inpatient immediate postpartum period (IPP) or outpatient setting up to 2 months postpartum (PP).

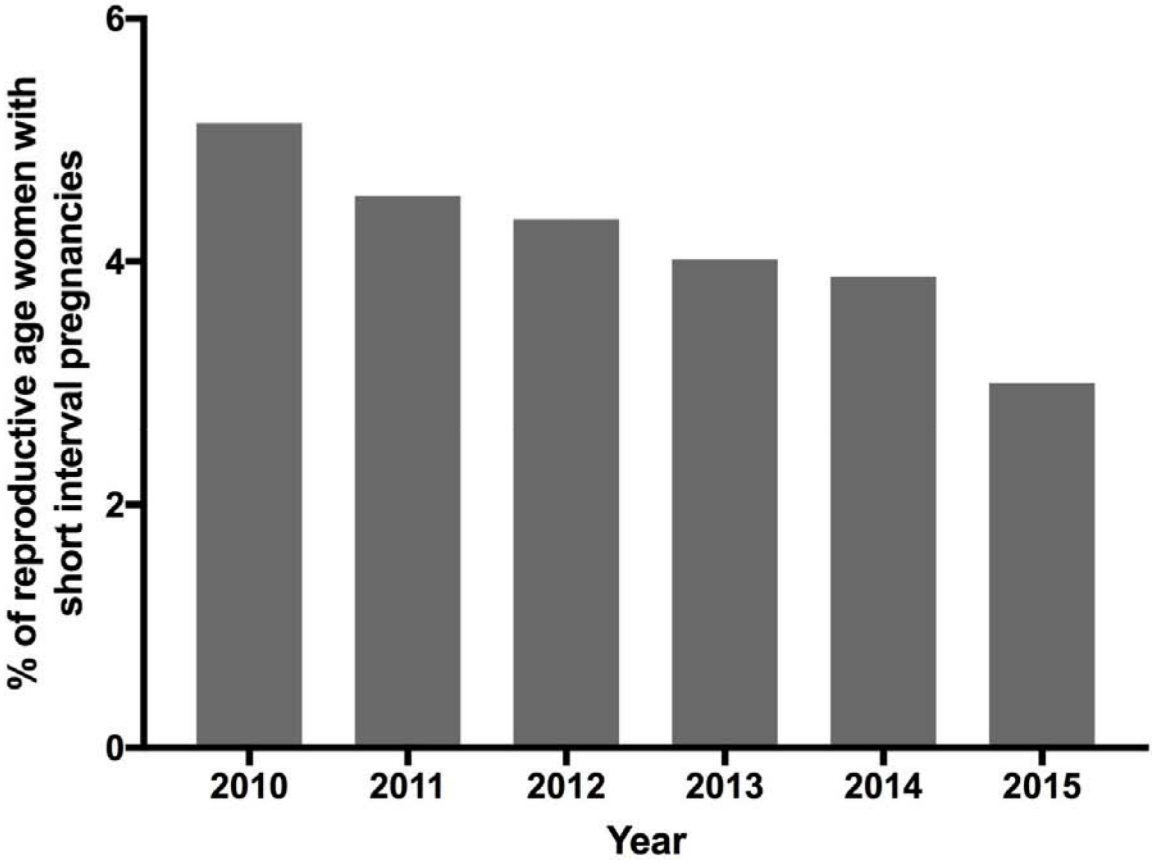

Figure 2:

The percent of short interval pregnancies among women with Medicaid over time. The figure is the number of women with a short interval pregnancy within that year compared to the total number of women ages 18 to 34 insured by Medicaid. Short interval pregnancy is defined as delivery-to-conception of less than 18 months.

Table 1:

Demographic and clinical characteristics of singleton births occurring to women insured by Medicaid in South Carolina between January 1, 2010 and July 31st, 2017.

	Total n (%)	Pre-policy n (%)	Post-policy n (%)
Total birth events	187,438	57,869	129,569
Number of women	145,973	55,574	108,430
Age[1]*	25.0 (5.4)	24.4 (5.4)	25.2 (5.4)
Multiparous*	115,344 (61.5)	34,396 (59.4)	80,948 (62.5)
Race/ethnicity*			
White	83,788 (44.7)	25,659 (44.3)	58,129 (44.9)
Hispanic	6,780 (3.6)	3,546 (6.1)	3,234 (2.5)
Black	86,869 (46.3)	26,771 (46.3)	60,098 (46.4)
Other	1,769 (0.9)	573 (1.0)	1,196 (0.9)
Unknown	8,232 (4.4)	1,320 (2.3)	6,912 (5.3)
County of residence[2]*			
Metro	149,089 (79.5)	45,913 (79.3)	103,176 (79.6)
Non-metropolitan	36,255 (19.3)	11,488 (19.9)	24,767 (19.1)
Medical complications of pregnancy			
Chronic hypertension*	5,586 (3.0)	1,641 (2.8)	3,945 (3.0)
Pre-pregnancy diabetes*	1,958 (1.0)	549 (0.9)	1,409 (1.1)
Hypertensive disorder of pregnancy*	12,354 (6.6)	3,057 (5.3)	9,297 (7.2)
Gestational diabetes*	10,072 (5.4)	2,727 (4.7)	7,345 (5.7)
Attended least 7 prenatal visits*	163,028 (87.0)	50,136 (86.6)	112,892 (87.1)
Delivery mode			
Vaginal delivery	124,451 (66.4)	38,462 (66.5)	85,989 (66.4)
Cesarean section	63,064 (33.6)	19,426 (33.6)	43,638 (33.7)
Gestational age[3]			
Term	166,991 (89.1)	51,533 (89.1)	115,458 (89.1)
Preterm	20,447 (10.9)	6,336 (10.9)	14,111 (10.9)
Attended postpartum visit	122,273 (65.2)	38,652 (66.8)	83,621 (64.5)

[1] Age is shown as mean (standard deviation).

[2] Metropolitan and non-metropolitan status was determined by 2013 USDA Rural-Urban Continuity Codes.

[3] Preterm refers to infants born between 23 and 36 weeks and 6 days. Term refers to all infants born after 37 weeks.

* Indicates p value < 0.05 for comparison between births occurring before and after the policy implementation.

Table 2:

Demographic and clinical factors associated with immediate postpartum and outpatient LARC utilization following the Medicaid policy change

	IPP LARC		PP LARC	
	aOR	**95% CI**	**aOR**	**95% CI**
Year post policy	1.39	(1.34, 1.43)	1.1	(1.09, 1.11)
Age				
<20 years old	1.83	(1.57, 2.15)	1.23	(1.17, 1.3)
20–24 years old	1.00	--	1.00	--
≥35 years old	0.60	(0.48, 0.77)	0.46	(0.42, 0.5)
Multiparous	1.42	(1.25, 1.61)	1.13	(1.09, 1.18)
Race				
White	1.00	--	1.00	--
Black	1.57	(1.41, 1.75)	0.92	(0.88, 0.95)
Hispanic	2.44	(1.90, 3.14)	1.28	(1.16, 1.41)
Other	1.35	(0.81, 2.23)	0.85	(0.71, 1.02)
Residence in nonmetropolitan county[1]	0.36	(0.30, 0.44)	0.73	(0.69, 0.76)
Inadequate prenatal care[2]	1.50	(1.31, 1.71)	0.73	(0.69, 0.77)
Medically complex pregnancy[3]	1.47	(1.29, 1.67)	1.13	(1.08, 1.19)
Preterm birth[4]	1.49	(1.29, 1.73)	1.06	(1, 1.13)
Cesarean	0.95	(0.85, 1.07)	0.88	(0.85, 0.91)

[1] Metropolitan and non-metropolitan status was determined by USDA Rural-Urban Continuity Codes.

[2] Defined as attendance at less than 7 prenatal visits

[3] Includes any pregnancy with chronic hypertension, pre-pregnancy diabetes, hypertensive disorders of pregnancy or gestational diabetes

[4] Preterm refers to infants born between 23 and 36 weeks and 6 days. Term refers to all infants born after 37 weeks.

LARC: long-acting reversible contraception; IPP: immediate postpartum; PP: postpartum; aOR: adjusted odds ratio; CI: confidence interval

Adjusted Odds Ratios presented; all model covariates shown.

Table 3:

The association between LARC and short interval pregnancy (<18 months) by timing of LARC utilization

	aOR	95% CI
IPP LARC	0.62	(0.44, 0.89)
PP LARC	0.31	(0.28, 0.33)
Age		
<20 years old	0.93	(0.89, 0.98)
20–34 years old	1.00	--
≥35 years old	1.24	(1.09, 1.41)
Multiparous	1.37	(1.32, 1.43)
Race		
White	1.00	--
Black	0.92	(0.88, 0.95)
Hispanic	0.64	(0.58, 0.70)
Other	1.10	(0.90, 1.34)
Residence in nonmetropolitan county[1]	0.98	(0.94, 1.02)
Inadequate prenatal care[2]	1.20	(1.13, 1.26)
Medically complex pregnancy[3]	1.01	(0.96, 1.07)
Preterm birth[4]	1.06	(1.00, 1.13)
Cesarean	0.91	(0.88, 0.95)

Observations missing birth route, race and maternal residence were excluded(< 5% missing).

[1] Metropolitan and non-metropolitan status was determined by USDA Rural-Urban Continuity Codes.

[2] Inadequate prenatal care defined as attendance at less than 7 visits

[3] Includes any pregnancy with chronic hypertension, pre-pregnancy diabetes, hypertensive disorders of pregnancy or gestational diabetes

[4] Preterm refers to infants born between 23 and 36 weeks and 6 days. Term refers to all infants born after 37 weeks.

LARC: long-acting reversible contraception; IPP: immediate postpartum; PP: postpartum; aOR: adjusted odds ratio; CI: confidence interval

Adjusted Odds Ratios presented; all model covariates shown.