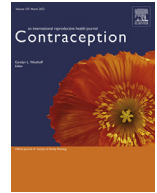




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## Original Research Article

## Association of the affordable care act Medicaid expansions with postpartum contraceptive use and early postpartum pregnancy ☆☆☆

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## ABSTRACT

**Objectives:** Before the Affordable Care Act (ACA), 55% of individuals giving birth with Medicaid lost insurance postpartum, potentially affecting their access to postpartum contraception. We evaluate the association of the ACA Medicaid expansions with postpartum contraceptive use and pregnancy at the time of the survey.

**Methods:** We used 2012–2019 Pregnancy Risk Assessment Monitoring System data to estimate difference-in-difference models for the association of Medicaid expansions with the use of postpartum contraception (mean: 4 months postpartum): any contraception, long-acting reversible contraception, or LARC (contraceptive implant and intrauterine device), short-acting (contraceptive pill, patch, and ring), permanent, or non-prescription methods (condoms, rhythm method, and withdrawal), and pregnancy at the time of the survey. We examine low-income respondents overall and stratified by race and ethnicity.

**Results:** We find that Medicaid expansion was associated with a 7.0 percentage point (95% CI: 3.0, 11.0) increase in postpartum LARC, a 3.1 percentage point (95% CI: -6.0, -0.2) decrease in short-acting contraception, and a 3.9 percentage point (95% CI: -6.2, -1.5) decrease in non-prescription contraceptive use overall. In stratified analyses, we find that increases in LARC use were concentrated among non-Hispanic White and Black respondents, with shifts in other postpartum contraceptives towards LARCs. Medicaid expansion was associated with a decrease in early postpartum pregnancy only among non-Hispanic Black respondents.

**Conclusions:** Medicaid expansions led to shifts from methods with a lower upfront out-of-pocket cost for people without insurance towards methods with the higher upfront out-of-pocket cost for people without insurance. These changes suggest that Medicaid expansion improved postpartum contraceptive access.

**Implications:** These findings indicate that postpartum uninsurance was a barrier to postpartum contraceptive access prior to Medicaid expansions under the Affordable Care Act. Medicaid expansions increased access to the full range of contraceptive methods.

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## 1. Introduction

After childbirth, most individuals giving birth would like to wait at least six months before becoming pregnant again [1]. Access to

the full range of medically safe postpartum contraceptive methods can help ensure that individuals can choose whether and when to become pregnant again. The American College of Obstetricians and Gynecologists recommends avoiding interpregnancy intervals shorter than 6 months because of the increased risk of adverse outcomes [2,3]. However, numerous barriers to accessing postpartum contraception exist, including out-of-pocket costs and lack of insurance coverage [4,5].

For low-income individuals with Medicaid, postpartum insurance coverage gaps caused by the loss of pregnancy-related Medicaid after 60 days postpartum may be a barrier to postpartum contraceptive use [6]. Between 2005 and 2013, 55% of individuals with Medicaid at delivery experienced uninsurance in the 6 months after childbirth [7]. In 2013, the year before the major coverage expansions under the Affordable Care Act (ACA), average

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Medicaid income eligibility for pregnant people was 185% of the federal poverty level (FPL) [8]. However, to maintain Medicaid after 60 days postpartum, parents needed to meet more restrictive eligibility limits (on average 61% of the FPL in 2013) [8]. In addition, some states offered (and continue to offer) coverage for contraception through Medicaid Family Planning Waivers, with income eligibility limits similar to pregnancy Medicaid eligibility [9]. To access contraceptive methods that require a health professional, low-income people who lose Medicaid eligibility after childbirth must transition to private coverage, coverage through a family planning waiver, or pay out-of-pocket for care.

Medicaid expansions under the ACA increased income eligibility for Medicaid coverage under the adult and parental eligibility pathways to 138% of the FPL. Increases in Medicaid eligibility under the ACA were associated with reductions in uninsurance among low-income individuals with a recent birth by 28% [10].

While postpartum contraception is a recommended component of the comprehensive postpartum visit, which typically takes place at 6-week after childbirth [3] many individuals miss their visit [11]. Increased postpartum coverage could have given individuals additional time to access contraception using Medicaid. Consistent with this hypothesis, previous research has shown that ACA Medicaid expansions were associated with increases in overall use of effective forms of postpartum contraception (such as sterilization or an implant, intrauterine device, injectable, pill, patch, or vaginal ring) [12]. Improvements in coverage past 60 days postpartum may have had a particularly large effect on methods that require more than one visit and on methods that require high upfront costs for people without insurance (e.g., IUDs and implants). However, it is not known whether Medicaid expansions affected the types of postpartum contraceptives used.

Previous research has shown that the ACA Medicaid expansions were associated with decreases in unintended pregnancies [13], with mixed findings on the association with short interpregnancy intervals of less than 12 months [14,15]. However, it is not known whether the expansion was associated with a change in short interpregnancy intervals of less than six months, which are associated with the greatest risks of adverse perinatal outcomes [2]. Further, despite higher rates of short interpregnancy intervals and unintended pregnancies among Black compared to White individuals [16–18], no studies have examined whether Medicaid expansion had different effects on this higher-risk birth spacing by race and ethnicity. Thus, the objective of this study was to evaluate the association of the ACA Medicaid expansions with changes in early postpartum pregnancy and postpartum contraceptive use by contraceptive method, as well as explore if these associations varied by race and ethnicity.

## 2. Material and methods

### 2.1. Data and sample

We used 2012–2019 data from the Pregnancy Risk Assessment Monitoring System (PRAMS), a multi-state survey on experiences before, during, and after childbirth [19]. Participating states draw monthly stratified samples from the state birth certificate files, with surveys conducted on average 4 months postpartum in English, Spanish, or Chinese. Samples are stratified by characteristics of public health interest (e.g., race/ethnicity, infant birth weight). Data collection occurs throughout the survey year. Sample weights are used to adjust for non-response and sample stratification so that the final sample is representative of state births [19].

While almost all states participate in PRAMS, state data is not available if respondents did not meet minimum response rate thresholds (50% 2018–2019, 55% 2015–2017, 60% 2012–2014). So that differences in the composition of states in the study were

not driving any difference in outcomes over time, we limited our analyses to states that met the minimum response thresholds and were thus consistently in PRAMS throughout 2012–2019. In addition, we excluded states that expanded Medicaid between 2015–2019 (Pennsylvania, Alaska, and Maine) because results from difference-in-differences designs with staggered policy start dates can result in biased estimates [20]. Our final sample consisted of eight expansion sites (Delaware, Illinois, Massachusetts, New Jersey, New Mexico, New York City, Vermont, and Washington) and three non-expansion sites (Missouri, Utah, Wyoming) (Appendix A1).

We limited the sample to respondents with incomes at or below 138% of the FPL, who would be eligible for expanded Medicaid eligibility under the ACA. We calculated FPL based on household size and income, using the midpoint of the categorical income variable. Of the 9 expansion sites included, four had relatively generous Medicaid eligibility policies in place prior to the 2014 Medicaid expansions (Delaware, Massachusetts, New York, and Vermont) [21]. The remaining 5 expansion states and 3 non-expansion states had no full-benefit Medicaid eligibility for non-disabled childless adults prior to Medicaid expansion [22]. We restricted the sample to respondents aged 18 or older because persons under 19 years of age are eligible for publicly funded insurance through Medicaid or the Children's Health Insurance Program at higher income levels. As PRAMS does not ask about gender identity, we refer to this population as respondents or individuals rather than women to encompass the range of gender identities present among pregnant and postpartum people. This study was considered to be not human subjects research by the Brown University Institutional Review Board.

### 2.2. Outcomes

Our primary outcomes of interest were pregnancy at the time of the postpartum survey (mean: 4 months postpartum, interquartile range: 3 to 5 months postpartum), which we refer to as early postpartum pregnancy, and postpartum contraception use, categorized as any postpartum contraception, long-acting reversible contraceptive methods (a contraceptive implant or an IUD), short-acting contraceptive methods (birth control pills, a contraceptive patch/ring, or the contraceptive injectable), permanent contraceptive methods (sterilization), or non-prescription contraception (condoms, the rhythm method, or the withdrawal method alone without any combined use of a prescription method). All outcomes were self-reported and measured at the time of the postpartum survey.

### 2.3. Study design

We used a difference-in-difference research design to estimate the association of the ACA Medicaid expansions with postpartum contraceptive use and early postpartum pregnancy. Under this approach, we compared the change in outcomes in expansion states with concurrent changes in non-expansion states. By comparing changes in expansion and non-expansion states, this approach controls for changes affecting both expansion and non-expansion states over time that are not due to Medicaid expansion.

### 2.4. Statistical analysis

We estimated linear probability models for each outcome with an interaction term between an indicator for states that adopted Medicaid expansion and an indicator for whether the year was after policy implementation as well as state and year fixed effects. All models included covariates for respondent age group (18–24, 25–29, 30–34, 35–39, 40+), educational attainment (high school or

less, more than high school), marital status (married, not married), race and ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, Asian or Pacific Islander, Indigenous, Other), survey language (English, Spanish or Chinese), number of previous live births (0–3 or more), and number of months postpartum at survey period. Models also included controls for state-year Medicaid family planning waivers or amendments and changes in Medicaid reimbursement for immediate postpartum LARCs, as these can affect access to contraceptive services among the low-income population. Of the included states, 3 expansion states (New Mexico, New York, and Washington) and one non-expansion state (Wyoming) had Medicaid family planning waivers or amendments in place prior to the 2014 Medicaid expansions [23]. We created missing categories for all covariates with missing data. All analyses used PRAMS-provided survey weights. Standard errors were clustered by state, the level of policy adoption. Clustering standard errors account for correlation of the error terms, in this case by state, as policy implementation varied at the state level.

Because of racial and ethnic differences in short interpregnancy intervals and unintended pregnancies prior to the ACA Medicaid expansions [16–18], we conducted stratified subgroup analyses by race and ethnicity for non-Hispanic White, non-Hispanic Black, and Hispanic respondents as an exploratory analysis. Stratified results are considered exploratory due to sizeable but not significantly different pre-period trends for racial and ethnic subgroups in tests for parallel pre-trends, described below. We could not examine further racial or ethnic subgroups due to small sample sizes.

### 2.5. Additional analyses

The primary assumption for difference-in-difference analysis is that trends in the treatment and control groups were parallel before the policy and would have remained parallel after the policy change (commonly referred to as the ‘parallel trends assumption’). While the post-policy counterfactual cannot be tested statistically, it is common to test whether trends in the treatment and comparison groups were parallel before the policy change. A finding of parallel pre-trends provides reassurance that the trends in the study outcomes were not diverging before the policy change, which could result in a biased difference-in-difference result. Therefore, we examined unadjusted trends in outcomes, tested for differences in pre-policy linear trends between expansion and non-expansion states, and estimated event study models (Appendix A2–A4).

In addition, we conducted a sensitivity analysis using wild cluster bootstrap standard errors, as this method of estimating standard errors can help account for analyses with a smaller number of clusters (Appendix A5) [24]. We also examined disaggregated contraceptive outcomes for LARCs to explore any differences for contraceptive implants or IUDs (Appendix A6). As some postpartum individuals may be relying on lactational amenorrhea to prevent pregnancy, we additionally examined the association between Medicaid expansion and 2 breastfeeding outcomes: breastfeeding duration and whether a respondent is still breastfeeding at the time of the survey (Appendix A7). Finally, as some postpartum individuals may not need contraceptive services – those who are infertile or whose partners have had a vasectomy – we conducted a sensitivity analysis that limited the sample to exclude individuals who used infertility services, as a proxy for fertility status, and to exclude individuals whose partners have had a vasectomy (Appendix A8).

## 3. Results

The study included a total of 34,598 PRAMS respondents, representing a weighted sample of 1,669,619 low-income postpartum

individuals. Of these 34,598 PRAMS respondents, 25,781 resided in expansion states (weighted: 1,325,426) and 8,817 in non-expansion states (weighted: 344,193). Table 1 presents the demographic characteristics of respondents by Medicaid expansion status for the pre-policy and post-policy periods. Prior to policy implementation, approximately 50% of respondents in non-expansion states were between ages 18–24 compared to 36.1% in expansion states. Respondents in non-expansion states were more likely to be non-Hispanic white (65.6%) and less likely to be Hispanic (12.8%) than respondents in expansion states (31.2% non-Hispanic white and 36.1% Hispanic). Respondents residing in non-expansion states had higher rates of educational attainment beyond high school (42.8%) compared to in expansion states (37.9%). Finally, a higher proportion of respondents completed the survey in English in non-expansion states (94.6%) compared to in expansion states (75.3%). Compared to the pre-policy period, we do not find evidence of substantial changes in demographics in the study population between expansion and non-expansion states after expansion implementation.

Table 2 displays the difference-in-difference estimates for changes in pregnancy status and postpartum contraceptive use associated with the ACA Medicaid expansions. In the study population overall, Medicaid expansion was not associated with a change in early postpartum pregnancy. However, Medicaid expansion was associated with a 3.6 percentage point increase in use of any postpartum contraception (95% CI: 0.3, 6.9), driven by a 7.0 percentage point (95% CI: 3.0, 11.0) increase in the proportion of respondents who used LARCs, a 3.1 percentage point (95% CI: -6.0, -0.2) decrease in short-acting contraception, and a 3.9 percentage point (95% CI: -6.2, -1.5) decrease in non-prescription contraception. We find no evidence of changes in postpartum use of permanent contraception associated with Medicaid expansion.

Use of wild cluster bootstrap standard errors, instead of clustered standard errors by state, resulted in similar estimated confidence intervals, with a significant change in confidence intervals only for the association of Medicaid expansion with short-acting contraception (Appendix A5). We find that increases in postpartum LARC use overall were driven by increases in both contraceptive implants by 3.0 percentage points (95% CI: 1.0, 5.1) as well as increases in IUDs by 3.0 percentage points (95% CI: 0.6, 5.5) (Appendix A6). We find no evidence of changes in breastfeeding duration or breastfeeding at the time of the postpartum survey, suggesting that Medicaid expansion was not associated with a change in lactational amenorrhea to prevent pregnancy (Appendix A7). Additionally, results were consistent in magnitude and significance when excluding individuals who had used infertility services or whose partners have had a vasectomy (Appendix A8).

In analyses stratified by race and ethnicity, Medicaid expansion was associated with a 6.2 percentage point (95% CI: 3.5, 8.9) increase in postpartum LARC use and a 5.7 percentage point (95% CI: -10.2, -1.2) decrease in the use of non-prescription contraception alone among non-Hispanic White respondents (Table 3). Among non-Hispanic Black respondents, Medicaid expansion was associated with an overall increase in any postpartum contraceptive use by 6.9 percentage points (95% CI: 2.5, 11.4), a 10.4 percentage point (95% CI: 1.7, 19.1) increase in postpartum LARC use, as well as an 8.2 percentage point (95% CI: -13.1, -3.4) and 5.0 percentage point (95% CI: -8.6, -1.4) decrease in short-acting contraception and permanent contraception respectively. In addition, Medicaid expansion was associated with a 4.8 percentage point decline (95% CI: -8.7, -0.9) in early postpartum pregnancy among non-Hispanic Black respondents. Finally, we find no evidence of changes in early postpartum pregnancy or postpartum contraceptive use among Hispanic respondents.

**Table 1**  
Demographic characteristics by state Medicaid Expansion status, PRAMS 2012–2019

Characteristics	Non-expansion states		Expansion states		Differential change, (95% CI)
	Pre-policy (n = 2,390)	Post-policy (n = 6,427)	Pre-policy (n = 6,945)	Post-policy (n = 18,836)	
<b>Maternal Age</b>					
18–24	49.6 (46.8, 52.4)	43.2 (41.5, 44.9)	36.1 (34.4, 37.8)	30.5 (29.6, 31.4)	0.8 (-3.0, 4.6)
25–29	28.9 (26.5, 31.5)	30.1 (28.6, 31.7)	30.7 (29.1, 32.4)	30.8 (29.9, 31.7)	-1.1 (-4.6, 2.4)
30–34	14.3 (12.5, 16.3)	18.4 (17.2, 19.7)	20.6 (19.3, 22.0)	22.7 (21.9, 23.6)	-2.0 (-4.7, 0.8)
35–39	5.6 (4.5, 6.9)	6.8 (6.1, 7.6)	10.0 (9.0, 11.1)	12.6 (12.0, 13.3)	1.4 (-0.5, 3.3)
40+	1.6 (1.1, 2.3)	1.5 (1.2, 1.9)	2.5 (2.1, 3.1)	3.3 (3.0, 3.7)	0.8 (-0.1, 1.8)
<b>Educational Attainment</b>					
High School or Less	56.1 (53.3, 58.8)	57.6 (55.9, 59.2)	61.2 (59.4, 62.9)	59.9 (59.0, 60.9)	-2.7 (-6.5, 1.1)
More than High School	42.8 (40.0, 45.5)	41.2 (39.6, 42.9)	37.9 (36.2, 39.6)	38.8 (37.9, 39.8)	2.5 (-1.2, 6.3)
<b>Marital Status</b>					
Married	45.6 (42.9, 48.3)	43.7 (42.1, 45.4)	40.4 (38.7, 42.1)	40.0 (39.1, 41.0)	1.5 (-2.2, 5.3)
Not Married	54.3 (51.5, 57.0)	56.1 (54.5, 57.8)	59.5 (57.8, 61.2)	59.9 (58.9, 60.9)	-1.5 (-5.2, 2.3)
<b>Race and Ethnicity</b>					
Non-Hispanic White	65.5 (62.8, 68.2)	62.9 (61.2, 64.5)	31.2 (29.5, 32.9)	31.5 (30.6, 32.5)	3.0 (-0.7, 6.7)
Non-Hispanic Black	14.7 (12.6, 17.2)	15.1 (13.8, 16.5)	18.4 (17.0, 19.9)	18.2 (17.4, 18.9)	-0.6 (-3.7, 2.5)
Hispanic	12.8 (11.3, 14.5)	13.3 (12.3, 14.4)	36.1 (34.4, 37.8)	35.8 (34.9, 36.7)	-0.8 (-3.5, 1.9)
Asian or Pacific Islander	1.5 (1.0, 2.2)	2.1 (1.7, 2.6)	8.0 (7.2, 8.9)	7.3 (6.9, 7.8)	-1.3* (-2.5, -0.0)
Indigenous	0.8 (0.5, 1.3)	0.7 (0.5, 0.9)	1.8 (1.5, 2.0)	1.6 (1.5, 1.8)	0.0 (-0.5, 0.5)
Other	3.8 (2.9, 5.0)	4.4 (3.7, 5.2)	2.3 (1.8, 2.8)	2.8 (2.5, 3.2)	-0.0 (-1.4, 1.4)
<b>Survey Language</b>					
English	94.6 (93.9, 95.3)	96.2 (95.7, 96.6)	75.3 (73.7, 76.7)	77.0 (76.2, 77.8)	0.2 (-1.7, 2.1)
Spanish or Chinese	5.4 (4.7, 6.1)	3.8 (3.4, 4.3)	24.7 (23.3, 26.3)	23.0 (22.2, 23.8)	-0.2 (-2.1, 1.7)
<b>Number of Previous Live Births</b>					
None	32.5 (29.9, 35.2)	29.8 (28.3, 31.4)	32.0 (30.5, 33.7)	28.4 (27.5, 29.3)	-1.0 (-4.5, 2.6)
1	28.4 (25.9, 30.9)	28.7 (27.2, 30.3)	31.2 (29.6, 32.9)	31.2 (30.3, 32.1)	-0.4 (-3.9, 3.1)
2	19.0 (17.0, 21.3)	20.5 (19.2, 21.9)	18.6 (17.2, 20.0)	20.9 (20.1, 21.7)	0.8 (-2.2, 3.8)
3 or More	19.3 (17.2, 21.5)	20.9 (19.6, 22.3)	17.5 (16.2, 18.9)	19.2 (18.5, 20.0)	0.2 (-2.8, 3.1)

Notes: Authors' analysis of 2012–2019 Pregnancy Risk Assessment Monitoring System (PRAMS) data of postpartum individuals (mean: 4 months postpartum) from Delaware, Illinois, Massachusetts, Missouri, New Jersey, New Mexico, New York City, Utah, Vermont, Washington, and Wyoming. Data are weighted using PRAMS survey weights. Estimates are presented as percentage points.

Ns presented are unweighted totals of PRAMS respondents. The pre-policy columns represent the average characteristics of 2012–2013 prior to Medicaid expansion. The post-policy columns represent the average characteristics of 2014–2019 after Medicaid expansion.

#### 4. Discussion

In this multistate analysis of the association of the ACA Medicaid expansions with early postpartum pregnancy and postpartum contraception, we found that Medicaid expansion was associated with changes in the types of postpartum contraception used, towards LARCs and away from short-acting and non-prescription methods.

Our results are consistent with research that finds that Medicaid expansion was associated with increased use of effective postpartum contraception overall [12]. Importantly, our study differentiates between the types of postpartum contraceptive methods used, expanding beyond effective contraceptive methods overall

towards a nuanced understanding of shifting use as a result of Medicaid expansions. We observe a transition from short-acting and non-prescription contraceptive methods postpartum towards LARCs, which could ultimately have an impact on birth spacing. In addition, our findings of decreased early postpartum pregnancies associated with Medicaid expansion only among Black respondents contributes to a literature that is mixed regarding the association between Medicaid expansion and short interpregnancy intervals [14,15].

For persons with Medicaid, all contraceptive methods are generally available without any out-of-pocket costs (i.e., without a copay, coinsurance, or deductible payment). For uninsured people, upfront costs for contraception vary considerably by method, with

**Table 2**  
Changes in early postpartum pregnancy and postpartum contraceptive use associated with Medicaid expansions, PRAMS 2012–2019

	Non-expansion states		Expansion states		Difference in Difference, (95% CI)
	Pre-policy (n = 2,390)	Post-policy (n = 6,427)	Pre-policy (n = 6,945)	Post-policy (n = 18,836)	
Outcome	Percent	Percent	Percent	Percent	
Early postpartum pregnancy	1.6 (0.6, 4.0)	2.8 (1.9, 4.3)	2.7 (1.8, 4.0)	3.1 (2.5, 3.9)	-0.0 (-2.4, 2.4)
<i>Postpartum Contraceptive Use:</i>					
Any Postpartum Contraception	84.9 (82.8, 86.7)	80.1 (78.7, 81.5)	77.3 (75.8, 78.8)	77.2 (76.4, 78.1)	3.6* (0.3, 6.9)
Long-Acting Contraception	27.9 (25.3, 30.7)	25.5 (24.0, 27.2)	21.8 (20.2, 23.5)	24.5 (23.6, 25.5)	7.0** (3.0, 11.0)
Short-Acting Contraception	32.3 (29.5, 35.2)	32.7 (30.9, 34.5)	34.4 (32.5, 36.3)	31.7 (30.6, 32.7)	-3.1* (-6.0, -0.2)
Permanent Contraception	12.1 (10.3, 14.3)	13.7 (12.4, 15.0)	10.0 (8.9, 11.2)	11.6 (10.9, 12.3)	-0.6 (-2.4, 1.2)
Non-Prescription Contraceptive Use Only	23.8 (21.3, 26.5)	25.0 (23.4, 26.7)	29.2 (27.4, 31.1)	28.0 (27.0, 29.1)	-3.9** (-6.2, -1.5)

Notes: Authors’ analysis of 2012–2019 Pregnancy Risk Assessment Monitoring System (PRAMS) data of postpartum individuals (mean: 4 months postpartum) from Delaware, Illinois, Massachusetts, Missouri, New Jersey, New Mexico, New York City, Utah, Vermont, Washington, and Wyoming.

Data are weighted using PRAMS survey weights.

Ns presented are unweighted totals of PRAMS respondents. Early postpartum pregnancy defined as pregnant at the time of the postpartum survey (mean: 4 months postpartum, interquartile range: 3–5 months postpartum). The pre-policy columns represent the average of outcomes 2012–2013 prior to Medicaid expansion. The post-policy columns represent the average of outcomes 2014–2019 after Medicaid expansion. Difference-in-difference model adjusted for age, educational attainment, marital status, race and ethnicity, language of survey completion, number of previous live births, number of months postpartum at survey period, state Medicaid family planning waiver, and state and year fixed effects. Standard errors clustered by state. Estimates are presented as percentage points. CI is the confidence interval.

\* p < 0.05

\*\* p < 0.01

**Table 3**

Changes in early postpartum pregnancy and postpartum contraceptive use associated with Medicaid expansions, Stratified by race and ethnicity, PRAMS 2012–2019

	Non-Hispanic White (n = 12,212)	Non-Hispanic Black (n = 5,877)	Hispanic (n = 9,156)
Outcome	Difference in Difference, (95% CI)	Difference in Difference, (95% CI)	Difference in Difference, (95% CI)
Early Postpartum Pregnancy	1.6 (1.9, 5.1)	-4.8* (-8.7, -0.9)	0.5 (-2.1, 3.0)
<i>Postpartum Contraceptive Use:</i>			
Any Postpartum Contraception	4.1 (-0.1, 8.4)	6.9** (2.5, 11.4)	0.3 (-4.6, 5.2)
Long-Acting Contraception	6.2** (3.5, 8.9)	10.4* (1.7, 19.1)	2.2 (-5.0, 9.5)
Short-Acting Contraception	-3.5 (-9.4, 2.4)	-8.2** (-13.1, -3.4)	0.6 (-4.0, 5.3)
Permanent Contraception	0.5 (-3.2, 4.1)	-5.0* (-8.6, -1.4)	2.0 (-2.9, 6.8)
Non-Prescription Contraceptive Use Only	-5.7* (-10.2, -1.2)	1.2 (-5.0, 7.4)	2.2 (-1.5, 5.8)

Notes: Authors’ analysis of 2012–2019 Pregnancy Risk Assessment Monitoring System (PRAMS) data of postpartum individuals (mean: 4 months postpartum) from Delaware, Illinois, Massachusetts, Missouri, New Jersey, New Mexico, New York City, Utah, Vermont, Washington, and Wyoming.

Data are weighted using PRAMS survey weights.

Ns presented are unweighted totals of PRAMS respondents. Early postpartum pregnancy is defined as pregnant at the time of the postpartum survey (mean: 4 months postpartum, interquartile range: 3–5 months postpartum). Difference-in-difference model adjusted for age, educational attainment, marital status, race and ethnicity, language of survey completion, number of previous live births, number of months postpartum at survey period, state Medicaid family planning waiver, and state and year fixed effects. Standard errors clustered by state. Estimates are presented as percentage points. CI is the confidence interval.

\* p < 0.05

\*\* p < 0.01

the highest upfront prices for LARCs (e.g., \$1000 dollars for long-acting reversible contraception), and lower prices for shorter-acting methods (e.g., approximately \$30–50 dollars for a 1-month supply of the most population brands of oral contraception) [25]. In practice, though many uninsured people seek care at safety net providers such as Planned Parenthood [26], which offer care at a sliding scale based on income, the relative price differences remain the same under a sliding fee scale. We find that for uninsured persons, Medicaid expansions led to shifts from methods with lower

upfront out-of-pocket costs (short-acting methods) towards methods with higher upfront out-of-pocket costs (LARCs). These findings suggest that the out-of-pocket costs for contraception among the uninsured were a barrier to preferred method choice before Medicaid expansion and that increased coverage increased postpartum people’s ability to use the method of their choice.

Increasing access to a range of postpartum contraceptive options, including methods with high out-of-pocket costs for people without insurance, can contribute to contraceptive autonomy de-

defined as an informed choice, free choice, and full choice of methods [27]. Medicaid expansion may have increased access to all contraceptive methods, thereby improving reproductive autonomy and allowing postpartum individuals to select the method that is best for them. However, although Medicaid expansion improved access to the full choice of methods, Medicaid expansion does not directly address the other 2 components of contraceptive autonomy (i.e., informed choice and free choice) [27]. Therefore, additional policy and advocacy efforts are needed to ensure that other aspects of contraceptive autonomy are in place.

Medicaid expansion in remaining non-expansion states would likely result in similar gains to contraceptive choice for low-income residents. In addition to Medicaid expansion, non-expansion states could consider extending pregnancy-related Medicaid for up to 1 year after childbirth, which is an option for states under the American Rescue Plan Act, passed in March 2021, and mandatory for states under the Build Back Better Act, which passed in the house in November 2021 [28].

This study has several limitations. First, due to the availability of postpartum contraceptive variables in PRAMS, this study is limited to 2012–2019. The two years of pre-policy data for the outcomes limits our ability to detect diverging trends in the pre-policy period between expansion and non-expansion states that could bias the difference-in-difference models. However, using 2012 as the first pre-policy year is consistent with other studies that have examined the ACA Medicaid expansions using postpartum measures in PRAMS [12]. Second, we did not detect statistically significant differential linear pre-trends by Medicaid expansion status among racial and ethnic subgroups, however, the estimated coefficients suggest some divergence in pre-trends. Third, not all states participate in PRAMS and not all participating states have available data for each year. For this reason, our analyses are limited to only 3 non-expansion sites and eight Medicaid expansion sites, and therefore results may not be generalizable to all expansion states. Fourth, PRAMS do not include lactational amenorrhea as a response option for postpartum contraception, however, our results for the 2 breastfeeding outcomes suggest that Medicaid expansion did not change the use of lactational amenorrhea as a contraceptive method. Finally, pregnancy is measured only at the time of the postpartum survey, which does not capture all short-interval pregnancies. Early postpartum pregnancies are rare and are likely underreported due to social desirability bias or in cases where the pregnancy has not yet been recognized. However, this measure of early postpartum pregnancies captures pregnancies that are very likely to be unintended and are most associated with adverse maternal and infant health outcomes [29,30].

Our findings suggest that postpartum uninsurance among persons with Medicaid during pregnancy was a barrier to postpartum contraceptive access and that continuous coverage increased contraceptive method choice. Increasing postpartum contraceptive access is an important step in decreasing unintended pregnancies and improving reproductive control over family planning and birth spacing.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.contraception.2022.02.012.

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