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The Effect of the Affordable Care Act Dependent Coverage Provision on Black–White Disparities on Pregnancy-Related Outcomes

Improving population health and reducing health disparities are complementary policy goals. However, policies targeted at improving overall outcomes that do not also aim to promote equity may have unintended adverse consequences for socially at-risk groups. If benefits of a policy accrue primarily to advantaged groups, improvements in the overall population may also unintentionally widen disparities. The dependent coverage provision of the Affordable Care Act (ACA), which allows young adults to remain on their parents' health insurance plan through age 25 (until their 26th birthday) beginning September 2010, raises such equity concerns.

Evidence has shown that the dependent coverage provision increased health insurance coverage and health outcomes among young adults, who are the age group most likely to be uninsured (Akosa Antwi et al., 2013; Berchick et al., 2019; Breslau et al, 2018; DeNavas-Walt et al., 2010; Mulcahy et al., 2013; Sommers and Kronick, 2012; Sommers et al., 2013; Wallace and Sommers, 2015). However, because improved access to coverage accrues to those whose parents have private health insurance coverage and because rates of private insurance coverage are persistently lower among Blacks than whites (Berchick et al., 2019; DeNavas-Walt et al., 2010), white young adults might be more likely to benefit from the policy than Black young adults. This is worrisome because it implies that the ACA dependent coverage provision may unintentionally widen existing racial disparities in health. Evidence on the policy's effects on racial and ethnic disparities in insurance coverage is mixed and evidence of impacts on disparities in health outcomes is sparse (Breslau et al, 2018; O'Hara and Brault, 2013).

This study investigates the effect of the dependent coverage provision on Black–white disparities on pregnancy-related outcomes. Examining differential effects of the dependent

coverage provision on pregnancy-related outcomes by race is critical, because substantial racial disparities in pregnancy care and birth outcomes exist. Black women are less likely to receive timely prenatal care compared with white women and black infants have significantly worse birth outcomes than white infants (Lu and Halfon, 2003; Lu et al., 2010; Martin et al., 2019). I hypothesize that the dependent coverage provision would widen existing racial and ethnic disparities in pregnancy-related outcomes.

This paper replicates and extends the 2018 study "Association of the Affordable Care Act dependent coverage provision with prenatal care use and birth outcomes" by Jamie Daw and Benjamin Sommers, published in the *Journal of the American Medical Association (JAMA)*. I replicate the study's primary analysis, which examines the policy's impact on health insurance coverage, access to care, and birth outcomes. The authors use a difference-in-differences (DiD) identification strategy to estimate the causal impact of the dependent coverage provision on pregnancy-related outcomes. By holding constant changes over time and differences between women eligible to gain parental coverage and women who are not, a DiD strategy allows the authors to isolate the unique effect of the dependent coverage provision. The original paper finds that the policy significantly increased private insurance coverage for deliveries and reduced Medicaid and self-pay. The article also reports a significant increase in prenatal care use (as a measure of access to care) and a significant decline in preterm birth.

Daw and Sommers (2018) also estimate the effect of the dependent coverage provision on pregnancy-related outcomes stratified by marital status to determine the policy's effect on unmarried women compared with married women. They show that unmarried women, who do not have access to insurance coverage through their spouses, are more likely to gain parental coverage under the policy than married women. I do not replicate these analyses. Instead, I

extend their paper by examining whether and to what extent the dependent coverage provision influenced Black–white disparities in pregnancy-related outcomes. Because marital rates differ substantially between Black and white young women, marriage may confound the effect of the policy in analyses stratified by race. For this reason, I restrict this analysis to unmarried women. I first conduct DiD analyses stratified by Black and white race. Then, I apply a triple difference estimator where the third difference is Black or white race. This allows me to examine the extent to which the dependent coverage provision caused changes in health insurance coverage, prenatal care, and birth outcomes among Black mothers compared with white mothers.

In DiD models adjusted for month of delivery, unemployment, and patient characteristics, the dependent coverage provision significantly increased private insurance coverage and reduced Medicaid among both unmarried Black and White women. The magnitude of these changes was larger for white women than Black women. However, after adding the triple difference estimator, these differences were not significant. In addition, the policy significantly increased early prenatal care among unmarried white women and significantly decreased cesarean delivery, preterm birth, and low birth weight among unmarried Black women. Again, in the adjusted difference-in-difference-in-difference (DiDiD) model, no outcomes were significantly different among Black women compared to white women.

Methods

Study design

The original paper applies a retrospective cohort study design using a DiD identification strategy to examine the impact of the dependent coverage provision on health insurance coverage, access to care, and birth outcomes. I replicate this analysis and extend the study by using a DiDiD estimator to examine the policy's impact on racial disparities, where the third

difference is Black or white race. The study period is 2009 to 2013, where 2009 is the pre-policy period and 2011 to 2013 is the post-policy period. Daw and Sommers (2018) begin their study in 2009 when natality data first reported payment source for births. They end their study period before the ACA's Medicaid and individual marketplace expansions went into effect in 2014, because this would influence access to health insurance for all adults and confound the treatment effect. As in the original study, I exclude 2010 as a "washout" period during which the policy was implemented (Daw and Sommers, 2018).

Data and study population

The sample comprises births among women aged 24-25 (treatment) and women aged 27-28 (comparison). Individual-level data on births come from the Centers and Disease Control and Prevention National Center for Health Statistics Vital Statistics public-use natality files, which capture census data from U.S. birth certificates (NBER, 2018). As in the original study, I restrict the sample to states that use the 2003 revised U.S. Certificate of Live Births. Of note, the number of states increased from 28 states in 2009 to 40 states and the District of Columbia in 2013 (see Appendix A). Although NCHS reports which states use the revision each year, the dataset does not identify individual states and therefore does not permit analyses by year added to the sample.

Treatment

The treatment is exposure to the dependent coverage provision. Notably, census data does not permit observation of which individuals gain private insurance coverage through their parents as a result of the law. Rather, the treatment group comprises women who may be eligible for parental coverage (i.e., all women aged 19 to 25). Among eligible women, the authors of the original study include only women aged 24 to 25 (Daw and Sommers, 2018). For the comparison group, they include only women aged 27 and 28.

Making causal inferences using a DiD strategy relies on the key assumption that the comparison group provides an appropriate counterfactual for the treatment group in the absence of the policy (the parallel trends assumption). When Daw and Sommers (2018) examined monthly trends in outcomes before 2010 to test this assumption, using wider age groups violated the assumption, whereas the narrower age band did not. Thus, use of the treatment and comparison groups using narrower age bands permits causal inferences.[1]

Outcomes

Outcomes assessed include payment source for delivery, prenatal care, and birth outcomes. Payment sources are private insurance, Medicaid, or self-pay. The payment source indicator in the original dataset does not include a category for uninsured. As such, self-pay captures the uninsured and underinsured (or, those with some insurance coverage but for whom pregnancy was not a covered benefit). Early prenatal care refers to receipt of prenatal care beginning in the first trimester (before month 4). Following the original paper, I define adequate prenatal care using Kotelchuck's Adequacy of Prenatal Care Utilization (APNCU) Index (1994). This index comprises two criteria: (1) prenatal care begun by the fourth month and (2) receiving 80 percent of more of the recommended number of visits, adjusted for gestational age (see Appendix B). Birth outcomes include cesarean delivery, preterm birth (before gestational week 37), low birth weight (less than 2,500 grams or 5.5 pounds), and NICU admission.

[1] Daw and Sommers provide results of these tests in an online-only supplement; I do not replicate these tests. However, I test for trends in the stratified analyses and find slightly significant trends on self-payment and NICU admission among unmarried Black women for the DiD estimation and no significant trends for the DiDiD estimation (analyses not presented). Inclusion of a linear time variable beginning in January 2019 in all adjusted models may help account for these slight trends. ACA Medicaid and individual marketplace expansions beginning in 2014 confound trends after the post-policy period and thus do not permit testing for trends after the post-policy period.

Covariates

Multivariable models adjust for month of delivery; maternal age, marital status, Hispanic ethnicity, race (white, Black, or other), education (less than high school, high school, or any postsecondary), first live birth (first child born alive to the mother), multiple delivery (indicator for twin or higher multiple or not); and paternal age. Because people gain insurance coverage through employment, models also adjust for the age-, sex-, and seasonally adjusted monthly unemployment rate. Data for the unemployment rate come from the Bureau of Labor Statistics (BLS, 2010, 2012, 2013, 2014). The original paper does not specify the precise unemployment data used, and I could only find publicly reported unemployment rates adjusted by sex, age, and season that classified ages in groups (see Appendix C). These data grouped women ages 20 to 24 and ages 25 to 34, which does not align with the ages of women in the treatment and comparison groups (24–25 and 27–28, respectively). Although imprecise, lacking more finely disaggregated data, I applied the unemployment rate for the 20–24 age group to the treatment group and the rate for the 25–34 age group to the comparison group.

Statistical Analyses

To compare patient characteristics and replicate Table 1 of Daw and Sommers' (2018) paper, I calculate univariate statistics for the patient characteristics in the pre- and post-policy periods in the treatment and comparison groups. I also calculate the "differential change, exposure minus control" (Daw and Sommers, 2018, p. 582) which is effectively the unadjusted DiD effect between the treatment and comparison group from before to after the policy for these patient characteristics.

To replicate the primary DiD analysis of the *JAMA* paper and the findings presented in Table 2 of the original paper (Daw and Sommers, 2018), I calculate the prevalence of each

outcome during the pre- and post-policy periods for women in the treatment and comparison groups, as well as unadjusted and adjusted DiD estimates. I estimate the unadjusted DiD effect using the following equation:

$$Outcome_{gt} = \beta_0 + \beta_1 Treat_g + \beta_2 Post_t + \beta_3 Treat_g * Post_t + \varepsilon \quad (1)$$

where *g* indexes groups and *t* indexes the date. *Treat* is an indicator for being in the treatment group, *Post* is an indicator for observations after the dependent coverage provision went into effect (2011–2013), and *Treat*Post* is the unadjusted DiD effect. I estimate the adjusted DiD effect using the following equation:

$$Outcome_{it} = \beta_0 + \beta_1 Treat_g + \beta_2 Post_t + \beta_3 Treat_g * Post_t + \beta_4 Unemployment_{gt} + \beta_5 Month_t + \beta_6 TimeTrend + \beta_x X_i + + \varepsilon \quad (2)$$

where *i* indexes births, *g* indexes group, and *t* indexes date. *Treat* is an indicator for being in the treatment group, *Post* is an indicator for being in after the dependent coverage provision went into effect (2011–2013), *Treat*Post* is the DiD effect, *Unemployment* is the age-, sex-, and seasonally-adjusted monthly unemployment rate, *Month* is the month of delivery, *TimeTrend* is the monthly linear time variable, and *X* is a vector for patient characteristics.

To estimate the differential effect of the dependent coverage provision on pregnancy-related outcomes among Black mothers compared with white mothers, I first conduct DiD analyses using equation 2 stratified by race and restricted to unmarried women. I then use the following triple difference estimator, where the third difference compares Black and White mothers:

$$Outcome_{igt} = \beta_0 + \beta_1 Treat_g + \beta_2 Post_t + \beta_3 Treat_{tg} * Post_t + \beta_4 BlackRace_i + \beta_5 Post_t * BlackRace_i + \beta_6 Treat_g * BlackRace_i + \beta_7 Treat_g * Post_t * BlackRace_i + \beta_8 UnemploymentRate_{gt} + \beta_9 Month_t + \beta_{10} TimeTrend_t + \beta_x X_i + \varepsilon_{igt}$$

(3).

where *i* indexes births, *g* indexes group, and *t* indexes date. *Treat* is an indicator for being in the treatment group, *Post* is an indicator for being in after the dependent coverage provision went into effect (2011–2013), *BlackRace* is an indicator for the mother's race, *UnemploymentRate* is the age-, sex-, and seasonally-adjusted monthly unemployment rate for the month of delivery, *Month* is the month of delivery, *TimeTrend* is the monthly linear time variable, and *X* is a vector for the individual-level covariates in equation 2 except marital status. β_7, the coefficient on the interaction $Treat_g*Post_t*BlackRace_i$, is the differential effect of the policy among Black women as compared to white women and is the coefficient of interest. All models use robust standard errors and a 2-sided p-value of less than 0.05 for statistical significance.

Results

Study population

The study sample includes 2,930,197 births of whom 1,379,005 are in the treatment group (born to mothers aged 24 or 25 years) and 1,551,192 are in the comparison group (born to mothers aged 27 or 28). The treatment group had a higher proportion of women who identify as Hispanic or black or who had no post-secondary education and a lower proportion of women who identify as other race than the comparison group. Results of the differential change in patient characteristics show that there were significant differences in all variables between the pre-policy and post-policy periods between the treatment and comparison groups except for Hispanic ethnicity and other race. Tables 1a, 1b, and 1c present patient characteristics in the overall sample from the original Table 1 and the replicated analyses. Tables 1a and 1b present characteristics of the treatment group and comparison group, respectively, before and after the

dependent coverage provision went into effect. Table 1c presents the change in patient characteristics from before to after the policy between the treatment and comparison groups.

The replicated summary statistics match the original results except for first live birth, for which my point estimates and upper and lower bound confidence interval are each 1.9 percentage points lower than those in the original article for both the pre- and post-policy periods. First live birth is an indicator based on a continuous live birth order variable, which refers to the number of children born alive to a mother (i.e., excludes fetal death); first live birth equals 1 if the live-birth order is also 1. The dataset includes no other data on live births and there is no record of coding changes for the variable in the dataset during the study period. I explored alternate coding of the live-birth order variable where I included unknown or not stated birth order as a first live birth and also re-estimated statistics using a total birth order variable, which captures both live births and fetal deaths. Neither method produced matching results. Despite these differences in the summary statistics, perhaps because my figures are each 1.9 percentage points lower in both the pre- and post-policy periods, the differential change statistics for first live birth in my analysis are identical to the originals.

Results of the replicated differential change estimation match those in the original paper except for maternal age, which differs by a factor of 100. In the analysis, most characteristics are proportions, which require multiplying by 100 to report results as percentages. Maternal and paternal age are means, which do not require transformation. Because the estimated p-values are identical, the constant for maternal age I estimate is equal to the mean maternal age for the comparison group in the pre-policy period that I estimate for Table 1b, and only the point estimates differ, I am confident in my estimates and attribute the difference between my estimate and the original estimate to the authors accidentally multiplying their coefficient by 100.

Policy impact on pregnant young women

Tables 2a, b, c, and d report results of the DiD estimation from the original study and my replication. Table 2a presents the outcomes in the treatment group pre-policy and post-policy, as well as the unadjusted difference in outcomes between the pre- and post-policy time periods. Table 2b presents these results for the comparison group. Table 2c presents the unadjusted DiD effects from the original paper and my replication. Table 2d presents results of from the adjusted DiD models from the original paper and my analysis for all outcomes.

Private insurance coverage was lower among women in the treatment group than in the comparison group in both the pre- and post-policy periods, while Medicaid coverage and self-payment for births were higher in the treatment group than the comparison group. Notably, Medicaid was the payer for nearly half of treatment group births and private insurance paid for more than one third of births. These figures are reversed in the comparison group. In unadjusted DiD models, only self-payment for births was significant, decreasing by 0.3 percentage points (95% CI -0.5 to -0.2, $p<0.001$) more in the treatment group compared with the comparison group between the pre- and post-policy periods. In the adjusted DiD models, private insurance coverage increased significantly and Medicaid and self-pay decreased significantly from before to after the policy in the treatment group compared with the comparison group, all else equal.

Early and adequate prenatal care were lower and preterm birth was higher in the treatment group than in the comparison group in both the pre- and post-policy periods. In the unadjusted DiD model, only early prenatal care was significant, increasing by 0.6 percentage points (95.% CI 0.3 to 0.8, $p<0.001$) more in the treatment group than the comparison groups from before to after implementation of the dependent coverage provision. After accounting for covariates, both measures were statistically significant; early prenatal care significantly increased

by 1.0 percentage point (95% CI 0.7 to 1.3, $p < .001$) and adequate prenatal care increased 0.4 percentage points (95% CI 0.1 to 0.6, $p = .003$) between the treatment and comparison groups between the pre-policy and post-policy periods.

Cesarean delivery was lower and preterm birth higher among women in the treatment group than in the comparison group in both the pre- and post-policy periods, while low birth weight and NICU admission were similar. There was no significant effect on any birth outcome in unadjusted models. However, in adjusted models, preterm birth declined significantly by 0.2 percentage points (95% CI -0.3 to -0.03, $p = 0.02$) in the treatment group compared with the comparison group from before to after the dependent coverage provision went into effect.

All outcomes in the pre- and post-policy periods as well as unadjusted DiD outcomes from my replication match findings in the original paper except for adequate prenatal care. My estimate is 0.06 percentage points higher than in the original paper, but confidence intervals overlap and both analyses find non-significant effects. Differences in adequate prenatal care might arise from slightly different construction of the variable, for which Daw and Sommers (2018) do not provide much detail. Because calculation of variable results in numbers that are not integers, differences in the APNCU index may arise due to rounding to whole numbers.

Results of the adjusted models from my DiD analysis differ from the original findings by less than 0.6 percentage points and all confidence intervals for all point estimates overlap. Both my findings and the original findings report significant effects at similar levels of confidence for the same outcomes. Slight differences likely arise due to differences in measurement of the covariates, particularly first live birth and unemployment rates. However, overall, my replicated results confirm the original findings.

Policy impact on Black–white disparities

From before to after the dependent coverage provision went into effect, for both unmarried white women and unmarried black women, private insurance coverage increased significantly (4.1, 95% CI 3.6 to 4.6, $p < .001$ among white women and 3.0, 95% CI 2.1 to 4.0, $p < .001$, among Black women) and Medicaid decreased significantly (3.8, 95% CI -4.3 to -3.2, $p < .001$, among whites and (-2.9, 95% CI -3.9 to -1.8, $p < .001$ among Black women) in the treatment group compared to the comparison group, after adjusting for covariates. Changes in self-payment did not reach statistical significance in adjusted models for either Black or white women. Table 3a shows outcomes among white women in the treatment and comparison groups before and after the policy, unadjusted differences within each group, and the unadjusted DiD estimates. Table 3b shows the same outcomes and unadjusted effects among Black women. Table 3c reports adjusted DiD estimates for all pregnancy-related outcomes among Black and white women.

Results of the triple difference estimation show that no differences in the effect of the dependent coverage provision between Black and white women reach statistical significance at the 0.05 level. However, holding constant covariates, the policy effect on private insurance coverage and Medicaid are significantly different between Black and white women at the 0.1 level. Specifically, the increase in private insurance coverage and the decrease in Medicaid was 1.0 percentage-point lower among unmarried Black women compared with unmarried white women (private insurance 95% CI -2.1 to 0.1, $p = .07$; Medicaid 95% CI -0.2 to 2.2, $p = .10$). Adjusted DiDiD estimates for all outcomes are shown in Table 3c.

Among white unmarried women, early prenatal care increased significantly by 1.0 percentage points (95% CI 0.4 to 1.6, $p = .001$) and adequate prenatal care was not statistically

significant between the treatment and comparison groups from before to after the dependent coverage provision and after accounting for covariates. The policy had no statistically significant effect on either measure among unmarried Black women. In the adjusted DiDiD model, both early and adequate prenatal care declined among Black women compared with white women. This decline was significant at the 0.1 level for early prenatal care (-1.2 percentage points, 95% CI -2.5 to .09, p = .07), and not statistically significant for adequate prenatal care (-0.3 percentage points, 95% CI -1.6 to 0.9, p = .62).

No changes in any birth outcome from before to after the dependent coverage provision went into effect between the treatment and comparison groups reached statistical significance among unmarried white women, holding constant month of delivery, unemployment, and patient characteristics. However, in adjusted DiD models, among unmarried Black women, cesarean delivery (-1.2, 95% CI -3.9 to -1.8, p < .001), preterm birth (-0.8, 95% CI -1.5 to -.001, p = .05), and low birth weight (-0.7, 95% CI -1.5 to .03, p = .05) significantly declined more in the treatment group then in the comparison group from before to after the policy. Effects on NICU admission were not statistically significant among black women. In the adjusted DiDiD models, all of the birth outcomes decreased more among Black women compared with white women in the treatment compared with the control groups between the pre- and post-policy periods. None of these effects were statistically significant at the .05 level, although the decrease in low birth weight babies born to Black women compared to white women was of borderline significance (-0.8, 95% CI -1.6 to .02, p = .06).

Discussion

This paper reinforces Daw and Sommers' finding that the ACA's dependent coverage provision increased private insurance coverage and reduced Medicaid coverage among pregnant

young women (2018). This finding is consistent with other studies that reported substantial private insurance coverage gains among young adults owing to the policy (e.g., Sommers et al., 2013). Before the policy was enacted, uninsured pregnant women were eligible for Medicaid coverage if low income or pregnant; however, access to Medicaid coverage gained as a result of pregnancy was associated with barriers to accessing care (Rosenberg et al., 2007). This study reaffirms Daw and Sommers' (2018) finding that increased access to insurance regardless of income and pregnancy status was associated with increases access to timely and adequate prenatal care and a reduction in preterm birth. Despite the small effect size, because the data capture a census of all births in the United States to women ages 24 to 25 and 27 to 28, a 0.2 percentage point reduction in preterm births is a reduction of several hundred premature babies born annually to women ages 24 to 25. Since the study captures only a portion of women eligible to gain parental insurance coverage, the total absolute policy effect may be larger. However, differences between younger and older young women may inhibit generalization of this study's findings to women ages 19 to 23. Because the data does permit direct observation of who gained parental coverage, the analysis provides an intent-to-treat effect that underestimates the dependent coverage provision effects on pregnancy-related outcomes.

Contrary to my hypothesis, the effect of the dependent coverage provision on pregnancy-related outcomes was not significantly different between Black and white unmarried women. Importantly, because the more pregnant Black young women are unmarried than white women and because marital status is strongly associated with coverage gains under the dependent coverage provision, among all young women (married and unmarried) the shift from uninsured or Medicaid to private insurance is significantly greater for Black women than white women (see Appendix D). In this way, the dependent coverage provision narrowed disparities.

This study has several limitations. First, states included in sample change substantially over time and I could not restrict analyses by state because the data lack state identifiers. A rough review of state-level birth outcomes showed that states added between 2009 and 2013 were equally divided among those that perform better and those that perform equal to or worse than the national average (analysis not shown). This suggests that the addition of states in the post-policy period should not bias results in a particular direction. Nonetheless, although analyses adjust for covariates, unobserved compositional differences may be confused for policy effects if they differ systematically between the original and added states that are associated with policy uptake in the treatment group and the outcomes. Second, the study uses a census of births (a population) and likelihood of Type I error may increase when using statistical tests designed to make inferences from samples to populations. Finally, although the original study and I do not find significant trends before the policy, we were not able to assess trends after the policy and could not firmly establish that the study does not violate the parallel trends assumption.

Conclusion

This study corroborates Daw and Sommers's finding that the Affordable Care Act dependent coverage provision increased private insurance coverage, reduced Medicaid coverage, increased access to timely and adequate prenatal care, and moderately reduced preterm births among pregnant young women aged 24 to 25. The policy did not significantly affect cesarean delivery, low birth weight, or NICU admission. This study also showed that the dependent coverage provisions impact on insurance, prenatal care, and birth outcomes did not differ significantly between Black and white women. In so doing it contributes to the body of evidence on the impact of the dependent coverage provision on Black–white disparities on health insurance coverage, access to care, and health outcomes.

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Table 1a. Patient characteristics before and after the Affordable Care Act dependent coverage provision among women aged 24 to 25 years (treatment)

Characteristic	Pre-policy % (95% CI)		Post-policy % (95% CI)	
	This paper	**Daw & Sommers, 2018**	**This paper**	**Daw & Sommers, 2018**
Total births (no.)	299,024	299,024	1,079,981	1,079,981
Mean maternal age (yrs)	24.5 (24.5 to 24.5)	24.5 (24.5 to 24.5)	24.5 (24.5 to 24.5)	24.5 (24.5 to 24.5)
Married	54.4 (54.2 to 54.6)	54.4 (54.2 to 54.6)	51.2 (51.1 to 51.3)	51.2 (51.1 to 51.3)
Hispanic ethnicity	29.6 (29.4 to 29.7)	29.6 (29.4 to 29.7)	*25.2 (25.2 to 25.3)*	*25.2 (25.1 to 25.3)*
Race				
White	79.6 (79.4 to 79.7)	79.6 (79.4 to 79.7)	76.5 (76.5 to 76.6)	76.5 (76.5 to 76.6)
Black	15.1 (14.9 to 15.2)	15.1 (14.9 to 15.2)	18.0 (17.9 to 18.0)	18.0 (17.9 to 18.0)
Other	5.3 (5.3 to 5.4)	5.3 (5.3 to 5.4)	5.5 (5.5 to 5.5)	5.5 (5.5 to 5.5)
Education				
< High school	19.9 (19.8 to 20.0)	19.9 (19.8 to 20.0)	16.6 (16.6 to 16.7)	16.6 (16.6 to 16.7)
High school	58.2 (58.0 to 58.4)	58.2 (58.0 to 58.4)	*59.9 (59.8 to 60.0)*	*60.0 (59.8 to 60.0)*
Any postsecondary	21.9 (21.8 to 22.1)	21.9 (21.8 to 22.1)	23.4 (23.3 to 23.5)	23.4 (23.3 to 23.5)
First live birth	*39.6 (39.4 to 39.8)*	*41.5 (41.3 0- 41.7)*	*40.3 (40.2 to 40.4)*	*42.2 (42.1 to 42.3)*
Multiple delivery	2.7 (2.7 to 2.8)	2.7 (2.7 to 2.8)	2.7 (2.6 to 2.7)	2.7 (2.6 to 2.7)
Mean paternal age (yrs)	27.7 (27.7 to 27.7)	27.7 (27.7 to 27.7)	27.7 (27.7 to 27.7)	27.7 (27.7 to 27.7)

Notes: Italics highlight estimates for which replicated results differ from Daw and Sommers (2018); CI = confidence interval.

Table 1b. Patient characteristics before and after the Affordable Care Act dependent coverage provision among women aged 27 and 28 years (comparison group)

Characteristic	Prepolicy % (95% CI)		Postpolicy % (95% CI)	
	This paper	**Daw & Sommers, 2018**	**This paper**	**Daw & Sommers, 2018**
Total births (no.)	325,564	325,564	1,225,628	1,225,628
Mean maternal age (yrs)	27.5 (27.5 to 27.5)	27.5 (27.5 to 27.5)	27.5 (27.5 to 27.5)	27.5 (27.5 to 27.5)
Married	68.7 (68.6 to 68.9)	68.7 (68.6 to 68.9)	67.9 (67.8 to 67.9)	67.9 (67.8 to 67.9)
Hispanic ethnicity	26.3 (26.1 to 26.4)	26.3 (26.1 to 26.4)	21.9 (21.9 to 22.0)	21.9 (21.9 to 22.0)
Race				
White	80.2 (80.1 to 80.4)	80.2 (80.1 to 80.4)	78.8 (78.7 to 78.8)	78.8 (78.7 to 78.8)
Black	12.5 (12.4 to 12.6)	12.5 (12.4 to 12.6)	13.7 (13.6 to 13.8)	13.7 (13.6 to 13.8)
Other	7.3 (7.2 to 7.4)	7.3 (7.2 to 7.4)	7.5 (7.5 to 7.6)	7.5 (7.5 to 7.6)
Education				
< High school	15.7 (15.5. to 15.8)	15.7 (15.5. to 15.8)	12.7 (12.6 to 12.7)	12.7 (12.6 to 12.7)
High school	45.6 (45.4 to 45.8)	45.6 (45.4 to 45.8)	45.0 (44.9 to 45.1)	45.0 (44.9 to 45.1)
Any postsecondary	38.8 (38.6 to 38.9)	38.8 (38.6 to 38.9)	42.3 (42.2 to 42.4)	42.3 (42.2 to 42.4)
First live birth	*35.7 (35.5 to 35.8)*	*37.6 (37.4 to 37.7)*	*37.4 (37.3 to 37.5)*	*39.4 (39.3 to 39.5)*
Multiple delivery	3.2 (3.2 to 3.3)	3.2 (3.2 to 3.3)	3.2 (3.2 to 3.3)	3.2 (3.2 to 3.3)
Mean paternal age (yrs)	30.3 (30.2 to 30.3)	30.3 (30.2 to 30.3)	30.3 (30.3 to 30.3)	30.3 (30.3 to 30.3)

Notes: Italics highlight estimates for which replicated results differ from Daw and Sommers (2018); CI = confidence interval

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Table 1c. Patient characteristics before and after the Affordable Care Act dependent coverage provision between women aged 24 and 25 (treatment) and women aged 27 and 28 years (comparison group)

Characteristic	Unadjusted differential change (95% CI), Percentage points		p-value	
	This paper	**Daw & Sommers, 2018**	**This paper**	**Daw & Sommers, 2018**
Mean maternal age (yrs)	*.0002 (-.003 to .003)*	*0.02 (-0.3 to 0.3)*	.89	.89
Married	-2.3 (-2.6 to 2.0)	-2.3 (-2.6 to 2.0)	<.001	<.001
Hispanic ethnicity	0.03 (-0.2 to 0.3)	0.03 (-0.2 to 0.3)	.84	.84
Race				
White	-1.6 (-1.8 to -1.4)	-1.6 (-1.8 to -1.4)	<.001	<.001
Black	1.7 (1.5 to 1.9)	1.7 (1.5 to 1.9)	<.001	<.001
Other	-0.1 (-0.2 to 0.04)	-0.1 (-0.2 to 0.04)	.15	.15
Education				
< High school	-0.3 (-0.5 to -0.1)	-0.3 (-0.5 to -0.1)	.01	.01
High school	2.3 (2.1 to 2.6)	2.3 (2.1 to 2.6)	<.001	<.001
Any postsecondary	-2.1 (-2.3 to -1.8)	-2.1 (-2.3 to -1.8)	<.001	<.001
First live birth	-1.1 (-1.4 to -0.8)	-1.1 (-1.4 to -0.8)	<.001	<.001
Multiple delivery	-0.1 (-0.2 to 0.003)	-0.1 (-0.2 to 0.003)	.06	.06
Mean paternal age (yrs)	-0.03 (-0.1 to -0.001)	-0.03 (-0.1 to -0.001)	.04	.04

Note: CI = confidence interval

Table 2a. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision among women aged 24 and 25 (treatment)

Outcome	Prepolicy %		Postpolicy %		Unadjusted difference (95%CI), Percentage points	
	This paper	**Daw & Sommer, 2018**	**This paper**	**Daw & Sommer, 2018**	**This paper**	**Daw & Sommer, 2018**
Payment for birth						
Private	36.9	36.9	35.9	35.9	-1.0 (-1.2 to -0.8)	-1.0 (-1.2 to -0.8)
Medicaid	51.6	51.6	53.6	53.6	2.0 (1.8 to 2.2)	2.0 (1.8 to 2.2)
Self-pay	5.2	5.2	4.3	4.3	-0.9 (-0.9 to -0.8)	-0.9 (-0.9 to -0.8)
Prenatal care						
Early prenatal care	70.0	70.0	71.6	71.6	1.6 (1.4 to 1.8)	1.6 (1.4 to 1.8)
Adequate prenatal care	*73.3*	*73.5*	74.8	74.8	*1.5 (1.3 t 1.7)*	*1.3 (1.1 to 1.5)*
Birth outcomes						
Cesarean delivery	30.1	30.1	29.7	29.7	-0.4 (-0.6 to -0.2)	-0.4 (-0.6 to -0.2)
Preterm birth	9.4	9.4	9.1	9.1	-0.3 (-0.4 to -0.2)	-0.3 (-0.4 to -0.2)
Low birth weight	7.5	7.5	7.6	7.6	0.1 (-0.03 to 0.2)	0.1 (-0.03 to 0.2)
NICU admission	6.6	6.7	7.3	7.3	*0.7 (0.6 to 0.8)*	*0.6 (0.5 to 0.7)*
Total births (n)	299,024	299,024	1,079,981	1,079,981		

Note: CI = confidence interval; NICU = neonatal intensive care unit; confidence intervals for unadjusted difference pending.

Table 2b. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision among women aged 27 and 28 (comparison)

Outcome	Prepolicy %		Postpolicy %		Unadjusted difference (95%CI), Percentage points	
	This paper	**Daw & Sommer, 2018**	**This paper**	**Daw & Sommer, 2018**	**This paper**	**Daw & Sommer, 2018**
Payment for birth						
Private	52.4	52.4	51.1	51.1	-1.3 (-1.5 to -1.1)	-1.3 (-1.5 to -1.1)
Medicaid	37.4	37.4	39.4	39.4	1.9 (1.8 to 2.1)	1.9 (1.8 to 2.1)
Self-pay	4.9	4.9	4.3	4.3	-0.5 (-0.6 to -0.4)	-0.5 (-0.6 to -0.4)
Prenatal care						
Early prenatal care	75.7	75.7	76.8	76.8	1.0 (0.9 to 1.2	1.1 (0.9 to 1.2)
Adequate prenatal care	77.5	77.5	*78.9*	*78.8*	*1.4 (1.2 to 1.6)*	*1.3 (1.1 to 1.4)*
Birth outcomes						
Cesarean delivery	32.1	32.1	31.5	31.5	-0.6 (-0.8 to -0.4)	-0.6 (-0.8 to -0.4)
Preterm birth	9.1	9.1	8.9	8.9	-0.2 (-0.3 to -0.1)	-0.2 (-0.3 to -0.1)
Low birth weight	7.2	7.2	7.2	7.2	-.005 (-0.1 to 0.1)	-0.005 (-0.1 to 0.1)
NICU admission	6.6	6.6	7.3	7.3	0.7 (0.6 to 0.8)	0.7 (0.6 to 0.8)
Total births (n)	325,564	325,564	1,225,628	1,225,628		

Note: Italics highlight estimates for which replicated results differ from Daw and Sommers (2018); ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Table 2c. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between women aged 24 and 25 (treatment) and women aged 27 and 28 (comparison): Undjusted difference-in-differences (DID) estimate

	Unadjusted DID estimate (95% CI) Percentage Points		**p-value**	
Outcome	**This paper**	**Daw & Sommers, 2018**	**This paper**	**Daw & Sommers, 2018**
Payment for birth				
Private	0.3 (0.01 to 0.6)	0.3 (0.01 to 0.6)	0.5	0.5
Medicaid	0.1 (-0.2 to 0.4)	0.1 (-0.2 to 0.4)	0.5	0.5
Self-pay	-0.3 (-0.5 to -0.2)	-0.3 (-0.5 to -0.2)	<.001	<.001
Prenatal care				
Early prenatal care	0.6 (0.3 to 0.8)	0.6 (0.3 to 0.8)	<.001	<.001
Adequate prenatal care	*0.1 (-0.1 to 0.4)*	*0.04 (-0.2 to 0.3)*	*0.39*	*.74*
Birth outcomes				
Cesarean delivery	0.2 (-0.1 to 0.4)	0.2 (-0.1 to 0.4)	.17	.17
Preterm birth	-0.1 (-0.3 to -.04)	-0.1 (-0.3 to 0.04)	.15	.15
Low birth weight	0.1 (-0.1 to 0.2)	0.1 (-0.1 to 0.2)	.30	.30
NICU admission	-0.1 (-0.2 to 0.1)	-0.1 (-0.2 to 0.1)	*.41*	*.39*

Note: Italics highlight estimates for which replicated results differ from Daw and Sommers (2018); ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Table 2d. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between women aged 24 and 25 (treatment) and women aged 27 and 28 (comparison): Adjusted difference-in-differences (DID) estimate

	Adjusted DiD estimate (95% CI) Percentage Points		**p-value**	
Outcome	**This paper**	**Daw & Sommers, 2018**	**This paper**	**Daw & Sommers, 2018**
Payment for birth				
Private	*1.3 (1.1 to 1.6)*	*1.9 (1.6 to 2.1)*	<.001	<.001
Medicaid	*-1.1 (-1.4 to -0.9)*	*-1.4 (-1.7 to -1.2)*	<.001	<.001
Self-pay	*-0.2 (-0.4 to 0.1)*	*-0.3 (-0.4 to -0.1)*	0.001	<.001
Prenatal care				
Early prenatal care	1.0 (0.7 to 1.3)	1.0 (0.7 to 1.2)	<.001	<.001
Adequate prenatal care	0.4 (0.1 to 0.6)	0.4 (0.2 to 0.6)	.003	<.001
Birth outcomes				
Cesarean delivery	*.09 (-0.2 to 0.4)*	*0.005 (-0.3 to 0.3)*	*.52*	*.97*
Preterm birth	-0.2 (-0.3 to -0.03)	-0.2 (-0.3 to -0.03)	.02	.02
Low birth weight	-0.1 (-0.2 to 0.1)	-0.01 (-0.1 to 0.1)	*.45*	*.91*
NICU admission	*-0.1 (-0.2 to 0.1)*	*-0.1 (-0.3 to 0.3)*	*.35*	*.11*

Note: Adjusted for mother's age, marital status, Hispanic ethnicity, race, education, first live birth, multiple delivery, father's age, month of delivery, unemployment rate, and linear time trend; Italics highlight estimates for which replicated results differ from Daw and Sommers (2018); ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Table 3a. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between unmarried white women aged 24 and 25 (treatment) and aged 27 and 28 (comparison)

Outcome	Treatment			Comparison			Unadjusted DiD estimate (95% CI) Percentage Points	p-value
	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points		
Payment for birth								
Private	19.4	22.3	2.9 (2.6 to 3.3)	22.7	22.0	-0.7 (-1.1 to -0.4)	3.7 (3.3 to 4.2)	<.001
Medicaid	70.1	69.0	-1.2 (-1.6 to -0.7)	66.1	68.4	2.3 (1.9 to 2.7)	-3.4 (-4.0 tp -3.0)	<.001
Self-pay	5.7	4.3	-1.4 (-1.6 to -1.2)	6.4	5.1	-1.4 (-1.6 to -1.2)	-0.1 (-0.3 to 0.2)	0.55
Prenatal care								
Early prenatal care	64.8	68.1	3.3 (2.9 to 3.6)	66.6	68.9	2.3 (1.9 to 2.7)	0.9 (0.4 to 1.5)	<.001
Adequate prenatal care	69.8	72.6	2.7 (2.4 to 3.0)	71.2	73.2	2.1 (1.7 to 2.5)	0.6 (0.1 to 1.1)	0.02
Birth outcomes								
Cesarean delivery	31.1	31.0	-0.1 (-0.5 to 0.2)	33.3	33.6	0.3 (-0.1 to 0.7)	-0.4 (-0.9 to 0.1)	0.11
Preterm birth	9.1	8.9	-0.3 (-0.5 to -0.1)	9.5	9.4	-0.1 (-0.3 to 0.2)	-0.2 (-0.5 to 0.1)	0.25
Low birth weight	7.2	7.4	0.2 (.03 to 0.4)	7.7	7.6	-0.1 (-0.3 to 0.1)	0.3 (0.01 to 0.6)	0.04
NICU admission	6.6	7.5	0.9 (0.7 to 1.1)	7.0	8.0	1.0 (0.8 to 1.2)	-0.1 (-0.4 to 0.2)	0.55
Total births (n)	96,567	353,484		71,289	266,532			

Note: ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Table 3b. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between Black women aged 24 and 25 (treatment) and Black women aged 27 and 28 (comparison)

Outcome	Treatment			Comparison			Undjusted DiD estimate (95% CI) Percentage Points	p-value
	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points		
Payment for birth								
Private	17.5	16.4	-1.0 (-1.5 to -0.6)	22.0	18.5	-3.6 (-4.1 to -3.0)	2.5 (1.8 to 3.3)	<.001
Medicaid	74.7	77.5	2.7 (2.2 to 3.3)	69.7	74.8	5.1 (4.5 to 5.8)	-2.4 (-3.2 to -1.6)	<.001
Self-pay	3.6	2.4	-1.2 (-1.4 to -1.0)	3.6	2.7	-0.9 (-1.2 to -0.7)	-0.3 (-0.6 to 0.1)	0.1
Prenatal care								
Early prenatal care	60.4	62.8	2.4 (1.8 to 3.0)	62.7	64.7	2.0 (1.3 to 2.7)	0.3 (-0.6 to 1.2)	0.48
Adequate prenatal care	63.6	65.9	2.4 (1.8 to 3.0)	65.6	67.7	2.0 (1.4 to 2.7)	0.3 (-0.6 to 1.2)	0.49
Birth outcomes								
Cesarean delivery	35.1	34.3	-0.8 (-1.3 to -0.2)	36.8	37.0	0.2 (-0.4 to 0.9)	-1.0 (-1.9 to -0.1)	0.02
Preterm birth	13.8	13.1	-0.8 (-1.2 to 0.4)	14.2	13.8	-0.4 (-0.9 to 0.04)	-0.4 (-1.0 to 0.3)	.26
Low birth weight	13.5	12.9	-0.6 (-1.0 to -0.2)	13.4	13.2	-0.2 (-0.7 to 0.3)	-0.4 (-1.0 to 0.2)	.22
NICU admission	9.4	9.8	0.3 (-.00004 to 0.7)	9.5	10.5	1.0 (0.6 to 1.4)	-0.6 (-1.2 to -0.1)	.02
Total births (n)	34,076	151,683		25,682	107,950			

Note: ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Table 3c. Adjusted difference-in-differences (DiD) estimates of the effect of the ACA dependent coverage provision on pregnancy-related outcomes among women aged 24 and 25 (treatment) and aged 27 and 28 (comparison), by race, and adjusted difference-in-difference-in-difference (DiDiD) effect

Outcome	White (n =787,872)		Black (n = 319,391)		Adjusted DiDiD estimate	
	Adjusted DiD estimate (95% CI) Percentage Points	p-value	Adjusted DiD estimate (95% CI) Percentage Points	p-value	(95% CI) Percentage Points	p-value
Payment for birth						
Private	4.1 (3.6 to 4.6)	<.001	3.0 (2.1 to 4.0)	<.001	-1.0 (-2.1 to 0.1)	.07
Medicaid	-3.8 (-4.3 to -3.2)	<.001	-2.9 (-3.9 to -1.8)	<.001	1.0 (-0.2 to 2.2)	.10
Self-pay	-0.1 (-0.4 to 0.1)	.34	-0.2 (-0.6 to 0.2)	.31	-0.1 (-0.6 to 0.3)	.56
Prenatal care						
Early prenatal care	1.0 (0.4 to 1.6)	.001	-0.2 (-1.4 to 0.9)	.68	-1.2 (-2.5 to .09)	.07
Adequate prenatal care	0.5 (-0.1 to 1.0)	.09	0.2 (-0.9 to 1.3)	.73	-0.3 (-1.6 to 0.9)	.62
Birth outcomes						
Cesarean delivery	-0.5 (-1.0 to 0.1)	.12	-1.2 (-2.4 to -0.1)	.03	-0.9 (-2.1 to 0.4)	.18
Preterm birth	-0.2 (-0.6 to 0.1)	.15	-0.8 (-1.5 to -.001)	.05	-0.4 (-1.3 to 0.4)	.30
Low birth weight	0.1 (-0.2 to 0.5)	.33	-0.7 (-1.5 to .03)	.05	-0.8 (-1.6 to .02)	.06
NICU admission	-0.06 (-0.4 to 0.2)	.70	-0.5 (-1.2 to 0.1)	.12	-0.4 (-1.2 to 0.3)	.25

Note: Adjusted for mother's age, Hispanic ethnicity, education, first live birth, multiple delivery, father's age, month of delivery, unemployment rate, and linear time trend; ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Appendix A. States using the 2003 revision of the U.S. Certificate of Live Births

State	2009	2011	2012	2013
Alabama				
Alaska				✓
Arizona				
Arkansas				
California	✓	✓	✓	✓
Colorado	✓	✓	✓	✓
Connecticut				
Delaware	✓	✓	✓	✓
District of Columbia		✓	✓	✓
Florida	✓	✓	✓	✓
Georgia	✓	✓	✓	✓
Hawaii				
Idaho	✓	✓	✓	✓
Illinois		✓	✓	✓
Indiana	✓	✓	✓	✓
Iowa	✓	✓	✓	✓
Kansa	✓	✓	✓	✓
Kentucky	✓	✓	✓	✓
Louisiana		✓	✓	✓
Maine				
Maryland		✓	✓	✓
Massachusetts			✓	✓
Michigan	✓	✓	✓	✓
Minnesota			✓	✓
Mississippi				✓
Missouri		✓	✓	✓
Montana	✓	✓	✓	✓
Nebraska	✓	✓	✓	✓
Nevada		✓	✓	✓
New Hampshire	✓	✓	✓	✓
New Jersey				
New Mexico	✓	✓	✓	✓
New York	✓	✓	✓	✓
North Carolina		✓	✓	✓
North Dakota	✓	✓	✓	✓
Ohio	✓	✓	✓	✓
Oklahoma		✓	✓	✓
Oregon	✓	✓	✓	✓
Pennsylvania	✓	✓	✓	✓
Rhode Island				
South Carolina	✓	✓	✓	✓
South Dakota	✓	✓	✓	✓

State	2009	2011	2012	2013
Tennessee	✓	✓	✓	✓
Texas	✓	✓	✓	✓
Utah	✓	✓	✓	✓
Vermont	✓	✓	✓	✓
Virginia				✓
Washington	✓	✓	✓	✓
West Virginia				
Wisconsin		✓	✓	✓
Wyoming	✓	✓	✓	✓
Total	28	37	39	42
Percentage of births to US residents	66	83	86.3	90.2

Appendix B. Adequacy of Prenatal Care Utilization Index

Gestational Age (weeks)	Cumulative prenatal care visits by month prenatal care began											
	Month 1			Month 2			Month 3			Month 4		
	Cumulative visits	80%	Minimum number of visits for adequacy	Cumulative visits	80%	Minimum number of visits for adequacy	Cumulative visits	80%	Minimum number of visits for adequacy	Cumulative visits	80%	Minimum number of visits for adequacy
6-9	1	0.8	**1**	-	-	-	-	-	-	-	-	-
10-13	2	1.6	**2**	1	0.8	**1**	-	-	-	-	-	-
14-17	3	2.4	**2**	2	1.6	**2**	1	0.8	**1**	-	-	-
18-21	4	3.2	**3**	3	2.4	**2**	2	1.6	**2**	1	0.8	**1**
22-25	5	4	**4**	4	3.2	**3**	3	2.4	**2**	2	1.6	**2**
26-29	6	4.8	**5**	5	4	**4**	4	3.2	**3**	3	2.4	**2**
30-31	7	5.6	**6**	6	4.8	**5**	5	4	**4**	4	3.2	**3**
32-33	8	6.4	**6**	7	5.6	**6**	6	4.8	**5**	5	4	**4**
34-35	9	7.2	**7**	8	6.4	**6**	7	5.6	**6**	6	4.8	**5**
36	10	8	**8**	9	7.2	**7**	8	6.4	**6**	7	5.6	**6**
37	11	8.8	**9**	10	8	**8**	9	7.2	**7**	8	6.4	**6**
38	12	9.6	**10**	11	8.8	**9**	10	8	**8**	9	7.2	**7**
39	13	10.4	**10**	12	9.6	**10**	11	8.8	**9**	10	8	**8**
40	14	11.2	**11**	13	10.4	**10**	12	9.6	**10**	11	8.8	**9**
41	15	12	**12**	14	11.2	**11**	13	10.4	**10**	12	9.6	**10**
42	16	12.8	**13**	15	12	**12**	14	11.2	**11**	13	10.4	**10**
43	17	13.6	**14**	16	12.8	**13**	15	12	**12**	14	11.2	**11**
44	18	14.4	**14**	17	13.6	**14**	16	12.8	**13**	15	12	**12**
45	19	15.2	**15**	18	14.4	**14**	17	13.6	**14**	16	12.8	**13**
46	20	16	**16**	19	15.2	**15**	18	14.4	**14**	17	13.6	**14**
47	21	16.8	**17**	20	16	**16**	19	15.2	**15**	18	14.4	**14**
48	22	17.6	**18**	21	16.8	**17**	20	16	**16**	19	15.2	**15**

Note: Prenatal care is adequate if patients receive the minimum number of adequate visits (in bold) or more.
Source: Adapted from Kotelchuck, 1994

Appendix C. Women's U.S. monthly sex- and age-adjusted unemployment rate, seasonally adjusted (%)

Ages	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20-24	2009	10.3	11.4	11.3	11.8	12.5	12.9	13.2	13.1	12.7	12.4	13.3	12.5
25-34	2009	7	7.7	7.8	8.1	8.9	8.6	8.7	9.1	8.9	9.9	9.3	9.2
20-24	2011	14.2	14.1	13.4	13.6	13.5	13.3	13.2	12.8	13.4	13.1	12.6	13.4
25-34	2011	8.7	9.2	9	9.1	8.8	9.2	9.2	9.1	9.5	9.2	9.2	9.3
20-24	2012	12.1	11.7	12.1	12.2	11.7	11.9	11.8	12.5	10.9	12.5	12.6	13.9
25-34	2012	8.9	8.8	8.6	8.1	8.5	8.7	8.6	8.3	8.2	8.3	7.9	7.7
20-24	2013	13	12.6	11.9	12.1	11.7	11.7	10.9	11.3	10.7	10.9	10.4	10.9
25-34	2013	7.6	7.8	7.6	7.2	7.1	7.9	7.3	7	6.9	6.9	7.3	6.7

Sources: BLS, 2010, 2012, 2013, 2014

Appendix D-a. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between white women aged 24 and 25 (treatment) and white women aged 27 and 28 (comparison)

Outcome	Treatment			Comparison			Unadjusted DiD estimate (95% CI) Percentage Points	p-value
	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points		
Payment for birth								
Private	39.7	39.7	.07 (-0.2 to 0.3)	55.1	55.0	-0.2 (-0.4 to .02)	0.3 (-.04 to 0.6)	.09
Medicaid	48.6	49.3	0.8 (0.5 to 1.0)	34.6	35.4	0.8 (0.6 to 1.0)	-.03 (-0.3 to 0.3)	.83
Self-pay	5.4	4.6	-0.8 (-0.9 to -0.7)	5.0	4.4	-0.6 (-0.7 to -0.5)	-0.2 (-0.4 to -0.1)	.002
Prenatal care								
Early prenatal care	71.6	73.7	2.0 (1.9 to 2.2)	77.2	78.6	1.4 (1.2 to 1.6)	0.6 (0.4 to 0.9)	<.001
Adequate prenatal care	74.9	76.9	2.0 (1.8 to 2.2)	78.9	80.7	1.8 (1.6 to 2.0)	0.2 (-1.1 to 0.4)	.25
Birth outcomes								
Cesarean delivery	29.4	29.0	-0.5 (-0.7 to -0.2)	31.5	30.9	-0.7 (-0.9 to -0.5)	0.3 (.004 to 0.6)	.05
Preterm birth	8.7	8.3	-0.4 (-0.5 to -0.3)	8.6	8.4	-0.2 (-0.3 to -0.1)	-0.2 (-0.3 to .004)	.06
Low birth weight	6.5	6.5	-.03 (-0.2 to .08)	6.3	6.3	-.08 (-0.2 to .02)	0.04 (-0.1 to 0.2)	.56
NICU admission	6.2	6.9	0.6 (0.5 to 0.7)	6.2	6.9	0.7 (0.5 to 0.8)	-0.1 (-0.2 to .1)	.39
Total births (n)	237,993	826,587		261,172	965,454			

Note: ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Appendix D-b. Estimated changes in pregnancy-related outcomes associated with the ACA dependent coverage provision between Black women aged 24 and 25 (treatment) and Black women aged 27 and 28 (comparison)

Outcome	Treatment			Comparison			Undjusted DiD estimate (95% CI) Percentage Points	p-value
	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points	Pre-Policy	Post-Policy	Unadjusted difference (95%CI), Percentage points		
Payment for birth								
Private	22.1	20.0	-2.1 (-2.6 to -1.7)	31.7	27.7	-4.0 (-4.5 to -3.5)	1.9 (1.2 to 2.6)	<.001
Medicaid	68.3	72.2	3.9 (3.4 to 4.4)	58.5	63.8	5.2 (4.7 to 5.8)	-1.4 (-2.1 to -0.7)	<.001
Self-pay	3.9	2.7	-1.1 (-1.3 to -0.9)	4.0	3.3	-0.7 (-0.9 to -0.5)	-0.4 (-0.7 to -0.1)	.003
Prenatal care								
Early prenatal care	62.4	64.2	1.8 (1.3 to 2.3)	66.4	67.3	0.9 (0.4 to 1.5)	0.9 (0.1 to 1.6)	.02
Adequate prenatal care	65.4	67.2	1.8 (1.2 to 2.3)	68.9	70.0	1.1 (0.6 to 1.6)	0.7 (-0.1 to 1.4)	.08
Birth outcomes								
Cesarean delivery	34.9	33.9	-0.9 (-1.4 to -0.5)	36.7	36.5	-0.2 (-0.8 to 0.3)	-0.7 (-0.1 to .01)	.06
Preterm birth	13.3	12.6	-0.8 (-1.1 to -0.4)	13.3	12.7	-0.6 (-0.9 to -0.2)	-0.2 (-0.7 to 0.3)	.43
Low birth weight	12.7	12.3	-0.4 (-0.8 to -.07)	12.2	12.0	-0.2 (-0.5 to 0.2)	-0.2 (-0.7 to 0.2)	.33
NICU admission	9.1	9.4	0.3 (0.1 to 0.7)	9.1	9.8	0.8 (0.4 to 1.1)	-0.4 (-0.8 to .04)	.07
Total births (n)	45,054	193,923		40,714	167,799			

Note: ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit

Appendix D-c. Adjusted difference-in-differences estimates of the effect of the ACA dependent coverage provision on pregnancy-related outcomes among women aged 24 and 25 (treatment) and aged 27 and 28 (comparison), by race, and adjusted difference-in-difference-in-difference effect

Outcome	White (n = 2,291,206)		Black (n = 447,490)		Adjusted DiDiD estimate (Black minus white)	
	Adjusted DiD estimate (95% CI) Percentage Points	p-value	Adjusted DiD estimate (95% CI) Percentage Points	p-value	(95% CI) Percentage Points	p-value
Payment for birth						
Private	1.2 (0.9 to 1.4)	<.001	2.5 (1.7 to 3.3)	<.001	1.6 (0.8 to 2.5)	<.001
Medicaid	-1.0 (-1.3 to -0.8)	<.001	-1.9 (-2.8 to -1.1)	<.001	-1.0 (-1.9 to -0.2)	.02
Self-pay	-0.2 (-0.3 to -.01)	.03	-0.5 (-0.8 to -0.1)	.01	-0.4 (-0.7 to .01)	.06
Prenatal care						
Early prenatal care	0.9 (0.7 to 1.2)	<.001	1.0 (0.1 to 1.8)	.03	0.1 (-0.8 to 1.0)	.83
Adequate prenatal care	0.3 (.02 to 0.6)	.04	0.9 (.03 to 1.7)	.04	0.6 (-0.3 to 1.5)	.22
Birth outcomes						
Cesarean delivery	0.2 (-0.1 to 0.5)	.13	-0.7 (-1.6 to 0.2)	.11	-1.0 (-1.9 to -0.1)	.03
Preterm birth	-0.2 (-0.3 to .02)	.09	-0.5 (-1.0 to 0.1)	.10	-0.3 (-0.9 to 0.3)	.37
Low birth weight	-.01 (-0.2 to 0.1)	.88	-0.5 (-1.0 to 0.1)	.09	-0.4 (-1.0 to 0.1)	.14
NICU admission	-.05 (-0.2 to 0.1)	.56	-0.4 (-0.9 to 0.1)	.13	-0.4 (-0.9 to 0.2)	.18

Note: Adjusted for mother's age, marital status, Hispanic ethnicity, education, first live birth, multiple delivery, father's age, month of delivery, unemployment rate, and linear time trend; ACA = Affordable Care Act; CI = confidence interval; NICU = neonatal intensive care unit