Supplementary Online Content

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eMethods.
eFigure 1. Directed Acyclic Graph
eTable 1. Pre-Period Trend Differences Between the Exposure Group and Control Group for Different Exposure and Control Group Definitions
eTable 2. Pre-Period Trend Differences Between the Exposure Group and Control Group, Stratified by Marital Status
eTable 3. Placebo Tests, Stratified by Marital Status
eTable 4. Sensitivity Analysis With Clustered Standard Errors
eTable 5. Sensitivity Analysis Adjusting for Tobacco Use
eTable 6. Sensitivity Analysis Adjusting for Payment Source
eTable 7. Maternal and Paternal Characteristics Before and After the Dependent Coverage Provision, Stratified by Marital Status

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods.

Regression Equations:

Difference-in-Differences Analysis

$Outcome_{igt} = \beta_0 + \beta_1 Exposure_g + \beta_2 Post_t + \beta_3 Exposure_g * Post_t + \beta_4 UnemploymentRate_{gt} + \beta_x X_i + \Omega\ Month_t + \partial TimeTrend_t + \varepsilon_{igt}$

(Equation 1)

where i indexed birth, g group, and t date. *Exposure* was an indicator for whether a birth was in

the exposure group (maternal age 24-25 years) or the control group (maternal age 27-28 years).

Post was an indicator for whether a birth occurred in the period after the implementation of the

dependent coverage provision (January 2011 – December 2013). X_i was a vector of control

variables (age, race, ethnicity, education, paternal age, marital status, first-live birth, and multiple

delivery). *UnemploymentRate* was the age-month specific unemployment rate, from the U.S.

Bureau of Labor Statistics. *Month* was the calendar month of delivery. *TimeTrend* was a linear

variable measuring the number of months since the beginning of the study period (January

2009). β_3 was the difference-in-differences estimate of the relative change in the outcome from

pre- to post-policy in the exposure group relative to the control group.

Difference-in-Differences Analysis with Marital Status Interaction

$Outcome_{igt} = \beta_0 + \beta_1 Exposure_g + \beta_2 Post_t + \beta_3 Exposure_g * Post_t + \beta_4 Married_i + \beta_5 Post_t * Married_i + \beta_6 Exposure_g * Married_i + \beta_7 Exposure_g * Post_t * Married_i * + \beta_8 UnemploymentRate_{gt} + \beta_x X_i + \Omega\ Month_t + \partial TimeTrend_t + \varepsilon_{igt}$

(Equation 2)

Married was an indicator of whether a birth was to a married mother. The remaining variables

were defined as in Equation 1. β_7 was the estimate of the difference in the difference-in-

differences estimate between married and unmarried women (i.e. the relative difference in the
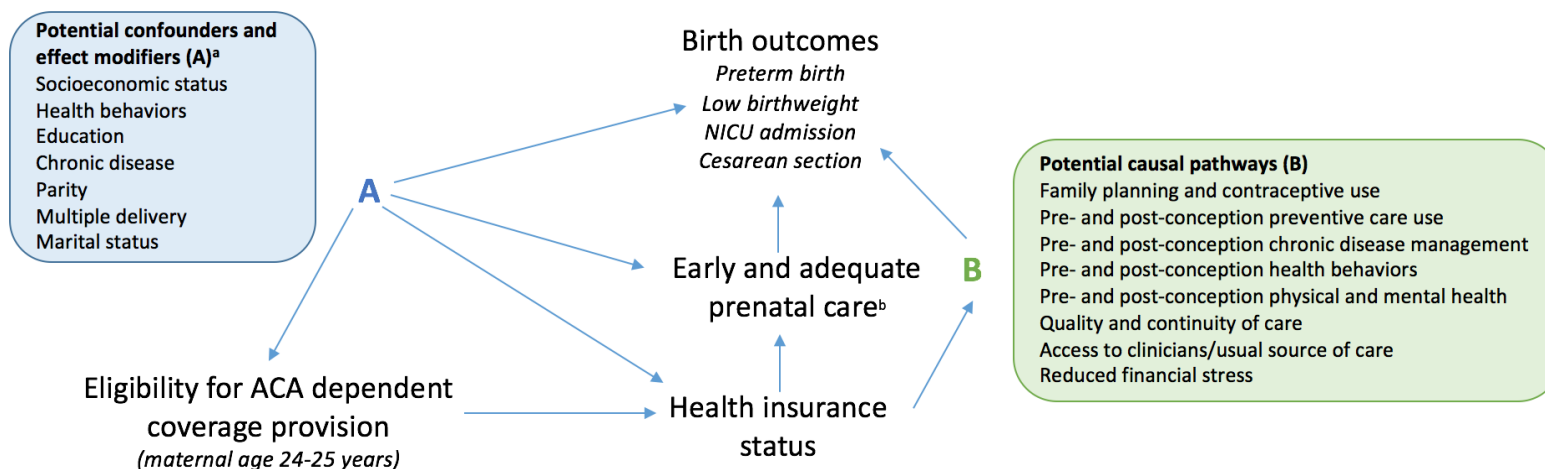
change in the outcome from pre- to post-policy in the exposure and treatment group between

married and unmarried women).

Pre-Policy Trend Comparison for the Exposure Group and the Control Group:

$Outcome_{igt} = \beta_0 + \beta_1 Time_t + \beta_2 Exposure_g * TimeTrend_t + \beta_3 UnemploymentRate_{gt} + \beta_x X_i + \Omega Month_g + \varepsilon_{igt}$

(Equation 3)

A key assumption in a difference-in-differences analysis is that the trends in the pre-policy

period between the two comparison groups are similar. This analysis (presented in Appendix

eTable 2) tested the trends prior to the implementation of the dependent coverage provision in

the exposure group (24-25 year olds) and the control group (27-28 year olds). Using monthly

data limited to the pre-policy period (Janury 2009 to December 2009), we modeled each

outcome as a function of a monthly time trend and an interaction term for the monthly time trend

and exposure group status. β_2 identified any diverging pre-policy trend in the exposure group

compared to the control group.

eFigure 1. Directed acyclic graph

Potential confounders and effect modifiers (A)[a]
Socioeconomic status
Health behaviors
Education
Chronic disease
Parity
Multiple delivery
Marital status

A

Birth outcomes
Preterm birth
Low birthweight
NICU admission
Cesarean section

Early and adequate prenatal care[b]

B

Potential causal pathways (B)
Family planning and contraceptive use
Pre- and post-conception preventive care use
Pre- and post-conception chronic disease management
Pre- and post-conception health behaviors
Pre- and post-conception physical and mental health
Quality and continuity of care
Access to clinicians/usual source of care
Reduced financial stress

Eligibility for ACA dependent coverage provision
(maternal age 24-25 years)

Health insurance status

Notes: [a]In a difference-in-differences design, variables are only confounders if they change differentially in the exposure group (ages 24-25) and control group (ages 27-28) over time. For example, education would be a confounder if education level is correlated with birth outcomes or prenatal care and education levels change differentially in the exposure and control group from the pre-policy to post-policy period. [b]Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 1. Pre-Period Monthly Trend Differences Between the Exposure Group and Control Group for Different Exposure and Control Group Definitions

Outcome	Broader Age Bands		Narrower Age Bands (Selected Definition)	
Exposure Group Age Range	19-25 year olds		24-25 year olds	
Control Group Age Range	27-29 year olds		27-28 year olds	
	Trend Difference	*P* value	Trend Difference	*P* value
Payment for Birth				
Private	0.05	0.02	0.002	0.94
Medicaid	-0.03	0.23	0.01	0.66
Self-Pay	-0.04	<0.001	-0.03	0.06
Prenatal Care				
Early Prenatal Care	0.12	<0.001	0.09	0.01
Adequate Prenatal Care	0.09	<0.001	0.08	0.01
Birth Outcomes				
Cesarean Delivery	0.01	0.73	0.05	0.14
Preterm Birth	0.03	0.08	0.02	0.43
Low Birthweight	0.01	0.42	0.002	0.90
NICU Admission	-0.01	0.75	-0.02	0.17

Notes: Trend difference represents the interaction between exposure group status and a monthly linear time trend calculated from a multivariate regression before the implementation of the dependent coverage provision. Trend differences are given in percentage-points. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 2. Pre-Period Monthly Trend Differences Between the Exposure Group and Control Group, Stratified by Marital Status

Outcome	Overall		Unmarried		Married	
	Trend Difference	*P* value	Trend Difference	*P* value	Trend Difference	*P* value
Payment for Birth						
Private	0.002	0.94	0.02	0.70	-0.07	0.10
Medicaid	0.01	0.66	0.02	0.77	0.05	0.22
Self-Pay	-0.03	0.06	-0.04	0.18	-0.02	0.40
Prenatal Care						
Early Prenatal Care	0.09	0.01	0.15	0.01	0.01	0.82
Adequate Prenatal Care	0.08	0.01	0.09	0.12	0.04	0.33
Birth Outcomes						
Cesarean Delivery	0.05	0.14	0.0002	1.00	0.07	0.09
Preterm Birth	0.02	0.43	0.04	0.21	0.003	0.91
Low Birthweight	0.002	0.90	-0.01	0.77	0.01	0.53
NICU Admission	-0.02	0.17	-0.06	0.05	0.004	0.86

Notes: Trend difference represents the interaction between exposure group status and a monthly linear time trend calculated from a multivariate regression before the implementation of the dependent coverage provision. Trend differences are given in percentage-points. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 3. Placebo Tests, Stratified by Marital Status

Outcome	Overall		Unmarried		Married	
	Estimated Change in Outcome (Adjusted)	P value	Estimated Change in Outcome (Adjusted)	P value	Estimated Change in Outcome (Adjusted)	P value
Payment Source for Birth						
Private	0.11	0.61	0.32	0.34	-0.50	0.09
Medicaid	0.02	0.94	0.00	0.99	0.30	0.30
Self-Pay	-0.20	0.08	-0.37	0.06	-0.04	0.79
Prenatal Care						
Early Prenatal Care	0.61	0.01	0.93	0.03	0.11	0.71
Adequate Prenatal Care	0.48	0.04	0.28	0.49	0.30	0.28
Birth Outcomes						
Cesarean Delivery	0.15	0.54	-0.21	0.61	0.33	0.28
Preterm Birth	0.04	0.78	0.19	0.45	-0.01	0.97
Low Birthweight	-0.03	0.80	-0.21	0.38	0.12	0.43
NICU Admission	-0.11	0.39	-0.47	0.04	0.17	0.30

Notes: Estimated change in outcome represents the interaction between Exposure group status and a policy indicator variable indicating implementation of a placebo policy assumed to be implemented six months prior to 2010 (July 2009). Estimates are calculated using multivariate regressions in the period before the dependent coverage provision that are otherwise identical to those used to produce the main results. Estimates are given in percentage-points. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 4. Sensitivity Analysis with Clustered Standard Errors

Outcome	Estimated Change in Outcome (Adjusted)	Robust Standard Errors		Cluster-Robust Standard Errors	
		95% Confidence Interval	*P* Value	95% Confidence Interval	*P* Value
Payment for Birth					
Private	1.9	1.6, 2.1	<0.001	1.3, 2.4	<0.001
Medicaid	-1.4	-1.7, -1.2	<0.001	-1.8, -1.1	<0.001
Self-Pay	-0.3	-0.4, -0.1	<0.001	-0.4, -0.1	<0.001
Prenatal Care					
Early Prenatal Care	1.0	0.7, 1.2	<0.001	0.6, 1.4	<0.001
Adequate Prenatal Care	0.4	0.2, 0.6	<0.001	0.1, 0.7	0.02
Birth Outcomes					
Cesarean Delivery	0.005	-0.3, 0.3	0.97	-0.3, 0.3	0.97
Preterm Birth	-0.2	-0.3, -0.03	0.02	-0.3, -0.01	0.04
Low Birthweight	-0.01	-0.1, 0.1	0.91	-0.1, 0.1	0.91
NICU Admission	-0.1	-0.3, -0.3	0.11	-0.3, 0.05	0.17

Notes: Estimates are given in percentage points unless otherwise noted. Cluster-robust standard errors clustered at the age group-month level. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 5. Sensitivity Analysis Adjusting for Prenatal Tobacco Use

Outcome	Main Regression			Adjusted for Prenatal Tobacco Use		
	Estimated Change in Outcome (Adjusted)	95% Confidence interval	*P* Value	Estimated Change in Outcome (Adjusted)	95% Confidence interval	*P* Value
Payment for Birth						
Private	1.9	1.6, 2.1	<0.001	1.3	1.0, 1.5	<0.001
Medicaid	-1.4	-1.7, -1.2	<0.001	-0.8	-1.1, -0.6	<0.001
Self-Pay	-0.3	-0.4, -0.1	<0.001	-0.3	-0.5, -0.2	<0.001
Prenatal Care						
Early Prenatal Care	1.0	0.7, 1.2	<0.001	1.0	0.7, 1.2	<0.001
Adequate Prenatal Care	0.4	0.2, 0.6	<0.001	0.4	0.1, 0.6	0.004
Birth Outcomes						
Cesarean Delivery	0.005	-0.3, 0.3	0.97	-0.001	-0.3, 0.3	0.99
Preterm Birth	-0.2	-0.3, -0.03	0.02	-0.2	-0.4, -0.02	0.02
Low Birthweight	-0.01	-0.1, 0.1	0.91	-0.02	-0.2, 0.1	0.75
NICU Admission	-0.1	-0.3, -0.3	0.11	-0.1	-0.3, 0.03	0.12

Notes: Estimates are given in percentage-points. Exposure group includes births to 24-25 year-old women and control group includes births to 27-28 year-old women. All models analyze data from 2009-2013 excluding 2010 as the policy-implementation period and use robust standard errors (N=2,930,197). Adjusted models are adjusted for month of delivery; a monthly linear time trend; maternal marital status, age, race, ethnicity, and education; whether the birth was a woman's first live birth; multiple delivery; paternal age; and monthly unemployment rates. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 6 Sensitivity Analysis Adjusting for Payment for Birth

Outcome	Main Regression			Adjusted for Payment for Birth		
	Estimated Change in Outcome (Adjusted)	95% Confidence interval	*P* Value	Estimated Change in Outcome (Adjusted)	95% Confidence interval	*P* Value
Prenatal Care						
Early Prenatal Care	1.0	0.7, 1.2	<0.001	0.7	0.5, 1.0	<0.001
Adequate Prenatal Care	0.4	0.2, 0.6	<0.001	0.2	-0.04, 0.4	0.09
Birth Outcomes						
Cesarean Delivery	0.005	-0.3, 0.3	0.97	0.07	-0.2, 0.3	0.61
Preterm Birth	-0.2	-0.3, -0.03	0.02	-0.1	-0.3, 0.01	0.06
Low Birthweight	-0.01	-0.1, 0.1	0.91	0.03	-0.1, 0.2	0.67
NICU Admission	-0.1	-0.3, -0.3	0.11	-0.07	-0.2, 0.1	0.31

Notes: Estimates are given in percentage-points. Exposure group includes births to 24-25 year-old women and control group includes births to 27-28 year-old women. All models analyze data from 2009-2013 excluding 2010 as the policy-implementation period and use robust standard errors (N=2,930,197). Adjusted models are adjusted for payment source for birth; month of delivery; a monthly linear time trend; maternal marital status, age, race, ethnicity, and education; whether the birth was a woman's first live birth; multiple delivery; paternal age; and monthly unemployment rates. Early prenatal care is defined as having the first prenatal visit in the first trimester (0-3 months). Adequate prenatal care is defined by the Adequacy of Prenatal Care Utilization (APNCU) index.

eTable 7

Differential Changes in Maternal and Paternal Characteristics in the Exposure (24-25 years) and Control Group (27-28 years) Before and After the Dependent Coverage Provision, Stratified by Marital Status

| | Unmarried | | | | | | Married | | | | | |
| | Control | | Exposure | | | | Control | | Exposure | | | |
	Pre-Policy	Post-Policy	Pre-Policy	Post-Policy	Differential Change Exposure-Control	P Value	Pre-Policy	Post-Policy	Pre-Policy	Post-Policy	Differential Change Exposure-Control	P Value
Total Sample size, No. Births	101,776	393,999	136,407	527,238	--	--	223,788	831,629	162,617	552,743	--	--
Maternal age, mean (years)	27.5 (27.5, 27.5)	27.5 (27.5, 27.5)	24.5 (24.5, 24.5)	24.5 (24.5, 24.5)	0.00 (-0.00, 0.0)	0.91	27.5 (27.5, 27.5)	27.5 (27.5, 27.5)	24.5 (24.5, 24.5)	24.5 (24.5, 24.5)	0.00 (-0.00,0.00)	0.89
Hispanic ethnicity	36.8 (36.5, 37.1)	31.0 (30.8, 31.1)	34.5 (34.3, 34.8)	28.7 (28.6, 28.9)	0.04 (-0.4, 0.5)	0.85	21.5 (21.4, 21.7)	17.7 (17.6, 17.8)	25.4 (25.2, 25.6)	21.9 (21.8, 22.0)	0.4 (0.0, 0.7)	0.02
Race												
White	70.0 (69.8, 70.3)	67.6 (67.5, 67.8)	70.8 (70.6, 71.0)	67.0 (66.9, 67.2)	-1.4 (-1.8, -0.9)	<0.001	84.8 (84.7, 85.0)	84.0 (84.0, 84.1)	87.0 (86.8, 87.1)	85.6 (85.5, 85.7)	-0.6 (-0.8, -0.3)	<0.001
Black	25.2 (25.0, 25.5)	27.4 (27.3, 27.5)	25.0 (24.8, 25.2)	28.8 (28.6, 28.9)	1.6 (1.2, 2.0)	<0.001	6.7 (6.6, 6.8)	7.2 (7.1, 7.3)	6.8 (6.6, 6.9)	7.6 (7.6, 7.7)	0.4 (0.2, 0.6)	<0.001
Other	4.7 (4.6, 4.9)	5.0 (4.9, 5.0)	4.2 (4.1, 4.3)	4.2 (4.1, 4.2)	-0.3 (-0.5, -0.1)	0.01	8.4 (8.3, 8.5)	8.8 (8.7, 8.8)	6.3 (6.2, 6.4)	6.8 (6.7, 6.8)	0.2 (0.0, 0.3)	0.10
Education												
Less than High School	26.7 (26.4, 27.0)	22.0 (21.9, 22.1)	26.3 (26.0, 26.5)	21.7 (21.5, 21.8)	0.1 (-0.3, 0.5)	0.61	10.6 (10.5, 10.8)	8.3 (8.2, 8.3)	14.6 (14.4, 14.8)	11.9 (11.8, 12.0)	-0.3 (-0.6, -0.1)	0.01
High School	57.9 (57.6, 58.3)	60.2 (60.1, 60.4)	62.4 (62.2, 62.7)	65.8 (65.7, 65.9)	1.1 (0.7, 1.6)	<0.001	40.0 (39.8, 40.2)	37.8 (37.7, 37.9)	54.7 (54.4, 54.9)	54.3 (54.2, 54.5)	1.9 (1.5, 2.2)	<0.001
Any Post-Secondary	15.3 (15.1, 15.6)	17.8 (17.6, 17.9)	11.3 (11.2, 11.5)	12.5 (12.4, 12.6)	-1.2 (-1.5, -0.9)	<0.001	49.3 (49.1, 49.6)	53.9 (53.8, 54.0)	30.8 (30.5, 31.0)	33.8 (33.7, 33.9)	-1.5 (-1.9, -1.2)	<0.001
First live birth	29.8 (29.6, 30.1)	31.1 (30.9, 31.2)	38.6 (38.3, 38.9)	39.2 (39.1, 39.3)	-0.6 (-1.1, -0.2)	0.01	41.0 (40.8, 41.2)	43.3 (43.2, 43.4)	43.9 (43.6, 44.1)	45.1 (44.9, 45.2)	-1.1 (-1.5, -0.7)	<0.001
Multiple delivery	3.1 (3.0, 3.2)	3.0 (3.0, 3.1)	2.8 (2.7, 2.9)	2.8 (2.7, 2.8)	0.1 (-0.1, 0.2)	0.40	3.3 (3.2, 3.3)	3.3 (3.3, 3.4)	2.7 (2.6, 2.8)	2.6 (2.5, 2.6)	-0.2 (-0.3, -0.1)	0.001
Paternal age, mean (years)	30.1 (30.0, 30.1)	30.2 (30.2, 30.3)	27.7 (27.6, 27.7)	27.7 (27.7, 27.7)	-0.1 (-0.2, -0.06)	0.006	30.3 (30.3, 30.3)	30.3 (30.3, 30.3)	27.8 (27.7, 27.8)	27.7 (27.7, 27.8)	-0.01 (-0.04, 0.02)	0.43

Notes: Estimates are given as percentage points unless otherwise noted. Differential change represents the difference in the change in each characteristic from pre- to policy in the exposure group relative to the control group, for example, the mean maternal age increased by 0.00 more years in the married exposure

group relative to the married control group. Estimates are based on an unadjusted model with robust standard errors analyzing data from 2009-2013 and excluding 2010 as the policy-implementation period.