Supplemental Online Content

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

eAppendix: Primary Regression Specification

The trends and level/trend changes in the quarterly percentage of deliveries with an associated immediate postpartum LARC in each state were estimated with the following regression specification:

$$Y_{ht} = \alpha + \beta * Time_{ht} + \delta * Post_{ht} + \gamma * TimePost_{ht} + \tau_h + \epsilon_{ht}$$

$Time_{ht}$ was a quarterly time trend being in the first quarter of 2011 through the last quarter of 2017. $Post_{ht}$ was an indicator equal to 1 for quarters after the start of the policy change and zero for quarters before the start of the policy change. $Time * Post_{ht}$ is an interaction term between the quarterly time trend and the post policy indicator. In the above equation, β captures the quarterly percentage point change in deliveries with IPP-LARC during the pre-policy period, δ captures the level change in the percentage of deliveries with IPP-LARC at the time of policy onset, γ captures the quarterly percentage point change in deliveries with IPP-LARC during the post-policy period relative to the pre-policy period, τ_h captures hospital fixed effects, and ϵ_{ht} is an error term, which allows for autocorrelation, heteroskedasticity, and cross-sectional dependence of observations within states. $TimePost_{ht}$ is defined such that it is 0 through the time of policy onset, after which it is incremented by 1.

eTable1: Diagnosis and Procedure Codes for Identification of Hospitalizations for Childbirth

Delivery Code(s)	Description
ICD-9-CM	
V27	Outcome of delivery (e.g., singleton, live; twins, one live one stillborn; other multiple births, all live)
650	Normal delivery
72.0-72.9	Selected procedures for forceps, vacuum, and breech deliveries
73.22, 73.59, 73.6	Other procedures inducing or assisting delivery
74.0-74.99	Cesarean section and removal of fetus
ICD-10-CM	
Z37	Outcome of delivery (e.g., single live birth; single stillbirth; quadruplets, some liveborn; unspecified)
O80	Encounter for delivery
ICD-10-PCS	
10E0XZZ	Spontaneous delivery
10D00Z0-10D00Z2	Cesarean delivery
10D07Z3-10D07Z8	Operative delivery
DRG	
370-375	Complicated cesarean section, uncomplicated cesarean section, complicated vaginal delivery, etc.
765-775	Cesarean delivery, vaginal delivery, etc.
Exclusion Code(s)	**Description**
ICD-9-CM	
63.0-63.9	Hydatidiform mole, abnormal production of conception, ectopic pregnancy, abortion, related complications
69.01, 69.51	Dilation/curettage for termination of pregnancy, aspiration curettage of uterus for termination of pregnancy
74.91, 75.0	Hysterotomy to terminate pregnancy, abortion of products of conception
ICD-10-CM	
O00, O01, O02, O08	Abnormal products of conception
O03, O04, O07, Z33.2	Abortion
ICD-10-PCS	
10A07Z6, 10A07ZW, 10A07ZX, 10A07ZZ, 10A03ZZ, 10A04ZZ, 10A07ZX	Abortion

eTable 2: Diagnosis and Procedure Codes for Identification of Immediate Postpartum LARC

Delivery Code(s)	Description
ICD-9 Diagnosis	
V25.11, V25.5	Encounter for insertion: intrauterine contraceptive, implantable subdermal contraceptive
ICD-9 Procedure	
69.7	Insertion of intrauterine contraceptive device
ICD-10 Diagnosis	
Z30.014, Z30.017	Encounter for initial prescription: intrauterine contraceptive, implantable subdermal contraceptive
Z30.430	Encounter for insertion of intrauterine contraceptive device
ICD-10 Procedure	
0UH97HZ, 0UH98HZ	Insertion of contraceptive device into uterus, via natural or artificial opening ± endoscopic
0UHC7HZ,	Insertion of contraceptive device into cervix, via natural or artificial opening ± endoscopic
0UHC8HZ 0UH90HZ	Insertion of contraceptive device into uterus, open approach
0JH60HZ, 0JH63HZ	Insertion of contraceptive device in chest subcutaneous tissue and fascia: open vs. perc
0JH80HZ, 0JH83HZ	Insertion of contraceptive device in abdominal subcutaneous tissue and fascia: open vs. perc
0JHD0HZ, 0JHD3HZ	Insertion of contraceptive device in right upper arm subcutaneous tissue and fascia: open vs. perc
0JHF0HZ, 0JHF3HZ	Insertion of contraceptive device in left upper arm subcutaneous tissue and fascia: open vs. perc
0JHG0HZ, 0JHG3HZ	Insertion of contraceptive device in right lower arm subcutaneous tissue and fascia: open vs. perc
0JHH0HZ, 0JHH3HZ	Insertion of contraceptive device in left lower arm subcutaneous tissue and fascia: open vs. perc
0JHL0HZ, 0JHL3HZ	Insertion of contraceptive device in right upper leg subcutaneous tissue and fascia: open vs. perc
0JHM0HZ,	Insertion of contraceptive device in left upper leg subcutaneous tissue and fascia: open vs. perc
0JHM3HZ 0JHN0HZ,	Insertion of contraceptive device in right lower leg subcutaneous tissue and fascia: open vs. perc
0JHN3HZ 0JHP0HZ,	Insertion of contraceptive device in left lower leg subcutaneous tissue and fascia: open vs. perc
0JHP3HZ	
CPT/HCPCS	
11981	Insertion, non-biodegradable drug delivery implant, Implanon or Nexplanon
58300	Insertion of IUD
Q0090	Levonorgestrel-releasing intrauterine contraceptive system, (Skyla), 13.5 mg
J7297-J7307	Contraceptive devices (e.g., levonorgestrel-releasing intrauterine/implant contraceptive system)
S4981-S4989	Insertion of levonorgestrel-releasing intrauterine system; intrauterine contraceptive, implant

eTable 3: Demographic Information by State of all Medicaid-Insured Individuals with Delivery Episodes Prior to Medicaid Reimbursement Policy Change

Characteristic	% GA Deliveries n = 212 803	% IA Deliveries n = 40 364	% MD Deliveries n = 103 841	% NY Deliveries n = 350 347	% RI Deliveries n = 19 450
Age					
12-17 years	4.2% (8,981 / 212,803)	3.2% (1,298 / 40,364)	3.4% (3,508 / 103,841)	2.4% (8,565 / 350,347)	3.2% (624 / 19,450)
18-29 years	71.8% (152,812 / 212,803)	76.5% (30,874 / 40,364)	67.0% (69,542 / 103,841)	63.6% (222,825 / 350,347)	68.6% (13,336 / 19,450)
30-35 years	17.6% (37,380 / 212,803)	15.7% (6,347 / 40,364)	21.5% (22,376 / 103,841)	23.7% (82,903 / 350,347)	20.6% (4,003 / 19,450)
36-50 years	6.4% (13,630 / 212,803)	4.6% (1,845 / 40,364)	8.1% (8,415 / 103,841)	10.3% (36,054 / 350,347)	7.6% (1,487 / 19,450)
Race/Ethnicity					
Hispanic	14.5% (30,726 / 211,261)	11.6% (4,374 / 37,588)	21.0% (21,007 / 99,897)	26.5% (92,565 / 349,287)	37.1% (6,626 / 17,872)
Non-Hispanic Black	45.8% (96,773 / 211,261)	11.5% (4,323 / 37,588)	44.0% (43,955 / 99,897)	20.7% (71,236 / 349,287)	12.2% (2,176 / 17,872)
Non-Hispanic White	33.2% (70,094 / 211,261)	71.8% (26,990 / 37,588)	26.3% (26,302 / 99,897)	27.5% (96,103 / 349,287)	45.6% (8,150 / 17,872)
Non-Hispanic Other	6.5% (13,668 / 211,261)	5.1% (1,901 / 37,588)	8.6% (8,633 / 99,897)	25.3% (88,483 / 349,287)	5.1% (920 / 17,872)
Below Median Education Zip Code[a]	76.4% (161,562 / 211,338)	43.7% (17,564 / 40,162)	---	81.2% (240,084 / 295,834)	72.5% (14,066 / 19,399)
Below 1st Quartile Income Zip Code	36.8% (77,617 / 211,128)	10.3% (4,136 / 40,127)	14.8% (15,291 / 103,239)	27.9% (82,326 / 295,501)	48.3% (9,353 / 19,380)
IPP-LARC Utilization[b]	0.2% (520 / 212,803)	0.3% (110 / 40,364)	0.6% (650 / 103,841)	0.2% (803 / 350,347)	0.9% (184 / 19,450)

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Zip code level educational attainment data unavailable for MD
[b]IPP-LARC utilization refers to the share of deliveries accompanied by an inpatient LARC insertion in the immediate postpartum period.

eTable 4: Demographic Information for all Commercially Insured Individuals with Delivery Episodes Prior to Reimbursement Policy Change for Inpatient LARC[a]

Characteristic	**% Deliveries n = 751 219**
Age	
12-17 years	0.7% (5,141 / 751,219)
18-29 years	39.4% (295,845 / 751,219)
30-35 years	41.4% (311,213 / 751,219)
36-50 years	18.5% (139,020 / 751,219)
Race	
Hispanic	6.6% (48,290 / 736,454)
Non-Hispanic Black	13.7% (101,211 / 736,454)
Non-Hispanic White	66.1% (486,978 / 736,454)
Non-Hispanic Other	13.6% (99,975 / 736,454)
Below Median Education Zip Code[b]	44.4% (271,402 / 610,606)
Below 1st Quartile Income Zip Code	9.4% (70,431 / 746,128)
IPP-LARC Utilization[c]	0.0% (291 / 751,219)

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Demographic information pooled across all states in the sample (GA, IA, MD, NY, RI).
[b]Zip code level educational attainment data unavailable for MD
[c]IPP-LARC utilization refers to the share of deliveries accompanied by an inpatient LARC insertion in the immediate postpartum period.

eTable 5: Testing for Structural Break Points in the Share of Medicaid-Insured Deliveries with Immediate Postpartum LARC Uptake

	Timing of Policy Change	Estimated Timing of Structural Breaks	F Statistic	P Value
Georgia	Q2 2014	Q4 2015	68.6	< 0.001
		Q3 2015	64.6	< 0.001
		Q2 2015	26.0	< 0.001
		Q1 2015	18.7	< 0.001
		Q2 2014	**18.4**	**< 0.001**
Iowa	Q1 2014	Q1 2016	16.9	< 0.001
		Q2 2016	9.5	< 0.001
		Q4 2015	9.0	0.001
		Q2 2014	4.2	0.027
		Q1 2014	**3.5**	**0.048**
Maryland	Q3 2014	Q3 2016	17.8	< 0.001
		Q2 2016	16.9	< 0.001
		Q4 2016	7.9	0.002
		Q1 2016	6.9	0.004
		Q3 2015	6.7	0.005
		Q4 2015	6.3	0.006
		Q2 2015	5.9	0.008
		Q4 2014	4.5	0.022
		Q1 2015	3.9	0.034
		Q3 2014	**3.3**	**0.055**
New York	Q2 2014	**Q2 2014**	**137.1**	**< 0.001**
Rhode Island	Q1 2015	Q3 2015	112.5	< 0.001
		Q4 2015	95.3	< 0.001
		Q4 2014	82.6	< 0.001
		Q1 2015	**82.5**	**< 0.001**

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

Testing for the presence of structural breaks in time series of states' seasonality-adjusted share of deliveries with IPP-LARC uptake. Structural breaks are estimated using sequential Chow tests for break points between Q3 2011 and Q2 2017, with corresponding F statistics and p values. For each state, the results are reported in decreasing statistical significance until the estimated structural break aligns with the true timing of policy change. Unlike in Iowa and Maryland, the results for Georgia, New York, and Rhode Island suggest there is strong evidence of a structural break around the timing of policy change.

eTable 6: Adjusted Interrupted Time Series Estimates of Immediate Postpartum LARC Uptake Among Medicaid Insured Individuals Before and After Medicaid Reimbursement Change for LARC Provision

	Georgia[b]	**Iowa**[b]	**Maryland**[b]	**New York**[b]	**Rhode Island**[b]
Quarterly percentage point change during pre-policy period	-0.02 (-0.05, 0.02) p = 0.39	0.07 (0.01, 0.14) * p = 0.04	0.07 (0.05, 0.10) *** p < 0.001	0.01 (0.00, 0.02) p = 0.16	0.06 (0.01, 0.11) * p = 0.03
Level change at time of policy onset	-0.17 (-0.54, 0.19) p = 0.35	-0.28 (-0.63, 0.07) p = 0.12	-0.30 (-0.62, 0.03) p = 0.07	-0.02 (-0.13, 0.09) p = 0.73	-0.16 (-1.20, 0.87) p = 0.76
Quarterly percentage point change during post-policy period relative to pre-policy period	0.15 (0.12, 0.18) *** p < 0.001	0.07 (0.01, 0.12) * p = 0.02	0.00 (-0.03, 0.04) p = 0.80	0.18 (0.17, 0.20) *** p < 0.001	0.79 (0.69, 0.89) *** p < 0.001
Overall change at end of Q4 2017 relative to estimated counterfactual[a]	1.93 (1.21, 2.66) *** p < 0.001	0.65 (-0.20, 1.50) p = 0.13	-0.24 (-0.80, 0.33) p = 0.41	2.56 (2.32, 2.80) *** p < 0.001	8.55 (7.53, 9.57) *** p < 0.001

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Absolute change in fraction of Medicaid insured deliveries with IPP-LARC placement. Estimated effects are relative to the predicted counterfactual fraction of deliveries with associated IPP-LARC through the end of Q4 2017 in all states.
[b]All estimates are adjusted for seasonality with quarter fixed effects, for clustering of observations by hospital with hospital fixed effects, and for state-quarter share of mothers of Black and/or Hispanic race/ethnicity, share of mothers from zip codes with below 25th percentile income, and share of mothers from zip codes with below median educational attainment. Driscoll-Kraay standard errors are used to account for autocorrelation, heteroskedasticity, and cross-sectional dependence of observations within states.

eTable 7: Interrupted Time Series Estimates for Iowa and New York Following Inclusion of Immediate Postpartum LARCs from State Ambulatory Data[a]

	Iowa[c]		**New York**[c]	
	Medicaid Insured	Commercially Insured	Medicaid Insured	Commercially Insured
Additional LARCs Observed in State Ambulatory Databases	5 (Among 145,304 Post-Policy Deliveries)		85 (Among 849,646 Post-Policy Deliveries)	
Quarterly percentage point change during pre-policy period	0.08 (0.05, 0.11) *** p < 0.001	0.02 (0.01, 0.03) *** p < 0.001	0.00 (0.00, 0.01) p = 0.22	0.00 (0.00, 0.00) ** p = 0.01
Level change at time of policy onset	-0.28 (-0.62, 0.07) p = 0.11	0.04 (-0.08, 0.15) p = 0.55	-0.07 (-0.22, 0.08) p = 0.35	0.01 (-0.01, 0.03) p = 0.38
Quarterly percentage point change during post-policy period relative to pre-policy period	0.05 (0.00, 0.11) * p = 0.05	0.00 (-0.02, 0.01) p = 0.72	0.17 (0.15, 0.19) *** p < 0.001	0.03 (0.02, 0.03) *** p < 0.001
Overall change at end of Q4 2017 relative to estimated counterfactual[b]	0.48 (-0.38, 1.34) p = 0.28	-0.01 (-0.29, 0.28) p = 0.97	2.32 (2.13, 2.52) *** p < 0.001	0.38 (0.35, 0.42) *** p < 0.001

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Given Medicaid program guidelines in Iowa and New York to bill IPP-LARCs on separate ambulatory claims, we supplemented inpatient data with State Ambulatory Surgery and Services Databases from HCUP in these two states.
[b]Absolute change in fraction of Medicaid insured deliveries with IPP-LARC placement. Estimated effects are relative to the predicted counterfactual fraction of deliveries with associated IPP-LARC through the end of Q4 2017 in all states.
[c]All estimates are adjusted for seasonality with quarter fixed effects and for clustering of observations by hospital with hospital fixed effects. Driscoll and Kraay standard errors are used to account for autocorrelation, heteroskedasticity, and cross-sectional dependence of observations within states.

Interrupted Time Series Estimates for Medicaid Insured Individuals in Georgia, Iowa, New York, and Rhode Island with Deliveries
eTable 8: Aggregated at the Monthly Level[a]

	Georgia[c]	**Iowa**[c]	**New York**[c]	**Rhode Island**[c]
Monthly percentage point change during pre-policy period	0.00 (-0.01, 0.00) p = 0.20	0.03 (0.02, 0.04) *** p < 0.001	0.00 (0.00, 0.00) p = 0.15	0.01 (-0.01, 0.03) p = 0.22
Level change at time of policy onset	-0.19 (-0.46, 0.09) p = 0.18	-0.34 (-0.73, 0.05) p = 0.08	-0.11 (-0.23, 0.00) p = 0.06	-0.13 (-1.18, 0.91) p = 0.80
Monthly percentage point change during post-policy period relative to pre-policy period	0.05 (0.04, 0.06) *** p < 0.001	0.02 (0.00, 0.03) * p = 0.04	0.06 (0.05, 0.06) *** p < 0.001	0.27 (0.24, 0.31) *** p < 0.001
Overall change at end of Dec 2017 relative to estimated counterfactual[b]	1.94 (1.45, 2.43) *** p < 0.001	0.42 (-0.50, 1.34) p = 0.37	2.32 (2.17, 2.47) *** p < 0.001	9.43 (8.28, 10.59) *** p < 0.001

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Maryland not included, as only discharge quarter (no admission or discharge month) provided.
[b]Absolute change in fraction of Medicaid insured deliveries with IPP-LARC placement. Estimated effects are relative to the predicted counterfactual fraction of deliveries with associated IPP-LARC through the end of 2017 in all states.
[c]All estimates are adjusted for seasonality with month fixed effects and for clustering of observations by hospital with hospital fixed effects. Driscoll and Kraay standard errors are used to account for autocorrelation, heteroskedasticity, and cross-sectional dependence of observations within states.

eTable 9: Interrupted Time Series Estimates for Medicaid Insured Individuals After Dropping Low-Volume Facilities[a]

	Georgia[c]	**Iowa[c]**	**Maryland[c]**	**New York[c]**	**Rhode Island[c]**
Facilities Dropped	50/95	75/81	21/45	95/164	8/9
Quarterly percentage point change during pre-policy period	-0.01 (-0.03, 0.01) p = 0.19	0.18 (0.10, 0.25) *** p < 0.001	0.07 (0.05, 0.08) *** p < 0.001	0.00 (0.00, 0.01) p = 0.31	0.03 (-0.01, 0.07) p = 0.10
Level change at time of policy onset	-0.18 (-0.55, 0.18) p = 0.33	-0.58 (-1.43, 0.26) p = 0.18	-0.26 (-0.71, 0.18) p = 0.24	-0.04 (-0.17, 0.09) p = 0.54	-0.24 (-1.32, 0.83) p = 0.64
Quarterly percentage point change during post-policy period relative to pre-policy period	0.16 (0.12, 0.20) *** p < 0.001	0.11 (-0.02, 0.24) p = 0.09	0.04 (-0.01, 0.09) p = 0.09	0.18 (0.17, 0.20) *** p < 0.001	1.03 (0.90, 1.16) *** p < 0.001
Overall change at end of Q4 2017 relative to estimated counterfactual[b]	2.04 (1.47, 2.61) *** p < 0.001	0.96 (-1.12, 3.03) p = 0.37	0.22 (-0.13, 0.57) p = 0.21	2.53 (2.32, 2.75) *** p < 0.001	11.09 (10.20, 11.97) *** p < 0.001

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Abbreviations: IPP-LARC, immediate postpartum long-acting reversible contraception

[a]Low-volume hospitals are defined as in Handley et al. (2021), namely hospitals with an average number of deliveries per year less than 500.

[b]Absolute change in fraction of Medicaid insured deliveries with IPP-LARC placement. Estimated effects are relative to the predicted counterfactual fraction of deliveries with associated IPP-LARC through the end of Q4 2017 in all states.

[c]All estimates are adjusted for seasonality with quarter fixed effects and for clustering of observations by hospital with hospital fixed effects. Driscoll and Kraay standard errors are used to account for autocorrelation, heteroskedasticity, and cross-sectional dependence of observations within states.