Supplemental Online Content

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

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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, \( \beta \) captures the quarterly percentage point change in deliveries with IPP-LARC during the pre-policy period, \( \delta \) captures the level change in the percentage of deliveries with IPP-LARC at the time of policy onset, \( \gamma \) captures the quarterly percentage point change in deliveries with IPP-LARC during the post-policy period relative to the pre-policy period, \( \tau_h \) captures hospital fixed effects, and \( \epsilon_{ht} \) 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                                                              |
| **ICD-9 Procedure**              | 69.7                                                                        |
| **ICD-10 Diagnosis**             | Z30.014, Z30.017, Z30.430                                                   |
| **ICD-10 Procedure**             | 0UH97HZ, 0UH98HZ, 0UHC7HZ, 0UHC8HZ, 0UH90HZ, 0JH60HZ, 0JH63HZ, 0JH80HZ, 0JH83HZ, 0JHD0HZ, 0JHD3HZ, 0JHF0HZ, 0JHF3HZ, 0JHG0HZ, 0JHG3HZ, 0JHH0HZ, 0JHH3HZ, 0JHL0HZ, 0JHL3HZ, 0JHM0HZ, 0JHM3HZ, 0JHN0HZ, 0JHN3HZ, 0JHP0HZ, 0JHP3HZ | Insertion of contraceptive device into uterus, via natural or artificial opening ± endoscopic; Insertion of contraceptive device into cervix, via natural or artificial opening ± endoscopic; Insertion of contraceptive device into uterus, open approach; Insertion of contraceptive device in chest subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in abdominal subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in right upper arm subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in left upper arm subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in right lower arm subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in left lower arm subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in right upper leg subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in left upper leg subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in right lower leg subcutaneous tissue and fascia: open vs. perc; Insertion of contraceptive device in left lower leg subcutaneous tissue and fascia: open vs. perc |
| **CPT/HCPCS**                    | 11981, 58300, Q0090, J7297-J7307, S4981-S4989                              |
|                                  | Insertion, non-biodegradable drug delivery implant, Implanon or Nexplanon; Insertion of IUD; Levonorgestrel-releasing intrauterine contraceptive system, (Skyla), 13.5 mg; Contraceptive devices (e.g., levonorgestrel-releasing intrauterine/implant contraceptive system); 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 / 212,803)      | 11.6% (4,374 / 40,364)      | 21.0% (21,007 / 103,841)    | 26.5% (92,565 / 350,347)    | 37.1% (6,626 / 17,872)      |
| Non-Hispanic Black                     | 45.8% (96,773 / 212,803)      | 11.5% (4,323 / 40,364)      | 44.0% (43,955 / 103,841)    | 20.7% (71,236 / 350,347)    | 12.2% (2,176 / 17,872)      |
| Non-Hispanic White                     | 33.2% (70,094 / 212,803)      | 71.8% (26,990 / 40,364)     | 26.3% (26,302 / 103,841)    | 27.5% (96,103 / 350,347)    | 45.6% (8,150 / 17,872)      |
| Non-Hispanic Other                     | 6.5% (13,668 / 212,803)       | 5.1% (1,901 / 40,364)       | 8.6% (8,633 / 103,841)      | 25.3% (88,483 / 350,347)    | 5.1% (920 / 17,872)         |
| Below Median Education Zip Codea       | 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 Utilizationb                  | 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

aZip code level educational attainment data unavailable for MD  
bIPP-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 LARCa

| 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 Codeb            | 44.4% (271,402 / 610,606) |
| Below 1st Quartile Income Zip Code          | 9.4% (70,431 / 746,128) |
| IPP-LARC Utilizationc                        | 0.0% (291 / 751,219) |

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

aDemographic information pooled across all states in the sample (GA, IA, MD, NY, RI).
bZip code level educational attainment data unavailable for MD
cIPP-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

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

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

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 25\(^{th}\) 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

|                        | Iowa<sup>c</sup>          | New York<sup>c</sup>         |
|------------------------|---------------------------|-------------------------------|
|                        | 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) *** | 0.02 (0.01, 0.03) *** | 0.00 (0.00, 0.01) | 0.00 (0.00, 0.00) ** |
|                        | p < 0.001          | p < 0.001                    | p = 0.22 | p = 0.01 |
| Level change at time of policy onset | -0.28 (-0.62, 0.07) | 0.04 (-0.08, 0.15) | -0.07 (-0.22, 0.08) | 0.01 (-0.01, 0.03) |
|                        | p = 0.11            | p = 0.55                    | p = 0.35 | p = 0.38 |
| Quarterly percentage point change during post-policy period relative to pre-policy period | 0.05 (0.00, 0.11) * | 0.00 (-0.02, 0.01) | 0.17 (0.15, 0.19) *** | 0.03 (0.02, 0.03) *** |
|                        | p = 0.05            | p = 0.72                    | p < 0.001 | p < 0.001 |
| Overall change at end of Q4 2017 relative to estimated counterfactual<sup>b</sup> | 0.48 (-0.38, 1.34) | -0.01 (-0.29, 0.28) | 2.32 (2.13, 2.52) *** | 0.38 (0.35, 0.42) *** |
|                        | p = 0.28            | p = 0.97                    | p < 0.001 | p < 0.001 |

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

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

<sup>a</sup>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.

<sup>b</sup>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.

<sup>c</sup>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.

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Interrupted Time Series Estimates for Medicaid Insured Individuals in Georgia, Iowa, New York, and Rhode Island with Deliveries

cTable 8: Aggregated at the Monthly Level

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

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

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

^aMaryland not included, as only discharge quarter (no admission or discharge month) provided.

^bAbsolute 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.

^cAll 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.
**Table 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 (0.10, 0.25) \(***\) \(p < 0.001\) | 0.18 (-0.03, 0.01) \(p = 0.19\) | 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) \(***\) \(p < 0.001\) |

\(\ast\) \(p < 0.05\) \(\ast\ast\) \(p < 0.01\) \(\ast\ast\ast\) \(p < 0.001\)

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.