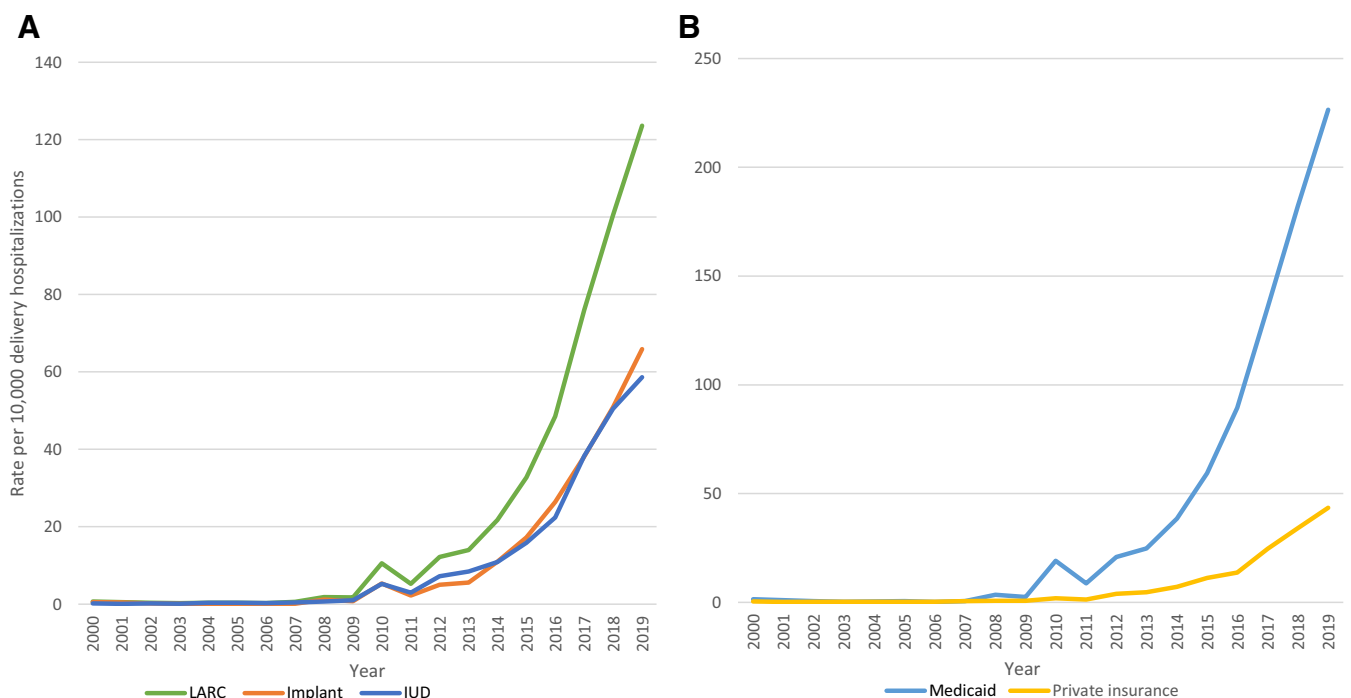


Trends in use of long-acting reversible contraception during delivery hospitalizations, 2000–2019

OBJECTIVE: Intrauterine device (IUD) or contraceptive implant placement after delivery can help reduce unintended and short-interval pregnancies and improve outcomes. The American College of Obstetricians and Gynecologists supports providing long-acting reversible contraception (LARC) immediately after childbirth, and the National

Quality Forum endorsed the practice as a high-quality care measure.^{1,2} Currently, 38 states have Medicaid reimbursement policies for LARC placement after delivery.^{3–5} To determine how practice patterns changed in the setting of these payment reforms and clinical recommendations, we analyzed trends in a large administrative database.

FIGURE
Proportion of delivery hospitalizations with LARC by year



A, demonstrates the proportion of delivery hospitalizations associated with contraceptive implant, IUD, or any LARC among deliveries without hysterectomy in the NIS from 2000 to 2019. **B**, demonstrates the proportion of delivery hospitalizations associated with any LARC among deliveries without hysterectomy in the NIS from 2000 to 2019, stratified by payer. For simplicity, only deliveries associated with Medicaid and commercial insurance are shown. These payers were associated with 93.4% of nonhysterectomy deliveries in the NIS from 2000 to 2019. For any LARC, the AAPC per 10,000 deliveries without hysterectomy with 95% CI was 28.7% (−5.3% to 75.0%) from 2000 to 2013 and 42.5% (36.5%–48.7%) from 2013 to 2019. For contraceptive implant, the AAPC per 10,000 deliveries without hysterectomy with 95% CI was 22.8% (−22.7% to 95.2%) from the 2000 to 2013 and 44.6% (38.2%–51.3%) from 2013 to 2019. For intrauterine devices, the AAPC per 10,000 deliveries without hysterectomy with 95% CI was 36.2% (7.0%–73.5%) from 2000 to 2013 and 37.6% (30.9%–44.6%) from 2013 to 2019.

B, demonstrates the proportion of delivery hospitalizations associated with any LARC among deliveries without hysterectomy in the NIS from 2000 to 2019, stratified by payer. For simplicity, only deliveries associated with Medicaid and commercial insurance are shown. These payers were associated with 93.4% of nonhysterectomy deliveries in the NIS from 2000 to 2019. For Medicaid, the AAPC per 10,000 deliveries without hysterectomy for any LARC with 95% CI was 27.7% (−11.7% to 84.9%) from 2000 to 2013 and 43.3% (36.9%–49.9%) from 2013 to 2019. For commercial insurance, the AAPC per 10,000 deliveries without hysterectomy for any LARC with 95% CI was 22.6% (10.5%–36.0%) from 2000 to 2013 and 44.9% (38.4%–51.6%) from 2013 to 2019.

AAPC, average annual percent change; CI, confidence interval; IUD, intrauterine device; LARC, long-acting reversible contraception; NIS, National Inpatient Sample.

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STUDY DESIGN: We conducted a serial cross-sectional analysis of delivery hospitalizations of patients aged 15 to 54 years included in the National Inpatient Sample (NIS) from 2000 to 2019. The NIS is a publicly available, all-payer inpatient database that approximates a 20% stratified sample of US hospitals. We identified delivery hospitalizations using validated criteria, excluding deliveries associated with hysterectomy. We characterized temporal trends in use of IUD, implants, or both during delivery hospitalizations using Joinpoint Regression Program, version 4.8.0.1 (National Cancer Institute, Bethesda, MD) to calculate the average annual percent change (AAPC) with 95% confidence intervals (CIs). We performed unadjusted and adjusted logistic regression to evaluate the association between demographic and clinical factors and likelihood of receiving inpatient LARC, reporting unadjusted and adjusted odds ratios (aORs) with 95% CIs as measures of association. In an ancillary analysis, we applied NIS population weights to evaluate national temporal trends. This analysis was deemed exempt by the Columbia University Institutional Review Board.

RESULTS: After applying study criteria, 15,917,829 deliveries were included in the analysis. The rate of LARC insertion during delivery hospitalization increased from 0.7 to 123.6 per 10,000 nonhysterectomy deliveries from 2000 to 2019 (Figure, A), whereas rates of tubal sterilization fell from 741.1 to 634.2 per 10,000 nonhysterectomy deliveries over the same interval (data not shown). The trend for inpatient LARC in the general obstetrical population demonstrated an inflection in 2013 in a 3-joinpoint model, with an AAPC of 42.5% (95% CI, 36.5%–48.7%) from 2013 to 2019. By 2019, LARC was placed in 226.5 per 10,000 nonhysterectomy deliveries among Medicaid beneficiaries (AAPC, 2013–2019, 43.3%; 95% CI, 36.9%–49.9%) vs 43.5 per 10,000 among the commercially insured (AAPC, 2013–2019, 44.9%; 95% CI, 38.4%–51.6%) (Figure, B). Deliveries to women with non-Hispanic Black (aOR, 2.06; 95% CI, 2.00–2.13) and Hispanic (aOR, 1.84; 95% CI, 1.78–1.90) race and ethnicity, Medicaid insurance (aOR, 3.59; 95% CI, 3.48–3.71), lowest ZIP code-income quartile (aOR, 1.64; 95% CI, 1.58–1.71), and deliveries at urban teaching hospitals (aOR, 6.11; 95% CI, 5.81–6.43) had higher odds of inpatient LARC (Supplemental Table). After applying population weights, an estimated 76,635,914 deliveries demonstrated similar trends and adjusted models (data not shown).

CONCLUSION: Use of immediate postpartum LARC among Medicaid beneficiaries dramatically increased after 2013, suggesting increased uptake in the setting of Medicaid payment reforms and clinical recommendations. Inpatient LARC use also increased among a smaller proportion of the commercially insured from 2013 to 2019.³ Low-income women and non-Hispanic Black and Hispanic women were significantly more likely to receive inpatient LARC from 2000 to 2019. These populations have higher rates of Medicaid enrollment. Further research is indicated to ensure that LARC use is

optimal in fulfilling the contraceptive needs and preferences for these populations. ■

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SUPPLEMENTAL TABLE

Unadjusted and adjusted odds for immediate postpartum long-acting reversible contraception among deliveries without a hysterectomy (unweighted)

Demographic, hospital and clinical factors	Unadjusted odds ratio (95% CI) for LARC at delivery	Adjusted odds ratio (95% CI) for LARC at delivery
Risk factors		
Hospital region		
Northeast	Ref	Ref
Midwest	0.65 (0.63–0.67)	0.73 (0.71–0.76)
South	0.58 (0.57–0.60)	0.56 (0.54–0.57)
West	0.72 (0.70–0.74)	0.78 (0.75–0.81)
Hospital location and teaching status		
Urban, nonteaching	Ref	Ref
Urban, teaching	13.59 (12.93–14.28)	6.11 (5.81–6.43)
Rural	1.18 (1.07–1.30)	0.75 (0.68–0.83)
Hospital bed size		
Small	Ref	Ref
Medium	1.05 (1.01–1.10)	1.38 (1.32–1.44)
Large	1.84 (1.77–1.91)	2.97 (2.86–3.09)
Age category		
15–19 y old	1.37 (1.32–1.42)	1.74 (1.67–1.80)
20–24 y old	1.19 (1.15–1.22)	1.20 (1.17–1.24)
25–29 y old	Ref	Ref
30–34 y old	0.80 (0.78–0.83)	0.89 (0.86–0.91)
35–39 y old	0.78 (0.75–0.81)	0.79 (0.76–0.83)
40–54 y old	0.76 (0.70–0.82)	0.67 (0.62–0.73)
Maternal race		
Non-Hispanic White	Ref	Ref
Non-Hispanic Black	4.79 (4.65–4.94)	2.06 (2.00–2.13)
Hispanic	3.26 (3.17–3.36)	1.84 (1.78–1.90)
Other	2.34 (2.25–2.44)	1.71 (1.64–1.78)
Unknown	0.46 (0.43–0.49)	1.48 (1.40–1.57)
Payer		
Medicare	8.66 (7.92–9.46)	5.30 (4.83–5.80)
Medicaid	5.69 (5.53–5.86)	3.59 (3.48–3.71)
Private insurance	Ref	Ref
Self-pay	2.84 (2.65–3.04)	2.72 (2.54–2.92)
No charge	1.98 (1.44–2.71)	2.98 (2.17–4.10)
Other	1.83 (1.67–2.00)	1.78 (1.63–1.95)
ZIP code-income quartile		
First quartile	4.83 (4.66–5.02)	1.64 (1.58–1.71)
Second quartile	2.32 (2.23–2.42)	1.25 (1.20–1.31)

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(continued)

SUPPLEMENTAL TABLE

Unadjusted and adjusted odds for immediate postpartum long-acting reversible contraception among deliveries without a hysterectomy (unweighted) (continued)

Demographic, hospital and clinical factors	Unadjusted odds ratio (95% CI) for LARC at delivery	Adjusted odds ratio (95% CI) for LARC at delivery
Third quartile	1.91 (1.83–1.99)	1.20 (1.15–1.25)
Fourth quartile	Ref	Ref
Year of delivery		
2000	Ref	Ref
2001	0.72 (0.48–1.09)	0.76 (0.50–1.14)
2002	0.56 (0.37–0.87)	0.58 (0.38–0.89)
2003	0.40 (0.25–0.65)	0.35 (0.22–0.57)
2004	0.52 (0.34–0.81)	0.46 (0.30–0.72)
2005	0.51 (0.33–0.80)	0.43 (0.28–0.67)
2006	0.42 (0.26–0.67)	0.33 (0.20–0.52)
2007	0.83 (0.57–1.21)	0.64 (0.44–0.94)
2008	2.65 (1.96–3.60)	2.06 (1.52–2.79)
2009	2.55 (1.87–3.47)	1.65 (1.21–2.25)
2010	15.28 (11.65–20.03)	9.91 (7.54–13.01)
2011	7.56 (5.72–9.99)	4.80 (3.64–6.34)
2012	17.63 (13.46–23.10)	13.04 (9.95–17.09)
2013	20.24 (15.47–26.49)	14.87 (11.35–19.47)
2014	31.48 (24.12–41.09)	20.73 (15.87–27.08)
2015	47.45 (36.41–61.84)	31.51 (24.16–41.10)
2016	70.33 (54.02–91.57)	46.52 (35.70–60.62)
2017	110.50 (84.93–143.77)	70.40 (54.05–91.68)
2018	146.46 (112.61–190.50)	92.66 (71.16–120.64)
2019	180.50 (138.80–234.73)	113.97 (87.55–148.36)
Obstetrical factors		
Multiple gestation	1.28 (1.19–1.37)	1.19 (1.11–1.28)
Medical comorbidities		
Pregestational diabetes mellitus	3.42 (3.21–3.64)	1.71 (1.60–1.83)
Obesity	5.19 (5.04–5.33)	1.74 (1.69–1.79)
Chronic hypertension	2.80 (2.65–2.96)	1.44 (1.36–1.53)

The adjusted model included maternal age category, race, payer, income quartile, hospital location and teaching status, hospital region, hospital bed size, year of delivery, obstetrical factors (multiple gestation) and medical comorbidities (pregestational diabetes mellitus, obesity, and chronic hypertension).

CI, confidence interval; LARC, long-acting reversible contraception; Ref, reference interval.

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