GYNECOLOGY

Long-acting reversible contraceptive utilization after policy change increasing device reimbursement to wholesale acquisition cost in Louisiana

Melissa Goldin Evans, PhD; Stephanie Broyles, PhD; Brittni Frederiksen, PhD; Rebekah E. Gee, MD; Stephen Phillippi, PhD; Melinda Sothern, PhD; Katherine P. Theall, PhD; Joan Wightkin, DrPH

BACKGROUND: Unintended pregnancies, occurring in nearly 1 out of every 2 (45%) pregnancies in the United States, are associated with adverse health and social outcomes for the infant and the mother. The risk of unintended pregnancies is significantly reduced when women use long-acting reversible contraceptives, namely intrauterine devices and implants. Inadequate reimbursement for long-acting reversible contraceptive devices may be an access barrier to long-acting reversible contraceptive uptake. In 2014, the Louisiana Department of Health Bureau of Health Services Financing implemented a policy change that increased the Medicaid reimbursement rates for acquiring long-acting reversible contraceptive devices to the wholesale acquisition cost.

OBJECTIVE: To examine the association of a Medicaid policy change that increased the long-acting reversible contraceptive device reimbursement rate to the wholesale acquisition cost (ie, price set by the manufacturers) on long-acting reversible contraceptive uptake among women at risk for unintended pregnancy.

MATERIALS AND METHODS: This retrospective, repeated cross-sectional study used 2013–2015 Louisiana Medicaid claims data and contraceptive provision measures to assess associations between patient (age, race, urban/rural residence, postpartum status) and provider (urban/rural location, specialty) characteristics and long-acting reversible contraceptive uptake among contraceptive users (N = 193,623) using bivariate and logistic regression analyses.

RESULTS: After long-acting reversible contraceptive reimbursement increased, there was a 2-fold likelihood increase in use in 2015 vs 2013 (odds ratio, 2.08; 95% confidence interval, 1.69–2.55). Long-acting reversible contraceptive uptake was more likely across all patient and provider subgroups in 2015 vs 2013 but notably among patients receiving contraceptive care from family planning clinics (odds ratio, 3.93; 95% confidence interval, 2.34–6.62).

CONCLUSION: Removal of a provider-level financial barrier to long-acting reversible contraceptive provision was associated with increased long-acting reversible contraceptive uptake among women at risk for unintended pregnancy. Efforts to improve long-acting reversible contraceptive access should focus on equitable healthcare reimbursement for healthcare providers of reproductive-aged women.

Key words: contraceptive provision measures, long-acting reversible contraceptives, Medicaid claims data, multilevel analyses, policy change

Nearly one-half (45%) of all pregnancies in the United States are unintended, with little improvement over the past 30 years.[1] Unintended pregnancies are associated with adverse infant and maternal outcomes, such as preterm birth, low birthweight, maternal depression, and increased exposure to harmful substances during pregnancy.[2,3] Unintended pregnancies are also associated with short interpregnancy intervals.[4] Short interpregnancy intervals are independently associated with preterm birth.[5] Publicly funded unintended pregnancies pose substantial economic costs to society as well, but publicly funded family planning services are cost-effective in preventing unintended pregnancies.[6]

Long-acting reversible contraceptives (LARCs), including intrauterine devices (IUDs) and implants, are the most effective reversible contraceptives for preventing unintended pregnancies, short interpregnancy intervals, and abortions.[7-9] Yet only 14% of contraceptive consumers use LARCs, and the remainder rely on sterilization (28%), moderately effective methods (ie, oral pills, injectables, patch, ring, or diaphragm) (32%), and coital-based methods (eg, condoms and withdrawal) (25%).[10]

Improved access to reproductive health services and contraception can help reduce unintended pregnancy rates and adverse birth outcomes.[8,9] A review by Dehlendorf et al examined factors that lead to racial, ethnic, and socioeconomic disparities in unintended pregnancy, and found that patient, healthcare system, and provider barriers all affect access to the woman's desired contraceptive.[11] Difficulties obtaining one's preferred contraceptive method, such as same-day availability of LARCs, could result in women opting for less effective methods and methods with higher user error.[12–14]

The American College of Obstetricians and Gynecologists (ACOG) and the Centers for Disease Control and Prevention (CDC) recommend removing access barriers and adopting same-day insertion protocols to improve LARC uptake.[15,16] Landmark studies have shown that women are more likely to choose LARCs once patient access barriers are removed and comprehensive contraceptive counseling occurs.[8,9] At the provider level, financial concerns related to inadequate reimbursement can be a deciding factor in providing LARCs.[14]

Cite this article as: Goldin Evans M, Broyles S, Frederiksen B, et al. Long-acting reversible contraceptive utilization after policy change increasing device reimbursement to wholesale acquisition cost in Louisiana. Am J Obstet Gynecol 2019;221:128.e1-10.

0002-9378/$36.00

https://doi.org/10.1016/j.ajog.2019.04.024

AJOG at a Glance

Why was this study conducted?

This multilevel study used Medicaid claims data and the contraceptive provision measures to examine long-acting reversible contraceptive (LARC) uptake by women at risk for unintended pregnancy and to determine whether uptake changed following a Medicaid policy change that increased LARC device reimbursement to the wholesale acquisition cost.

Key findings

Following the device reimbursement increase, LARC uptake was 2 times more likely than the year before and more likely across all patient and provider characteristics, particularly among patients receiving contraceptive care from family planning clinics.

What does this add to what is known?

This study demonstrated that reducing cost-related barriers to providers can increase LARC access, and that contraception provision measures can be used as a quality measure of provider behavior.

Given that inadequate reimbursement may impede LARC access, this study aimed to investigate the influence of the healthcare system (Medicaid) and providers on LARC uptake. We examined this in Louisiana because its rates of unintended pregnancy (60%)[1,17] and adverse birth outcomes (eg, infant mortality, preterm birth, and low birthweight)[18] are among the highest in the country, and the rates have stark racial disparities.[18] Also, approximately two-thirds (67%) of births in Louisiana are publicly funded, of which the majority (79%) are unintended (vs 68% of the publicly funded births resulting from unintended pregnancies in the United States).[19]

The Louisiana Department of Health, Bureau of Health Services Financing (Medicaid), implemented a reimbursement rate increase for providers acquiring LARC devices, which became effective in October 2014. Reimbursement for LARC devices was increased by as much as 60% to the wholesale acquisition cost. Using a modified version of the contraceptive provision measures endorsed by the National Quality Forum,[20] this study examined uptake of LARCs by women covered by Medicaid in Louisiana from 2013 to 2015 who were using most and moderately effective contraceptive methods.

Materials and Methods

This retrospective, repeated cross-sectional study utilized 3 years of Medicaid claims data (January 1, 2013, through December 31, 2015) to measure LARC use and patterns of uptake among a patient population at risk for unintended pregnancy using a most or moderately effective contraceptive method. Each year of Medicaid data was treated as a separate measurement year when calculating contraceptive provision outcomes. Although Medicaid participants could appear in multiple years' data, individuals were not linked across measurement years.

Performance measures are an effective way to assess the quality of healthcare services.[20] The US Department of Health and Human Services' Office of Population Affairs developed and tested contraceptive provision performance measures using Medicaid claims data to measure the following: (1) the percentage of women at risk for unintended pregnancy who are provided a most (ie, female sterilization, IUDs, and implants) or moderately (ie, injectables, oral pills, patch, ring, or diaphragm) effective method; and (2) the percentage of women at risk for unintended pregnancy who are provided a LARC method.[21] Women were defined as being at risk for unintended pregnancy if they were 15–44 years old, able to become pregnant (excluding women sterile for noncontraceptive reasons), and were not pregnant at the end of the measurement year or had a pregnancy end due to miscarriage, ectopic pregnancy, induced abortion, or stillbirth.[22] Women were included in the denominator if they had a live birth in the first 10 months of the measurement year to allow adequate time for postpartum contraception.[22] The National Quality Forum (NQF) endorsed the contraceptive provision measures in November 2016.[20]

Using the NQF-endorsed contraceptive provision measures, data on the most and moderately effective contraceptives were extracted from the Medicaid claims database by International Classification of Disease, Ninth and Tenth Revisions, Clinical Modification (ICD-9-CM and ICD-10-CM), Current Procedural Terminology (CPT), Healthcare Common Procedure Coding System (HCPCS), and National Drug Code (NDC).[22] Additional patient and provider data were extracted from the Medicaid claims to better understand the underlying factors that influenced LARC uptake. This study also evaluated changes in LARC provision in 2015 vs 2013 (before vs after policy change). Because the Medicaid LARC reimbursement increase was in 2014, this year was defined as the "washout period" (ie, a time period that includes both when a previous practice was terminated and a new practice began)[23] to avoid any carryover residual effect in the regression analyses.

In accordance with the NQF contraceptive provision measures,[22] the study population consisted of women at risk for unintended pregnancy with continuous Medicaid enrollment (ie, enrolled for at least 10 consecutive months of each year) during 2013, 2014, and/or 2015. Provider-level information was available only for those with contraceptive claims; therefore, to perform a multilevel (ie, patient-level and provider-level) analysis, our denominator slightly deviated from the NQF measures' denominator of women at risk for unintended pregnancy (regardless of contraceptive use) to include only those women at risk for unintended pregnancy

using a most or moderately effective method of contraception (sterilization, IUD, implant, oral pills, injectables, patch, ring, or diaphragm).

LARC provision (IUDs and implants) was the primary outcome of interest. We selected the following independent variables available in Medicaid claims at the patient and provider levels because of their relationship to access and uptake of LARCs: age, race, patient residence in an urban or rural parish (Louisiana's equivalent of a county), postpartum status (yes/no postpartum in the measurement year), provider location in an urban or rural parish, and provider specialty (eg, obstetrician-gynecologist or family practice).

Because LARC uptake might differ by geographic location of the woman's residence and where she received contraceptive services, a patient/provider categorical variable was created in the adjusted analyses: access by urban or rural patient residence according to the location of the patient's contraceptive provider. After the 4 possible combinations of patient urban/rural and provider urban/rural were tested, it appeared that urban/urban (83.3%), rural/urban (6.9%), and rural/rural (8.1%) encompassed most combinations (data not shown). As urban/rural was only 1.7% of the LARC population, it was combined into the urban patient−urban provider population (hereafter referred to as the urban patient category). The 3 categories analyzed in the multilevel analyses were urban patient (85.0%), rural patient−urban provider (6.9%), and rural patient−rural provider (8.1%).

Provider specialties were singled out for analysis if they provided at least 5% of all LARCs or were a specialty of interest given their opportunity to provide LARCs to women at risk for unintended pregnancy (eg, pediatricians). Providers assigned to the "other" specialty type comprised 43 unique provider specialties, most of which inserted less than 1% of the LARCs in 2013−2015. In addition, some provider specialties appeared to be in error (eg, radiology, 0.7%; diagnostic laboratory, 0.4%). Because pharmacy was the primary "specialty" source of submitted claims

TABLE 1
Unadjusted prevalence (%) of contraceptive type among contraceptive users by Medicaid patient and provider characteristics: Louisiana, 2013−2015

		Contraceptive type[a]	
	Total population of contraceptive users, n	LARC users n (%)	Non-LARC contraceptive users n (%)
Overall	N = 241,858	n = 31,594 (13.1%)	n = 210,264 (86.9%)
Patient level			
Age, y			
15−17	36,484	3312 (9.08)	33,172 (90.92)
18−19	32,479	3461 (10.66)	29,018 (89.34)
20−24	62,531	10,098 (16.15)	52,433 (83.85)
25−29	53,473	8103 (15.15)	45,370 (84.85)
30−34	33,820	4179 (12.36)	29,641 (87.64)
35−39	16,179	1749 (10.81)	14,430 (89.19)
40−44	6892	692 (10.04)	6200 (89.96)
Race[b]			
Black	137,715	17,711 (12.86)	120,004 (87.14)
White	86,211	11,104 (12.88)	75,107 (87.12)
Other	9793	1599 (16.33)	8194 (83.67)
Postpartum			
Yes	48,399	11,318 (23.38)	37,081 (76.62)
No	193,459	20,276 (10.48)	173,183 (89.52)
Patient location[c]			
Urban	184,508	25,118 (13.61)	159,390 (86.39)
Rural	40,526	4307 (10.63)	36,219 (89.37)
Year			
2013	76,160	7324 (9.62)	68,836 (90.38)
2014	81,014	9742 (12.03)	71,272 (87.97)
2015	84,684	14,528 (17.16)	70,156 (82.84)
Provider level			
Provider specialty			
Obstetrician-gynecologist	30,242	12,983 (42.93)	17,259 (57.07)
Hospital/hospital system	15,729	3417 (21.72)	12,312 (78.28)
Family planning clinic	19,837	2241 (11.30)	17,596 (88.70)
Nurse practitioner	4707	1880 (39.94)	2827 (60.06)
Maternal and fetal medicine	1046	308 (29.45)	738 (70.55)
Family practice	8886	1293 (14.55)	7593 (85.45)
Pediatrics	2207	166 (7.52)	2041 (92.48)
Pharmacy	142,376	5830 (4.09)	136,546 (95.91)
Other	16,822	3475 (20.66)	13,347 (79.34)

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

(continued)

TABLE 1
Unadjusted prevalence (%) of contraceptive type among contraceptive users by Medicaid patient and provider characteristics: Louisiana, 2013–2015
(continued)

	Total population of contraceptive users, n	Contraceptive type[a]	
		LARC users n (%)	Non-LARC contraceptive users n (%)
Overall	N = 241,858	n = 31,594 (13.1%)	n = 210,264 (86.9%)
Provider location[d]			
Urban	179,845	24,095 (13.40)	155,750 (86.60)
Rural	32,656	2588 (7.93)	30,068 (92.07)

All χ^2 *P* values <.0001.

LARC, long-acting reversible contraceptive.

[a] LARC and non-LARC use reported within categories; for example, 9.08% of the 36,484 women 15–17 years of age used LARCs; [b] For race, missing data occurred at the following frequencies for the sample, LARC users, and non-LARC users: 3.4%, 3.7%, and 3.3%; [c] For patient location, missing data occurred at the following frequencies for the sample, LARC users, and non-LARC users: 7.0%, 6.9%, and 7.0%; [d] For provider location, missing data occurred at the following frequencies for the sample, LARC users, and non-LARC users: 12.1%, 15.5%, and 11.6%.

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

for non-LARC contraceptives, pharmacy was included in analyses as a distinct "specialty." Unfortunately, provider-level data from Louisiana Medicaid includes only descriptive variables that identify the individual submitting the claim. Contraceptives, like many items, can be billed as either a pharmacy or medical benefit.

All analyses were conducted using SAS version 9.3 software. First, unadjusted patient and provider characteristics associated with LARC and non-LARC uptake were determined from a frequency analysis. Unadjusted analyses of LARC provision among most and moderately effective contraceptive users, by patient and provider characteristics, found that all characteristics had statistically significant associations with LARCs ($P < .0001$) (results not shown), and thus all remained in subsequent multilevel logistic regression analyses.

Next, a generalized estimating equation version of multilevel logistic regression analysis (PROC GENMOD), which included provider as a repeated (clustered) effect, was used to determine the relationship between LARC uptake for all patient and provider characteristics. Finally, a similar logistic regression analysis was conducted to determine whether LARC uptake by patient and provider variables was moderated by time. Time (before or after the LARC reimbursement policy change year) was treated as an interaction term to determine whether patient and provider associations of LARC uptake differed when there was an increase in LARC reimbursement.

Data were missing at inconsequential levels[24] for all variables except patient parish and provider parish (7.0% and 12.1% missing, respectively). We conducted sensitivity analyses comparing results with and without patient/provider location (Supplementary Tables 1 and 2) and found no significant differences. Therefore, we chose to present results from the sample of claims with complete patient and provider location data (80.1% of the overall sample).

The Institutional Review Boards at the Louisiana State University Health Sciences Center–New Orleans and the Louisiana Department of Health approved this research.

Results

Among the population of reproductive-aged women at risk for unintended pregnancy covered by Medicaid in Louisiana in 2013, 2014, and/or 2015 who used a most or moderately effective method of contraception (N = 241,858), 13.1% used a LARC (Table 1). There were 7324 LARC users among contraceptive users (n = 76,160) in 2013; 9742 LARC users among contraceptive users (n = 81,014) in 2014; and 14,528 LARC users among contraceptive users (n = 84,684) in 2015 (data not shown). In 2013, 2674 providers were represented in the dataset (average of 28.5 patients per provider; range, 1–6398), with 2750 providers in 2014 (29.5 patients per provider; range, 1–7451), and 3046 in 2015 (27.8 patients per provider; range, 1–5649) (data not shown). The "individual" providers at the high end of the range are from family planning clinics; however, because of their centralized billing system, it appears as a large patient population because unique family planning providers are unknown.

There were 193,623 contraceptive users analyzed in the logistic regression analyses once individuals with missing data were removed. After adjusting for patient and provider characteristics (age, race, postpartum status, access by urban and rural patients/location of their contraceptive provider, and provider specialty), non-postpartum patients were significantly less likely to use LARCs compared to postpartum patients (odds ratio [OR], 0.47; 95% confidence interval [CI], 0.31–0.70), as were rural patients receiving contraceptive services from a rural provider compared to urban patients (OR, 0.56; 95% CI, 0.45–0.71). The most compelling finding was that the odds of LARC provision was more than twice as high in 2015 than in 2013 (OR, 2.08; 95% CI, 1.69–2.55) (Table 2).

When time (ie, year) was included in the adjusted analysis as an interaction term, there were nearly universal higher odds of LARC provision in 2015 vs 2013 across all patient and provider characteristics (Table 3). Notably, the odds of LARC uptake in 2015 vs 2013 were greatest among the 15- to 17-year-old age group (OR, 2.56; 95% CI, 1.99–3.28), even though each age group had higher odds of LARC uptake in 2015

than in 2013. Likewise, although each race had higher odds of LARC uptake in 2015 than 2013, the odds were greatest among black women (OR, 2.59; 95% CI, 2.14−3.13). However, as shown in the Figure, after adjusting for other patient and provider characteristics (age, postpartum status, urban/rural patient/provider location, and provider specialty), each race had similar means of uptake in 2015 (23.1% for white women, 24.6% for black women, and 24.3% for other). In addition, patients attending family planning clinics had nearly 4 times the odds of receiving a LARC in 2015 vs 2013 (OR, 3.93; 95% CI, 2.34−6.62).

Comment

In Louisiana, a Medicaid increase for LARC device reimbursement to the wholesale acquisition cost in 2014 had a substantial relationship with LARC uptake and provision across patient and provider characteristics. This study demonstrated that LARC uptake increased at the same time that a provider financial barrier to LARC provision was removed. Qualitative research by Kavanaugh et al found that most staff at publicly funded family planning facilities cited cost-related issues regarding LARC provision, including "low reimbursement" and having to "absorb some of the costs associated with providing them."[14] However, study authors did not include the precise percentage of providers reporting these barriers.[14] This study adds to the existing research on eliminating cost-related barriers for women to access LARCs,[8,9] showing that eliminating a cost-related barrier to providers is associated with increased LARC access.

LARC provision in 2015 was markedly greater than in 2013 among most provider types, including those that frequently encounter women of reproductive age, such as at family planning clinics. Although the trend in LARC use has been increasing,[10] the large increase in LARC provision in family planning clinics administered by the Title X Family Planning Program was likely due partly to LARC training efforts led by Louisiana's Office of Public Health Reproductive Health Program that began in early 2013 rather than the reimbursement policy change in October of 2014. Title X efforts included LARC education, insertion training, and operational assistance in making same-day LARC insertions possible

TABLE 2
Characteristics associated with LARC uptake over a non-LARC method, adjusted analysis[a]: Louisiana, 2013−2015 (N = 193,623)

	LARC vs non-LARC Adjusted OR (95% CI)[c]
Patient level	
Age, y	
15−17	0.91 (0.84−0.99)*
18−34	(reference)
35−44	0.71 (0.65−0.78)***
Race	
White	(reference)
Black	1.03 (0.92−1.15)
Other	1.17 (1.07−1.29)**
Postpartum	
Yes	(reference)
No	0.47 (0.31−0.70)**
Access by urban patients and by rural patients/location of their contraceptive provider	
Urban patient[b]	(reference)
Rural patient−urban provider	1.13 (0.96−1.32)
Rural patient−rural provider	0.56 (0.45−0.71)***
Year	
2013	(reference)
2014	1.39 (1.28−1.52)***
2015	2.08 (1.69−2.55)***
Provider level	
Provider specialty	
Obstetrics/gynecology	(reference)
Hospital/hospital system	0.34 (0.23−0.51)***
Family planning clinic	0.21 (0.15−0.30)***
Nurse practitioner	0.83 (0.57−1.20)
Maternal and fetal medicine	0.67 (0.37−1.21)
Family practice	0.27 (0.21−0.36)***
Pediatrics	0.15 (0.09−0.26)***
Pharmacy	0.05 (0.02−0.09)***
Other	0.29 (0.22−0.40)***

Significant results, based on *P* values, are indicated by the following asterisks: *$P < .05$, **$P < .001$, and ***$P < .0001$.

LARC, long-acting reversible contraceptive.

[a] Adjusted for age, race, postpartum status, access by urban patients and by rural patients/location of their contraceptive provider, policy year, and provider specialty; [b] The 1.7% of urban patient/rural clinic was combined into the "urban" patient category; [c] LARC vs non-LARC provision differed by age ($P < .001$), race ($P = .0032$), postpartum status ($P = .0002$), location ($P < .0001$), year ($P < .0001$), and provider specialty ($P < .0001$).

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

TABLE 3
Likelihood that a woman received a LARC in the year before (2013) the reimbursement increase (2014) compared to the year after (2015), adjusted analysis: Louisiana, 2015 vs 2013 (N = 193,623)

	OR 2015 vs 2013 (reference) (95% CI)[a]
Patient level	
Age, y	
15–17	2.56 (1.99–3.28)**
18–34	2.00 (1.66–2.41)**
35–44	1.95 (1.53–2.50)**
Race	
White	2.20 (1.81–2.67)**
Black	2.59 (2.14–3.13)**
Other	1.76 (1.37–2.25)**
Postpartum	
Yes	1.78 (1.40–2.26)**
No	2.60 (2.15–3.16)**
Access by urban patients and by rural patients/location of their contraceptive provider	
Urban patient	1.97 (1.64–2.37)**
Rural patient–urban provider	2.09 (1.56–2.81)**
Rural patient–rural provider	2.42 (1.79–3.26)**
Provider level	
Obstetrician/gynecologist	1.90 (1.52–2.38)**
Hospital/hospital system	1.66 (1.31–2.11)**
Family planning clinic	3.93 (2.34–6.62)**
Nurse practitioner	1.12 (0.73–1.74)
Maternal and fetal medicine	3.19 (1.64–6.20)*
Family practice	2.90 (1.96–4.29)**
Pediatrics	1.94 (0.88–4.32)
Pharmacy	1.13 (0.86–1.48)
Other	3.50 (2.29–5.36)**

Analysis included all years, but only the 2015 vs 2013 results are displayed.

Significant results, based on *P* values, are indicated by the following asterisks: *$P < .001$ and **$P < .0001$.

LARC, long-acting reversible contraceptive.

[a] Effect of year differed by age ($P = .0002$), race ($P = .0023$), postpartum status ($P = .0011$), provider specialty ($P < .0001$), and location ($P = .0178$).

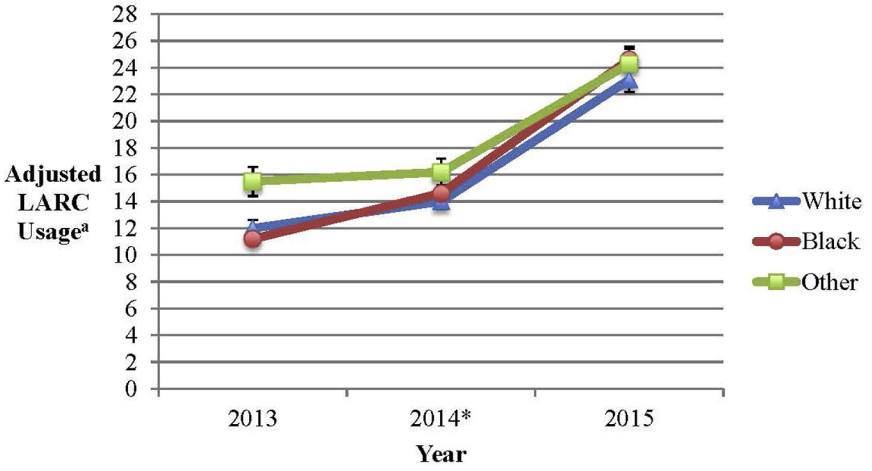
Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

throughout the Title X statewide network of clinics.

There are several strengths to the study, including use of large, population-based data to assess LARC utilization and provision to women at risk for unintended pregnancy using contraceptive claims data. This study also used Medicaid claims data, a data source that is objective, readily available, and conveniently contains multiple levels (ie, patient and provider) of data associated with the outcome.[25,26] Most of our knowledge about the types of contraceptives used by and provided to women comes from retrospective data collected from surveys or interviews.[10,14,27] Although some studies have successfully extracted contraceptive information from claims data,[9,26,28–30] few have sourced their data from Medicaid,[9,29] and no study to date has analyzed LARC provision from Medicaid claims data using multilevel analyses. Furthermore, this is 1 of the first studies[31] to exhibit the utility of the NQF-endorsed contraceptive provision measures in a state where women with Medicaid coverage have particularly high rates of unintended pregnancies.[19] More importantly, results demonstrated that the measures could be used as a foundation for a more in-depth multilevel exploration of LARC uptake and provision by extracting additional patient and provider factors available in claims data. In addition, because Medicaid incurs a substantial proportion of the costs associated with births resulting from unintended pregnancies,[19] claims were chosen to assess the impact of a Medicaid policy change to improve access and provision of LARCs. Finally, performance measures have been shown to improve the quality of reproductive healthcare and are well received by reproductive healthcare providers.[32,33] Examining LARC provision before and after a reimbursement increase demonstrated that the contraceptive provision measures could be used as a quality measure of provider behavior.

There are some limitations to our study. The generalizability is limited to the female Louisiana Medicaid population that is 15–44 years old and using contraception. Although LARC use increased over time, given the cross-sectional nature of the study design, it is unknown whether these were new contraceptive users or women who switched methods. Also, those with private insurance and without insurance may have different patterns of uptake and provision.[10] Furthermore, measuring contraceptive provision via claims data is imperfect because of inherent limitations of the data source. As with any claims-based study, claims data are subject to missing data and to recording and coding errors.[32,33] Although the amount of missing data was low (<4.0%) for most

FIGURE
Adjusted long-acting reversible contraceptive (LARC) provision in the years spanning the 2014 policy change that increased with the LARC reimbursement rate, by race: Louisiana, 2013–2015



Error bars indicate 95% confidence intervals.

[a] Least square means (SE) adjusted for age, postpartum status, access by urban patients and by rural patients/location of their contraceptive provider, and provider specialty

*The policy change occurred in 2014

SE, standard error

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

characteristics examined, higher amounts of missing data (6.9–15.5%) for patient and provider geographic location may have limited our ability to completely capture geographical differences in method uptake and provision. A sensitivity analysis revealed that although missingness was not completely random, it did not appear to bias the results presented in Tables 2 and 3. Data quality issues are not unique to Louisiana Medicaid; more than 5% of race/ethnicity data were missing from a study that used Illinois Medicaid claims to assess uptake and trends in postpartum care.[33] In addition, data and interpretation are limited to billable services, submitted claims, and the finite number of variables available on the claim form.[32,33] Medicaid claims do not describe the provider but rather the biller; thus the individual prescribing the method is unknown. Data analyses included only descriptive variables that were available and feasible to interpret from Louisiana Medicaid claims. Thus, important influential factors on the outcomes, such as LARC availability onsite for same-day insertions, were not included in the analyses. The omission of these and other potential influential factors limited our ability to develop a complete multilevel model of LARC provision. Regardless, findings elucidated the potential benefit of a health policy change to eliminate provider cost barriers to increase LARC uptake in a population at risk for unintended pregnancy.

This study of a reimbursement policy change can be used to improve the quality of contraceptive care received by Medicaid populations at risk for unintended pregnancy who are seeking contraceptive services. However, the reimbursement policy could have had varying degrees of influence on providers, depending on their characteristics. Future studies should seek to understand providers' decisions regarding LARC provision and should include measurements of clinic-based factors that contribute to contraceptive provision (eg, same-day insertion availability and protocols).

Ensuring that women of reproductive age have equitable LARC access, along with access to moderately effective contraceptive methods, should be a public health priority. Evidence from this study suggests that policies and/or interventions to improve LARC uptake should be focused toward the provider. Such efforts should include provider education on unbiased comprehensive contraceptive counseling, training on LARC insertions, and the promotion of same-day insertion clinical protocols.[15,16] Efforts should focus on providers in frequent contact with reproductive-aged women, providers in specialties less likely to have received formal education and training about LARCs (eg, those in primary care and adolescent health), and providers in rural areas. Furthermore, healthcare providers should receive equitable reimbursement for contraceptive provision, as it is imperative that reimbursement not be a barrier for LARC provision to the women who could benefit most. ■

References

1. Finer LB, Zolna MR. Declines in unintended pregnancy in the United States, 2008-2011. N Engl J Med 2016;374:843–52.
2. Shah PS, Balkhair T, Ohlsson A, Beyene J, Scott F, Frick C. Intention to become pregnant and low birth weight and preterm birth: a systematic review. Matern Child Health J 2011;15:205–16.
3. Cheng D, Schwarz EB, Douglas E, Horon I. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. Contraception 2009;79:194–8.
4. Gemmill A, Lindberg LD. Short interpregnancy intervals in the United States. Obstet Gynecol 2013;122:64–71.
5. Conde-Agudelo A, Rosas-Bermudez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: a meta-analysis. JAMA 2006;295:1809–23.
6. Frost JJ, Sonfield A, Zolna MR, Finer LB. Return on investment: a fuller assessment of the benefits and cost savings of the US publicly funded family planning program. Milbank Q 2014;92:696–749.
7. White K, Teal SB, Potter JE. Contraception after delivery and short interpregnancy intervals among women in the United States. Obstet Gynecol 2015;125:1471–7.

8. Birgisson NE, Zhao Q, Secura GM, Madden T, Peipert JF. Preventing unintended pregnancy: the contraceptive CHOICE project in review. J Womens Health 2015;24:349–53.
9. Ricketts S, Klingler G, Schwalberg R. Game change in Colorado: widespread use of long-acting reversible contraceptives and rapid decline in births among young, low-income women. Perspect Sex Reprod Health 2014;46:125–32.
10. Kavanaugh ML, Jerman J. Contraceptive method use in the United States: trends and characteristics between 2008, 2012 and 2014. Contraception 2018;97:14–21.
11. Dehlendorf C, Rodriguez MI, Levy K, Borrero S, Steinauer J. Disparities in family planning. Am J Obstet Gynecol 2010;202:214–20.
12. Potter JE, Hopkins K, Aiken AR, et al. Unmet demand for highly effective postpartum contraception in Texas. Contraception 2014;90:488–95.
13. Bergin A, Tristan S, Terplan M, Gilliam ML, Whitaker AK. A missed opportunity for care: two-visit IUD insertion protocols inhibit placement. Contraception 2012;86:694–7.
14. Kavanaugh ML, Frohwirth L, Jerman J, Popkin R, Ethier K. Long-acting reversible contraception for adolescents and young adults: patient and provider perspectives. J Pediatr Adolesc Gynecol 2013;26:86–95.
15. Gavin L, Moskosky S, Carter M, et al. Providing quality family planning services: recommendations of CDC and the U.S. Office of Population Affairs. MMWR Recomm Rep 2014;63:1–54.
16. American College of Obstetricians and Gynecologists, Committee on Gynecologic Practice Long-Acting Reversible Contraception Working Group. Committee Opinion No. 642: Increasing access to contraceptive implants and intrauterine devices to reduce unintended pregnancy. Obstet Gynecol 2015;126:e44–8.
17. Kost K. Unintended pregnancy rates at the state level: estimates for 2010 and trends since 2002. New York, NY: Guttmacher Institute; 2015.
18. Henry J. Kaiser Family Foundation. Louisiana: health status indicators. 2018. Available at: https://www.kff.org/state-category/health-status/?state=LA. Accessed September 1, 2018.
19. Sonfield A, Kost K. Public costs from unintended pregnancies and the role of public insurance programs in paying for pregnancy-related care: national and state estimates for 2010. New York, NY: Guttmacher Institute; 2015.
20. National Quality Forum. NQF endorses perinatal and reproductive health measures. 2017. Available at: http://www.qualityforum.org/News_And_Resources/Press_Releases/2017/NQF_Endorses_Perinatal_and_Reproductive_Health_Measures.aspx. Accessed March 10, 2019.
21. U.S. Department. of Health and Human Services, Office of Population Affairs. Clinical performance measures of contraceptive care. 2016. Available at: https://www.hhs.gov/opa/sites/default/files/clinical-performance-measures.pdf. Accessed August 31, 2018.
22. U.S. Department. of Health and Human Services, Office of Population Affairs. Most or moderately effective contraceptive methods. 2017. Available at: https://www.hhs.gov/opa/performance-measures/most-or-moderately-effective-contraceptive-methods/index.html. Accessed January 5, 2017.
23. Handley MA, Lyles CR, McCulloch C, Cattamanchi A. Selecting and improving quasi-experimental designs in effectiveness and implementation research. Annu Rev Public Health 2018;39:5–25.
24. Schafer JL. Multiple imputation: a primer. Stat Methods Med Res 1999;8:3–15.
25. Katz A, Soodeen RA, Bogdanovic B, De Coster C, Chateau D. Can the quality of care in family practice be measured using administrative data? Health Serv Res 2006;41:2238–54.
26. Triebwasser JE, Higgins S, Secura GM, Zhao Q, Peipert JF. Pharmacy claims data versus patient self-report to measure contraceptive method continuation. Contraception 2015;92:26–30.
27. Luchowski AT, Anderson BL, Power ML, Raglan GB, Espey E, Schulkin J. Obstetrician-gynecologists and contraception: long-acting reversible contraception practices and education. Contraception 2014;89:578–83.
28. Pace LE, Dusetzina SB, Keating NL. Early impact of the Affordable Care Act on uptake of long-acting reversible contraceptive methods. Med Care 2016;54:811–7.
29. O'Brien SH, Klima J, Reed S, Chisolm D, Schwarz EB, Kelleher KJ. Hormonal contraception use and pregnancy in adolescents with sickle cell disease: analysis of Michigan Medicaid claims. Contraception 2011;83:134–7.
30. Champaloux SW, Tepper NK, Curtis KM, et al. Contraceptive use among women with medical conditions in a nationwide privately insured population. Obstet Gynecol 2015;126:1151–9.
31. Frederiksen BN, Kane DJ, Rivera M, Wheeler D, Gavin L. Use of clinical performance measures for contraceptive care in Iowa, 2013. Contraception 2017;96:158–65.
32. Watts LA, Thiel de Bocanegra H, Darney PD, et al. In a California program, quality and utilization reports on reproductive health services spurred providers to change. Health Aff (Millwood) 2012;31:852–62.
33. Rankin KM, Haider S, Caskey R, Chakraborty A, Roesch P, Handler A. Healthcare utilization in the postpartum period among Illinois women with Medicaid paid claims for delivery, 2009-2010. Matern Child Health J 2016;20(Suppl 1):144–53.

Author and article information

From the Department of Community Health Sciences (Drs Goldin Evans, Broyles, Phillippi, Sothern, and Wightkin), Louisiana State University Health Sciences Center, New Orleans, LA; Pennington Biomedical Research Center (Dr Broyles), Baton Rouge, LA; Kaiser Family Foundation (Dr Frederiksen), San Francisco, CA; Louisiana Department of Health (Dr Gee), Baton Rouge, LA; Global Community Health and Behavioral Sciences (Dr Goldin Evans, Theall), Tulane University, New Orleans, LA.

Received Dec. 12, 2018; revised March 20, 2019; accepted April 19, 2019.

Dr Goldin Evans is currently affiliated with Global Community Health and Behavioral Sciences, Tulane University, New Orleans, LA.

The authors report no conflicts of interest.

The study was performed in New Orleans, LA, and Baton Rouge, LA.

Part of the findings in this article were presented on a poster at the 2018 North American Family Planning Forum, October 21, 2018, New Orleans, LA.

Corresponding author: Melissa Goldin Evans, PhD. mel.goldin@gmail.com

SUPPLEMENTARY TABLE 1

Characteristics associated with LARC uptake over a non-LARC method, adjusted analysis without patient/provider location[a]: Louisiana, 2013–2015 (N = 223,713)

	LARC vs non-LARC Adjusted OR (95% CI)[c]
Patient level	
Age, y	
15–17	0.87 (0.77–0.97)*
18–34	(reference)
35–44	0.71 (0.64–0.79)**
Race	
White	(reference)
Black	1.03 (0.94–1.13)
Other	1.26 (1.16–1.37)**
Postpartum	
Yes	(reference)
No	0.54 (0.41–0.70)**
Access by urban patients and by rural patients/location of their contraceptive provider	
Urban patient/urban clinic**[b]	—
Rural patient/urban clinic	—
Rural patient/rural clinic	—
After the reimbursement increase policy	
2013	(reference)
2014	1.39 (1.28–1.51)**
2015	1.95 (1.60–2.38)**
Provider level	
Provider specialty	
Obstetrician/gynecologist	(reference)
Hospital/hospital system	0.37 (0.27–0.52)**
Family planning clinic	0.22 (0.16–0.30)**
Nurse practitioner	0.89 (0.64–1.25)
Maternal and fetal medicine	0.58 (0.30–1.13)
Family practice	0.26 (0.20–0.33)**
Pediatrics	0.14 (0.08–0.23)**
Pharmacy	0.06 (0.03–0.15)**
Other	0.29 (0.22–0.40)**

Significant results, based on *P* values, are indicated by the following asterisks: *$P < .05$ and **$P < .0001$.

LARC, long-acting reversible contraceptive.

[a] Adjusted for age, race, postpartum status, access by urban patients and by rural patients/location of their contraceptive provider, policy year, and provider specialty; [b] The 1.7% of urban patient–rural clinic was combined into the "urban" patient category; [c] LARC vs non-LARC provision differed by age ($P < .0001$), race ($P < .0001$), postpartum status ($P < .0001$), location ($P < .0001$), year ($P < .0001$), and provider specialty ($P < .0001$).

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.

SUPPLEMENTARY TABLE 2

Likelihood that a woman received a LARC in the year before (2013) the reimbursement increase (2014) compared to the year after (2015), adjusted analysis: Louisiana, without patient/provider location, 2015 vs 2013 (N = 223,713)

	OR 2015 vs 2013 (reference) (95% CI)
Level 1: Patient variables	
Age, y	
15–17	2.41 (1.96–2.97)**
18–34	1.81 (1.40–2.33)**
35–44	1.86 (1.57–2.21)**
Race	
White	2.06 (1.74–2.44)**
Black	2.41 (2.02–2.87)**
Other	1.63 (1.28–2.08)**
Postpartum	
Yes	1.66 (1.33–2.06)**
No	2.44 (2.03–2.92)**
Access by urban patients and by rural patients/location of their contraceptive provider	
Urban patient/urban clinic	—
Rural patient/urban clinic	—
Rural patient/rural clinic	—
Level 2: Provider variables	
Obstetrician/gynecologist	1.79 (1.48–2.15)**
Hospital/hospital system	1.56 (1.28–1.91)**
Family planning clinic	3.64 (2.10–6.29)**
Nurse practitioner	1.03 (0.68–1.56)
Maternal and fetal medicine	2.92 (1.55–5.53)*
Family practice	2.82 (1.97–4.04)**
Pediatrics	1.75 (0.80–3.80)
Pharmacy	1.06 (0.82–1.38)
Other	3.35 (2.30-4.89)**

Analysis included all years, but only the 2015 vs 2013 results are displayed.

Effect of year differed by age ($P = .0003$), race ($P = 0.0022$), postpartum status ($P = 0.0009$), and provider specialty ($P < .0001$).

Significant results, based on P values, are indicated by the following asterisks: *$P < .001$ and **$P < .0001$.

LARC, long-acting reversible contraception.

Goldin Evans et al. LARC utilization after LARC device reimbursement increased in Louisiana. Am J Obstet Gynecol 2019.