Factors associated with postpartum use of long-acting reversible contraception

Titilope Oduyebo, MD, MPH, **Lauren B. Zapata, PhD**, **Maegan E. Boutot, MS**, **Naomi K. Tepper, MD, MPH**, **Kathryn M. Curtis, PhD**, **Denise V. D'Angelo, MPH**, **Polly A. Marchbanks, PhD**, and **Maura K. Whiteman, PhD**

Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Chamblee, GA.

Abstract

BACKGROUND: Contraception use among postpartum women is important to prevent unintended pregnancies and optimize birth spacing. Long-acting reversible contraception, including intrauterine devices and implants, is highly effective, yet compared to less effective methods utilization rates are low.

OBJECTIVES: We sought to estimate prevalence of long-acting reversible contraception use among postpartum women and examine factors associated with long-acting reversible contraception use among those using any reversible contraception.

STUDY DESIGN: We analyzed 2012–2015 data from the Pregnancy Risk Assessment Monitoring System, a population-based survey among women with recent live births. We included data from 37 sites that achieved the minimum overall response rate threshold for data release. We estimated the prevalence of long-acting reversible contraception use in our sample (n = 143,335). We examined maternal factors associated with long-acting reversible contraception use among women using reversible contraception (n = 97,013) using multivariable logistic regression (long-acting reversible contraception vs other type of reversible contraception) and multinomial regression (long-acting reversible contraception vs other hormonal contraception and long-acting reversible contraception vs other nonhormonal contraception).

RESULTS: The prevalence of long-acting reversible contraception use overall was 15.3%. Among postpartum women using reversible contraception, 22.5% reported long-acting reversible contraception use, which varied by site, ranging from 11.2% in New Jersey to 37.6% in Alaska. Factors associated with postpartum long-acting reversible contraception use vs use of another reversible contraceptive method included age ≤24 years (adjusted odds ratio =1.43; 95% confidence = interval 1.33–1.54) and ≥35 years (adjusted odds ratio=0.87; 95% confidence interval =0.80–0.96) vs 25–34 years; public insurance (adjusted odds ratio = 1.15; 95% confidence interval = 1.08–1.24) and no insurance (adjusted odds ratio = 0.73; 95% confidence interval = 0.55–0.96) vs private insurance at delivery; having a recent unintended pregnancy (adjusted odds

ratio = 1.44; 95% confidence interval =1.34-.54) or being unsure about the recent pregnancy (adjusted odds=ratio 1.29; 95% confidence interval =1.18–1.40) vs recent pregnancy intended; having 1 previous live birth (adjusted odds ratio=1.40; 95% confidence interval = 1.31–1.48); and having a postpartum check-up after recent live birth (adjusted odds ratio =2.70; 95% confidence interval2.35–3.11). Hispanic and non-Hispanic black postpartum women had a higher rate of long-acting reversible contraception use (26.6% and 23.4%, respectively) compared to non-Hispanic white women (21.5%), and there was significant race/ethnicity interaction with educational level.

CONCLUSION: Nearly 1 in 6 (15.3%) postpartum women with a recent live birth and nearly 1 in 4 (22.5%) postpartum women using reversible contraception reported long-acting reversible contraception use. Our analysis suggests that factors such as age, race/ethnicity, education, insurance, parity, intendedness of recent pregnancy, and postpartum visit attendance may be associated with postpartum long-acting reversible contraception use. Ensuring all postpartum women have access to the full range of contraceptive methods, including long-acting reversible contraception, is important to prevent unintended pregnancy and optimize birth spacing. Contraceptive access may be improved by public health efforts and programs that address barriers in the postpartum period, including increasing awareness of the availability, effectiveness, and safety of long-acting reversible contraception (and other methods), as well as providing full reimbursement for contraceptive services and removal of administrative and logistical barriers.

Keywords

LARC; long-acting reversible contraception; postpartum; PRAMS; short interpregnancy interval; unintended pregnancy

Postpartum contraception use is an important strategy to prevent unintended pregnancy and optimize birth spacing. In the United States, about half of pregnancies each year are unintended (defined as mistimed or unwanted),[1] and about 36% are conceived within 18 months of a previous live birth.[2] Both unintended pregnancies and short interpregnancy intervals are associated with adverse maternal and infant health outcomes.[3–6] Unintended pregnancies also result in substantial public expenditures; in 2010, public insurance programs spent $21 billion on unintended pregnancies.[7]

Most postpartum women use some form of contraception;[8,9] however, all contraceptive methods are not equally effective. Long-acting reversible contraception (LARC), which includes intrauterine devices (IUDs) and implants, are the most effective reversible methods with typical use.[10] LARCmethods have annual failure rates less than 1%, largely because once in place they require no user action and are effective for 3–10 years[11] compared to other reversible methods, which have failure rates ranging from 4% to 21%.

The postpartum period is a unique and important time for women to make the decision to initiate contraception, including LARC. LARC methods are safe to use among postpartum women,[12,13] and initiation in the hospital before discharge after delivery can be performed and is convenient, since women are already within the health care system and some women may not return for follow-up post-partum visits.[14]

Many states have implemented state-specific funding, policies, and programs to address barriers to LARC use, particularly in the postpartum period. LARC use overall has increased over recent years, with notable increase in the postpartum period;[15–17] 2013 estimates of LARC use among women 2e6 months postpartum in 28 states ranged from 7% to 31%.[17] Although several contextual factors have been suggested to be barriers to LARC use,[18] including lack of consumer awareness, lack of provider knowledge and training, stocking, logistic and administrative obstacles, and cost, limited studies have evaluated the maternal characteristics associated with LARC intent and use postpartum.[19,20] Contraceptive access may be improved by public health efforts, policies, and programs that take into account these factors. A small number of studies show that age, marital status, pregnancy intention, parity, and insurance status are associated with LARC use postpartum; however, these studies are limited owing to small sizes and lack of generalizability.

Using data from a large population-based survey of postpartum women, this analysis sought to examine the maternal characteristics associated with LARC use among postpartum women using reversible contraception.

Materials and Methods

The Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing surveillance system of the Centers for Disease Control and Prevention and participating sites. It uses a standardized mixed-mode mail and phone survey to obtain information from a population-based sample of women with recent live births. PRAMS captures information about maternal behaviors and experiences around the time of pregnancy. Women are randomly sampled from birth certificates 2e6 months post-partum, and each site samples between 1000 and 3000 women per year. Women not responding to any of 3 mailed survey attempts receive telephone follow-up. Data are weighted for sample design, nonresponse, and noncoverage to produce data representative of state birth populations. Details about the PRAMS methodology have been published previously[21] and are also available on the PRAMS website (http://www.cdc.gov/prams).

We analyzed 2012–2015 PRAMS data from 37 sites that achieved the minimum overall response rate threshold for data release (2012–2014 60%; 2015: 55%). Data were included for 2012–2013 for Georgia and Minnesota; 2012–2014 for Rhode Island; 2012–2015 for Alaska, Delaware, Hawaii, Illinois, Massachusetts, Maryland, Maine, Missouri, Nebraska, New Jersey, New Mexico, New York City, Oklahoma, Pennsylvania, Tennessee, Utah, Vermont, Washington, Wisconsin, West Virginia, and Wyoming; 2013–2015 for Iowa, New Hampshire, and New York; 2014–2015 for Alabama and Connecticut; 2012 and 2014–2015 for Ohio; 2012, 2013, and 2015 for Arkansas, Colorado, Michigan, and Oregon; and 2015 for Louisiana, Texas, and Virginia. The annual weighted response rates for these reporting areas during 2012–2015 ranged from 55% to 79%. Institutional Review Board (IRB) approval was not needed for this analysis of deidentified data available upon request, but PRAMS data collection is approved by the IRB of the Centers for Disease Control and Prevention and the local IRB of record in each participating PRAMS site.

To measure postpartum contraception use, women were asked "Are you or your husband or partner doing anything now to keep from getting pregnant?" Respondents who answered "yes" were asked "What kind of birth control are you or your husband or partner using now to keep from getting pregnant?" This question included 10 specific contraceptive methods, "not having sex (abstinence)," and "other." Respondents answering "other" were given the opportunity to write in a response; when possible, some responses were recoded into existing method options or were recoded as new method options (eg, spermicide). Respondents who answered "no" to the first question were asked "What are your reasons or your husband's or partner's reasons for not doing anything to keep from getting pregnant now?" This question included 10 response options for specific reasons, including the use of permanent sterilization, current pregnancy, and "other." Respondents answering "other" were given the opportunity to write in a response and when possible, responses were recoded. Respondents who answered "no" to the first question and had no responses that could be recoded into existing contraceptive options were classified as using no method.

Postpartum contraception use was grouped into 6 categories: sterilization, which included tubal sterilization and vasectomy; LARC, which included IUDs and implants; other hormonal contraception, which included shots, pills, patch, and vaginal ring; other nonhormonal contraception, which included condoms, diaphragm, withdrawal, natural family planning including rhythm method, and spermicide; and no method. Women who reported not having sex were coded as not using contraception, and those who reported more than 1 contraceptive method were categorized by the most effective method they reported.

There were 147,747 women with recent live births who responded to the PRAMS survey. To obtain our analytic sample, we excluded women who reported being currently pregnant (n=857) or having a past hysterectomy, having a past bilateral oophorectomy, or being menopausal (n = 258). We also excluded women with missing data on current contraception use (n = 2123) and those who answered "yes" to current contraception use but either did not respond to the follow-up question about type of current contraception (n 1073) or responded "other" but the write-in response could not be recoded (n 101); this resulted in an analytic sample of 143,335 postpartum women with a recent live birth. We examined factors associated with LARC use among women using reversible contraceptive methods. For these analyses, we also excluded women who reported female or male sterilization (n =16,777) and noncontraception users (n = 29,545), resulting in a sample size of 97,013 reversible contraception users.

We created 2 postpartum contraception use outcome variables. The first had 2 levels: LARC or any other reversible contraception (other hormonal and nonhormonal). The second had 3 levels: LARC, other hormonal contraception, or other nonhormonal contraception. Covariates of interest were sociodemo-graphic characteristics (ie, age, race/ethnicity, education, marital status, type of insurance at delivery, and state of residence), pregnancy-related characteristics (ie, previous live birth, pregnancy intention of most recent pregnancy, number of prenatal visits, delivery mode, gestational age at delivery, current breastfeeding status, and postpartum visit attendance), and risk behaviors and medical characteristics (ie, smoking during last 3 months of pregnancy or currently, prepregnancy body mass index, chronic hypertension, and chronic diabetes). Most covariates of interest were obtained from

the birth certificate; however, type of insurance at delivery (only for states without these data on the birth certificate), pregnancy intention of most recent pregnancy, current breastfeeding status, and post-partum visit attendance were obtained from the PRAMS survey (https://www.cdc.gov/prams/pdf/questionnaire/Phase-7-Topics-Reference_508tagged.pdf). Pregnancy intention was assessed based on the question "Thinking back to just before you got pregnant with your new baby, how did you feel about becoming pregnant?" Women who responded that they wanted to be pregnant then or sooner were categorized as having an intended pregnancy, women who stated that they wanted to be pregnant later or who stated they did not want to get pregnant then or any time in the future were categorized as unintended, and those who reported they were not sure what they wanted were categorized as unsure. Current breastfeeding was assessed by asking if the woman was currently breastfeeding or feeding pumped milk to her new baby at the time of the interview, while postpartum visit attendance was assessed by asking if the woman had a postpartum checkup about 4–6 weeks after birth.

We described sample characteristics and estimated LARC use among our analytic sample of postpartum women with a recent live birth. Among the subset of reversible contraception users, χ^2 tests were used to determine if the prevalence of LARC use differed by each covariate. In modeling, factors of interest were selected a priori based on previous literature[19,20] and univariateassociations that significantly (P < .05) associated with LARC use. Multivariable logistic regression was used to determine factors significantly (P <.05) associated with LARC use (vs other type of reversible contraception). Based on previous literature,[22,23] we also examined whether the effect of race/ethnicity was modified by education by testing interaction terms added to full models. Where significant effect modification was detected, stratum-specific estimates were calculated using contrast statements in a single model. Multinomial regression using the 3-level outcome variable was used to further explore factors significantly associated with LARC use.

Variance inflation factors were examined and multicollinearity between covariates was ruled out. All analyses were performed on weighted data using SAS-callable SUDAAN (RTI International, Research Triangle Park, NC) to account for the complex survey design of PRAMS.

Results

Among our analytic sample of post-partum women with a recent live birth (n = 143,335), the majority (>50%)were aged 25e34 years, were non-Hispanic white, were married, had >12 years of education, and had private insurance at delivery (Table 1). Fewer than half reported that their most recent pregnancy was unintended (28.7%) or expressed uncertainty about recent pregnancy intentions (14.2%). Most women (79.2%) reported currently using some method of contraception, with11.3% reporting sterilization, 15.3% reporting LARC (11.7% IUDs and 3.5% implants), 27.9% using other hormonal methods (most commonly pills), and 24.8% using other nonhormonal methods (most commonly condoms) (Table 1).

Among reversible contraception users (n = 97,013), the distribution of characteristics was similar to the distribution among our sample of postpartum women with a recent live birth

(Table 1). Among this subgroup of women, 22.5% reported using LARC methods (17.3% IUDs and 5.2% implants), 41.0% reported using other hormonal contraception (most commonly pills), and 36.5% reported using other nonhormonal contraception (most commonly condoms).

Among women currently using reversible contraception, contraceptive method use differed significantly (P < .05) by all characteristics examined except number of prenatal visits attended (Table 2). The prevalence of LARC use was highest among women aged 24 years (29.0%), women reporting their most recent pregnancy as unintended (28.1%), and unmarried women (27.8%). The prevalence of LARC use was lowest among women with 16 years of education (16.8%), women with no health insurance at delivery (16.0%), and women who did not attend a post-partum visit (12.9%). LARC use also varied by site of residence, with Alaska having the highest prevalence (37.6%), followed by Oregon (37.5%) and New Mexico (35.2%); New Jersey had the lowest prevalence (11.2%), followed by New York City (16.1%) and Pennsylvania (16.6%).

For our 2-level outcome variable (postpartum LARC use vs other types of reversible contraception), factors statistically significantly associated with higher odds of LARC use included age 24 (adjusted odds ratio [AOR] 1.43, 95% confidence interval [CI]= 1.33–54) vs 25–34 years, having Medicaid or other public health insurance (AOR = 1.15, CI = 1.08-.24) vsprivate insurance at delivery, having 1 previous live birth (AOR=1.40, CI =1.31–48) vs none, reporting their intention for most recent pregnancy as unintended (AOR=1.44, CI=1.34-.54) or unsure (AOR=1.29, CI=1.18–40) vs intended, being overweight (AOR=1.21,CI=1.13–29) or obese (AOR=1.38, CI =1.29–1.49) vs normal weight based on prepregnancy body mass index, reporting postpartum visit attendance (AOR=2.70, CI=2.35–3.11), smoking during or after pregnancy (AOR=1.11, CI=1.02–1.21), and chronic hypertension (AOR = 1.12, CI = 1.01–1.25) (Table 3). 1.01 Factors associated with significantly lower odds of LARC use included age 35 years (AOR=0.87, CI = 0.80–0.96) vs 25–34 years, being married (AOR = 0.76, CI 0.71–0.82) vs unmarried, and having no insurance (AOR=0.73, CI=0.55–0.96) vs private insurance at delivery.

Significant effect modification (P interaction <.001) between education and race/ethnicity was detected in the analysis using the 2-level outcome variable (postpartum LARC use vs other type of reversible contraception). Among women with 12 years of education, non-Hispanic black women had significantly lower odds of LARC use (AOR=0.77, CI = 0.67–0.88) compared with non-Hispanic white women; however, among women with 16 years of education, non-Hispanic black women had higher odds of LARC use (AOR = 1.45, CI 1.21–1.73). Hispanic women had a higher odds of LARC use across all levels of education, which was statistically significant among women with 12 (AOR = 1.19, CI =1.05–1.35) and 16 (AOR=CI = 1.02–1.56) years of education.

Results were generally similar when examining our 3-level outcome variable (postpartum LARC use, other hormonal contraception, other nonhormonal contraception) (Table 3). Women who were aged 35 years, who were married, or who reported no insurance at delivery did not show significantly lower LARC use compared with other hormonal methods; however, association remained between LARC and other nonhormonal methods.

Women who were currently breastfeeding had significantly higher odds of LARC use vs a hormonal method (AOR = 1.35, CI =1.26–1.44) butsignificantly lower odds of LARC use vs other nonhormonal methods (AOR=0.63, CI 0.59–0.68). Although womenwho reported postpartum visit attendance had a higher odds of LARC use compared to other types of reversible contraception (AOR=2.70, CI =2.35–3.11), the magnitude of association was higher for LARC use compared to other nonhormonal contraception (AOR = 4.81, CI = 4.13–5.61).

Discussion

In our analysis, current LARC use was reported by nearly 1 in 6 (15.3%) post-partum women with a recent live birth and nearly 1 in 4 (22.5%) postpartum women using reversible contraception. These estimates are higher than older estimates of 1e3% of postpartum LARC use among postpartum women from 2000 PRAMS data[15] but consistent with more recent estimates.[17] In addition, consistent with another report of state-level data,[15] our analysis showed wide variation in postpartum LARC use across included states, ranging from11.2% in New Jersey to 37.6% in Alaska among reversible contraception users.

A multitude of factors have been suggested to be barriers to LARC use, including lack of consumer awareness, lack of provider knowledge and training, stocking, logistic and administrative obstacles, and cost.[18] To address some of these barriers, many states have implemented state-specific funding, policies, and programs that might explain the variation of postpartum LARC use across states.[24–26] For example, with support and collaboration from organizations such as the Association of State and Territorial Health Officials (ASTHO) and American College of Obstetricians and Gynecologists (ACOG), about 40 jurisdictions currently have a Medicaid policy that allows providers and health facilities to bill for LARC devices and insertion procedures separate from global delivery fees.[27] The increased odds of LARC use among women with Medicaid at delivery compared to those with private insurance in our analysis might also be related to limitations of pregnancy-related Medicaid coverage, which often ends 60 days after delivery unless states have expansions extending coverage.[28] Women who expect to lose pregnancy-related income eligibility for Medicaid may opt for contraceptive methods such as LARC that do not require regular contact with the health care system[29] and have a longer duration of effectiveness. Additionally, providers may recommend LARC differentially to women, based on socioeconomic status or race/ethnicity; one study suggests that providers may be more likely to recommend IUDs to black and Hispanic women of low socioeconomic status.[22]

Although we found a higher rate of LARC use among non-Hispanic black vs white postpartum women, it varied by level of education. Non-Hispanic black vs white women had higher odds of LARC use among women with greater years of education but lower odds of LARC use among women with fewer years of education, whereas Hispanic women had higher odds of LARC use across all education levels. Studies show that women of color may perceive more provider pressure to use LARC,[30,31] raising concerns about disparities in access to care and inappropriate LARC promotion.[32] Despite the lack of difference in the association between education or income and LARC use by race/ethnicity shown by a study that examined the 2011–2015 National Survey of Family Growth data using a multiple race-

interactions model,[33] it is important that an individual's autonomy, culture, values, and preferences be taken into account when selecting a contraceptive method.[34] Increased efforts to educate all women, regardless of education levels or race/ethnicity about the full range of contraceptive methods, is critical in ensuring that women have access to all methods.

Several other sociodemographic factors were associated with LARC use, including age and marital status. The increased odds of LARC use by women of younger reproductive age (24 years old) may in part reflect the efforts to prioritize adolescents in pregnancy prevention programs[35] because they are a subpopulation at increased risk for unintended pregnancy[36] and short inter-pregnancy intervals.[37–39] In addition, national and professional organization guidelines and publications have included or highlighted adolescent-specific recommendations related to family planning and specifically LARC use.[40–43] Consistent with other studies that examined LARC use by age, older women had lower LARC use compared to younger women,[44–46] specifically when compared to use of other nonhormonal methods. Potential reasons for this pattern of use may include ambivalence about a subsequent pregnancy, perceived sub-fertility, or the desire to avoid hormonal methods owing to concerns about thromboembolism or other potential risks.[47,48]

Consistent with other studies, pregnancy-related characteristics including a recent unintended pregnancy and multiparity were associated with higher odds of LARC use. [20,45,49–51] These women may have increased motivation to avoid another pregnancy in the near future and choose methods with the highest effectiveness. Among women currently breastfeeding, we found greater LARC use compared with other hormonal methods, but lower LARC use compared with other nonhormonal methods. These findings may be related to concerns about the effects of early initiation of hormonal methods on breastfeeding success,[41] as well as concerns about increased risk of uterine perforation.[52]

Similar to other studies,[53,54] this studyshows a beneficial impact of postpartum visit attendance on greater use of contraception, specifically highly effective contraceptive methods. The post-partum visit offers the opportunity for health care providers to provide the necessary counseling, as well as the contraception, if desired by the patient. In recognition of the importance of postpartum care in optimizing the health of women, ACOG recommends that new mothers be seen within the first 3 weeks postpartum and end with a comprehensive visit no later than 12 weeks postpartum.[55]

Strengths of this analysis include the examination of a large, population-based sample of women from 37 sites and a broad range of potential factors associated with postpartum LARC use. However, our findings should be interpreted in the context of several limitations. PRAMS is a cross-sectional survey with self-reported data and is potentially subject to social desirability bias and recall errors. In addition, the results may only be generalizable to women residing in the 37 sites included in the analysis. Last, because the survey does not report timing of contraceptive initiation, insurance status at delivery may not reflect insurance status at time of contraceptive initiation.

In conclusion, LARC use was reported by almost 1 in 6 postpartum women using reversible contraception, but rates varied substantially by site and certain characteristics. Contraceptive

access may be improved by public health efforts, policies, and programs that address barriers in the postpartum period, including increasing awareness of the availability, effectiveness, and safety of LARC and other methods, as well as by providing full reimbursement for contraceptive services, provider training, and removal of administrative and logistic barriers. Access to the full range of contraceptive methods, including LARC, is important to decrease rates of unintended pregnancy and to optimize birth spacing.

Acknowledgments

References

1. Finer LB, Zolna MR. Declines in Unintended Pregnancy in the United States, 2008–2011. N Engl J Med 2016;374(9):843–52. [PubMed: 26962904]

2. Ahrens KA, Thoma ME, Copen CE, Frederiksen BN, Decker EJ, Moskosky S. Unintended pregnancy and interpregnancy interval by maternal age, National Survey of Family Growth. Contraception 2018;98(1):52–5. [PubMed: 29501647]

3. Kost K, Lindberg L. Pregnancy intentions, maternal behaviors, and infant health: investigating relationships with new measures and propensity score analysis. Demography 2015;52(1):83–111. [PubMed: 25573169]

4. Orr ST, Miller CA, James SA, Babones S. Unintended pregnancy and preterm birth. Paediatr Perinat Epidemiol 2000;14(4):309–13. [PubMed: 11101017]

5. Conde-Agudelo A, Rosas-Bermudez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: a meta-analysis. JAMA 2006;295(15):1809–23. [PubMed: 16622143]

6. Hall JA, Benton L, Copas A, Stephenson J. Pregnancy intention and pregnancy outcome: systematic review and meta-analysis. Matern Child Health J 2017;21(3):670–704. [PubMed: 28093686]

7. 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: Guttmacher Institute, 2015.

8. Centers for Disease Control and Prevention. Contraceptive use among postpartum women −12 states and New York City, 2004–2006. MMWR Morb Mortal Wkly Rep 2009;58(30): 821–6. [PubMed: 19661855]

9. Robbins CL, Farr SL, Zapata LB, D'Angelo DV, Callaghan WM. Postpartum contraceptive use among women with a recent preterm birth. Am J Obstet Gynecol 2015;213(4):508 e501–9. [PubMed: 26003062]

10. Trussell J, Wynn LL. Reducing unintended pregnancy in the United States. Contraception 2008;77(1):1–5. [PubMed: 18082659]

11. Winner B, Peipert JF, Zhao Q, et al. Effectiveness of long-acting reversible contraception. N Engl J Med 2012;366(21):1998–2007. [PubMed: 22621627]

12. Curtis KM, Tepper NK, Jatlaoui TC, et al. U.S. medical eligibility criteria for contraceptive use, 2016. MMWR Recomm Rep 2016;65(3):1–103.

13. Curtis KM, Jatlaoui TC, Tepper NK, et al. U.S. selected practice recommendations for contraceptive use, 2016. MMWR Recomm Rep 2016;65(4):1–66.

14. American College of Obstetricians Gynecologists. ACOG Practice Bulletin No. 121: Long-acting reversible contraception: Implants and intrauterine devices. Obstet Gynecol 2011;118(1):184–96. [PubMed: 21691183]

15. White K, Potter JE, Hopkins K, Grossman D. Variation in postpartum contraceptive method use: results from the Pregnancy Risk Assessment Monitoring System (PRAMS). Contraception 2014;89(1):57–62. [PubMed: 24237967]

16. White K, Teal SB, Potter JE. Contraception after delivery and short interpregnancy intervals among women in the United States. Obstet Gynecol 2015;125(6):1471–7. [PubMed: 26000519]

17. Boulet SL, D'Angelo DV, Morrow B, et al. Contraceptive use among nonpregnant and postpartum women at risk for unintended pregnancy, and female high school students, in the context of zika preparedness - United States, 2011–2013 and 2015. MMWR Morb Mortal Wkly Rep 2016;65(30): 780–7. [PubMed: 27490117]

18. Kroelinger CD, Romero L, Lathrop E, et al. Meeting summary: state and local implementation strategies for increasing access to contraception during zika preparedness and response - United States, September 2016. MMWR Morb Mortal Wkly Rep 2017;66(44): 1230–5. [PubMed: 29121000]

19. Dahlke JD, Ramseyer AM, Terpstra ER, Doherty DA, Keeler SM, Magann EF. Post-partum use of long-acting reversible contraception in a military treatment facility. J Womens Health (Larchmt) 2012;21(4):388–92. [PubMed: 22017380]

20. Tang JH, Dominik R, Re S, Brody S, Stuart GS. Characteristics associated with interest in long-acting reversible contraception in a postpartum population. Contraception 2013;88(1):52–7. [PubMed: 23158805]

21. Shulman HB, Gilbert BC, Msphbrenda CG, Lansky A. The Pregnancy Risk Assessment Monitoring System (PRAMS): current methods and evaluation of 2001 response rates. Public Health Rep 2006;121(1):74–83. [PubMed: 16416701]

22. Dehlendorf C, Ruskin R, Grumbach K, et al. Recommendations for intrauterine contraception: a randomized trial of the effects of patients' race/ethnicity and socioeconomic status. Am J Obstet Gynecol 2010;203(4):319 e311–8. [PubMed: 20598282]

23. Introduction and Literature Review. In: Smedley BD, Stith AY, Nelson AR, eds. Unequal treatment: confronting racial and ethnic disparities in health care. Washington (DC): National Academies Press; 2013.

24. Kroelinger CD, Morgan IA, DeSisto CL, et al. State-identified implementation strategies to increase uptake of immediate postpartum long-acting reversible contraception policies. J Womens Health (Larchmt) 2019;28:346–56. [PubMed: 30388052]

25. Okoroh EM, Kane DJ, Gee RE, et al. Policy change is not enough: engaging provider champions on immediate postpartum contraception. Am J Obstet Gynecol 2018;218(6):590 e591–7. [PubMed: 29530670]

26. Vela VX, Patton EW, Sanghavi D, Wood SF, Shin P, Rosenbaum S. Rethinking Medicaid coverage and payment policy to promote high value care: the case of long-acting reversible contraception. Women's Health Issues 2018;28(2):137–43. [PubMed: 29329988]

27. American College of Obstetricians Gynecologists. Medicaid Reimbursement for Post-partum LARC by State 2018. Available at: https://www.acog.org/About-ACOG/ACOG-Departments/Long-Acting-Reversible-Contraception/Immediate-Postpartum-LARC-Medic aid-Reimbursement. Accessed July 31, 2018.

28. Guttmacher Institute. State policies in brief: Medicaid family planning eligibility expansions. New York: Guttmacher Institute; 2016.

29. Boardman LA, Weitzen S, Lapane KL. Context of care and contraceptive method use. Women's Health Issues 2004;14(2):51–9. [PubMed: 15120414]

30. Kusunoki Y, Barber JS, Ela EJ, Bucek A. Black-white differences in sex and contraceptive use among young women. Demography 2016;53(5):1399–428. [PubMed: 27624320]

31. Higgins JA, Kramer RD, Ryder KM. Provider bias in long-acting reversible contraception (LARC) promotion and removal: perceptions of young adult women. Am J Public Health 2016;106(11): 1932–7. [PubMed: 27631741]

32. Gomez AM, Fuentes L, Allina A. Women or LARC first? Reproductive autonomy and the promotion of long-acting reversible contraceptive methods. Perspect Sex Reprod Health 2014;46(3):171–5. [PubMed: 24861029]

33. Kramer RD, Higgins JA, Godecker AL, Ehrenthal DB. Racial and ethnic differences in patterns of long-acting reversible contraceptive use in the United States, 2011–2015. Contraception 2018;97(5):399–404. [PubMed: 29355492]

34. Division of Reproductive Health NCfCDP. U.S. Selected Practice Recommendations for Contraceptive Use, 2013: adapted from the World Health Organization selected practice recommendations for contraceptive use, 2nd edition. MMWR Recomm Rep 2013;62(RR-05): 1–60.

35. Han L, Teal SB, Sheeder J, Tocce K. Preventing repeat pregnancy in adolescents: is immediate postpartum insertion of the contraceptive implant cost effective? Am J Obstet Gynecol 2014;211(1):24e21–7. [PubMed: 24631431]

36. Finer LB, Zolna MR. Unintended pregnancy in the United States: incidence and disparities, 2006. Contraception 2011;84(5): 478–85. [PubMed: 22018121]

37. Copen CE, Thoma ME, Kirmeyer S. Inter-pregnancy intervals in the United States: data from the birth certificate and the National Survey of Family Growth. Nat Vital Stat Rep 2015;64(3): 1–10.

38. Gemmill A, Lindberg LD. Short interpreg-nancy intervals in the United States. Obstet Gynecol 2013;122(1):64–71. [PubMed: 23743455]

39. Dee DL, Pazol K, Cox S, et al. Trends in repeat births and use of postpartum contraception among teens - United States, 2004–2015. MMWR Morb Mortal Wkly Rep 2017;66(16):422–6. [PubMed: 28448483]

40. Briggs PE, Praet CA, Humphreys SC, Zhao C. Impact of UK Medical Eligibility Criteria implementation on prescribing of combined hormonal contraceptives. J Fam Plann Reprod Health Care 2013;39(3):190–6. [PubMed: 23299629]

41. Centers for Disease Control and Prevention. U S. medical eligibility criteria for contraceptive use, 2010. MMWR Recomm Rep 2010;59(RR-4):1–86.

42. Committee on Adolescent Health Care Long-Acting Reversible Contraception Working Group TACoO, Gynecologists. Committee opinion no. 539: adolescents and long-acting reversible contraception: implants and intrauterine devices. Obstet Gynecol 2012;120(4):983–8. [PubMed: 22996129]

43. Ott MA, Sucato GS, Committee on A. Contraception for adolescents. Pediatrics 2014;134(4):e1257–81. [PubMed: 25266435]

44. Godfrey EM, Zapata LB, Cox CM, Curtis KM, Marchbanks PA. Unintended pregnancy risk and contraceptive use among women aged 45 to 50 years - Massachusetts, 2006, 2008, and 2010. Am J Obstet Gynecol 2016;214(6):712.e1–8. [PubMed: 26694134]

45. Kavanaugh ML, Jerman J, Finer LB. Changes in use of long-acting reversible contraceptive methods among U.S. women, 2009–2012. Obstet Gynecol 2015;126(5): 917–27. [PubMed: 26444110]

46. Skouby SO. Contraceptive use and behavior in the 21st century: a comprehensive study across five European countries. Eur J Contracept Reprod Health Care 2010;15(Suppl 2): S42–53. [PubMed: 21091166]

47. Godfrey EM, Chin NP, Fielding SL, Fiscella K, Dozier A. Contraceptive methods and use by women aged 35 and over: A qualitative study of perspectives. BMC Womens Health 2011;11:5. [PubMed 21324194]

48. Ketting E Contraceptive needs of women over 35. Maturitas 1988;(Suppl 1):23–38. [PubMed: 3237109]

49. Branum AM, Jones J. Trends in long-acting reversible contraception use among U.S. women aged 15–44. NCHS Data Brief 2015(188):1–8.

50. Daniels K, Daugherty J, Jones J, Mosher W. Current contraceptive use and variation by selected characteristics among women aged 15–44: United States, 2011–2013. Natl Health Stat Report 2015(86):1–14.

51. Secura GM, Allsworth JE, Madden T, Mullersman JL, Peipert JF. The Contraceptive CHOICE Project: reducing barriers to long-acting reversible contraception. Obstet Gynecol 2010;203(2):115 e111–7.

52. Heinemann K, Reed S, Moehner S, Minh TD. Risk of uterine perforation with levonorgestrel-releasing and copper intrauterine devices in the European Active Surveillance Study on Intrauterine Devices. Contraception 2015;91(4): 274–9. [PubMed: 25601352]

53. Zapata LB, Murtaza S, Whiteman MK, et al. Contraceptive counseling and postpartum contraceptive use. Am J Obstet Gynecol 2015;212(2):171 e171–8. [PubMed: 25093946]

54. Depineres T, Blumenthal PD, Diener-West M. Postpartum contraception: the New Mexico Pregnancy Risk Assessment Monitoring System. Contraception 2005;72(6):422–5. [PubMed: 16307963]

55. ACOG Committee Opinion No. 736. optimizing postpartum care. Obstet Gynecol 2018;131(5):e140–50. [PubMed: 29683911]

AJOG at a Glance

Why was this study conducted?

To estimate prevalence of long-acting reversible contraception use among postpartumwomen and examine factors associated with long-acting reversiblecontraception use among those using any reversible contraception.

Key findings

Overall prevalence of postpartum long-acting reversible contraception use was15.3% and it varied by state of residence. Several factors were associated with itsuse postpartum, including demographics and postpartum visit attendance.

What does this add to what is known?

An increasing percentage of postpartum women use long-acting reversiblecontraception.

TABLE 1

Selected characteristics of postpartum women with a recent live birth,[a] Pregnancy Risk Assessment Monitoring System, 37 sites,[b] 2012–2015

Characteristics	Postpartum women with a recent live birth (N = 143,335)		Postpartum women with a recent live birth using reversible contraception (N = 97,013)	
	n[c]	%[c]	n[c]	%[c]
Age group, years				
<24	40,126	26.6	30,627	29.9
25–34	80,538	57.4	54,620	58.0
35	22,667	16.0	11,763	12.1
Race/ethnicity				
Non-Hispanic white	70,229	59.9	47,942	60.4
Non-Hispanic black	22,996	13.1	14,984	12.6
Hispanic	23,743	17.2	16,712	17.7
Non-Hispanic other	21,930	9.2	14,201	8.6
Education, years				
12	55,454	37.2	37,110	36.5
13–15	40,838	27.7	27,536	27.8
16	45,333	34.2	31,258	34.9
Married	85,058	61.5	56,996	60.8
Type of insurance at delivery				
None	2912	2.3	1913	2.2
Medicaid/other public health insurance	55,917	39.2	37,344	38.7
Private	62,875	50.1	43,351	50.9
Other	1371	1.3	921	1.2
1 previous live birth	84,199	59.5	52,554	55.2
Most recent pregnancy intention				
Unintended	41,730	28.7	28,658	29.4
Intended	76,858	55.2	52,673	55.9
Unsure	21,935	14.2	13,937	13.1
Number of prenatal visits				

Characteristics	Postpartum women with a recent live birth (N = 143,335)		Postpartum women with a recent live birth using reversible contraception (N = 97,013)	
	n[c]	%[c]	n[c]	%[c]
8	30,026	17.4	19,574	16.8
9–11	43,049	30.6	29,179	30.5
12	64,991	48.3	44,752	49.1
Vaginal delivery	95,626	69.3	67,811	72.5
Term birth (37 weeks gestation)	115,881	91.5	79,276	92.0
Currently breastfeeding	68,607	48.9	46,744	48.9
Smoking during the last 3 months of pregnancy or currently	23,388	14.5	14,528	13.5
Prepregnancy BMI, kg/m^2				
Underweight <18.5	5965	3.8	4085	3.8
Normal 18.5–24.9	65,866	46.8	45,846	48.2
Overweight 25.0–29.9	33,204	23.3	22,471	23.1
Obese 30.0	32,054	21.5	20,460	20.4
Chronic hypertension	12,954	6.6	8550	6.5
Chronic diabetes	8646	5.6	5304	5.0
Attended a postpartum visit	127,727	90.3	88,433	92.2
Current contraceptive use				
Sterilization[d]	16,777	11.3	N/A	-
Long-acting reversible contraception[e]	24,221	15.3	24,221	22.5
Other hormonal methods[f]	39,641	27.9	39,641	41.0
Other nonhormonal methods[g]	33,151	24.8	33,151	36.5
No method	29,545	20.8	N/A	-

BMI, body mass index; LARC, long-acting reversible contraception; N/A, not applicable.

[a]Excludes women pregnant at the time of survey or reporting hysterectomy, bilateral oophorectomy, or menopause;

[b]Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming;

[c]Unweighted n, weighted percentage; sum of percentages may not equal 100% because of missing data;

[d]Includes tubal ligation and vasectomy;

[e]Includes intrauterine device and implants;

[f]Includes shots, pills, patch, and vaginal ring;

[g]Includes condoms, diaphragm, natural family planning/rhythm method, withdrawal, and spermicide.

TABLE 2

Contraceptive method use among postpartum women using reversible contraception [a] by select characteristics, Pregnancy Risk Assessment Monitoring System, [b] 37 sites, [b] 2012–2015

Characteristics	Contraceptive method, % [c]		
	LARC [d] %	Other hormonal contraception [e] %	Other nonhormonal contraception [f] %
Total	22.5	41.0	36.5
Age group, years [g]			
24	29.0	47.5	23.5
25–34	20.2	39.4	40.4
35	17.5	32.7	49.8
Race/ethnicity [g]			
Non-Hispanic white	21.5	41.0	37.5
Non-Hispanic black	23.4	52.3	24.3
Hispanic	26.6	38.1	35.4
Non-Hispanic other	19.5	31.5	49.0
Education, years [g]			
12	25.2	45.6	29.2
13–15	26.2	41.8	32.0
16	16.8	35.7	47.6
Married [g]			
Yes	19.1	36.2	44.7
No	27.8	48.6	23.7
Type of insurance at delivery [g]			
None	16.0	25.2	58.8
Medicaid/other public health insurance	27.1	44.0	28.9
Private	19.3	39.2	41.4
Other	18.5	42.2	39.3

Characteristics	Contraceptive method, %[c]		
	LARC[d] %	Other hormonal contraception[e] %	Other nonhormonal contraception[f] %
Previous live births[g]			
0	20.6	44.5	34.9
1	24.0	38.2	37.7
Most recent pregnancy intention[g]			
Unintended	28.1	44.2	27.7
Intended	18.8	38.7	42.4
Ambivalent	25.6	43.9	30.5
Number of prenatal visits			
8	21.7	42.5	35.8
9–11	22.6	40.4	37.0
12	22.8	40.8	36.4
Vaginal delivery[g]			
Yes	23.2	40.1	36.7
No	20.6	43.6	35.8
Term birth (37weeks gestation)[g]			
Yes	22.5	40.7	36.8
No	23.3	44.8	31.9
Currently breastfeeding[g]			
Yes	20.8	32.6	46.6
No	24.3	49.2	26.5
Smoking during or after pregnancy[g]			
Yes	27.6	47.8	24.5
No	21.7	39.9	38.3
Prepregnancy BMI, kg/m^2[g]			
Underweight <18.5	21.3	41.3	37.4

| Characteristics | Contraceptive method, %[c] | | |
	LARC[d] %	Other hormonal contraception[e] %	Other nonhormonal contraception[f] %
Normal 18.5–24.9	20.1	40.6	39.3
Overweight 25.0–29.9	24.0	41.4	34.6
Obese ≥30.0	27.5	41.3	31.2
Chronic hypertension[g]			
Yes	24.9	43.1	32.0
No	22.4	40.9	36.7
Chronic diabetes11			
Yes	22.7	38.0	39.3
No	22.5	41.2	36.3
Attended a postpartum visit[g]			
Yes	23.3	41.6	35.0
No	12.9	33.8	53.3
Sites9			
Alabama	21.4	54.4	24.2
Alaska	37.6	27.0	35.4
Arkansas	19.4	49.3	31.2
Colorado	32.1	33.2	34.6
Connecticut	24.6	35.8	39.6
Delaware	18.9	47.7	33.4
Georgia	20.6	51.2	28.2
Hawaii	23.2	46.2	30.7
Illinois	20.9	40.4	38.7
Iowa	25.8	44.5	29.6
Louisiana	18.6	52.3	29.1
Maine	32.1	37.7	30.2
Maryland	18.2	43.4	38.5
Massachusetts	26.3	36.5	37.1

Characteristics	Contraceptive method, %[c]		
	LARC[d] %	Other hormonal contraception[e] %	Other nonhormonal contraception[f] %
Michigan	21.9	42.4	35.7
Minnesota	23.8	38.0	38.2
Missouri	24.3	43.4	32.3
Nebraska	23.4	38.7	37.9
New Hampshire	31.9	34.7	33.4
New Jersey	11.2	40.0	48.8
New Mexico	35.2	38.5	26.3
New York	17.9	42.4	39.7
New York City	16.1	35.5	48.4
Ohio	17.5	47.5	35.0
Oklahoma	23.0	46.0	31.0
Oregon	37.5	30.4	32.1
Pennsylvania	16.6	44.1	39.3
Rhode Island	30.2	38.5	31.4
Tennessee	21.3	47.9	30.7
Texas	23.9	39.7	36.5
Utah	34.7	29.8	35.4
Vermont	30.4	35.4	34.2
Virginia	21.2	42.2	36.6
Washington	31.1	31.8	37.1
West Virginia	22.3	50.8	26.9
Wisconsin	24.0	41.1	34.9
Wyoming	30.0	41.7	28.3
Reporting year[h]			
2012	21.4	41.3	37.3
2013	22.4	42.0	35.7
2014	22.0	40.9	37.1

Characteristics	Contraceptive method, %[c]		
	LARC[d] %	Other hormonal contraception[e] %	Other nonhormonal contraception[f] %
2015	23.8	40.2	36.0

BMI, body mass index; LARC, long-acting reversible contraception.

[a] Excludes women pregnant at the time of survey or reporting hysterectomy, bilateral oophorectomy, menopause, sterilization, or not using contraception;

[b] Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming;

[c] Weighted percentage; sum of percentages may not equal 100 because of missing data;

[d] Includes intrauterine device and implants;

[e] Includes shots, pills, patch, and vaginal ring;

[f] Includes condoms, diaphragm, natural family planning/rhythm method, withdrawal, and spermicide;

[g] $P < .001$;

[h] P .05.

TABLE 3

Adjusted odds of long-acting reversible contraception use among postpartum women using reversible contraception,[a] Pregnancy Risk Assessment Monitoring System, 37 sites,[b] 2012–2015

Characteristics	LARC[c] vs other hormonal[d] or nonhormonal contraception[e]		LARC vs other hormonal contraception		LARC vs other nonhormonal contraception	
	aOR[f]	95% CI	aOR[f]	95% CI	aOR[f]	95% CI
Age group, year						
24	1.43	1.33–1.54	1.33	1.23–1.45	1.66	1.52–1.82
25–34	1.00	Referent	1.00	Referent	1.00	Referent
35	0.87	0.80–0.96	1.03	0.93–1.15	0.76	0.69–0.84
Marital status						
Married	0.76	0.71–0.82	0.93	0.86–1.01	0.57	0.52–0.62
Not married	1.00	Referent	1.00	Referent	1.00	Referent
Type of insurance at delivery						
None	0.73	0.55–0.96	1.23	0.91–1.68	0.48	0.36–0.64
Medicaid/other public health insurance	1.15	1.08–1.24	1.19	1.10–1.28	1.12	1.03–1.21
Private	1.00	Referent	1.00	Referent	1.00	Referent
Other	0.95	0.69–1.33	1.01	0.71–1.44	0.87	0.59–1.27
Education and race/ethnicity interaction						
12 years						
Non-Hispanic, white	1.00	Referent	1.00	Referent	1.00	Referent
Non-Hispanic, black	0.77	0.67–0.88	0.70	0.61–0.81	1.01	0.85–1.20
Hispanic	1.19	1.05–1.35	1.24	1.08–1.42	1.08	0.92–1.25
Non-Hispanic, other	0.94	0.80–1.11	1.14	0.95–1.37	0.71	0.59–0.85
13–15 years						
Non-Hispanic, white	1.00	Referent	1.00	Referent	1.00	Referent
Non-Hispanic, black	0.95	0.83–1.08	0.87	0.75–1.00	1.13	0.96–1.34
Hispanic	1.07	0.91–1.24	1.10	0.92–1.31	1.01	0.84–1.21
Non-Hispanic, other	0.96	0.80–1.14	1.05	0.86–1.28	0.85	0.70–1.04

Characteristics	LARC[e] vs other hormonal[d] or nonhormonal contraception[e]		LARC vs other hormonal contraception		LARC vs other nonhormonal contraception	
	aOR[f]	95% CI	aOR[f]	95% CI	aOR[f]	95% CI
16 years						
Non-Hispanic, white	1.00	Referent	1.00	Referent	1.00	Referent
Non-Hispanic, black	1.45	1.21–1.73	1.32	1.08–1.60	1.59	1.30–1.94
Hispanic	1.26	1.02–1.56	1.45	1.14–1.84	1.11	0.89–1.40
Non-Hispanic, other	0.75	0.64–0.88	1.25	1.04–1.50	0.57	0.48–0.67
Previous live births						
0	1.00	Referent	1.00	Referent	1.00	Referent
1	1.40	1.31–1.48	1.45	1.36–1.55	1.32	1.23–1.41
Pregnancy intention						
Intended	1.00	Referent	1.00	Referent	1.00	Referent
Unintended	1.44	1.34–1.54	1.34	1.24–1.44	1.60	1.47–1.73
Unsure	1.29	1.18–1.40	1.24	1.13–1.36	1.34	1.20–1.48
Current breastfeeding						
Yes	0.97	0.91–1.03	1.35	1.26–1.44	0.63	0.59–0.68
No	1.00	Referent	1.00	Referent	1.00	Referent
Prepregnancy BMI, kg/m^2						
Underweight <18.5	0.96	0.83–1.12	0.98	0.84–1.15	0.93	0.79–1.10
Normal 18.5–24.9	1.00	Referent	1.00	Referent	1.00	Referent
Overweight 25.0–29.9	1.21	1.13–1.29	1.16	1.08–1.25	1.27	1.17–1.37
Obese 30.0	1.38	1.29–1.49	1.38	1.27–1.49	1.37	1.26–1.50
Attended a postpartum visit						
Yes	2.70	2.35–3.11	1.63	1.40–1.90	4.81	4.13–5.61
No	1.00	Referent	1.00	Referent	1.00	Referent
Smoking during or after pregnancy						
Yes	1.11	1.02–1.21	1.07	0.98–1.17	1.21	1.09–1.35
No	1.00	Referent	1.00	Referent	1.00	Referent
Chronic hypertension						

Characteristics	LARC[c] vs other hormonal[d] or nonhormonal contraception[e]		LARC vs other hormonal contraception		LARC vs other nonhormonal contraception	
	aOR[f]	95% CI	aOR[f]	95% CI	aOR[f]	95% CI
Yes	1.12	1.01–1.25	1.09	0.97–1.23	1.17	1.03–1.32
No	1.00	Referent	1.00	Referent	1.00	Referent

aOR, adjusted odds ratio; BMI, body mass index; CI, confidence interval; LARC, long-acting reversible contraception.

[a] Excludes women pregnant at the time of survey or reporting hysterectomy or bilateral oophorectomy, or menopausal;

[b] Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming;

[c] Includes intrauterine device and implants;

[d] Includes shots, pills, patch, and vaginal ring;

[e] Includes condoms, diaphragm, natural family planning/rhythm method, withdrawal, and spermicide;

[f] Adjusted for all other variables listed, site, and year.