GENERAL GYNECOLOGY

Interpregnancy intervals: impact of postpartum contraceptive effectiveness and coverage

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OBJECTIVE: The purpose of this study was to determine the use of contraceptive methods, which was defined by effectiveness, length of coverage, and their association with short interpregnancy intervals, when controlling for provider type and client demographics.

STUDY DESIGN: We identified a cohort of 117,644 women from the 2008 California Birth Statistical Master file with second or higher order birth and at least 1 Medicaid (Family Planning, Access, Care, and Treatment [Family PACT] program or Medi-Cal) claim within 18 months after index birth. We explored the effect of contraceptive method provision on the odds of having an optimal interpregnancy interval and controlled for covariates.

RESULTS: The average length of contraceptive coverage was 3.81 months (SD = 4.84). Most women received user-dependent hormonal contraceptives as their most effective contraceptive method (55%; n = 65,103 women) and one-third (33%; n = 39,090) had no contraceptive claim. Women who used long-acting reversible contraceptive methods had 3.89 times the odds and women who

used user-dependent hormonal methods had 1.89 times the odds of achieving an optimal birth interval compared with women who used barrier methods only; women with no method had 0.66 times the odds. When user-dependent methods are considered, the odds of having an optimal birth interval increased for each additional month of contraceptive coverage by 8% (odds ratio, 1.08; 95% confidence interval, 1.08–1.09). Women who were seen by Family PACT or by both Family PACT and Medi-Cal providers had significantly higher odds of optimal birth intervals compared with women who were served by Medi-Cal only.

CONCLUSION: To achieve optimal birth spacing and ultimately to improve birth outcomes, attention should be given to contraceptive counseling and access to contraceptive methods in the postpartum period.

Key words: contraceptive coverage, contraceptive effectiveness, interpregnancy interval, Medicaid, postpartum contraception

In the United States, one-third of all repeat pregnancies are conceived within 18 months of the previous birth.[1] These short interpregnancy intervals are associated with adverse maternal and child health outcomes, such as increased risk of preterm birth and infants with low birthweight.[2-5] To address this public health problem, the US Department

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of Health and Human Services chose as one of its Healthy People 2020 objectives to reduce the proportion of pregnancies that were conceived within 18 months of a previous birth by 10% in 2020.[1]

Effective contraceptive method use after birth has the potential to achieve

optimal interpregnancy intervals.[6,7] However, methods that require regular refills such as oral contraceptives or contraceptive ring provide, on average, less coverage over a 12-month period,[8] especially if women receive only a limited contraceptive supply per visit.[9] Similarly, the effectiveness of barrier methods is influenced by the client's consistent and accurate use.

Minority and low-income women are more likely to have short birth intervals as a result of unintended pregnancies than are white or middle-class women.[10-12] Therefore, assessment of the access to and provision of contraceptive methods through publicly funded services for low-income women may help to guide interventions to reduce short interpregnancy intervals. Women who have a birth that is reimbursed by California's Medicaid program (Medi-Cal) usually are eligible to receive healthcare services that include contraceptive services, from either Medi-Cal or its Medicaid family planning expansion,

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the Family Planning, Access, Care, and Treatment (Family PACT) program. The Family PACT program provided reproductive health services to >1.8 million low-income, uninsured women and men, including adolescents, in 2012.[13]

Any Medi-Cal provider can enroll in the Family PACT program and get reimbursed on a fee-for-service basis. At enrollment, providers agree to adhere to program standards (such as making all Food and Drug Administration—approved contraceptive methods available to clients) and to provide comprehensive family planning counseling services.[14] Family PACT program providers receive professional education and clinical support through clinical practice alerts, webinars, and skills-based training. Provider performance is monitored regularly through external evaluations, and the delivery of high quality of care has been documented.[15,16]

In a previously published analysis of the 2008 California Birth Statistical Master File (BSMF), we found that the provision of contraceptives within the first 90 days after delivery was associated significantly with optimal interpregnancy intervals of at least 18 months.[17] In the current analysis, we evaluated for the effect of postpartum contraceptive method effectiveness and length of postpartum contraceptive coverage on short interpregnancy intervals, when the data were controlled for Medi-Cal provider type and client demographics.

MATERIALS AND METHODS
The data analysis was approved by the University of California, San Francisco, Committee on Human Research and the California Committee for the Protection of Human Subjects. We identified a total of 331,132 women who had second or higher order births among women from California's 2008 BSMF. The birth immediately before the 2008 birth is referred to as the "index birth." Women who had multiple births, births that occurred before January 1, 2002, or index births that occurred outside California were excluded. Other exclusions were data inconsistencies, such as missing index birth dates, births with an interval of <30 days, or missing or improbable maternal age (<12 years old).

Of the remaining 230,850 women, we calculated the birth-to-conception interval between the date of the index birth and the conception date of the 2008 birth. *Conception date* was defined as the date of the last menses as recorded in the BSMF plus 9 days. To identify women who received contraceptive services from publicly funded programs, we applied a probabilistic linking method to match BSMF birth mother data with enrollment records for women with Medi-Cal or Family PACT program claims. The linking algorithm decided whether a pair of records from 2 disparate data files belongs to the same entity (person).[17-19]

We found 117,644 women who had at least 1 Family PACT program or Medi-Cal claim within 18 months after the index birth, which means that they were at least temporarily below the income threshold for publicly funded family planning programs. The remaining 113,206 women either received no services at all or services from a commercial health plan and were not included in the analysis.

Variables
This study explored whether contraceptive method provision within 18 months of the index birth and contraceptive coverage were associated with increased odds of an optimal interpregnancy interval. Contraceptive methods were categorized into tiers based on effectiveness[20]:

- Tier 1: Long-acting reversible contraception (LARC)—implant and intrauterine contraceptives.
- Tier 2: User-dependent hormonal—oral contraceptives, injection, patch, and ring.
- Tier 3: Barrier method and supplies—condoms, diaphragm, and spermicides.
- No method.

In cases of women who received multiple types of contraception that fell into different tiers, the most effective method that had been used after the index birth was defined as the "maximum tier" and used for descriptive and regression analyses.

Contraceptive coverage was defined to estimate the amount of contraceptive supply that a woman received. We calculated coverage for user-dependent hormonal methods and barrier methods using an algorithm that is based on the specified method and the quantity (for example, the number of pill packs or condoms distributed) for each of the pharmacy and onsite claims during the study period. If women switched methods, coverage was calculated on the aggregate of both methods without double counting periods of overlap. For this study, we focused on how contraceptive method provision affected the length of the interpregnancy interval, so the maximum length of coverage that was counted was up to 18 months from a woman's index birth. For LARC, unless a removal claim was found, we assigned the maximum length of coverage. Emergency contraception was not assigned any days of coverage. When a woman received multiple contraceptive methods in the same time period, we estimated contraceptive coverage based on the most effective method. The length of coverage was summed across service dates, from the first postpartum visit until the 18-month cutoff.

To identify Family PACT program providers, we used the provider enrollment status from the Medi-Cal Provider Master File, which contains provider information that was entered at the time of enrollment and is updated periodically. Medi-Cal providers who were not enrolled in the Family PACT program will be referred to as Medi-Cal—only providers.

Client demographics were determined from the mother's information that had been recorded in birth certificates. Demographic variables included education level (less than high school, high school and some college, or college graduate and higher); race/ethnicity (white, African American, Latina, Asian and Pacific Islander, Native American, or other/unknown); country of birth (United States or foreign-born); age at index birth (continuous variable); and parity (2 births or >2 births). Univariate analyses were performed on the demographic variables to examine the