

GYNECOLOGY

Racial and ethnic disparities in postpartum care and contraception in California's Medicaid program



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BACKGROUND: Considerable racial and ethnic disparities have been identified in maternal and infant health in the United States, and access to postpartum care likely contributes to these disparities. Contraception is an important component of postpartum care that helps women and their families achieve optimal interpregnancy intervals and avoid rapid repeat pregnancies and preterm births. National quality measurements to assess postpartum contraception are being developed and piloted.

OBJECTIVE: To assess racial/ethnic variation in receipt of postpartum care and contraception among low-income women in California.

STUDY DESIGN: We conducted a prospective cohort study of 199,860 Californian women aged 15–44 with a Medicaid-funded delivery in 2012. We examined racial/ethnic variation of postpartum care and contraception using multivariable logistic regression to control for maternal age, language, cesarean delivery, Medicaid program, and residence in a primary care shortage area (PCSA).

RESULTS: Only one-half of mothers attended a postpartum visit (49.4%) or received contraception (47.5%). Compared with white women, black women attended postpartum visits less often (adjusted odds ratio

[aOR], 0.73; 95% confidence interval [CI], 0.71–0.76), were less likely to receive any contraception (aOR, 0.83; 95% CI, 0.78–0.89) and were less likely to receive highly effective contraception (aOR, 0.64; 95% CI, 0.58–0.71). Women with Spanish as their primary language were more likely to get any contraception (aOR, 1.15; 95% CI, 1.11–1.19) but had significantly lower odds of receiving a highly effective method (aOR, 0.94; 95% CI, 0.90–0.99) compared with women with English as their primary language. Similarly, women in PCSAs had a greater odds of getting any contraception (aOR, 1.06; 95% CI, 1.03–1.09), but 24% lower odds of getting highly effective contraception than women not living in PCSAs (aOR, 0.76; 95% CI, 0.73–0.79).

CONCLUSION: Significant racial/ethnic disparities exist among low-income Californian mothers' likelihood of attending postpartum visits and receiving postpartum contraception as well as receiving highly effective contraception.

Key words: health disparities, highly effective contraception, Medicaid, postpartum care, postpartum contraception

Considerable racial and ethnic disparities have been identified in maternal and infant health in the United States.¹ In particular, black women in the United States are at greater risk of poor infant and maternal health outcomes^{2,3} and face high rates of rapid repeat pregnancies and preterm births.^{4–7} The reasons for this variation, however, are not understood fully. Although biological mechanisms may underlie some of these differences, access to preconception, prenatal, and postpartum care also likely contribute to these disparities.⁸ Contraception is an important component of postpartum care that helps women and their families achieve

optimal interpregnancy intervals and avoid rapid repeat pregnancies and preterm births.^{9–11} Because highly effective forms of contraception (such as intrauterine devices and implants) are associated with optimal interpregnancy intervals, access to these forms of contraception is particularly important.^{10,12,13}

In 2012, California was one of 26 states that received federal funding to collect, report, and analyze data on the Core Set of Health Care Quality Measures for Adults Enrolled in Medicaid (Adult Core Set). The Adult Core Set included the Healthcare Effectiveness Data and Information Set (HEDIS) Postpartum Care Rate measure,¹⁴ which examines postpartum visits between 21 and 56 days after delivery. These visits commonly address breastfeeding, contraception, postpartum depression, and medical conditions such as diabetes and hypertension.

In California, publicly funded family planning services are offered through Medi-Cal, California's Medicaid

program, and California's Family Planning, Access, Care, and Treatment (Family PACT) program. Women whose deliveries are covered by Medi-Cal are eligible for postpartum care and contraception for at least 60 days postpartum. If they are ineligible for full-scope Medi-Cal beyond this period, they can receive family planning services through Family PACT. Medi-Cal postpartum visit rates in California, especially among black women, have been below national averages; thus, increasing these rates became a focus of California's Medi-Cal quality strategy.¹⁵ California's Department of Health Care Services also participated in the Centers for Medicare & Medicaid Services Postpartum Learning Series, which focused on improving postpartum care, including postpartum contraception.¹⁶

In this analysis, we examined differences in postpartum visit rates and receipt of postpartum contraception among women receiving publicly funded health care in California by race/ethnicity, language preference, and

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residence in a primary care shortage area (PCSA).

Materials and Methods

HEDIS technical specifications were applied to Medi-Cal administrative data (including claims and encounter data) to identify a cohort of women eligible for postpartum visits.¹⁷ Women with deliveries of live births between November 6, 2011, and November 5, 2012, were eligible. Deliveries of live births were identified with Current Procedural Terminology codes, *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) diagnosis, and ICD-9-CM procedure codes indicative of live birth. Delivery dates were defined by service dates on claims most likely to be billed at the time of delivery; delivery dates from encounter data were verified against delivery payment records. Women were included once for every live birth delivery in this period. Fewer than 100 women had a second birth during the 12-month period.

Using this methodology, we identified 245,623 deliveries to women ages 15–44 years. Because Medi-Cal and Family PACT have separate enrollment systems, a probabilistic linking algorithm was used to link these Medi-Cal clients to their Family PACT Health Access Program identification numbers and associated claims. The linking algorithm is based on the Fellegi-Sunter model of record linkage¹⁸ that mathematically decides whether a pair of records from two disparate data files belongs to the same entity (person). Consistent with the HEDIS requirements for continuous enrollment in Medicaid, women who were not enrolled continuously in Medi-Cal or Family PACT from 43 days prior to 99 days after delivery were excluded ($N = 32,650$). Women with incomplete claims data or missing data on available covariates of interest (race/ethnicity, age, language, residence, and delivery type) ($N = 13,113$) also were excluded. Multivariable logistic regression was used to examine the odds of postpartum care for the remaining subpopulation ($N = 199,860$). Finally, we conducted multivariable logistic regression to assess the odds of receiving any contraception and

highly effective contraception among women who returned for a HEDIS postpartum visit without previous receipt of contraception ($N = 87,304$).

Per HEDIS guidelines, Current Procedural Terminology codes, ICD-9-CM diagnosis or procedure, uniform billing revenue, and Healthcare Common Procedure Coding System codes were used to identify postpartum care 21–56 days after delivery.¹⁴ These codes address procedures and diagnoses that include provision of postpartum care, pelvic examinations, cervical cytology, intrauterine contraceptive (IUC) insertion/removal, or diaphragm fitting. One Healthcare Common Procedure Coding System code for postpartum care (Z1038) that was used in California in 2012 also was included.

Women identified as having received postpartum contraception included those with at least one paid Medi-Cal claim, Family PACT claim, or Medi-Cal Managed Care encounter record for contraception between 0 and 99 days postpartum (3 months after delivery plus a 2-week buffer for scheduling the visit) for contraception. Women with no paid claims for contraceptives in Medi-Cal or Family PACT were categorized as having no contraceptive method. Women with multiple forms of contraception were categorized by the most effective method received. Contraceptives were categorized as highly effective (IUC, implants, or female sterilization), moderately effective (injectable, pills, patch, ring, or diaphragm), or less effective (condoms, spermicide, or sponge).¹⁹

Medi-Cal and Family PACT enrollment records were used to identify race/ethnicity (white, black, Latina, Asian/Pacific Islander, or other/unknown), primary language (English, Spanish, or other), and maternal age at delivery. Because residence in a rural community or a community with a limited number of clinicians can make it difficult to receive medical services in a timely manner, we also adjusted for residence in a PCSA. This was defined as having resided in a census tract designated by the California Healthcare Workforce Policy Commission as a PCSA for at least 1

month between 0 and 99 days postpartum. One month was chosen because it was the shortest period of time available in the dataset to measure access to primary care.²⁰

Deliveries that had claims with procedure or diagnosis codes for cesarean delivery within 7 days of their delivery date were considered cesarean. Deliveries with at least one vaginal delivery procedure or diagnosis code were considered vaginal. If no codes indicated mode of delivery, the delivery type was considered missing. Women were assigned to the publicly funded health care program (Medi-Cal Fee for Service, Medi-Cal Managed Care health plans, or Family PACT), where they were enrolled on the 99th day postpartum.

Rates of HEDIS postpartum visits, receipt of any contraception, and receipt of highly effective contraception were examined by maternal demographics. Associations between these covariates and the 3 postpartum outcomes of interest (ie, any postpartum visit, receipt of any postpartum contraception, receipt of highly effective postpartum contraception) were assessed via Pearson χ^2 tests. Finally, we conducted multivariable logistic regression to assess the adjusted odds of receiving any contraception and highly effective contraception among the 87,304 women who had not received contraception prior to their postpartum visit.

All analyses were conducted with SAS 9.2 (Cary, NC). This study was approved by the Committee of Human Subjects Research of the University of California, San Francisco, and the California Health and Human Services Agency's Committee for the Protection of Human Subjects.

Results

Postpartum visit rates

Of 199,860 women with deliveries, the majority were Latina (67.4%). One-half (49.9%) spoke English, and 46% spoke Spanish as their primary language. More than one-half (57.9%) were 20–29 years of age at delivery, 33.9% had cesarean deliveries, and 64.7% resided in a PCSA during their postpartum period. Roughly one-half (49.0%) were enrolled

TABLE 1

Demographic and service delivery characteristics of low-income women ages 15–44 years delivering in California, 2012

Maternal demographics	Total population, n (%)	Women without contraception before first postpartum visit, n (%)
Overall	199,860 (100%)	87,304 (100%)
Race/ethnicity		
White	31,371 (15.7%)	12,338 (14.1%)
Black	16,352 (8.2%)	4791 (5.5%)
Latina	134,607 (67.4%)	62,713 (71.8%)
Asian/Pacific Islander	12,512 (6.3%)	5323 (6.1%)
Other	5018 (2.5%)	2139 (2.5%)
Primary language		
English	99,716 (49.9%)	37,254 (42.7%)
Spanish	92,721 (46.4%)	46,853 (53.7%)
Other	7423 (3.7%)	3197 (3.7%)
Age at delivery, y		
15–19	23,485 (11.8%)	9651 (11.1%)
20–29	115,767 (57.9%)	51,451 (58.9%)
30–39	55,664 (27.9%)	24,160 (27.7%)
40–44	4944 (2.5%)	2042 (2.3%)
Resided in PCSA		
Yes	129,303 (64.7%)	55,133 (63.2%)
No	70,557 (35.3%)	32,171 (36.9%)
Cesarean delivery	67,781 (33.9%)	26,045 (29.8%)
Attended postpartum visit 21–56 d after delivery (as defined by HEDIS)	98,719 (49.4%)	87,304 (100.0%)
Received any contraception 0–99 d postpartum	94,922 (47.5%)	45,924 (52.6%)
Received highly effective contraception 0–99 d postpartum	32,794 (16.4%)	13,784 (15.8%)

HEDIS, Healthcare Effectiveness Data and Information Set; PCSA, primary care shortage area.

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in Medi-Cal Managed Care, 43.3% were enrolled in Medi-Cal Fee for Service, and 7.7% were enrolled in Family PACT on the 99th day postpartum. Among these 199,860 women, 49.4% had a HEDIS postpartum visit (Table 1).

In multivariable logistic regression analysis, black women had 27% lower odds of attending an HEDIS postpartum visit than white women (adjusted odds ratio [aOR], 0.73; confidence interval [CI], 0.71 to 0.76). Women younger than the age of 20 had lower odds of attending a HEDIS postpartum visit than women

ages 20–29 (aOR, 0.82; CI, 0.80–0.85). Women residing in PCSAs also were less likely to make postpartum visits (aOR, 0.88; CI, 0.86–0.89). Finally, women who had a cesarean delivery also had lower odds of returning for a HEDIS postpartum visit (aOR, 0.81; CI, 0.80 to 0.83) (Table 2). In contrast, women who spoke primarily Spanish (aOR, 1.65; CI, 1.61 to 1.69) and women who were enrolled in Family PACT at the end of the postpartum period (aOR, 1.19; CI, 1.15 to 1.24) had greater odds of returning for a HEDIS postpartum visit compared

with their peers, when we controlled for all covariates (Table 2).

Receipt of contraception

Among the 49.4% of women who received postpartum care, 11,432 already had received contraception before their first postpartum visit. Among the remaining 87,304 women who returned for a visit with no previous postpartum contraception, 52.6% received contraception before 99 days postpartum. Compared with the full population, women coming to their HEDIS postpartum visit without a contraceptive method were more likely to be Latina (71.8% vs 67.4%), Spanish speaking (53.7% vs 46.4%), and returning after a vaginal delivery (70.2% vs 66.1%) (Table 1).

In multivariable logistic regression controlled for all covariates in this same subpopulation ($n = 87,304$), Latina women were more likely to have received any contraception than white women (aOR, 1.13; CI, 1.08 to 1.19), whereas black, Asian, and other groups had significantly lower odds of receiving postpartum contraception than white women (Table 3). Women had greater odds of receiving any postpartum contraception if they primarily spoke Spanish (aOR, 1.15; CI, 1.11 to 1.19). Women with cesarean deliveries had lower odds of receiving postpartum contraception compared with women with vaginal deliveries (aOR, 0.84; CI, 0.81 to 0.86). Lastly, the odds of receiving postpartum contraception decreased with age. Although adolescents and women ages 20–29 years had similar odds of receiving contraception, women ages 30–39 (aOR, 0.81; CI, 0.78 to 0.83) and 40–44 (aOR, 0.63, CI, 0.57 to 0.69) had lower odds of receiving postpartum contraception than women ages 20–29 (Table 3).

Highly effective contraception

Sixteen percent of all women received a highly effective postpartum contraceptive method (sterilization, IUC, or implant). As with the receipt of any postpartum contraception, women older than 30 years of age had lower odds of receiving highly effective contraception. Black and Asian women were less likely to receive highly effective contraception

TABLE 2

Receipt of any postpartum care among low-income women ages 15–44 years delivering in California, adjusted for select covariates, 2012 (N = 199,860)

Maternal demographics	Received postpartum care 21–56 d after delivery, %	Adjusted ^a odds of receiving postpartum care 21–56 d after delivery, aOR (CI)
Race/ethnicity		
White	43.4%	Referent
Black	33.3%	0.73 (0.71–0.76)
Latina	53.0%	1.03 (1.00–1.07)
Asian/Pacific Islander	47.7%	1.11 (1.06–1.16)
Other	46.6%	1.06 (1.00–1.13)
Primary language		
English	41.6%	Referent
Spanish	57.9%	1.65 (1.61–1.69)
Other	48.1%	1.14 (1.08–1.21)
Age at delivery, y		
15–19	44.0%	0.82 (0.80–0.85)
20–29	48.8%	Referent
30–39	52.7%	1.09 (1.07–1.12)
40–44	52.8%	1.07 (1.01–1.13)
Ever resided in PCSA		
Yes	48.1%	0.88 (0.86–0.89)
No	51.8%	Referent
Delivery method		
Cesarean	46.2%	0.81 (0.80–0.83)
Vaginal	51.0%	Referent

aOR, adjusted odds ratio; CI, confidence interval; PCSA, primary care shortage area.

^a Model adjusted for state-funded health care program (Medi-Cal Fee for Service, managed care, Family PACT) at 99 days. Thiel de Bocanegra et al. Disparities in postpartum contraception. *Am J Obstet Gynecol* 2017.

than white women, even in multivariable models (Table 3). Although women who spoke primarily Spanish were more likely to receive some form of contraception 0–99 days postpartum, they had significantly lower odds of receiving a highly effective reversible method compared with women who spoke primarily English (aOR, 0.94; CI, 0.90 to 0.99). Women in primary care shortage areas had marginally greater odds of getting any contraception but had a 24% lower odds of getting a highly effective reversible form of contraception than women not living in primary care shortage areas (aOR, 0.76; CI, 0.73 to 0.79) (Table 3).

Comment

This study found significant racial/ethnic disparities in postpartum visit rates and receipt of postpartum contraception among women served by the Medi-Cal program, even after we controlled for maternal age, delivery type, and residence in a primary care shortage area. Only one-half of women with Medi-Cal–funded deliveries had evidence of a postpartum visit, which is below the 2012 national Medicaid HMO average of 63%.²¹ In particular, black women were less likely to attend postpartum visits and receive contraception than white and Latina women. These findings are consistent with previous studies.²² Although

contraceptive preferences vary by individuals, because black women overall are more likely to experience short interpregnancy intervals²³ and poor maternal and infant health outcomes, programs such as the Black Infant Health program²⁴ should be strengthened.

Because Latina women on Medi-Cal are more frequently without health insurance 3 months after delivery,²² they may be more motivated to return for a postpartum visit before losing their limited scope Medi-Cal insurance (about 60 days after delivery). Similarly, women in PCSAs were significantly more likely to get any contraception compared with their peers but significantly less likely to get a highly effective form of contraception. Women and their clinicians, particularly those in rural areas or with transportation challenges, may be more motivated to take care of contraceptive needs at the visit rather than planning a return appointment. Although this dataset did not include information on provider specialties available in the PCSA, a sizable number of women receive family planning services from primary care Medi-Cal and Family PACT providers.²⁵ Our findings suggest that geographic access to providers needs to be complemented by clinician training and other interventions to ensure the provision of highly effective contraception.²⁶

A limitation of this analysis is its reliance on administrative claims and encounter data, which can undercount contraceptive method provision if correct claims were not submitted, if clients paid for contraceptives themselves, had already picked up prescription contraception prior to birth, or if they relied on their partner's method (vasectomy, condom use). We also do not know how many women in the cohort had experienced fertility challenges or how many were in same-sex relationships. The use of administrative data also limited the number of available covariates. Although information on the mother's parity or country of birth was not available, we were able to control for delivery type (cesarean or vaginal) and residence in a primary care shortage area. Importantly, however, claims data have no

TABLE 3

Receipt of any postpartum contraception within 99 days, 2012 (N = 87,304)^a

Maternal demographics	Received any contraception	Adjusted odds (95% CI)	Received highly effective contraception, %	Adjusted odds ratio (95% CI)
Race/ethnicity				
White	50.4%	Referent	18.3%	Referent
Black	46.8%	0.83 (0.78–0.89)	12.4%	0.64 (0.58–0.71)
Latina	54.7%	1.13 (1.08–1.19)	15.9%	0.95 (0.90–1.00)
Asian/Pacific Islander	41.8%	0.81 (0.76–0.87)	11.7%	0.65 (0.59–0.72)
Other	43.5%	0.80 (0.73–0.88)	15.8%	0.89 (0.78–1.01)
Primary language				
English	51.3%	Referent	16.8%	Referent
Spanish	54.7%	1.15 (1.11–1.19)	15.3%	0.94 (0.90–0.99)
Other	36.9%	0.68 (0.62–0.74)	11.2%	0.76 (0.67–0.86)
Age at delivery, y				
15–19	56.4%	1.02 (0.98–1.07)	17.1%	1.00 (0.95–1.07)
20–29	54.4%	Referent	16.6%	Referent
30–39	48.2%	0.81 (0.78–0.83)	13.8%	0.85 (0.82–0.89)
40–44	41.9%	0.63 (0.57–0.69)	12.9%	0.81 (0.71–0.93)
Ever resided in PCSA				
Yes	53.2%	1.06 (1.03–1.09)	14.4%	0.76 (0.73–0.79)
No	51.5%	Referent	18.2%	Referent
Delivery method				
Cesarean	49.1%	0.84 (0.81–0.86)	13.2%	0.77 (0.73–0.80)
Vaginal	54.1%	Referent	16.9%	Referent

CI, confidence interval; PCSA, primary care shortage area.

^a Model adjusted for state-funded health care program (Medi-Cal Fee for Service, managed care, Family PACT) at 99 days.Thiel de Bocanegra et al. Disparities in postpartum contraception. *Am J Obstet Gynecol* 2017.

information on women's health-related beliefs or contraceptive preferences, which may also vary by race/ethnicity.

HEDIS postpartum visit rates computed using administrative data rather than the hybrid method of chart reviews and administrative data are lower than rates supplemented with chart review²⁷ and self-reported postpartum visits in the Pregnancy Risk Assessment Monitoring System (PRAMS).^{28,29} There is no reason, however, to believe reporting methods affect differences seen by race or ethnicity and using administrative data provides an efficient means to monitor postpartum contraception uptake.

States usually report postpartum visit rates using HEDIS reporting

requirements, which excludes women who switched managed care plans or disenrolled for other reasons and are less likely to return for postpartum visits.³⁰ Our analysis shows the importance of monitoring postpartum visit and postpartum contraception rates for all women with a publicly-funded delivery to ensure optimal maternal child health.

Health care encounters during the postpartum period are an important opportunity to help ensure that future pregnancies are well-timed and healthy. Efforts to increase postpartum visit rates will need to address the multiple reasons that women do not make these visits, including education on the importance and benefit of returning postpartum. Text4Baby, a client-focused text service

that sends prenatal and postpartum health messages to women,³¹ has provided a novel approach to sharing such information. Hospital systems also can work on the scheduling of postpartum appointments that consider the infant's pediatric appointments as well as the woman's work schedule.

Concomitant with increasing the HEDIS postpartum visit rate, efforts are needed to increase provision of postpartum contraception before hospital discharge to ensure that women have access to their contraceptive of choice even if they are unable to return for further postpartum care. Several states (including California) have changed their policies to reimburse for maternity inpatient IUC and implant placement

outside of a global delivery billing fee.^{32,33}

In conclusion, significant racial/ethnic disparities exist among low-income Californian mothers' likelihood of attending postpartum visits and receiving postpartum contraception and highly effective contraception. Healthy People 2020 includes a developmental objective to assess postpartum contraception (MCH16-6)³⁴; in 2014, the Centers for Medicaid and CHIP Services initiated a pilot of technical specifications for this measure among various state Medicaid agencies.^{35,36} Measures for postdelivery inpatient contraception (within 3 days after delivery) and postpartum contraception at sixty days have been endorsed by the National Quality Forum.^{37,38} To identify gaps and develop successful interventions, it will be important to calculate these measures by race/ethnicity, age, and place of residence to ensure equitable access to postpartum care. Identifying these disparities will support design and implementation of tailored interventions designed to address these disparities and will, ultimately, support the reduction of disparities in maternal and infant health. ■

References

- Bryant AS, Worjoh A, Caughey AB, Washington AE. Racial/ethnic disparities in obstetrical outcomes and care: prevalence and determinants. *Am J Obstet Gynecol* 2010;202:335-43.
- Howell EA, Egorova N, Balbierz A, Zeitlin J, Hebert PL. Black-white differences in severe maternal morbidity and site of care. *Am J Obstet Gynecol* 2016;214:122.e1-7.
- Grobman WA, Bailit JL, Rice MM, et al. *Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network*. Racial and ethnic disparities in maternal morbidity and obstetric care. *Obstet Gynecol* 2015;125:1460-7.
- Basso O, Olsen J, Knudsen LB, Christensen K. Low birth weight and preterm birth after short interpregnancy intervals. *Am J Obstet Gynecol* 1998;178:259-63.
- Hussaini KS, Ritenour D, Coonrod DV. Interpregnancy intervals and the risk for infant mortality: a case control study of Arizona infants 2003-2007. *Matern Child Health J* 2012;17:646-53.
- Chen I, Jhangri GS, Chandra S. Relationship between interpregnancy interval and congenital anomalies. *Am J Obstet Gynecol* 2014;210:564.e1-8.
- Davis EM, Babineau DC, Wang X, et al. Short inter-pregnancy intervals, parity, excessive pregnancy weight gain and risk of maternal obesity. *Matern Child Health J* 2014;18:554-62.
- Howell EA, Zeitlin J, Hebert P, Balbierz A, Egorova N. Paradoxical trends and racial differences in obstetric quality and neonatal and maternal mortality. *Obstet Gynecol* 2013;121:1201-8.
- 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;88:53-7.
- Baldwin MK, Edelman AB. The effect of long acting reversible contraception on rapid repeat pregnancy in adolescents: a review. *J Adolesc Health* 2013;52(suppl 4):S47-53.
- Rodriguez M, Chang R, Thiel de Bocanegra H. The impact of postpartum contraception on reducing preterm birth: findings from California. *Am J Obstet Gynecol* 2015;213:703.e1-6.
- Isquick S, Chang R, Thiel de Bocanegra H, Chabot M, Brindis CD. Postpartum contraception and interpregnancy intervals among adolescent mothers accessing public services in California. *Matern Child Health J*. 2016 Jul 30. PMID: 27475821.
- Thiel de Bocanegra H, Chang R, Howell M, Darney P. Interpregnancy intervals: impact of postpartum contraceptive effectiveness and coverage. *Am J Obstet Gynecol* 2014;210:311.e1-8.
- National Committee on Quality Assurance, Prenatal and Postpartum Care. Available at: <http://www.ncqa.org/portals/0/Prenatal%20Postpartum%20Care.pdf>. Accessed Sept. 7, 2015.
- Department of Health Care Services Medical Managed Care Division, Medi-Cal Managed Care Program, Quality Strategy Annual Assessment October 2014. Sacramento. Available at: http://www.dhcs.ca.gov/dataandstats/reports/Documents/MMCD_Qual_Rpts/Studies_Quality_Strategy/MgdCare_Quality_Strategy2015.pdf. Accessed Sept. 7, 2015.
- Centers for Medicaid and Medicare Services Maternal and Infant Health Initiative Factsheet: Overview of the CMCS Maternal and Infant Health Initiative, December 2014. Available at: <https://www.medicaid.gov/medicaid-chip-program-information/by-topics/quality-of-care/downloads/mih-initiative-fact-sheet.pdf>. Accessed Mar. 8, 2016.
- Core Set of Adult Health Care Quality Measures for Medicaid (Adult Core Set) Technical Specifications and Resource Manual for Federal Fiscal Year 2016 Reporting. June 2016. Available at: <https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Quality-of-Care/Downloads/Medicaid-Adult-Core-Set-Manual.pdf>. Accessed July 30, 2016.
- Winkler WE. Frequency-based matching in Fellegi-Sunter model of record linkage. *Statistical Research Report Series No. RR2000/06*. 2000.
- Trussell J. Contraceptive efficacy. In: Hatcher RA, Trussell J, Nelson AL, Cates W, Kowal D, Policar M, eds. *Contraceptive technology*, 20th ed. Atlanta, GA: Ardent Media; 2011.
- Primary Care Shortage Areas (Update) Report. California Office of Statewide Health Planning and Development, Healthcare Workforce Development Division. 2015 Feb 9. Available at: http://www.oshpd.ca.gov/hwdd/MSSA/GIS/Memo-PCSA_20131212.pdf. Accessed March 17, 2017.
- National Committee on Quality Assurance. The state of health care quality: Improving quality and patient experience. Available at: http://www.ncqa.org/Portals/0/Newsroom/SOHC/2013/SOHC-web_version_report.pdf. Accessed July 19, 2016.
- California Department of Public Health, MIHA Snapshot, California by Race/Ethnicity, 2012 Maternal and Infant Health Assessment (MIHA) Survey. Available at: <http://www.cdph.ca.gov/data/surveys/MIHA/MIHASnapshots/SnapshotbyRace2012.pdf>. Accessed Sep. 6, 2016.
- Gemmill A, Lindberg LD. Short interpregnancy intervals in the United States. *Obstet Gynecol* 2013;122:64-71.
- California Department of Public Health, Black Infant Health program. Available at: <http://www.cdph.ca.gov/programs/BIH/Pages/default.aspx>. Accessed Sep. 6, 2016.
- Thiel de Bocanegra H, Cross Riedel J, Menz M, Darney P, Brindis C. Onsite provision of specialized contraceptive services: does Title X funding enhance access? *J Womens Health (Larchmt)* 2014;23:428-33.
- Harper CC, Rocca CH, Thompson KM, et al. Reductions in pregnancy rates in the USA with long-acting reversible contraception: a cluster randomised trial. *Lancet* 2015;386:562-8.
- Pawson LG, Scholle SH, Powers A. Comparison of administrative-only versus administrative plus chart review data for reporting HEDIS hybrid measure. *Am J Managed Care* 2007;13:553-8.
- 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;89:57-62.
- Starr KA, Martins SL, Watson S, Gilliam ML. Postpartum contraception use by urban/rural status: an analysis of the Michigan pregnancy risk assessment monitoring system data. *Womens Health Issues* 2015;25:622-7.
- Barr M, Bradsberry M, Howell M, et al. Postpartum Care and the Provision of Effective Postpartum Contraceptive Methods in California's Medicaid Program. Presentation at the annual meeting of the American Public Health Association, New Orleans, Nov. 19, 2014.
- Centers for Disease Control and Prevention. Become a Text4Baby Partner. Available at: <http://www.cdc.gov/women/text4baby/>. Accessed July 20, 2016.
- Aiken AR, Creinin MD, Kaunitz AM, Nelson AL, Trussell J. Global fee prohibits postpartum provision of the most effective reversible contraceptives. *Contraception* 2014;90:466-7.

33. CMCS Informational Bulletin. State Medicaid Payment Approaches to Improve Access to Long-Acting Reversible Contraception; April 8, 2016. Available at <https://www.medicaid.gov/federal-policy-guidance/downloads/CIB040816.pdf>. Accessed April 9, 2016.

34. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2020: Maternal, Infant, and Child Health Objectives. Available at: <https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health/objectives>. Accessed July 19, 2016.

35. Centers for Medicaid and Medicare Services. Maternal and Infant Health Care Quality. Available at: <https://www.medicaid.com/medicaid-chip-program-information/by-topics/qualityof-care/maternal-and-infant-health-care-quality/html>. Accessed July 22, 2016.

36. Office of Population Affairs/Centers for Disease Control and Prevention. Measure PCU:

Postpartum contraceptive use among women ages 15-44 (developmental measure). Available at: <https://www.medicaid.gov/medicaid-chip-program-information/by-topics/quality-of-care/downloads/postpartum-contraceptive-use-measure.pdf>. Accessed Feb. 27, 2016.

37. National Quality Forum, Perinatal and Reproductive Health 2015 – 2016. #2902 Contraceptive Care – Postpartum. Available at: www.qualityforum.org/Projects/n-r/Perinatal_2015-2016/Draft_Report.aspx. Accessed July 20, 2016.

38. National Quality Forum. Perinatal and Reproductive Health Project 2015-2016. Available at: <http://www.qualityforum.org/ProjectMeasures.aspx?projectId=80680>. Accessed Dec. 28, 2016.

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