Published in final edited form as:

Prev Med. 2019 September ; 126: 105743. doi:10.1016/j.ypmed.2019.06.001.

Prevalence and maternal characteristics associated with receipt of prenatal care provider counseling about medications safe to take during pregnancy

Denise V. D'Angelo[a,*], **Brenda L. Bauman**[a], **Cheryl S. Broussard**[b], **Van T. Tong**[b], **Jean Y. Ko**[a], **Martha Kapaya**[a], **Leslie Harrison**[a], **Indu B. Ahluwalia**[a]

[a]National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, United States of America

[b]National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, United States of America

Abstract

Use of some medications during pregnancy can be harmful to the developing fetus, and discussion of the risks and benefits with prenatal care providers can provide guidance to pregnant women. We used Pregnancy Risk Assessment Monitoring System data collected for 2015 births aggregated from 34 US states (n = 40,480 women) to estimate the prevalence of self-reported receipt of prenatal care provider counseling about medications safe to take during pregnancy. We examined associations between counseling and maternal characteristics using adjusted prevalence ratios (aPR). The prevalence of counseling on medications safe to take during pregnancy was 89.2% (95% confidence interval [CI]: 88.7–89.7). Women who were nulliparous versus multiparous (aPR 1.03; 95% CI: 1.02–1.04), who used prescription medications before pregnancy versus those who did not, (aPR 1.03; 95% CI: 1.02–1.05), and who reported having asthma before pregnancy versus those who did not, (aPR 1.05; 95% CI: 1.01–1.08) were more likely to report receipt of counseling. There was no difference in counseling for women with pre-pregnancy diabetes, hypertension, and/or depression compared to those without. Women who entered prenatal care after the first trimester were less likely to report receipt of counseling (aPR 0.93; 95% CI: 0.91–0.96). Overall, self-reported receipt of counseling was high, with some differences by maternal characteristics. Although effect estimates were small, it is important to ensure that information is available to prenatal care providers about medication safety during pregnancy, and that messages are communicated to women who are or might become pregnant.

Keywords

Prenatal care counseling; Pregnancy; Medication use during pregnancy; PRAMS

[*]Corresponding author at: Centers for Disease Control and Prevention, 4770 Buford Highway NE, Mailstop F-74, Atlanta, GA 30341-3724, United States of America. DDAngelo@cdc.gov (D.V. D'Angelo).

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Declaration of Competing Interest

Authors report no conflicts of interest.

1. Introduction

Many women use prescription medications during pregnancy. Estimates range from 22% to 50% based on self-report, and as much as 82% when estimating from Medicaid dispensary data (Tinker et al., 2015; Mitchell et al., 2011; Palmsten et al., 2015). The prescription medications most commonly used during pregnancy are antibiotics and medications for chronic conditions such as asthma and thyroid problems (Palmsten et al., 2015; Thorpe et al., 2013). Although medication use is common among pregnant women, significant gaps exist in the availability of information about the fetal effects of medications used during pregnancy, and careful consideration of the risks and benefits of taking medication during pregnancy is needed (Mitchell, 2003; Ayad and Costantine, 2015; Lagoy et al., 2005). Several studies using drug dispensing data from Medicaid and health maintenance organizations have found that even for medications with clear evidence of teratogenic impacts on the developing fetus, dispensing is still reported during pregnancy for a small percentage of women, commonly early in pregnancy when a woman may not be aware she is pregnant (Palmsten et al., 2015; Andrade et al., 2006).

The prevalence of medication use during pregnancy has been increasing over the past few decades. From 1976 to 2008 prescription medication use increased by > 60%, and was most common among white women based on findings from Boston and Philadelphia sites that participated in the Birth Defects Study (Mitchell et al., 2011).

The Centers for Disease Control and Prevention (CDC) suggests a systematic approach for safer medication use during pregnancy (Broussard et al., 2014). CDC and professional medical societies recommend assessment and discussion of medication use with women during the preconception and prenatal periods, and have developed tools to assist providers with these assessments (CDC, 2006; American College of Obstetricians and Gynecologists, 2012; Gregory et al., 2006; *Center for Maternal and Infant Health*, n.d.). Given the extensive list of topics covered during prenatal care visits, however, there are no current estimates of how often prenatal care providers talk with their pregnant patients about medications that are safe to use during pregnancy. Previous studies using Pregnancy Risk Assessment Monitoring System (PRAMS) data from 2008 and earlier have reported prenatal care provider counseling about medications to be around 90% (Krans et al., 2013; Petersen et al., 2001).

The purpose of this study was to examine reported receipt of prenatal care provider counseling about medications that are safe to take during pregnancy among women with a recent live birth. The current study provides more recent 2015 PRAMS estimates, and examines associations between receipt of counseling specific to medication safety during pregnancy and maternal characteristics which have not been previously described. We examine whether there were differences in reported receipt of counseling among subgroups of women who may be at greater risk of taking a teratogenic medication during pregnancy, such as women with certain chronic health conditions.

2. Methods

2.1. Data source

PRAMS is an ongoing state- and population-based surveillance system designed to monitor selected maternal behaviors and experiences that occur before, during, and shortly after pregnancy among women who deliver live-born infants in selected U.S. states, cities and territories. Using standardized PRAMS data collection methods, all participating health departments select a stratified random sample of 75–300 women monthly from birth certificate records. PRAMS sites use a standardized protocol for data collection, which includes sending up to three self-administered surveys via the mail to a sample of mothers, and contacting those who do not respond to the mailings for telephone interviews. At the end of a calendar year of births, the data are weighted to account for sample design, nonresponse, and noncoverage. Annual PRAMS data sets are created that are representative of the statewide population of live births in each site for each year. More details on the PRAMS methodology have been described elsewhere (Shulman et al., 2018).

2.2. Study sample

We aggregated data from the Pregnancy Risk Assessment Monitoring System (PRAMS) in 34 sites that achieved an overall weighted response rate of 55% or greater in 2015. The 34 sites are Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. There were 40,480 respondents in the dataset from the 34 sites, representing the 2,300,054 women who gave birth to a live infant in these sites in 2015. The PRAMS study protocol has approval from the Institutional Review Boards at CDC and in each participating site.

2.3. Measures

We analyzed the measure on self-reported receipt of counseling about medications during prenatal care visits as captured by the question, "*During any of your prenatal care visits*, did a doctor, nurse, or other health care worker talk with you about any of the things listed below? *Please count only discussions*, not reading materials or videos." Women who responded yes to the response option "Medicines that are safe to take during my pregnancy" were considered to have received prenatal provider counseling about medication safety.

We obtained information on maternal age, race/ethnicity, education level, parity, and marital status from the linked birth certificate data. Women who reported Hispanic ethnicity of any race were categorized as Hispanic. Women who did not report Hispanic ethnicity were categorized as non-Hispanic white, black, American Indian/Alaska Native, or other based on race. Women categorized as "other" were those who did not report white, black, or American Indian/Alaska Native race. Health insurance coverage for prenatal care and timing of prenatal care initiation were from the PRAMS questionnaire, as were the questions on chronic conditions, prescription medication use before pregnancy, cigarette smoking and alcohol use during the 3 months before pregnancy and during the last 3 months of

pregnancy, and pregnancy intention. Women who reported wanting pregnancy sooner or then were classified as having intended pregnancies, and those who reported wanting the pregnancy later, never, or unsure were classified as having an unintended pregnancy. All states asked women if a health care provider told them that they had diabetes, hypertension, or depression before their most recent pregnancy. A subset of states included an optional question about having asthma, heart problems, epilepsy, thyroid problems, or anxiety in the 3 months before pregnancy (7 states: Delaware, Hawaii, Maryland, Michigan, New York City, Utah, and Washington [no thyroid question]). The estimates for these indicators were calculated only among women in the states that included the question.

2.4. Statistical analysis

We calculated percentages and confidence intervals among respondents for maternal characteristics by receipt of prenatal provider counseling about medications that are safe to take during pregnancy. We used multivariable logistic regression with receipt of provider counseling as the dependent variable to examine the associations between maternal characteristics and receipt of counseling using crude and adjusted prevalence ratios. Predictors were selected based on theoretical consideration of demographic and behavioral characteristics likely to impact general health status, access to prenatal care, and health conditions that might require medical management.

Adjusted prevalence ratios (aPR) were calculated for all outcomes. Significance was determined based on whether or not the confidence intervals for the adjusted prevalence ratio included the value 1.0. In the adjusted models, we controlled for maternal age, race/ethnicity, parity, first trimester prenatal care initiation, pre-pregnancy prescription medication use, and smoking during pregnancy. For indicators of chronic conditions that were only available in 7 states, the multivariable analysis was restricted to women who resided in those states. We used SAS-callable SUDAAN software version 11.0 for the analysis to account for the PRAMS complex sampling design.

3. Results

Overall, most women with a recent live birth in the 34 study sites (89.2%) reported receipt of prenatal counseling about medications safe to take during pregnancy. Considering only the characteristics with the lowest prevalence, reported prevalence of counseling was less than the overall 89% among women who were 35 years or older (86.8%), American Indian/Alaska Native non-Hispanic race/ethnicity (88.4%),"other" non-Hispanic race/ethnicity (86.2%), had less than a high school education (87.1%), were multiparous (87.8%), who reported health insurance coverage other than private or Medicaid for prenatal care (87.4%), and who entered prenatal care after the first trimester of pregnancy (84.4%) (Table 1).

Considering behavioral characteristics, reported prevalence of counseling was less than the overall 89% among women who smoked during the last 3 months of pregnancy (86.2%), who used alcohol in the 3 months before pregnancy (88.3%) and during the last 3 months or pregnancy (86.6%), and those who reported an unintended pregnancy (88.4%). Across all subgroups examined, no group had a report of counseling < 84% (Table 1).

In the multivariable analysis, the characteristics significantly associated with being more likely to report of receiving counseling about medications safe to take during pregnancy were being nulliparous (aPR 1.04; 95% CI: 1.03–1.05), reporting asthma before pregnancy (aPR 1.04; 95% CI: 1.01–1.08), and using prescription medications before pregnancy (aPR 1.03; 95% CI: 1.02–1.05). Factors associated with being less likely to report receiving counseling were maternal age 35 years or older (aPR 0.98; 95% CI 0.96–0.99), "other" non-Hispanic race/ethnicity (aPR 0.96; 95% CI: 0.94–0.98), entry into prenatal care after the first trimester (aPR 0.93; 95% CI: 0.91–0.96), smoking in the last 3 months of pregnancy (aPR 0.97; 95% CI 0.94–0.99), and alcohol use in the last 3 months of pregnancy (aPR 0.97; 95% CI 0.94–0.99) (Table 2).

4. Discussion

Reported prenatal care counseling on medications safe to take during pregnancy was high overall and by demographic subgroup (> 84%), in our sample of women with recent live births. These findings mirror results from prior studies using PRAMS data from 2004 to 2008 and from 1997 to 1998, suggesting no change over time in the prevalence (Petersen et al., 2001; Handler et al., 2012). Both previous studies reported prevalence around 90%, and the study from 2004 to 2008 found that the reported prevalence of discussion of medications safe to take during pregnancy was higher than other topics covered including alcohol and tobacco use, seatbelt use, and intimate partner violence (Petersen et al., 2001). The current study provides more recent 2015 PRAMS estimates, and examines associations between receipt of counseling specific to medication safety during pregnancy and maternal characteristics which have not been previously described. Another study using Illinois Medical Assistance program claims data, medical record data, and birth certificate data, found that the majority of women with a recent birth had < 80% of recommended content for prenatal care documented in their medical record. The study found differences by whether the site was private or publicly funded (Kogan et al., 1994). Others studies found differences in receipt of various aspects of prenatal care and advice by race/ethnicity(Kogan et al., 1994; Oza-Frank et al., 2015). While these studies are not specific to medication use, gaps or differential counseling during prenatal care in relation to the full set of topics recommended by CDC and professional medical societies may indicate missed opportunities to discuss women's overall health, as well as any conditions that require ongoing management for which discussion of the risks and benefits of medication use during pregnancy is important (CDC, 2006; American College of Obstetricians and Gynecologists, 2012; Gregory et al., 2006; *Center for Maternal and Infant Health*, n.d.).

Although our adjusted analyses primarily revealed only weak associations, with point estimates and confidence intervals close to but excluding 1.0, results did show receipt of counseling to be reported more frequently among some groups, including nulliparous women, women who reported use of prescription medication prior to pregnancy, and women who reported having asthma prior to pregnancy, as compared to women without these characteristics. However, counseling was not reported more frequently among women with other chronic conditions prior to pregnancy (e.g., diabetes, epilepsy, thyroid problems, depression, anxiety), as compared to those without. These differences may be due to few women reporting these conditions, the relatively high prevalence of counseling in general,

or prior counseling these women may have received from the medical specialists who were treating them before pregnancy. Further, some groups of women were less likely to receive counseling, including women aged 35 and older, "other" non-Hispanic women, those who entered prenatal care after the first trimester, and those who reported smoking cigarettes or drinking alcohol during the last 3 months of pregnancy. It is possible that older women are perceived to already be aware of the risks of medication use, and that those who enter prenatal care late or are using substances have fewer encounters with health care providers, and therefore fewer opportunities for counseling. Nevertheless, this gap still may warrant further investigation as some women may have conditions that require medical management throughout pregnancy.

4.1. Limitations

PRAMS ascertains reported prenatal care provider counseling at any time during pregnancy using a broad measure that has been evaluated and found to work well on PRAMS in terms of comprehension and low item non-response. However, it does not capture the content, quality, or timing of the counseling provided. Women are sampled between 2 and 6 months after the delivery of a live infant to minimize recall bias; however, the data are self-reported by the respondents after their pregnancy. This, as well as potential social desirability bias, may lead to an underestimation of the prevalence of counseling if respondents do not remember the content of the prenatal care counseling they received or chose not to report it. Lastly, the data are only representative of women who had a live birth in the 34 included sites, and do not account for counseling among women who experienced a pregnancy that did not result in a live birth. This may under- or overestimate the prevalence estimates if characteristics of those women are different from women with a live birth.

5. Conclusion

It is reassuring that nearly 90% of women reported receiving information from their prenatal care providers about medications that are safe to take during pregnancy. However, about 10% of women did not report receiving counseling, and efforts are needed to investigate the reason for this gap. Additional research on special counseling needs for older women, women who enter prenatal care late, and those who smoke cigarettes or drink alcohol during pregnancy may contribute to the understanding of these gaps. In light of the increasing use of medications among pregnant women, it continues to be important to ensure that adequate information is available to prenatal care providers about the safety of different types of medication during pregnancy, and that messages are communicated to all women who are or might become pregnant.

PRAMS Working Group:

Alabama— Tammie Yelldell, MPH; Alaska—Kathy Perham-Hester, MS; Arkansas— Letitia de Graft-Johnson, DrPH; Colorado— Ashley Juhl, MSPH; Connecticut — Jennifer Morin, MPH; Delaware— George Yocher, MS; Florida— Tara Hylton, MPH; Georgia— Florence A. Kanu, PhD; Hawaii— Matt Shim, PhD; Illinois— Julie Doetsch, MA; Iowa — Jennifer Pham; Louisiana— Rosaria Trichilo, MPH; Maine—Tom Patenaude, MPH; Maryland—Laurie Kettinger, MS; Massachusetts— Hafsatou Diop, MD; Michigan— Peterson Haak; Minnesota— Mira Grice Sheff, PhD, MS; Mississippi— Brenda Hughes, MPPA; Missouri— Venkata Garikapaty, PhD; Nebraska — Jessica Seberger; New Hampshire—David J. Laflamme, PhD; New Jersey—Sharon Smith Cooley, MPH; New Mexico— Sarah Schrock, MPH; New York State—Anne Radigan; New York City— Pricila Mullachery, MPH;

North Carolina— Kathleen Jones-Vessey, MS; Oklahoma— Ayesha Lampkins, MPH; Oregon— Cate Wilcox, MPH; Pennsylvania— Sara Thuma, MPH; Rhode Island— Karine Tolentino Monteiro, MPH; South Carolina— Kristin Simpson, MSW; Texas— Tanya Guthrie, PhD; Tennessee— Ransom Wyse, MPH; Utah— Nicole Stone, MPH; Vermont—Peggy Brozicevic; Virginia— Kenesha Smith, MSPH; Washington—Linda Lohdefinck; West Virginia—Melissa Baker, MA; Wisconsin— Fiona Weeks, MSPH; Wyoming— Lorie Chesnut, PhD.

References

American College of Obstetricians and Gynecologists, 2012. Guidelines for Perinatal Care. American Academy of Pediatrics and the American College of Obstetricians and Gynecologists, Washington, DC.

Andrade SE, Raebel MA, Morse AN, et al. , 2006. Use of prescription medications with a potential for fetal harm among pregnant women. Pharmacoepidemiol. Drug Saf 15 (8), 546–554. [PubMed: 16586470]

Ayad M, Costantine MM, 2015. Epidemiology of medications use in pregnancy. Semin. Perinatol 39 (7), 508–511 ; Nov. [PubMed: 26358804]

Broussard CS, Frey MT, Hernandez-Diaz S, Greene MF, Chambers CD, Sahin L, Collins Sharp BA, Honein MA, 2014. Developing a systematic approach to safer medication use during pregnancy: summary of a Centers for Disease Control and Prevention—convened meeting. Am. J. Obstet. Gynecol 211 (3), 208–214 ; Sep. [PubMed: 24881821]

CDC, 2006. Recommendations to Improve Preconception Health and Health Care—United States: A Report of the CDC/ATSDR Preconception Care Work Group and the Selected Panel on Preconception Care. vol. 55 MMWR (No. RR-6).

Center for Maternal and Infant Health, School of Medicine at University of North Carolina at Chapel Hill. Before, Between & Beyond Pregnancy Toolkit and Reports Available at https://beforeandbeyond.org/resources/toolkits-reports/ (accessed 6/29/18) n.d.

Gregory KD, Johnson CT, Johnson TR, Entman SS, 2006. The content of prenatal care. Update 2005. Womens Health Issues 16 (4), 198–215. [PubMed: 16920524]

Handler A, Rankin K, Rosenberg D, Sinha K, 2012. Extent of documented adherence to recommended prenatal care content: provider site differences and effect on outcomes among low-income women. Matern. Child Health J 16 (2), 393–405 ; Feb. [PubMed: 21369724]

Kogan MD, Kotelchuck M, Alexander GR, Johnson WE, 1994. Racial disparities in reported prenatal care advice from health care providers. Am. J. Public Health 84 (1), 82–88. [PubMed: 8279618]

Krans EE, Davis MM, Schwarz EB, 2013. Psychosocial risk, prenatal counseling and maternal behavior: findings from PRAMS, 2004–2008. Am. J. Obstet. Gynecol 208 (2), 141.e1–7.

Lagoy CT, Joshi N, Cragan JD, et al. , 2005. Medication use during pregnancy and lactation: an urgent call for public health action. J. Women's Health 14 (2), 104–109.

Mitchell AA, 2003. Systematic identification of drugs that cause birth defects—a new opportunity. N. Engl. J. Med 349 (26), 2556–2559. [PubMed: 14695418]

Mitchell AA, Gilboa SM, Werler MM, Kelley KE, Louik C, Hernández-Díaz S, 2011. National Birth Defects Prevention Study. Medication use during pregnancy, with particular focus on prescription drugs: 1976–2008. Am. J. Obstet. Gynecol 205 (1), 51.e1–8.

Palmsten K, Hernández-Díaz S, Chambers CD, Mogun H, Lai S, Gilmer TP, Huybrechts KF, 2015. The most commonly dispensed prescription medications among pregnant women enrolled in the U.S. Medicaid Program. Obstet. Gynecol 126 (3), 465–473 Sep. [PubMed: 26244530]

Petersen R, Connelly A, Martin SL, Kupper LL, 2001. Preventive counseling during prenatal care: Pregnancy Risk Assessment Monitoring System (PRAMS). Am. J. Prev. Med 20 (4), 245–250 May. [PubMed: 11331111]

Shulman HB, D'Angelo DV, Harrison L, Smith RA, Warner L, 2018. The Pregnancy Risk Assessment Monitoring System (PRAMS): overview of design and methodology. AJPH 108 (10), 1305–1313. 10.2105/AJPH.2018.304563.

Oza-Frank R, Kachoria R, Keim SA, Lynch CD, Klebanoff MA, 2015. Receipt and Timing of Pregnancy-Related Preventive Health Messages Varyby Message Type and Maternal Characteristics. American Journal of Health Promotion 30 (2), 109–116. [PubMed: 25372233]

Thorpe PG, Gilboa SM, Hernandez-Diaz S, Lind J, Cragan JD, Briggs G, Kweder S, Friedman JM, Mitchell AA, Honein MA, National Birth Defects Prevention Study, 2013. Medications in the first trimester of pregnancy: most common exposures and critical gaps in understanding fetal risk. Pharmacoepidemiol. Drug Saf 22 (9), 1013–1018 Sep. [PubMed: 23893932]

Tinker SC, Broussard CS, Frey MT, Gilboa SM, 2015. Prevalence of prescription medication use among non-pregnant women of childbearing age and pregnant women in the United States: NHANES, 1999–2006. Matern. Child Health J 19, 1097–1106. [PubMed: 25287251]

Table 1

Demographic and behavioral characteristics of women with recent live births by receipt of provider counseling on medication safety during pregnancy, Pregnancy Risk Assessment Monitoring System, 2015[a].

		Received provider counseling	
		No	Yes
Maternal characteristics	**Unweighted sample size**	**% (95% confidence interval)**	**% (95% confidence interval)**
Overall	40,480	10.8 (10.3–11.3)	89.2 (88.7–89.7)
Age			
< 20	2295	8.8 (6.9–11.0)	91.2 (89.0–93.1)
20–25	10,533	10.0 (8.9–11.0)	90.1 (89.0–91.2)
26–34	20,853	10.7 (10.1–11.4)	89.3 (88.6–90.0)
≥35	6799	13.3 (12.0–14.6)	86.8 (85.4–88.0)
Race/ethnicity			
White (non-Hispanic)	20,227	10.5 (9.9–11.2)	89.5 (88.8–90.1)
Black (non-Hispanic)	7402	9.8 (8.7–10.9)	90.2 (89.1–91.3)
American Indian/Alaska Native (non-Hispanic)	1069	11.6 (8.8–15.2)	88.4 (84.8–91.2)
Other (non-Hispanic)	4763	13.9 (12.2–15.7)	86.2 (84.3–87.8)
Hispanic	6829	11.0 (9.6–12.6)	89.0 (87.4–90.4)
Education			
Less than high school	5515	12.9 (11.0–15.0)	87.1 (85.0–89.0)
High school	9837	10.7 (9.7–11.8)	89.3 (88.2–90.3)
More than high school	24,825	10.4 (9.8–11.0)	89.6 (89.0–90.2)
Parity			
Nulliparous	15,536	8.6 (7.9–9.3)	91.4 (90.7–92.1)
Multiparous	24,386	12.2 (11.5–12.9)	87.8 (87.1–88.6)
Marital status			
Married	24,099	11.0 (10.4–11.6)	89.0 (88.4–89.6)
Not married	15,909	10.5 (9.6–11.4)	89.5 (88.6–90.4)
Insurance coverage for prenatal care			
Private	21,280	9.7 (9.1–10.3)	90.3 (89.7–90.9)
Medicaid	16,339	11.5 (10.7–12.5)	88.5 (87.5–89.3)

		Received provider counseling	
		No	Yes
Maternal characteristics	**Unweighted sample size**	**% (95% confidence interval)**	**% (95% confidence interval)**
Other	1537	12.7 (9.7–16.4)	87.4 (83.6–90.4)
Timing of prenatal care entry			
1st trimester	33,695	9.8 (9.3–10.4)	90.2 (89.7–90.7)
After first trimester	5887	15.6 (13.9–17.6)	84.4 (82.4–86.1)
Health condition before pregnancy			
Diabetes			
No	38,571	10.8 (10.3–11.3)	89.2 (88.7–89.8)
Yes	1176	9.1 (5.7–14.3)	90.9 (85.7–94.4)
Hypertension			
No	37,441	10.8 (10.3–11.3)	89.2 (88.7–89.8)
Yes	2373	9.2 (6.9–12.1)	90.8 (87.9–93.1)
Depression			
No	35,279	10.9 (10.4–11.5)	89.1 (88.5–89.6)
Yes	4521	9.5 (8.0–11.2)	90.5 (88.8–92.0)
Asthma [b]			
No	7984	13.9 (12.9–14.9)	86.1 (85.1–87.1)
Yes	920	8.4 (6.3–11.3)	91.6 (88.8–93.7)
Heart problems[b]			
No	8736	13.4 (12.4–14.3)	86.6 (85.7–87.6)
Yes	150	13.6 (7.5–23.4)	86.4 (76.6–92.5)
Epilepsy[b]			
No	8815	13.4 (12.5–14.4)	86.6 (85.6–87.5)
Yes	69	6.5 (2.1–18.7)	93.5 (81.3–97.9)
Thyroid problems[c]			
No	7273	14.1 (13.0–15.2)	85.9 (84.8–87.0)
Yes	419	10.8 (7.4–15.5)	89.2 (84.6–92.6)
Anxiety[b]			
No	7740	13.7 (12.8–14.7)	86.3 (85.3–87.3)

		Received provider counseling	
		No	Yes
Maternal characteristics	**Unweighted sample size**	**% (95% confidence interval)**	**% (95% confidence interval)**
Yes	1155	11.3 (8.9–14.2)	88.7 (85.8–91.1)
Pre-pregnancy prescription medication use			
No	31,665	11.4 (10.9–12.0)	88.6 (88.0–89.2)
Yes	8583	8.5 (7.5–9.5)	91.5 (90.5–92.5)
Substance use			
Smoking 3 months before pregnancy			
No	31,569	10.7 (10.1–11.3)	89.3 (88.7–89.9)
Yes	8379	11.3 (10.2–12.6)	88.7 (87.5–89.8)
Smoking during last 3 months of pregnancy			
No	35,844	10.5 (10.0–11.1)	89.5 (88.9–90.0)
Yes	4126	13.8 (11.9–15.9)	86.2 (84.1–88.1)
Alcohol use 3 months before pregnancy			
No	18,460	11.7 (10.8–12.5)	88.3 (87.5–89.2)
Yes	21,424	10.1 (9.4–10.7)	89.9 (89.3–90.6)
Alcohol use during last 3 months of pregnancy			
No	37,045	10.6 (10.1–11.1)	89.4 (88.9–90.0)
Yes	2926	13.4 (11.4–15.6)	86.6 (84.4–88.6)
Experiences			
Intended[d] pregnancy			
No	17,779	11.6 (10.8–12.5)	88.4 (87.5–89.2)
Yes	21,957	10.1 (9.4–10.8)	89.9 (89.3–90.6)

[a] **Data combined from 34 states** (Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming).

[b] **Health condition in the 3 months before pregnancy; information available from 7 states** (Delaware, Hawaii, Maryland, Michigan, New York City, Utah, Washington).

[c] **Health condition in the 3 months before pregnancy; information available from 6 states** (Delaware, Hawaii, Maryland, Michigan, New York City, Utah).

[d] Reported wanting to get pregnant then or sooner.

Table 2

Association between selected maternal characteristics and receipt of provider counseling on medication safety during pregnancy, Pregnancy Risk Assessment Monitoring System, 2015[a].

	Received provider counseling	
	Crude prevalence ratio	Adjusted prevalence ratio[b]
Characteristics	**cPR (95% confidence interval)**	**aPR (95% confidence interval)**
Overall		
Age		
< 20	1.02 (1.00–1.05)	1.02 (0.99–1.05)
20–25	1.01 (0.99–1.02)	1.01 (1.00–1.03)
26–34	Ref.	Ref.
≥35	**0.98 (0.96–0.99)**	**0.98 (0.96–0.99)**
Race/ethnicity		
White (non-Hispanic)	Ref.	Ref.
Black (non-Hispanic)	1.01 (0.99–1.02)	1.02 (1.00–1.03)
American Indian/Alaska Native (non-Hispanic)	0.99 (0.95–1.02)	1.00 (0.96–1.04)
Other (non-Hispanic)	**0.96 (0.94–0.98)**	**0.96 (0.94–0.98)**
Hispanic	0.99 (0.98–1.01)	1.01 (0.99–1.02)
Education		
Less than high school	0.97 (0.95–1.00)	0.97 (0.95–1.00)
High school	0.99 (0.98–1.01)	1.00 (0.98–1.01)
More than high school	Ref.	Ref.
Parity		
Nulliparous	**1.04 (1.03–1.05)**	**1.03 (1.02–1.04)**
Multiparous	Ref.	Ref.
Marital status		
Married	Ref.	Ref.
Not married	1.00 (0.99–1.02)	1.01 (0.99–1.02)
Insurance coverage for prenatal care		
Private	Ref.	Ref.
Medicaid	**0.98 (0.97–0.99)**	0.98 (0.97–1.00)
Other	0.97 (0.93–1.01)	0.98 (0.94–1.01)
First trimester prenatal care initiation		
No	**0.94 (0.91–0.96)**	**0.93 (0.91–0.96)**
Yes	Ref.	Ref.
Health condition before pregnancy		
Diabetes		
No	Ref.	Ref.
Yes	1.02 (0.97–1.07)	1.01 (0.96–1.06)
Hypertension		
No	Ref.	Ref.

	Received provider counseling	
	Crude prevalence ratio	Adjusted prevalence ratio[b]
Characteristics	**cPR (95% confidence interval)**	**aPR (95% confidence interval)**
Yes	1.02 (0.99–1.05)	1.02 (0.98–1.05)
Depression		
No	Ref.	Ref.
Yes	1.02 (1.00–1.04)	1.01 (0.99–1.03)
Asthma[c]		
No	Ref.	Ref.
Yes	**1.06 (1.03–1.10)**	**1.05 (1.01–1.08)**
Heart problems[c]		
No	Ref.	Ref.
Yes	1.00 (0.91–1.09)	0.98 (0.88–1.09)
Epilepsy[c]		
No	Ref.	Ref.
Yes	1.08 (1.00–1.17)	1.07 (0.98–1.17)
Thyroid problems[d]		
No	Ref.	Ref.
Yes	1.04 (0.99–1.09)	1.02 (0.97–1.08)
Anxiety[c]		
No	Ref.	Ref.
Yes	1.03 (1.00–1.06)	1.01 (0.98–1.05)
Pre-pregnancy prescription medication use		
No	Ref.	Ref.
Yes	**1.03 (1.02–1.05)**	**1.03 (1.02–1.05)**
Substance use		
Smoking 3 months before pregnancy		
No	Ref.	Ref.
Yes	0.99 (0.98–1.01)	1.01 (0.99–1.03)
Smoking during last 3 months of pregnancy		
No	Ref.	Ref.
Yes	**0.96 (0.94–0.99)**	**0.97 (0.94–0.99)**
Alcohol use 3 months before pregnancy		
No	Ref.	Ref.
Yes	**1.02 (1.01–1.03)**	1.01 (1.00–1.02)
Alcohol use during last 3 months of pregnancy		
No	Ref.	Ref.
Yes	**0.97 (0.94–0.99)**	**0.97 (0.94–0.99)**
Experiences		
Intended pregnancy[e]		
No	**0.98 (0.97–0.99)**	0.99 (0.97–1.00)

	Received provider counseling	
	Crude prevalence ratio	Adjusted prevalence ratio[b]
Characteristics	cPR (95% confidence interval)	aPR (95% confidence interval)
Yes	Ref.	Ref.

Significance was based on the 95% confidence intervals for the adjusted prevalence ratio not including the value 1.0.

[a] **Data combined from 34 states** (Alabama, Alaska, Arkansas, Colorado, Connecticut, Delaware, Hawaii, Illinois, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, New Mexico, New York, New York City, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming).

[b] Adjusted for maternal age, race/ethnicity, parity, 1st trimester prenatal care, pre-pregnancy medication use, and smoking during pregnancy.

[c] **Health condition in the 3 months before pregnancy; information available from 7 states** (Delaware, Hawaii, Maryland, Michigan, New York City, Utah, Washington).

[d] **Health condition in the 3 months before pregnancy; information available from 6 states** (Delaware, Hawaii, Maryland, Michigan, New York City, Utah).

[e] Reported wanting to get pregnant then or sooner.