HHS Public Access

Prevalence of Home Births and Associated Risk Profile and Maternal Characteristics, 2016–2018

Sonal Goyal, PharmD, MPH, **Katherine Kortsmit, PhD, MPH**, **Shanna Cox, MSPH**, **Denise V. D'Angelo, MPH**, **Lisa Romero, DrPH, MPH**, **Zsakeba T. Henderson, MD**, **Wanda D. Barfield, MD, MPH**

Division of Reproductive Health and the Division of Scientific Education and Professional Development, Centers for Disease Control and Prevention, Atlanta, Georgia; the Oak Ridge Institute for Science and Education, Oak Ridge, Tennessee; and the United States Public Health Service Commissioned Corps, Washington, DC

Abstract

OBJECTIVE: To estimate the prevalence of pregnancies that meet the low-risk criteria for planned home births and describe geographic and maternal characteristics of home births compared with hospital births.

METHODS: Data from the 2016–2018 Pregnancy Risk Assessment Monitoring System (PRAMS), a survey among women with recent live births, and linked birth certificate variables were used to calculate the prevalence of home births that were considered low-risk. We defined low-risk pregnancy as a term (between 37 and 42 weeks of gestation), singleton gestation with a birth weight within the 10th–90th percentile mean for gestational age (as a proxy for estimated fetal size appropriate for gestational age), without prepregnancy or gestational diabetes or hypertension, and no vaginal birth after cesarean (VBAC). We also calculated the prevalence of home and hospital births by site and maternal characteristics. Weighted prevalence estimates are presented with 95% CIs to identify differences.

RESULTS: The prevalence of home births was 1.1% (unweighted n=1,034), ranging from 0.1% (Alabama) to 2.6% (Montana); 64.9% of the pregnancies were low-risk. Among the 35.1% high-risk home births, 39.5% of neonates were large for gestational age, 20.5% of neonates were small for gestational age, 17.1% of the women had diabetes, 16.9% of the women had hypertension, 10.6% of the deliveries were VBACs, and 10.1% of the deliveries were preterm. A significantly higher percentage of women with home births than hospital births were non-Hispanic White (83.9% vs 56.5%), aged 35 years or older (24.0% vs 18.1%), with less than a high school-level of education (24.6% vs 12.2%), and reported no health insurance (27.0% vs 1.9%). A significantly lower percentage of women with home births than hospital births initiated prenatal visits in the

first trimester (66.9% vs 87.1%), attended a postpartum visit (80.1% vs 90.0%), and most often laid their infants on their backs for sleep (59.3% vs 79.5%).

CONCLUSIONS: Understanding the risk profile, geographic distribution, and characteristics of women with home births can guide efforts around safe birthing practices.

Although home births are infrequent in the United States, they have increased from 0.56% of all births in 2004 to 0.99% in 2017.[1] This increase has coincided with conflicting evidence regarding the safety and best practices of home births in the United States. Although some studies in the United States have shown that home births, when compared with hospital births, may have improved maternal outcomes, such as lower rates of cesarean delivery and decreased labor interventions, they also reported a possible increase in adverse neonatal outcomes, such as lower Apgar scores, neonatal death, seizures, and neurologic dysfunction. [2–4] Prior research suggests that there is increased maternal and neonatal morbidity and mortality among women who have home births with high-risk pregnancies, compared with women with low-risk pregnancies.[5–7] For this reason, the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics (AAP) have issued committee opinions describing low-risk pregnancy criteria that may be considered for eligibility for a planned home birth (Table 1) and systems that should be in place when considering a home birth (ie, presence of a certified nurse-midwife, certified midwife or physician for home birth with another appropriately trained individual to care for the newborn, availability of safe and timely transport to a nearby hospital and ready access to consultation).[8,9]

Traditionally, epidemiologic trends in home births and characteristics of women who had home births in the United States have been assessed by analyzing data from the National Center for Health Statistics birth certificate data. The Pregnancy Risk Assessment Monitoring System (PRAMS) is a population-based survey of mothers with recent live births that takes place in multiple sites (state and local jurisdictions) every year in the United States. The PRAMS analytic data set includes some variables from the linked birth certificate file, as well as questionnaire variables on characteristics and behaviors (eg, income and postpartum visit attendance) not available in birth certificate data. Our primary aim was to use PRAMS data to determine whether women who had home births from 2016 to 2018 had characteristics that met the low-risk pregnancy criteria for planned home births cited by ACOG and the AAP. Among women who did not meet low-risk pregnancy characteristics, we reported which characteristics were not being met and how they compared with women who had hospital births. Our secondary aims were to calculate PRAMS site-specific prevalence estimates of home and hospital births and compare characteristics and health behaviors of women who had home births to women who had hospital births to help identify which women have home births more often.

METHODS

We used 2016–2018 PRAMS data from 40 U.S. states, New York City, and Puerto Rico. PRAMS is a site-specific, population-based data surveillance system conducted by Centers for Disease Control and Prevention in collaboration with health departments in funded jurisdictions that uses mail and telephone surveys to assess behaviors, attitudes, and

experiences of women with a recent live birth from before, during, and after pregnancy. Women are sampled 2–6 months postpartum using a standardized protocol and questionnaire. Birth certificates are used for stratified random sampling in each participating site, and select birth certificate variables are linked to the PRAMS data set. The samples are ultimately representative of each site's annual birth population through weighting and adjustments for sampling design, nonresponse and noncoverage.[10] Data from a site are included in the data set available to researchers only if the response rate threshold has been achieved by the site for that year; the minimum response rate threshold required was 55% from 2016 to 2018.[10] The overall response rate from 2016 to 2018 for all sites included in this analysis was 61%. Details about the PRAMS methodology has been previously published elsewhere.[10] The PRAMS protocol has been approved by the Centers for Disease Control and Prevention and participating jurisdictions institutional review boards.[10] Deidentified data sets are publicly available by request to researchers; analyses of deidentified data are considered research not involving human subjects and do not require additional review.

To determine whether a birth was a home birth or a hospital birth, we used a birth certificate variable linked to PRAMS that specified the place of birth as one of the following: hospital, freestanding birthing center, clinic or doctor's office, home, or other (eg, car). For our analyses, we defined home births as births that occurred at home and hospital births as births that occurred at a hospital.

We used available PRAMS questionnaire variables, as well as linked birth certificate variables, that most closely aligned with the criteria cited by ACOG and the AAP to determine which pregnancies were considered appropriate candidates (low-risk) for a planned home birth (Table 1). Ultimately, we defined a low-risk pregnancy as a term (between 37 and 42 weeks of gestation), singleton gestation with a neonatal birth weight within the 10th–90th percentile mean for gestational age (as a proxy for estimated fetal size appropriate for gestational age [AGA]), without prepregnancy or gestational hypertension or diabetes, and no vaginal birth after cesarean (VBAC). Women with a recent live birth who did not meet all of these requirements were considered to have had a high-risk pregnancy (and to not be appropriate candidates for planned home birth).

Variables to assign risk were captured from linked birth certificate data alone, with the exceptions of prepregnancy and gestational hypertension, and diabetes. In addition to available birth certificate data, we also captured prepregnancy and gestational hypertension and diabetes using PRAMS data. We defined women as having any diabetes or any hypertension as those who were documented as having prepregnancy or gestational hypertension, or had gestational diabetes on the birth certificate, or had responded "yes" to the following PRAMS questions: 1) During the 3 months before you got pregnant with your new baby, did you have any of the following health conditions? Type 1 or type 2 diabetes (not gestational diabetes or diabetes that starts during pregnancy), high blood pressure, or hypertension; or 2) During your most recent pregnancy, did you have any of the following health conditions? Gestational diabetes (diabetes that started during this pregnancy), high blood pressure (that started during this pregnancy), preeclampsia, or eclampsia.

We also compared the prevalence of select maternal characteristics and health behaviors between women who had home births and hospital births. We obtained data on maternal characteristics from both the birth certificate (race–ethnicity, maternal age, marital status, number of previous live births, and education) and the PRAMS survey (annual household income [used to calculate federal poverty level at the time of delivery] and maternal insurance type during prenatal visits [among women who attended prenatal visits]). Self-reported race and ethnicity (Hispanic or non-Hispanic) were taken from birth certificate data.[11] For analyses, we recoded these data into the following categories: Hispanic (any race), non-Hispanic Black, non-Hispanic White, and non-Hispanic American Indian and Alaska Native. We combined non-Hispanic other Asian, Chinese, Japanese and Filipino together as non-Hispanic Asian, and combined the remaining women in Hawaiian, other non-White and mixed race together as non-Hispanic other.

Using PRAMS self-reported questionnaire variables, we obtained data on maternal health behaviors including trimester of initiation of prenatal visits (first trimester, second or third trimester, or never), attendance at a postpartum visit, attendance at any health care worker visit (doctor, nurse, or other health care worker including a dental or mental health worker) during the 12 months before conception, vitamin (multivitamin, prenatal vitamin, or folic acid vitamin) use in the month before conception, whether they ever breastfed their new infant (including women who pumped breast milk to feed the infant), and whether mothers most often laid their infants on their backs for sleep.

We calculated the weighted prevalence of home and hospital births overall and by each site among all live births in the PRAMS sample, including those not born at home or in a hospital. We also calculated the weighted prevalence and 95% CIs of low-risk pregnancies, each characteristic that made a pregnancy high-risk, and select maternal demographic and behavioral characteristics among women who had home births and hospital births, excluding those who gave birth at a freestanding birthing center, clinic or doctor's office, or other location. We compared 95% CIs for the prevalence for each selected variable to determine differences (ie, nonoverlap of CIs) between home and hospital births. We used SAS 9.4 complex survey for all analyses to account for the PRAMS complex survey design.

RESULTS

Overall, among 108,098 women with live births who responded to the PRAMS survey between 2016 and 2018, 1.1% had home births and 98.2% had hospital births (Table 2). Freestanding birthing centers, clinic or doctor's office, and other places of birth made up the remaining 0.7% of births. The states with the highest percentage of home births were Montana (2.6%), Maine (2.4%), and Vermont (2.3%). The states with the lowest percentage of home births were Alabama (0.1%), Nebraska (0.2%) and Louisiana (0.3%).

All five low-risk pregnancy characteristics were met by 64.9% of women who had home births and 54.8% of women who had hospital births (Table 3). Of the 35.1% of women with home births who had high-risk pregnancies, the most common high-risk characteristics were neonates born large or small for gestational age (39.5% and 20.5%, respectively), prepregnancy or gestational diabetes and hypertension (17.1% and 16.9%, respectively),

having a VBAC (10.6%), and having a preterm birth (10.1%). Compared with women who had hospital births with high-risk pregnancies, women who had home births with high-risk pregnancies had a higher percentage of neonates who were large for gestational age (39.5% vs 22.4%) and VBACs (10.6% vs 5.0%).

Compared with women who had hospital births, a higher percentage of women with home births were non-Hispanic White (83.9% vs 56.5%), 35 years of age or older (24.0% vs 18.1%), and had less than a high school level of education (24.6% vs 12.2%) (Table 4). A lower percentage of women with home births had household income levels that were at 100% of the federal poverty level or less (24.1% vs 32.6%), and a higher percentage had household income levels of more than 100% to no more than 200% of the federal poverty level (27.4% vs 21.7%), compared with women with hospital births. Among women with home births who attended prenatal visits, a higher percentage were without health insurance (27.0% vs 1.9%), and a lower percentage had Medicaid (17.0% vs 34.4%) compared with women with hospital births.

A lower percentage of women who had home births initiated attending prenatal visits in the first trimester, compared with women who had hospital births (66.9% vs 87.1%). Similarly, a lower percentage of women who had home births compared with hospital births attended their postpartum visit (80.1% vs 90.0%). A higher percentage of women who had home births took a multivitamin, prenatal vitamin, or folic acid vitamin one to six times per week (25.3% vs 13.4%) in the month before conception and had ever breastfed their infants (94.8% vs 87.7%) compared with women who had hospital births. A lower percentage of women who had home births most often laid their infants on their backs for sleep, compared with women who had hospital births (59.3% vs 79.5%).

DISCUSSION

Although the overall percentage of women who had home births was small, at least 35% did not meet the low-risk pregnancy characteristics cited by ACOG and the AAP for considering a planned home birth. A similar study evaluating risk using criteria cited by ACOG and the AAP conducted using 2010–2012 National Center for Health Statistics data also found that around 30% of pregnancies with planned home births were high-risk.[12] Another study using 2016–2018 National Center for Health Statistics data found that more than 60% of planned home births were high-risk pregnancies, but included several high-risk factors in their definition, such as maternal age and obesity,[13] that were not included in the characteristics outlined by ACOG and the AAP. Hypertension and diabetes have been well established as high-risk factors in pregnancy for mothers and neonates; hypertensive disorders are also a leading cause of maternal deaths.[14,15] Still, our analysis showed that many women with home births had hypertension or diabetes (5.9% and 6.0%, respectively), each accounting for about 17% of high-risk home births.

Women with high-risk pregnancies may be at greater risk for maternal and neonatal morbidity and mortality during home births, and pregnancy risk or a women's choice of birth setting may change over time, even during labor. For these reasons, repeated conversations with licensed and certified maternal health care professionals regarding each

woman's individualized birth plan, risk factors, and recent evidence about risks and benefits of all places of delivery are important. To support women in making informed decisions regarding their birth setting, structural changes and safety mechanisms that integrate home and birthing center births in health care systems may facilitate women being able to exercise their choice as safely as possible (eg, availability of safe transfer from one birth setting to another).[16]

Delivery setting choices also include prioritization of values and preferences a woman may hold in addition to their risk perception (eg, cultural or religious beliefs or desired experience), and risk perception may differ between a health care professional and patient.[16] The most common reasons women report planning home births are having more choice and control over their birthing experience, avoiding unnecessary interventions (eg, elective early induction, episiotomies, and cesarean delivery), giving birth in a more comfortable environment, and having a previous negative hospital experience.[17–19] Women also report disliking constant monitoring by machines during labor, which can restrict freedom of movement.[17,18] Prior literature suggests that many women are opting for home births to have a VBAC that may otherwise be denied by hospital-based health care professionals.[5,19] These reasons may account for the higher proportion of women with home births compared with hospital births in our analysis who had pregnancies deemed high-risk based on large-for-gestational-age neonates or having a VBAC.

Our low-risk assessment was based on individual medical and obstetric factors, but pregnancy risk is also influenced by structural inequities and biases in the health system and society, health system-related factors, and social determinants of health.[16] These additional factors may also influence a women's decision regarding birth setting. A higher proportion of women with a home birth had less than a high school level of education, an income of 101–200% of the federal poverty level, and no insurance during prenatal visits than women with hospital births suggesting that socioeconomic status may be associated with home births in the United States. There was a lower percentage of women with Medicaid among women who had a home birth compared with those with a hospital birth, also suggesting that having insurance coverage may play a role in the location of birth. Our results differ slightly from previous analyses in the United States that have shown a higher percentage of women who had home births with more than 12 years of education, compared with women who had hospital births.[1,3]

Similar to previous studies conducted using birth certificate data, the majority of the states with the highest percentage of home births were in the Northwest region of the United States and in Vermont.[1,20] Most women who had home births in our analysis were non-Hispanic White, older, married, and had previous children, and analyses conducted using National Center for Health Statistics data have shown similar characteristics of women who had home births since 2009.[1,21] PRAMS offers additional information that can go a step beyond birth certificate data. In addition to insurance and income described above, we used PRAMS to explore whether women who had home births interacted with health care professionals as often as women who had hospital births by looking at the initiation of prenatal visits, attendance of a postpartum visit, and a visit to a health care worker during the year before conception. Data on postpartum visits, where many recommended services are administered

(eg, recovery check-up, mental health screenings, chronic conditions follow-up, and contraception counseling),[22] and health care worker visits before conception are not collected on the birth certificate. Although there was no difference in the prevalence of women who saw health care workers in the year before conception, a smaller proportion of women who had home births initiated prenatal visits in the first trimester and attended postpartum visits in comparison with women who had hospital births. A prior analysis that used National Center for Health Statistics data also showed that in 2017, a higher proportion of women with home births initiated prenatal visits later in pregnancy or not at all compared with women with hospital births.[1] The same study showed that 28.1% of all home births were attended by a physician, certified nurse-midwife or certified midwife compared with 99.3% of hospital births in 2017.[1] Ongoing conversations between pregnant women and licensed or certified maternal health care professionals during health care visits may not be enough to reach all women who are considering home birth with information for decision-making.

Using PRAMS, we also were able to calculate the prevalence of protective health behaviors. Folic acid supplementation (found in most vitamins) in the month before conception has been shown to decrease development of neural tube defects in fetuses, and breastfeeding provides numerous benefits for child and mother, such as decreased infections in infants and speedier postpartum recovery in mothers.[23,24] The AAP recommends laying infants on their backs to sleep in the first year of life, because laying them in other positions has been linked to increased risk of sudden infant death syndrome, hypercapnia, and hypoxia.[25] Although women with home births used vitamins in the month before conception and had ever breastfed at rates higher than women who had hospital births, only 59.3% of women with home births most often laid their infants on their backs to sleep, compared with 79.5% of women with hospital births, demonstrating the need for counseling on safe sleep practices to reduce infant mortality.

This study had several limitations. First, as shown in Table 1, a few low-risk characteristics identified by ACOG and the AAP were not reported in PRAMS or the linked birth certificate variables (eg, presentation of fetus at birth), so our results are likely an underestimation of total high-risk pregnancies.[8,9] We used birth weight in the 10th-90th percentile range as a proxy for estimated fetal weight AGA, but, owing to the large variability of calculating estimated fetal weight between health care professionals, birth weight not within the 10th–90th percentile does not necessarily reflect whether estimated fetal weight would also label the neonate as not AGA.[26] Although ACOG's and the AAP's criteria for considering home birth cited preexisting maternal disease and significant disease that occurs during pregnancy, we included only prepregnancy and gestational hypertension and diabetes. Additionally, our definition of a term gestation based on data available in PRAMS did not align with what ACOG and the AAP defined in their criteria (Table 1). We also were unable to assess whether systems needed to support home births as cited by ACOG and the AAP were in place (eg, presence of licensed or certified maternal health care professionals and back-up transportation to hospital).[8,9]

Our analysis could not distinguish between planned and unplanned home or hospital births to identify women who intended to have home births compared with those who could not

reach a medical facility on time, or women who had planned home births but had to be transferred to a medical facility; characteristics may differ among these groups. According to National Center for Health Statistics' data, among 49 states and Washington, DC, approximately 85% of home births were planned in 2017.[1] We present unadjusted comparisons; associations with socioeconomic factors such as lower levels of education may be due to variation by geographical site. Finally, although PRAMS data are weighted to be representative of all women giving birth in each site, data are generalizable only to the 42 sites included in this study. PRAMS survey responses are subject to recall and response bias by participants. Many of the variables used in this study were linked birth certificate variables; birth certificate data are not always complete or accurately captured.[27]

Although less prevalent than those that had hospital births, our findings highlight that more than one in three home births had high-risk pregnancy characteristics. Compared with women who had hospital births, women with home births were less likely to attend prenatal and postpartum visits or put their infants to sleep on their backs, which has implications for maternal and infant morbidity and mortality. This information can raise awareness for health care professionals, particularly those located in areas with a higher prevalence of home births, to inform their patients on safe birthing options (tailored to each woman's individual risk and preferences) and protective health behaviors, including the importance of attending prenatal and postpartum visits and safe sleep practices for infants. Simultaneously, public health professionals can use our findings on geographic prevalence and maternal characteristics of women who had home births (such as insurance type and education level) to develop appropriate resources and outreach regarding high-risk pregnancy characteristics, safe birthing options, and protective health behaviors for women, especially for women who may not have the opportunity to discuss these topics with a health care professional.

REFERENCES

1. MacDorman MF, Declercq E. Trends and state variations in out-of-hospital births in the United States, 2004-2017. Birth 2019;46:279–88. [PubMed: 30537156]

2. Cheng YW, Snowden JM, King TL, Caughey AB. Selected perinatal outcomes associated with planned home births in the United States. Am J Obstet Gynecol 2013;209:325.e1–8. [PubMed: 23791564]

3. Snowden JM, Tilden EL, Snyder J, Quigley B, Caughey AB, Cheng YW. Planned out-of-hospital birth and birth outcomes. N Engl J Med 2015;373:2642–53. [PubMed: 26716916]

4. Grünebaum A, McCullough LB, Sapra KJ, Brent RL, Levene MI, Arabin B, et al. Apgar score of 0 at 5 minutes and neonatal seizures or serious neurologic dysfunction in relation to birth setting. Am J Obstet Gynecol 2013;209:323.e1–6. [PubMed: 23791692]

5. Bovbjerg ML, Cheyney M, Brown J, Cox KJ, Leeman L. Perspectives on risk: assessment of risk profiles and outcomes among women planning community birth in the United States. Birth 2017;44:209–21. [PubMed: 28332220]

6. Bastian H, Keirse MJ, Lancaster PA. Perinatal death associated with planned home birth in Australia: population based study. BMJ 1998;317:384–8. [PubMed: 9694754]

7. Cheyney M, Bovbjerg M, Everson C, Gordon W, Hannibal D, Vedam S. Outcomes of care for 16,924 planned home births in the United States: the Midwives Alliance of North America Statistics Project, 2004 to 2009. J Midwifery Womens Health 2014;59:17–27. [PubMed: 24479690]

8. Planned home birth. Committee Opinion No. 697. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017;129:e117–22. [PubMed: 28333824]

9. American Academy of Pediatrics Committee on Fetus and Newborn. Planned home birth. Pediatrics 2013;131:1016–20.

10. Shulman HB, D'Angelo DV, Harrison L, Smith RA, Warner L. The Pregnancy Risk Assessment Monitoring System (PRAMS): overview of design and methodology. Am J Public Health 2018;108:1305–13. [PubMed: 30138070]

11. Martin JA, Hamilton BE, Osterman MJK, Driscoll AK. Births: final data for 2018. Natl Vital Stat Rep 2019;68:1–47.

12. Grünebaum A, McCullough LB, Brent RL, Arabin B, Levene MI, Chervenak FA. Perinatal risks of planned home births in the United States. Am J Obstet Gynecol 2015;212:350.e1–6. [PubMed: 25446661]

13. Grünebaum A, McCullough LB, Chervenak FA. Most intended home births in the United States are not low risk: 2016-2018. Am J Obstet Gynecol 2020;222:384–5. [PubMed: 31715146]

14. Kuklina E, Ayala C, Callaghan W. Hypertensive disorders and severe obstetric morbidity in the United States. Obstet Gynecol 2009;113:1299–306. [PubMed: 19461426]

15. Ali S, Dornhorst A. Diabetes in pregnancy: health risks and management. Postgrad Med J 2011;87:417–27. [PubMed: 21368321]

16. National Academies of Sciences, Engineering, and Medicine. Birth settings in America: outcomes, quality, access, and choice. Washington, DC: The National Academies Press; 2020.

17. Bernhard C, Zielinski R, Ackerson K, English J. Home birth after hospital birth: women's choices and reflections. J Midwifery Womens Health 2014;59:160–6. [PubMed: 24612335]

18. Boucher D, Bennett C, McFarlin B, Freeze R. Staying home to give birth: why women in the United States choose home birth. J Midwifery Womens Health 2009;54:119–26. [PubMed: 19249657]

19. Simpson KR, Thorman KE. Obstetric "conveniences": elective induction of labor, cesarean birth on demand, and other potentially unnecessary interventions. J Perinat Neonatal Nurs 2005; 19:134–44. [PubMed: 15923963]

20. Hamilton BE, Martin JA, Osterman MJ, Curtin SC, Mathews TJ. Births: final data for 2014. Natl Vital Stat Rep 2015;64:1–64.

21. MacDorman MF, Mathews TJ, Declercq E. Home births in the United States, 1990-2009. NCHS Data Brief 2012:1–8.

22. Optimizing postpartum care. ACOG Committee Opinion No. 736. American College of Obstetricians and Gynecologists. Obstet Gynecol 2018;131:e140–50. [PubMed: 29683911]

23. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. MMWR Recomm Rep 1992;41:1–7.

24. Policy statement: breastfeeding and the use of human milk. Section on breastfeeding. Pediatrics 2012;129:e827–41. [PubMed: 22371471]

25. Moon RY; Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: evidence base for 2016 updated recommendations for a safe infant sleeping environment. Pediatrics 2016;138:e20162940. [PubMed: 27940805]

26. Milner J, Arezina J. The accuracy of ultrasound estimation of fetal weight in comparison to birth weight: a systematic review. Ultrasound 2018;26:32–41. [PubMed: 29456580]

27. Northam S, Knapp TR. The reliability and validity of birth certificates. J Obstet Gynecol Neonatal Nurs 2006;35:3–12.

Table 1.

Low-Risk Pregnancy Characteristics for Consideration Before Home Birth From the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics, and Associated Variables in the Pregnancy Risk Assessment Monitoring System, 2016–2018[*]

ACOG	AAP	PRAMS 2016–2018
Absence of any preexisting maternal disease	Absence of preexisting maternal disease	Absence of prepregnancy or gestational hypertension or diabetes
Absence of significant disease arising during the pregnancy	Absence of significant disease occurring during the pregnancy	
A singleton fetus[†]	A singleton fetus estimated to be AGA	A singleton fetus; birth weight within 10th–90th percentile mean
A cephalic presentation[†]	A cephalic presentation	NA
Gestational age greater than 36–37 completed wk and less than 41–42 completed wk of pregnancy	A gestation of 37 wk to less than 41 completed wk of pregnancy	Term (between 37 and 42 wk of gestation)
Labor that is spontaneous or induced as an outpatient	Labor that is spontaneous or induced as an outpatient	NA
The patient has not been transferred from another referring hospital	A mother who has not been referred from another hospital	NA
No prior cesarean delivery[†]		Not VBAC

ACOG, American College of Obstetricians and Gynecologists; AAP, American Academy of Pediatrics; PRAMS, Pregnancy Risk Assessment Monitoring System; AGA, appropriate for gestational age; NA, not available; VBAC, vaginal birth after cesarean.

Planned home birth. Committee Opinion No. 697. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017;129:e117–22; and American Academy of Pediatrics Committee on Fetus and Newborn. Planned home birth. Pediatrics 2013;131:1016–20.

[*]
The Pregnancy Risk Assessment Monitoring System includes some linked birth certificate variables.

[†]
The American College of Obstetricians and Gynecologists considers fetal malpresentation, multiple gestation, and prior cesarean delivery as absolute contraindications to planned home birth.

Table 2.

Weighted Prevalence of Home and Hospital Births Overall and by Each Site Among all Live Births,[*] Pregnancy Risk Assessment Monitoring System:[†] 40 States, New York City, and Puerto Rico, 2016–2018 (Unweighted N =108,098)

PRAMS Site	Home Births		Hospital Births	
	Unweighted n	Weighted %	Unweighted n	Weighted %
40 states, New York City, and Puerto Rico	1,034	1.1 (1.0–1.2)	106,446	98.2 (98.1–98.4)
Alabama[‡]	1	0.1 (0.0–0.4)	880	99.7 (99.3–100.0)
Alaska	48	1.8 (1.2–2.3)	3,040	91.6 (90.4–92.8)
Arkansas[§]	6	1.1 (0.1–2.2)	900	98.9 (97.8–99.9)
Colorado	73	1.8 (1.3–2.3)	3,767	96.9 (96.2–97.5)
Connecticut	20	0.7 (0.3–1.1)	4,169	99.0 (98.5–99.4)
Delaware	19	0.8 (0.4–1.1)	2,612	97.7 (97.1–98.3)
Georgia[∥]	7	0.9 (0.2–1.5)	1,717	98.8 (98.0–99.5)
Hawaii[§]	22	1.1 (0.5–1.7)	1,043	98.6 (98.0–99.2)
Illinois	19	0.5 (0.2–0.7)	3,892	99.5 (99.3–99.7)
Iowa[¶]	17	1.8 (0.8–2.7)	1,996	98.2 (97.3–99.2)
Kansas[∥]	21	1.5 (0.8–2.2)	1,939	97.7 (96.8–98.6)
Kentucky[∥]	13	1.4 (0.6–2.1)	1,440	98.6 (97.9–99.4)
Louisiana	7	0.3 (0.1–0.5)	2,625	99.6 (99.4–99.9)
Maine	43	2.4 (1.6–3.2)	2,452	97.1 (96.3–98.0)
Maryland[¶]	13	0.7 (0.3–1.1)	2,207	99.0 (98.5–99.5)
Massachusetts	18	0.6 (0.3–1.0)	4,138	98.9 (98.4–99.3)
Michigan	38	0.8 (0.5–1.2)	5,520	99.0 (98.6–99.3)
Minnesota[#]	15	1.2 (0.3–1.4)	1,248	98.0 (97.1–98.9)
Mississippi[#]	6	0.6 (0.1–1.2)	1,200	99.3 (98.7–99.9)
Missouri	29	1.2 (0.8–1.7)	3,056	98.0 (97.4–98.5)
Montana[‡]	22	2.6 (1.6–3.6)	904	96.2 (95.0–97.4)

PRAMS Site	Home Births		Hospital Births	
	Unweighted n	Weighted %	Unweighted n	Weighted %
North Carolina[‡]	6	0.6 (0.1–1.1)	982	98.4 (97.5–99.3)
North Dakota[‖]	18	1.1 (0.5–1.7)	1,457	98.9 (98.3–99.5)
Nebraska[**]	4	0.2 (0.0–0.5)	2,632	99.6 (99.2–99.9)
New Hampshire[¶]	13	1.5 (0.6–2.4)	1,125	97.2 (96.0–98.4)
New Jersey	13	0.4 (0.2–0.7)	3,763	99.5 (99.2–99.8)
New Mexico	44	1.1 (0.7–1.4)	3,480	97.8 (97.3–98.2)
New York State[¶]	31	1.9 (1.1–2.7)	1,760	97.7 (96.8–98.5)
Oklahoma[¶]	13	0.4 (0.1–0.7)	3,450	99.6 (99.2–99.9)
Pennsylvania	51	1.9 (1.3–2.4)	3,147	96.5 (95.8–97.3)
Rhode Island	15	0.5 (0.2–0.7)	3,335	99.5 (99.3–99.8)
South Dakota[‖]	15	0.7 (0.3–1.1)	2,132	99.2 (98.8–99.6)
Texas[§]	11	0.8 (0.2–1.4)	1,824	97.9 (97.0–98.8)
Utah	68	2.0 (1.4–2.6)	3,997	96.6 (95.9–97.4)
Vermont	58	2.3 (1.7–2.9)	2,584	97.5 (96.9–98.1)
Virginia	35	1.1 (0.5–1.7)	2,855	98.3 (97.6–99.0)
Washington	62	2.1 (1.5–2.7)	3,551	96.2 (95.4–97.0)
West Virginia	15	0.7 (0.3–1.0)	2,165	99.1 (98.6–99.5)
Wisconsin	29	1.8 (1.1–2.6)	3,626	97.2 (96.3–98.2)
Wyoming	28	2.0 (1.2–2.7)	1,634	98.0 (97.3–98.8)
New York City	34	0.8 (0.5–1.0)	4,227	99.0 (98.7–99.3)
Puerto Rico[‖]	14	1.1 (0.5–1.7)	1,975	98.9 (98.3–99.5)

PRAMS, Pregnancy Risk Assessment Monitoring System.

Data are % (95% CI).

[*] Includes those not born at home or in a hospital (eg, freestanding birthing centers, clinics).

[†] Place of birth is a birth certificate variable linked to PRAMS.

[‡] Includes 2017 data only.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

§Includes 2016 data only.

‖Includes 2017–2018 data only.

¶Includes 2016–2017 data only.

#Includes 2018 data only.

**Includes 2016 and 2018 data only.

Table 3.

Weighted Prevalence of High-Risk Pregnancy Characteristics Among Women With Live Births Who Had Home Births and Hospital Births, Pregnancy Risk Assessment Monitoring System (PRAMS):[*] 40 States, New York City, and Puerto Rico, 2016–2018

High-Risk Pregnancy Characteristics [†]	Home Births		Hospital Births	
	All Pregnancies (Unweighted n=1,034)	High-Risk Pregnancies (Unweighted n=57,160)	All Pregnancies (Unweighted n=106,446)	High-Risk Pregnancies (Unweighted n=57,160)
Low-risk pregnancy (no high-risk pregnancy characteristics)	64.9 (60.4–69.4)	NA	54.8 (54.3–55.3)	NA
Multiple gestation	0.1 (0.0–0.2)	0.3 (0.0–0.7)	1.8 (1.7–1.9)	4.0 (3.8–4.3)
SGA	7.2 (5.1–9.2)	20.5 (14.8–26.2)	9.8 (9.6–10.1)	22.3 (21.7–22.9)
LGA	13.8 (10.4–17.2)	39.5 (31.6–47.5)	9.9 (9.6–10.2)	22.4 (21.8–23.0)
Preterm (less than 37 wk of gestation)	3.5 (1.8–5.1)	10.1 (5.4–14.8)	9.0 (8.8–9.2)	20.0 (19.5–20.5)
Postterm (43 wk of gestation or greater)	0.2 (0.0–0.5)	0.4 (0.0–1.3)	0.0 (0.0–0.0)	0.0 (0.0–0.1)
Prepregnancy or gestational hypertension	5.9 (3.9–7.9)	16.9 (11.5–22.3)	17.6 (17.3–18.0)	39.0 (38.3–39.6)
Prepregnancy or gestational diabetes	6.0 (3.7–8.3)	17.1 (11.0–23.2)	12.8 (12.5–13.1)	28.4 (27.8–29.0)
VBAC	3.7 (1.9–5.5)	10.6 (5.7–15.5)	2.2 (2.1–2.4)	5.0 (4.7–5.3)

NA, not applicable; SGA, small for gestational age; LGA, large for gestational age; VBAC, vaginal birth after cesarean.

Data are % (95% CI).

[*] The Pregnancy Risk Assessment Monitoring System includes some linked birth certificate variables.

[†] Data are weighted; sample size varies owing to differences in missing data; sample sizes for all characteristics have less than 5% missing.

Table 4.

Weighted Prevalence of Maternal Characteristics Among Women With Live Births Who Had Home Births and Hospital Births, Pregnancy Risk Assessment Monitoring System (PRAMS): [*] 40 States, New York City, and Puerto Rico, 2016–2018

Maternal Characteristics [†]	Women With Home Births (Unweighted n=1,034) [‡]	Women With Hospital Births (Unweighted n=106,446) [‡]
Race–ethnicity		
Non-Hispanic White	83.9 (80.6–87.1)	56.5 (56.1–56.9)
Hispanic	6.7 (4.6–8.7)	19.3 (19.0–19.7)
Non-Hispanic Black	5.3 (3.1–7.5)	14.4 (14.1–14.7)
Non-Hispanic Asian	1.4 (0.6–2.2)	5.8 (5.6–6.0)
Non-Hispanic American Indian or Alaska Native	0.3 (0.1–0.4)	0.8 (0.8–0.8)
Non-Hispanic other [§]	2.5 (1.0–4.0)	3.1 (2.9–3.2)
Maternal age (y)		
Younger than 20	2.8 (1.2–4.3)	4.6 (4.4–4.8)
20–24	15.3 (12.1–18.6)	18.6 (18.2–18.9)
25–34	57.9 (53.3–62.4)	58.8 (58.3–59.3)
35 or older	24.0 (20.1–27.9)	18.1 (17.7–18.4)
Married	84.6 (81.4–87.8)	61.8 (61.3–62.2)
Previous live births		
0	22.7 (18.6–26.7)	38.6 (38.1–39.0)
1	31.0 (26.7–35.3)	33.3 (32.8–33.7)
2 or more	46.3 (41.7–50.9)	28.2 (27.7–28.6)
Education		
Less than high school	24.6 (20.4–28.8)	12.2 (11.9–12.5)
High school diploma or equivalency certificate	12.4 (9.6–15.1)	24.7 (24.3–25.1)
Some college or more	63.0 (58.5–67.5)	63.1 (62.6–63.5)
Household income by FPL [‖¶]		
100% or lower	24.1 (19.9–28.2)	32.6 (32.1–33.0)
More than 100–no more than 200%	27.4 (23.0–31.7)	21.7 (21.2–22.1)
More than 200%	48.6 (43.7–53.5)	45.8 (45.3–46.2)
Insurance during pregnancy [#]		

Maternal Characteristics[†]	Women With Home Births (Unweighted n=1,034)[‡]	Women With Hospital Births (Unweighted n=106,446)[‡]
Private	54.3 (49.4–59.2)	60.2 (59.8–60.7)
Medicaid	17.0 (13.8–20.3)	34.4 (33.9–34.8)
Other	1.7 (0.0–3.4)	3.5 (3.3–3.7)
No insurance	27.0 (22.6–31.4)	1.9 (1.8–2.0)
Timing of prenatal care initiation		
1st trimester	66.9 (62.5–71.3)	87.1 (86.7–87.4)
2nd or 3rd trimester	29.7 (25.5–34.0)	12.1 (11.8–12.4)
Never	3.4 (1.4–5.3)	0.8 (0.7–0.9)
Attended postpartum visit	80.1 (76.2–84.0)	90.0 (89.7–90.3)
Attended health care worker visit in 12 mo before conception	69.1 (64.9–73.4)	66.8 (66.4–67.3)
Multivitamin, prenatal vitamin, or folic acid vitamin use in month before conception		
No vitamin use	40.5 (35.9–45.1)	51.9 (51.4–52.4)
1-6 times/wk	25.3 (21.3–29.3)	13.4 (13.1–13.7)
Every day of the week	34.3 (29.8–38.8)	34.7 (34.2–35.1)
Ever breastfed [**]	94.8 (92.7–96.9)	87.7 (87.3–88.0)
Laid infant on back most often for sleep [††]	59.3 (54.7–64.0)	79.5 (79.1–79.9)

FPL, federal poverty level.

Data are % (95% CI).

[*] The Pregnancy Risk Assessment Monitoring System includes some linked birth certificate variables.

[†] Data are weighted; sample size varies owing to differences in missing data and skip patterns; sample sizes for all characteristics have less than 5% missing unless otherwise indicated.

[‡] Percentages for the individual categories might not add to 100 because of rounding.

[§] Non-Hispanic other includes women who self-reported as Hawaiian, mixed race, or other non-White on the birth certificate.

[||] Excludes data from Puerto Rico; 10.0% of sample missing.

[¶] Federal poverty level was calculated based on yearly total household income in the 12 months before delivery.

[#] Among women who attended prenatal visits.

[**] Includes women who pumped breast milk to feed their infants; women whose infants were deceased or not living with them were instructed to skip questions related to breastfeeding.

[††] Women whose infants were deceased, not living with them, or hospitalized were instructed to skip questions related to safe sleep.