



Characteristics of women without a postpartum checkup among PRAMS participants, 2009–2011

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Published online: 10 January 2019

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Abstract

Introduction For uncomplicated pregnancies in the United States, a healthcare visit 4 to 6 weeks postpartum is recommended to assess a woman's mental, social, and physical health. We studied whether sociodemographic characteristics and pregnancy and delivery factors were related to the likelihood of missing a postpartum checkup. **Methods** We conducted a cross-sectional analysis of 64,952 women who completed the United States Centers for Disease Control Pregnancy Risk Assessment Monitoring System (PRAMS) Phase 6 survey in 2009–2011 from 17 states and New York City that included a Yes/No question about receiving a maternal postpartum checkup. We calculated risk ratios (RR) with 95% confidence intervals (CI) to assess the association between maternal factors and lack of a postpartum checkup. **Results** Compared to women who attended a postpartum checkup (89.4%), women who missed the visit (10.6%) were younger, unmarried, less educated, with lower income, without insurance, and smokers (all $p < 0.05$). Compared to women with adequate prenatal care, women with intermediate (RR 1.79 (95% CI 1.70–1.88)) or inadequate (RR 2.71 (95% CI 2.53–2.91)) care were more likely to miss the checkup. Women were more likely to miss this checkup if their infant was born at a residence compared to a hospital (RR 2.27 (95% CI 1.71–3.01)), and were less likely to miss the checkup if their newborn had a 1-week well visit (RR 0.70 (95% CI 0.61–0.81)). **Discussion** Sociodemographic factors and noncompliance with other medical care were associated with missing a postpartum checkup. Women with a high-risk of not attending a postpartum visit should be targeted for interventions to increase their accessibility to care.

Keywords Postpartum · Clinic visit · Surveys · PRAMS · Obstetrics

Significance

The underutilization of women's postpartum checkups can be detrimental to the health of women and newborns. Research has shown associations between postpartum visit attendance and demographic characteristics. The current study examined maternal, pregnancy, and newborn characteristics and found that newborn health issues and non-compliance with other medical care were associated with not attending a postpartum checkup. Given that postpartum visits address important health topics such as breastfeeding, weight retention, mental health, physical activity, contraception, sexuality, nutrition, and existing or new-onset clinical conditions, a focus on improving attendance at postpartum checkups or making postpartum care accessible in other ways is warranted.

This work was presented as part of a poster session at the Society for Reproductive Investigation Annual Scientific Meeting, March 2016, Montreal, QC.

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Introduction

A postpartum checkup is recommended for women in the first 4 to 6 weeks after giving birth. This visit is used as a means of assessing the woman's mental, social, and physical health. In the first few weeks after giving birth, a woman is recovering from childbirth and the guidance provided at the postpartum visit addresses topics such as breastfeeding, weight retention, mental health (including postpartum mood disorders), physical activity, contraception, sexuality, and nutrition (American College of Obstetricians and Gynecologists (ACOG) 2016). National surveys show that women often have multiple unmet clinical needs following giving birth (Tully et al. 2017). In addition, women with existing or new-onset clinical conditions benefit from a mother-focused postpartum checkup, where they can receive guidance about managing and treating these conditions with the aim of reducing the risk of further health issues (ACOG 2016; Tully et al. 2017). This study seeks to identify the characteristics of women at increased risk of missing a postpartum visit, as a first step toward the goal of improving postpartum health of women who may be clinically underserved.

Under-utilized postpartum visits can be detrimental to the health of the mother and infant (Henderson et al. 2016). For example, Rai et al. (2015) suggested that in families where psychiatric issues are not addressed during the postpartum period, the mother's interaction and attachment may be adversely affected, which can in turn affect the child and family. Also, Masho et al. (2016) found that women were 50% more likely to use contraception after delivering if they attended a postpartum visit, which helps to avoid unintended and rapid repeat pregnancies.

In the limited research that looks at risk and protective factors of women's attendance at the postpartum visit, associations have been found between attendance and maternal characteristics such as age, race, type of insurance, education level, income, and chronic conditions (Henderson et al. 2016; Lu and Prentice 2002; Wilcox et al. 2016). While Bryant et al. (2006) found that having a chronic health condition and receiving a reminder from the doctor increased women's compliance in attending the visit, research largely has not explored the protective factors that may help women not miss their visit. In addition, while studies have suggested that demographic and other maternal characteristics may contribute to whether women attend their postpartum checkup, research on the associations among postpartum checkup attendance and pregnancy and newborn characteristics is minimal. This study helps fill a gap in the literature by focusing on pregnancy and newborn characteristics.

A doctor's active engagement in patient-focused postpartum care for women has the potential to maintain good

health, support their well-being, and improve outcomes for women, infants, and their families (ACOG 2016). Without knowing more about the populations of women who are vulnerable to missing postpartum appointments, it will be difficult to develop interventions to increase attendance or identify women that may benefit from alternative venues to receive postpartum care. The current study aimed to determine whether maternal, pregnancy, and infant characteristics are related to attendance at a postpartum visit. We expand on prior studies by examining factors of pregnancy and delivery characteristics to better understand the vulnerable populations that are not attending the postpartum visit.

Methods

Research Approval

This study has been deemed exempt by the Women & Infants Hospital Institutional Review Board (project #800833), and was approved by the Center for Disease Control (CDC) for use of the Pregnancy Risk Assessment Monitoring System (PRAMS) Phase 6 survey data, which was conducted in 2009–2011.

Data Source

PRAMS collects data related to a woman's most recent pregnancy, including attitudes and feelings about the pregnancy, content and source of prenatal care, alcohol and tobacco use, past and current physical abuse, pregnancy-related morbidity, health care for the infant, contraceptive use, and knowledge of health-related issues in pregnancy (CDC: PRAMS Questionnaires 2017). The sample of women who participate in the survey are selected from a state's birth certificate registry of recent live births. Surveys are typically mailed 2 to 4 months after delivery (CDC: What is PRAMS? 2017). Survey responses are then linked to select birth certificate data.

Measures

In addition to core questions that appear nationwide in all surveys, individual states may elect to include additional items from a list of standard questions. In 2009–2011, the PRAMS survey collected 64,952 responses from women in 17 states and New York City who answered a standard question about receiving a maternal postpartum checkup. The question read: "Since your new baby was born have you had a postpartum checkup for yourself? (A postpartum checkup is the regular checkup a woman has about 6 weeks after she gives birth)." Using the dichotomous responses to this question as our primary outcome, we examined associations with

responses to other PRAMS questions addressing maternal, pregnancy, and newborn characteristics. Maternal characteristics included age, marital status, maternal education level, income, insurance status, race, Hispanic ethnicity, smoking status, and body mass index. Pregnancy characteristics included adequacy of prenatal care as defined by the Kessner Index (Kessner et al. 1973) on the birth certificate, reproductive history, delivery details, and pregnancy timing, defined as whether the woman had wanted to become pregnant sooner than she did, later than she did, at the time that she did, or not then or in the future. Newborn characteristics included gestational age at birth, neonatal intensive care unit (NICU) admission, length of stay in the hospital, place of birth (hospital, residence, or other place), and whether the newborn was seen for a 1-week pediatric checkup.

Statistical Analysis

Univariable log binomial regression was used with sampling, nonresponse, and non-coverage weights, accounting for stratum assignment and sample design. Risk ratios (RRs) were calculated with 95% confidence intervals (CI) to assess the associations between each factor and a missed postpartum checkup. Analyses were performed using SAS 9.3 (SAS Institute, Inc., Cary, NC) and STATA/SE 10.1 (StataCorp, LP. 2007, College Station, TX).

Results

Among 64,952 women, 6893 (10.6%) self-reported missing their postpartum checkup and were compared to 58,059 (89.4%) women who reported attending a postpartum checkup (Table 1).

Maternal Characteristics

Results showed that the risk of missing a postpartum checkup varied by age, race, ethnicity, marital status, education, income, insurance status, and cigarette smoking habits (Table 1). The risk of missing a postpartum checkup among women younger than 17 (RR = 1.63, CI 1.36–2.08), between the ages of 18 and 19 (RR 1.73, CI 1.49–2.01), or between the ages of 20 and 24 (RR 1.54, CI 1.38–1.71) was higher compared to women aged 25–29 years. The risk of missing a postpartum checkup among women who were aged 30–34 years or 35–39 years was even lower than the risk among women aged 25–29 years. Unmarried women were nearly twice as likely to miss their postpartum checkup as married women (RR 1.94, CI 1.79–2.10). Women who completed 0–8 years of education or completed 9–11 years of education were 1.86 (CI 1.59–2.17) and 1.54 (CI 1.38–1.72) times more likely to miss a postpartum checkup,

respectively, than women who completed 12 years of education, while women who completed 13–15 years of education (RR 0.66, CI 0.59–0.74) or 16 years or more years (RR 0.33, CI 0.29–0.37) were less likely to miss a postpartum checkup. Compared to women who identified as White, women who identified as Black (RR 1.40, CI 1.28–1.54), American Indian (RR 1.92, CI 1.48–2.50), and “other” (RR 2.01, CI 1.73–2.32) were significantly more likely to miss their postpartum checkup. Women with Hispanic ethnicity were 1.87 (CI 1.70–2.06) times more likely to miss a postpartum checkup than women not of Hispanic ethnicity. Smokers had 1.72 (CI 1.56–1.89) times the risk of missing a postpartum checkup compared to non-smokers. Women with a household income of more than \$50,000 per year had 75% (CI 72–78%) less of a risk of missing a postpartum checkup compared to women with a household income less than \$10,000 per year. Furthermore, women who had insurance (RR 0.53, CI 0.49–0.58) were less likely to miss a checkup compared to women who did not have insurance.

Pregnancy Characteristics

When examining pregnancy characteristics, the risk of missing a postpartum checkup differed by delivery method, abuse history, intentions of pregnancy at the time the woman became pregnant, and adequacy of prenatal care (Table 2). The risk of missing a postpartum checkup was higher for women who had a vaginal delivery (RR 1.14, CI 1.04–1.24) compared to women with a cesarean delivery. Women were more likely to miss this visit if they intended to become pregnant later than they actually did (RR 1.42, CI 1.29–1.57) or did not want to become pregnant at all (RR 1.68, CI 1.48–1.90) compared to women who wanted to get pregnant when they did. In comparison to women who received adequate prenatal care, women who received intermediate (RR 1.90, CI 1.73–2.09), inadequate (RR 2.83, CI 2.49–3.22), or an unknown level (RR 1.23, CI 1.05–1.45) of prenatal care were more likely to miss their postpartum checkup. In addition, women who had one or more previous live births were more likely to miss the postpartum checkup, and a dose–response effect was seen with increasing number of previous live births. The risk of missing the postpartum checkup among women who reported abuse by their husband or partner during pregnancy was 1.79 (CI 1.54–2.09) times as high as the risk of missing the checkup among women who did not report abuse.

Newborn Characteristics

Newborn characteristics associated with risk of a missed checkup included gestational age, place of birth, and length of hospital stay (Table 3). Women with infants who were born at less than 27 weeks gestation were 1.53

Table 1 Maternal characteristics by postpartum checkup status and risk ratios for whether women missed their postpartum checkup, N = 64,952

Characteristic	No postpartum checkup N = 6893 (10.6%)	Postpartum checkup N = 58,059 (89.4%)	RR [95% CI] for missed postpartum checkup
Maternal age			
≤ 17 years	300 (4.4)	1630 (2.8)	1.63 [1.36–2.08]
18–19 years	698 (10.1)	3679 (6.3)	1.73 [1.49–2.01]
20–24 years	2047 (29.7)	13,095 (22.6)	1.54 [1.38–1.71]
25–29 years	1759 (25.5)	16,671 (28.7)	Ref
30–34 years	1275 (18.5)	14,446 (24.9)	0.87 [0.77–0.98]
35–39 years	625 (9.1)	6810 (11.7)	0.86 [0.74–0.99]
≥ 40 years	187 (2.7)	1726 (3.0)	1.30 [1.02–1.67]
Marital status			
Married	2859 (41.5)	34,742 (59.8)	Ref
Other	4019 (58.3)	23,281 (40.1)	1.94 [1.79–2.10]
Maternal education			
0–8 years	448 (6.5)	1741 (3.0)	1.86 [1.59–2.17]
9–11 years	1613 (23.4)	6839 (11.8)	1.54 [1.38–1.72]
12 years	2415 (35.0)	15,651 (27.0)	Ref
13–15 years	1468 (21.3)	15,218 (26.2)	0.66 [0.59–0.74]
≥ 16 years	828 (12.0)	17,814 (30.7)	0.33 [0.29–0.37]
Household Income			
Less than \$10,000	2621 (38.0)	11,704 (20.2)	Ref
\$10,000 to \$14,999	796 (11.6)	5088 (8.8)	0.82 [0.72–0.94]
\$15,000 to \$19,999	479 (7.0)	3566 (6.1)	0.67 [0.57–0.80]
\$20,000 to \$24,999	434 (6.3)	3921 (6.8)	0.54 [0.45–0.64]
\$25,000 to \$34,999	529 (7.7)	5305 (9.1)	0.55 [0.47–0.64]
\$35,000 to \$49,999	450 (6.5)	5648 (9.7)	0.41 [0.35–0.49]
\$50,000 or more	975 (14.1)	19,131 (33.0)	0.25 [0.22–0.28]
Maternal race			
White	3658 (53.1)	34,844 (60.0)	Ref
Black	1582 (23.0)	10,656 (18.4)	1.40 [1.28–1.54]
American Indian	213 (3.1)	927 (1.6)	1.92 [1.48–2.50]
Chinese	48 (0.7)	904 (1.6)	0.70 [0.48–1.00]
Japanese	28 (0.4)	504 (0.9)	0.56 [0.34–0.92]
Filipino	115 (1.7)	1138 (2.0)	1.31 [0.99–1.73]
Other Asian	297 (4.3)	2729 (4.7)	0.94 [0.78–1.12]
Hawaiian	151 (2.2)	1359 (2.3)	1.11 [0.85–1.44]
Other	547 (7.9)	3156 (5.4)	2.01 [1.73–2.32]
Mixed race	186 (2.7)	1318 (2.3)	1.41 [0.91–1.85]
Maternal ethnicity			
Hispanic	1394 (20.2)	8253 (14.2)	1.87 [1.70–2.06]
Not Hispanic	5280 (76.6)	48,095 (82.8)	Ref
Maternal smoking			
Insurance vs. no insurance	4731 (68.6)	46,372 (79.9)	0.53 [0.49–0.58]
Maternal BMI (kg/m ²)	25.9 [6.8]	25.9 [6.6]	1.00 [0.99–1.00]

N (%) used for categorical variables and mean [SD] for continuous variables. Missing categories were omitted from the table for brevity, and so percentages may not sum to 100. Log binomial regression conducted for risk ratios (RR) and 95% confidence intervals [CI], incorporating complex survey design weights

Table 2 Pregnancy characteristics and birth-related complications by postpartum checkup status and risk ratios for whether women missed their postpartum checkup, N = 64,952

Characteristic	No postpartum checkup N = 6893 (10.6%)	Postpartum checkup N = 58,059 (89.4%)	RR [95% CI] for missed postpartum checkup
Vaginal delivery	4660 (67.6)	36,996 (63.7)	1.14 [1.04–1.24]
Pregnancy timing			
Sooner than planned	951 (13.8)	11,044 (19.0)	0.86 [0.76–0.98]
Later than planned	2589 (37.6)	17,899 (30.8)	1.42 [1.29–1.57]
Got pregnant when planned to	2097 (30.4)	22,260 (38.3)	Ref
Did not want	1099 (15.9)	5876 (10.1)	1.68 [1.48–1.90]
Trying to get pregnant when became pregnant	2389 (34.7)	28,197 (48.6)	0.62 [0.57–0.68]
KESSNER Prenatal Care Index			
Adequate prenatal care	3658 (53.1)	39,921 (68.8)	Ref
Intermediate prenatal care	1936 (28.1)	10,983 (18.9)	1.90 [1.73–2.09]
Inadequate prenatal care	758 (11.0)	2574 (4.4)	2.83 [2.49–3.22]
Unknown prenatal care	541 (7.9)	4581 (7.9)	1.23 [1.05–1.45]
Number of births			
Single birth	6672 (96.8)	55,521 (95.6)	Ref
Twin or multiple birth	221 (3.2)	2538 (4.4)	0.91 [0.72–1.16]
Number of previous live births			
0	2369 (34.4)	24,992 (43.1)	Ref
1	2020 (29.3)	17,748 (30.6)	1.20 [1.08–1.33]
2	1219 (17.7)	8881 (15.3)	1.39 [1.23–1.56]
3–5	1116 (16.2)	5645 (9.7)	1.93 [1.71–2.18]
≥ 6	126 (1.8)	457 (0.8)	2.60 [1.97–3.44]
Reported abuse during pregnancy by husband or partner	463 (6.7)	1694 (2.9)	1.79 [1.54–2.09]
Had HIV test during pregnancy	4197 (60.9)	34,699 (59.8)	0.98 [0.88–1.08]

N (%) used for categorical variables and mean [SD] for continuous variables. Missing categories were omitted from the table for brevity, and so percentages may not sum to 100. Log binomial regression conducted for risk ratios (RR) and 95% confidence intervals [CI], incorporating complex survey design weights

(CI 1.24–1.89) times more likely to miss their postpartum checkup than women of infants who were born at term. Giving birth at home or another residence as indicated on the birth certificate had a 2.27 (CI 1.71–3.01) times higher risk of missing a postpartum checkup compared to giving birth in a hospital. Compared to women with an infant who was in the hospital 1–2 days, women with an infant who was in the hospital for less than 1 day (RR 1.63, CI 1.36–1.95), in the hospital for more than 14 days (RR 1.26, CI 1.06–1.49), still in the hospital (RR 2.27, CI 1.32–3.90), or not born in a hospital (RR 2.40, CI 1.81–3.17) were at a higher risk of missing a postpartum checkup. Women whose newborns were seen for a 1st week checkup were 0.70 (CI 0.61–0.81) times as likely to miss their postpartum checkup as women whose newborns did not have a 1st week checkup.

Discussion

This study examined the influence of demographic, pregnancy, and newborn characteristics on whether a woman misses attending a postpartum checkup. Sociodemographic factors, newborn health issues, and noncompliance with other medical care emerged as main themes associated with missing the postpartum checkup. Since attending a postpartum visit is important for meeting reproductive and clinical needs (ACOG 2016; Tully et al. 2017), women with characteristics associated with low attendance could be targeted for interventions that aim to increase compliance with the postpartum checkup or that assist in finding the woman accessible postpartum care in an alternative venue.

Table 3 Newborn characteristics by postpartum checkup status and risk ratios for whether women missed their postpartum checkup, N = 64,952

Characteristic	No postpartum checkup N = 6893 (10.6%)	Postpartum checkup N = 58,059 (89.4%)	RR [95% CI] for missed postpartum checkup
Gestational age at birth			
≤ 27 weeks	188 (2.7)	1134 (2.0)	1.53 [1.24–1.89]
28–33 weeks	437 (6.3)	3380 (5.8)	1.10 [0.91–1.32]
34–36 weeks	873 (12.7)	6901 (11.9)	1.08 [0.93–1.25]
≥ 37 weeks	5374 (78.0)	46,516 (80.1)	Ref
Place of birth			
Hospital	6781 (98.4)	57,579 (99.2)	Ref
Residence	98 (1.4)	351 (0.6)	2.27 [1.71–3.01]
Other	13 (0.2)	128 (0.2)	1.06 [0.55–2.05]
Length of newborn stay			
< 1 day	354 (5.1)	1866 (3.2)	1.63 [1.36–1.95]
1–2 days	3318 (48.1)	30,596 (52.7)	Ref
3–5 days	1849 (26.8)	16,341 (28.2)	0.99 [0.91–1.10]
6–14 days	494 (7.2)	3672 (6.3)	1.09 [0.93–1.29]
More than 14 days	592 (8.6)	4314 (7.4)	1.26 [1.06–1.49]
Not born in hospital	94 (1.4)	39 (0.6)	2.40 [1.81–3.17]
Still in hospital	50 (0.7)	299 (0.5)	2.27 [1.32–3.90]
Newborn ICU admission	1462 (21.2)	11,113 (19.1)	1.09 [0.98–1.21]
Baby seen for 1st week visit	5889 (85.4)	52,953 (91.2)	0.70 [0.61–0.81]

Missing categories were omitted from the table for brevity, and so percentages may not sum to 100. Log binomial regression conducted for risk ratios (RR) and 95% confidence intervals [CI], incorporating complex survey design weights

The demographic risk factor results of this study are comparable to prior studies that found that age, race, insurance, education, income, childcare, and lack of available transportation to the doctor are associated with not attending postpartum appointments (Henderson et al. 2016; Lu and Prentice 2002; Wilcox et al. 2016). Without insurance or a sufficient income, gaining access to a provider and paying for a checkup may be a low priority, if not impractical, for some women.

Newborn health issues, such as premature birth, appeared to hinder a woman attending her postpartum checkup. In addition to an infant's health complications necessitating increased care, Eutrope et al. (2014) found that infants born very preterm can impact a woman's emotional responses and mental health, such that she is at an increased risk of experiencing trauma and developing depression. Melnyk et al. (2002) showed that such an effect of preterm birth on the mother's mental health can place parents at risk for negative parenting outcomes. Therefore, in cases where a mother is caring for a preterm infant with a prolonged hospital stay, it may be particularly important to ensure that she is receiving postpartum care.

The risk of missing a postpartum checkup was related to underutilization of other types of health care. Specifically, underutilization included women who gave birth outside a hospital, whose child was never hospitalized, women with

sub-adequate prenatal care, and women with infants who did not attend a first week well-visit. Providers who observe patterns of suboptimal care for other clinical encounters may find it advantageous to discuss the importance and logistics of the postpartum visit or to plan to deliver this care at another encounter, such as during the delivery hospitalization or a newborn well-visit.

The scope, detail, rigor, and uniqueness of PRAMS are strengths of this study, including the standardized recruitment and data collection methodologies. Due to the widespread use of this survey and its complex sampling design, the results are generally representative of the U.S. population of postpartum women. Although our primary outcome was based on a supplemental question not administered to all PRAMS respondents, the question was answered by over 64 thousand respondents. The study also has some limitations. First, our analyses were based on cross-sectional data collected at one time point and are unable to prove a causal relationship among demographics, prenatal characteristics, and postpartum checkup attendance. Although the questions used were part of a larger survey and participants did not know our study question when completing the survey, we cannot rule out differential or non-differential issues with recall of the independent or outcome variables. The supplemental question used for the main outcome does not specify exactly how long after giving birth the woman attended a

postpartum checkup. As we focused on characteristics that ideally relate to the prenatal or delivery time frame, we do not believe there will be any issues in establishing temporality in our exposure-outcome associations. However, the ambiguity of the postpartum question coupled with the uncertainty of how long after birth and after a woman's postpartum checkup she completed the survey limit the detail in our conclusions. For example, we were not able to determine whether differences exist among the timing of when women attended a postpartum visit after giving birth.

In this study, sociodemographic factors, newborn health issues, and noncompliance with other medical care were associated with missing a postpartum checkup. Given that postpartum visits emphasize promoting mental and physical health for women, substantial health benefits could be gained by focusing on improving attendance at postpartum checkups or making postpartum care accessible in other ways. Future research may focus on what might be the best timeframe for a postpartum checkup to obtain maximum compliance and how such a timeframe may differ by maternal and newborn characteristics. Several approaches are currently being used to increase postpartum care for women and their infants, including nurse postpartum in-home visits and web-based programs, and future research should assess the benefits of these alternative approaches in comparison to the benefits offered with a traditional postpartum visit.

Acknowledgements This study would like to acknowledge the 17 states and 1 city that used the standard question from which our outcome data stems. These places chose to include Question L8 from the PRAMS, which reads: "Since your new baby was born, have you had a postpartum checkup for yourself? (A postpartum check is the regular checkup a woman has about 6 weeks after she gives birth)." These sites are: Arkansas, Georgia, Hawaii, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Rhode Island, Tennessee, Texas, Utah, Washington, West Virginia, Wisconsin, and New York City. We would also like to acknowledge the Center for Disease Control and Prevention (CDC) and the PRAMS Working Group for their permission to use Phase 6 data for the PRAMS, 2009–2011. PRAMS Working Group: Alabama—Izza Afgan, MPH; Alaska—Kathy Perham-Hester, MS, MPH; Arkansas—Mary McGehee, PhD; Colorado—Alyson Shupe, PhD; Connecticut—Jennifer Morin, MPH; Delaware—George Yocher, MS; Florida—Elizabeth C. Stewart, MSPH; Georgia—Florence A. Kanu, MPH; Illinois—Patricia Kloppenburg, MT (ASCP), MPH; Iowa—Sarah Mauch, MPH; Louisiana—Rosaria Trichilo, MPH; Maine—Tom Patenaude, MPH; Massachusetts—Emily Lu, MPH; Michigan—Peterson Haak; Minnesota—Kathy Raleigh, PhD, MPH; Mississippi—Brenda Hughes, MPPA; Missouri—David McBride, PhD; Montana—Emily Healy, MS; Nebraska—Jessica Seberger; New Hampshire—David J. Laflamme, PhD, MPH; New Jersey—Lakota Kruse, MD; New Mexico—Oralia Flores; New York State—Anne Radigan; New York City—Pricila Mullachery, MPH; North Carolina—Kathleen Jones-Vessey, MS; North Dakota—Sandra Anseth; Ohio—Connie Geidenberger, PhD; Oklahoma—Aysha Lampkins, MPH, CHES; Oregon—Claudia W. Bingham, MPH; Pennsylvania—Tony Norwood; Rhode Island—Karine Tolentino Monteiro, MPH; South Carolina—Mike Smith, MSPH; Texas—Tanya Guthrie, PhD; Tennessee—Ramona Lainhart,

PhD; Utah—Nicole Stone; Vermont—Peggy Brozicevic; Virginia—Christopher Hill, MPH, CPH; Washington—Linda Lohdefinck; West Virginia—Melissa Baker, MA; Wisconsin—Christopher Huard; Wyoming—Lorie Chesnut, PHD.

Funding Funding was provided by Agency for Healthcare Research and Quality (Grant No. K01HS025013), National Institute of Child Health and Human Development (Grant No. 5K12HD050108).

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