



MMWRTM

Morbidity and Mortality Weekly Report

www.cdc.gov/mmwr

Surveillance Summaries

May 29, 2009 / Vol. 58 / No. SS-4

Trends in Smoking Before, During, and After Pregnancy — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 Sites, 2000–2005



DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

The *MMWR* series of publications is published by the Coordinating Center for Health Information and Service, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

Suggested Citation: Centers for Disease Control and Prevention. [Title]. Surveillance Summaries, [Date]. MMWR 2009;58(No. SS-#).

Centers for Disease Control and Prevention

- Richard E. Besser, MD
(Acting) Director
- Tanja Popovic, MD, PhD
Chief Science Officer
- James W. Stephens, PhD
Associate Director for Science
- Steven L. Solomon, MD
Director, Coordinating Center for Health Information and Service
- Jay M. Bernhardt, PhD, MPH
Director, National Center for Health Marketing
- Katherine L. Daniel, PhD
Deputy Director, National Center for Health Marketing

Editorial and Production Staff

- Frederic E. Shaw, MD, JD
Editor, MMWR Series
- Christine G. Casey, MD
Deputy Editor, MMWR Series
- Susan F. Davis, MD
Associate Editor, MMWR Series
- Teresa F. Rutledge
Managing Editor, MMWR Series
- David C. Johnson
(Acting) Lead Technical Writer-Editor
- Jeffrey D. Sokolow, MA
Project Editor
- Martha F. Boyd
Lead Visual Information Specialist
- Malbea A. LaPete
Stephen R. Spriggs
Visual Information Specialists
- Kim L. Bright, MBA
Quang M. Doan, MBA
Phyllis H. King
Information Technology Specialists

Editorial Board

- William L. Roper, MD, MPH, Chapel Hill, NC, Chairman
- Virginia A. Caine, MD, Indianapolis, IN
- David W. Fleming, MD, Seattle, WA
- William E. Halperin, MD, DrPH, MPH, Newark, NJ
- Margaret A. Hamburg, MD, Washington, DC
- King K. Holmes, MD, PhD, Seattle, WA
- Deborah Holtzman, PhD, Atlanta, GA
- John K. Iglehart, Bethesda, MD
- Dennis G. Maki, MD, Madison, WI
- Sue Mallonee, MPH, Oklahoma City, OK
- Patricia Quinlisk, MD, MPH, Des Moines, IA
- Patrick L. Remington, MD, MPH, Madison, WI
- Barbara K. Rimer, DrPH, Chapel Hill, NC
- John V. Rullan, MD, MPH, San Juan, PR
- William Schaffner, MD, Nashville, TN
- Anne Schuchat, MD, Atlanta, GA
- Dixie E. Snider, MD, MPH, Atlanta, GA
- John W. Ward, MD, Atlanta, GA

CONTENTS

Introduction	2
Methods	2
Results	4
Discussion.....	5
Conclusion.....	7
References	7
Appendix	30

Trends in Smoking Before, During, and After Pregnancy – Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 Sites, 2000–2005

Van T. Tong, MPH¹
Jaime R. Jones, MPH¹
Patricia M. Dietz, DrPH¹
Denise D'Angelo, MPH¹
Jennifer M. Bombard, MSPH²

¹Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC

²Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC

Abstract

Problem: Smoking among nonpregnant women contributes to reduced fertility, and smoking during pregnancy is associated with delivery of preterm infants, low infant birthweight, and increased infant mortality. After delivery, exposure to secondhand smoke can increase an infant's risk for respiratory tract infections and for dying of sudden infant death syndrome. During 2000–2004, an estimated 174,000 women in the United States died annually from smoking-attributable causes, and an estimated 776 infants died annually from causes attributed to maternal smoking during pregnancy.

Reporting Period Covered: 2000–2005.

Description of System: The Pregnancy Risk Assessment Monitoring System (PRAMS) was initiated in 1987 and is an ongoing state- and population-based surveillance system designed to monitor selected maternal behaviors and experiences that occur before, during, and after pregnancy among women who deliver live-born infants in the United States. Self-reported questionnaire data are linked to selected birth certificate data and are weighted to represent all women delivering live infants in the state. Self-reported smoking data were obtained from the PRAMS questionnaire and birth certificates. This report provides data on trends (aggregated and site-specific estimates) of smoking before, during, and after pregnancy and describes characteristics of female smokers during these periods.

Results: For the study period 2000–2005, data from 31 PRAMS sites (Alabama, Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) were included in this report. All 31 sites have met the Healthy People 2010 (HP 2010) objective of increasing the percentage of pregnant smokers who stop smoking during pregnancy to 30%; site-specific quit rates in 2005 ranged from 30.2% to 61.0%. However, none of the sites achieved the HP 2010 objective of reducing the prevalence of prenatal smoking to 1%; site-specific prevalence of smoking during pregnancy in 2005 ranged from 5.2% to 35.7%. During 2000–2005, two sites (New Mexico and Utah) experienced decreasing rates for smoking before, during, and after pregnancy, and two sites (Illinois and New Jersey) experienced decreasing rates during pregnancy only. Three sites (Louisiana, Ohio, and West Virginia) had increases in the rates for smoking before, during, and after pregnancy, and Arkansas had increases in rates before pregnancy only. For the majority of sites, smoking rates did not change over time before, during, or after pregnancy. For 16 sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) for which data were available for the entire 6-year study period, the prevalence of smoking before pregnancy remained unchanged, with approximately one in five women (from 22.3% in 2000 to 21.5% in 2005) reporting smoking before pregnancy. The prevalence of smoking during pregnancy declined ($p = 0.01$) from 15.2% in 2000 to 13.8% in 2005, and the prevalence of smoking after delivery declined ($p = 0.04$) from 18.1% in 2000 to 16.4% in 2005.

Corresponding author: Van Tong, MPH, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC, MS K-22, 4770 Buford Hwy., NE, Atlanta, GA, 30341. Telephone: 770-488-6309; Fax: 770-488-6291; E-mail: vtong@cdc.gov.

Interpretation: The results indicate that efforts to reduce smoking prevalence among female smokers before pregnancy have not been effective; however, efforts targeting pregnant women have met some success as rates have

declined during pregnancy and after delivery. Current tobacco-control efforts and smoking-cessation efforts targeting pregnant women are not sufficient to reach the HP 2010 objective of reducing prevalence of smoking during pregnancy.

Public Health Action: The data provided in this report are important for developing, monitoring, and evaluating state tobacco-control policies and programs to reduce smoking among female and pregnant smokers. States can reduce smoking before, during, and after pregnancy through sustained and comprehensive tobacco-control efforts (e.g., smoke-free policies and tobacco excise taxes). Health-care providers should increase efforts to assess the smoking status of their patients and offer effective smoking-cessation interventions to every female or pregnant smoker to whom they provide health-care services.

Introduction

Prenatal smoking remains one of the most common preventable causes of infant morbidity and mortality and is associated with 30% of small-for-gestational-age infants, 10% of preterm infants, and 5% of infant deaths (1,2). Cigarette smoking before conception can cause reduced fertility and conception delay among women (2,3). Maternal cigarette smoking during pregnancy increases the risk for pregnancy complications (e.g., placental previa, placental abruption, and premature rupture of the membrane) and poor pregnancy outcomes (e.g., preterm delivery, restricted fetal growth, and sudden infant death syndrome [SIDS]) (2,3). Exposure to secondhand smoke after delivery increases an infant's risk for respiratory tract infections (e.g., bronchitis and pneumonia), ear infections, and dying from SIDS (2–6). During 2000–2004, an estimated 174,000 women in the United States died annually from smoking-attributable causes, and an estimated 776 infants died annually from causes attributed to maternal smoking during pregnancy (7).

In 2005, approximately 10%–12% of women giving birth reported smoking during pregnancy based on birth certificates (8). Rates were higher among certain subpopulations (e.g., women aged <25 years, women with lower levels of education, American Indian/Alaska Native women, and white women) (8). Although smoking rates among women have been decreasing in the United States, an estimated 22% of women of reproductive age continued to smoke in 2006 (9).

Two Healthy People 2010 (HP 2010) national health objectives address smoking during pregnancy: 1) reduce the prevalence of cigarette smoking among pregnant women to 1% (objective no. 16-17) and 2) increase the percentage of pregnant smokers who stop smoking during pregnancy to 30% (objective no. 27-6) (10). A previous study of 10 states (Alabama, Alaska, Florida, Georgia, Maine, New York [excluding New York City*], Oklahoma, South Carolina, Washington, and West Virginia) that participated in the Pregnancy Risk Assessment

Monitoring System (PRAMS) indicated that quit rates during pregnancy increased from 37.0% in 1993 to 46.0% in 1999, but no change occurred in smoking rates before pregnancy or in postpartum relapse rates during the study period (11). In 2003, 19 PRAMS sites (Alabama, Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Louisiana, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Ohio, Oklahoma, South Carolina, Utah, Washington, and West Virginia) achieved the second objective, with quit rates ranging from 30.2% in West Virginia to 65.8% in Utah (12). However, none of the sites achieved the first objective, with prevalence of smoking during the last 3 months of pregnancy ranging from 3.9% in Utah to 27.5% in West Virginia.

To assess progress toward achieving the HP 2010 objectives and to assist tobacco-control efforts targeting nonpregnant, pregnant, and postpartum female smokers, CDC analyzed data from the PRAMS questionnaire for 2000–2005. This report provides the first summary of PRAMS data concerning trends (aggregated and site-specific estimates) of smoking before, during, and after pregnancy and describes characteristics of female smokers during these periods.

Methods

Project Description

Initiated in 1987, PRAMS is an ongoing state- and population-based surveillance system designed to monitor selected self-reported behaviors, health-care use, and maternal morbidities that occur before, during, and after pregnancy among women who deliver a live-born infant in the United States. PRAMS is administered by CDC's National Center for Chronic Disease Prevention and Health Promotion in collaboration with state health departments. During 1987–2008, PRAMS began with six sites (District of Columbia, Indiana, Maine, Michigan, Oklahoma, and West Virginia) and now includes 37 states (Alabama, Alaska, Arkansas, Colorado, Delaware, Florida, Georgia, Hawaii, Illinois, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New Mexico, New York,

* Because New York state and New York City have separate vital records registries and collect data as independent projects, data for these two PRAMS sites are reported separately.

North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming), a tribal-state collaborative project (South Dakota), and one major metropolitan city (New York City).

Data Collection

All health departments participating in PRAMS use a standardized data collection methodology developed by CDC (13). At each site, a monthly stratified sample of 100–300 new mothers is selected systematically from recent birth certificates. PRAMS staff at each site mail a self-administered questionnaire to the selected women starting 2–3 months after the delivery of a live infant. Women who do not respond to any of three serial mailings are contacted by telephone to complete the survey. To minimize recall bias, all efforts to contact women by mail and telephone end 9 months postpartum. Survey data are linked to selected birth certificate data and weighted for sample design, nonresponse, and noncoverage.

The PRAMS questionnaire is revised periodically. Data highlighted in this report were collected using the Phase Four (2000–2003) and Phase Five (2004–2005) versions of the questionnaire (14). Details concerning the PRAMS methodology have been described elsewhere (13).

PRAMS sites were included in the report if an overall weighted response rate of $\geq 70\%$ was achieved for a given year for every site. To minimize nonresponse bias, PRAMS has established 70% as the minimum weighted response rate for site data to be included in published results. The weighted response rate indicates the proportion of women sampled who completed a survey, adjusting for sample design.

For the study period 2000–2005, data from 31 PRAMS sites (Alabama, Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Montana, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) were included in this report. Data from 26 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) with data available in 2005 were aggregated for the analysis of maternal characteristics associated with smoking, and data from 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South

Carolina, Utah, Washington, and West Virginia) with data available for all 6 years during 2000–2005 were aggregated to analyze time trends in the prevalence of smoking. The 31 PRAMS sites included in this report represent approximately 54% of live births in the United States during 2005.

Data Analysis

This report presents data on five measures of smoking behaviors before, during, and after pregnancy: 1) smoking during the 3 months before pregnancy, 2) smoking during pregnancy (reported by women on the PRAMS questionnaire for the last 3 months of pregnancy or indicated on the linked birth certificate at any time during pregnancy[†]), 3) quitting smoking during pregnancy among women who smoked before pregnancy, 4) smoking after delivery (measured at the time the questionnaire was completed), and 5) relapsing to smoking after delivery among women who quit smoking during pregnancy (see Appendix for definitions). Three PRAMS questions were used to calculate these measures: 1) “In the 3 months before you got pregnant, how many cigarettes did you smoke on an average day?”; 2) “In the last 3 months of your pregnancy, how many cigarettes did you smoke on an average day?”; and 3) “How many cigarettes do you smoke on an average day now?”

Smoking measures were analyzed in the aggregate by selected maternal characteristics for the 26 sites with available data for 2005. Maternal age, race/ethnicity, education, marital status, parity, and initiation of prenatal care were derived from the birth certificate. Annual income, prepregnancy body mass index, pregnancy intention, health-care insurance coverage during pregnancy, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) enrollment during pregnancy, alcohol use during pregnancy, and number of cigarettes smoked per day before pregnancy were derived from the PRAMS questionnaire (see Appendix for variable definitions). Smoking prevalence and standard errors were estimated by year for each site and aggregated only for the 16 sites with available data for all 6 years during 2000–2005.

To estimate the magnitude of change in the prevalence estimates, the proportion change was calculated by subtracting the smoking prevalence of the most recent year available from that of the earliest year available and dividing the difference by the prevalence from the earliest year. Statistical linear trends were

[†] Compared with the 1989 birth certificate, which had a check box for smoking at any time during pregnancy, the 2003 revised birth certificate has three check boxes, one for smoking during each trimester of pregnancy. For the analysis, smoking during each trimester of pregnancy was aggregated to indicate smoking at any time during pregnancy on the basis of the birth certificate. Four PRAMS states (New York [2004], Nebraska [2005], South Carolina [2004], and Washington [2003]) have implemented the 2003 revised birth certificate.

assessed using logistic regression with smoking as the outcome variable and the infant's birth year as the independent variable. Only sites with at least 3 years of data were assessed for linear trends. Chi-square tests for independence were conducted to test for differences in smoking and maternal characteristics for categorical variables. Significance level for all statistical tests was set at $p \leq 0.05$.

Data were weighted to represent all live births delivered in each respective site in the given year. The analyses were conducted using SUDAAN version 9.1 to account for the complex survey design of PRAMS (15).

Results

A total of 31 PRAMS sites that had ≥ 1 year of data available during 2000–2005 were included in the analysis, with a total unweighted sample size of 242,038. The yearly site-specific sample size ranged from 770 respondents in New York City in 2004 to 2,518 respondents in Hawaii in 2000. The highest (89%) 1-year response rate was achieved in Utah in 2004. The average age of infants for whom the PRAMS questionnaire was completed varied (range: 93.8 days [Montana in 2002]–146.7 days [Florida in 2005]) on the basis of the most recent year of data available for a site (Table 1).

Maternal Characteristics of Smokers and Nonsmokers

In 2005, on the basis of aggregated data from 26 sites, 22.5% of women reported smoking before or during pregnancy or after delivery (Table 2). Compared with nonsmokers, women who smoked were significantly more likely to be younger (aged < 25 years), non-Hispanic white, have ≤ 12 years of education, be unmarried, have an annual income of $< \$15,000$, be underweight, have an unintended pregnancy, be first-time mothers, have initiated prenatal care later, be Medicaid-enrolled, and be enrolled in WIC during pregnancy (Table 2).

Smoking Before Pregnancy

Site-Specific Trends

On the basis of aggregated data from the 16 sites for which data were available for all 6 years during 2000–2005, the prevalence of smoking during the 3 months before pregnancy did not change significantly (from 22.3% to 21.5%) (Figure 1; Table 3). During 2000–2005, the prevalence of smoking during the 3 months before pregnancy increased significantly for four sites (Arkansas [from 28.6% to 32.6%], Louisiana [from 21.2% to 28.2%], Ohio [from 28.6% to 32.0%], and West Virginia [from 36.2% to 45.8%]) and decreased significantly

for two sites (New Mexico [from 21.3% to 18.8%] and Utah [from 14.3% to 10.2%]) (Table 3). In 2005, among 26 sites, site-specific prevalence of smoking during the 3 months before pregnancy ranged from 10.2% in Utah to 45.8% in West Virginia (Figures 2 and 3; Table 3).

Smoking During Pregnancy

Site-Specific Trends

PRAMS datasets include two sources for data on smoking during pregnancy: self-reported smoking during the last 3 months of pregnancy reported on the PRAMS questionnaire and smoking at any time during pregnancy indicated on the linked birth certificate. Estimates from each data source are presented with a combined estimate, which includes smoking during pregnancy indicated on either source. In 2005, on the basis of aggregated data from the 26 sites, the combined estimate for smoking during pregnancy (14.1%) was 16% higher than the PRAMS-only estimate (12.2%) and 38% higher than the birth certificate-only estimate (10.2%; data not presented). The prevalence of smoking during pregnancy based on the combined estimate was higher than the estimate based on either data source alone in all 31 sites.

On the basis of aggregated data from the 16 sites, smoking during pregnancy (combined estimate) decreased significantly during 2000–2005, from 15.2% to 13.8%; however, this trend differed by site (Figure 1; Table 4). During the study period, smoking during pregnancy (combined estimate) increased significantly for three sites (Louisiana [from 13.7% to 18.9%], Ohio [from 20.2% to 23.8%], and West Virginia [from 29.4% to 35.7%]) and decreased significantly for four sites (Illinois [from 14.6% to 11.3%], New Jersey [from 11.5% to 9.8%], New Mexico [from 13.1% to 11.3%], and Utah [from 9.9% to 6.2%]) (Table 4). The site-specific prevalence of smoking during pregnancy (combined estimate) among the 26 sites in 2005 ranged from 5.2% in New York City to 35.7% in West Virginia (Figures 4 and 5; Table 4).

Maternal Racial/Ethnic, and Age Trends

On the basis of aggregated data from the 16 sites with data available for all 6 years during 2000–2005, trends in smoking during pregnancy varied by maternal racial/ethnic and age categories. American Indians were the only racial/ethnic population that experienced a significant decline in smoking during pregnancy, from 27.1% in 2000 to 20.6% in 2005 (Figure 6; Table 5). In 2005, prevalence of smoking was highest among Alaska Natives (36.3%) and American Indians (20.6%) and lowest among Hispanics (4.0%) and Asian/Pacific Islanders (5.4%) (Table 5). Among age groups, only women aged ≥ 35 years had a significant decline in smoking during pregnancy,

from 13.2% in 2000 to 9.2% in 2005 (Figure 7; Table 5). In 2005, the prevalence of smoking was highest among women aged 20–24 years (20.7%) and lowest among women aged ≥ 35 years (9.2%) (Table 5).

Breakdowns by age within racial/ethnic subpopulations demonstrated different trends over time. During 2000–2005, the prevalence of prenatal smoking increased significantly (from 30.0% to 32.8%) among non-Hispanic white women aged 20–24 years and decreased significantly (from 15.3% to 10.8%) among non-Hispanic white women aged ≥ 35 years (Table 5). Among non-Hispanic black women aged 25–34 years, the prevalence of smoking increased significantly (from 8.9% to 12.0%) (Table 5). Among Alaska Natives aged 20–24 years, the prevalence of prenatal smoking decreased significantly (from 44.8% to 36.1%) (Table 5). Among American Indians, the prevalence of prenatal smoking decreased significantly among women aged < 20 years (from 37.6% to 15.9%) and among women aged 20–24 years (from 30.9% to 17.0%) (Table 5).

Quitting Smoking During Pregnancy

During the study period, on the basis of aggregated data from the 16 sites, the percentage of smokers who quit smoking during pregnancy did not increase significantly (from 43.9% to 45.7%) (Table 6). However, significant site-specific trends over time were observed. The percentage of smokers who quit smoking during pregnancy decreased significantly for one site (Louisiana [from 44.2% to 37.1%]) and increased significantly for two sites (Michigan [from 33.1% to 44.9%] and New Jersey [from 47.9% to 58.5%]) (Table 6). The site-specific percentage of women who quit smoking during pregnancy among the 26 sites in 2005 ranged from 30.2% in West Virginia to 61.0% in Hawaii (Figure 8; Table 6).

The 2005 aggregated data from 26 sites indicate that women who quit smoking during pregnancy differed from those who continued to smoke. Compared with women who did not quit smoking, women who quit were more likely to be Hispanic or Asian/Pacific Islander, had > 12 years of education, were married, had an annual income of $\geq \$15,000$, had an intended pregnancy, had normal or overweight body mass index, were first-time mothers, initiated prenatal care in the first trimester, were not Medicaid-enrolled, were not enrolled in WIC, did not use alcohol during pregnancy, and smoked fewer cigarettes before pregnancy (Table 7).

Smoking After Delivery

On the basis of aggregated data from the 16 sites, the prevalence of smoking after delivery decreased significantly (from 18.1% to 16.4%) during the study period (Figure 1; Table 8).

The prevalence of smoking after delivery increased significantly for three sites (Louisiana [from 18.7% to 23.4%], Ohio [from 24.2% to 27.4%], and West Virginia [from 31.6% to 39.3%]) and decreased significantly for two sites (New Mexico [from 16.0% to 13.1%] and Utah [from 9.5% to 7.3%]) (Table 8). In 2005, the site-specific prevalence of smoking after delivery among the 26 states ranged from 7.3% in Utah to 39.3% in West Virginia (Figures 9 and 10; Table 8).

Relapsing to Smoking After Delivery

On the basis of aggregated data from the 16 sites, the percentage of women who relapsed to smoking after delivery was not statistically different (50.3% in 2000 compared with 51.4% in 2005) (Table 9). During the study period, the percentage of women relapsing to smoking after delivery increased significantly for three sites (Arkansas [from 43.1% to 62.0%], Minnesota [from 40.1% to 54.5%], and Vermont [from 34.7% to 44.0%]) (Table 9). In 2005, the percentage of women in the 26 sites who relapsed to smoking after delivery ranged from 36.4% in Oregon to 62.0% in Arkansas (Figure 11; Table 9).

Characteristics of women who quit smoking during pregnancy and did not start smoking again after delivery differed from those of women who relapsed to smoking. Compared with women who did not start smoking again after delivery, women who relapsed to smoking after delivery were significantly more likely to be aged < 25 years, be non-Hispanic black, have < 12 years of education, be unmarried, have an annual income of $< \$15,000$, have had an unintended pregnancy, have entered prenatal care during or after the second trimester, have had Medicaid coverage, and be enrolled in WIC during pregnancy (Table 10).

Discussion

During 2000–2005, the overall aggregated prevalence of smoking before pregnancy for the 16 sites for which data were available for all 6 years remained unchanged, with approximately one in five women (from 22.3% in 2000 to 21.5% in 2005) reporting smoking during the 3 months before pregnancy. This finding suggests that efforts in the United States to prevent smoking and increase cessation among female smokers before becoming pregnant have not been effective. However, during 2000–2005, significant declines occurred in the prevalence of women smoking while pregnant (from 15.2% to 13.8%) and after delivery (from 18.1% to 16.4%), suggesting that efforts targeting pregnant and postpartum women have been effective. During 2000–2005, two sites (New Mexico and Utah) had decreases in the smoking prevalence

before, during, and after pregnancy, and two sites (Illinois and New Jersey) had decreases in the smoking prevalence during pregnancy only. Three sites (Louisiana, Ohio, and West Virginia) had increases in the prevalence of smoking before, during, and after pregnancy, and Arkansas had increases in the smoking prevalence before pregnancy. For the majority of sites, smoking rates did not change over time before, during, or after pregnancy.

The 31 PRAMS sites included in this report have achieved the HP 2010 objective of increasing the percentage of pregnant smokers who stop smoking during pregnancy to 30%, although variations occurred across the PRAMS sites. In 2005, quit rates during pregnancy ranged from 30.2% in West Virginia to 61.0% in Hawaii. However, none of the sites achieved the HP 2010 objective of reducing prevalence of smoking during pregnancy to 1%; site-specific prevalence of smoking during pregnancy in 2005 ranged from 5.2% in New York City to 35.7% in West Virginia.

State tobacco-control efforts should be increased to achieve the HP 2010 objective of reducing prenatal smoking to 1%. Effective state and local strategies to prevent the initiation of smoking or to increase smoking cessation among nonpregnant women include banning all forms of tobacco advertisement, enforcing laws that prohibit sales to children and adolescents, promoting smoke-free policies in public places and in the workplace, and increasing taxes on cigarettes (16). A 10.0% increase in the price of tobacco products would result in an estimated 3.7% decrease in the number of adolescents who use tobacco and an estimated 4.1% decrease in the amount of tobacco used by the general population (16). Raising state tobacco taxes might assist states with high smoking rates and current low excise tax rates. In 2008, state tobacco excise taxes ranged from \$0.07 to \$2.75 per pack, and 25 states (Alabama, Arkansas, California, Colorado, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, South Carolina, Tennessee, Utah, Virginia, West Virginia, and Wyoming) had excises taxes lower than \$1.00 per pack (17).

Smoking cessation counseling and programs offered during prenatal care can provide effective assistance to encourage pregnant women to quit smoking, especially women who were light- to moderate-level smokers before becoming pregnant (i.e., women who smoke <1 pack of cigarettes a day) (18,19). However, the number of smokers who are offered such interventions is unknown. Studies of prenatal care providers in a few states indicate that approximately 30%–60% provide intensive interventions or referrals to cessation programs to pregnant smokers (20–22). Therefore, health-care providers

can increase promotion and use of evidence-based cessation services. Each state has a telephone quitline that provides cessation counseling and support and is a free resource that can be promoted (e.g., through mass media campaigns and provider referrals) to all smokers (23).

Because higher rates of smoking during pregnancy were observed among Medicaid-enrolled women, comprehensive Medicaid coverage of tobacco-dependence treatments needs to be made available for all smokers who want to quit. As of 2006, seven state Medicaid programs (California, Indiana, Minnesota, New York, Oregon, Pennsylvania, and West Virginia) covered all forms of tobacco-dependence medications and at least one form of counseling, and 39 programs covered at least one form of treatment (24). However, even when coverage is available, providers and patients often are unaware of the Medicaid coverage. In a survey conducted in two states with comprehensive Medicaid coverage of cessation treatment, only 36% of Medicaid-enrolled smokers and 60% of Medicaid physicians knew that their state Medicaid program offered any coverage for tobacco-dependence treatments (25). States can encourage Medicaid coverage for tobacco-dependence treatments for all smokers and promote awareness of this coverage among providers and patients.

The results presented in this report indicate that smoking trends differed among racial/ethnic populations and age groups. During 2000–2005, prenatal smoking rates increased among non-Hispanic white women aged 20–24 years and among non-Hispanic black women aged 25–34 years. However, these rates declined among other ages in these racial/ethnic populations. The increase in smoking rates among non-Hispanic white women aged 20–24 years is similar to the increase in smoking rates among young adults aged 18–24 years reported for 1991–2002 (26). This increase might be attributable to tobacco marketing directed at these age groups or to a cohort effect of teens who had high smoking rates in the 1990s. Further analyses are needed to explore the increases and disparities of prevalence rates among subpopulations of pregnant smokers.

Pregnancy is an opportune time to encourage women to quit smoking for their lifetime. The data provided in this report indicate that 53.0% of women who quit smoking during pregnancy reported smoking cigarettes at the time they completed the PRAMS questionnaire, an average of 4 months after delivery. In 2005, relapse rates varied among PRAMS sites (range: 36.4% [Oregon]–62.0% [Arkansas]). Women who were more likely to relapse to smoking after delivery were younger and had a lower annual income. Other important factors associated with relapse include living with a partner who smoked and experiencing a stressful life event and depression (27). Effective clinic-based interventions to prevent postpartum relapse do not exist; a meta-analysis of nine interventions to

prevent relapse among pregnant and postpartum ex-smokers did not find any significant benefit (28). Relapse to smoking is common among quit attempts, and women should be encouraged to make additional attempts if relapse occurs. However, community-based interventions, (e.g., raising cigarette taxes) have been demonstrated to be effective in reducing relapse rates (11).

Limitations

Previous studies have determined that women underreport smoking and overreport quitting smoking (29,30). PRAMS is a self-administered, mailed, and confidential survey. More pregnant smokers are identified on the PRAMS questionnaire than the birth certificate, which is based on women reporting smoking to their health-care provider, suggesting that women might be more likely to report smoking through a confidential and anonymous survey than to their health-care providers (31,32). Underreporting of prenatal smoking was addressed by combining smoking reported on the PRAMS questionnaire and the linked birth certificate. However, because PRAMS data are based on self-reporting and are not validated biochemically, the data provided in this report probably underestimate the burden of smoking among pregnant women (33). In addition, PRAMS samples only women who have delivered a live infant and cannot estimate the total prevalence of smoking among all pregnant women, specifically those who did not have a live birth outcome (e.g., spontaneous abortions, ectopic pregnancies, or still-birth). Finally, the findings of this report are generalizable only to the PRAMS sites included in the analyses.

Conclusion

PRAMS is an effective state-level tool to monitor and evaluate the impact of tobacco-control activities. Additional resources for monitoring and evaluating tobacco-control efforts include 1) CDC's State Tobacco Activities Tracking and Evaluation system, which provides detailed information on state-level tobacco-control activities (e.g., tobacco excise taxes and smoke-free regulations in child care centers) and 2) CDC's Smoking-Attributable Mortality, Morbidity, and Economic Costs system, which estimates the health and health-related economic consequences of smoking to both adults and infants (34,35).

The majority of negative pregnancy outcomes are of unknown etiology (36). However, smoking during pregnancy is one behavior known to result in infant morbidity and mortality and for which effective cessation interventions exist. States can reduce smoking during pregnancy through sustained and comprehensive tobacco-control activities, including promot-

ing policies that establish smoke-free environments in public places and the workplace, increasing tobacco excise taxes, banning all forms of tobacco advertisement, enforcing laws to prohibit sales to children and adolescents, using mass media campaigns, and ensuring adequate health-care coverage for cessation services.

On the clinical level, primary and prenatal health-care providers can assess their patients' smoking status, offer smoking cessation interventions, or refer smoking patients to effective cessation services. Maternal and child health-care practitioners should work in concert with state tobacco-control professionals to achieve the HP 2010 objective of reducing prenatal smoking to 1%.

Acknowledgments

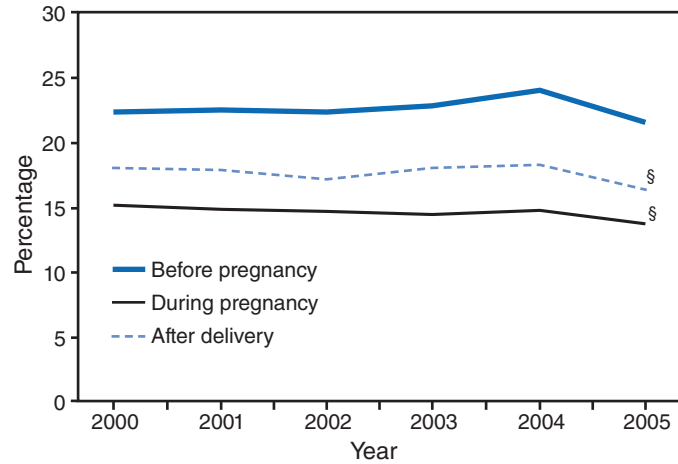
The following persons assisted in the preparation of this report: E. Kathleen Adams, PhD, Rollins School of Public Health, Emory University, Atlanta, Georgia; Brian Morrow, MA, Dabo Brantley, MPH, Lucinda England, MD, Juliette Kendrick, MD, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

References

1. Salihu HM, Aliyu MH, Pierre-Louis BJ, Alexander GR. Levels of excess infant deaths attributable to maternal smoking during pregnancy in the United States. *Matern Child Health J* 2003;7:219–27.
2. CDC. Women and smoking: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2001.
3. CDC. The health consequences of smoking: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2004.
4. DiFranza JR, Aligne CA, Weitzman M. Prenatal and postnatal environmental tobacco smoke exposure and children's health. *Pediatrics* 2004;113(Suppl 4):1007–15.
5. Jedrychowski W, Flak E. Maternal smoking during pregnancy and postnatal exposure to environmental tobacco smoke as predisposition factors to acute respiratory infections. *Environ Health Perspect* 1997;105:302–6.
6. CDC. The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 2006.
7. CDC. Smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 2000–2004. *MMWR* 2008;57:1226–8.
8. Martin JA, Hamilton BE, Sutton PD, et al. Births: final data for 2005. *Natl Vital Stat Rep* 2007;56(6).
9. CDC. Smoking prevalence among women of reproductive age—United States, 2006. *MMWR* 2008;57:849–52.
10. US Department of Health and Human Services. Healthy people 2010. 2nd ed. With understanding and improving health and objectives for improving health (2 vols). Washington, DC: US Department of Health and Human Services; 2000.
11. Colman GJ, Joyce T. Trends in smoking before, during, and after pregnancy in ten states. *Am J Prev Med* 2003;24:29–35.
12. Suellentrop K, Morrow B, Williams L, D'Angelo D. Monitoring progress toward achieving maternal and infant Healthy People 2010 objectives—19 states, Pregnancy Risk Assessment Monitoring System (PRAMS), 2000–2003. In: *Surveillance Summaries*, October 6, 2006. *MMWR* 2006;55(No. SS-9).

13. Shulman HB, Gilbert BC, Lansky A. The Pregnancy Risk Assessment Monitoring System (PRAMS): current methods and evaluation of 2001 response rates. *Public Health Rep* 2006;121:74–83.
14. CDC. Pregnancy Risk Assessment Monitoring System (PRAMS): Questionnaire. Phase 4 (2000–2003) core questions, phase 4 (2000–2003) standard questions, phase 5 (2004–2008) core questions, and phase 5 (2004–2008) standard questions. Available at <http://www.cdc.gov/PRAMS/Questionnaire.htm>.
15. Shah B, Barnwell B, Bieler G. SUDAAN user's manual: software for the statistical analysis of correlated data. Release 7.5. Research Triangle Park, NC: Research Triangle Institute; 1997.
16. Hopkins DP, Briss PA, Ricard CJ, et al. Reviews of evidence regarding interventions to reduce tobacco use and exposure to environmental tobacco smoke. *Am J Prev Med* 2001;20(Suppl 2):16–66.
17. CDC. State excise tax fact sheet. Atlanta, GA: US Department of Health and Human Services, CDC; 2007. Available at <http://apps.nccd.cdc.gov/statesystem/publications/STATESystemFactSheetTax.pdf>.
18. Fiore MC, Bailey WC, Cohen SJ, Dorfman SF, Goldstein MG, Gritz ER. Treating tobacco use and dependence: clinical practice guidelines. Rockville, MD, US Department of Health and Human Services, Public Health Service; 2008.
19. Lumley J, Oliver SS, Chamberlain C, Oakley L. Interventions for promoting smoking cessation during pregnancy. *Cochrane Database Syst Rev* 2004;4:CD001055.
20. Hartmann KE, Wechter ME, Payne P, Salisbury K, Jackson RD, Melvin CL. Best practice smoking cessation intervention and resource needs of prenatal care providers. *Obstet Gynecol* 2007;110:765–70.
21. Price JH, Jordan TR, Dake JA. Obstetricians and gynecologists' perceptions and use of nicotine replacement therapy. *J Community Health* 2006;31:160–75.
22. Tong VT, England LJ, Dietz PM, Asare LA. Smoking patterns and use of cessation interventions during pregnancy. *Am J Prev Med* 2008;35:327–33.
23. US Department of Health and Human Services. 1-800-QUIT-NOW. Washington, DC: US Department of Health and Human Services; 2007. Available at <http://1800quitnow.cancer.gov>.
24. CDC. State Medicaid coverage for tobacco-dependence treatments—United States, 2006. *MMWR* 2008;57:117–22.
25. McMenamin SB, Halpin HA, Ibrahim JK, Orleans CT. Physician and enrollee knowledge of Medicaid coverage for tobacco dependence treatments. *Am J Prev Med* 2004;26:99–104.
26. CDC. Cigarette smoking among adults—United States, 2004. *MMWR* 2005;54:1121–4.
27. Fang WL, Goldstein AO, Butzen AY, et al. Smoking cessation in pregnancy: a review of postpartum relapse prevention strategies. *J Am Board Fam Pract* 2004;17:264–75.
28. Hajek P, Stead LF, West R, Jarvis M. Relapse prevention interventions for smoking cessation. *Cochrane Database Syst Rev* 2005;1:CD003999.
29. Ford RP, Tappin DM, Schluter PJ, Wild CJ. Smoking during pregnancy: how reliable are maternal self reports in New Zealand? *J Epidemiol Community Health* 1997;51:246–51.
30. Lawrence T, Aveyard P, Croghan E. What happens to women's self-reported cigarette consumption and urinary cotinine levels in pregnancy? *Addiction* 2003;98:1315–20.
31. Allen AM, Dietz PM, Tong VT, England L, Prince CB. Prenatal smoking prevalence ascertained from two population-based data sources: birth certificates and PRAMS questionnaires, 2004. *Public Health Rep* 2008;123:586–92.
32. Northam S, Knapp TR. The reliability and validity of birth certificates. *J Obstet Gynecol Neonatal Nurs* 2006;35:3–12.
33. Russell T, Crawford M, Woodby L. Measurements for active cigarette smoke exposure in prevalence and cessation studies: why simply asking pregnant women isn't enough. *Nicotine Tob Res* 2004(6 Suppl 2): S141–51.
34. CDC. State Tobacco Activities Tracking and Evaluation (STATE) System. Atlanta, GA: US Department of Health and Human Services, CDC; 2008. Available at <http://apps.nccd.cdc.gov/statesystem>.
35. CDC. Smoking-Attributable Mortality, Morbidity, and Economic Costs (SAMMEC). Atlanta, GA: US Department of Health and Human Services, CDC; 2008. Available at <http://apps.nccd.cdc.gov/sammec>.
36. Goldenberg RL, Rouse DJ. Prevention of premature birth. *N Engl J Med* 1998;339:313–20.

FIGURE 1. Prevalence of smoking before pregnancy, during pregnancy, and after delivery,* by year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 16 sites,† 2000–2005

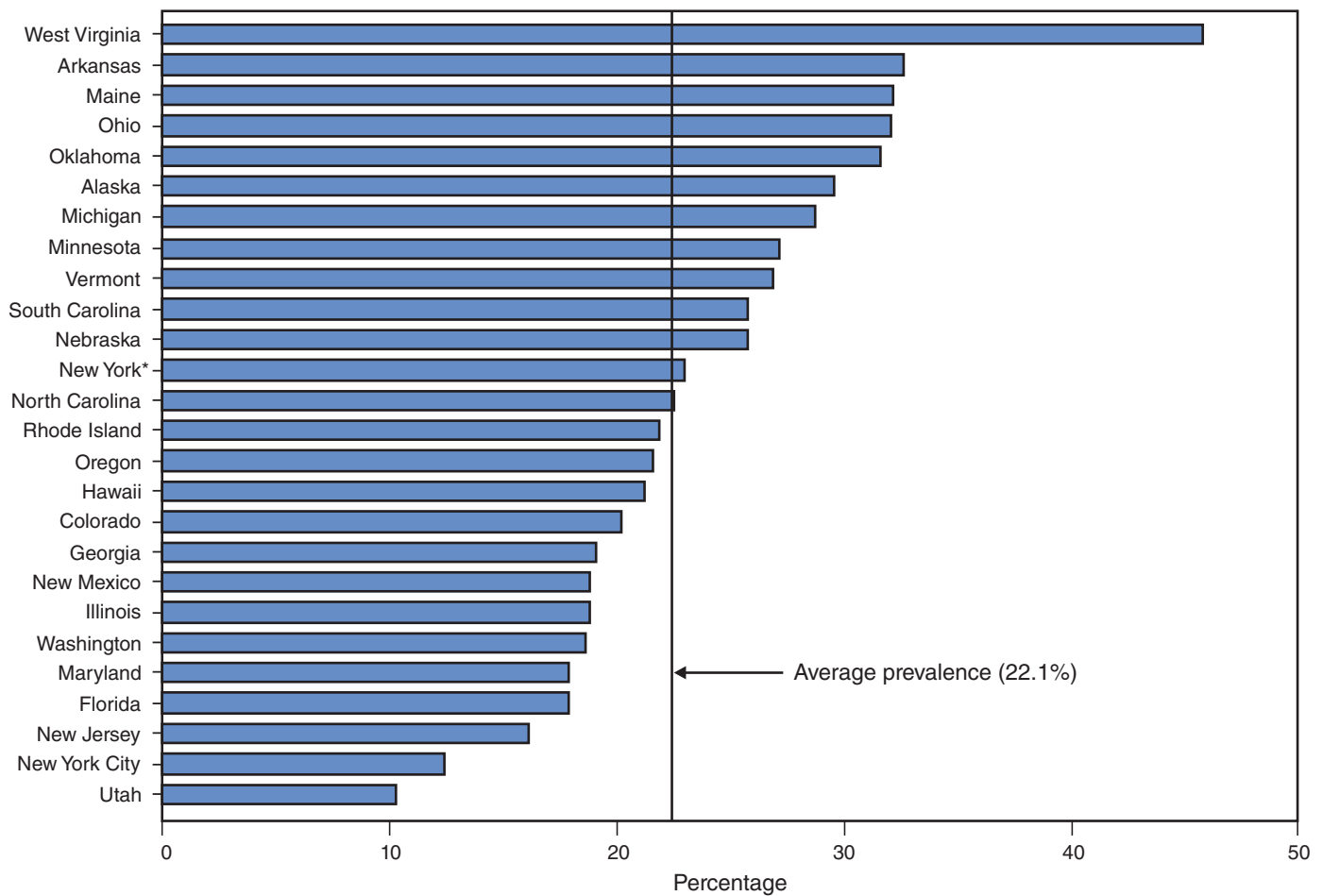


* Smoking before pregnancy = smoking 3 months before pregnancy on the basis of the PRAMS survey. Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking at any time during pregnancy on the basis of the birth certificate. Smoking after delivery = smoking approximately 4 months after delivery on the basis of the PRAMS survey.

† Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

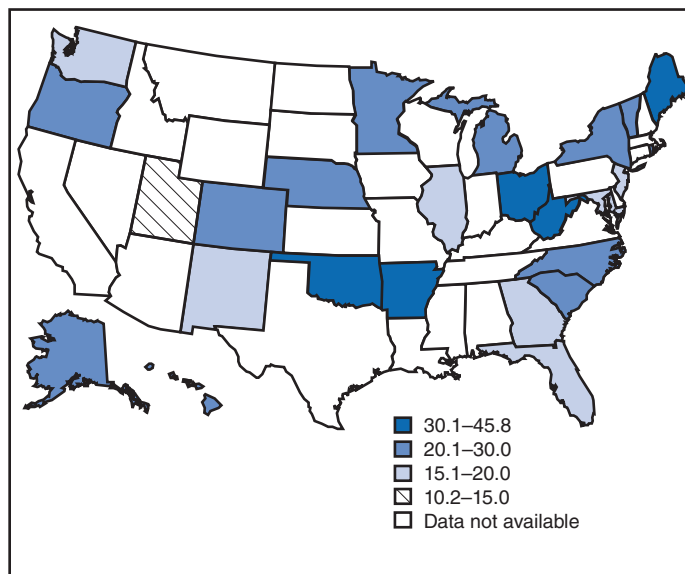
§ Significant linear trend was $p \leq 0.05$.

FIGURE 2. Prevalence of smoking 3 months before pregnancy — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites, 2005



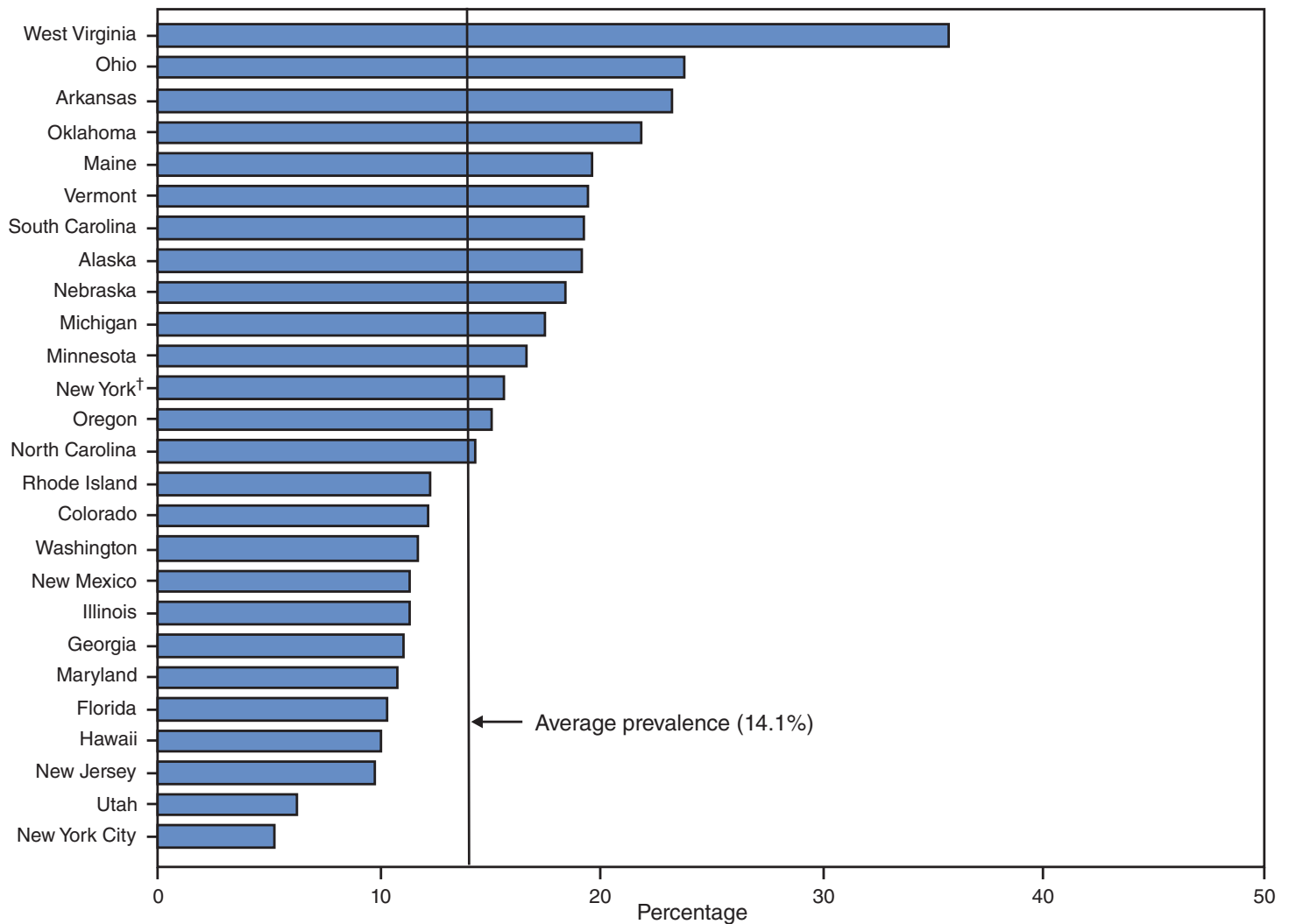
* Births for New York City are reported separately.

FIGURE 3. Prevalence of smoking 3 months before pregnancy — Pregnancy Risk Assessment Monitoring System, United States, 26 sites,* 2005



* Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia.

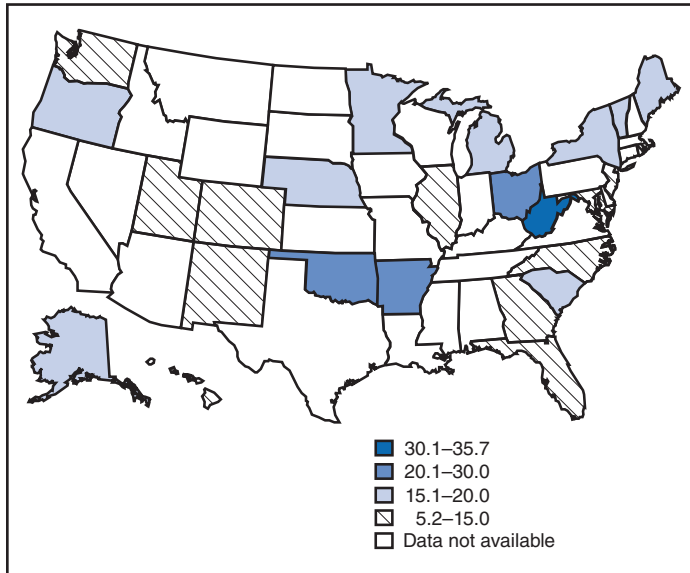
FIGURE 4. Prevalence of smoking during pregnancy* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites, 2005



* Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking at any time during pregnancy on the basis of the birth certificate.

[†] Births for New York City are reported separately.

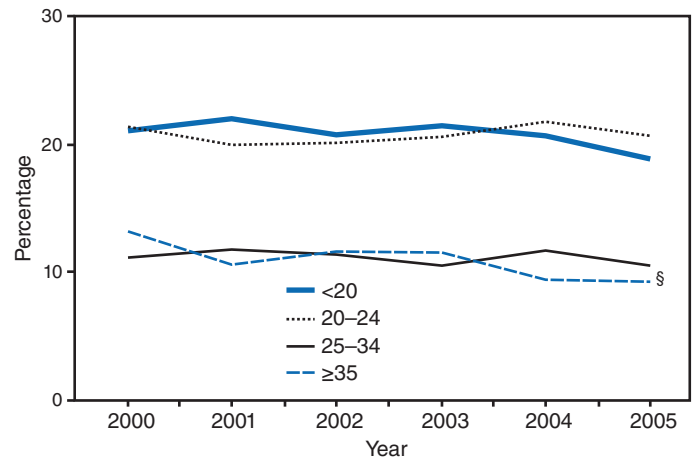
FIGURE 5. Prevalence of smoking during pregnancy* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites,† 2005



* Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking at any time during pregnancy on the basis of the birth certificate.

† Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York (excluding New York City), New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia.

FIGURE 7. Prevalence of smoking during pregnancy,* by maternal age group and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 16 sites,† 2000–2005

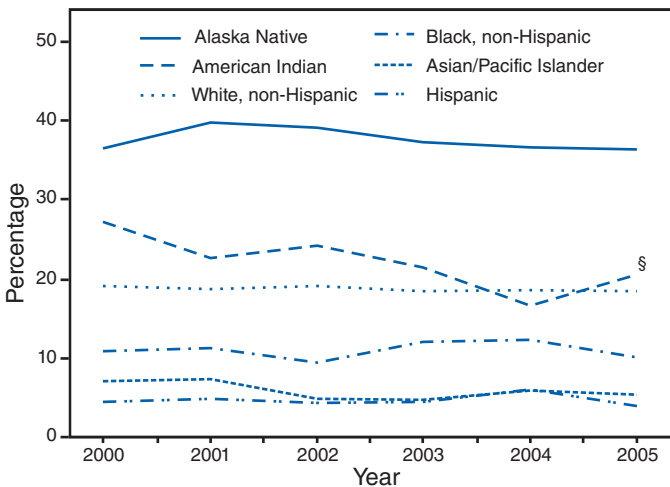


* Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking at any time during pregnancy on the basis of the birth certificate.

† Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

§ Significant linear trend was $p \leq 0.05$.

FIGURE 6. Prevalence of smoking during pregnancy,* by maternal race/ethnicity and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 16 sites,† 2000–2005

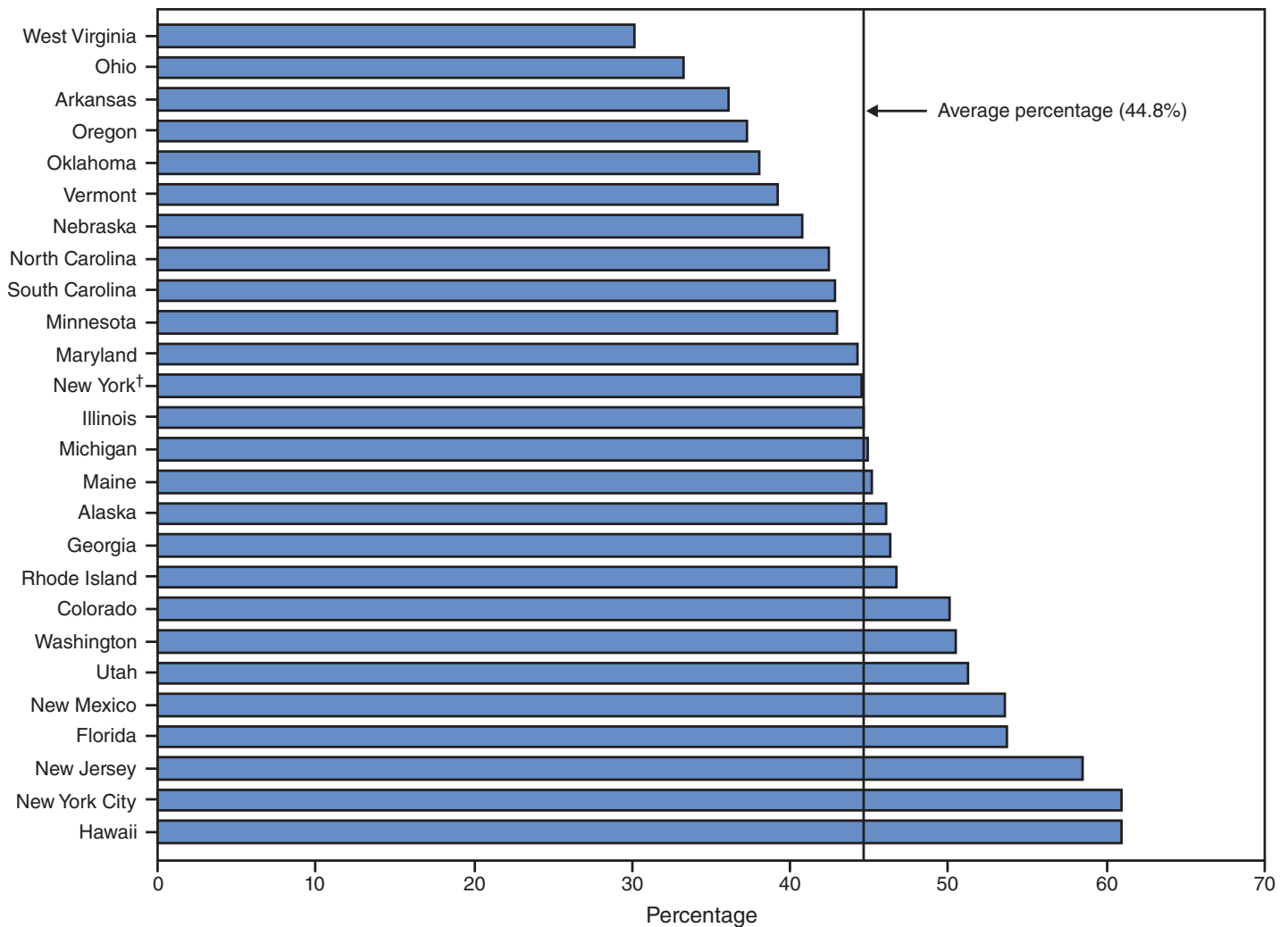


* Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking at any time during pregnancy on the basis of the birth certificate.

† Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

§ Significant linear trend was $p \leq 0.05$.

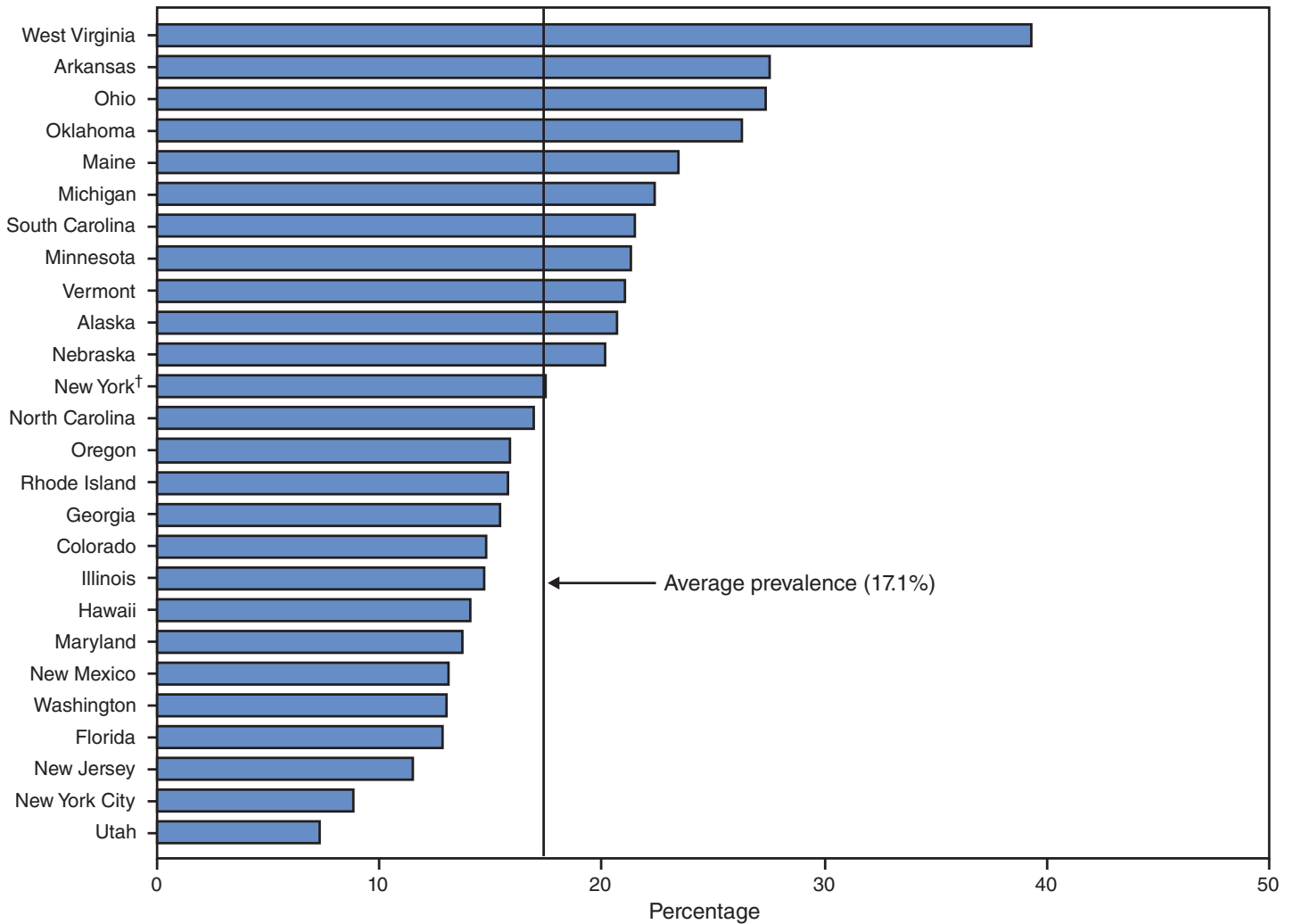
FIGURE 8. Percentage of women who quit smoking by the last 3 months of pregnancy* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites, 2005



*Quit smoking = no smoking during the last 3 months of pregnancy among women who smoked 3 months before pregnancy on the basis of the PRAMS survey.

† Births for New York City are reported separately.

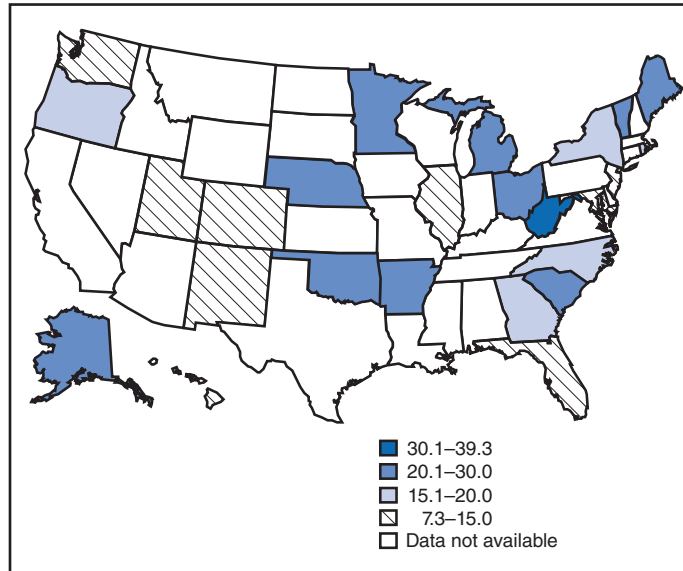
FIGURE 9. Prevalence of smoking after delivery* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites, 2005



* Smoking after delivery = smoking approximately 4 months after delivery on the basis of the PRAMS survey.

† Births for New York City are reported separately.

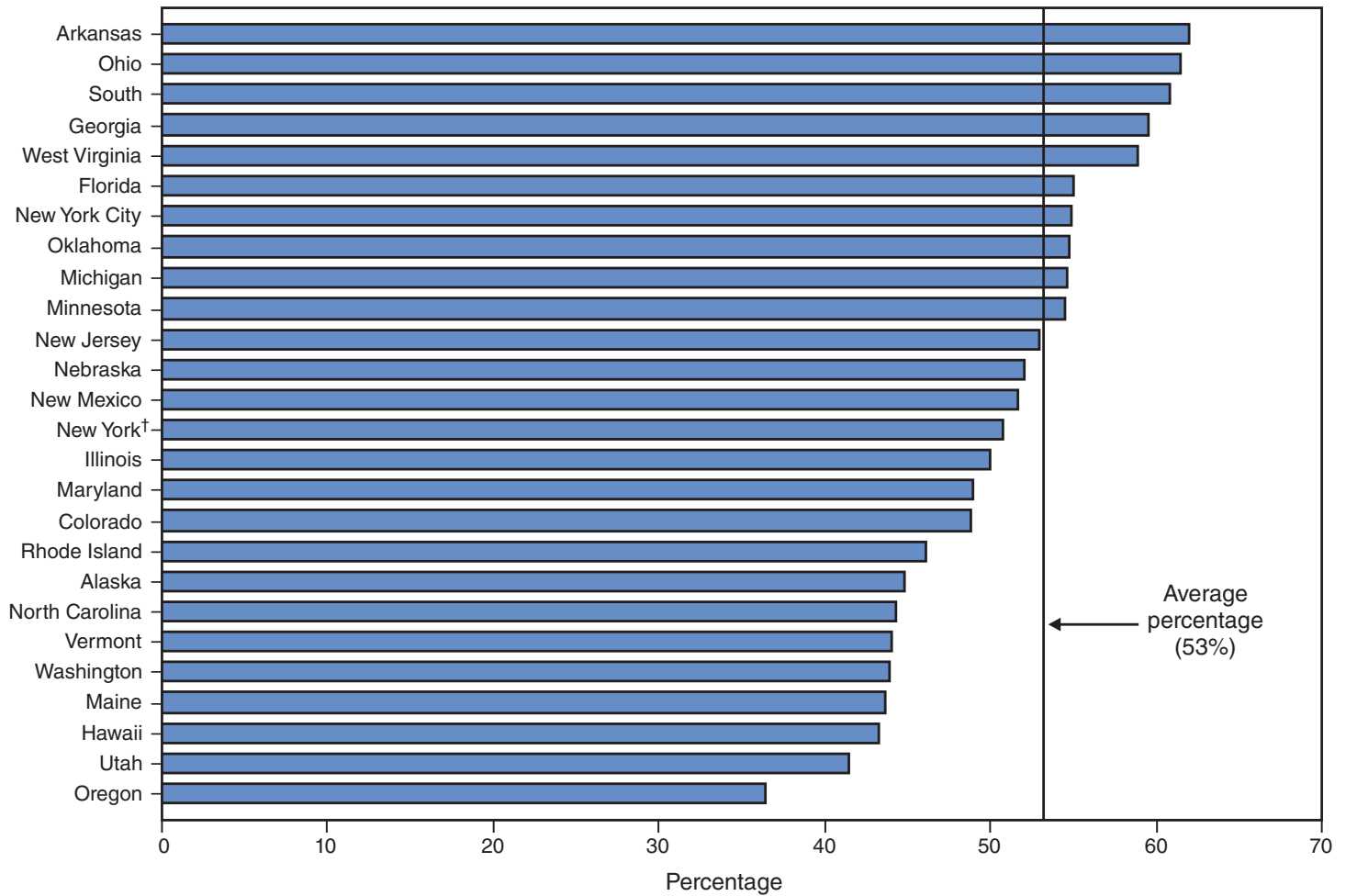
FIGURE 10. Prevalence of smoking after delivery* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites,† 2005



* Smoking after delivery = smoking approximately 4 months after delivery on the basis of the PRAMS survey.

† Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia.

FIGURE 11. Percentage of women who relapsed to smoking following delivery after having quit smoking during pregnancy* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites, 2005



* Relapsed to smoking = smoking approximately 4 months after delivery among women who quit smoking during the last 3 months of pregnancy on the basis of the PRAMS survey. Quit smoking = no smoking during the last 3 months of pregnancy among women who smoked 3 months before pregnancy on the basis of the PRAMS survey.

† Births for New York City are reported separately.

TABLE 1. Analysis years, sample size range, response rate range, and average age of infant at survey completion, by days — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Analysis years	Sample size range	Response rate range (%) [*]	Average age of infant (days) 2005 [†]
Alabama	2000–2003	1,492–1,607	72–77	123.6 [§]
Alaska	2000–2005	1,340–1,642	77–88	116.7
Arkansas	2000–2005	1,655–2,238	74–80	119.7
Colorado	2000–2005	1,975–2,295	71–76	119.0
Florida	2000–2005	1,995–2,161	77–80	146.7
Georgia [¶]	2004–2005	1,601–1,799	70–70	137.2
Hawaii	2000–2005	1,724–2,518	79–82	115.1
Illinois	2000–2005	1,621–2,018	78–84	127.6
Louisiana	2000–2004	1,651–2,374	70–75	127.6 [§]
Maine	2000–2005	1,140–1,191	75–78	103.5
Maryland [¶]	2001–2005	1,359–1,627	70–73	115.9
Michigan	2001–2005	848–1,568	70–76	109.8
Minnesota [¶]	2002–2005	1,153–1,831	76–77	114.6
Mississippi	2003–2004	1,386–1,453	70–72	124.3 [§]
Montana	2002	1,045	79	93.8 [§]
Nebraska	2000–2005	1,758–2,239	80–86	120.4
New Jersey [¶]	2002–2005	952–2,291	71–74	123.2
New Mexico [¶]	2000–2005	1,056–1,615	70–73	116.9
New York ^{**}	2000–2005	1,085–1,262	71–78	121.8
New York City [¶]	2004–2005	770–1,026	70–70	110.1
North Carolina [¶]	2000–2005	1,030–1,837	70–76	115.5
North Dakota	2002	909	77	111.8 [§]
Ohio	2000–2003, 2005	1,353–1,668	73–78	126.5
Oklahoma	2000–2005	1,878–2,001	77–84	131.8
Oregon	2003–2005	1,508–1,968	74–76	101.6
Rhode Island	2002–2005	1,414–1,533	72–76	108.6
South Carolina	2000–2005	1,419–1,639	70–78	127.8
Utah	2000–2005	1,582–1,970	80–89	108.6
Vermont [¶]	2001–2005	1,056–1,392	80–88	111.8
Washington	2000–2005	1,395–1,616	75–82	108.2
West Virginia [¶]	2000–2005	870–1,700	72–75	124.1

* Weighted response rates.

† Average age of infant by days when the PRAMS survey was completed.

§ Most recent year of data was used if 2005 data were not available.

¶ Sites include partial year of births because of data availability for a given year.

** New York City births reported separately.

TABLE 2. Maternal characteristics among women who smoked before or during pregnancy, or after delivery and among nonsmokers — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites,* 2005

Maternal characteristics	Smoked before or during pregnancy, or after delivery†	Nonsmokers	p value [‡]
	Unweighted n = 10,485	Unweighted n = 29,882	
	% (SE) [§]	% (SE)	
All women**	22.5 (±0.3)	77.5 (±0.3)	
Maternal age group (yrs)			
<20	13.0 (±0.6)	8.6 (±0.2)	<0.0001
20–24	36.0 (±0.8)	21.0 (±0.4)	
25–34	42.5 (±0.9)	53.7 (±0.5)	
≥35	8.4 (±0.5)	16.8 (±0.3)	
Maternal race/ethnicity			
White, non-Hispanic	76.9 (±0.7)	54.9 (±0.4)	<0.0001
Black, non-Hispanic	10.4 (±0.5)	17.5 (±0.3)	
Hispanic	8.1 (±0.5)	20.9 (±0.4)	
Alaska Native	0.3 (±0.01)	0.1 (±0.004)	
American Indian	1.6 (±0.1)	0.7 (±0.1)	
Asian/Pacific Islander	1.6 (±0.2)	4.9 (±0.2)	
Other	1.2 (±0.2)	1.1 (±0.1)	
Maternal education (yrs)			
<12	24.9 (±0.8)	16.9 (±0.3)	<0.0001
12	40.8 (±0.9)	26.3 (±0.4)	
>12	34.3 (±0.8)	56.8 (±0.4)	
Marital status			
Not married	56.0 (±0.9)	31.0 (±0.4)	<0.0001
Married	44.0 (±0.9)	69.0 (±0.4)	
Annual income			
<\$15,000	43.6 (±0.9)	26.0 (±0.4)	<0.0001
≥\$15,000	56.4 (±0.9)	74.0 (±0.4)	
Prepregnancy body mass index			
Underweight (<18.5)	7.1 (±0.5)	4.3 (±0.2)	<0.0001
Normal (18.5–24.9)	51.1 (±0.9)	53.5 (±0.5)	
Overweight (25.0–29.9)	20.9 (±0.7)	23.3 (±0.4)	
Obese (≥30)	20.9 (±0.7)	18.8 (±0.4)	
Pregnancy intention			
Intended	44.7 (±0.9)	61.7 (±0.4)	<0.0001
Unintended	55.3 (±0.9)	38.3 (±0.4)	
Parity			
First birth	45.5 (±0.9)	40.4 (±0.5)	<0.0001
Second or later birth	54.5 (±0.9)	59.6 (±0.5)	
Initiation of prenatal care (PNC)			
1st Trimester	80.0 (±0.7)	83.1 (±0.3)	0.0002
2nd Trimester	16.0 (±0.6)	13.3 (±0.3)	
3rd Trimester or no PNC	4.0 (±0.3)	3.6 (±0.2)	
Health insurance coverage during PNC			
Medicaid	54.7 (±0.9)	32.2 (±0.4)	<0.0001
Other Insurance	38.3 (±0.8)	58.3 (±0.4)	
Uninsured	7.1 (±0.4)	9.5 (±0.3)	
WIC†† enrollment during pregnancy			
Yes	58.2 (±0.9)	41.2 (±0.4)	<0.0001
No	41.8 (±0.9)	58.8 (±0.4)	
Alcohol use during pregnancy			
Yes	7.4 (±0.5)	6.8 (±0.2)	0.2485
No	92.6 (±0.5)	93.2 (±0.2)	

* Data aggregated for 26 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) with data available for 2005.

† Smoking before pregnancy = smoking 3 months before pregnancy on the basis of the PRAMS survey. Smoking during pregnancy = smoking during the last 3 months of pregnancy on the basis of the PRAMS survey and smoking at any time during pregnancy on the basis of the birth certificate. Smoking after delivery = smoking approximately 4 months after delivery on the basis of the PRAMS survey.

§ Standard error.

‡ Chi-square significance test.

** Percentages for rows are presented.

†† Special Supplemental Nutrition Program for Women, Infants, and Children.

TABLE 3. Prevalence of smoking during the 3 months before pregnancy, by site and year — Pregnancy Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change [†]	p value [§]
	2000 % (SE) [*]	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites[¶]	22.3 (±0.4)	22.5 (±0.4)	22.3 (±0.4)	22.8 (±0.5)	24.0 (±0.5)	21.5 (±0.4)	-3.6	0.76
Alabama	23.0 (±1.3)	26.9 (±1.4)	24.3 (±1.3)	22.9 (±1.4)	— ^{**}	—	-0.4	0.69
Alaska	30.8 (±1.4)	27.2 (±1.2)	31.9 (±1.3)	30.9 (±1.3)	30.9 (±1.5)	29.5 (±1.5)	-4.2	0.80
Arkansas	28.6 (±1.6)	32.3 (±1.4)	29.4 (±1.4)	31.0 (±1.5)	34.5 (±1.4)	32.6 (±1.3)	+14.0	0.02 ^{††}
Colorado	19.9 (±1.1)	21.3 (±1.2)	20.1 (±1.1)	18.7 (±1.1)	21.3 (±1.3)	20.2 (±1.3)	+1.5	0.98
Florida	17.2 (±1.3)	19.7 (±1.4)	19.5 (±1.4)	21.3 (±1.4)	22.1 (±1.4)	17.9 (±1.2)	+4.1	0.29
Georgia ^{§§}	—	—	—	—	19.4 (±1.5)	19.1 (±1.4)	-1.5	¶¶
Hawaii	20.2 (±0.9)	20.8 (±0.9)	19.8 (±1.1)	20.8 (±1.1)	20.6 (±0.9)	21.2 (±1.0)	+5.0	0.50
Illinois	20.3 (±1.0)	21.1 (±1.0)	21.6 (±1.0)	21.9 (±1.1)	22.3 (±1.0)	18.8 (±1.0)	-7.4	0.66
Louisiana	21.2 (±1.1)	24.2 (±1.1)	22.7 (±1.2)	24.4 (±1.2)	28.2 (±1.3)	—	+33.0	<0.01 ^{††}
Maine	31.2 (±1.6)	29.8 (±1.6)	28.9 (±1.6)	29.0 (±1.6)	31.0 (±1.6)	32.1 (±1.6)	+2.9	0.52
Maryland ^{§§}	—	18.9 (±1.6)	18.4 (±1.6)	20.6 (±1.6)	20.3 (±1.6)	17.9 (±1.6)	-5.3	0.98
Michigan	—	29.3 (±1.8)	28.9 (±1.3)	27.6 (±1.3)	31.7 (±1.5)	28.8 (±1.4)	-1.7	0.66
Minnesota ^{§§}	—	—	27.7 (±1.7)	24.6 (±1.4)	27.6 (±1.5)	27.2 (±1.5)	-1.8	0.67
Mississippi	—	—	—	21.9 (±1.4)	21.4 (±1.4)	—	-2.3	¶¶
Montana	—	—	29.7 (±1.5)	—	—	—	***	¶¶
Nebraska	24.8 (±1.2)	26.9 (±1.1)	27.6 (±1.3)	25.7 (±1.2)	26.1 (±1.3)	25.8 (±1.2)	+4.0	0.99
New Jersey ^{§§}	—	—	17.2 (±1.3)	15.7 (±0.8)	16.7 (±0.8)	16.1 (±0.8)	-6.4	0.75
New Mexico ^{§§}	21.3 (±1.1)	24.0 (±1.2)	19.8 (±1.1)	18.4 (±1.1)	20.7 (±1.1)	18.8 (±1.3)	-11.7	0.02 ^{††}
New York ^{†††}	27.1 (±1.6)	24.8 (±1.6)	23.3 (±1.6)	25.6 (±1.6)	28.4 (±1.8)	23.0 (±1.6)	-15.1	0.59
New York City ^{§§}	—	—	—	—	14.2 (±1.6)	12.4 (±1.3)	-12.7	¶¶
North Carolina ^{§§}	24.4 (±1.3)	21.3 (±1.3)	22.5 (±1.3)	23.6 (±1.4)	26.7 (±1.4)	22.5 (±1.7)	-7.8	0.38
North Dakota	—	—	26.4 (±1.4)	—	—	—	***	¶¶
Ohio	28.6 (±1.6)	27.2 (±1.5)	26.6 (±1.6)	32.5 (±1.7)	—	32.0 (±1.8)	+11.9	0.02 ^{††}
Oklahoma	30.2 (±1.8)	31.8 (±1.8)	31.2 (±1.7)	28.6 (±1.7)	31.8 (±1.8)	31.6 (±1.7)	+4.6	0.74
Oregon	—	—	—	20.2 (±1.7)	23.6 (±1.7)	21.6 (±1.6)	+6.9	0.57
Rhode Island	—	—	21.3 (±1.3)	21.6 (±1.3)	22.2 (±1.3)	21.9 (±1.3)	+2.8	0.71
South Carolina	23.2 (±1.7)	22.8 (±1.7)	22.0 (±1.8)	23.7 (±1.9)	24.7 (±1.8)	25.8 (±1.8)	+11.2	0.17
Utah	14.3 (±1.2)	13.8 (±1.0)	13.6 (±1.2)	11.5 (±1.0)	12.3 (±0.8)	10.2 (±0.7)	-28.7	<0.01 ^{††}
Vermont ^{§§}	—	30.4 (±1.2)	28.4 (±1.4)	25.1 (±1.2)	29.8 (±1.4)	26.9 (±1.4)	-11.5	0.16
Washington	21.4 (±1.5)	20.5 (±1.6)	22.3 (±1.6)	21.4 (±1.6)	19.8 (±1.5)	18.6 (±1.4)	-13.1	0.18
West Virginia ^{§§}	36.2 (±1.6)	39.1 (±1.7)	37.0 (±1.7)	38.9 (±1.7)	39.5 (±2.4)	45.8 (±1.7)	+26.5	<0.01 ^{††}

* Standard error.

† Proportion change calculated using the first and last years of data available by site.

§ Linear trends were assessed conducted using logistic regression model for sites with at least 3 years of data.

¶ Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

** Data not available.

†† Significant linear trend was $p < 0.05$.

§§ Sites include partial year of births because of data availability for a given year.

¶¶ Insufficient data (i.e., <3 years) to assess linear trends.

*** Insufficient data (i.e., <2 years) to calculate change in proportions.

††† New York City births reported separately.

TABLE 4. Prevalence of smoking during pregnancy, by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change†	p value§
	2000 % (SE*)	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites¶								
Combined estimate**	15.2 (±0.4)	14.9 (±0.4)	14.7 (±0.4)	14.5 (±0.4)	14.8 (±0.4)	13.8 (±0.4)	-9.2	0.01††
PRAMS§§	12.7 (±0.3)	12.5 (±0.3)	12.3 (±0.3)	12.3 (±0.4)	12.9 (±0.4)	11.7 (±0.3)		
Birth certificate¶¶	11.9 (±0.3)	11.5 (±0.3)	11.2 (±0.3)	10.9 (±0.3)	10.9 (±0.3)	10.2 (±0.3)		
Alabama								
Combined estimate	16.9 (±1.2)	17.9 (±1.2)	17.0 (±1.1)	14.9 (±1.1)	—***	—	-11.8	0.18
PRAMS	14.0 (±1.1)	15.6 (±1.1)	14.4 (±1.1)	13.3 (±1.1)	—	—		
Birth certificate	12.3 (±1.0)	13.8 (±1.0)	12.4 (±1.0)	8.5 (±0.8)	—	—		
Alaska								
Combined estimate	20.7 (±1.1)	18.1 (±1.0)	21.5 (±1.1)	20.3 (±1.1)	20.3 (±1.3)	19.1 (±1.2)	-7.7	0.76
PRAMS	16.8 (±1.0)	14.7 (±0.9)	17.7 (±1.0)	16.7 (±1.0)	17.4 (±1.2)	16.0 (±1.1)		
Birth certificate	17.0 (±1.0)	15.2 (±0.9)	18.0 (±1.0)	16.6 (±1.0)	14.8 (±1.1)	14.5 (±1.0)		
Arkansas								
Combined estimate	22.4 (±1.5)	23.1 (±1.2)	22.3 (±1.3)	21.0 (±1.2)	24.7 (±1.3)	23.2 (±1.2)	+3.6	0.50
PRAMS	20.3 (±1.4)	20.1 (±1.2)	19.2 (±1.2)	18.5 (±1.2)	23.1 (±1.2)	20.9 (±1.1)		
Birth certificate	17.5 (±1.4)	18.7 (±1.2)	16.8 (±1.1)	15.7 (±1.1)	16.5 (±1.1)	16.5 (±1.0)		
Colorado								
Combined estimate	12.0 (±0.9)	13.3 (±1.0)	12.0 (±0.8)	12.6 (±0.9)	13.0 (±1.0)	12.2 (±1.1)	+1.7	0.93
PRAMS	10.2 (±0.8)	11.4 (±0.9)	10.6 (±0.8)	10.6 (±0.9)	10.4 (±0.9)	10.2 (±1.0)		
Birth certificate	8.0 (±0.7)	9.2 (±0.8)	7.5 (±0.6)	8.9 (±0.8)	8.7 (±0.9)	8.8 (±0.9)		
Florida								
Combined estimate	10.9 (±1.1)	10.8 (±1.0)	11.4 (±1.1)	11.7 (±1.1)	11.9 (±1.1)	10.3 (±0.9)	-5.5	0.94
PRAMS	9.1 (±1.0)	9.4 (±1.0)	10.0 (±1.0)	10.6 (±1.1)	10.0 (±1.0)	8.3 (±0.9)		
Birth certificate	8.9 (±1.0)	7.6 (±0.9)	8.1 (±0.9)	7.9 (±0.9)	9.0 (±1.0)	7.5 (±0.8)		
Georgia†††								
Combined estimate	—	—	—	—	12.2 (±1.2)	11.1 (±1.1)	-9.0	§§§
PRAMS	—	—	—	—	10.5 (±1.1)	10.3 (±1.1)		
Birth certificate	—	—	—	—	7.5 (±1.0)	6.5 (±0.9)		
Hawaii								
Combined estimate	10.2 (±0.6)	11.4 (±0.7)	10.1 (±0.8)	11.1 (±0.8)	10.1 (±0.7)	10.0 (±0.7)	-2.0	0.52
PRAMS	8.4 (±0.6)	9.5 (±0.6)	8.1 (±0.7)	9.3 (±0.8)	8.1 (±0.6)	8.4 (±0.7)		
Birth certificate	6.5 (±0.5)	6.8 (±0.5)	5.6 (±0.5)	5.5 (±0.5)	5.9 (±0.6)	5.9 (±0.6)		
Illinois								
Combined estimate	14.6 (±0.9)	14.1 (±0.8)	13.2 (±0.8)	13.7 (±0.9)	13.1 (±0.8)	11.3 (±0.8)	-22.6	0.01††
PRAMS	12.5 (±0.8)	12.6 (±0.8)	11.4 (±0.8)	12.6 (±0.9)	12.1 (±0.8)	10.4 (±0.8)		
Birth certificate	10.5 (±0.7)	10.4 (±0.7)	10.1 (±0.7)	10.2 (±0.8)	9.0 (±0.7)	7.4 (±0.7)		
Louisiana								
Combined estimate	13.7 (±0.9)	15.0 (±0.9)	13.7 (±0.9)	16.5 (±1.1)	18.9 (±1.1)	—	+38.0	<0.01††
PRAMS	11.9 (±0.8)	12.8 (±0.9)	11.8 (±0.9)	14.5 (±1.0)	17.7 (±1.1)	—		
Birth certificate	8.7 (±0.7)	10.0 (±0.8)	9.2 (±0.8)	10.3 (±0.9)	9.9 (±0.9)	—		
Maine								
Combined estimate	22.2 (±1.4)	20.3 (±1.4)	19.5 (±1.4)	18.9 (±1.4)	21.5 (±1.4)	19.6 (±1.4)	-11.7	0.39
PRAMS	17.5 (±1.3)	17.3 (±1.3)	15.9 (±1.3)	16.2 (±1.3)	20.0 (±1.4)	17.5 (±1.3)		
Birth certificate	17.9 (±1.3)	16.8 (±1.3)	15.5 (±1.3)	14.1 (±1.2)	16.0 (±1.3)	14.6 (±1.2)		
Maryland†††								
Combined estimate	—	10.9 (±1.3)	9.7 (±1.2)	12.0 (±1.3)	11.8 (±1.3)	10.8 (±1.3)	-0.9	0.61
PRAMS	—	9.4 (±1.2)	8.3 (±1.1)	11.1 (±1.3)	10.3 (±1.2)	10.0 (±1.3)		
Birth certificate	—	8.0 (±1.1)	6.6 (±1.0)	8.9 (±1.1)	7.5 (±1.1)	6.2 (±1.0)		
Michigan								
Combined estimate	—	22.3 (±1.7)	19.0 (±1.1)	18.7 (±1.1)	21.2 (±1.3)	17.5 (±1.2)	-21.5	0.18
PRAMS	—	20.0 (±1.7)	17.4 (±1.1)	15.6 (±1.1)	18.9 (±1.3)	15.8 (±1.1)		
Birth certificate	—	17.6 (±1.6)	14.4 (±1.0)	14.2 (±1.0)	15.2 (±1.2)	13.4 (±1.1)		
Minnesota†††								
Combined estimate	—	—	17.9 (±1.4)	15.7 (±1.1)	17.5 (±1.3)	16.6 (±1.2)	-7.3	0.82
PRAMS	—	—	15.4 (±1.4)	14.9 (±1.1)	15.9 (±1.2)	15.6 (±1.2)		
Birth certificate	—	—	11.5 (±1.2)	10.2 (±1.0)	10.8 (±1.1)	9.5 (±1.0)		
Mississippi								
Combined estimate	—	—	—	15.6 (±1.2)	15.5 (±1.2)	—	-0.6	§§§
PRAMS	—	—	—	13.5 (±1.1)	13.9 (±1.2)	—		
Birth certificate	—	—	—	9.3 (±0.9)	10.1 (±1.0)	—		

TABLE 4. (Continued) Prevalence of smoking during pregnancy, by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change†	p value§
	2000 % (SE*)	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
Montana								
Combined estimate	—	—	20.5 (±1.3)	—	—	—	¶¶¶	§§§
PRAMS	—	—	15.9 (±1.2)	—	—	—		
Birth certificate	—	—	16.8 (±1.2)	—	—	—		
Nebraska								
Combined estimate	16.0 (±1.0)	17.4 (±0.9)	17.5 (±1.1)	16.1 (±1.0)	16.9 (±1.1)	18.4 (±1.1)	+15.0	0.29
PRAMS	14.0 (±1.0)	14.8 (±0.9)	14.4 (±1.1)	13.0 (±1.0)	16.0 (±1.1)	15.2 (±1.0)		
Birth certificate	13.4 (±1.0)	13.5 (±0.8)	13.7 (±1.0)	12.5 (±0.9)	12.8 (±1.0)	15.4 (±1.0)		
New Jersey†††								
Combined estimate	—	—	11.5 (±0.8)	10.9 (±0.4)	10.6 (±0.4)	9.8 (±0.4)	-14.8	0.03††
PRAMS	—	—	9.0 (±0.8)	7.9 (±0.5)	7.9 (±0.4)	6.7 (±0.4)		
Birth certificate	—	—	8.4 (±0.1)	8.1 (±0.1)	8.1 (±0.03)	7.8 (±0.04)		
New Mexico†††								
Combined estimate	13.1 (±0.9)	14.4 (±1.0)	11.1 (±0.8)	10.5 (±0.9)	11.3 (±0.9)	11.3 (±1.0)	-13.7	0.01††
PRAMS	9.3 (±0.8)	10.7 (±0.9)	8.2 (±0.7)	8.2 (±0.8)	9.9 (±0.8)	8.6 (±0.9)		
Birth certificate	10.2 (±0.8)	11.6 (±1.0)	8.3 (±0.8)	8.1 (±0.8)	6.8 (±0.7)	7.9 (±0.9)		
New York****								
Combined estimate	19.8 (±1.5)	18.0 (±1.4)	17.1 (±1.4)	18.1 (±1.4)	19.1 (±1.6)	15.6 (±1.3)	-21.2	0.17
PRAMS	17.0 (±1.4)	14.4 (±1.3)	14.6 (±1.3)	14.6 (±1.3)	15.6 (±1.5)	12.9 (±1.2)		
Birth certificate	15.5 (±1.3)	14.0 (±1.2)	12.2 (±1.2)	14.4 (±1.3)	15.7 (±1.5)	12.7 (±1.3)		
New York City†††								
Combined estimate	—	—	—	—	7.8 (±1.2)	5.2 (±0.9)	-33.3	§§§
PRAMS	—	—	—	—	7.6 (±1.2)	5.0 (±0.9)		
Birth certificate	—	—	—	—	2.1 (±0.6)	0.8 (±0.4)		
North Carolina†††								
Combined estimate	16.6 (±1.1)	15.0 (±1.1)	14.6 (±1.1)	16.2 (±1.2)	16.8 (±1.2)	14.3 (±1.4)	-13.9	0.82
PRAMS	13.9 (±1.1)	12.2 (±1.0)	11.7 (±1.0)	13.2 (±1.1)	14.8 (±1.1)	13.3 (±1.3)		
Birth certificate	13.9 (±1.1)	13.1 (±1.1)	11.5 (±1.0)	13.4 (±1.1)	12.3 (±1.1)	10.0 (±1.2)		
North Dakota								
Combined estimate	—	—	19.6 (±1.2)	—	—	—	¶¶¶	§§§
PRAMS	—	—	15.6 (±1.2)	—	—	—		
Birth certificate	—	—	15.0 (±1.1)	—	—	—		
Ohio								
Combined estimate	20.2 (±1.4)	19.2 (±1.3)	20.8 (±1.4)	23.0 (±1.5)	—	23.8 (±1.6)	+17.8	0.02††
PRAMS	17.1 (±1.3)	17.5 (±1.3)	17.6 (±1.4)	19.0 (±1.5)	—	21.6 (±1.6)		
Birth certificate	15.7 (±1.3)	15.5 (±1.2)	17.5 (±1.4)	18.1 (±1.4)	—	18.6 (±1.5)		
Oklahoma								
Combined estimate	19.7 (±1.5)	24.1 (±1.6)	23.7 (±1.6)	19.3 (±1.5)	20.3 (±1.5)	21.8 (±1.5)	+10.7	0.67
PRAMS	16.9 (±1.4)	20.3 (±1.6)	20.0 (±1.5)	16.2 (±1.4)	19.0 (±1.5)	19.6 (±1.5)		
Birth certificate	15.4 (±1.5)	18.0 (±1.5)	18.2 (±1.4)	14.0 (±1.3)	13.2 (±1.3)	15.7 (±1.3)		
Oregon								
Combined estimate	—	—	—	14.7 (±1.5)	15.2 (±1.4)	15.1 (±1.4)	+2.7	0.86
PRAMS	—	—	—	12.1 (±1.4)	13.7 (±1.4)	13.7 (±1.3)		
Birth certificate	—	—	—	11.7 (±1.4)	12.2 (±1.3)	12.4 (±1.3)		
Rhode Island								
Combined estimate	—	—	14.5 (±1.1)	12.2 (±1.0)	12.7 (±1.0)	12.3 (±1.0)	-15.2	0.20
PRAMS	—	—	12.9 (±1.1)	10.5 (±1.0)	11.3 (±1.0)	11.7 (±1.0)		
Birth certificate	—	—	11.6 (±1.0)	10.4 (±0.9)	9.9 (±0.9)	9.6 (±0.9)		
South Carolina								
Combined estimate	15.4 (±1.4)	15.2 (±1.4)	17.0 (±1.6)	14.2 (±1.5)	16.0 (±1.5)	19.2 (±1.6)	+24.7	0.14
PRAMS	12.4 (±1.3)	13.0 (±1.4)	13.1 (±1.5)	11.4 (±1.4)	13.9 (±1.5)	14.9 (±1.5)		
Birth certificate	11.3 (±1.2)	12.1 (±1.3)	14.2 (±1.5)	11.8 (±1.4)	12.3 (±1.4)	15.7 (±1.5)		
Utah								
Combined estimate	9.9 (±1.1)	9.0 (±0.8)	8.4 (±1.0)	5.6 (±0.7)	7.9 (±0.6)	6.2 (±0.5)	-37.4	<0.01††
PRAMS	7.3 (±0.9)	7.7 (±0.8)	6.8 (±0.9)	3.9 (±0.6)	6.6 (±0.6)	5.1 (±0.5)		
Birth certificate	9.1 (±1.0)	7.1 (±0.7)	7.4 (±0.9)	4.7 (±0.7)	6.3 (±0.6)	5.0 (±0.5)		

TABLE 4. (Continued) Prevalence of smoking during pregnancy, by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change†	p value§
	2000 % (SE*)	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
Vermont†††								
Combined estimate	—	22.7 (±1.1)	21.6 (±1.2)	18.9 (±1.1)	22.6 (±1.3)	19.4 (±1.2)	-14.5	0.12
PRAMS	—	17.8 (±1.0)	18.2 (±1.2)	15.3 (±1.0)	18.0 (±1.2)	16.4 (±1.2)		
Birth certificate	—	20.3 (±1.1)	19.4 (±1.2)	16.8 (±1.1)	19.9 (±1.3)	16.7 (±1.2)		
Washington								
Combined estimate	14.3 (±1.3)	13.1 (±1.3)	14.4 (±1.4)	12.3 (±1.2)	12.0 (±1.2)	11.7 (±1.2)	-18.2	0.09
PRAMS	11.1 (±1.2)	9.9 (±1.2)	11.8 (±1.3)	10.2 (±1.2)	10.3 (±1.1)	9.2 (±1.1)		
Birth certificate	11.8 (±1.2)	11.1 (±1.3)	12.8 (±1.4)	9.2 (±1.1)	8.9 (±1.1)	9.0 (±1.1)		
West Virginia†††								
Combined estimate	29.4 (±1.5)	29.8 (±1.6)	29.7 (±1.5)	32.2 (±1.6)	31.7 (±2.3)	35.7 (±1.7)	+21.4	<0.01††
PRAMS	24.5 (±1.5)	26.1 (±1.5)	25.3 (±1.5)	27.5 (±1.6)	28.4 (±2.2)	31.9 (±1.6)		
Birth certificate	25.8 (±1.5)	25.1 (±1.5)	24.9 (±1.5)	27.2 (±1.5)	25.4 (±2.1)	29.7 (±1.6)		

* Standard error.

† Proportion change calculated using the first and last years of data available by site.

§ Linear trends analysis was conducted using logistic regression model for sites with at least 3 years of data.

¶ Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York, North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data for all years.

** Smoking during the last 3 months of pregnancy on the basis of the PRAMS survey or smoking any time during pregnancy on the basis of the birth certificate.

†† Significant linear trend was $p \leq 0.05$.

§§ Smoking during the last 3 months of pregnancy on the basis of the PRAMS survey.

¶¶ Smoking any time during pregnancy on the basis of the birth certificate.

*** Data not available.

††† Sites include partial year of births because of data availability for a given year.

§§§ Insufficient data (i.e., <3 years) to assess linear trends.

¶¶¶ Insufficient data (i.e., <2 years) to calculate change in proportions.

**** New York City births reported separately.

TABLE 5. Prevalence of smoking during pregnancy, by maternal race/ethnicity and age group, by year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 16 sites,* 2000–2005

Characteristic	Year						Proportion change [§]	p value [¶]
	2000 % (SE [†])	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites	15.2 (±0.4)	14.9 (±0.4)	14.7 (±0.4)	14.5 (±0.4)	14.8 (±0.4)	13.8 (±0.4)	-9.2	0.01**
Maternal race/ethnicity								
White, non-Hispanic	19.2 (±0.5)	18.8 (±0.5)	19.2 (±0.5)	18.5 (±0.5)	18.6 (±0.5)	18.5 (±0.5)	-3.6	0.27
Black, non-Hispanic	10.9 (±0.8)	11.3 (±0.8)	9.4 (±0.7)	12.1 (±0.9)	12.3 (±0.9)	10.1 (±0.8)	-7.3	0.75
Hispanic	4.4 (±0.5)	4.8 (±0.5)	4.3 (±0.4)	4.5 (±0.5)	6.1 (±0.6)	4.0 (±0.4)	-9.1	0.68
Alaska Native	36.5 (±1.8)	39.7 (±1.9)	39.1 (±1.9)	37.3 (±1.9)	36.6 (±2.1)	36.3 (±2.0)	-0.5	0.50
American Indian	27.1 (±3.2)	22.7 (±2.9)	24.3 (±3.0)	21.5 (±3.0)	16.7 (±2.5)	20.6 (±2.7)	-24.0	0.03**
Asian/Pacific Islander	7.1 (±1.1)	7.4 (±1.0)	4.9 (±0.8)	4.7 (±0.8)	5.9 (±0.9)	5.4 (±0.8)	-23.9	0.09
Maternal age group (yrs)								
<20	21.1 (±1.1)	22.0 (±1.1)	20.8 (±1.1)	21.5 (±1.3)	20.7 (±1.3)	18.9 (±1.2)	-10.4	0.17
20–24	21.4 (±0.9)	20.0 (±0.8)	20.1 (±0.8)	20.6 (±0.8)	21.8 (±0.9)	20.7 (±0.8)	-3.3	0.72
25–34	11.1 (±0.5)	11.8 (±0.5)	11.4 (±0.5)	10.5 (±0.5)	11.7 (±0.5)	10.5 (±0.4)	-5.4	0.25
≥35	13.2 (±1.1)	10.6 (±0.9)	11.6 (±0.9)	11.5 (±1.0)	9.4 (±0.9)	9.2 (±0.8)	-30.3	<0.01**
White, non-Hispanic								
<20	34.0 (±1.9)	36.8 (±1.9)	34.7 (±1.9)	34.3 (±2.2)	36.4 (±2.3)	35.4 (±2.3)	+4.1	0.76
20–24	30.0 (±1.3)	26.2 (±1.2)	28.7 (±1.3)	30.4 (±1.3)	30.8 (±1.4)	32.8 (±1.3)	+9.3	0.01**
25–34	13.2 (±0.6)	14.6 (±0.7)	14.5 (±0.7)	12.1 (±0.6)	13.7 (±0.7)	12.4 (±0.6)	-6.1	0.08
≥35	15.3 (±1.4)	11.8 (±1.1)	13.5 (±1.2)	13.8 (±1.3)	10.2 (±1.1)	10.8 (±1.1)	-29.4	0.01**
Black, non-Hispanic								
<20	7.8 (±1.4)	8.5 (±1.6)	8.9 (±1.8)	8.8 (±1.7)	10.8 (±2.1)	6.6 (±1.7)	-15.4	0.88
20–24	13.5 (±1.6)	14.6 (±1.7)	9.7 (±1.3)	13.4 (±1.6)	13.0 (±1.5)	9.2 (±1.3)	-31.9	0.07
25–34	8.9 (±1.2)	9.0 (±1.2)	7.8 (±1.1)	12.8 (±1.5)	13.3 (±1.5)	12.0 (±1.5)	+34.8	<0.01**
≥35	15.9 (±3.0)	15.8 (±3.0)	15.6 (±3.1)	10.7 (±2.7)	8.6 (±2.4)	12.0 (±2.8)	-24.5	0.07
Hispanic								
<20	6.8 (±1.5)	6.6 (±1.1)	6.4 (±1.3)	9.5 (±2.0)	5.4 (±1.2)	4.4 (±1.1)	-35.3	0.24
20–24	4.9 (±0.8)	5.5 (±1.0)	5.2 (±1.0)	3.1 (±0.5)	7.6 (±1.2)	4.7 (±0.9)	-4.1	0.68
25–34	3.6 (±0.7)	3.9 (±0.7)	3.2 (±0.5)	4.0 (±0.8)	5.2 (±0.8)	3.6 (±0.6)	No change	0.40
≥35	2.6 (±0.9)	4.4 (±1.4)	4.2 (±1.5)	4.4 (±1.7)	7.0 (±2.4)	3.1 (±1.3)	+19.2	0.55
Alaska Native								
<20	36.0 (±4.1)	48.7 (±4.4)	36.0 (±4.2)	43.9 (±4.4)	40.5 (±5.5)	45.3 (±5.8)	+25.8	0.48
20–24	44.8 (±3.3)	43.2 (±3.3)	44.7 (±3.6)	40.1 (±3.2)	36.4 (±3.7)	36.1 (±3.3)	-19.4	0.02**
≥25 ^{††}	31.5 (±2.4)	33.5 (±2.6)	37.2 (±2.6)	32.5 (±2.7)	35.4 (±2.9)	34.0 (±2.8)	+7.9	0.51
American Indian								
<20	37.6 (±8.3)	19.9 (±5.6)	24.9 (±6.1)	32.9 (±7.4)	13.9 (±4.5)	15.9 (±6.0)	-57.7	0.04**
20–24	30.9 (±5.5)	25.3 (±5.4)	37.3 (±6.0)	20.6 (±5.1)	15.7 (±4.2)	17.0 (±3.9)	-45.0	0.01**
25–34	18.0 (±4.0)	22.8 (±4.7)	10.9 (±2.5)	18.9 (±4.6)	15.7 (±3.4)	25.3 (±4.7)	+40.6	0.50
≥35	27.1 (±11.1)	18.4 (±8.6)	21.6 (±9.1)	17.0 (±7.9)	32.6 (±13.9)	20.9 (±8.5)	-22.9	0.96
Asian/Pacific Islander								
<20	12.2 (±2.3)	14.8 (±4.4)	14.6 (±4.4)	11.3 (±3.2)	18.2 (±4.6)	10.2 (±3.5)	-16.4	0.74
20–24	12.4 (±2.1)	15.7 (±4.3)	9.3 (±1.8)	8.1 (±1.3)	11.6 (±2.9)	8.7 (±1.6)	-29.8	0.13
25–34	6.1 (±1.6)	5.2 (±0.8)	3.1 (±1.2)	4.0 (±1.1)	4.7 (±1.1)	4.7 (±1.2)	-23.0	0.52
≥35	3.3 (±0.8)	3.7 (±0.8)	2.5 (±0.9)	1.9 (±0.7)	2.6 (±0.6)	3.1 (±1.0)	-6.1	0.54

* Smoking indicated on the PRAMS survey or birth certificate (combined estimate). Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, West Virginia) with data available for all years.

† Standard error.

§ Proportion change calculated using first and last years of data available by site.

¶ Linear trends were assessed using logistic regression model.

** Significant linear trend was $p \leq 0.05$.

†† For Alaska Natives, age categories aged 25–34 years and ≥35 years were collapsed because of small sample sizes.

TABLE 6. Percentage of women who quit smoking during pregnancy,* by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change [§]	p value [¶]
	2000 % (SE) [†]	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites**	43.9 (±1.1)	45.5 (±1.1)	46.2 (±1.1)	47.5 (±1.2)	46.3 (±1.1)	45.7 (±1.1)	+4.1	0.17
Alabama	41.7 (±3.3)	41.4 (±3.1)	41.6 (±3.2)	44.2 (±3.5)	— ^{††}	—	+6.0	0.62
Alaska	45.7 (±2.7)	46.6 (±2.7)	46.1 (±2.5)	46.8 (±2.6)	44.5 (±2.9)	46.1 (±3.0)	+0.9	0.88
Arkansas	31.9 (±3.1)	37.4 (±2.7)	35.6 (±2.8)	40.3 (±2.8)	33.1 (±2.4)	36.1 (±2.4)	+13.2	0.68
Colorado	49.3 (±3.1)	47.6 (±3.1)	49.3 (±3.0)	46.0 (±3.2)	52.0 (±3.4)	50.1 (±3.6)	+1.6	0.58
Florida	47.8 (±4.3)	53.7 (±3.9)	49.8 (±4.0)	51.5 (±3.9)	54.7 (±3.6)	53.7 (±3.7)	+12.3	0.31
Georgia ^{§§}	—	—	—	—	46.1 (±4.3)	46.3 (±4.1)	+0.4	¶¶
Hawaii	59.3 (±2.4)	56.0 (±2.3)	59.1 (±3.0)	55.6 (±2.9)	61.3 (±2.5)	61.0 (±2.7)	+2.9	0.30
Illinois	40.3 (±2.7)	41.3 (±2.5)	47.4 (±2.7)	44.5 (±3.0)	45.8 (±2.6)	44.7 (±3.1)	+10.9	0.16
Louisiana	44.2 (±2.8)	46.2 (±2.8)	49.1 (±3.0)	39.7 (±2.9)	37.1 (±2.6)	—	-16.1	0.01***
Maine	43.9 (±3.1)	41.6 (±3.1)	46.6 (±3.3)	45.5 (±3.3)	35.1 (±2.9)	45.2 (±3.1)	+3.0	0.60
Maryland ^{§§}	—	53.8 (±4.9)	54.5 (±4.7)	45.5 (±4.5)	49.5 (±4.5)	44.3 (±5.1)	-17.7	0.13
Michigan	—	33.1 (±3.4)	39.9 (±2.7)	44.2 (±2.8)	39.9 (±2.9)	44.9 (±2.9)	+35.6	0.04***
Minnesota ^{§§}	—	—	45.3 (±3.6)	39.9 (±3.2)	42.7 (±3.2)	42.9 (±3.1)	-5.3	0.88
Mississippi	—	—	—	39.0 (±3.6)	35.3 (±3.5)	—	-6.9	¶¶
Montana	—	—	48.1 (±3.0)	—	—	—	***	¶¶
Nebraska	43.6 (±2.9)	46.5 (±2.4)	47.7 (±2.9)	50.8 (±2.9)	38.5 (±2.8)	40.7 (±2.8)	-6.7	0.11
New Jersey ^{§§}	—	—	47.9 (±4.2)	51.3 (±2.7)	53.0 (±2.5)	58.5 (±2.5)	+22.1	0.02***
New Mexico ^{§§}	58.6 (±2.8)	55.3 (±3.0)	58.3 (±3.0)	56.8 (±3.3)	52.1 (±3.1)	53.6 (±3.7)	-8.5	0.17
New York ^{§§§}	37.3 (±3.5)	43.4 (±3.6)	38.4 (±3.7)	44.7 (±3.7)	45.2 (±3.7)	44.5 (±3.9)	+19.3	0.11
New York City ^{§§}	—	—	—	—	46.2 (±6.0)	60.9 (±5.6)	+31.8	¶¶
North Carolina ^{§§}	44.5 (±3.2)	43.4 (±3.5)	50.5 (±3.4)	45.4 (±3.5)	45.1 (±3.1)	42.4 (±4.2)	-4.7	0.83
North Dakota	—	—	43.1 (±3.2)	—	—	—	***	¶¶
Ohio	39.7 (±3.2)	36.9 (±3.2)	34.8 (±3.4)	41.0 (±3.3)	—	33.3 (±3.2)	-16.1	0.31
Oklahoma	46.4 (±3.6)	37.6 (±3.3)	38.2 (±3.3)	44.7 (±3.5)	39.2 (±3.4)	38.0 (±3.1)	-18.1	0.28
Oregon	—	—	—	43.5 (±4.9)	42.6 (±4.2)	37.3 (±4.0)	-14.3	0.32
Rhode Island	—	—	38.0 (±3.5)	51.9 (±3.5)	49.0 (±3.4)	46.7 (±3.4)	+22.9	0.15
South Carolina	45.6 (±4.2)	43.3 (±4.4)	44.8 (±4.9)	49.6 (±4.6)	42.7 (±4.3)	42.8 (±4.2)	-6.1	0.72
Utah	49.8 (±4.7)	45.6 (±3.8)	49.7 (±4.8)	65.8 (±4.5)	47.0 (±3.3)	51.3 (±3.6)	+3.0	0.41
Vermont ^{§§}	—	42.9 (±2.4)	37.5 (±2.7)	39.1 (±2.8)	39.9 (±2.9)	39.2 (±3.0)	-8.6	0.48
Washington	49.7 (±4.2)	54.8 (±4.4)	49.7 (±4.4)	54.1 (±4.2)	47.9 (±4.3)	50.5 (±4.5)	+1.6	0.75
West Virginia ^{§§}	32.7 (±2.6)	32.8 (±2.6)	32.8 (±2.6)	30.2 (±2.6)	28.1 (±3.5)	30.2 (±2.4)	-7.6	0.24

* Quit smoking = no smoking during the last 3 months of pregnancy among women who smoked 3 months before pregnancy on the basis of the PRAMS survey.

† Standard error.

§ Proportion change calculated using first and last years of data available.

¶ Linear trends were assessed using logistic regression model for sites with at least 3 years of data.

** Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

†† Data not available.

§§ Sites include partial year of births because of data availability for a given year.

¶¶ Insufficient data (i.e., <3 years) to assess linear trends.

*** Significant linear trend was $p \leq 0.05$.

††† Insufficient data to calculate change in proportions.

§§§ New York City births reported separately.

TABLE 7. Maternal characteristics among smokers who quit smoking during pregnancy and among smokers who did not quit smoking during pregnancy — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites,* 2005

Maternal characteristics	Quit smoking	Did not quit smoking	p value [§]
	Unweighted n = 4,185	Unweighted n = 6,066	
	% (SE) [†]	% (SE)	
Maternal age (yrs)			
<20	12.2 (±0.9)	13.7 (±0.8)	0.1082
20–24	34.8 (±1.3)	36.7 (±1.2)	
25–34	45.0 (±1.3)	40.8 (±1.2)	
≥35	8.0 (±0.7)	8.8 (±0.6)	
Maternal race and ethnicity			
White, non-Hispanic	74.2 (±1.1)	79.8 (±0.9)	<0.0001
Black, non-Hispanic	9.6 (±0.8)	10.5 (±0.7)	
Hispanic	11.1 (±0.9)	5.6 (±0.5)	
Alaska Native	0.2 (±0.02)	0.3 (±0.02)	
American Indian	1.4 (±0.2)	1.6 (±0.2)	
Asian/Pacific Islander	2.2 (±0.3)	1.2 (±0.2)	
Other	1.3 (±0.3)	1.0 (±0.2)	
Maternal education (yrs)			
<12	16.0 (±1.0)	31.8 (±1.1)	<0.0001
12	37.2 (±1.3)	43.6 (±1.2)	
>12	46.8 (±1.3)	24.6 (±1.0)	
Marital status			
Not married	49.0 (±1.3)	61.6 (±1.1)	<0.0001
Married	51.0 (±1.3)	38.4 (±1.1)	
Annual income			
<\$15,000	33.0 (±1.3)	52.2 (±1.2)	<0.0001
≥\$15,000	67.0 (±1.3)	47.8 (±1.2)	
Prepregnancy body mass index			
Underweight (<18.5)	5.4 (±0.6)	8.3 (±0.7)	0.0002
Normal (18.5–24.9)	53.5 (±1.3)	49.3 (±1.2)	
Overweight (25.0–29.9)	22.4 (±1.1)	19.8 (±0.9)	
Obese (≥30)	18.7 (±1.0)	22.6 (±1.0)	
Pregnancy intention			
Intended	48.6 (±1.3)	41.4 (±1.2)	<0.0001
Unintended	51.4 (±1.3)	58.6 (±1.2)	
Parity			
First birth	56.5 (±1.3)	36.8 (±1.1)	<0.0001
Second or later birth	43.5 (±1.3)	63.2 (±1.1)	
Initiation of prenatal care (PNC)			
1st trimester	82.5 (±1.0)	78.2 (±1.0)	0.0038
2nd trimester	14.3 (±0.9)	17.0 (±0.9)	
3rd trimester or no PNC	3.1 (±0.5)	4.8 (±0.5)	
Health insurance coverage during PNC			
Medicaid	44.7 (±1.3)	62.7 (±1.2)	<0.0001
Other insurance	48.6 (±1.3)	30.2 (±1.1)	
Uninsured	6.8 (±0.7)	7.1 (±0.6)	
WIC[¶] enrollment during pregnancy			
Yes	50.2 (±1.3)	64.5 (±1.1)	<0.0001
No	49.8 (±1.3)	35.5 (±1.1)	
Alcohol use during pregnancy			
Yes	5.9 (±0.6)	8.4 (±0.7)	0.0052
No	94.1 (±0.6)	91.6 (±0.7)	
No. of cigarettes smoked per day before pregnancy			
≤10	70.8 (±1.2)	42.2 (±1.2)	<0.0001
11–20	22.4 (±1.1)	42.0 (±1.2)	
>20	6.8 (±0.7)	15.9 (±0.9)	
Total	44.8 (±0.9)	55.2 (±0.9)	

* Quitting smoking or not quitting smoking during pregnancy was assessed among women who smoked 3 months before pregnancy on the basis of the PRAMS survey. Data aggregated for 26 sites (Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) with data available for 2005.

[†] Standard error.

[§] Chi-square significance test.

[¶] Special Supplemental Nutrition Program for Women, Infants, and Children.

TABLE 8. Prevalence of smoking after delivery,* by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change [§]	p value [¶]
	2000 % (SE [†])	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites**	18.1 (±0.4)	17.9 (±0.4)	17.2 (±0.4)	18.1 (±0.4)	18.3 (±0.4)	16.4 (±0.4)	-9.4	0.04^{¶¶}
Alabama	19.5 (±1.3)	22.4 (±1.3)	19.7 (±1.2)	17.8 (±1.2)	— ^{††}	—	-8.7	0.18
Alaska	24.4 (±1.2)	20.4 (±1.1)	24.3 (±1.2)	22.1 (±1.1)	23.6 (±1.4)	20.7 (±1.3)	-15.2	0.29
Arkansas	25.0 (±1.6)	25.9 (±1.3)	25.3 (±1.3)	26.1 (±1.4)	28.6 (±1.3)	27.5 (±1.3)	+10.0	0.07
Colorado	15.0 (±1.0)	15.9 (±1.0)	14.0 (±0.9)	14.0 (±1.0)	15.3 (±1.1)	14.8 (±1.2)	-1.3	0.75
Florida	14.8 (±1.2)	14.7 (±1.2)	14.3 (±1.2)	16.7 (±1.3)	16.1 (±1.2)	12.8 (±1.0)	-13.5	0.69
Georgia ^{§§}	—	—	—	—	14.8 (±1.3)	15.4 (±1.3)	+4.1	0.75
Hawaii	13.7 (±0.7)	15.0 (±0.8)	13.0 (±0.9)	14.8 (±0.9)	13.1 (±0.8)	14.1 (±0.9)	+2.9	0.79
Illinois	16.6 (±0.9)	17.2 (±0.9)	16.8 (±0.9)	17.8 (±1.0)	17.1 (±0.9)	14.7 (±0.9)	-11.4	0.27
Louisiana	18.7 (±1.0)	20.5 (±1.1)	19.2 (±1.1)	21.9 (±1.2)	23.4 (±1.2)	—	+25.1	<0.01 ^{¶¶}
Maine	23.8 (±1.5)	22.7 (±1.4)	21.6 (±1.4)	20.8 (±1.4)	24.5 (±1.5)	23.4 (±1.5)	-1.7	0.86
Maryland ^{§§}	—	14.6 (±1.4)	12.8 (±1.4)	16.4 (±1.5)	16.3 (±1.5)	13.7 (±1.5)	-6.2	0.64
Michigan	—	24.3 (±1.7)	23.4 (±1.3)	22.7 (±1.2)	25.6 (±1.4)	22.4 (±1.3)	-7.8	0.78
Minnesota ^{§§}	—	—	19.9 (±1.5)	19.4 (±1.3)	21.4 (±1.4)	21.3 (±1.4)	+7.0	0.30
Mississippi	—	—	—	20.0 (±1.3)	17.7 (±1.3)	—	-11.5	***
Montana	—	—	20.8 (±1.3)	—	—	—	†††	***
Nebraska	19.4 (±1.1)	21.4 (±1.0)	19.9 (±1.2)	18.8 (±1.1)	20.8 (±1.2)	20.1 (±1.1)	+3.6	0.96
New Jersey ^{§§}	—	—	13.1 (±1.1)	12.2 (±0.7)	12.0 (±0.6)	11.5 (±0.6)	-12.2	0.18
New Mexico ^{§§}	16.0 (±1.0)	16.2 (±1.1)	13.6 (±0.9)	12.5 (±0.9)	14.5 (±1.0)	13.1 (±1.1)	-18.1	0.01 ^{¶¶}
New York ^{§§§}	22.4 (±1.6)	20.6 (±1.5)	19.3 (±1.5)	19.2 (±1.5)	21.6 (±1.7)	17.5 (±1.4)	-21.9	0.09
New York City ^{§§}	—	—	—	—	11.7 (±1.5)	8.8 (±1.1)	-24.8	***
North Carolina ^{§§}	20.1 (±1.2)	17.6 (±1.2)	17.8 (±1.2)	20.5 (±1.3)	20.7 (±1.3)	16.9 (±1.5)	-15.9	0.96
North Dakota	—	—	21.8 (±1.3)	—	—	—	†††	***
Ohio	24.2 (±1.5)	23.8 (±1.4)	22.6 (±1.5)	28.0 (±1.7)	—	27.4 (±1.7)	+13.2	0.04 ^{¶¶}
Oklahoma	25.8 (±1.7)	27.2 (±1.7)	27.0 (±1.6)	24.7 (±1.6)	26.3 (±1.7)	26.3 (±1.6)	+1.9	0.85
Oregon	—	—	—	15.5 (±1.6)	17.8 (±1.5)	15.9 (±1.4)	+2.6	0.87
Rhode Island	—	—	17.0 (±1.2)	15.1 (±1.1)	16.6 (±1.2)	15.8 (±1.2)	-7.1	0.69
South Carolina	18.6 (±1.5)	20.3 (±1.6)	17.8 (±1.7)	20.1 (±1.7)	19.2 (±1.7)	21.5 (±1.7)	+15.6	0.32
Utah	9.5 (±1.0)	10.1 (±0.8)	9.0 (±1.0)	7.6 (±0.9)	8.7 (±0.6)	7.3 (±0.6)	-23.2	0.01 ^{¶¶}
Vermont ^{§§}	—	22.2 (±1.1)	21.5 (±1.2)	17.6 (±1.1)	22.8 (±1.3)	21.0 (±1.3)	-5.4	0.68
Washington	16.0 (±1.4)	14.9 (±1.4)	15.7 (±1.5)	15.5 (±1.4)	14.6 (±1.3)	13.0 (±1.3)	-18.8	0.13
West Virginia ^{§§}	31.6 (±1.6)	34.3 (±1.7)	33.7 (±1.6)	33.6 (±1.6)	33.5 (±2.3)	39.3 (±1.7)	+24.4	0.01 ^{¶¶}

* Smoking after delivery = smoking approximately 4 months after delivery on the basis of the PRAMS survey. Average = 117.9 days; range = 61–270 days.

† Standard error.

§ Proportion change calculated using first and last years of data available.

¶ Linear trends were assessed using logistic regression model for sites with at least 3 years of data.

** Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

†† Data not available.

§§ Sites include partial year of births because of data availability for a given year.

¶¶ Significant linear trend was $p \leq 0.05$.

*** Insufficient data (i.e., <3 years) to assess linear trends.

††† Insufficient data (i.e., <2 years) to calculate change in proportions.

§§§ New York City births reported separately.

TABLE 9. Percentage of women who relapsed to smoking* after delivery, by site and year — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 31 sites, 2000–2005

Site	Year						Proportion change [§]	p value [¶]
	2000 % (SE) [†]	2001 % (SE)	2002 % (SE)	2003 % (SE)	2004 % (SE)	2005 % (SE)		
16 PRAMS sites**	50.3 (±1.7)	49.2 (±1.7)	46.1 (±1.7)	51.6 (±1.8)	51.8 (±1.7)	51.4 (±1.7)	+2.2	0.18
Alabama	54.0 (±5.4)	54.9 (±4.9)	52.1 (±5.1)	42.4 (±5.5)	— ^{††}	—	-21.5	0.12
Alaska	52.0 (±4.1)	42.4 (±4.0)	47.3 (±3.7)	41.8 (±3.8)	47.6 (±4.5)	44.8 (±4.5)	-13.8	0.46
Arkansas	43.1 (±5.8)	43.0 (±4.6)	45.3 (±5.0)	56.6 (±4.6)	50.4 (±4.4)	62.0 (±4.0)	+43.9	<0.01 ^{§§}
Colorado	45.5 (±4.5)	45.6 (±4.5)	39.3 (±4.4)	43.1 (±4.7)	45.2 (±4.9)	48.8 (±5.2)	+7.3	0.60
Florida	59.1 (±6.3)	45.8 (±5.5)	43.3 (±5.6)	54.4 (±5.6)	53.8 (±4.9)	55.0 (±5.0)	-6.9	0.56
Georgia ^{¶¶}	—	—	—	—	52.3 (±6.4)	59.5 (±6.1)	+13.8	***
Hawaii	46.6 (±3.2)	46.6 (±3.2)	42.4 (±4.0)	47.7 (±4.0)	44.6 (±3.2)	43.3 (±3.4)	-7.1	0.54
Illinois	45.8 (±4.3)	51.1 (±4.0)	50.1 (±3.9)	53.5 (±4.5)	49.8 (±3.9)	50.0 (±4.6)	+9.2	0.58
Louisiana	65.9 (±4.0)	63.3 (±3.9)	62.3 (±4.2)	68.4 (±4.2)	57.3 (±4.4)	—	-13.1	0.33
Maine	42.2 (±4.7)	41.2 (±4.8)	39.8 (±4.6)	42.3 (±4.9)	42.9 (±5.1)	43.7 (±4.5)	+3.6	0.69
Maryland ^{¶¶}	—	46.4 (±6.7)	40.5 (±6.6)	54.5 (±6.7)	64.1 (±6.1)	49.0 (±7.7)	+5.6	0.11
Michigan	—	46.0 (±6.2)	51.4 (±4.4)	59.6 (±4.2)	55.6 (±4.6)	54.6 (±4.4)	+18.7	0.34
Minnesota ^{¶¶}	—	—	40.1 (±5.3)	43.7 (±5.1)	48.8 (±4.9)	54.5 (±4.8)	+35.9	0.03 ^{§§}
Mississippi	—	—	—	63.6 (±5.7)	57.6 (±6.0)	—	-9.4	***
Montana	—	—	36.9 (±4.1)	—	—	—	†††	***
Nebraska	48.0 (±4.4)	50.0 (±3.6)	41.9 (±4.1)	46.3 (±4.0)	59.5 (±4.5)	52.0 (±4.4)	+8.3	0.15
New Jersey ^{¶¶}	—	—	43.9 (±6.8)	50.8 (±4.4)	45.2 (±3.9)	53.0 (±4.0)	+20.7	0.38
New Mexico ^{¶¶}	54.8 (±3.9)	40.4 (±3.9)	43.8 (±4.0)	42.7 (±4.2)	46.5 (±4.2)	51.7 (±5.2)	-5.7	0.79
New York ^{§§§}	56.1 (±5.9)	49.7 (±5.6)	52.5 (±6.1)	40.9 (±5.5)	54.1 (±5.3)	50.8 (±5.9)	-9.4	0.65
New York City ^{¶¶}	—	—	—	—	72.8 (±7.8)	54.9 (±7.3)	-24.6	***
North Carolina ^{¶¶}	47.8 (±4.8)	51.9 (±5.3)	47.9 (±4.8)	60.5 (±5.2)	50.9 (±4.7)	44.3 (±6.4)	-7.3	0.88
North Dakota	—	—	50.8 (±4.9)	—	—	—	†††	***
Ohio	52.3 (±5.2)	61.2 (±5.5)	46.8 (±5.9)	62.5 (±5.1)	—	61.5 (±5.6)	+17.6	0.23
Oklahoma	60.2 (±5.1)	57.8 (±5.3)	56.9 (±5.4)	59.7 (±5.2)	64.3 (±5.3)	54.8 (±5.1)	-9.0	0.90
Oregon	—	—	—	42.7 (±7.3)	39.2 (±6.2)	36.4 (±6.4)	-14.8	0.51
Rhode Island	—	—	34.7 (±5.4)	38.4 (±4.8)	47.8 (±5.0)	46.1 (±5.1)	+32.9	0.06
South Carolina	50.0 (±6.4)	70.2 (±6.1)	40.1 (±7.1)	61.5 (±6.3)	55.3 (±6.5)	60.8 (±6.2)	+21.6	0.54
Utah	38.9 (±6.4)	39.5 (±5.6)	35.6 (±6.5)	52.0 (±6.3)	45.9 (±4.8)	41.4 (±5.2)	+6.4	0.28
Vermont ^{¶¶}	—	34.7 (±3.6)	37.2 (±4.5)	33.9 (±4.3)	47.4 (±4.6)	44.0 (±4.8)	+26.8	0.03 ^{§§}
Washington	41.6 (±5.8)	46.2 (±5.9)	38.9 (±5.9)	46.3 (±5.9)	48.4 (±6.1)	43.9 (±6.1)	+5.5	0.61
West Virginia ^{¶¶}	51.0 (±4.9)	53.5 (±4.9)	65.4 (±4.6)	52.1 (±5.1)	46.2 (±7.2)	58.9 (±4.7)	+15.5	0.60

* Relapsed to smoking = smoking approximately 4 months after delivery among women who quit smoking during the last 3 months of pregnancy on the basis of the PRAMS survey. Quit smoking = no smoking during the last 3 months of pregnancy among women who smoked 3 months before pregnancy on the basis of the PRAMS survey. Average = 117.9 days; range = 61–270 days.

† Standard error.

§ Proportion change calculated using first and last years of data available by site.

¶ Linear trends were assessed using logistic regression model for sites with at least 3 years of data.

** Data aggregated for 16 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Hawaii, Illinois, Maine, Nebraska, New Mexico, New York [excluding New York City], North Carolina, Oklahoma, South Carolina, Utah, Washington, and West Virginia) with data available for all years.

†† Data not available.

§§ Significant linear trend was $p \leq 0.05$.

¶¶ Sites include partial year of births because of data availability for a given year.

*** Insufficient data to assess linear trends.

††† Insufficient data to calculate change in proportions.

§§§ New York City births reported separately.

TABLE 10. Maternal characteristics among women who relapsed to smoking or did not relapse to smoking after delivery* — Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 sites,[†] 2005

Maternal characteristics	Relapsed to smoking after delivery Unweighted n = 2,216		Did not relapse to smoking after delivery Unweighted n = 1,959		p value [‡]
	%	(SE [§])	%	(SE)	
Maternal age (yrs)					
<20	15.2	(±1.3)	8.8	(±1.2)	<0.0001
20–24	40.0	(±1.8)	29.1	(±1.7)	
25–34	38.7	(±1.7)	52.1	(±1.9)	
≥35	6.1	(±0.8)	10.0	(±1.2)	
Maternal race and ethnicity					
White, non-Hispanic	70.1	(±1.6)	78.8	(±1.6)	<0.0001
Black, non-Hispanic	13.3	(±1.2)	5.5	(±0.9)	
Hispanic	10.9	(±1.1)	11.3	(±1.3)	
Alaska Native	0.2	(±0.03)	0.3	(±0.04)	
American Indian	1.5	(±0.2)	1.2	(±0.2)	
Asian/Pacific Islander	2.3	(±0.4)	2.0	(±0.4)	
Other	1.7	(±0.5)	0.9	(±0.4)	
Maternal education (yrs)					
<12	20.0	(±1.5)	11.6	(±1.3)	<0.0001
12	37.9	(±1.8)	36.5	(±1.9)	
>12	42.2	(±1.8)	51.9	(±1.9)	
Marital status					
Not married	55.1	(±1.8)	42.1	(±1.9)	<0.0001
Married	44.9	(±1.8)	57.9	(±1.9)	
Annual income					
<\$15,000	37.5	(±1.8)	28.0	(±1.8)	0.0002
≥\$15,000	62.5	(±1.8)	72.0	(±1.8)	
Prepregnancy body mass index					
Underweight (<18.5)	5.0	(±0.8)	6.0	(±1.0)	0.6160
Normal (18.5–24.9)	52.9	(±1.8)	54.1	(±1.9)	
Overweight (25–29.9)	23.6	(±1.5)	21.1	(±1.5)	
Obese (≥30)	18.6	(±1.4)	18.8	(±1.5)	
Pregnancy intention					
Intended	45.4	(±1.8)	52.2	(±1.9)	0.0094
Unintended	54.6	(±1.8)	47.8	(±1.9)	
Parity					
First birth	54.3	(±1.8)	58.9	(±1.9)	0.0775
Second or later birth	45.7	(±1.8)	41.1	(±1.9)	
Initiation of prenatal care (PNC)					
1st trimester	79.5	(±1.5)	85.9	(±1.3)	0.0045
2nd trimester	17.1	(±1.4)	11.3	(±1.2)	
3rd trimester or no PNC	3.4	(±0.7)	2.7	(±0.7)	
Health insurance coverage during PNC					
Medicaid	50.0	(±1.8)	38.7	(±1.9)	0.0001
Other insurance	43.2	(±1.8)	54.6	(±1.9)	
Uninsured	6.8	(±0.9)	6.7	(±1.0)	
WIC** enrollment during pregnancy					
Yes	56.7	(±1.8)	42.9	(±1.9)	<0.0001
No	43.3	(±1.8)	57.1	(±1.9)	
Alcohol use during pregnancy					
Yes	4.9	(±0.7)	7.0	(±1.0)	
No	95.1	(±0.7)	93.0	(±1.0)	0.0851
No. of cigarettes smoked per day before pregnancy					
≤10	70.2	(±1.7)	71.5	(±1.7)	0.8596
11–20	22.9	(±1.5)	21.8	(±1.6)	
>20	6.9	(±1.0)	6.7	(±0.9)	
Total	53.0	(±1.3)	47.0	(±1.3)	

* Relapsed to smoking = smoking approximately 4 months after delivery among women who quit smoking during the last 3 months of pregnancy on the basis of the PRAMS survey. Quit smoking = no smoking during the last 3 months of pregnancy among women who smoked 3 months before pregnancy on the basis of the PRAMS survey. Average: 117.9 days; range: 61–270 days.

[†] Data aggregated for 26 PRAMS sites (Alaska, Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nebraska, New Jersey, New Mexico, New York, New York City, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Washington, and West Virginia) with data available for 2005.

[§] Standard error.

[‡] Chi-square significance test.

** Special Supplemental Nutrition Program for Women, Infants, and Children.

Appendix

Definition of Indicators and Variables

Name	Analysis definition	Tables/Figures	Data source
Smoking			
Smoking during the 3 months before pregnancy	Women who reported any level of cigarette smoking during the 3 months before pregnancy	Figures 1–3; Tables 2 and 3	PRAMS*
Smoking during pregnancy, combined estimate	Women who reported any level of cigarette smoking in the last 3 months of pregnancy on the PRAMS survey or at any time during pregnancy on the linked birth certificate†	Figures 1 and 4–7; Tables 2, 4, and 5	PRAMS and birth certificate
Smoking during pregnancy, PRAMS only	Women who reported any level of cigarette smoking in the last 3 months of pregnancy on the PRAMS survey only	Table 4	PRAMS
Smoking during pregnancy, birth certificate only	Women who reported smoking at any time during pregnancy on the linked birth certificate only†	Table 4	Birth certificate
Quit smoking during pregnancy	Women who reported smoking no cigarettes per day during the last 3 months of pregnancy among women who smoked during the 3 months before pregnancy	Figure 8; Tables 6 and 7	PRAMS
Smoking after delivery	Women who reported any level of cigarette smoking at the time of PRAMS survey (approximately 4 months after delivery) among all respondents	Figures 1, 9, and 10; Tables 2 and 8	PRAMS
Relapsing to smoking after delivery	Women who reported any level of cigarette smoking at the time of PRAMS survey among women who quit smoking during pregnancy	Figure 11; Tables 9 and 10	PRAMS
Maternal characteristics			
Maternal age	Reported age in years of the mother at the time of delivery	Figure 7; Tables 2, 5, 7, and 10	Birth certificate
Maternal race and ethnicity	Reported race and ethnicity of the mother	Figure 6; Tables 2, 5, 7, and 10	Birth certificate
Maternal education	Reported years of education of the mother	Tables 2, 7, and 10	Birth certificate
Marital status	Reported marital status of mother	Tables 2, 7, and 10	Birth certificate
Annual income	Reported total household income before taxes during the 12 months before the baby was born	Tables 2, 7, and 10	PRAMS
Prepregnancy body mass index (BMI)	Reported height and weight before pregnancy; BMI classifications are based on the NHLBI§ standard	Tables 2, 7, and 10	PRAMS
Pregnancy intention	Reported wanting pregnancy “sooner” or “then” was categorized as intended pregnancy, and wanting pregnancy “later” or “never” was categorized as unintended pregnancy	Tables 2, 7, and 10	PRAMS
Parity	Reported number of previous live births of the mother	Tables 2, 7, and 10	Birth certificate
Initiation of prenatal care	Reported trimester of pregnancy when the woman attended her first prenatal care visit	Tables 2, 7, and 10	Birth certificate
Health insurance coverage during prenatal care	Reported type of insurance coverage for prenatal care: Medicaid, other insurance coverage, or no insurance	Tables 2, 7, and 10	PRAMS
Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) enrollment during pregnancy	Reported being enrolled in WIC during pregnancy	Tables 2, 7, and 10	PRAMS
Alcohol use during pregnancy	Reported any drinking during the last 3 months of pregnancy	Tables 2, 7, and 10	PRAMS
Number of cigarettes smoked per day before pregnancy	Reported number of cigarettes smoked on an average day 3 months before pregnancy	Tables 7 and 10	PRAMS

* Pregnancy Risk Assessment Monitoring System.

† Compared with the 1989 birth certificate, which had a check box for smoking at any time during pregnancy, the 2003 revised birth certificate has three check boxes, one for smoking during each trimester of pregnancy. For the analysis, smoking during each trimester of pregnancy was aggregated to indicate smoking at any time during pregnancy based on the birth certificate. Four PRAMS states (New York [2004], Nebraska [2005], South Carolina [2004], and Washington [2003]) have implemented the 2003 revised birth certificate.

§ National Heart Lung and Blood Institute Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report. *Obes Res* 1998;6:S51–209.

The Pregnancy Risk Assessment Monitoring System (PRAMS) Working Group Membership as of September 2008

Albert Woolbright, PhD, Alabama; Kathy Perham-Hester, MS, MPH, Alaska; Mary McGehee, PhD, Arkansas; Alyson Shupe, PhD, Colorado; Charlon Kroelinger, PhD, Delaware; Jamie Fairclough, MPH, Florida; Carol Hoban, MS, MPH, Georgia; Mark Eshima, MA, Hawaii; Theresa Sandidge, MA, Illinois; Joan Wightkin, Louisiana; Kim Haggan, Maine; Diana Cheng, MD, Maryland; Hafsatou Diop, MD, Massachusetts; Violanda Grigorescu, MD, Michigan; Jan Jernell, Minnesota; Marilyn Jones, Mississippi; Venkata Garikapaty, PhD, Missouri; JoAnn Dotson, Montana; Brenda Coufal, Nebraska; Lakota Kruse, MD, New Jersey; Eirian Coronado, New Mexico; Anne Radigan-Garcia, New York State; Candace Mulready-Ward, MPH, New York City; Paul Buescher, PhD, North Carolina; Sandra Anseth, North Dakota; Connie Geidenberger, Ohio; Alicia Lincoln, Oklahoma; Kenneth Rosenberg, MD, Oregon; Kenneth Huling, Pennsylvania; Sam Viner-Brown, PhD, Rhode Island; Mike Smith, South Carolina; Christine Rinki, MPH, South Dakota; Eric Miller, PhD, Texas; David Law, PhD, Tennessee; Laurie Baksh, Utah; Peggy Brozicevic, Vermont; Marilyn Wenner, Virginia; Linda Lohdefinck, Washington; Melissa Baker, MA, West Virginia; Katherine Kvale, PhD, Wisconsin; Angi Crottsenberg, Wyoming; CDC PRAMS Team, Applied Sciences Branch, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format. To receive an electronic copy each week, visit *MMWR*'s free subscription page at <http://www.cdc.gov/mmwr/mmwrsubscribe.html>. Electronic copy also is available from CDC's Internet server at <http://www.cdc.gov/mmwr> or from CDC's file transfer protocol server at <ftp://ftp.cdc.gov/pub/publications/mmwr>. Paper copy subscriptions are available through the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone 202-512-1800.

Data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the following Friday. Data are compiled in the National Center for Public Health Informatics, Division of Integrated Surveillance Systems and Services. Address all inquiries about the *MMWR* Series, including material to be considered for publication, to Editor, *MMWR* Series, Mailstop E-90, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30333 or to mmwrq@cdc.gov.

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of these sites. URL addresses listed in *MMWR* were current as of the date of publication.