

**Cigarette Smoking During the Last 3 Months of Pregnancy
Among Women Who Gave Birth to Live Infants —
Maine, 1988–1997**

Cigarette smoking during pregnancy is associated with adverse birth outcomes (e.g., low birthweight and preterm delivery) (1). The adverse effect of smoking on birthweight occurs primarily during the last trimester of pregnancy (1). To study smoking prevalence over time among women who gave birth to live infants in Maine, CDC and the Maine Department of Human Services (MDHS) analyzed self-reported data from the Pregnancy Risk Assessment Monitoring System (PRAMS) collected during 1988–1997. This report summarizes the results of this analysis, which indicate that despite the overall decline in smoking prevalence in Maine among women who gave birth to live infants, smoking prevalence remains high during the last 3 months of pregnancy among young women and low-income women, particularly those

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participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).*

Maine PRAMS surveys a sample of new mothers about pregnancy-related behaviors, including smoking during pregnancy. Each month, a stratified systematic sample of 125 new mothers is selected from recently processed live-born infants' birth certificates. Selected women are mailed a questionnaire 2–6 months postpartum; nonrespondents are mailed up to two additional questionnaires, followed by attempted telephone contact, if necessary.

From 1988 through 1997, the response rate to PRAMS in Maine was approximately 80%. The 10,770 women participating in the survey were representative of 138,668 women in Maine who gave birth to live infants during these years. PRAMS participants were asked whether they smoked during the last 3 months of pregnancy. SUDAAN was used to account for the sample design in estimating prevalence percentages and standard errors (2). Data were weighted to adjust for survey design, nonresponse, and sampling frame noncoverage.† To examine trends over time, logistic regression was performed using SUDAAN where the outcome was cigarette smoking during the last 3 months of pregnancy and the predictor variable was infant birth year. Data on smoking prevalence were examined by maternal age (<20 years and ≥20 years) and by WIC participation. Selected demographic characteristics and participation in WIC and Medicaid for 1988 and 1997 were examined to observe changes in the population participating in PRAMS.

The overall smoking prevalence during the last 3 months of pregnancy among women in Maine who gave birth to live infants declined from 30.7% (95% CI=26.3%–35.0%) in 1988 to 20.4% (95% CI=17.7%–23.2%) in 1997 ($p<0.01$). Smoking during the last 3 months of pregnancy among women aged ≥20 years declined from 30.0% (95% CI=25.4%–34.5%) in 1988 to 18.7% (95% CI=15.8%–21.6%) in 1997 ($p<0.01$); no significant change was observed for women aged <20 years, from 37.4% (95% CI=21.3%–53.5%) in 1988 to 37.9% (95% CI=26.9%–49.0%) in 1997 (Figure 1).

Smoking prevalence declined among WIC participants and nonparticipants. Among WIC participants, smoking prevalence declined from 53.1% (95% CI=42.9%–63.3%) in 1988 to 34.4% (95% CI=28.9%–39.8%) in 1997; among nonparticipants, smoking declined from 23.9% (95% CI=19.3%–28.5%) in 1988 to 12.6% (95% CI=9.8%–15.3%) in 1997 (Figure 2).

To examine demographic changes among women participating in PRAMS, selected population and program participation characteristics for 1988 and 1997 were analyzed. PRAMS participants who gave birth to live infants in 1997 were older and more educated than were participants in 1988. They also were more likely to have entered prenatal care during the first trimester, to have enrolled in Medicaid and/or WIC, and to have received advice about smoking from a health-care provider (Table 1).

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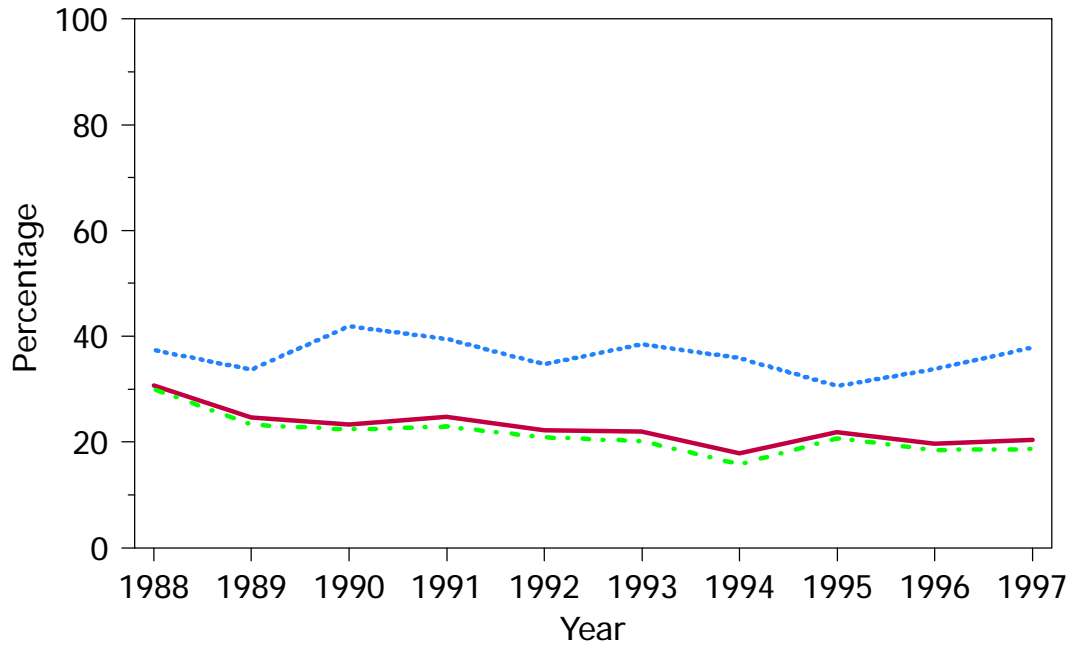
Editorial Note: The findings in this report indicate that during 1988–1997 smoking prevalence during the last 3 months of pregnancy decreased among women who

*WIC provides prenatal nutrition and health education services to low-income pregnant women.

†Noncoverage adjustment is performed to bring the totals estimated from sampled data in line with known population totals. The magnitude of the noncoverage is small, from 1% to 2% in Maine.

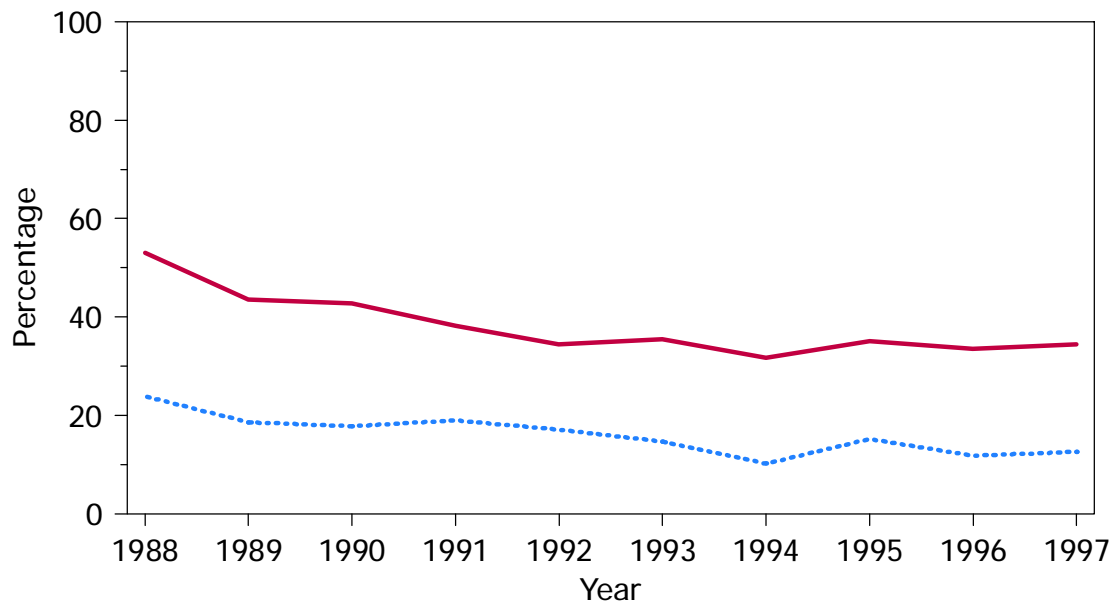
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FIGURE 1. Percentage of women who smoked during the last 3 months of pregnancy and gave birth to live infants, by age group and infant birth year — Maine, Pregnancy Risk Assessment Monitoring System, 1988–1997*



*Data for 1988 are for June–December.

FIGURE 2. Percentage of women who smoked during the last 3 months of pregnancy and gave birth to live infants, by WIC* participation and infant birth year — Maine, Pregnancy Risk Assessment Monitoring System, 1988–1997†



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

†Data for 1988 are for June–December.

*Cigarette Smoking During Pregnancy — Continued***TABLE 1. Demographic characteristics of women who gave birth to live infants — Maine, 1988 and 1997**

Characteristic	1988 (n=704)		1997 (n=1187)	
	%*	(95% CI) [†]	%	(95% CI)
Parity				
0	41.1	(36.4%–45.7%)	43.3	(40.1%–46.5%)
1	35.8	(31.2%–40.3%)	35.5	(32.4%–38.7%)
2	18.0	(14.4%–21.6%)	16.3	(13.8%–18.7%)
≥3	5.2	(3.0%– 7.2%)	4.9	(3.5%– 6.2%)
Age (yrs)				
<20	9.1	(6.3%–11.9%)	9.1	(7.1%–11.1%)
20–24	32.3	(27.9%–36.8%)	21.5	(18.8%–24.2%)
25–29	32.7	(28.2%–37.2%)	32.9	(29.9%–35.9%)
30–34	18.9	(15.3%–22.5%)	23.3	(20.5%–25.9%)
≥35	7.0	(4.6%– 9.4%)	13.3	(11.1%–15.4%)
Married	82.2	(78.4%–86.0%)	71.1	(68.0%–74.2%)
Education				
Less than high school	12.3	(8.9%–15.7%)	9.6	(7.6%–11.6%)
High school	50.8	(46.1%–55.5%)	38.1	(34.8%–41.3%)
More than high school	36.9	(32.3%–41.4%)	52.3	(49.0%–55.6%)
Entered prenatal care				
First trimester	71.1	(66.8%–75.4%)	83.5	(81.0%–86.0%)
Later or no care	28.8	(24.5%–33.1%)	16.5	(14.0%–19.0%)
Enrolled in Medicaid	20.5	(16.6%–24.4%)	33.9	(30.7%–37.0%)
Enrolled in WIC[§]	22.9	(18.9%–27.0%)	36.4	(33.2%–39.6%)
Received smoking advice[¶]	74.1	(69.9%–78.2%)	82.0	(79.5%–84.5%)
Smoked during the last 3 months of pregnancy	30.7	(26.3%–35.0%)	20.4	(17.7%–23.2%)

*Data for 1988 were collected for June–December.

[†]Confidence interval.

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

[¶]During the 10-year period, questionnaire wording changed to ascertain information about smoking advice received from a health-care provider. The 1988–1995 questionnaire asked “Did a doctor or nurse talk with you about how smoking during pregnancy could affect your baby?” The 1995–1997 questionnaire asked “During any of your prenatal care visits, did a doctor, nurse, or other health-care worker talk with you about any of the things listed below?” The second item was “How smoking during pregnancy could affect your baby?”

gave birth to live infants in Maine. Consistent with these findings, the Maine Behavioral Risk Factor Surveillance System indicated that smoking prevalence among reproductive-aged women (18–44 years) declined from 34% in 1988 to 24% in 1997 (3; M. Henson, MDHS, personal communication, 1999). Among women aged <20 years participating in PRAMS, more than one third reported smoking during the last 3 months of pregnancy throughout this period.

Among WIC participants who gave birth to live infants, smoking prevalence during the last 3 months of pregnancy remained high. Because WIC is a prenatal nutrition and

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health education program serving low-income women and children, WIC provides opportunities for intervention and follow-up of women who are pregnant and smoke.

Declines in smoking prevalences observed in this survey may be attributed to state-wide tobacco prevention and control efforts, changes in the programs serving pregnant women, demographic and societal changes, or a combination of these factors. Project ASSIST (American Stop Smoking Intervention Study for Cancer Prevention), which began in 1991, has built a geographically and programmatically diverse network of activities that focus on tobacco-use prevention in Maine (4). Beginning in 1993, MDHS sponsored a smoking cessation project for pregnant women. Shifts in demographic and social characteristics also occurred among women participating in PRAMS. Women who have more education were less likely to report smoking during pregnancy (5), and other factors (e.g., early prenatal care and increased access to health-care services) may have contributed to declines in smoking during pregnancy.

The findings in this report are subject to at least two limitations. First, data are self-reported and can be subject to recall bias. Second, although smoking during the last 3 months of pregnancy was analyzed, smoking behaviors may have changed during pregnancy.

These trends indicate that Maine programs targeting tobacco prevention and control may have reduced smoking. Targeted and appropriate efforts for young, low-income, and less educated women are needed to increase smoking cessation in these populations, and WIC programs may be one channel to accomplish this goal. Comprehensive tobacco prevention and control programs in other states have shown a decline in smoking after the campaigns were implemented (6–8). MDHS Partnership for a Tobacco Free Maine will design approaches to prevent young persons from starting to smoke, to protect citizens from environmental tobacco smoke, and to promote smoking cessation among adults. These activities might reduce smoking not only among adults in Maine but particularly among pregnant women, thereby reducing the adverse effects of smoking on mothers and infants.

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