

PRAMS PERSPECTIVES

A Pregnancy Risk Assessment Monitoring System Quarterly Report V.2 No.1

Tobacco Use Before, During, or After Pregnancy

Background

Tobacco use during pregnancy is associated with many adverse birth outcomes. The *2001 Surgeon General's Report on Women and Smoking* details these adverse outcomes: increased risks of ectopic pregnancy, spontaneous abortion, preterm premature rupture of membranes (PPROM), placental abruption, placenta previa, preterm delivery, stillbirth, and low birthweight. The effects of cigarette use during pregnancy extend into the lives of infants born to these women. Infants born to pregnant smokers have increased risks for neonatal mortality and SIDS.¹ A recent article in the *British Journal of Medicine* reported that the infants of women who were heavy smokers during pregnancy (10 or more cigarettes per day) have a four-fold increased risk of developing diabetes as adults.² Women who smoke during pregnancy are also less likely to breastfeed their infants.¹

Smoking during pregnancy is costly. Smoking-attributable costs of complicated births in 1995 were estimated at \$1.4 billion nationally. The estimated direct medical cost of a complicated birth for a smoker was 66% higher than for a nonsmoker.³

According to the Surgeon General's report, eliminating maternal smoking may lead to a 10% reduction in all infant deaths and a 12% decrease in deaths from perinatal conditions.¹ If there were an annual drop of one percentage point in smoking during pregnancy, it would prevent an estimated 1300 low birth weight infants and save \$21 million in direct medical costs in the first year.⁴

There are two Healthy People 2010 goals for tobacco use during pregnancy. For pregnant women, the goal is for 99% to abstain from using cigarettes during pregnancy and of those who do smoke, 30% should cease smoking during pregnancy.

What is PRAMS?

Data in this newsletter were provided by the Utah Pregnancy Risk Assessment Monitoring System (PRAMS). PRAMS is an ongoing, population-based risk factor surveillance system designed to identify and monitor selected maternal experiences that occur before and during pregnancy and experiences of the child's early infancy. Each month, a sample of approximately 200 women two to four months postpartum is selected. The sample is stratified based upon race and birth weight so that inferences and comparisons about these groups can be made. The results are weighted for sample design and non-response.

Women were asked questions about prenatal care, breastfeeding, smoking and alcohol use, physical abuse and early infant care. PRAMS is intended to help answer questions that birth certificate data alone cannot answer. Data will be used to provide important information that can guide policy and other efforts to improve care and outcomes for pregnant women and infants in Utah.

The PRAMS data reported here represents all live births to Utah residents in 1999. A total of 2140 mothers were selected to participate in the project and 1540 mothers responded for a response rate of 72%. Survey results are weighted for non-response so that analyses can be generalized to the entire population of Utah women delivering live births.

Methodology

For this report, 1999 Utah PRAMS and birth certificate data were used to determine the prevalence of smoking in the periods before, during or after pregnancy; estimate changes in smoking habits in the prenatal and perinatal periods; compare birth outcomes of infants whose mothers smoked during the last trimester to infants whose mothers did not; and to examine the impact of prenatal care provider discussions with women about smoking during pregnancy. The 1999 Utah birth certificate data were used to examine the relationship between smoking and birthweight. Chi-square tests were used to determine if differences in smoking prevalences were statistically significant.

The 1999 Utah PRAMS survey data included information about women's cigarette smoking habits before, during and after pregnancy. Women first received the question, "Have you smoked at least 100 cigarettes in your entire life?" If women reported that they had not smoked 100 cigarettes, they were instructed to skip the questions on smoking. If women reported that they had smoked 100 cigarettes, they were asked:

"In the **3 months before** you got pregnant, how many cigarettes or packs of cigarettes did you smoke on an average day?"

"In the **last 3 months** of your pregnancy, how many cigarettes or packs of cigarettes did you smoke on an average day?"

"How many cigarettes or packs of cigarettes do you smoke on an average day **now**?"

Number of cigarettes smoked "now" refers to women's smoking habits 3-7 months postpartum. Changes in smoking during the perinatal and postnatal period were determined by comparing the number of cigarettes smoked per day among the three time periods. The 1999 Utah PRAMS survey data also included information about prenatal provider discussions with pregnant women about smoking. The questions included:

"During any of your prenatal care visits, did a doctor, nurse, or other health care worker talk with you about how smoking during pregnancy could affect your baby?"

"At any time during your prenatal care, did a doctor, nurse or other health care worker ask you if you were smoking?"

Prevalence of Smoking Before, During or After Pregnancy

In 1999, 14.8% of Utah women (6800 women) reported smoking in the three months before they became pregnant. The percentage of women who reported smoking during the last three months of their pregnancy decreased to 6.2% (2900 women). At 3-7 months postpartum, 9.4% (4300) of Utah women reported that they were smoking cigarettes.

Table one shows the proportion of women who smoked before, during, or after pregnancy by various maternal characteristics. Each subgroup listed in Table 1 had significantly different smoking proportions at each point in time, except where noted.

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Table 1. Percentage of Utah Women With Live Births Who Reported Smoking Before, During, or After Pregnancy by Selected Maternal Characteristics, 1999 Utah PRAMS Data.

| Characteristics | Percentage of Women Who Smoked in 3 Months Before Pregnancy¹ | Percentage of Women Who Smoked in Last 3 Months of Pregnancy¹ | Percentage of Women Who Smoked 3-7 Months Postpartum¹ |
|--|--|---|---|
| Total Birth Population | 14.8 ± 2.4 | 6.2 ± 1.6 | 9.4 ± 2.0 |
| Maternal Age | | | |
| ≤ 19 | 48.6 ± 11.6 | 20.7 ± 9.7 | 32.9 ± 10.8 |
| 20 + | 11.4 ± 2.2 | 4.7 ± 1.4 | 7.0 ± 1.8 |
| Education Level | | | |
| Less than High School | 34.6 ± 8.4 | 17.2 ± 6.7 | 24.0 ± 7.3 |
| Completed High School | 20.7 ± 5.2 | 8.3 ± 3.4 | 13.0 ± 4.4 |
| More than High School | 5.7 ± 1.9 | 1.9 ± 1.0 | 3.2 ± 1.4 |
| Marital Status | | | |
| Married | 8.6 ± 1.9 | 3.0 ± 1.1 | 4.8 ± 1.4 |
| Unmarried | 49.1 ± 9.1 | 24.3 ± 7.9 | 35.0 ± 8.8 |
| Annual Household Income | | | |
| < \$15,000 | 28.4 ± 7.1 | 15.6 ± 5.5 | 23.8 ± 6.6 |
| \$15,000 - 35,000 | 13.1 ± 3.7 | 4.6 ± 2.2 | 5.7 ± 2.3 |
| \$35,000 - 50,000 | 10.4 ± 4.2 | 3.1 ± 2.4 | 6.0 ± 3.1 |
| > \$50,000 | 6.3 ± 3.4 | 1.7 ± 1.7 | 2.7 ± 2.1 |
| Poverty Status | | | |
| < 100% FPL ² | 24.9 ± 6.8 | 13.8 ± 5.2 | 21.1 ± 6.4 |
| 101 - 133% FPL | 19.0 ± 8.2 | 8.1 ± 5.9 | 12.3 ± 7.1 |
| 134 - 199% FPL | 10.3 ± 4.6 | 3.0 ± 2.3 | 3.8 ± 2.5 |
| 200% + FPL | 9.9 ± 2.7 | 3.4 ± 1.6 | 5.1 ± 1.8 |
| Health Insurance Coverage Before Conception³ | | | |
| Yes | 10.7 ± 2.3 | 3.6 ± 1.3 | 6.1 ± 1.8 |
| No | 25.8 ± 6.0 | 13.5 ± 4.6 | 18.4 ± 5.3 |
| Medicaid Coverage Before Conception | | | |
| Yes | 37.9 ± 15.6 | 21.8 ± 12.5 | 33.8 ± 15.1 |
| No | 13.6 ± 2.4 | 5.4 ± 1.6 | 8.1 ± 1.9 |
| Prenatal Care (PNC) Payer | | | |
| Private/Group Insurance | 10.1 ± 2.3 | 3.2 ± 1.2 | 5.4 ± 1.6 |
| Medicaid | 32.0 ± 7.1 | 17.6 ± 5.9 | 24.6 ± 6.7 |
| Other/Self Pay | 10.3 ± 6.5 | 2.7 ± 3.0 | 4.7 ± 3.9 |
| Delivery Payer | | | |
| Private/Group Insurance | 9.6 ± 2.3 | 3.1 ± 1.2 | 5.1 ± 1.6 |
| Medicaid | 26.6 ± 5.9 | 14.0 ± 4.7 | 20.1 ± 5.4 |
| Other/Self Pay | 15.9 ± 11.8 | 2.0 ± 3.8 | 4.7 ± 5.6 |
| Domestic Violence in Year Before Pregnancy | | | |
| Yes | 39.7 ± 13.2 | 24.1 ± 5.2 | 30.3 ± 11.8 |
| No | 13.3 ± 2.4 | 5.2 ± 1.6 | 8.2 ± 1.9 |
| Pregnancy Recognition | | | |
| < 5 weeks | 12.7 ± 3.1 | 4.4 ± 1.8 | 7.9 ± 2.5 |
| 5 - 8 weeks | 12.7 ± 3.9 | 5.0 ± 2.6 | 7.3 ± 3.0 |
| 9+ weeks | 25.8 ± 8.1 | 13.8 ± 6.0 | 18.6 ± 7.1 |
| Trimester of PNC Entry | | NS* | NS |
| First Trimester | 13.2 ± 2.5 | 5.3 ± 1.6 | 8.6 ± 2.1 |
| Late or No PNC | 22.2 ± 7.4 | 9.1 ± 5.3 | 12.4 ± 5.7 |
| Adequacy of PNC | | NS | NS |
| Adequate | 12.7 ± 2.9 | 5.1 ± 1.9 | 8.2 ± 2.4 |
| Inadequate | 18.7 ± 4.5 | 7.6 ± 3.1 | 11.2 ± 3.6 |

¹ Plus or minus 95% confidence interval

² Federal Poverty Level

³ Women were asked not to include Medicaid when answering this question

* Not statistically significant

Changes in Smoking Habits During or After Pregnancy

Most Utah women who reported smoking in the three months prior to their pregnancy reported reductions in the number of cigarettes they smoked during the pregnancy. Of women who smoked before pregnancy, 56% (3800) reported quitting smoking during pregnancy, 36% (2400) reported smoking fewer cigarettes per day during pregnancy and 8% (600) reported that they continued to smoke the same amount during pregnancy.

When comparing women who quit smoking to women who reduced smoking during pregnancy, the following differences were observed (data not shown):

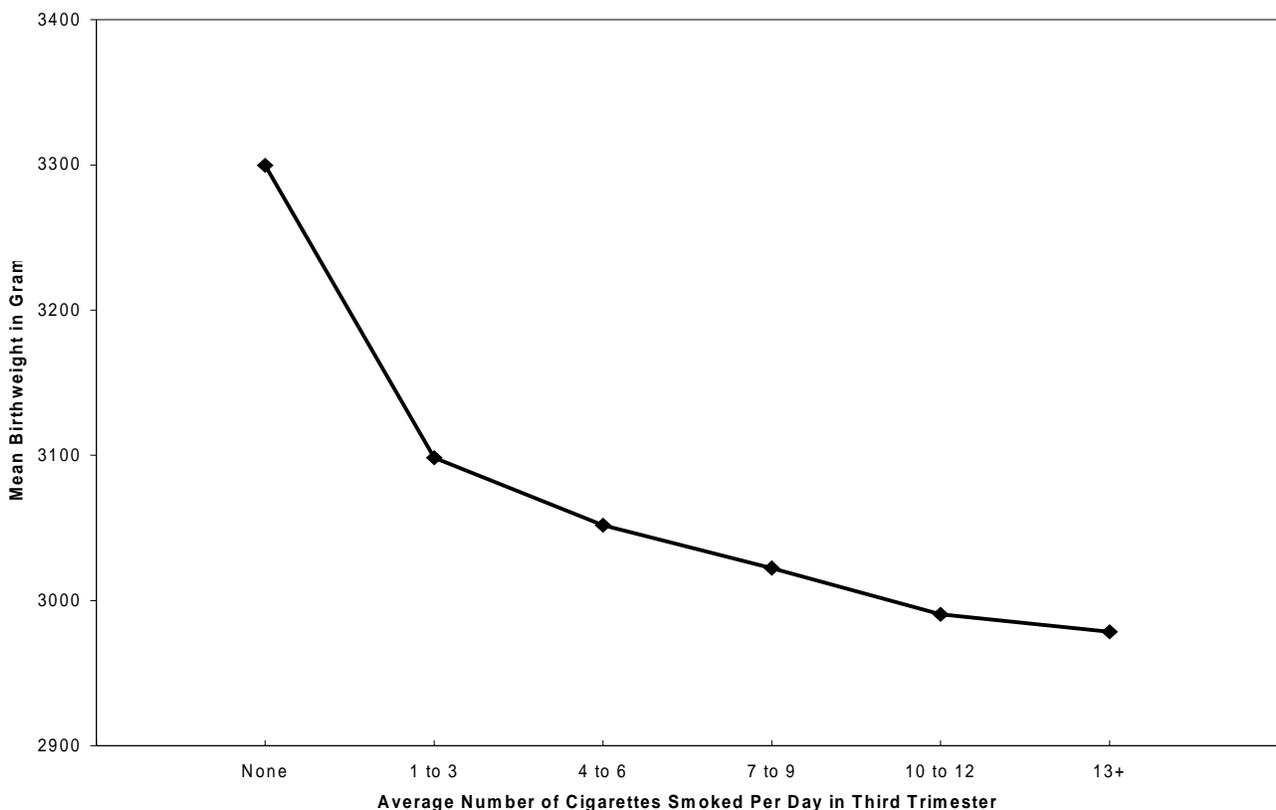
- Women who had a high school education or greater were more likely to quit smoking.
- Women whose annual household incomes were greater than \$15,000 per year were more likely to quit smoking during pregnancy.
- Women who had private/group insurance for their prenatal care were more likely to stop smoking.
- Women who recognized their pregnancy early (before nine weeks gestation) were more likely to quit smoking.

Of women who reported quitting smoking during pregnancy, 38% said that they had resumed smoking by 3-7 months postpartum. By contrast 94% of women who reported a reduction in smoking during pregnancy said that they had resumed their previous amount of cigarette use by 3-7 months postpartum.

Infant Birthweight and Cigarette Use

Utah birth certificate data (1999) show that the risk of delivering a low birthweight infant was 2.2 times greater for women who smoked during the third trimester of their pregnancy compared with women who did not smoke cigarettes at that time (95% C.I.: 2.0 - 2.4). Figure 1 compares the average infant birthweight to the average number of cigarettes smoked per day during the third trimester. The data indicate a statistically significant decrease in birthweight as the number of cigarettes smoked per day increased.

Figure 1. Mean Birthweight by Average Number of Cigarettes Smoked Per Day in Third Trimester of Pregnancy. Utah Birth Certificate Data, 1999.



Prenatal Care Discussions About Smoking

Women were asked whether at any prenatal care visit a health care provider or worker directly asked them if they were smoking. Seventy-six percent of women responded that they had been asked. Women who reported smoking before pregnancy were asked this question more often than their non-smoking counterparts (81.3% of smokers versus 53.0% of non-smokers).

Women were also asked if a health care worker or provider talked with them about how smoking cigarettes during pregnancy could affect their baby. Fifty-seven percent of women reported having this discussion with their health care provider. This percentage was also higher for smokers (90%) than non-smokers (73.1%).

While it is good that providers are having these discussions more often with their patients who smoke, all women should be asked if they are smoking and should be counseled about how tobacco use affects the fetus.

Comments/Recommendations

It is important to remember that smoking behaviors are self-reported. As there is social stigma attached to tobacco use during pregnancy, there may be some underreporting of actual tobacco use. However, estimates for third trimester smoking prevalence in 1999 were 6.6% and 6.2%, according to Utah birth certificate data and Utah PRAMS data, respectively.

Both the American College of Obstetricians and Gynecologists (ACOG) and the American Academy of Pediatrics recommend taking tobacco histories and intervening in the interest of tobacco cessation. ACOG has identified smoking cessation during pregnancy as one of the most important actions needed to improve pregnancy outcomes.⁵ With only 76% of pregnant women being asked about current tobacco use and 57% being counseled on the effects of tobacco use on the fetus, Utah could significantly improve in this area.

Although 38% of women who stopped smoking during pregnancy reported smoking again by the time the PRAMS survey was filled out, this percentage would likely be higher if the women were surveyed again one year postpartum. With a one-year postpartum relapse rate nearing 70% nationally, interventions to prevent relapse are needed.

Studies have shown that the provision of a single 5 to 15 minute counseling session by a specially trained clinician, plus appropriate printed materials, can increase smoking cessation success.⁵ Studies have shown that smoking cessation is less successful for women who reside with a current smoker, therefore providers should counsel both the pregnant patient and her partner. Smoking cessation for women should be integrated into prenatal care and continue postpartum with the child's pediatrician for improved and continued success.

**** Mark Your Calendars ****

Smoke-Free Families Training - Implementing the U.S. Public Health Service "Five A's" to promote smoking cessation among pregnant and parenting women and their families



Sponsored by the Utah Department of Health's Reproductive Health Program, the Association of Maternal & Child Health Programs (AMCHP) and Health Insight.

April 15th, 5:30 to 9:30 p.m. at the University Park Marriott Hotel, Salt Lake City, Utah

A \$20.00 registration fee will help offset the costs of the 2.75 hours of CME that will be offered through Health Insight.

For registration information, contact Tia Korologos, ESI Management Group, at 801-272-9446

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1. United States Department of Health and Human Services, *Women and Smoking: A Report of the Surgeon General*. 2001: Rockville, MD.
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4. Lightwood, J.M., Phibbs, C.S., and Glantz, S.A., *Short-term health and economic benefits of smoking cessation: low birth weight*. *Pediatrics*, 1999. **104**(6): p. 1312-20.
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Publishing Information

This publication was supported by Award Number U50/CCU817126-02 from the Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.

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