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Smoking Before, During and After Pregnancy: Colorado Trends

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Introduction

Smoking during pregnancy is one of the most preventable causes of fetal and infant morbidity and mortality.[1] Maternal smoking is associated with 30 percent of small-for-gestational-age infants, 10 percent of preterm infants and 5 percent of infant deaths. In addition, maternal smoking increases the risk of pregnancy complications, including fetal growth retardation and sudden infant death syndrome.[2,3] A recent study done by the Colorado Department of Public Health and Environment (CDPHE) found smoking during pregnancy was a leading cause of low birth weight among singleton births in Colorado, where one in eight low-birth-weight births was attributed to maternal smoking.[4] National estimates suggest that a reduction of 20 percent in the incidence of low birth weight is possible if smoking during pregnancy could be eliminated.[5] Women who continue to smoke after delivery also place their children at risk. Research shows children exposed to secondhand smoke are at increased risk for sudden infant death syndrome, acute respiratory infections, ear infections and more severe asthma.[6]

Quitting smoking during pregnancy or at any time throughout the reproductive years has tremendous potential for improving and protecting the health of women and children. Because half of all pregnancies are unplanned, cessation interventions before conception greatly reduce the risk of poor pregnancy outcomes. While spontaneous quitting occurs among many pregnant women who smoked prior to pregnancy, about 50 percent of women who quit during pregnancy resume smoking within the first six months after delivery and as many as 80 percent resume within 12 months.[7,8] Treating tobacco dependence during preconception, prenatal and postpartum medical visits is a high priority given the devastating risks to both women and infants.

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Methodology

CDPHE, in collaboration with the Centers for Disease Control and Prevention, collects extensive data on pregnant women annually through the Colorado Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based risk factor surveillance system designed to identify and monitor behaviors of women before, during and after pregnancy. Each month, a stratified random sample of Colorado mothers is selected from recent birth certificates; selected mothers receive the survey two to four months after delivery. The survey combines two methods of data collection: a mailed questionnaire with multiple follow-up attempts and a telephone survey for those who do not respond by mail. For this report, surveys from approximately 2,000 mothers each year were compiled between 2000 and 2008. Results from the surveys were weighted to reflect the experiences of all Colorado mothers giving birth.

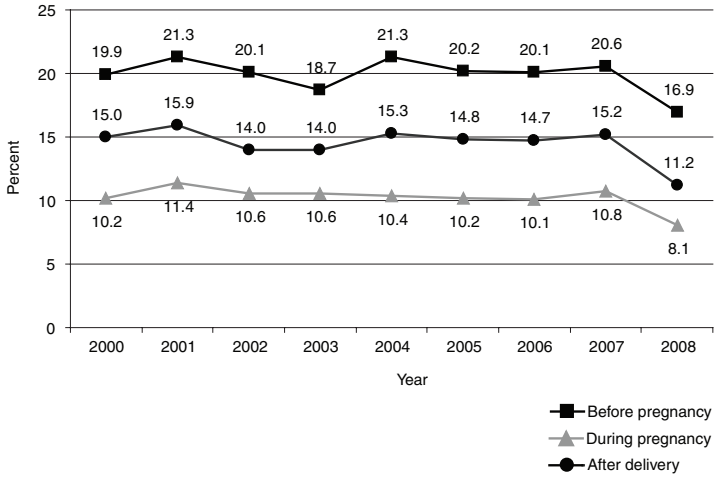
The survey contains questions regarding cigarette use at three points in time: "In the 3 months before you got pregnant, how many cigarettes did you smoke on an average day?", "In the last 3 months of your pregnancy, how many cigarettes did you smoke on an average day?" and "How many cigarettes do you smoke on an average day now?" This last question is used to determine smoking after delivery and relapse. Finally, women can indicate "some things about smoking that a doctor, nurse or other health care worker might have done during any of your prenatal care visits" by checking types of help and referrals from professionals, including: spending time discussing smoking, suggesting setting a specific date for quitting, suggesting attending a stop smoking class or program, providing booklets, videos or other materials to help with quitting, referring for counseling or to a quit line, and asking the smoker if a family member or friend would support a decision to quit.

Descriptive analyses were conducted to identify changes over time in smoking prevalence and health care worker advice to quit smoking. In addition to characterizing smoking prevalence among mothers (age, race/ethnicity and Medicaid status), a detailed analysis was performed to assess smoking prevalence during the different time periods of pregnancy (before conception, in the last trimester and soon after delivery). For each analysis, a Chi-square test statistic was used to evaluate differences for each risk factor and significance ($p < .05$) was determined by calculating the p values of tests of independence. Data were analyzed using SAS version 9.1 and SUDAAN release 10.0 (Windows Individual User SAS-Callable version).

Results

The percentage of women who smoked in the three months before they became pregnant changed little between 2000 and 2007, but reached its lowest level in 2008 (16.9%), a significant change from the previous year (Figure 1). This pattern was also reflected in the percentage of women who smoked in the last three months of pregnancy: about 10 percent between 2000 and 2007, decreasing to 8.1 percent in 2008. The percentage of women who reported smoking after delivery was about 15 percent from 2000 through 2007, but dropped to 11.3 percent in 2008. As shown in Figure 1, the trends for these three indicators were generally flat after 2000 until 2008 when the three measures decreased. The declines in smoking before and after pregnancy from 2007 to 2008 were significant.

Figure 1. Smoking prevalence before and during pregnancy and after delivery, Colorado PRAMS, 2000-2008

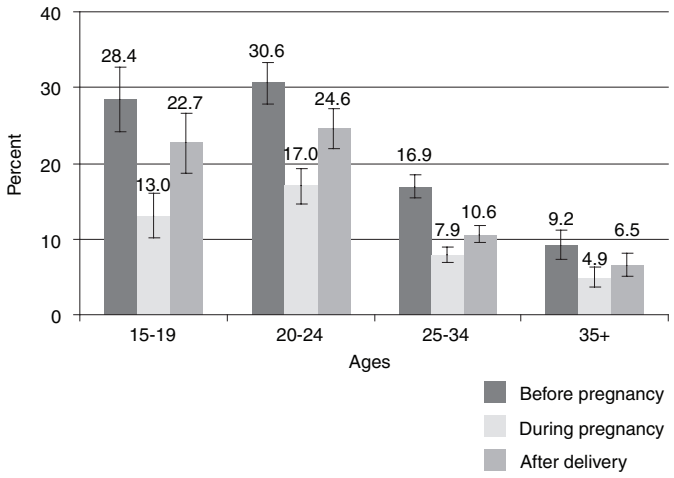


Demographic characteristics

Age

The prevalence of smoking varied among subgroups of women who became pregnant, as defined by their demographic characteristics. Age makes a significant difference: young women were more likely to be smokers than older women (Figure 2). For the combined years 2004-2008, about three in 10 women ages 15-19 (28.4%) and ages 20-24 (30.6%) reported smoking in the three months prior to conception, compared to just under two in 10 (16.9%) women ages 25-34 and one in 10 (9.2%) women ages 35 and older. About half of all women were able to quit smoking during pregnancy. After delivery, however, about half of all women who had quit resumed smoking. About one-quarter of women under age 25 reported smoking after delivery, while significantly lower levels of those ages 25-34 (10.6%) and ages 35 and older (6.5%) reported smoking again.

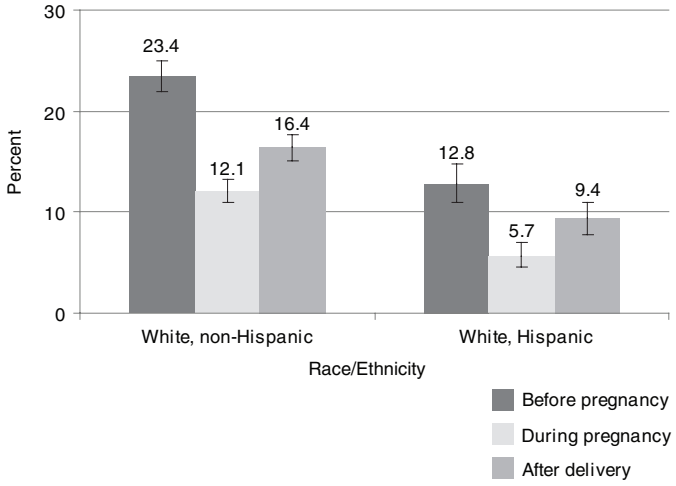
Figure 2. Percent of mothers smoking before and during pregnancy and after delivery by age (including 95% confidence intervals), Colorado PRAMS, 2004-2008



Race/Ethnicity

White, non-Hispanic women during 2004-2008 were significantly more likely to be smokers before pregnancy than White, Hispanic women (Figure 3). Close to one-quarter (23.4%) of White, non-Hispanic women reported smoking prior to pregnancy, nearly double the rate of White, Hispanic women (12.8%). About half of women who smoked before pregnancy, regardless of race/ethnicity, reported that they did not smoke during the last three months of pregnancy. Nevertheless, large proportions of women of both race/ethnic groups resumed smoking after delivery, and the difference in smoking prevalence between White, non-Hispanic women and White, Hispanic women remained significant, with a higher percentage of White, non-Hispanic women reporting smoking (16.4%) compared to White, Hispanic women (9.4%). Smoking results for Black women and women of other races were not shown because of insufficient numbers.

Figure 3. Percent of mothers smoking before and during pregnancy and after delivery by race/ethnicity (including 95% confidence intervals), Colorado PRAMS, 2004-2008

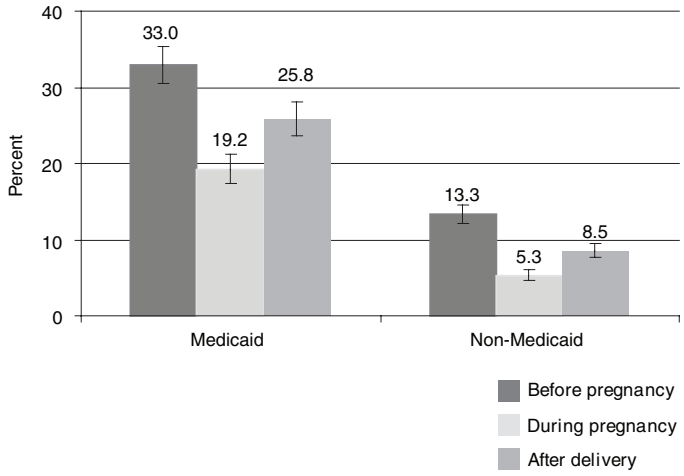


Medicaid Status

Women with Medicaid coverage for prenatal care and delivery were more than twice as likely to be smokers before pregnancy than women without Medicaid coverage (who were typically covered by private health insurance), according to combined data for the years 2004-2008. One-third (33.0%) of women with Medicaid coverage reported smoking before pregnancy, compared to 13.3 percent of women not on Medicaid (Figure 4). Forty-two percent of Medicaid-covered smokers reported quitting smoking during pregnancy, compared to 60 percent of non-Medicaid smokers, resulting in smoking prevalence rates during pregnancy that were almost four times as high for Med-

icaid women (19.2%) as for non-Medicaid women (5.3%). Furthermore, the rate of smoking among Medicaid women after delivery was triple (25.8%) the rate of smoking among non-Medicaid women after delivery (8.5%) and nearly double the rate of smoking among non-Medicaid women before pregnancy. All differences were significant.

Figure 4. Percent of mothers smoking before and during pregnancy and after delivery by Medicaid insurance coverage (including 95% confidence intervals), Colorado PRAMS, 2004-2008



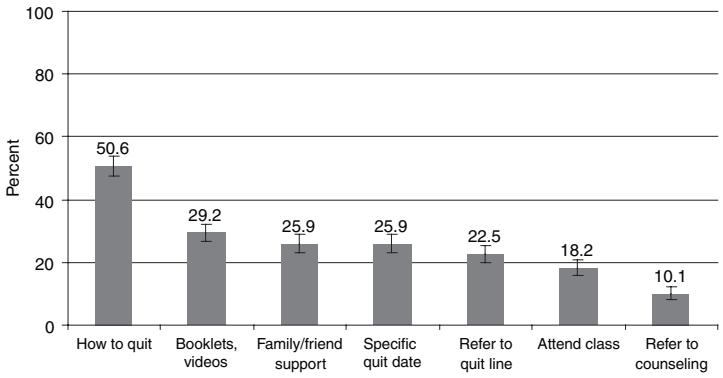
Advice on Quitting Smoking

Seven out of 10 (70.4%) women (smokers and nonsmokers) reported that a health care worker discussed the effects of smoking on the baby during 2004-2008. Most smokers (85.0%) and two-thirds of nonsmokers (66.9%) reported a discussion.

The PRAMS survey also provides information on types of advice and referrals offered to smokers, beginning in 2002. In that year, four in 10 (39.8%) smokers reported that a health care worker spent time discussing how to quit smoking; by 2008, five in 10 (51.9%) smokers reported such discussions. Few smokers in 2002 (4.4%) were referred to counseling for help with quitting. By 2008, such referrals had more than doubled. In 2004, a new question was added to the survey about a health care worker asking if a family member or friend would support a decision to quit, and almost a quarter (22.3%) of smokers reported being asked. By 2008, one-third (32.3%) had been asked this question. Also added in 2004 was a question asking if the smoker had been referred to a national or state quit line. While 15.5 percent of smokers reported being referred to a quit line in 2004, 26.0 percent reported being referred in 2008. Other questions on the survey about advice (suggesting a specific quit date or stop smoking class, or providing booklets and videos) showed no statistically significant changes between 2002 and 2008.

Figure 5 shows the type of advice that pregnant smokers reported receiving. Results are for the combined period 2004-2008. Half (50.6%) of the women stated that a health care worker spent time discussing how to quit. More than one-quarter of the pregnant smokers were given booklets, videos or other materials to help them quit smoking on their own (29.2%), were asked if a family member or friend would support a decision to quit (25.9%), or reported hearing the suggestion that they set a specific date to stop smoking (25.9%). Just under one-quarter (22.5%) reported referral to a quit line, and fewer received a suggestion to attend a class or specific program to stop smoking (18.2%) or a referral to counseling to stop smoking (10.1%).

Figure 5. Percent of pregnant smokers reporting health care worker advice on quitting smoking (including 95% confidence intervals), Colorado PRAMS, 2004-2008



Discussion

For nearly a decade, there was little change in the rates of tobacco use before, during and after pregnancy. Then, in 2008, a significant decrease occurred in two of the three measures. However, the decreases in tobacco use during and after pregnancy from 2007 to 2008 are related to the decrease in the prevalence of women who smoked prior to pregnancy and do not reflect improvements in pregnant smokers quitting. In January 2005, a tax increase on tobacco and tobacco products increased the price of a pack of cigarettes by 64 cents, and in July 2006, Colorado implemented the Colorado Clean Indoor Air Act, which prohibited smoking in most indoor public places. An increase in the price of tobacco and passage of a statewide smoke-free law are both evidence-based strategies known to increase tobacco cessation and decrease consumption. The majority of babies born in 2008 were conceived in 2007; therefore, the preconception period included the last months of 2006. The timing of the tax increase and clean indoor air law likely decreased the total percentage of women who were smoking prior to conception and later gave birth in 2008, as there are no other known events that occurred during this time period that might have resulted in a significant change.

Two of the Healthy People 2010 national health objectives address smoking during pregnancy: increasing to 30 percent the percentage of pregnant smokers who stop smoking during pregnancy and reducing to 1 percent the prevalence of cigarette smoking among pregnant women.[9] While Colorado is seeing some progress in the stop-smoking objective, with 50 percent of women quitting smoking during pregnancy, it is far from reaching the reduced prevalence objective. A total of 8.1 percent of pregnant women report smoking in the last trimester of pregnancy.

The prevalence of smoking among women during pregnancy and resumption after delivery varies among subpopulations, with higher prevalence rates among white, non-Hispanic women, women under 25 years of age and those receiving Medicaid. Nearly one-third of Colorado women giving birth receive Medicaid, and one-third of those women smoked prior to pregnancy, had lower rates of quitting during pregnancy and experienced higher relapse rates after delivery compared to non-Medicaid women. The need for strategies to promote cessation is especially compelling among the Medicaid population. To help address this need, Colorado Medicaid in 2009 improved its cessation benefit to cover all Food and Drug Administration-approved tobacco medications* for as many as two quit attempts each year rather than the previous once-in-a-lifetime benefit.

According to the May 29, 2009, issue of the Morbidity and Mortality Weekly Report, health care providers and public health systems across the nation are doing a poor job of reducing smoking prevalence during pregnancy.[10] Colorado data have shown some improvement in health care provider behavior, with an increase in the number of mothers reporting receiving health care worker advice on how to quit smoking, and being referred to counseling and a quit line for cessation support. However, the overall rates of providing advice remain low, despite research that shows health care providers can make a considerable difference with even a three-minute intervention.[5]

A number of resources support tobacco cessation among women of reproductive age. The U.S. Public Health Service provides evidence-based clinical practice guidelines that support the use of brief, office-based counseling intervention, referred to as the "5 A's" (Ask, Advise, Assess, Assist and Arrange). A stakeholder group led by the Colorado Department of Public Health and Environment designed an abbreviated version: the "2 A's and an R" (Ask, Advise and Refer) model for health professionals to use specifically when addressing tobacco cessation for pregnant and postpartum women. This abbreviated model of the "5 A's" helps providers and clinicians quickly identify women who smoke, advise them to quit and refer them to the Colorado QuitLine, an evidence-based cessation intervention.

The Colorado QuitLine (1-800-QUIT-NOW) offers cessation coaching tailored for women during pregnancy, and most recently added postpartum sessions and text messaging to help

prevent relapse after delivery. The QuitLine also offers women the option to work with the same coach throughout the prenatal and postpartum period via telephone. Health care providers can expedite patient enrollment by using the Fax-To-Quit program. The provider simply faxes the referral to QuitLine staff members, who then proactively call patients to enroll them. Providers can find more information about the Colorado QuitLine, the Fax-To-Quit program and additional resources at http://www.cohealthproviders.com.

Smoking among women in their reproductive years continues to be a major public health concern in Colorado. Today, numerous effective treatments exist that can be used across a broad range of populations. Cessation strategies supported by clinical evidence, such as the "5 A's" are available and should be integrated into routine care during preconception, prenatal and postpartum visits. Additionally, the Colorado QuitLine provides a proven evidence-based intervention that significantly improves abstinence rates. Health care providers should ensure patient access to quit lines and promote their use. The health benefits for women and their children will last a lifetime.

A future HealthWatch on secondhand smoke exposure among women and children is planned.

**For information on tobacco medication use during pregnancy, refer to the Public Health Service. "Treating tobacco use and dependence," Clinical practice guideline. U.S. Department of Public Health and Human Services; 2008 Update.*

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