

Impact of Hurricanes on the Prevalence of Smoking During Pregnancy, 2004

February 16, 2006

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Introduction

Smoking during pregnancy remains a public health problem despite increased knowledge of the health effects of smoking during pregnancy. While the prevalence of smoking during pregnancy has declined steadily, a considerable number of pregnant women continue to smoke. For those who are able to stop smoking during pregnancy, only about one third of them remain abstinent one year after delivery.¹ An association between smoking and infant morbidity has been well established in research literature. Smoking during pregnancy has been associated with lower infant birth weight, extended hospital stays, increased neonatal health care dollars, and Sudden Infant Death Syndrome (SIDS).

When mothers quit smoking during the first trimester, their infants have weight and body measurements similar to infants of nonsmokers. Smoking cessation programs for pregnant women attempt to protect against intrauterine growth retardation, which causes low birth weight and other serious health problems. Nationwide, just a 1% decline in the proportion of pregnant women who smoke would prevent approximately 1,300 cases of low birth weight.²

The Healthy people 2010 goal is to reduce tobacco use during pregnancy to no more than 1%. According to the Behavioral Risk Factor Surveillance Survey (BRFSS) smoking among Florida women of childbearing age (18-44) has increased slightly from 1999-2003, shown in Chart 1.³ The Florida 2003 Youth Risk Behavior Surveillance Survey (BRFSS) revealed current cigarette use among female high school students (shown in Chart 2) has reached an all time low of 21.9%.⁴

According to the Florida Department of Health, Office of Vital Statistics, reported smoking during pregnancy has declined steadily from 12.9% in 1995 to 8.1% in 2003, the lowest reported

1 CDC. Women and Smoking: A Report of the Surgeon General. MMWR 2002; 51: 1-30.

2 CDC. Chronic Disease Prevention, Preventing Smoking During Pregnancy <http://www.cdc.gov/nccdphp/factsheets/prevention/smoking.htm>.

3 March of Dimes-Peristats: Smoking: Behavioral Risk Factor Surveillance System, 2003.

4 CDC. Youth Risk Behavior Surveillance-United States, 2003. MMWR 2004; 53: 1-51.

prevalence.⁵ In 2004 this pattern reversed and the prevalence increased to 9.0% and has continued to increase. During the first and second quarters of 2004 a revised birth certificate was implemented; which changed the question related to tobacco use during pregnancy; in addition, during the third quarter of 2004 several devastating hurricanes occurred. In the previous year (2003) third quarter the smoking prevalence was 8.1% while in the third quarter of 2004 the prevalence was 9.3%. The purpose for this analysis is to determine whether the hurricanes during 2004 had any influence on the increase in the prevalence of reported smoking during pregnancy.

Methodology

Data Sources

In Florida, information on reported smoking during pregnancy are collected at the time of birth and recorded on the birth certificate. From January, 1995 to March, 2004, the birth certificate included a check response format question (38a): Tobacco use during pregnancy (yes or no). In March, 2004, the revised birth certificate added an additional response - yes, but quit. After which time the prevalence of smoking during pregnancy numerator included those women who responded *yes* plus those who responded *yes, but quit*. Previous studies have shown birth certificates to slightly underestimate smoking prevalence during pregnancy although it is common practice to use these data to monitor patterns and trends with the understanding that the actual rates may be higher.

Data Analysis

The birth data for calendar year 2003 through 2005 were gathered and divided into 4 quarters by calendar year. Standard Query Language (SQL), Microsoft Excel and Epi Info were used to perform these analyses. Contingency tables were created and p-values were calculated using Chi-Square test and Z-test to determine statistical significance.

Results

During the first quarter of 2003 (January - March), the prevalence of women reporting smoking during pregnancy was 8.2%, by the first quarter of 2004 the prevalence was 8.5%, shown in Chart 3. The revised birth certificate was implemented during the first and second quarters of 2004. The second of quarter 2003 (7.9%) was compared to the second quarter of 2004 (9.0%) to determine if the increased prevalence was influenced by the implementation of the revised birth certificate. The same quarter of the previous year was chosen because this was a period of time before any changes had taken place. Statistical significance was determined, p-value = 0.000.

To determine any impact of the hurricanes on the smoking prevalence, the eight counties most affected by the hurricanes were explored. These counties were: Charlotte, Desoto, Escambia, Hardee, Indian River, Martin, Polk, and Saint Lucie. For these counties as a group, the smoking prevalence increased from 13.5% in 2003 to 14.7% in 2004, as shown in Table 1. In contrast, for all other counties, as a group, the prevalence increased from 7.6% in 2003 to 9.0% in 2004. Although the prevalence of smoking was higher in the 8 counties most affected by the hurricanes in both 2003 and 2004, the absolute increase in the smoking prevalence and the percent change, from 2003 to 2004, was higher for the other 59 counties least affected by the

⁵ Florida Department of Health. Office of Planning, Evaluation and Data Analysis-Vital Statistics-CHARTS

hurricanes. When examining the increase in both groups of counties (affected and non-affected) on a quarterly basis, no demonstrable temporal affect of the hurricanes can be seen in Chart 4.

Discussion

Some studies suggest that babies of women who suffer from high levels of stress and anxiety are more likely to be born low birth weight even when born at full term. Stress also may exert potential adverse effects indirectly by affecting the pregnant woman's behavior. For example, women who experience high levels of stress may not follow good health habits. They may skip meals or not choose nutritious foods, or they may react to stress by reaching for cigarettes, alcohol or illicit drugs, all of which have been linked to low birth weight.⁶

A 1999 study at the University of California, Los Angeles School of Medicine found that women who reported high levels of stress at 18 to 20 weeks of pregnancy were more likely to have high levels of a hormone called corticotropin-releasing hormone (CRH) in their blood. This study found a potential link between high levels of CRH and preterm labor.⁷

In addition researchers at the University of California at Irvine found that the earlier in pregnancy a woman experienced a very stressful event (in this study an earthquake), the earlier she was likely to deliver. The researchers speculate that women become less sensitive to stress as pregnancy progresses, possibly helping protect the baby from adverse effects of stress.⁸

Each woman finds different tasks or situations stressful. A task that one finds enjoyable can be highly stressful to another. Each individual also reacts differently to an event perceived as stressful and some of these differences may have an impact on pregnancy.

All pregnant women need to be screened for smoking at their first prenatal care visit and throughout their pregnancy. The Centers for Disease Control and Prevention recommends, when counseling pregnant smokers, using the modified 5A's intervention: Ask, Advise, Assess, Assist, and Arrange. In practices that have used the 5 A's approach, quit rates among pregnant women have risen by approximately 30%. Such efforts move the nation closer to meeting the *Healthy People 2010* goal of reducing tobacco use so that no more than 1% of pregnant women smoke.⁹

Conclusion

In summary, the prevalence of reported smoking during pregnancy in Florida is above the Healthy People 2010 goal. The prevalence started to increase prior to and continued after the hurricane season. It appears that some of the increase was influenced by the revision of question number 38a. The revised birth certificate has enhanced the ability to capture those

6 March of Dimes: Stress and Pregnancy http://www.marchofdimes.com/printablearticle/14332_1158.asp.

7 Hobel, C.J., et al. Maternal plasma corticotropin- releasing hormone associated with stress at 20 weeks' gestation in pregnancies ending in preterm delivery. *American Journal of Obstetrics and Gynecology*, volume 180, number 1, part 3, January 1999, pages S257–S263.

8 Glynn, L., et al. When stress happens matters: effects of earthquake timing on stress responsivity in pregnancy. *American Journal of Obstetrics and Gynecology*, volume 184, number 4, March 2001, pages 637–642.

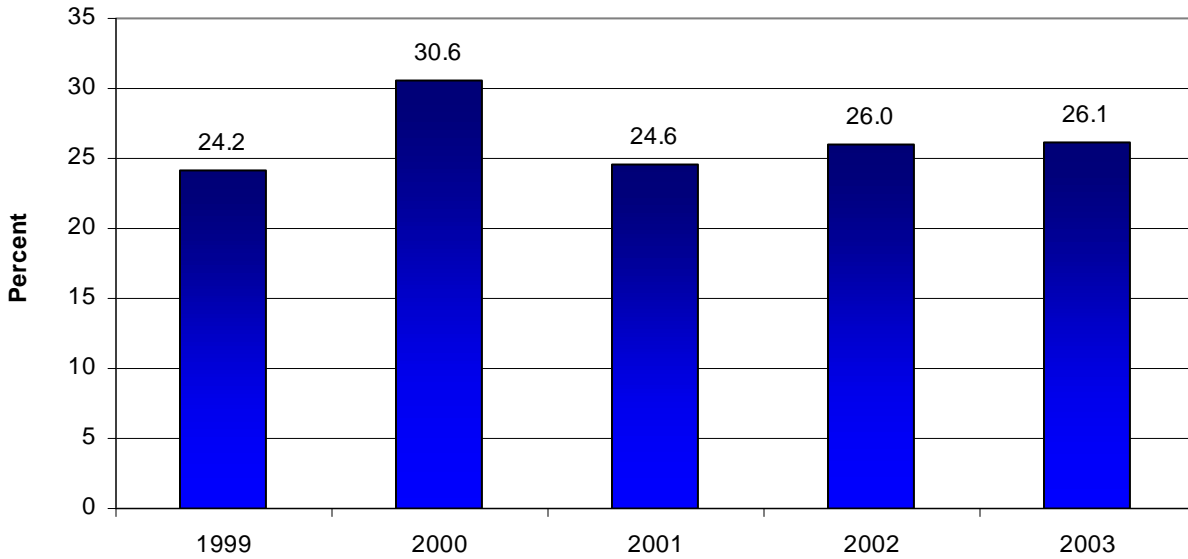
9 CDC. Chronic Disease Prevention, Preventing Smoking During Pregnancy <http://www.cdc.gov/nccdphp/factsheets/prevention/smoking.htm>.

women who may have smoked during their pregnancy, but were able to quit—those that may have previously responded “No” to tobacco use during pregnancy.

Increases among other Florida women of similar ages have not yet been reported, but data from BRFSS and YRBSS for 2004 and/or 2005 are not yet available. This trend may reflect an overall increase in smoking among young women in Florida.

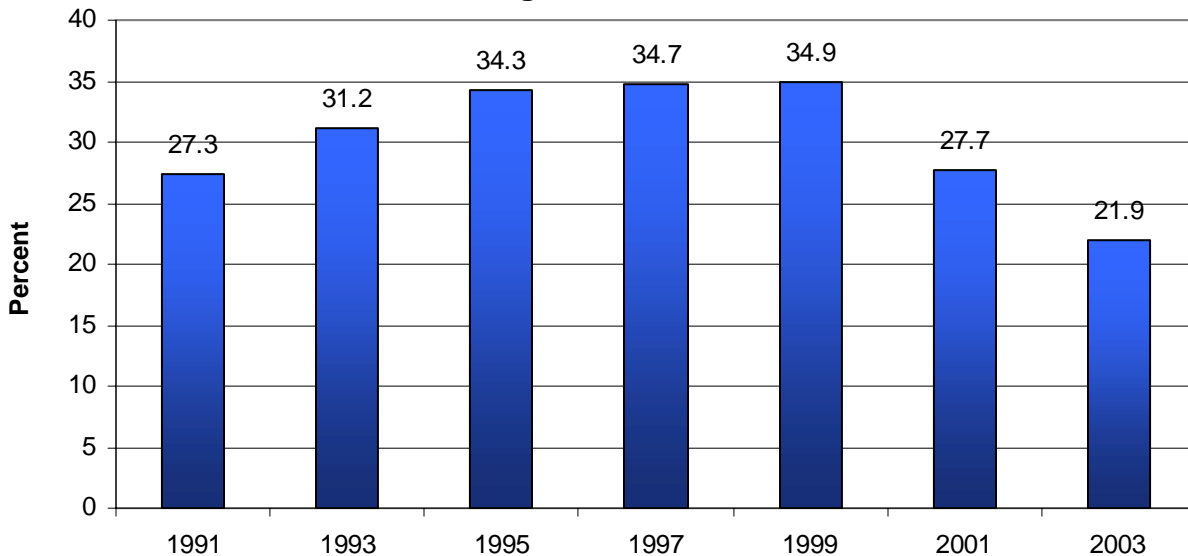
The increase in prevalence does not appear to be temporally associated with the 2004 hurricane season. Those counties most affected by the hurricanes had a smaller increase in prevalence than those counties least affected. Other explanations need to be explored and renewed public health efforts are need to reverse these trends.

**Chart 1: Florida Women of Childbearing Age (18-44)
Who Smoke, 1999-2003**



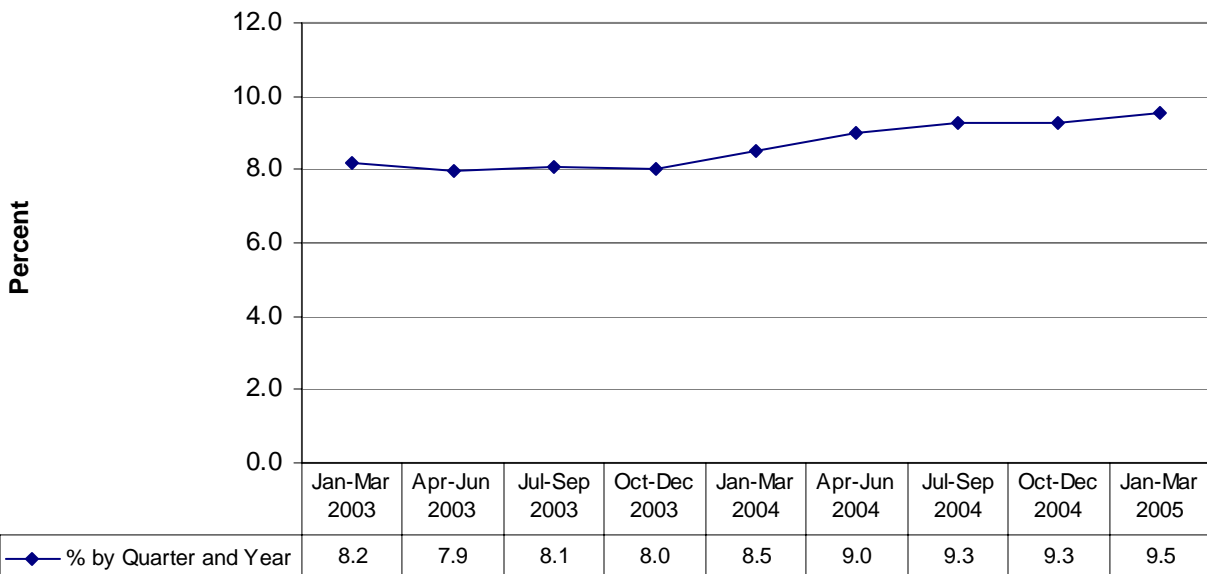
Data Source: March of Dimes-Peristats: Smoking: Behavioral Risk Factor Surveillance System.

**Chart 2: Female High School Students Who reported
Current Cigarette Use, 1991-2003**



Data Source: Morbidity and Mortality Weekly Report, Vol. 53, No. 23: Youth Risk Surveillance Survey (YRBSS) United States, 2003

Chart 3: Prevalence of Reported Smoking During Pregnancy on the Florida Birth Certificate by Quarter and Year

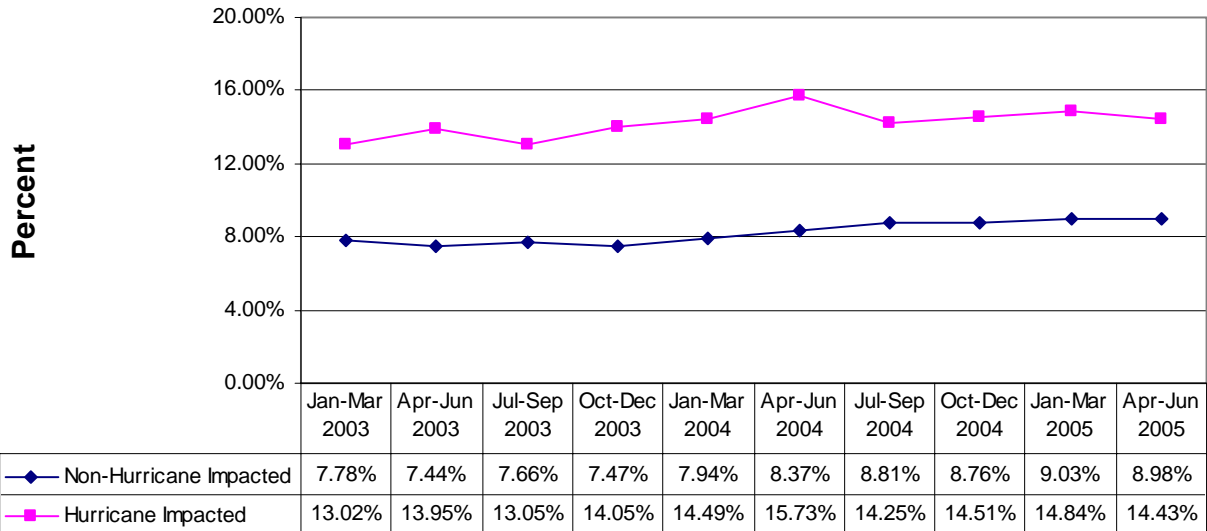


Secretary's Quarterly Performance Report, 2005 data are provisional and are not complete includes (Jan.-Sept.).

Table 1: Smoking Percentages for the Eight Hurricane Affected Counties Compared to All Other Counties, Calendar Years 2003 and 2004

8 Hurricane Affected Counties	2003	2004	Percent Change
Smoke yes	2,417	2,752	
Smoke no	15,465	15,929	
Total	17,882	18,681	
Smoke Percent	13.5%	14.7%	9.0%
Other 59 Counties	2003	2004	Percent Change
Smoke yes	14,748	16,905	
Smoke no	179,613	182,364	
Total	194,361	199,269	
Smoke Percent	7.6%	9.0%	18.9%

Chart 4: Prevalence of Reported Smoking During Pregnancy, Florida Birth Certificate



Data Source: Florida Department of Health, Office of Planning, Evaluation and Data Analysis, Secretary's Quarterly Performance Report