

Florida's Increasing Prevalence of Smoking During Pregnancy: The Impact of Revising the Smoking Question on the Birth Certificate

Prepared by: Angel Watson, M.P.H., R.H.I.A.,
Florida State University, Consultant to Florida Department of Health,
Division of Family Health Services

Dave Goodman, Ph. D., M.S., and William M. Sappenfield, M.D., M.P.H.
Florida Department of Health, Division of Family Health Services

Introduction

Although the prevalence of smoking during pregnancy has declined it remains a major public health issue. Smoking during pregnancy has been associated with preterm premature rupture of the membranes, abruptio placentae, placenta previa and preterm delivery. A Healthy People 2010 goal is to reduce tobacco use during pregnancy to no more than 1%.ⁱ During 2005, Florida's smoking during pregnancy prevalence was 9.6%.ⁱⁱ

Florida adopted the revised birth certificate during March, 2004 on which the smoking question was revised. Florida chose not use the NCHS recommended smoking question, shown in Appendix A.ⁱⁱⁱ Florida added a response ("Yes, but quit") to their original smoking question which was Tobacco use during pregnancy? (Previous responses: "Yes" or "No") This changed the method for calculating smoking during pregnancy. Florida began to add the "Yes" and the "Yes, but quit" responses together to determine the number of women who smoked during pregnancy.

Objective

The purpose of this analysis was to examine to what extent the revision of the birth certificate and change in reporting contributed to Florida's increasing prenatal smoking prevalence and to determine if the new smoking question on Florida's revised birth certificate should be used for policy and program decision making purposes. Specific aims included 1) describing how changes to the smoking question may have affected estimates of the proportion of women in Florida who smoke during pregnancy and 2) determining the accuracy of the new smoking question for measuring the proportion of women that smoke or quit smoking during pregnancy.

Methods

This analysis used Florida Pregnancy Risk Assessment Monitoring Systems (PRAMS) data linked to birth records for 2001-2004. Smoking trends in PRAMS, Florida birth certificates, Behavior Risk Factor Surveillance System (BRFSS), and Youth Risk Behavior Surveillance System (YRBSS) were examined. A sub analysis restricted to women who responded to PRAMS and had a completed birth certificate, was conducted to determine accuracy of smoking questions.

Responses to the revised smoking question from the newly adopted birth certificate were used, see appendix B. For PRAMS, smoking status was based on two questions: smoking within the

three months before pregnancy and smoking during the last three months of pregnancy, see appendix. "Yes" is based on smoking during the third trimester, "No" is based on no smoking during either time period, and "Quit" is based on smoking before pregnancy but not during the third trimester.

Responses from both were compared to calculate sensitivity and positive predicative values (PPV). These data were analyzed using Stata SE 9. The PRAMS percentages were weighted to reflect the population of Florida.

Results

The prevalence of smoking during pregnancy decreased gradually from 1993 (15%) to 2001 (8.1%). In 2004, the year the revised birth certificate was implemented the prevalence increased to 9%, shown in Figure 1.

Figure 1

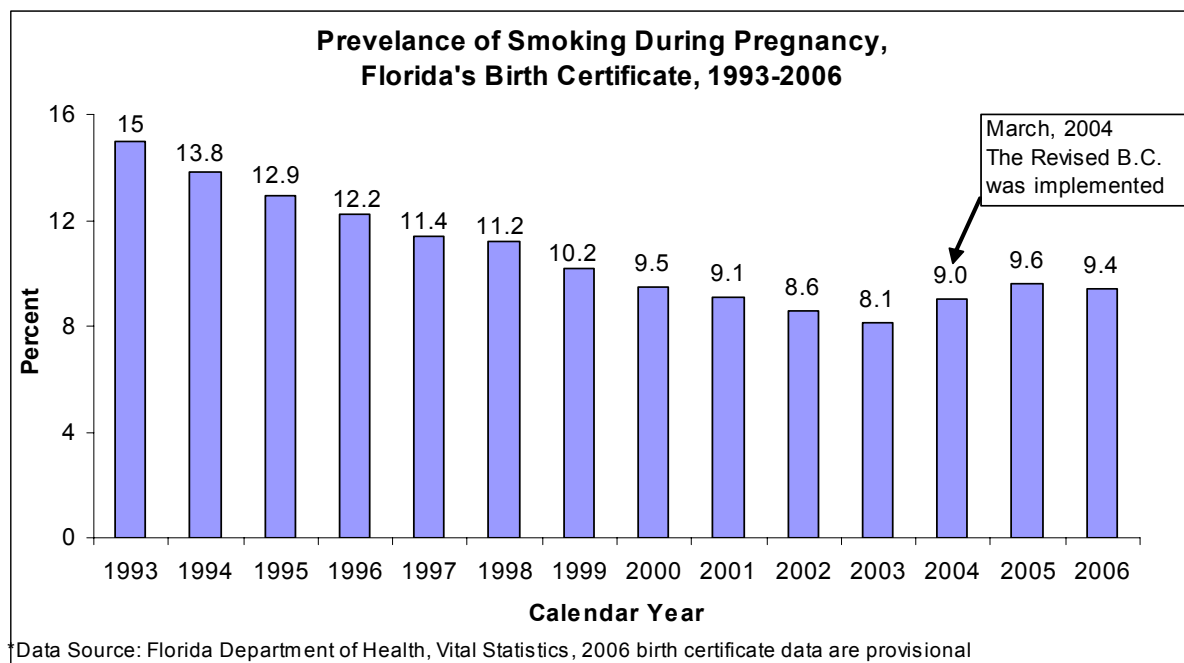


Figure 2 shows the smoking prevalence rates from the birth certificate and PRAMS. During the study period the PRAMS smoking prevalence rates were higher than the birth certificate prevalence rates, however during 2004 PRAMS did not show an increase in smoking; the smoking prevalence decreased from 10.6 to 9.8.

Figure 2

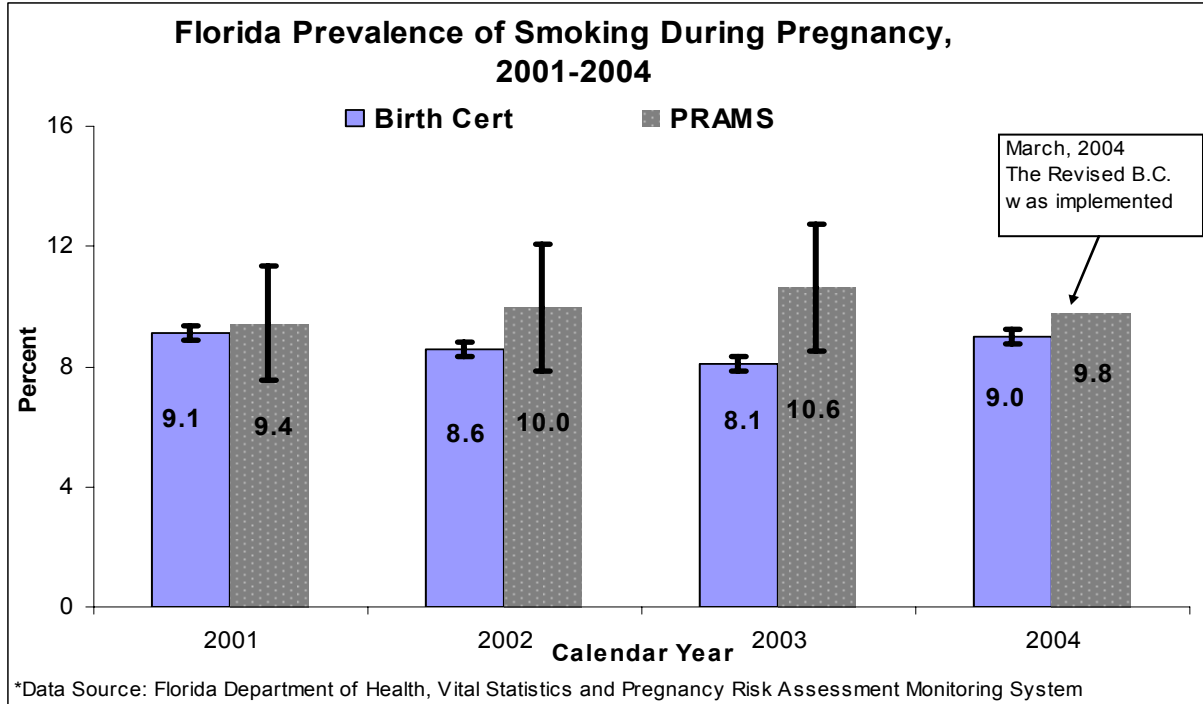
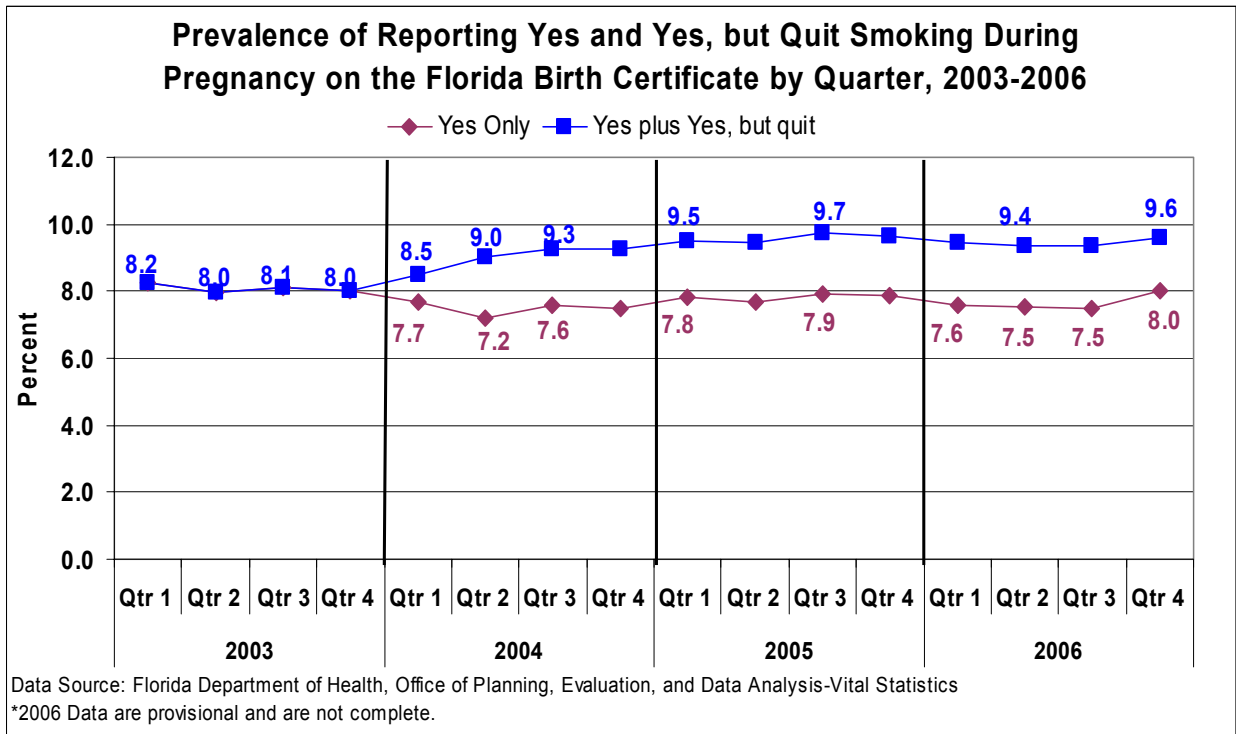


Figure 3 shows the revised method for calculating smoking during pregnancy (“Yes” plus “Yes, but quit”) and the old method for calculating smoking during pregnancy (“Yes” only) by quarter. Prior to implementation and thereafter the revised method suggested that smoking increased from 8.5% to 9.6%. The old method shows virtually no change.

Figure 3



Data from BRFSS suggest that the prevalence of smoking among women of childbearing age decreased from 2003 (28.1%) to 2004 (22.8%), shown in Figure 4. The prevalence of smoking among female students, according to YRBSS also decreased from 2001 (22.9%) to 2005 (16.9%), shown in Figure 5.

Figure 4

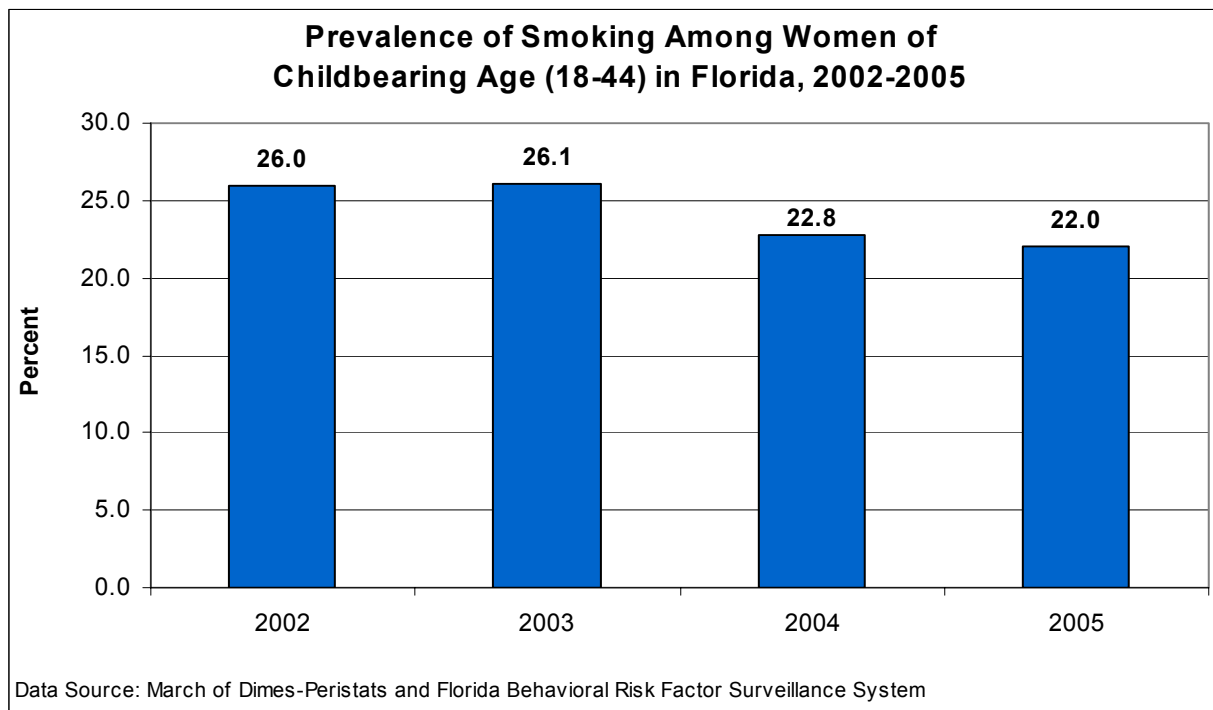


Figure 5

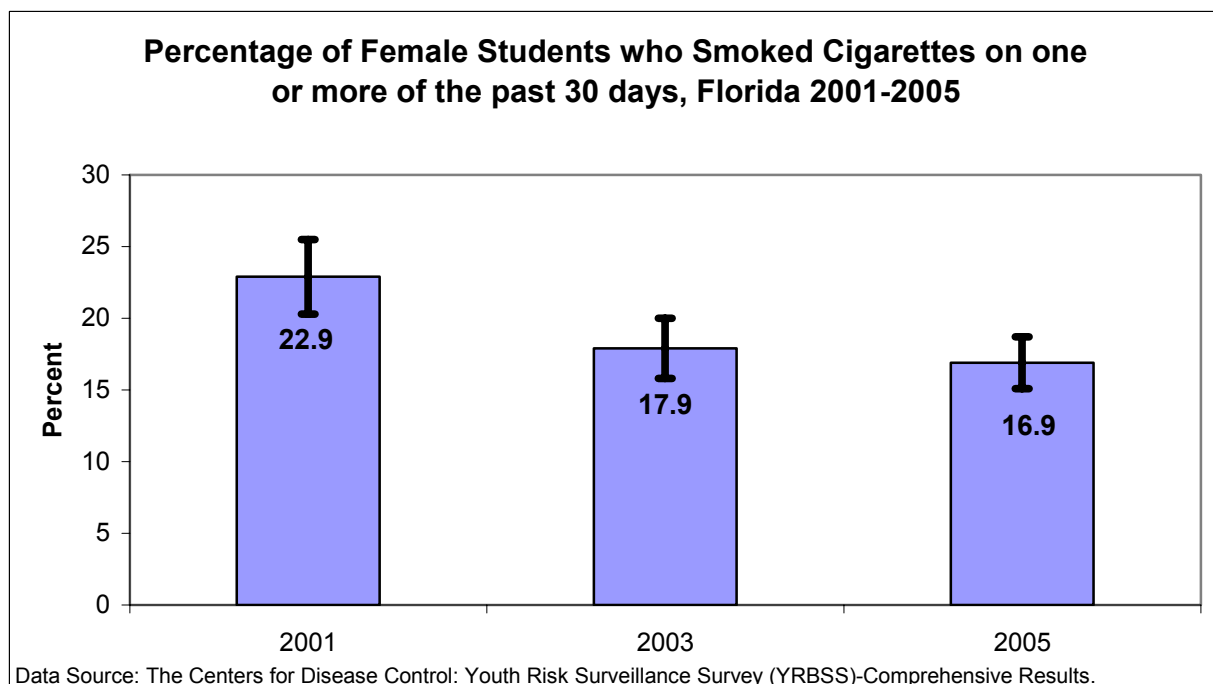


Table 1 below compares three categories of smoking: *yes*, *quit*, and *no* for both birth certificates and PRAMS from March to December, 2004. The birth certificate and PRAMS agree on .9% of the 12.8% of “quits” identified by PRAMS. This suggests that the birth certificate is correctly identifying only about 7% of women who quit smoking during pregnancy (sensitivity). PRAMS agrees on only .9% of the 1.7% of “quits” identified by the birth certificate (PPV). This suggests that a little over half (52.9%) of those women who were reported to have quit on the revised birth certificate. More importantly, PRAMS reports 11.5% of women who quit smoking that the revised birth certificate reports as not smoking.

In terms of smoking, PRAMS and Birth Certificates better agree (Sensitivity=83%, PPV=63%). As shown in earlier studies, PRAMS reports a higher smoking prevalence (8.6% vs. 6.6%). This difference needs to be recognized but should not mislead health monitoring at a state and county level as the trends have generally agreed over time.

PRAMS Responses	Birth Certificate Responses			Total
	No	Quit	Yes	
No	77.7%	0.2%	0.8%	78.6%
Quit	11.5%	0.9%	0.4%	12.8%
Yes	2.4%	0.7%	5.5%	8.6%
Total	91.6%	1.7%	6.6%	100.0%

Conclusions

According to the revised method for calculating smoking during pregnancy there has been an increase in smoking during pregnancy, however PRAMS, BRFSS, and YRBSS do not indicate an increase in tobacco use. Therefore, we conclude that the increase in smoking during pregnancy may be attributed to the revised birth certificate change in calculation for reporting smoking during pregnancy.

Given that other states are using the PRAMS-like question on their birth certificates or have adopted the NCHS recommended question, Florida “quit” estimates would be incomparable with other states. In addition, the response item substantially underreports quit rates and could seriously mislead health monitoring at a state and county level. In regards to smoking, the “yes, but quit” responses should not be combined with those who smoked as the combination could lead to over-reporting.

PRAMS is not the gold standard for accuracy as the smoking information is based on recall months after delivery and is not validated by biochemical testing. However, smoking information on PRAMS is generally thought to be more sensitive and specific than the smoking information on birth certificates. Moreover, the smoking question on the new NCHS model birth certificate is similar to the PRAMS questions.

Public Health Implications

Florida should not use the current quit response from the revised birth certificate for policy and program purposes. Florida should further explore the PRAMS and birth certificate responses.

Florida should also re-evaluate accepting the NCHS recommended question, using a PRAMS-like question, or reverting to the previous method for calculating smoking during pregnancy.

Many states are in the process of implementing the latest birth certificate revision. These revisions may alter prevalence and trends which in turn could impact policy and program decision making, as well as, comparability with other states.

ⁱ The Centers for Disease Control and Prevention, Maternal and Infant Health: Smoking During Pregnancy
<http://www.cdc.gov/reproductivehealth/maternalinfanthealth/related/smokingpregnancy.htm>

ⁱⁱ Florida Department of Health, Office of Planning, Evaluation and Data Analysis- Vital Statistics,
<http://www.floridacharts.com/charts/report.aspx?domain=03&IndNumber=0343>

ⁱⁱⁱ Center for Health Statistics, <http://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf>

Appendix

U.S. Standard Certificate of Live Birth, Smoking Question

37. CIGARETTE SMOKING BEFORE AND DURING PREGNANCY

For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. IF NONE, ENTER "0".

Average number of cigarettes or packs of cigarettes smoked per day.

	# of cigarettes		# of packs
Three Months Before Pregnancy	_____	OR	_____
First Three Months of Pregnancy	_____	OR	_____
Second Three Months of Pregnancy	_____	OR	_____
Third Trimester of Pregnancy	_____	OR	_____

Data Source: National Center for Health Statistics, <http://www.cdc.gov/nchs/data/dvs/birth11-03final-ACC.pdf>

Florida's Certificate of Live Birth Smoking Question

Tobacco Use During Pregnancy?

Yes (if yes, avg. no. cigarettes/day)
Yes, but quit
No

Data Source: Florida Department of Health, Office of Planning, Evaluation, and Data Analysis-Vital Statistics-Certificate of Live Birth