



Issue Brief

Cigarette Use During Pregnancy Among Rhode Island Mothers, 2012-2015, Rhode Island PRAMS

Erin Clements, MPH candidate, School of Public Health, Brown University

Pregnancy Is a Great Time to Quit!

Definition and Significance

Tobacco use before, during, and after pregnancy has been linked to adverse fetal, neonatal, and maternal outcomes. Smoking during pregnancy can cause premature birth, neonatal death, respiratory disease, and birth defects such as cleft lip or cleft palate.^{1,2,3} Tobacco exposure can also cause pregnancy complications such as miscarriage, placental previa, abruption, and insufficiency.⁴ In 2011, approximately 10% of women in the United States smoked cigarettes during their pregnancy according to data from the Centers for Disease Control and Prevention's (CDC) Pregnancy Risk Assessment Monitoring System (PRAMS).⁴ By understanding the risk factors and patterns of Rhode Island women who smoke during pregnancy, healthcare workers will be able to target interventions for at-risk women and help meet the Healthy People 2020 Goal of increasing abstinence from cigarette use during pregnancy. Cigarette use during pregnancy is preventable and quitting during pregnancy can significantly reduce adverse birth outcomes. Pregnancy can be a time when a woman is more motivated toward healthy behavior changes and more open to tobacco cessation counseling. Pregnancy is a great time to quit.

Healthy People 2020 Goal (MICH-11.3)

The Healthy People 2020 goal is to increase abstinence from cigarette smoking among pregnant women from 89.6% (in 2007) to 98.6%.

Rhode Island PRAMS

The goal of the PRAMS survey is to improve the health of mothers and infants by providing accurate data to a wide audience. The Rhode Island PRAMS program is conducted through a collaboration between the Rhode Island Department of Health (RIDOH) and the CDC. It surveys about 1,900 recent mothers per year. Responses are weighted to be representative of women who delivered a live infant in Rhode Island from 2012-2015. More information is available on the PRAMS website.^{5,6}

Recommendations for Healthcare Providers^{7, 8, 9}

Institute the 5As steps for pregnancy-specific counseling:

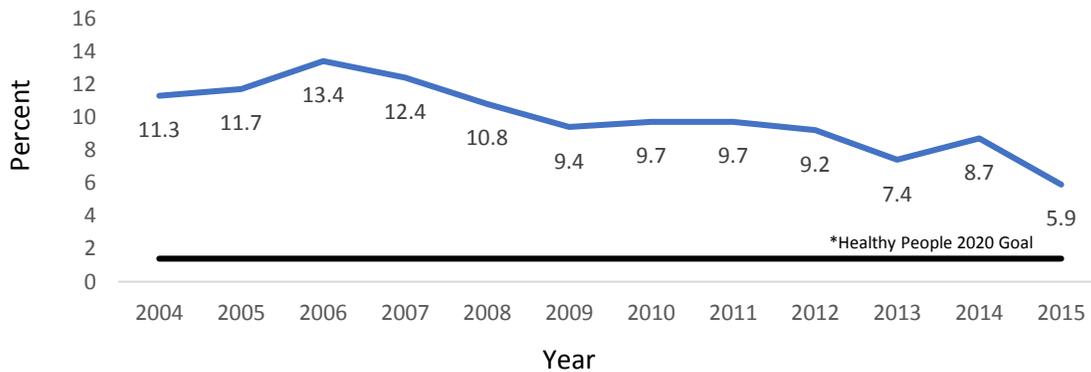
1. **Ask** the patient about smoking status at the first prenatal visit and follow up at subsequent visits.
 2. **Advise** the patient to quit.
 3. **Assess** the patient's willingness to quit
 4. **Assist** the patient by providing resources.
 5. **Arrange** follow-up visits to track the progress of the patient's attempt to quit.
- Start intervention during prenatal care.
 - Provider reminders and documentation of smoking status and cessation intervention can increase the number of patients who quit.
 - Use quitlines to support goal of quitting.
 - Create a *Quit Contract* and agree on a date to stop smoking.
 - Consider nicotine replacement therapies (NRT) with provider supervision.
 - Monitor for postpartum relapse.
 - Link health systems and organizations that serve women who are at high risk for smoking during pregnancy with available resources.
 - Educate providers and pregnant women on tobacco cessation coverage benefits and services available in Rhode Island via commercial health insurers and Medicaid.
 - Be aware of the State's smoking prevalence rates for prenatal and pregnant women.

Methods

The 2012 - 2015 Rhode Island PRAMS survey weighted dataset was used. Tobacco use is assessed in PRAMS by asking mothers about cigarette use in the past two years, three months before their latest pregnancy, and the last three months of that pregnancy. Women were coded as *no cigarette use* if they reported no cigarette use in the past two years, in the three months before pregnancy, and during pregnancy. Women were assigned to *quit cigarette use* if they reported smoking pre-conceptionally (three months before) but no cigarette use during the last three months of pregnancy. Women were assigned to *cigarette use during pregnancy* if they reported any cigarette use during the last three months of pregnancy.¹⁰

Adverse birth outcomes were also measured and coded. Small-for-gestational-age infants were coded as such if they were in the tenth percentile for size based on their gestational age. Infants were coded as low birth weight if their birth weight was less than 2,500 grams. Infants were coded as preterm if they were born at less than 37 gestational weeks. Statistical analysis was performed using survey weighted data in STATA/SE 14.2 to determine prevalence, trends, and odds ratios of adverse birth outcomes.

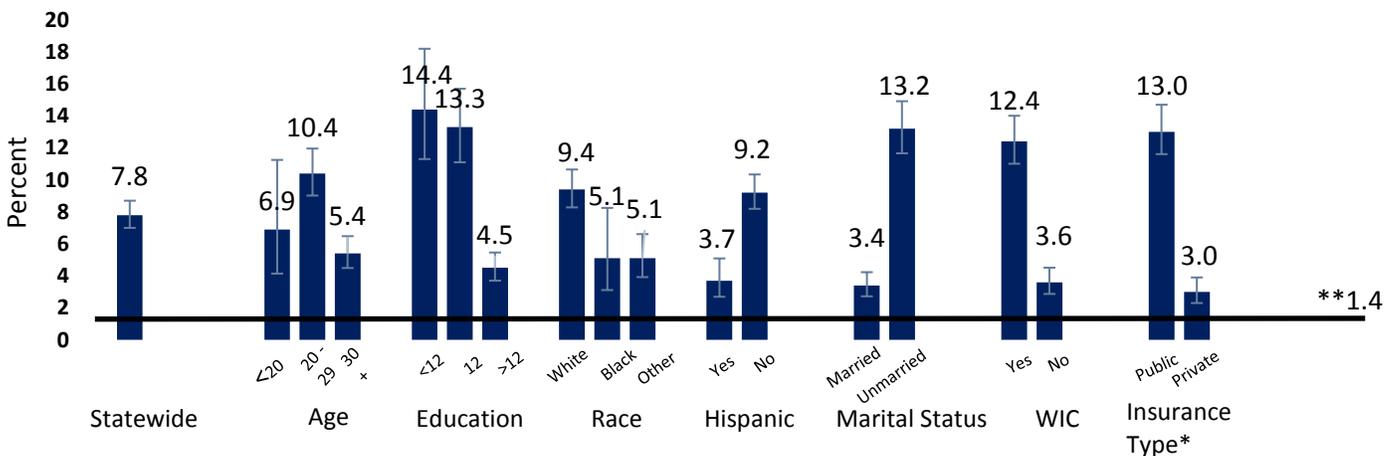
Figure 1: Cigarette Use During Pregnancy by Year, RI PRAMS 2004-2015



Trend Data

In Rhode Island, cigarette use during pregnancy has been trending downward in the last decade. Since 2004, prevalence of cigarette use during the last three months of pregnancy has decreased from 11.3% in 2004 to 5.9% in 2015 (Linear Trend: $p < 0.0001$), as shown in **Figure 1**.

Figure 2: Prevalence of Cigarette Use During Pregnancy by Maternal Demographic Characteristics, RI PRAMS 2012-2015



*Insurance type describes insurance the mother had during her latest pregnancy. Public insurance includes Medicaid and Rlte Care. Other types of insurance and no insurance were not included in the variable.

**Healthy People 2020 goal is 1.4%.

Demographic Characteristics

The results listed in **Figure 2** demonstrate that the overall prevalence of Rhode Island mothers smoking in the last three months of pregnancy, surveyed between 2012 to 2015, was 7.8%. Mothers between 20-29 years of age (10.4%), white (9.4%), non-Hispanic (9.2%), unmarried (13.2%), had less than 12 years of education (14.4%), had public health insurance (13.0%), and participated in the WIC program (12.4%) had a higher prevalence of tobacco use during pregnancy compared with their counterparts.

Birth Outcomes by Maternal Cigarette Use Status

The prevalence of adverse birth outcomes (low birth weight, small-for-gestational age, and preterm birth) by maternal cigarette smoking status is listed in **Figure 3**. Infants whose mothers used cigarettes during pregnancy had a notably higher prevalence of preterm birth, small-for-gestational age, and low birth weight compared to infants whose mothers did not smoke cigarettes at all or those who quit smoking during pregnancy. **Figure 4** demonstrates that women who smoke during pregnancy had 2.58 higher odds of having an infant small-for-gestational age, 2.07 higher odds of having a low birth weight infant, and 1.76 higher odds of having a preterm birth compared to women with no cigarette use. There was no significant difference in the odds of having adverse birth outcomes for mothers who smoked pre-conceptionally but quit during pregnancy compared to mothers with no cigarette use as demonstrated by **Figure 4**. All variables listed in Figure 1 were controlled for in the logistic model to produce adjusted odds ratios.

Figure 3: Prevalence of Adverse Birth Outcomes by Cigarette Use Status, Rhode Island PRAMS 2012-2015

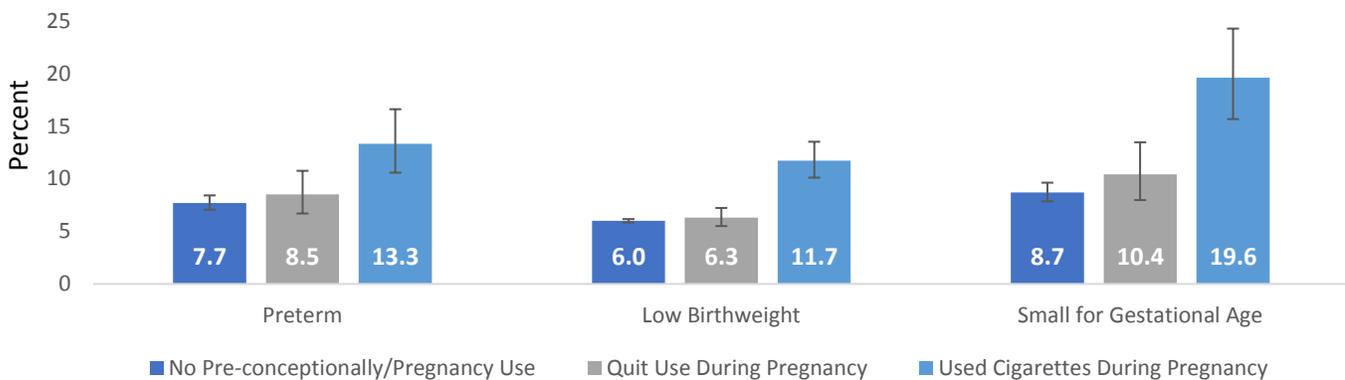
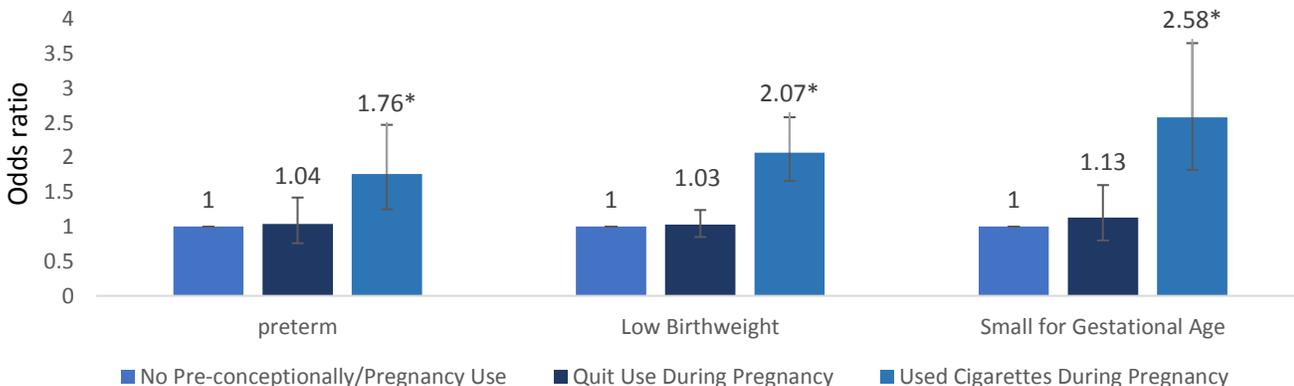


Figure 4: Adjusted Odds Ratios of Adverse Birth Outcomes by Cigarette Use Status, Rhode Island PRAMS 2012-2015



*p<0.001

Public Health Implications

Overall, there has been a substantial downward trend of cigarette use during pregnancy in Rhode Island in the past decade. Healthcare workers should follow the CDC and American College of Obstetricians and Gynecologists (ACOG) recommendations for counseling women to quit smoking during pregnancy, including counseling and motivational interviewing and surveillance of postpartum relapse.⁴ This trend needs to continue until the Healthy People 2020 goal is

met. Women who smoked during pregnancy have significantly higher odds of experiencing an adverse birth outcome compared to women who did not smoke cigarettes at all, which is consistent with past years' findings. Notably, women who smoked cigarettes pre-conceptionally but quit during pregnancy did not have significant odds of adverse birth outcomes compared to women who did not smoke before and during pregnancy.¹¹ Pregnancy is an ideal motivational time to highlight the many health benefits of quitting tobacco use for both mother and baby.

Limitations

The data demonstrate that cigarette use during pregnancy has decreased significantly in Rhode Island in time. However, Rhode Island PRAMS Phase 7 survey only collects information regarding cigarette smoking. It does not collect information on use of other types of smoking products, such as e-cigarettes and vaping, thereby creating a limitation of findings. The use of these types of smoking products will be collected in the upcoming revised PRAMS questionnaire.

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References

1. Forest S, Priest S. Intrauterine Tobacco Smoke Exposure and Congenital Heart Defects. *Journal of Perinatal & Neonatal Nursing* 2016;30:54-63.
2. Centers for Disease Control and Prevention. Smoking During Pregnancy. https://www.cdc.gov/tobacco/basic_information/health_effects/pregnancy/index.htm
3. Centers for Disease Control and Prevention. Tobacco Use and Pregnancy. <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/index.htm>
4. American Congress of Obstetricians and Gynecologists (ACOG). Smoking Cessation During Pregnancy. 2011. <https://www.acog.org/~media/Departments/Tobacco%20Alcohol%20and%20Substance%20Abuse/SCDP.pdf>
5. Centers for Disease Control and Prevention (CDC): Pregnancy Risk Assessment Monitoring System [Internet]. Available from: <https://www.cdc.gov/prams/>
6. State of Rhode Island Department of Health: Pregnancy Risk Assessment Monitoring System [Internet]. [cited 2017 Dec 14]; Available from: http://health.ri.gov/programs/detail.php?pgm_id=185/
7. Centers for Disease Control and Prevention Information for Health Care Providers and Public Health Professionals: Preventing Tobacco Use During Pregnancy <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/tobaccousepregnancy/providers.html>
8. The American College of Obstetricians and Gynecologists. Smoking Cessation During Pregnancy: A Clinician's Guide to Helping Pregnant Women Quit Smoking. 2011 Self-instructional Guide and Tool Kit. 2011. Print.
9. The American College of Obstetricians and Gynecologists. Smoking Cessation During Pregnancy: Interim Update. ACOG Committee Opinion. Vol. 130, No. 4, October 2017. <https://www.acog.org/-/media/Committee-Opinions/Committee-on-Obstetric-Practice/co721.pdf?dmc=1&ts=20180201T1832413356>
10. Oh S, Reingle Gonzalez JM, Salas-Wright CP, Vaughn MG, DiNitto DM. Prevalence and correlates of alcohol and tobacco use among pregnant women in the United States: Evidence from the NSDUH 2005–2014. *Preventive Medicine* 2017;97:93-9.
11. Kim H, Monteiro K. Effect of Smoking Cessation during Pregnancy on Birth Outcomes: Rhode Island, 2012-2015. Brown School of Public Health. 2017.