

# PRAMSGRAM

OKLAHOMA PREGNANCY RISK ASSESSMENT MONITORING SYSTEM VOL 17, NO 2 FALL 2013

## First Trimester Prenatal Care and Impact on Household Smoking Rules

### Introduction:

In the United States, more than 50,000 deaths a year are attributable to secondhand smoke exposure.<sup>1</sup> One study found that approximately 900 infant deaths annually in the United States were attributable to secondhand smoke.<sup>2</sup> Secondhand smoke is a combination of over 4,000 chemicals, with more than 40 identified as known carcinogens. Secondhand smoke is sometimes known as involuntary or passive smoking.<sup>3</sup>

In Oklahoma, approximately 22.5% of adults live in homes where smoking is allowed some or all of the time (2012 Behavioral Risk Factor Surveillance System (BRFSS) unpublished data). Pregnant women in households where smoking is permitted inside the home are at an increased risk for adverse birth outcomes.<sup>4</sup> The American College of Obstetricians and Gynecology (ACOG) reports that secondhand smoke exposure during pregnancy increases a woman's risk of having a baby with low birthweight by 20%, and women exposed to secondhand smoke should be counseled during prenatal care (PNC) on how to address the issue with family and avoid exposure.<sup>4</sup> ACOG also recommends that evidence-based smoking cessation practices, such as the 5 As, be integrated into a woman's routine prenatal care, including strategy development for limiting exposure from others in the household who smoke.<sup>5</sup>

Approximately 8% of children in the U.S. (5.5 million children) live in households where someone smoked inside the home, resulting in secondhand smoke exposure.<sup>6</sup> Infants and children living with secondhand smoke exposure have an increased risk for acute respiratory infections, asthma attacks, ear infections, and sudden infant death syndrome (SIDS). Children 18 months or younger account for an estimated 150,000-300,000 of new cases of bronchitis and pneumonia annually. This results in a projected 7,500-15,000 hospitalizations in the US each year.<sup>1</sup>

### In Oklahoma:

- 91.2% of first-time mothers in Oklahoma reported having smoke-free rules for their homes.
- Mothers who were married, living with the infant's father postpartum, those with more than a high school education, and/or did not utilize Medicaid for payment of delivery or prenatal care were more likely to report smoke-free households.
- Mothers with Medicaid-funded prenatal care or delivery service were more likely to discuss the harmful effects of smoking with their PNC providers.
- Receiving prenatal care in the first trimester had no significant impact in having a smoke-free household among first-time mothers.

Smoking rules support creating a smoke-free environment. Opening windows, closing doors, and ventilating the home are not solutions for eliminating exposure to secondhand smoke. The only proven method to eliminate secondhand smoke exposure is to implement a smoke-free home policy and adhere to it. There is no safe level of exposure to secondhand smoke.<sup>1</sup>

This PRAMSgram explores characteristics of first-time mothers with and without smoke-free homes. The report examines the relationship between first trimester PNC and the presence of household smoking rules in determining if early contact with a health care provider benefits women in establishing a smoke-free environment within the home.

## Methods:

Oklahoma PRAMS survey data for the years 2009-2011 were used in this report. The survey asked new mothers to “describe the rules about smoking inside your home now” (at the time the survey was administered, 2-8 months postpartum). Mothers answering “no one is allowed to smoke anywhere inside my home” were classified as having completely smoke-free homes. Mothers responding “smoking is allowed in some rooms or at some times” or “smoking is permitted anywhere inside the home” were classified as having limited or no rules. To determine if receipt of prenatal care in the first trimester impacted the likelihood of smoking rules in the household, only first-time mothers were reviewed; approximately 39% of the birth population. This was done to limit the potential bias from providers who had established obstetric relationships with patients and may have introduced the topic in prior pregnancies. PNC in the first trimester was determined from the response to the PRAMS survey question “How many weeks or months pregnant were you when you had your first visit for prenatal care?”

Analysis for this study utilized SAS callable SUDAAN. Prevalence rates and 95% confidence interval (C.I.) estimates were calculated. Potential associations were identified using the Cochran-Mantel-Haenszel Chi-Square ( $\chi^2$ ) Test. Variables were considered significant at  $p < 0.05$ . Multivariate logistic regression models were used to calculate adjusted odds ratios (OR).

The Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing, population-based study designed to collect information about maternal behaviors and experiences before, during, and after pregnancy. Monthly, PRAMS sampled between 200 to 250 recent mothers taken from the Oklahoma live birth registry. Mothers were mailed up to three questionnaires seeking their participation. Follow-up phone interviews for non-respondents were conducted. A systematic stratified sampling design was used to yield sample sizes sufficient to generate population estimates for groups considered at risk for adverse pregnancy outcomes. Information included in the birth registry is used to develop analysis weights that adjust for probability of selection and non-response.

## Results:

More than ninety percent of first-time mothers in Oklahoma had smoke-free households two to eight months postpartum. Nearly nine percent indicated they had limited or no rules about smoking in their homes (Table 1). Mothers who were married, living with the infant’s father postpartum, had more than a high school education and/or did not utilize Medicaid to pay for delivery or prenatal care were more likely to report smoke-free households. There was no significant difference in smoking rules among racial and ethnic groups.

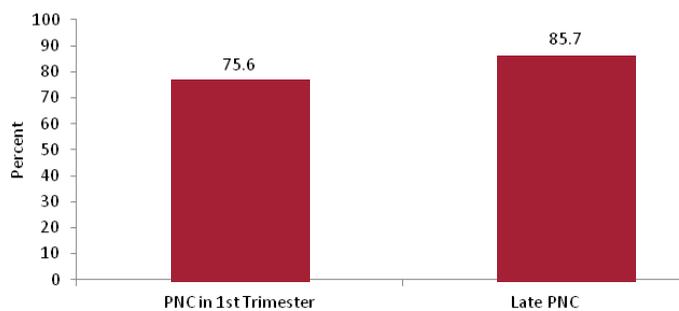
**Table 1. Selected Demographics of First-time Mothers by Household Smoking Rules Status, Oklahoma PRAMS 2009-2011**

Demographics	Completely smoke free rules		Limited or no rules	
	Rate	95% C.I.	Rate	95% C.I.
<b>Overall</b>	91.2	89.0 - 93.1	8.8	6.9 - 11.0
<b>Maternal Age*</b>				
< 20 yrs	83.2	76.7 - 88.2	16.8	11.9 - 23.2
20-29 yrs	93.4	90.8 - 95.3	6.6	4.7 - 9.2
≥ 30yrs	94.8	89.3 - 97.6	-	-
<b>Marital Status*</b>				
Married	96.5	94.4 - 97.9	3.5	2.1 - 5.6
Other	86.2	82.3 - 89.4	13.8	10.6 - 17.7
<b>Current Living Arrangement*</b>				
Not living with infant’s father	85.9	79.7 - 90.5	14.1	9.5 - 20.4
Living with infant’s father	93.6	91.3 - 95.3	6.4	4.7 - 8.7
<b>Maternal Education*</b>				
< HS	76.9	66.8 - 84.6	23.1	15.4 - 33.2
HS	89.4	84.6 - 92.8	10.6	7.2 - 15.4
> HS	96.1	93.8 - 97.6	3.9	2.4 - 6.2
<b>Race</b>				
White	92.3	89.7 - 94.3	7.7	5.7 - 10.3
Black	85.5	73.7 - 92.6	14.5	7.4 - 26.3
American Indian	86.3	76.1 - 93.5	-	-
Others	92.6	85.2 - 96.4	-	-
<b>Hispanic</b>				
No	90.7	88.3 - 92.7	9.3	7.3 - 11.7
Yes	95.0	88.2 - 98.0	-	-
<b>Prenatal care/delivery paid by Medicaid*</b>				
No	97.0	94.4 - 98.5	-	-
Yes	87.7	84.4 - 90.4	12.3	9.6 - 15.6
<b>Household income*</b>				
< \$10,000	85.4	79.4 - 89.9	14.6	10.1 - 20.6
\$10,000-\$14,999	80.5	71.0 - 87.4	19.6	12.6 - 29.0
\$15,000-\$19,999	97.6	92.2 - 99.3	-	-
\$20,000-\$24,999	94.7	85.8 - 98.1	-	-
\$25,000-\$34,999	94.7	87.6 - 97.8	-	-
\$35,000-\$49,999	92.2	89.9 - 99.3	-	-
\$50,000 or more	98.8	96.0 - 99.6	-	-

\* Indicates significance at  $p < 0.05$  - Indicates cell size  $< 30$

§ Only mothers  $< 17$  years of age

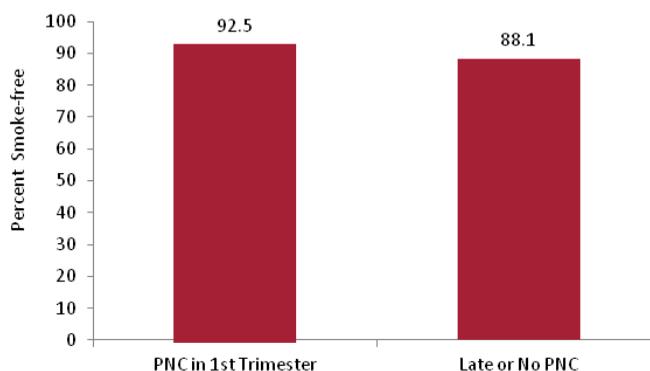
**Figure 1. Prevalence of a Prenatal Care Discussion about the Effects of Smoking Among Oklahoma First Time Mothers, PRAMS 2009-2011**



According to Oklahoma PRAMS data, 76.4% of first-time mothers received prenatal care in the first trimester. Almost 76% of those receiving prenatal care (PNC) in the first trimester discussed the harmful effects of smoking with their prenatal care provider (Figure 1). The percentage of mothers with late PNC receiving counseling on smoking was 86%. Mothers with no PNC (approximately 1%) were not asked about counseling topics.

Overall, first-time mothers reported significantly higher rates of smoke-free households. Ninety-two percent of first-time mothers with first trimester PNC reported

**Figure 2. Household Smoke-free Smoking Rules Among Oklahoma First Time Mothers, by Prenatal Care Status, PRAMS 2009-2011**



a smoke-free home policy compared to 88.1% among mothers with late or no PNC (Figure 2).

Household smoking rules varied by smoking behaviors and PNC status. Among women with first trimester PNC, mothers who smoked in the three months prior to pregnancy were significantly less likely to report a smoke-free home, compared to mothers who did not smoke (Table 2). More than one in five women with late or no PNC and secondhand smoke exposure had limited or no household smoking rules.

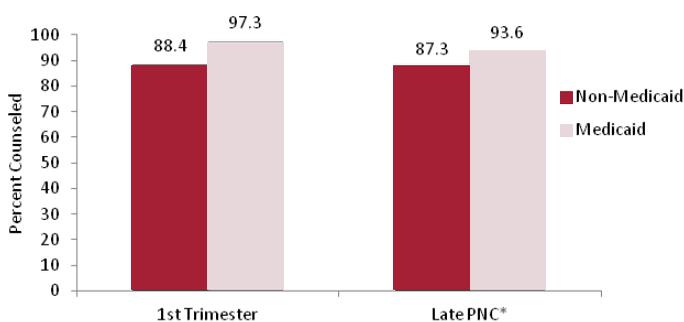
**Table 2. Prevalence of Smoking and Secondhand Smoke Exposure Among First-time Mothers by Prenatal Care Status and Household Smoking Rules Status, Oklahoma PRAMS 2009-2011**

Maternal Behavior	PNC in 1 <sup>st</sup> Trimester				Late or No PNC			
	Completely smoke free rules		Limited or no rules		Completely smoke free rules		Limited or no rules	
	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.	Rate	95% C.I.
<b>Smoking 3 Months Before Pregnancy</b>								
No	95.7	93.2 - 97.3	4.3	2.7 - 6.8	92.9	86.0 - 96.6	-	-
Yes	85.6	79.9 - 90.0	14.3	10.0 - 20.2	80.7	69.4 - 88.5	19.3	11.5 - 30.6
<b>Smoking Last 3 Months of Pregnancy</b>								
No	94.2	91.8 - 95.9	5.8	4.1 - 8.3	91.8	85.7 - 95.4	-	-
Yes	81.2	71.2 - 88.4	18.8	11.6 - 28.9	75.2	58.6 - 86.6	-	-
<b>Secondhand Smoke Exposure</b>								
Never	97.9	96.1 - 98.9	2.0	1.1 - 3.9	98.3	91.4 - 100.0	-	-
Sometimes or always	91.8	75.5 - 86.7	18.2	13.3 - 24.5	78.3	68.1 - 85.9	21.7	14.1 - 31.9
<b>Smoking Postpartum</b>								
No	95.2	92.9 - 96.8	4.8	3.2 - 7.1	90.5	83.6 - 94.7	-	-
Yes	82.9	75.3 - 88.6	17.1	11.4 - 24.7	82.7	70.2 - 90.7	17.3	9.3 - 29.8

- Indicates cell size < 30

Table 1 shows the differences between Medicaid and non-Medicaid mothers with respect to smoking rules. To further examine these differences with respect to their PNC status, PNC counseling on smoking and smoke-free rules were examined for both groups. Figure 3 highlights the percent of first-time mothers with PNC counseling about smoking by Medicaid and PNC status. Mothers with Medicaid-funded prenatal care or delivery service were more likely to discuss the harmful effects of smoking with their PNC providers, regardless of timing of PNC initiation, compared to their counterparts (only mothers indicating they had PNC answered this question). However, mothers who initiated PNC in the first trimester were more likely to have counseling on smoking if they had Medicaid-funded services (97.3%), compared to mothers without Medicaid (88.4%).

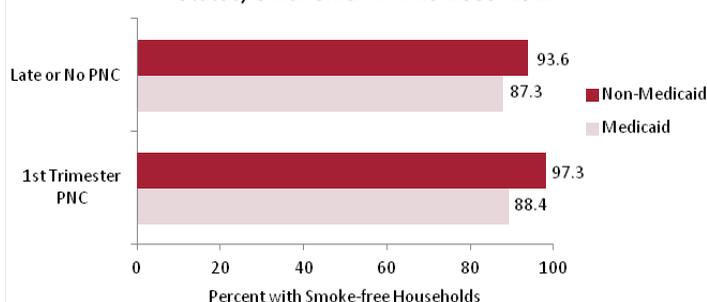
**Figure 3: PNC Counseling about Smoking by Medicaid and PNC Status for First-time Mothers, Oklahoma PRAMS 2009-2011**



\* Mothers with no PNC were excluded

The presence of a smoke-free household policy also differed by Medicaid status (Figure 4). First-time mothers with Medicaid-funded services were less likely to have a smoke-free home policy, compared to mothers without Medicaid and this appeared to be independent of the timing of PNC initiation.

**Figure 4. Percent of Smoke-free Households Among First-time Mothers by Medicaid and Prenatal Care Status, Oklahoma PRAMS 2009-2011**



A logistic regression analysis (Table 3) was run to determine if PNC in the first trimester impacted the likelihood of having a smoke-free home policy for women. The unadjusted odds ratio for PNC in the first trimester was 1.67. When adjusting for maternal demographics, PNC counseling on smoking, maternal smoking status, and income, the adjusted odds ratio became 0.96 (95% CI= 0.52-1.93), indicating that receiving PNC in the first trimester did not likely impact having completely smoke-free household rules among first-time mothers.

**Table 3. Unadjusted and Adjusted Odds Ratios for Completely Smoke-Free Household Rules Among First-time Mothers, Oklahoma PRAMS 2009-2011**

PNC in 1st Trimester	OR	95% C.I.
Unadjusted	1.67	0.96 - 2.93
Adjusted	0.96	0.52 - 1.93

### Discussion:

In Oklahoma, approximately nine out of ten first-time mothers reported having completely smoke-free household rules. Mothers who smoked reported lower rates; about eight in ten stated they had completely smoke-free household rules. These data are similar to reported smoke-free household rule rates in other PRAMS states like Texas, Arkansas and South Carolina.<sup>7</sup>

The lack of an association between first trimester PNC and maintaining a completely smoke-free household postpartum underscores the need for health care providers to discuss setting smoke-free rules in the household for smoking and non-smoking patients. Guidance on maintaining a smoke-free household should be given at health visits throughout the life course, without regards to an individual's smoking status. All household members should be educated on the risks of secondhand smoke. Secondhand smoke's harmful health effects for pregnant women and infants, including preterm birth and infant death, are widely documented.<sup>1-5</sup>

Providers counseled women with Medicaid on the effects of smoking at significantly higher rates than women without Medicaid. However, first-time mothers receiving Medicaid had significantly lower rates of completely smoke-free household rules. Discussions of the harmful effects of smoking alone were not effective in creating smoke-free households, illustrating the need for specific secondhand smoke counseling with

follow-up reinforcement at multiple points during prenatal and postpartum care.

A non-smoker living or working around smokers may be exposed to thirdhand smoke, even if no one smokes when they are present. Thirdhand smoke, or residual tobacco smoke, consists of particles that settle into dust and on surfaces, including clothing, after the smoke has cleared. Residue may be particularly risky for infants and small children who are more likely to play on the floor, be held by someone with residue on their clothing, and place non-food objects in their mouths.<sup>8</sup> Thirdhand smoke was not evaluated for this study and cannot be accurately measured at this time. Emerging research on this subject indicates potential toxicity and harmful health effects.<sup>9</sup>

Limitations for this study include the lack of measurable information regarding the breadth and depth of prenatal care counseling concerning smoking and the lack of information about smoking cessation offered to mothers. A universal definition of 1st trimester PNC is not used across datasets, therefore clear, unambiguous initiation of care is difficult to document. Mothers who indicated to their providers they did not smoke may not have received appropriate counseling on this topic or felt the information was not considered relevant. Social desirability bias may be causing an over-reporting of smoke-free households in the state and an under-reporting of smoking. Tribal tobacco use for cultural purposes may impact the likelihood of tobacco exposure in a household, as some tribal members use tobacco for ceremonial purposes. An unknown in this study was others in the household, besides the mother, who may have smoked and where exposure to secondhand smoke may have occurred outside the home (in a vehicle, at work, etc.). Alternative nicotine delivery devices, such as electronic cigarettes (or e-cigarettes), were not measured.

## Recommendations:

1. Screen pregnant women and new mothers for tobacco use and exposures to secondhand and thirdhand smoke in their homes and vehicles, and discuss the importance of maintaining a smoke-free environment for their families.
2. Encourage all health care providers to refer families to the Oklahoma Tobacco Helpline if anyone in the household uses tobacco products: 1-800-QUIT-NOW (1-800-784-8669).
3. Create more awareness about thirdhand smoke, the danger associated with it, and how to limit exposure to infants and children.
4. Encourage Medicaid to reimburse pediatric health care providers for smoking cessation counseling to parents/guardians of children during well child and sick care visits.
5. Include secondhand and thirdhand smoke exposure in discussions about infant and toddler safety given during prenatal classes, PNC visits, and well child checks.
6. Encourage providers to utilize the free Centers for Disease Control and Prevention (CDC) training on tobacco cessation for CMEs, available at [www.smokingcessationandpregnancy.org](http://www.smokingcessationandpregnancy.org) (Free CME expires in August 2014).
7. Encourage licensed, home-based child care facilities to be smoke-free 24 hours a day, not just during hours of operation, to limit infant and toddler thirdhand smoke exposure.
8. Add questions to existing surveys about traditional tobacco use, e-cigarette use, and the use of other non-FDA approved alternative nicotine delivery devices, to better understand the prevalence of these issues in Oklahoma and their impact on maternal and child health.
9. Educate policymakers about the potential health impact and quality control issues regarding e-cigarettes and other non-FDA approved alternative nicotine delivery devices.
10. Refer all e-cigarette users, including users of other non-FDA approved alternative nicotine delivery devices, to the Oklahoma Tobacco Helpline: 1-800-QUIT-NOW (1-800-784-8669).

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