

# PRAMSGRAM

OKLAHOMA PREGNANCY RISK ASSESSMENT MONITORING SYSTEM VOL 14 NO 1 SUMMER 2010

## Preconception Care and Its Impact in Oklahoma

### Introduction:

The percent of women who received prenatal care during the first trimester has increased in Oklahoma during the last 20 years (67.6% in 1990 to 77.3% in 2007).<sup>1</sup> While advances in medical care during this time have improved chances of survivability, the prevalence of adverse outcomes associated with pregnancy and childbirth (low birth weight, preterm birth, infant death, maternal death) has not improved, indicating early and adequate prenatal care by itself is not sufficient to bring about reductions in poor outcomes.<sup>2</sup> In addition, nearly half of all live births in Oklahoma continue to be the result of unintended pregnancies. Therefore, health status, care, and behaviors before conception may be an area where additional concentration and effort are needed to reduce adverse pregnancy and delivery outcomes for women and infants.

Preconception health, or health prior to pregnancy, has gained wide recognition as an important means to ameliorate health issues before they can impact a pregnancy. Health conditions and risk factors such as diabetes, high blood pressure, obesity, alcohol use, and tobacco use all have the potential to complicate pregnancy and harm the developing fetus. Although early prenatal care may identify and treat the presenting health issue due to those conditions, the fetus may have been exposed to the teratogenic effects for eight to twelve weeks before prenatal care began. Comprehensive preconception care provides potential parents with an awareness and understanding of their risk factors such as family health history, tobacco and alcohol use, pre-existing medical conditions, body weight, nutrition and physical activity, and needed vaccines. However, preconception care is not routinely provided to all women. Women may not seek preconception health care for a variety of reasons including: lack of insurance; insurance that does not cover the cost of a preconception health care visit; the perception that they are healthy and do not need a preconception health care visit; lack of education regarding the impact of current health conditions on pregnancy; or a lack of

### In Oklahoma:

- Only 12.0% of Oklahoma women received advice or counseling to prepare for becoming pregnant.
- Preconception care visits were associated with a reduced likelihood of smoking during pregnancy.
- Preconception care visits were associated with an increased likelihood of taking a regular multivitamin before pregnancy and receiving first trimester prenatal care.
- Only 1.0% of Oklahoma mothers met all the criteria for the Oklahoma Preconception Health Index, indicating multiple risk factors were present before conception, which could have been addressed during a preconception care visit.

planning for pregnancy for those 50% of females who have unintended pregnancies.<sup>3,4,5</sup>

Studies have found that only 13.5% to 15.2% of women in Oklahoma receive preconception care (PCC).<sup>4,5</sup> Although several variables most likely influenced those findings, one potential contributor was a lack of awareness of the importance and value of PCC. Another possibility was that women were receiving some preconception health care advice but did not recognize it as such. Given the impact that chronic health conditions, obesity, infections, and substance abuse can have on pregnancy outcomes, women may have received advice on these issues but not perceived the information as related to preconception health. Because of the potential impact on pregnancy outcome, health care providers should view every interaction with a female of reproductive age as an opportunity to provide preconception health care and counseling.

This PRAMSGRAM describes the women in Oklahoma who received a preconception care visit, the impact the visit had on pregnancy outcomes, and provides an Oklahoma Preconception Health Index to highlight the health needs of women in this state before they become pregnant.

## Methods:

This study used data from the Pregnancy Risk Assessment Monitoring System (PRAMS) for the survey years 2005 to 2008. For this period, 11,067 Oklahoma mothers were sent the PRAMS survey shortly after the birth of their child. Of these mothers, 7,942 completed the questionnaire, yielding an unweighted overall response rate of 71.8%. An overview of the mothers who completed the survey can be found in Table 1. A detailed explanation of PRAMS methodology has been well-documented elsewhere.<sup>6</sup>

To determine preconception health advice or counseling receipt, respondents were asked to respond by checking “No” or “Yes” if certain events occurred before they became pregnant with their most recent baby. A total of 7,840 valid responses were received for the specific item, “I received advice or counseling from a health care provider to prepare for becoming pregnant.” For the purposes of this study, preconception care includes only preconception advice or counseling.

Due to the PRAMS stratified weighted sample, SUDAAN 10.0.0 was used to perform the statistical analysis. In the descriptive analysis, variables were examined using percentages and confidence intervals. Logistic regression modeling was performed to produce adjusted odds ratios (AOR) as measures of association between selected independent variables and PCC. Variables were considered statistically significant at  $p < 0.05$ .

## Results:

Overall, only 12.0% of women in Oklahoma received a preconception health visit prior to pregnancy (Table 2). Significant differences were evident between demographic groups of women who did or did not receive a visit. Non-Hispanic women were more likely to report the receipt of a PCC visit when compared to Hispanic women (12.9% vs. 5.7%).

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. On a monthly basis, PRAMS samples between 200 and 250 recent mothers from the Oklahoma live birth registry. Mothers are sent as many as three mail questionnaires seeking their participation, with follow-up phone interviews for non-respondents. A systematic stratified sampling design is 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.

**Table 1: Characteristics of Oklahoma PRAMS Respondents, 2005-2008**

| Characteristic              | %*   | 95% CI     |
|-----------------------------|------|------------|
| <b>Maternal Race</b>        |      |            |
| White                       | 79.4 | 77.8, 80.9 |
| African American            | 8.7  | 7.7, 9.8   |
| Native American             | 12.0 | 10.8, 13.3 |
| <b>Maternal Ethnicity</b>   |      |            |
| Hispanic                    | 13.2 | 12.0, 14.6 |
| Non-Hispanic                | 86.8 | 85.5, 88.0 |
| <b>Maternal Age</b>         |      |            |
| <20                         | 13.1 | 11.9, 14.5 |
| 20-24                       | 31.5 | 29.8, 33.3 |
| 25-29                       | 30.1 | 28.5, 31.8 |
| 30+                         | 25.2 | 23.7, 26.8 |
| <b>Maternal Education**</b> |      |            |
| <12 years                   | 20.7 | 19.2, 22.3 |
| 12 years                    | 38.2 | 36.4, 40.0 |
| >12 years                   | 40.4 | 39.4, 42.9 |
| <b>Marital Status</b>       |      |            |
| Married                     | 40.3 | 38.5, 42.1 |
| Unmarried                   | 59.7 | 57.9, 61.5 |
| <b>Insurance Status</b>     |      |            |
| Medicaid/SoonerCare         | 40.1 | 38.3, 41.9 |
| Private                     | 59.9 | 58.2, 61.7 |

\*Weighted Percentage

\*\* Mothers under age 18 excluded from this measure

**Table 2: Maternal Demographics by Preconception Care Status, PRAMS 2005-2008**

|                                     | Received advice or counseling from a health care provider to prepare for becoming pregnant |            | Did not receive advice or counseling from a health care provider to prepare for becoming pregnant |            | Chi-Square $p$ -value |
|-------------------------------------|--|------------|---|------------|-----------------------|
|                                     | %  | 95% CI     | %   | 95% CI     |                       |
| <b>Overall</b>                      | 12.0   | 10.9, 13.2 | 88.0  | 86.8, 89.1 |                       |
| <b>Maternal Race</b>                |  |            |   |            |                       |
| White                               | 12.0   | 10.7, 13.3 | 88.0  | 86.7, 89.3 | 0.1647                |
| African American                    | 15.5   | 11.4, 20.9 | 84.5  | 79.1, 88.7 |                       |
| Native American                     | 10.0   | 7.2, 13.7  | 90.0  | 86.3, 92.8 |                       |
| <b>Maternal Ethnicity</b>           |  |            |   |            |                       |
| Hispanic                            | 5.7  | 3.8, 8.5   | 94.3  | 91.5, 96.3 | <.0001                |
| Non-Hispanic                        | 12.9   | 11.7, 14.3 | 87.1  | 85.7, 88.3 |                       |
| <b>Maternal Age</b>                 |  |            |   |            |                       |
| <20                                 | 9.8  | 7.0, 13.6  | 90.2  | 86.4, 93.0 | <.0001                |
| 20-24                               | 7.2  | 5.7, 9.1   | 92.8  | 90.9, 94.3 |                       |
| 25-29                               | 15.0   | 12.9, 17.5 | 85.0  | 82.5, 87.1 |                       |
| 30+                                 | 15.5   | 13.2, 18.1 | 84.5  | 82.0, 86.8 |                       |
| <b>Maternal Education*</b>          |  |            |   |            |                       |
| <12 years                           | 6.5  | 4.6, 9.0   | 93.5  | 90.9, 95.4 | <.0001                |
| 12 years                            | 9.0  | 7.4, 10.8  | 91.0  | 89.2, 92.6 |                       |
| >12 years                           | 17.6   | 15.7, 19.7 | 82.4  | 80.3, 84.3 |                       |
| <b>Marital Status</b>               |  |            |   |            |                       |
| Married                             | 15.1   | 13.6, 16.8 | 84.9  | 83.2, 86.4 | <.0001                |
| Unmarried                           | 7.3  | 5.9, 9.1   | 92.7  | 90.9, 94.1 |                       |
| <b>Insurance Status</b>             |  |            |   |            |                       |
| Medicaid/SoonerCare                 | 7.0  | 5.9, 8.4   | 93.0  | 91.6, 94.1 | <.0001                |
| Private                             | 21.3   | 19.0, 23.9 | 78.7  | 76.1, 81.0 |                       |
| <b>Geographic Area of Residence</b> |  |            |   |            |                       |
| Urban                               | 12.7   | 11.4, 14.0 | 87.3  | 86.0, 88.6 | .0085                 |
| Rural                               | 8.9  | 6.7, 11.7  | 91.1  | 88.3, 93.3 |                       |

\*Mothers under age 18 excluded from this measure

Maternal age, education, and marital status were each significantly associated with the receipt of PCC. Women 20-24 were less likely to receive PCC than women who were older than 24. Having some higher education contributed to a greater likelihood of having received PCC when compared to women with a high school education or less (17.6% vs. 9.0% and 6.5%, respectively). Women who were married were twice as likely to receive PCC as women who were unmarried. Maternal race was not significant in the bivariate analysis.

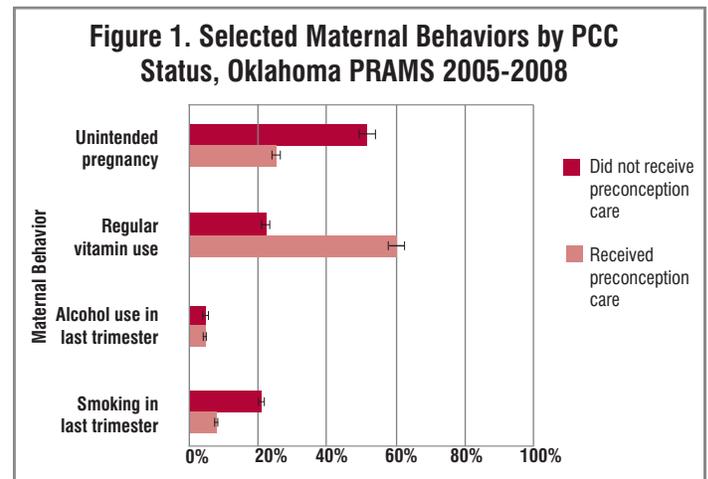
Women with private health insurance were almost three times as likely to report receiving preconception care as women who had Medicaid/SoonerCare (21.3% vs. 7.0%). Women with urban addresses more often reported utilizing PCC compared to rural women; however, the difference was less dramatic and not statistically significant (12.7% vs. 8.9%).

| Table 3: Maternal Characteristics by Preconception Care Status, PRAMS 2005-2008 |              |            |                     |            |                    |
|---|--------------|------------|---------------------|------------|--------------------|
| Characteristic  | Received PCC |            | Did not receive PCC |            | Chi-Square p-value |
|   | %            | 95% CI     | %                   | 95% CI     |                    |
| <b>Parity</b>   |              |            |                     |            |                    |
| Previous live birth   | 8.9          | 7.7, 10.4  | 91.1                | 89.6, 92.3 | <.0001             |
| No previous live birth  | 16.2         | 14.3, 18.4 | 83.8                | 81.6, 85.7 |                    |
| <b>Dental Visit 12 Months Before Pregnancy</b>                                  |              |            |                     |            |                    |
| Yes   | 18.2         | 16.1, 20.4 | 81.8                | 79.6, 83.9 | <.0001             |
| No  | 8.0          | 6.8, 9.4   | 92.0                | 90.6, 93.2 |                    |
| <b>Trying to Get Pregnant at Time of Conception</b>                             |              |            |                     |            |                    |
| Yes   | 20.0         | 17.9, 22.3 | 80.0                | 77.7, 82.1 | <.0001             |
| No  | 6.3          | 5.2, 7.7   | 93.7                | 92.3, 94.8 |                    |
| <b>Pre-pregnancy BMI</b>  |              |            |                     |            |                    |
| Underweight (< 19.8)  | 10.2         | 7.5, 13.7  | 89.8                | 86.3, 92.5 | .5596              |
| Normal (19.8- 26)   | 12.6         | 10.9, 14.4 | 87.4                | 85.6, 89.1 |                    |
| Overweight (>26-29)   | 13.0         | 9.9, 16.9  | 87.0                | 83.1, 90.1 |                    |
| Obese (>29)   | 12.6         | 10.4, 15.2 | 87.4                | 84.8, 89.6 |                    |
| <b>Confirmation of Pregnancy</b>  |              |            |                     |            |                    |
| 1-4 weeks   | 14.9         | 13.0, 17.0 | 85.1                | 83.0, 87.0 | <.0001             |
| 5-8 weeks   | 11.9         | 10.2, 13.9 | 88.1                | 86.1, 89.8 |                    |
| 9-12 weeks  | 7.4          | 4.9, 11.0  | 92.6                | 89.0, 95.1 |                    |
| 13+ weeks   | 5.8          | 3.2, 10.4  | 94.2                | 89.6, 96.8 |                    |
| <b>Prenatal Care Initiated in 1st Trimester</b>                                 |              |            |                     |            |                    |
| Yes   | 13.9         | 12.5, 15.3 | 86.1                | 84.7, 87.5 | <.0001             |
| No  | 5.6          | 4.0, 7.8   | 94.4                | 92.2, 96.0 |                    |
| <b>Preterm Birth</b>  |              |            |                     |            |                    |
| Yes (<37 weeks gestation)   | 14.3         | 11.5, 17.7 | 85.7                | 82.3, 88.5 | .1273              |
| No (37+ weeks gestation)  | 11.7         | 10.5, 13.0 | 88.3                | 87.0, 89.5 |                    |
| <b>Infant Birthweight</b>   |              |            |                     |            |                    |
| Low Birthweight (<2,500 grams)  | 13.1         | 12.1, 14.2 | 86.9                | 85.8, 87.9 | .1539              |
| Normal Birthweight (2,500+ grams)   | 11.9         | 10.7, 13.2 | 88.1                | 86.8, 89.3 |                    |
| <b>Infant in NICU after Delivery</b>  |              |            |                     |            |                    |
| Yes   | 15.9         | 12.7, 19.7 | 84.1                | 80.3, 87.4 | .0262              |
| No  | 11.6         | 10.4, 12.9 | 88.4                | 87.1, 89.6 |                    |
| <b>Breastfeeding Initiation</b>   |              |            |                     |            |                    |
| Yes   | 12.7         | 11.4, 14.2 | 87.3                | 85.8, 88.6 | .0539              |
| No  | 10.1         | 8.0, 12.6  | 89.9                | 87.4, 92.0 |                    |

Table 3 describes selected maternal characteristics and delivery outcomes by receipt of preconception care. Those women most likely to receive preconception care advice or counseling were nulliparous (no previous live births), had been to the dentist in the 12 months prior to pregnancy, were trying to get pregnant at conception, and received prenatal care in the first trimester. Body mass index (BMI) prior to pregnancy was not significantly associated with PCC. The infant's birth weight, gestational age, time spent in the neonatal intensive care unit (NICU), and breastfeeding status were not found to be significantly associated with PCC.

When adjusting for potential confounding factors in a multivariate logistic regression, only race was significantly associated with PCC. African American women were almost three times more likely to receive PCC than white women (adjusted odds ratio (AOR) = 2.88, 95% confidence interval (CI) 1.54-5.38). Insurance status, pregnancy intention, ethnicity, marital status, and education were not found to be significantly associated with PCC (data not shown).

Women who received PCC were less likely to have an unintended pregnancy compared to women who did not receive PCC (24.6% vs. 51.6%, Figure 1). Sixty percent of women who received PCC took vitamins four or more times per week prior to pregnancy (regular usage), compared to 22.2% of women who did not receive PCC. There was not a significant difference in alcohol use during pregnancy between the two groups. Women who received PCC were significantly less likely to smoke in the last three months of pregnancy compared to women who did not receive PCC (See Figure 1).



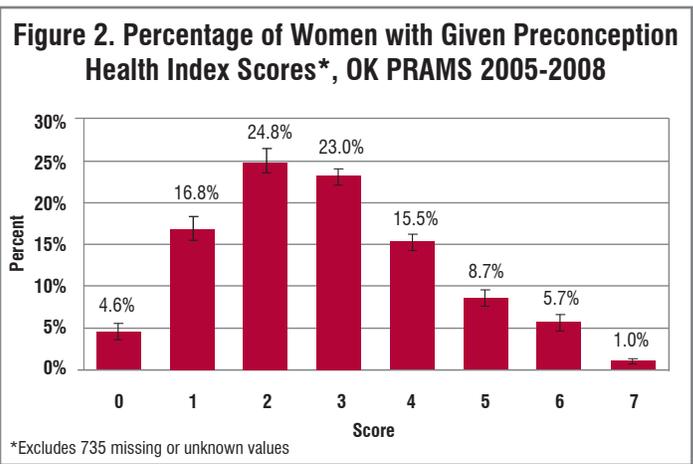
To determine if PCC had an impact on pregnancy outcomes when controlling for maternal demographic and behavioral variables, several multivariate logistic regression models were run. Outcomes of interest were smoking during pregnancy, drinking during pregnancy,

regular multivitamin use before pregnancy, entry into prenatal care during the first trimester, breastfeeding initiation, infant low birth weight (< 2500 grams), and preterm birth (< 37 weeks gestation). Women who received PCC when controlling for a variety of demographic and maternal behavior characteristics were less likely to smoke during pregnancy (AOR= 0.42, 95% CI 0.26-0.67), were three times more likely to take a regular multivitamin (4 or more times per week, (AOR= 3.28, 95% CI 2.52-4.28)), and were more likely to receive first trimester prenatal care (AOR= 1.90, 95% CI 1.17-3.08) compared to women who did not receive PCC. Drinking alcohol during pregnancy, breastfeeding initiation, low birth weight, and preterm birth were not associated with PCC (data not shown).

An Oklahoma Preconception Health Index was created using eight variables known to contribute to pregnancy health and improved infant outcomes to determine how many women in Oklahoma began pregnancy in optimal preconception health. These variables were the only indicators of pre-pregnancy health available in the 2005-2008 PRAMS dataset. Overall statewide prevalence varied for the individual preconception health variables: 49.8% had a BMI that fell into the normal weight range; 66.8% reported no smoking in the three months prior to pregnancy; 48.8% stated no drinking in the three months prior to pregnancy; 36.3% had a dental visit in the 12 months before pregnancy; 65.2% had heard or read about the benefits of folic acid; 26.7% reported taking a multivitamin four or more times per week before pregnancy; 12.0% had a PCC visit; and 51.1% had an intended pregnancy (data not shown).

Abstinence from alcohol and tobacco prior to pregnancy was combined into one variable to create an index with seven variables. To be classified as optimally preconceptionally healthy the women must have: BMI that fell into the normal weight range (19.8-26.0 BMI); reported no smoking and no drinking in the three months prior to pregnancy; had a dental visit in the 12 months before pregnancy; had heard or read about the benefits of folic acid; reported taking a multivitamin four or more times per week before pregnancy; had a PCC visit; and had an intended pregnancy.

Only 1.0% (95% CI 0.6%-1.3%) of women met all of the preconception health index criteria. If the PCC visit is removed from the criteria, the definition becomes a little more inclusive: 4.7% (95% CI 3.9%-5.5%) met the preconception health index criteria. Approximately half of new mothers in the state scored a two or a three, meaning they met the criteria for any two or three of the selected variables; while 4.6% did not meet any of the criteria (See Figure 2).



## Discussion:

Preconception care is a public health priority for the state of Oklahoma. The Oklahoma Health Improvement Plan (OHIP) states that receiving quality PCC in Oklahoma is imperative to the health of Oklahoma's children. Increasing the number of females who receive quality PCC and improving the overall health of females and males in Oklahoma can only benefit reproductive health outcomes in the state.<sup>7</sup> This study found that only 12% of mothers received PCC prior to their most recent delivery.

Maternal age and race were significant contributors to the likelihood of receipt of PCC in Oklahoma. Women 20-24 years of age had some of the lowest rates of PCC. This has been replicated in other studies; Utah PRAMS found that women in this age group were significantly less likely to receive PCC when compared to older women.<sup>8</sup> This may be in part due to the higher likelihood of being uninsured or underinsured in this age group. Many no longer qualified for parental insurance policies, and may have been without full-time employment or working jobs with limited or no health care benefits due to student status or limited time in the labor force. Why African American women were more likely to receive PCC should be further explored in studies, to ascertain the content and quality of their PCC and their satisfaction with the advice or counseling.

Preconception care visits were not directly associated with a reduced risk of low birth weight or preterm birth in Oklahoma in this study. What was found to be significantly associated with PCC was increased likelihood of multivitamin use prior to conception, first trimester initiation of prenatal care, and a reduction in smoking during pregnancy. All three of these factors have been found to improve the health outcomes of the pregnancy and fetus in a multitude of research studies.<sup>9-11</sup>

Many preconception behaviors vital to reducing risks such as the regular consumption of multivitamins, planning a pregnancy, abstinence from tobacco and alcohol, achieving

a healthy weight, regular dental visits, and receiving advice or counseling to prepare for becoming pregnant, are not practiced by most females prior to pregnancy in Oklahoma. Less than 1 in 20 women met the Oklahoma Preconception Health Index criteria without a PCC visit, and only 1.0% met all of the criteria with the PCC visit. The index is useful in pinpointing a few basic areas of health where providers and programs can consistently and repeatedly emphasize the importance of these behaviors and their impact on possible future pregnancies as well as overall health status. Preconception care can positively impact the health of a pregnancy by lowering risks and improving behaviors that contribute to healthier babies in this state.

System barriers to the receipt of PCC should be explored. Because so few women received PCC in the state, barriers to preconception care need attention. Lack of awareness about the need for and benefits of preconception care may be a major contributor to this low overall rate among most women in the state. Other barriers may include provider knowledge and attitude. Dentists, pediatricians, and primary care physicians seeing a client for a “problem” visit may not recognize the visit as an opportunity to provide PCC counseling and education. Some providers may be providing PCC counseling and education but not identifying it as PCC, and therefore clients do not perceive the information provided as such.

One limitation of this study is the lack of a specific definition of preconception care, other than “advice or counseling to prepare for becoming pregnant” from a health care provider. The number of visits prior to pregnancy, where the care was obtained, the quality and content of the care, and who the health care provider was is all unknown. Additionally, the issue of self motivation to obtain PCC, and to then practice healthy behaviors, is unknown.

Strengths of the study include the random sample survey methods, the large sample size, and the inclusion of questions about preconception care. Until 2009, only a few PRAMS states asked women about receiving preconception care in their PRAMS surveys. However, due to the retrospective nature of the survey only associations can be determined, not causation.

## Recommendations:

1. Educate health care providers to view every interaction with a female or male of reproductive age as an opportunity for preconception health counseling.
2. Advocate for the provision of preconception care in all health insurance packages for all females and males of reproductive age and promote preconception care as a necessary component of medical care.

3. Encourage employer-based wellness programs to offer preconception health materials and counseling as a routine part of the company’s program.
4. Educate women and men on the connection between everyday health and future pregnancy health.
5. Incorporate preconception health into health education curricula in schools to reinforce the importance of health across a lifespan, and how it impacts health across generations.
6. Support programs like Children First (C1) and Healthy Start that provide evidence-based preconception counseling and advice for clients.
7. Utilize the Women’s Health Checklist created by the Preconception Workgroup of the statewide initiative to reduce infant mortality, “Preparing for a Lifetime, It’s Everyone’s Responsibility,” to provide PCC to all females of reproductive age. This tool can be utilized by a variety of health care providers at a multitude of sites, walk-in health clinics, county health departments, community health centers, private providers, and Federally Qualified Health Centers (FQHCs).
8. Offer group sessions for preconception care at county health departments as part of family planning services so that community members can have access to quality, low-cost preconception counseling and advice to prepare for a healthy pregnancy when they are ready.
9. Inform women using non-traditional education methods about their need for preconception health care so that they can advocate for PCC themselves.
10. Provide the tobacco quit line number to females who smoke or have partners who smoke 1-800-QUIT NOW (1-800-784-8669).
11. Monitor opportunities to apply for federal and private funding to promote preconception health as part of routine health care.
12. Enhance collection of data on preconception health care and the quality of advice and pregnancy-related information received by females prior to pregnancy.
13. Access “Preparing for a Lifetime, It’s Everyone’s Responsibility” initiative webpage “Before and Between Pregnancy” to learn more about preconception/interconception health at <http://iio.health/ok.gov>.

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