

## Pre-pregnancy Maternal Overweight as a Risk Factor for Child Overweight

Studies have shown that maternal obesity is a risk factor for poor pregnancy outcomes, infant health issues, and childhood overweight and obesity.<sup>1</sup> This report examines the strength of association maternal pre-pregnancy overweight/obesity has on childhood overweight/obesity at age three.

Because weight status for children is not readily available on a statewide level, Oklahoma Pregnancy Risk Assessment Monitoring System (PRAMS) and the Supplemental Nutrition Program for Women, Infants and Children (WIC) data were linked to determine the impact maternal overweight/obesity had on childhood overweight/obesity when controlling for confounding factors. Body Mass Index (BMI) was cal-

culated for the children based on height and weight measurements by WIC counselors. BMI for mothers was obtained from self-reported pre-pregnancy weight and height in PRAMS. Overweight/obese status for children was classified as being at or above the 85th percentile for weight and height by gender.<sup>2</sup> Among mothers, the Institute of Medicine (IOM) classification of pre-pregnancy overweight/obese was used (BMI  $\geq$  25.0).<sup>3</sup> Data from 2004-2008 PRAMS and WIC were linked and analyzed. For the remainder of the report overweight/obese will be referred to as overweight.

PRAMS data show that 41.1% of new mothers in Oklahoma were overweight in 2004-2008. Wom-

### OKLAHOMA FACTS

- 41.1% of new mothers were classified as overweight or obese prior to pregnancy.
- 32.0% of 3-year-olds with WIC were overweight or obese.
- 37.4% of children with WIC born to women who were overweight prior to pregnancy were overweight at the age of 3.
- 27.5% of children with WIC born to women who were under or normal weight before they became pregnant were overweight at age 3.
- Overweight/obese women had a 34% higher risk of having an overweight 3-year-old, compared to normal or underweight women (among the WIC population).

**Figure 1. Prevalence of Overweight/Obese 3-year-old WIC Participants by Maternal BMI Status, PRAMS-WIC Linked Data 2004-2008**

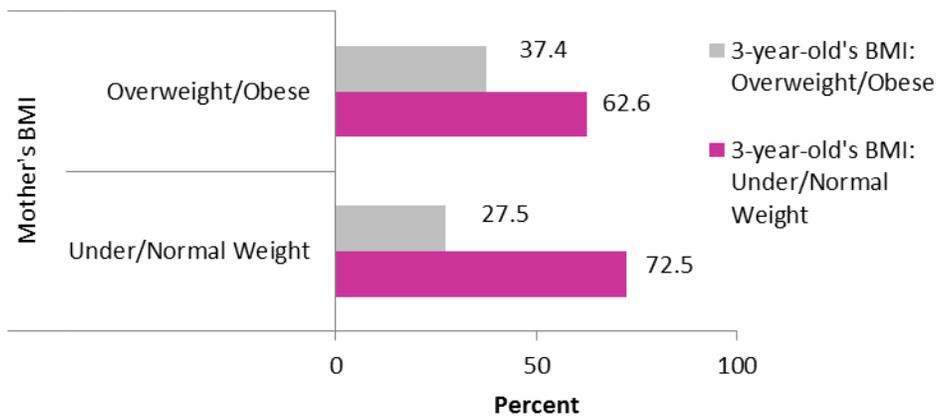


Table 1. Maternal Pre-pregnancy Overweight as a Risk Factor for Child Overweight at 3-years-old, PRAMS-WIC Linked Data 2004-2008

Risk	Risk Ratio	95% C.I.
<b>Maternal Overweight</b>  (Adjusted for maternal age, race, education, household income, child's birth weight, Hispanic ethnicity, parity, Medicaid status, gestational diabetes)	1.34	(1.04 - 1.71)

en were more likely to be classified as overweight if they were 30 years or older, married, white, had more than a high school education, and/or had more than one child.

Thirty-seven percent of 3-year-olds with WIC were overweight if their mothers' pre-pregnancy BMI was 25.0 or greater (Figure 1). For toddlers born to women who had a BMI of less than 25.0 prior to pregnancy (or who were classified as under or normal weight), 27.5% were classified as overweight at age 3.

Mothers who were overweight or obese prior to pregnancy were significantly more likely to have an overweight 3-year-old, when compared to mothers who were under or normal weight. To gain a better understanding of this relationship, the risk ratio was determined, adjusting the model for potential confounders, like maternal age, prior live births, race/ethnicity, gestational diabetes, Medicaid, and the child's birth weight (Table 1).

After controlling for these factors, the relationship remained significant. Women with a BMI of 25.0 or greater prior to pregnancy had

a 34% higher risk of having an overweight 3-year-old than mothers who were at a normal or underweight BMI (among the WIC population).

WIC provides valuable nutrition to low-income mothers and their children. These data were collected prior to changes in the WIC food packages, state breastfeeding campaigns, and data quality improvements, so future years' data may find differing rates and associations. Future studies to determine these relationships with more recent data are necessary.

**References:**

1. Catalano, P. and Ehrenberg, H. (2006), Review article: The short- and long-term implications of maternal obesity on the mother and her offspring. *BJOG: An International Journal of Obstetrics & Gynecology*, 113: 1126–1133.
2. Centers for Disease Control and Prevention (CDC). Growth Charts. Available from: <http://www.cdc.gov/growthcharts/index.htm> Accessed: October 1, 2013.
3. Institute of Medicine. Weight Gain During Pregnancy: Reexamining the Guidelines. May 2009. Accessed November 16, 2013. Available at: <http://iom.edu/Reports/2009/Weight-Gain-During-Pregnancy-Reexamining-the-Guidelines.aspx>

*"I think the WIC program is a great contribution to our state! It helped me out considerably!"*

- PRAMS Mom

ACKNOWLEDGEMENTS

Special assistance for this Brief was provided by Binitha Kunnel, MS; Alicia Lincoln, MSW, MSPH; Jill Nobles-Botkin, MSN, APRN-CNM; Wanda Thomas; and, Carrie Zeman, MS (OSDH WIC).

Funding for PRAMS is provided by the Centers for Disease Control and Prevention (CDC) and the Maternal and Child Health Bureau, Department of Health and Human Services, Maternal and Child Health Services (MCH) Title V Block Grant.

PRAMS is a population-based surveillance system about maternal behaviors and experiences before, during, and after pregnancy. Approximately 250 mothers are selected to participate in Oklahoma each month. Mothers are sent as many as three mail questionnaires seeking their participation with follow-up phone interviews for non-respondents. Information included in the birth registry is used to develop analysis weights that adjust for probability of selection and non-response. Prevalence rates were calculated and the potential risk factors were identified using the Cochran-Mantel-Haenszel Chi-Square ( $\chi^2$ ) Test. PRAMS had 9,829 respondents for 2004-2008, and a response rate of 72.2%.

The Oklahoma State Department of Health (OSDH) is an Equal Opportunity Employer. This publication was issued by the OSDH, as authorized by Terry Cline, PhD, Commissioner. 1,800 copies were printed by OSDH in February 2014 at a cost of \$522. This publication is available for download at <<http://www.health.ok.gov>>.

