



# MI PRAMS Delivery

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## Obesity and Mode of Delivery

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### Points of Interest

- ◆ Approximately 47% of MI PRAMS responders were either overweight or obese.
- ◆ Respondents 20-34 years of age were most likely to be defined as obese (22.3%)
- ◆ Black, Non-Hispanic responders were more likely obese (30.4 %) than White, Non-Hispanics (19.5 %)
- ◆ The proportion of obesity among the <20 age group more than doubled between 2002 - 2005
- ◆ More than a third (36.3%) of obese respondents reported having a C-section.

Overweight and obesity are modifiable disorders, represented by abnormal fat accumulation (1). Body mass index (BMI) is an index used in classifying overweight and obesity.

Increasing global prevalence prompted a World Health Organization (WHO) declaration that obesity is a major killer on par with HIV (2).

In US women, the problem of obesity is greatest among non-Hispanic black women (48.8%), as compared with non-Hispanic whites (31.3%) (3). The prevalence of obesity in women aged

20-39 years tripled from 9% in 1960-62 to 28% in 1999-2000. Of particular concern is that more than 33% of obese women are of childbearing age (4).

Obesity in pregnancy poses a special problem as it represents a sequel of complications including gestational diabetes and cesarean delivery (5). Compared with spontaneous vaginal delivery, cesarean delivery is associated with increased risks of endometritis, pneumonia and deep venous thrombosis among other disorders (6).

In Michigan adults, the prevalence of obesity has doubled over the past two decades. As of 2004, 35.5% of Michigan adults report weights that are classified as overweight while 25.5% report weights classified as obese (7).

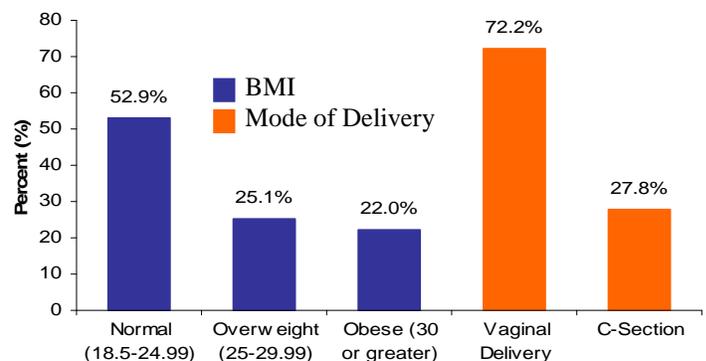
While much is known about obesity and associated disorders, such as diabetes and hypertension, very little information is available about pre-pregnancy obesity and untoward health outcomes. This issue of MI PRAMS Delivery will focus on pre-pregnancy obesity and mode of delivery in Michigan.

### Body Mass Index and Mode of Delivery Trends, MI PRAMS 2001 - 2005

Michigan PRAMS ascertained information about pre-pregnancy weight and height from the following questions:  
**#5: Just before you got pregnant with your new baby, how much did you weigh?**  
**AND**  
**#6: How tall are you without shoes?**  
 Pre-pregnancy body mass index (BMI), a reliable indicator of body fatness, was then calculated. Obesity was defined as BMI ≥ 30 while overweight was defined as BMI

greater than or equal to 25 OR less than or equal to 29.9. Information on mode of delivery was obtained from birth files.

Over 20% of responders were defined as overweight or obese, and approximately 28% reported having a C-section delivery (**Figure 1**).



**Figure 1:** Prevalence of BMI and Mode of Delivery, 2001 - 2005 MI PRAMS

**Adverse Outcomes Associated with unresolved Overweight and Obesity**

- ◆ Birth defects, especially neural tube defects
- ◆ Labor and delivery complications including C-section
- ◆ Fetal and neonatal death
- ◆ Complications (e.g. hypertension, gestational diabetes, preeclampsia)

*Information adopted from the March of Dimes*

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**Demographics**

Black, Non-Hispanic responders were more likely to be obese (30.4 %) than White, Non-Hispanics (19.5 %). The trend for White, Non-Hispanics virtually mirrors the overall trend – the prevalence fell from 19.0 % in 2001 to 16.3 % in 2002 and rose to 23.7% in 2005. Among Black, Non-Hispanics, the prevalence of obesity rose from 28.5 % to

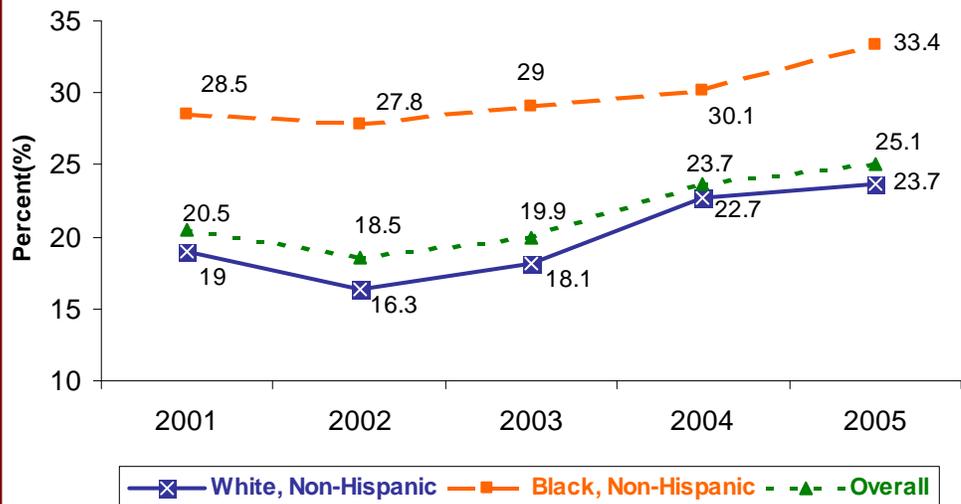
33.4% between 2001 – 2005 (Figure 2).

Of note, obesity increased, for all women, by nearly 5% from 20.5 in 2001 to 25.1 in 2005. This increase did not differ by race/ethnicity.

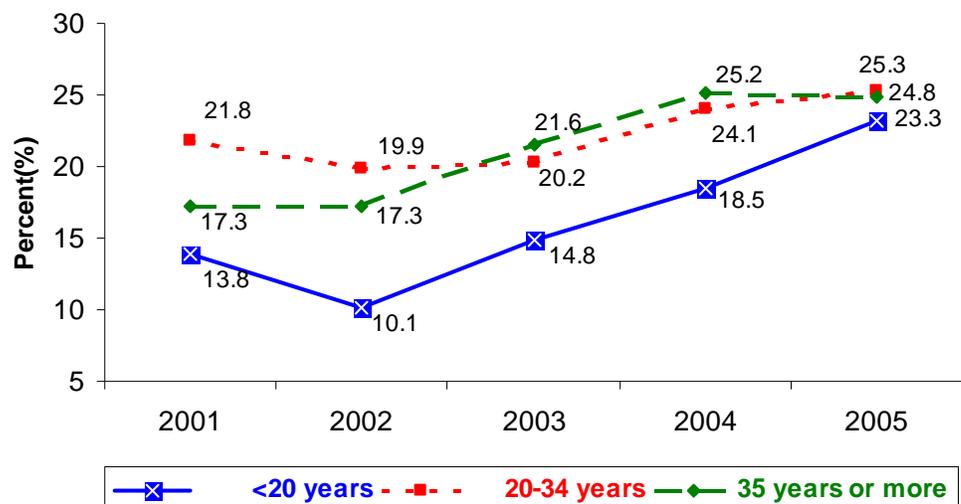
Respondents 20-34 years of age were most likely to be defined as obese (22.3%) while those less than 20 years of age were least likely (16.3%) (Figure 3). There was

an upward trend in obesity among women 35 years of age or more.

The obesity trend among teenage responders presents an intriguing picture. The prevalence rose sharply from 10.1% in 2002 to 23.3% in 2005, more than doubling the prevalence (Figure 3).



**Figure 2:** Trends in pre-pregnancy obesity by maternal race/ethnicity, 2001 to 2005 MI PRAMS



**Figure 3:** Trends in pre-pregnancy obesity by maternal age, 2001 to 2005 MI PRAMS

## Body Mass Index and Mode of Delivery, MI PRAMS 2001–2005

Recent dramatic rise in the worldwide prevalence of obesity is of concern. More than 60% of American women of childbearing age are either overweight or obese (8). The epidemic is especially pronounced in young women where 28% of those 20 – 39 years of age are obese (9).

Michigan Ranks 11<sup>th</sup> heaviest in the nation and the weight of Michigan’s population has been steadily rising (10). Obesity in women of reproductive age is of particular concern because of its association with complications in late

pregnancy such as stillbirth and cesarean delivery (5).

Almost half of PRAMS respondents (47.1%) were either obese or overweight while over a quarter (27.8%) reported having a cesarean delivery.

We examined the crude association between pre-pregnancy BMI and mode of delivery among young responder (less than 25 years of age.) When compared to vaginal delivery, a statistically significant association was found for cesarean

delivery (Odds ratio [OR] =1.3; 95% CI: 1.1-1.5).

After adjusting for the variables in **table 1**, younger overweight women still had significantly higher odds of having a C-section (Adjusted OR=1.9; 95% CI: 1.3-2.8) than normal weight women. This was also true for the association between maternal obesity and having a C-section (AOR=1.6; 95% CI: 1, 2.4).

### Recommendations

- ◆ All women, regardless of age and after consulting a physician, should exercise regularly (> 30 minutes of moderate physical activity daily).
- ◆ Women of childbearing age are encouraged to maintain a healthy BMI (18.5 kg/m<sup>2</sup> – 24.9 kg/m<sup>2</sup>).
- ◆ After delivery, return to a healthy weight as soon as possible.

Table 1. Likelihood of having a caesarian delivery among women less than 25 years of age who delivered a live birth, MI PRAMS 2001 to 2005.

Maternal Characteristic	n	Percent <sup>a</sup> Caesarian Delivery	Adjusted Odds Ratio <sup>†</sup> (95% CI)
<b>BMI<sup>b</sup></b>			
Normal	1028	17.5	Reference
Overweight	430	24.5	1.9 (1.2 – 2.8)
Obese	358	24.0	1.5 (1.0 – 2.4)
<b>Race/ethnicity</b>			
White, Non-Hispanic	1258	20.4	Reference
Black, Non-Hispanic	430	18.9	0.9 (0.6 – 1.3)
Hispanic	128	26.5	0.8 (0.4 – 1.4)
<b>Education</b>			
Less than high school	555	23.0	1.1 (0.7 – 1.5)
High school	820	20.7	Reference
College or higher	84	15.1	0.9 (0.4 – 2.0)
<b>WIC</b>			
Yes	1,269	23.4	1.6 (1.1 – 2.5)
No	616	15.2	Reference

<sup>†</sup> Adjusted for all variables listed

<sup>a</sup> Weighted percent

<sup>b</sup> Pre-pregnancy body mass index

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## About Michigan's PRAMS

The Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based survey, is a CDC initiative to reduce infant mortality and low birth weight. It is a combination mail/telephone survey designed to monitor selected self-reported maternal behaviors and

experiences of women who delivered a live infant in Michigan that occur before and during pregnancy, as well as early-postpartum periods. Information regarding the health of the infant is also collected for analysis. Annually, over 2,000 mothers are selected at random to participate from

a frame of eligible birth certificates. Women who delivered a low-birth weight infant were over-sampled in order to ensure adequate representation. The results are weighted to represent the entire cohort of women who delivered during that time frame.

*With Thanks from MI PRAMS Delivery!!*

*We publicly express thanks to the  
members of the MI PRAMS Advisory  
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**THANK YOU!**

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