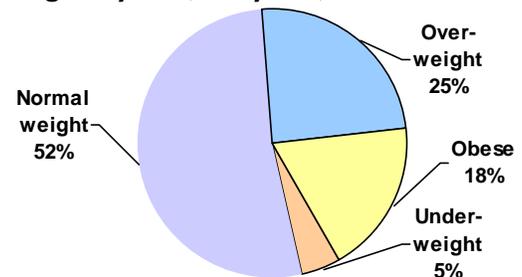


## Pre-Pregnancy Body Mass Index (BMI) and Obesity

A woman's BMI prior to pregnancy may have a significant impact on perinatal morbidity and mortality. The PRAMS survey questions about weight and height "just before" pregnancy were used to calculate BMI and categorize women as underweight (BMI= <18.5), normal weight (BMI=18.5-24.9), overweight (BMI= 25-29.9) and obese (BMI= ≥30) (Figure 1). The prevalence of obesity was 18% overall and highest among women who were Black (24%), used Medicaid for delivery (21%), and did not finish college (21%) (Table 1).

**Figure 1. Percentage of Mothers by Pre-Pregnancy BMI, Maryland, 2004-2008**



**Table 1. Pre-Pregnancy BMI by Maternal Characteristics, Maryland, 2004-2008**

Maternal Characteristic	Body Mass Index (BMI) Percentage of mothers			
	Underweight BMI <18.5	Normal BMI 18.5-24.9	Overweight BMI 25-29.9	Obese BMI ≥30
<b>Age</b>				
Less than 20	11	56	23	9
20-24	5	53	23	19
25-34	4	52	25	19
35+	3	52	27	19
<b>Race / Hispanic ethnicity</b>				
White, non-Hispanic	4	56	23	17
Black, non-Hispanic	4	44	29	24
Asian	11	70	14	6
Hispanic	3	56	26	15
<b>Education</b>				
Non-college graduate	5	48	26	21
College graduate	4	60	23	14
<b>Medicaid at Delivery</b>				
Yes	6	47	26	21
No	4	55	24	17



### Pre-Pregnancy BMI and Pre-Pregnancy Medical Disorders

**Table 2. Prevalence of Pre-Pregnancy Medical Conditions by Pre-Pregnancy BMI, Maryland, 2004-2008**

Pre-Pregnancy Disorder	Underweight %	Normal Weight %	Overweight %	Obese %
Asthma	4.3	6.9	8.5	11.0
Hypertension	0.3	1.6	2.6	6.9
Diabetes	1.1	0.9	1.2	2.7

Women who were overweight or obese before pregnancy were significantly more likely than normal weight women to report that they had asthma, hypertension or diabetes during the “three months” before pregnancy (Table 2).

Obese women were four times more likely than normal weight women to report that they had hypertension (6.9% vs. 1.6%) and three times more likely to report that they had diabetes (2.7% vs. 0.9%) (Table 2).

### Pre-Pregnancy BMI and Medical Disorders During Pregnancy

**Table 3. Prevalence of Medical Conditions During Pregnancy by Pre-Pregnancy BMI, Maryland, 2004-2008**

Prenatal Disorder	Underweight %	Normal Weight %	Overweight %	Obese %
Hypertension	3.7	7.7	14.9	20.7
Diabetes	5.7	6.5	9.0	16.0

Women who were overweight or obese before pregnancy were significantly more likely to report that they had hypertension or diabetes during pregnancy (Table 3).

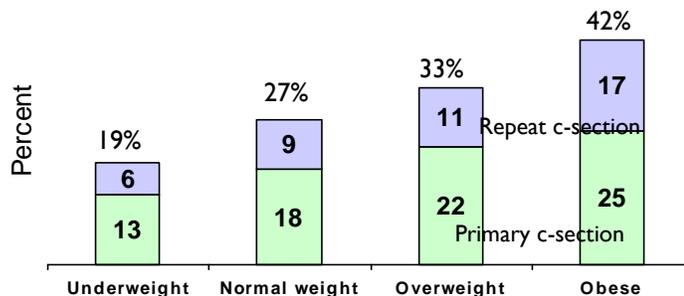
Obese women were three times more likely to report that they had hypertension or diabetes than normal weight women (Table 3). The PRAMS survey did not ask about asthma during pregnancy.

### Pre-Pregnancy BMI and Delivery Method

The highest rates of both primary and repeat cesarean sections were among obese women. [Note that mothers who have had one cesarean section are more likely to have a repeat cesarean section.]

Obese women were 56% more likely to deliver via cesarean section than normal weight women (42% vs. 27%) (Figure 2).

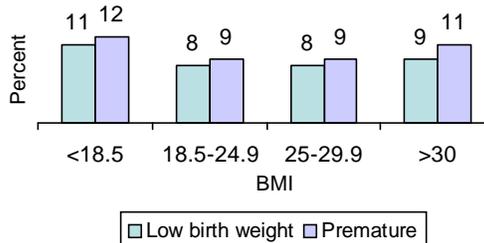
Figure 2. Pre-Pregnancy BMI by Delivery Method, Maryland, 2004-2008



### Birth Outcomes

Compared to women of the other weight categories, underweight mothers reported the highest prevalence of low birth weight infants (<2500 grams) and premature infants (<37 weeks gestation) (Figure 3). Obese mothers reported higher rates of infant low birth weight (9%) and prematurity (11%) than overweight and normal weight mothers. Additionally, the prevalence of very low birth weight (<1500 grams) was almost twice as high among obese mothers (2.3%) compared to normal weight mothers (1.3%) (data not shown). The differences in prematurity rates did not reach statistical significance among the BMI categories.

Figure 3. Pre-Pregnancy BMI by Infant Outcomes, Maryland, 2004-2008



*“Because of my morbid obesity I had extreme difficulty during my pregnancy. I had morning sickness all the time. I had to use a cane to walk because of early pelvic separation and I had to monitor my blood sugar 4 time a day and blood pressure 3 times a day.”*

**PRAMS mother**



### Postpartum Factors

Table 4. Prevalence of Postpartum Factors by Pre-Pregnancy BMI Maryland, 2004-2008

Postpartum Factor	Underweight %	Normal Weight %	Overweight %	Obese %
Breastfeeding Initiation >10 weeks	66	81	79	72
Postpartum Depression	16	13	15	18

The prevalence of breastfeeding at 10 weeks after delivery was lowest for underweight (40%) and obese (42%) mothers.

Postpartum depression was 38% higher among obese mothers (18%) compared to normal weight mothers (13%).

### Summary

According to the Institute of Medicine (2009), “a greater percentage of [women] are entering pregnancy overweight or obese...which can put the mother and her baby’s health at risk”.

cesarean section (43% vs. 27%), have a low birth weight infant (9.4% vs. 7.8%), and be depressed postpartum (18% vs. 13%). Obese women were also less likely to initiate breastfeeding (72% vs. 81%) or breastfeed for more than 10 weeks (42% vs. 57%).

In Maryland, 43% of women were overweight or obese just before pregnancy. The prevalence of obesity was highest among women who were Black (24%), used Medical Assistance for delivery (21%) and did not graduate from college (21%). Compared to normal weight women before pregnancy, obese women were significantly more likely to report hypertension (21% vs. 8%) and diabetes (16% vs. 7%) during pregnancy, deliver by

Because weight control during pregnancy may not be in the best interest of the mother-fetal unit, helping women maintain or achieve a normal BMI value before pregnancy may have the most potential for the prevention of adverse pregnancy outcomes associated with obesity.



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## PRAMS Methodology

Data included in this report were collected through the Pregnancy Risk Assessment Monitoring System (PRAMS), a surveillance system established by the Centers for Disease Control and Prevention (CDC) to obtain information about maternal behaviors and experiences that may be associated with adverse pregnancy outcomes.

In Maryland, the collection of PRAMS data is a collaborative effort of the Department of Health and Mental Hygiene and the CDC. Each month, a sample of 200 Maryland women who have recently delivered live born infants are surveyed by mail or by

telephone, and responses are weighted to make the results representative of Maryland resident births who delivered in-state. Survey data are linked with birth certificate data to provide additional demographic and pregnancy information.

The results in this report were based on the responses of 7,665 mothers who delivered in 2004-2008. The response rate for this study period was 71%. The BMI was calculated from responses to survey questions about weight and height "just before" pregnancy. The BMI of adolescents less than 20 years of age was not calculated differently.

## Limitations of Report

This report presents only basic associations between maternal risk factors, birth outcomes and maternal race or ethnicity. Unexamined interrelationships among variables are not described and could explain some of the findings described in this report.

PRAMS data is retrospective and therefore subject to recall bias. It is also based on the

mother's perception of events and may not be completely accurate.

It is important to note that women may under-estimate their weight on self-report. Also, maternal weight gain during pregnancy was not known and may account for some of the associations shown in this report based on pre-pregnancy BMI.

## Resources

"Weight Gain During Pregnancy: Reexamining the Guidelines" Report Brief, May 2009; National Academies Press, Washington, D.C., available at [www.nap.edu](http://www.nap.edu)

Maryland WIC (Women, Infants, Children) Program  
1-877-463-3464 or 410-767-5300  
<http://fha.maryland.gov/wic/>



Maryland Department of Health and Mental Hygiene  
Center for Maternal and Child Health • Vital Statistics Administration

Martin O'Malley, Governor; Anthony G. Brown, Lieutenant Governor; John M. Colmers, Secretary

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