

# Obesity Trends in New Jersey Counties: 1992-2006

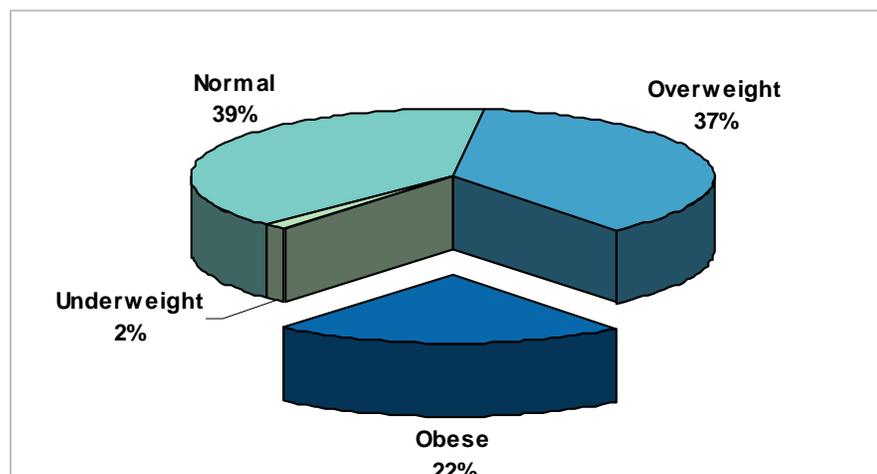
June 2008

## CHS BRIEF

**O**besity, particularly higher levels of obesity, is associated with increased mortality and morbidity as well as high health care costs. The number of deaths attributable to obesity in the United States has been estimated to be over 100,000 per year.<sup>1</sup> Meanwhile, obesity-related health conditions such as arthritis, asthma, cardiovascular disease, and stroke cost the nation \$75 billion a year in medical expenses in 2003, with taxpayers paying half those costs through the Medicare and Medicaid programs.<sup>2,3</sup> New Jersey's share of this cost was \$2.3 billion, according to the state's Obesity Prevention Task Force.<sup>4</sup>

Obesity occurs when more calories are consumed than burned, resulting in excessive body fat. The prevalence of obesity is commonly assessed using body mass index (BMI),<sup>5</sup> calculated as weight in kilograms divided by the square of height in meters. Individuals are classified as underweight (BMI < 18.5 kg/m<sup>2</sup>), normal weight (BMI 18.5-24.9 kg/m<sup>2</sup>), overweight (BMI 25.0-29.9 kg/m<sup>2</sup>) or obese (BMI ≥ 30.0 kg/m<sup>2</sup>), according to a criterion developed by the World Health Organization and the National Heart, Lung, and Blood Institute (NHLBI).<sup>6</sup> The obesity rate in the U.S. has roughly doubled in the past 25 years. Based on self-reported weight and height, about one in four adult Americans would be classified as obese in 2005,<sup>7</sup> while the prevalence of obesity among New Jersey adults was only slightly lower (Figure 1).

Figure 1. Percent underweight, normal, overweight, and obese among New Jersey adults age 18 years and older (BRFSS data, 2004-2006)



### HIGHLIGHTS

About 22% of adults in New Jersey were obese in 2004-06, which reflects a 97% increase since 1992-94.

In the early 90s, the highest obesity rate among all New Jersey counties was 15% in Cape May County. By 2004-06, 17% was the lowest obesity rate (Bergen and Morris Counties) while 28% was the highest (Salem County) among all New Jersey counties.

Table 1. Age-adjusted prevalence of obesity among New Jersey adults aged 18+ years by county, 1992-94, 1998-2000, and 2004-2006

	Rate (95% CI)		
	1992-94	1998-2000	2002-2004
New Jersey	11.3 (10.2 – 12.4)	17.1 (16.2 – 18.1)	22.0 (21.4 – 22.6)
Atlantic	10.6 (5.9 - 15.4)	16.0 (12.1 - 19.8)	23.6 (21.2 - 26.0)
Bergen	8.8 (6.4 - 11.1)	15.1 (12.6 - 17.6)	17.0 (15.3 - 18.7)
Burlington	12.0 (8.3 - 15.8)	16.2 (13.0 - 19.3)	23.8 (21.2 - 26.4)
Camden	12.5 (9.1 - 16.0)	18.7 (15.0 - 22.3)	25.7 (23.1 - 28.3)
Cape May	15.2 (9.0 - 24.2)	16.9 (12.3 - 21.5)	23.3 (20.1 - 26.3)
Cumberland	13.1 (8.2 - 18.4)	18.7 (14.3 - 23.3)	25.9 (22.4 - 29.3)
Essex	12.3 (9.0 - 15.7)	20.4 (17.0 - 24.0)	24.8 (22.7 - 26.9)
Gloucester	10.6 (6.4 - 14.8)	19.4 (15.3 - 23.8)	24.4 (21.7 - 27.2)
Hudson	12.9 (9.1 - 17.1)	17.8 (14.5 - 21.2)	24.2 (21.9 - 26.7)
Hunterdon	13.2 (7.7 - 19.7)	14.8 (10.5 - 18.8)	19.1 (16.2 - 22.0)
Mercer	11.9 (8.1 - 16.0)	16.2 (12.8 - 19.7)	22.3 (19.7 - 24.8)
Middlesex	8.1 (5.6 - 10.7)	17.8 (14.7 - 20.9)	20.5 (18.7 - 22.3)
Monmouth	11.3 (8.1 - 14.6)	14.3 (11.5 - 17.0)	18.9 (16.8 – 21.1)
Morris	7.7 (4.8 - 10.6)	15.4 (12.4 - 18.2)	17.4 (15.4 - 19.5)
Ocean	13.0 (9.1 - 17.2)	18.6 (15.7 - 21.7)	24.7 (22.4 - 27.1)
Passaic	8.7 (4.8 - 12.3)	18.1 (15.0 - 21.4)	23.2 (20.7 - 25.6)
Salem	10.1 (5.4 - 14.8)	19.1 (14.0 - 24.9)	27.6 (23.2 - 32.5)
Somerset	11.0 (6.8 - 15.3)	14.3 (10.8 - 17.5)	17.7 (15.2 - 20.1)
Sussex	11.0 (6.4 - 15.6)	17.7 (13.5 - 22.2)	20.6 (17.8 - 23.4)
Union	13.1 (8.8 - 17.7)	14.9 (11.8 - 18.0)	21.4 (18.8 - 23.9)
Warren	11.4 (6.3 - 16.7)	18.0 (13.2 - 23.3)	24.4 (21.3 - 27.6)

The data presented in this report came from the New Jersey component of the Behavioral Risk Factor Surveillance System (BRFSS), an ongoing national telephone survey of persons aged 18 and over. Due to small sample sizes at the county level, three-year data were combined to yield more reliable estimates. This report uses the terms prevalence, proportion, rate, and percent interchangeably.

The estimation process consisted of two phases: (1) the obesity percentages were weighted and adjusted for age and the survey design in STATA 9.0, and (2) the survey adjusted percentages with standard errors were smoothed by the simplest Markov Chain Monte Carlo (MCMC) model calculated in WinBUGS, the MCMC modeling program of the British Medical Research Council.<sup>8</sup> In addition, maps were created using ArcView Desktop 9.2.

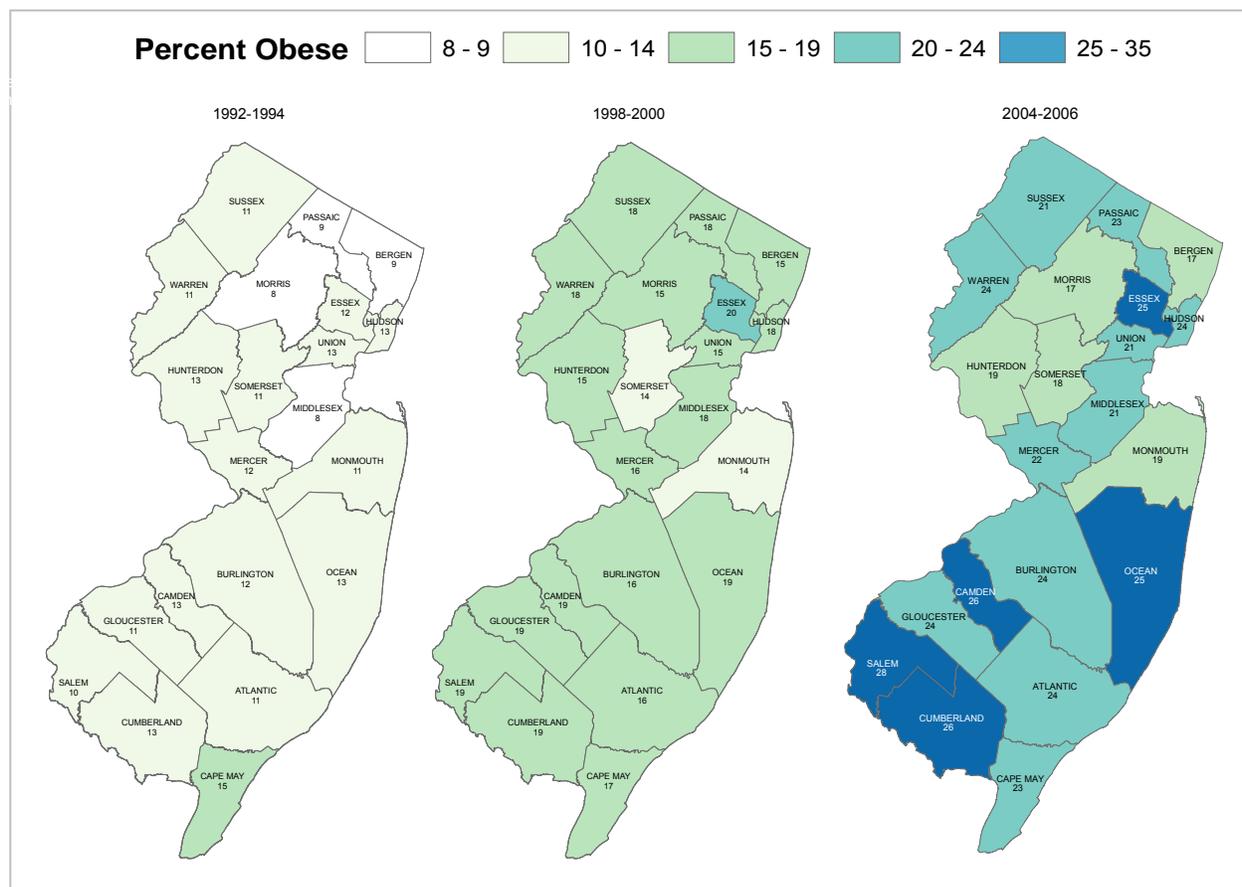
## Findings

### *Trends Over Time*

In New Jersey, rates of obesity have been rising steadily since the early 1990s. As shown in Figure 1, 22.1% of all New Jersey adults aged 18 years and over were obese by 2004-2006, which reflects a 97% increase since 1992-1994, when 11.2% of New Jersey adults were obese.

Table 1 shows the county-level obesity rates at three time points during the last two decades. The rapid growth was seen in all New Jersey counties. For example, in 1992-1994, Cape May County had the highest percentage (15%) of obese adults in the state. By 1998-2000, 18 of New Jersey's 21 counties had adult obesity rates greater than 15%, with the highest proportion found in Essex

Figure 2. Adjusted prevalence of obesity among New Jersey adults age 18 years and older, (3-year averages, BRFSS data, 1992-94; 1998-2000; 2004-06)



County (20%). The problem became worse between 2004 and 2006, when the minimum county-level prevalence of obesity among adults was 17% (Bergen and Morris Counties) and the maximum prevalence was 28% (Salem County).

To demonstrate the increase in obesity prevalence over time graphically, Figure 2 shows the same data as a series of choropleth maps. These maps suggest a persistent spatial pattern in addition to the clear secular trend, i.e., counties in southern New Jersey tend to have higher rates of obesity throughout the time period. For example, among the five counties that had more than 25% of population being obese in 2004-2006, four are located in South Jersey.

The trend in obesity rates make it virtually impossible to achieve the Healthy New Jersey 2010 objective, which aims to reduce the percentage of persons aged 18 and over who are obese to 12% or below for all adults.<sup>9</sup>

#### *Racial and Ethnic Differences*

Table 2 characterizes the rates of obesity in New Jersey counties by race and ethnicity between 2004 and 2006. The same statistics have been mapped in Figure 3. Similar to the nation as a whole, the prevalence of obesity in New Jersey is significantly higher among Blacks when compared to other groups. Between 2004 and 2006, 33% of non-Hispanic Blacks were obese in New Jersey compared to 24% of Hispanics, and 21% of non-Hispanic Whites.<sup>10</sup>

**Table 2.** Age-adjusted rate of obesity among New Jersey adults aged 18+ years by county and race/ethnicity, 2004-2006

	Rate (95% CI)		
	Non-Hispanic White	Non-Hispanic Black	Hispanic
New Jersey	21.0 (20.4 – 21.7)	33.3 (31.2 – 35.4)	23.7 (21.9 – 25.5)
Atlantic	22.6 (19.9 – 25.3)	30.9 (25.0 – 36.8)	27.3 (19.9 – 34.7)
Bergen	18.2 (16.1 – 20.3)	29.1 (22.2 – 35.9)	21.0 (15.8 – 26.1)
Burlington	23.2 (20.7 – 25.7)	29.4 (23.4 – 35.4)	24.9 (18.4 – 31.5)
Camden	24.0 (21.0 – 27.0)	33.7 (28.1 – 39.3)	25.1 (19.3 – 30.9)
Cape May	22.9 (19.9 – 25.9)	31.1 (23.5 – 38.8)	26.0 (18.9 – 33.1)
Cumberland	23.7 (20.1 – 27.3)	35.2 (27.9 – 42.6)	24.2 (18.6 – 29.7)
Essex	19.1 (16.2 – 21.9)	34.6 (31.0 – 38.2)	26.5 (21.7 – 31.4)
Gloucester	23.0 (20.3 – 25.7)	36.4 (28.2 – 44.7)	25.1 (18.1 – 32.0)
Hudson	23.8 (20.3 – 27.3)	32.8 (27.4 – 38.1)	22.7 (19.5 – 26.0)
Hunterdon	19.3 (16.4 – 22.3)	n/a	19.0 (11.5 – 26.0)
Mercer	19.2 (16.6 – 21.8)	36.4 (29.6 – 43.2)	24.4 (18.3 – 30.4)
Middlesex	22.9 (20.5 – 25.3)	32.4 (26.3 – 38.5)	22.5 (17.6 – 27.3)
Monmouth	17.4 (15.4 – 19.5)	31.2 (24.4 – 38.0)	27.4 (20.1 – 34.8)
Morris	17.9 (15.7 – 20.1)	30.1 (22.3 – 38.0)	23.9 (17.8 – 30.0)
Ocean	23.6 (21.3 – 25.9)	32.7 (25.2 – 40.2)	24.8 (18.5 – 31.1)
Passaic	21.2 (18.1 – 24.2)	33.8 (28.2 – 39.5)	24.1 (20.3 – 28.0)
Salem	25.5 (21.2 – 29.8)	33.3 (25.7 – 40.9)	24.5 (17.5 – 31.5)
Somerset	18.1 (15.8 – 20.4)	24.9 (17.0 – 32.8)	18.6 (12.3 – 24.9)
Sussex	20.7 (17.8 – 23.5)	29.7 (22.1 – 37.3)	24.0 (17.6 – 30.3)
Union	19.5 (16.6 – 22.4)	31.2 (25.3 – 37.2)	23.4 (18.7 – 28.0)
Warren	24.4 (21.2 – 27.6)	33.9 (25.5 – 42.3)	24.5 (17.7 – 31.2)

Note: Hunterdon non-Hispanic Blacks omitted due to data sparseness.

The disparity is also pronounced at the county level. Because the maps in Figure 3 all use the same scale, they can be easily compared. All New Jersey counties appeared in darker colors on the map of non-Hispanic Blacks than on the maps of non-Hispanic Whites and Hispanics. When the maps of non-Hispanic Whites and Hispanics were compared, Hispanics showed higher rates in most counties than non-Hispanic Whites. Despite the racial differences, a consistent geographic pattern is observed in all three maps -- counties with greater obesity prevalence tend to cluster in southern New Jersey.

Another geographic pattern was also revealed in many counties: if the obesity rate was high for one racial group, it tended to be high for other groups too. A list of such counties includes northern counties such as Warren, Passaic, and most of the southern counties. The observation that obesity prevalence remains relatively low in Somerset County regardless of ethnicity

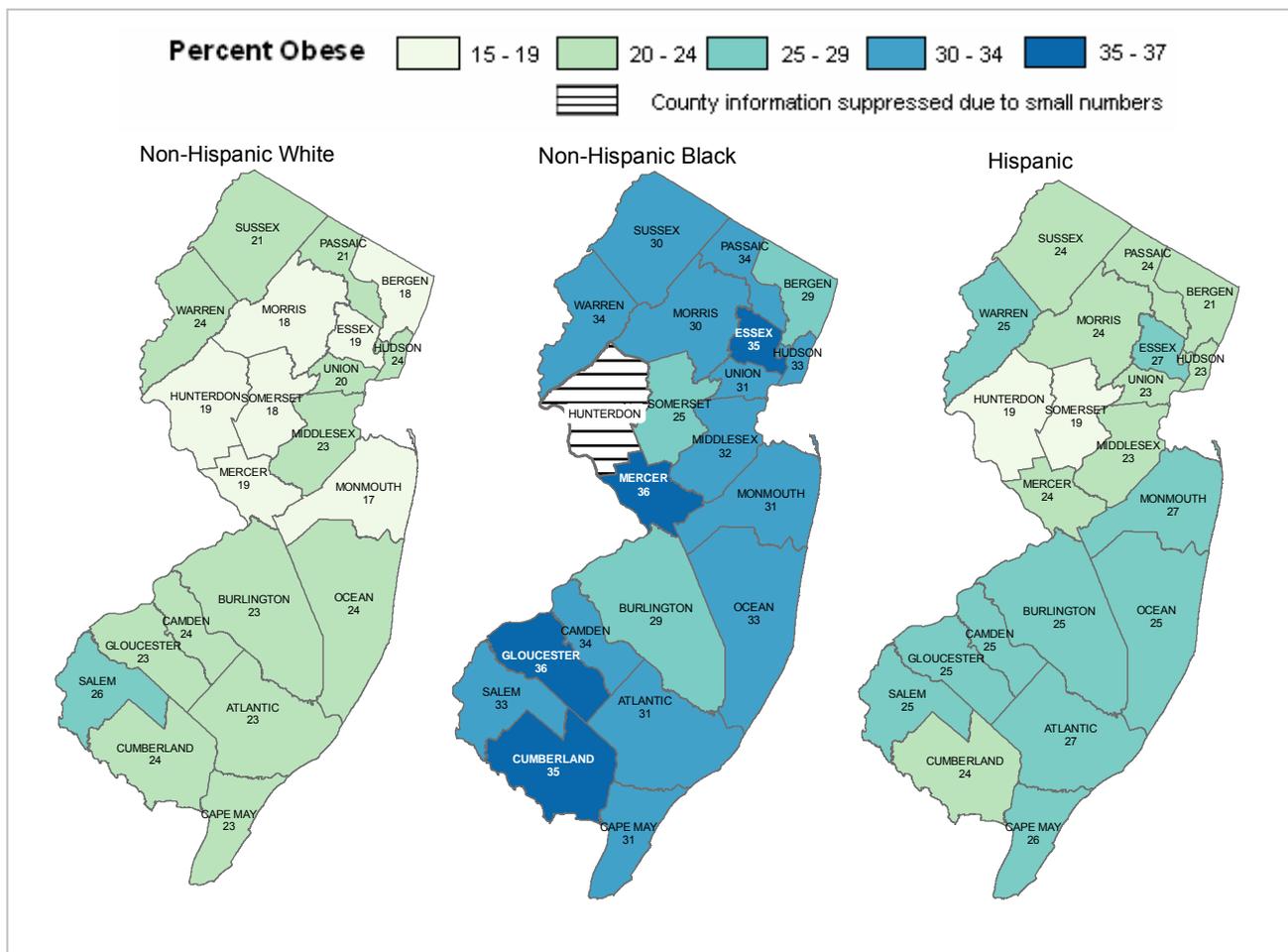
suggests the influence of some other socio-demographic and/or environmental characteristics.

## Discussion

This analysis shows there has been a dramatic increase in obesity prevalence in New Jersey counties between 1992 and 2006. It has also unveiled a racial and ethnic disparity in obesity.

The obesity epidemic is considered to be a public health crisis, because it is associated with a variety of elevated health risks. For example, obesity and weight gain are risk factors for ischemic and total stroke in women, and abdominal obesity may predict the risk of stroke in men. Obesity contributes to the development of osteoarthritis of the hand, hip, back and especially the knee, and is related to rheumatoid arthritis in both men and women.<sup>11</sup> Severe obesity has been associated with increased daytime

Figure 3. Adjusted prevalence of obesity among New Jersey adults age 18 years and older by race and ethnicity, (3-year averages, BRFSS data, 2004-06)



sleepiness even in the absence of sleep apnea or other breathing disorders.<sup>11</sup>

Medical interventions such as bariatric surgery are frequently used to promote weight loss in obese patients.<sup>12</sup> According to clinical guidelines developed by an NHLBI Expert Panel, bariatric surgery is recommended for people with a BMI that is (1) greater than 40 or (2) between 35 and 40, with at least one obesity related co-morbidity. A recent report showed that the number of patients pursuing bariatric surgery in New Jersey has steadily increased in last decade. By 2005, the number had leveled off to approximately 4,500 a year. However, not all obese people should consider bariatric surgery as an option for weight management. Also, for

people who have the surgery, ongoing changes to diet and exercise are needed to control their post-surgical weight.<sup>12</sup>

A combination of individual, societal, and environmental factors has shaped the obesity epidemic. Gender, age, race,<sup>13,14</sup> physical activities, and dietary patterns have been shown to play a role. Additionally, socioeconomic status at both individual<sup>15</sup> and community levels<sup>16</sup> contributes to body weight. People living in impoverished neighborhoods are at a higher risk for obesity. Increasingly cited is the influence of an “obesigenic environment” on obesity. An “obesigenic environment” characterizes the societal attitudes that encourage sedentary lifestyles, larger food portion, and marketing of energy-dense foods and beverages, thereby contributing to obesity.<sup>17</sup>

A successful obesity prevention program needs to engage all levels of the society – individual, organizations, and community – to change the knowledge, attitude, and behaviors of individuals, and to change the prevailing “obesigenic environment” and build social and physical environments that are conducive to healthful behaviors.

## Limitations

The findings in this report are subject to at least two limitations. First, BRFSS data rely on self-reported weight and height. Study participants, especially in telephone surveys, tend to underreport their weight, over-report their height, or both, which can lead to an underestimation of obesity prevalence.<sup>18</sup>

Second, only people living in households with telephones are included in the survey. People living in households without telephones may be different from those who are interviewed. The result is some potential bias in the calculation of obesity rates.

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