

# Healthy Eating and Living Body Mass Index Screening Study

Ulster County Department of Health

---

Ulster County Report

June 2011



*Michael P. Hein  
County Executive*

*La Mar Hasbrouck, MD, MPH  
Public Health Director*

*Prepared by CRREO at SUNY New Paltz  
Eve Waltermaurer, PhD  
Kathleen Tobin, MS*

## Table of Contents

<b>INTRODUCTION</b> .....	<b>1</b>
<i>Ulster County Initiative</i> .....	1
<i>Methodology</i> .....	2
<i>Sample and BMI Calculation</i> .....	2
<b>COUNTY-WIDE RESULTS</b> .....	<b>3</b>
1 <sup>st</sup> GRADE.....	3
<i>Table 1. BMI Distribution Overall and by Gender in Ulster County: 1<sup>st</sup> Grade</i> .....	3
<i>Figure 1. BMI Distribution in Ulster County: 1st Grade</i> .....	3
<i>Figure 2. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: First Grade Boys</i> .....	4
<i>Figure 3. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: First Grade Girls</i> .....	4
3 <sup>RD</sup> GRADE.....	5
<i>Table 2. BMI Distribution Overall and by Gender in Ulster County: 3rd Grade</i> .....	5
<i>Figure 4. BMI Distribution in Ulster County: 3rd Grade</i> .....	5
<i>Figure 5. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Third Grade Boys</i> .....	6
<i>Figure 6. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Third Grade Girls</i> .....	6
5 <sup>th</sup> GRADE.....	7
<i>Table 3. BMI Distribution Overall and by Gender in Ulster County: 5th Grade</i> .....	7
<i>Figure 8. Comparison of Percent Overweight and Obese in Ulster County and Across Sampled School Districts: Fifth Grade Boys</i> .....	8
<i>Figure 9. Comparison of Percent Overweight and Obese in Ulster County and Across Sampled School Districts: Fifth Grade Girls</i> .....	8
7 <sup>th</sup> GRADE.....	9
<i>Table 4. BMI Distribution Overall and by Gender in Ulster County: 7th Grade</i> .....	9
<i>Figure 10. BMI Distribution in Ulster County: 7th Grade</i> .....	9
<i>Figure 11. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Seventh Grade Boys</i> .....	10
<i>Figure 12. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Seventh Grade Girls</i> .....	10
Trends.....	11
<i>Table 5. Overweight/Obesity Rate Comparisons by Grade</i> .....	11
<b>CONCLUSION</b> .....	<b>12</b>
<i>County-Wide</i> .....	12
<i>District Level Comparisons</i> .....	12
<i>Limitations</i> .....	12
<i>Implications</i> .....	13
<b>REFERENCES</b> .....	<b>14</b>
<b>HOW TO PREVENT OBESITY</b> .....	<b>15</b>

## INTRODUCTION

An obese child is more likely to become an obese adult. Health issues associated with obesity include type 2 diabetes, heart disease, high cholesterol, and high blood pressure. Children who are physically active perform better in school (Li & Hooker, 2010) and have higher self-esteem and less depression (COFMP/COSH, 2006). One of the national goals for Healthy People 2020 (HP2020) is to “Promote health and reduce chronic disease risk through the consumption of healthful diets and achievement and maintenance of healthy body weights” by reducing the rate of children aged 6-11 who are obese by 10% to a target of 15.7% and reduce the rate of children ages 12-19 who are obese by 10% to a target of 16.9% (DHHS, 2011). Body Mass Index (BMI) is a number calculated by using a child’s height and weight. It is age and gender specific for children and adolescents to account for the differences in growth rates. Once the BMI is known it is plotted on a BMI-for-age growth chart in order to obtain the percentile ranking compared to other children of the same gender and age.

To help achieve the HP2020 goal in New York State, the New York State Department of Health (NYSDOH) worked with key stakeholders and experts throughout the state to develop the New York State Strategic Plan for Overweight and Obesity Prevention. In this plan, ten goals were identified to help reduce overweight and obesity rates. The goals include: increasing the awareness of overweight and obesity as a major public health threat; increase early recognition of overweight and/or excessive weight gain; improve management (medical and nonmedical) of people who are overweight or obese and those with obesity-related diseases; increase initiation, exclusivity and duration of breastfeeding during infancy; improve lifelong healthy eating; increase lifelong physical activity; decrease exposure to television and other recreational screen time; increase policy and environmental supports for physical activity and healthy eating; increase and maintain effective public health responses to the obesity epidemic; and, expand surveillance and program evaluation to prevent overweight and obesity (NYSDOH, 2005).

### Ulster County Initiative

In February 2007, the Healthy Eating and Living (HEAL-Ulster County) initiative was created by the Ulster County Department of Health (DOH), made possible through funding and support from the Ulster County Legislature’s Health and Human Services Committee. Additional help came from key stakeholders who helped determine the scope of the problem in Ulster County. A study released in 2008 that examined Body Mass Index (BMI) showed that among school aged children in 1<sup>st</sup> and 3<sup>rd</sup> grades, 36% of the students surveyed were classified at the 85<sup>th</sup> percentile or higher (now referred to as “overweight”) with 20% of these weighing at or above the 95<sup>th</sup> percentile (now referred to as “obese”). This study was repeated collecting 2010 data for a broader sample of students from across the county. For those schools who participated in the 2007 study, collecting 2010 data provides trend information (2006 compared with 2010) of obesity rates to give districts insight as to whether the initiatives put into place since the previous study period are working. For those schools new to the HEAL BMI screening, this 2011 report provides baseline data while also providing information about which age groups may be at most need for intervention.

## Methodology

School district nurses were contacted by telephone to discuss participation in the study. Letters were sent to district superintendents outlining the BMI study and requesting participation in the data collection. Nurses in districts willing to participate received follow-up letters about the study and data collection procedure for children currently in grades 1, 3, 5 and 7. These grades were selected to provide a four-year follow-up for the 1<sup>st</sup> and 3<sup>rd</sup> grade data collected from schools who participated in Ulster County's 2007 HEAL BMI study and to establish early grade baselines for future examinations. Statistical significance for comparisons of proportions was done using Z tests.

### Sample and BMI Calculation

For Ulster County, eight of the nine school districts participated for a total of 41 (out of 43) schools. Gender, birth month and year, weight, height, and date of measurement were provided for 5,796 children. Among these, 1,496 were 1<sup>st</sup> graders, 1,492 were 3<sup>rd</sup> graders, 1,504 were 5<sup>th</sup> graders and 1,304 were 7<sup>th</sup> graders. Just over 50% were male (2,933) and approximately 49% were female (2,863).

Each data set was calculated using an Excel BMI Calculator (EBMIC) designed by the Centers for Disease Control and Prevention (CDC) to determine each child's BMI and BMI-for-age percentile. With the EBMIC, BMI was calculated by dividing the weight in pounds by height in inches squared and multiplied by a factor of 703 (Barlow, 2007).

$$\text{BMI} = \frac{\text{weight (kg)}}{\{\text{height m}\}^2}$$

Due to the fact that children's body fat changes with age and differs between girls and boys, once each child's BMI was calculated, their percentile ranking was calculated using the EBMIC. The percentile ranking helps to determine if a child is either underweight (less than the 5<sup>th</sup> percentile), healthy weight (5<sup>th</sup> percentile to less than the 85<sup>th</sup> percentile), overweight (85<sup>th</sup> percentile to less than the 95<sup>th</sup> percentile), or obese (equal to or greater than the 95<sup>th</sup> percentile) (Barlow, 2007). This classification is somewhat different than the one used in the 2007 study where 85<sup>th</sup>-94<sup>th</sup> percentile were considered "at-risk for obesity" as opposed to the currently used CDC nomenclature of "overweight" for those falling within these parameters.

In our sample of 5,796 children in Ulster County, from grades 1, 3, 5 and 7, 3% were identified as underweight, 60% were identified normal weight, and 37% were obese or overweight, with 20% being obese. Our local rates reflect national trends. Data collected by the National Health and Nutrition Examination Survey (NHANES) reports that nationwide, 35.5% of children ages 6-11 (typically grades 1 through 5) have a BMI  $\geq$  85 while the rate of children in the BMI  $\geq$  95 percentile was 19.6 % (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010).

## COUNTY-WIDE RESULTS

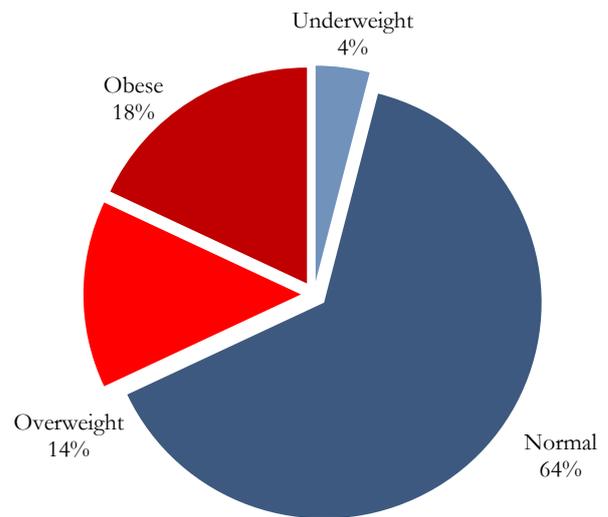
### 1<sup>st</sup> GRADE

**Table 1. BMI Distribution Overall and by Gender in Ulster County: 1<sup>st</sup> Grade**

<b>Total</b>	<b>(N=1496)</b>
Underweight	4%
Normal	64%
Overweight or obese	32%
Overweight	14%
Obese	18%
<b>Boys</b>	<b>(n=777)</b>
Underweight	4%
Normal	63%
Overweight or obese	33%
Overweight	14%
Obese	19%
<b>Girls</b>	<b>(n=719)</b>
Underweight	4%
Normal	66%
Overweight or obese	31%
Overweight	15%
Obese	16%

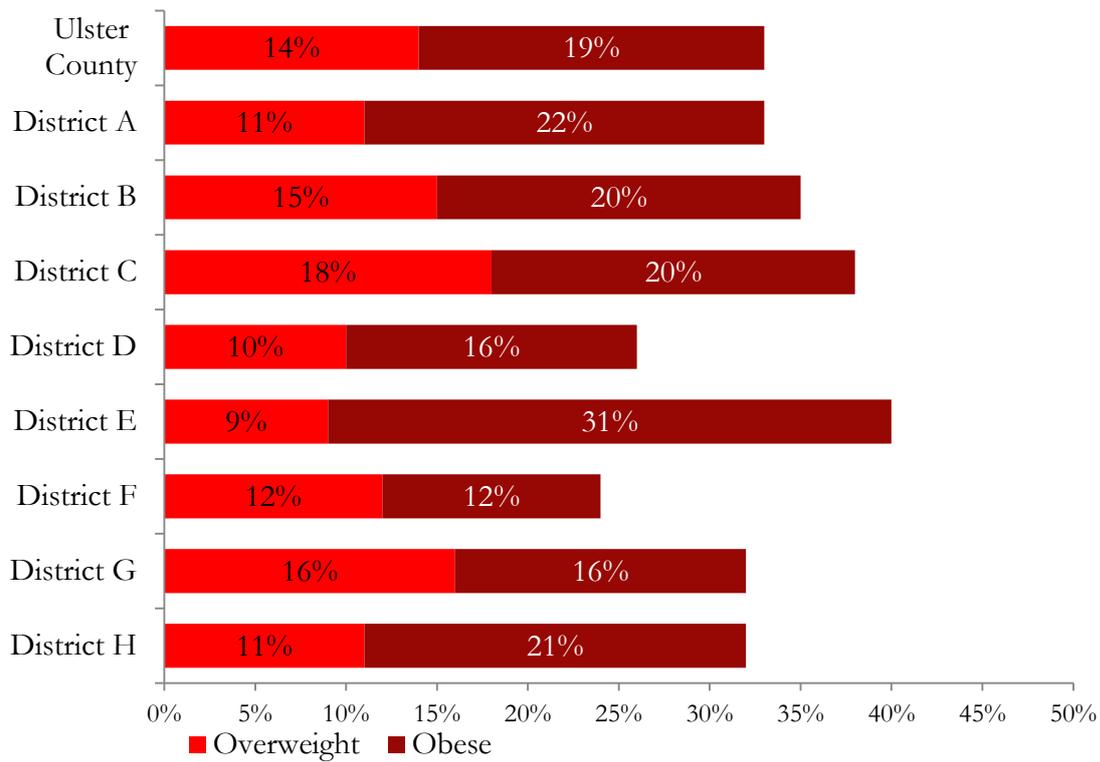
Among Ulster County 1<sup>st</sup> graders, 4% were identified as underweight, 64% were normal weight, and 32% were obese or overweight, including 18% obese. This higher rate of obesity, as compared with overweight, among 1<sup>st</sup> graders, is seen in six of the eight school districts. Overall, boys and girls showed relatively similar rates of overweight and obesity among 1<sup>st</sup> graders in the county.

**Figure 1. BMI Distribution in Ulster County: 1<sup>st</sup> Grade**

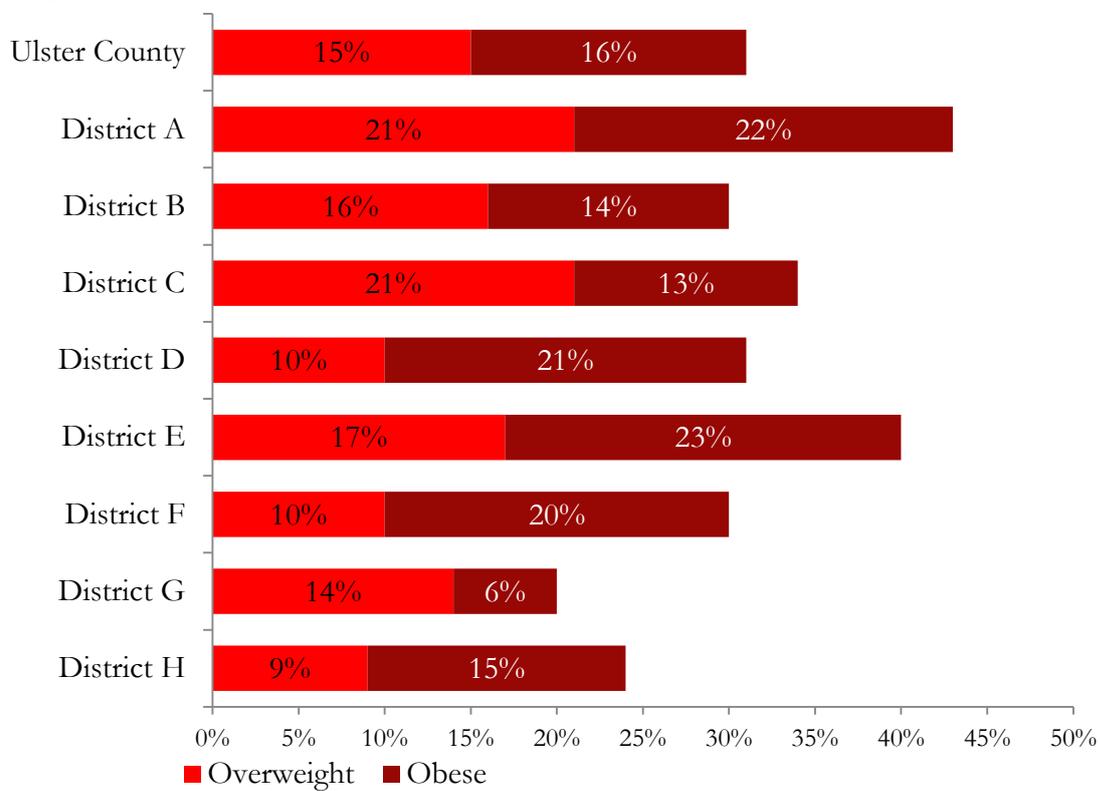


Across every school district sampled, there is either an equal or larger proportion of 1<sup>st</sup> grade boys who are obese than overweight. In nearly all districts, over one quarter of the 1<sup>st</sup> grade boys fall into the higher risk weight groups. Among 1<sup>st</sup> grade girls, in two districts (A and E) four in ten or more are at high risk weights. These same two districts have over one in five obese girls in 1<sup>st</sup> grade.

**Figure 2. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: First Grade Boys**



**Figure 3. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: First Grade Girls**



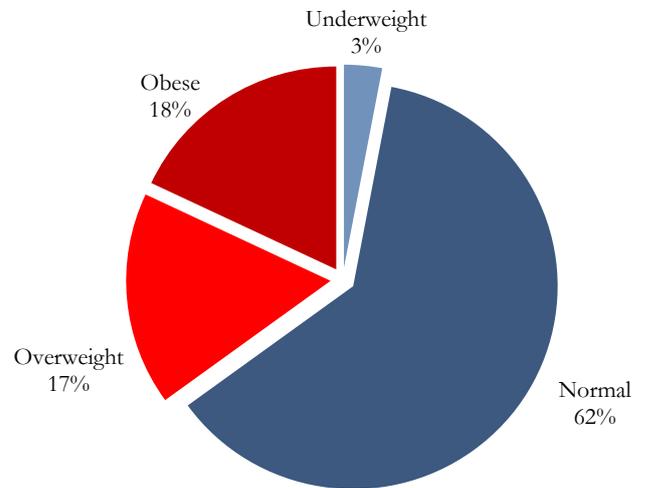
### 3<sup>RD</sup> GRADE

**Table 2. BMI Distribution Overall and by Gender in Ulster County: 3rd Grade**

<b>Total</b>	<b>(N=1492)</b>
Underweight	3%
Normal	62%
Overweight or obese	35%
Overweight	17%
Obese	18%
<b>Boys</b>	<b>(n=749)</b>
Underweight	3%
Normal	60%
Overweight or obese	37%
Overweight	17%
Obese	20%
<b>Girls</b>	<b>(n=743)</b>
Underweight	3%
Normal	63%
Overweight or obese	33%
Overweight	17%
Obese	16%

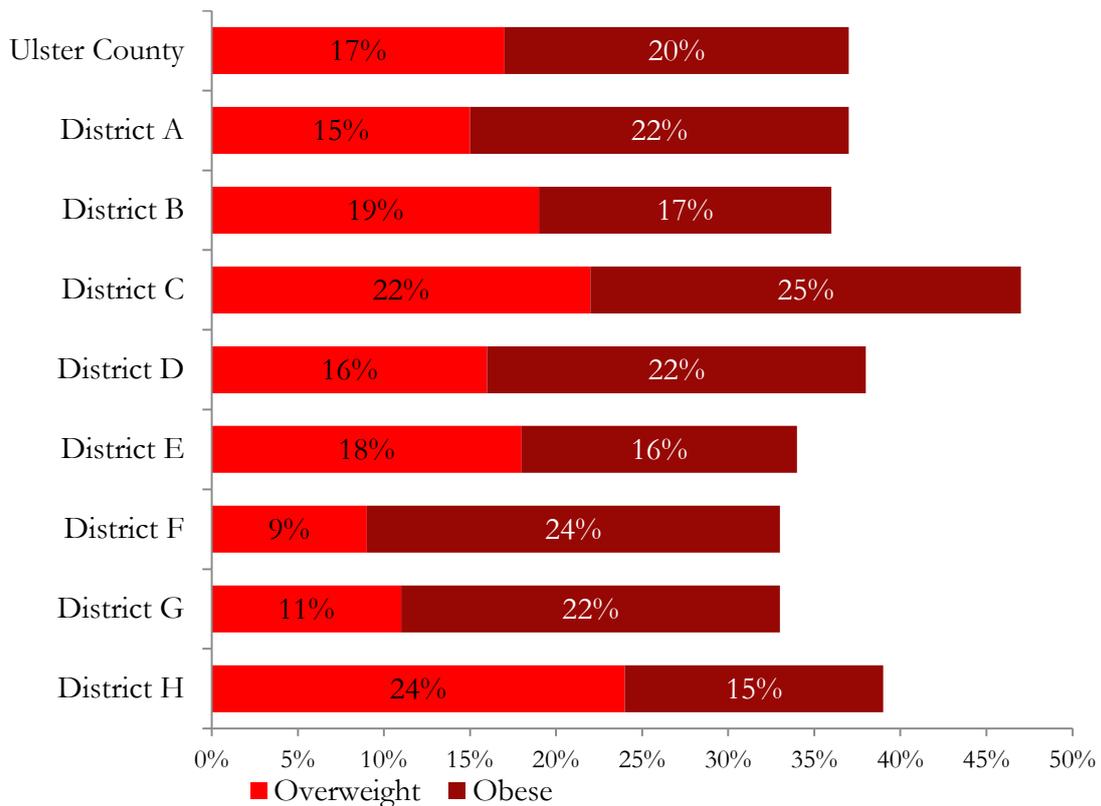
Among Ulster County 3<sup>rd</sup> graders, 3% were identified as underweight, 62% were normal weight, and 35% were obese or overweight, with 18% being obese. While boys and girls showed relatively similar rates of overweight in this age group, boys tended to have a higher rate of obesity than girls. This higher rate of obesity, as compared with the rate of children classified as overweight, among 3<sup>rd</sup> grade boys, is seen in five of the eight school districts. However, among the 3<sup>rd</sup> grade girls in five districts, the proportion of obese girls

**Figure 4. BMI Distribution in Ulster County: 3rd Grade**

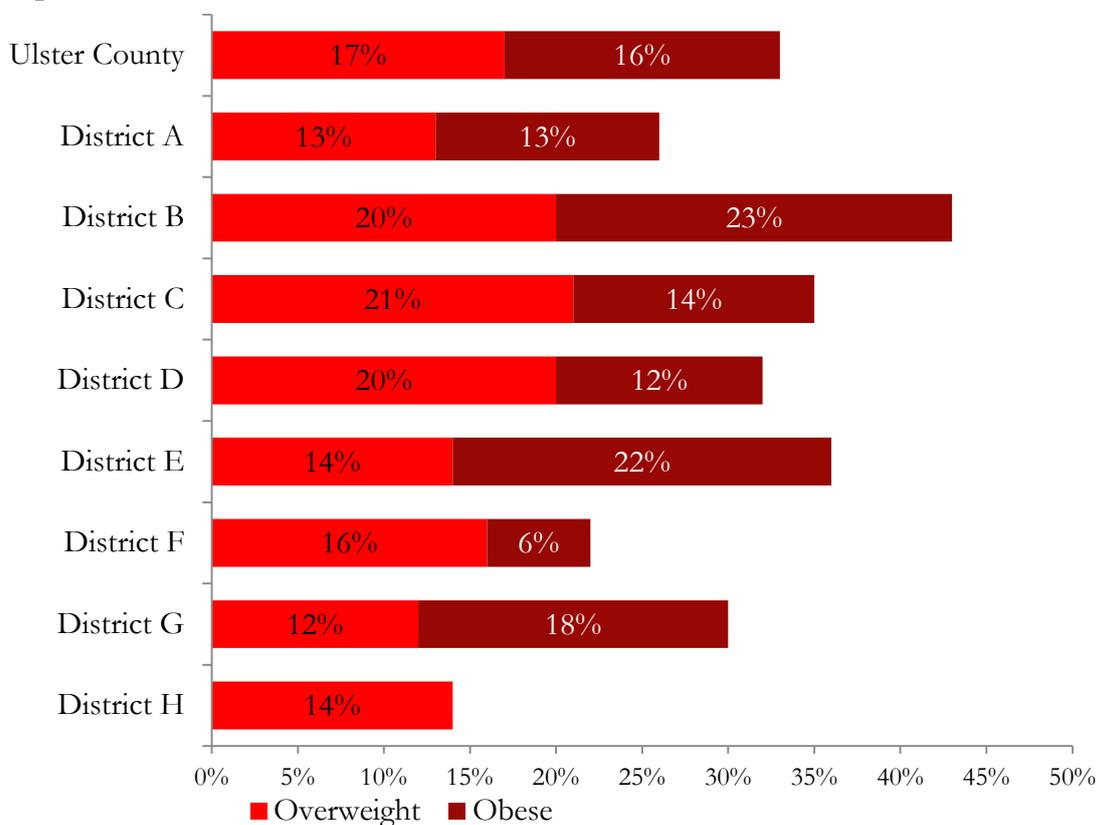


is equal or smaller than the proportion of girls who are overweight. In nearly all districts, over one third of the 3<sup>rd</sup> grade boys fall into the higher risk weight groups. Among 3<sup>rd</sup> grade girls, in one district 43% of girls are at high risk weights with nearly a quarter being obese. Interestingly, the district that has the highest at risk population of overweight or obese girls (District B) is not one of the two districts (A and E) that showed this high rate among 1<sup>st</sup> grade girls.

**Figure 5. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Third Grade Boys**



**Figure 6. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Third Grade Girls**



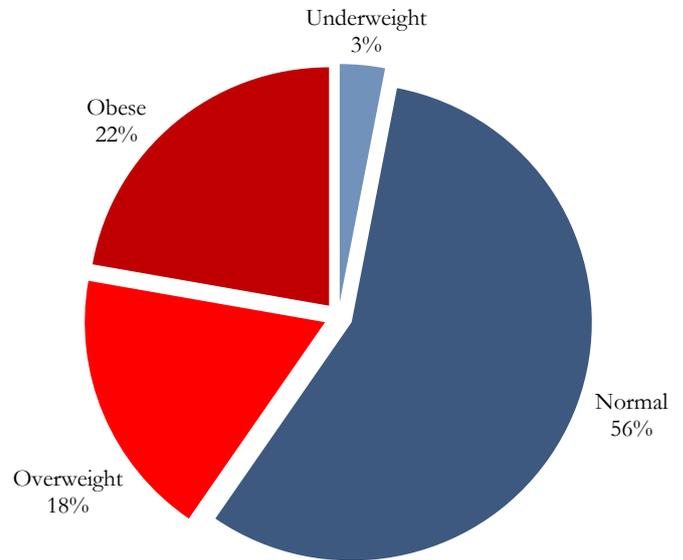
## 5<sup>th</sup> GRADE

**Table 3. BMI Distribution Overall and by Gender in Ulster County: 5th Grade**

<b>Total</b>	<b>(N=1504)</b>
Underweight	3%
Normal	56%
Overweight or obese	40%
Overweight	18%
Obese	22%
<b>Boys</b>	<b>(n=758)</b>
Underweight	3%
Normal	57%
Overweight or obese	40%
Overweight	16%
Obese	24%
<b>Girls</b>	<b>(n=746)</b>
Underweight	2%
Normal BMI	56%
Overweight or obese	42%
Overweight	21%
Obese	21%

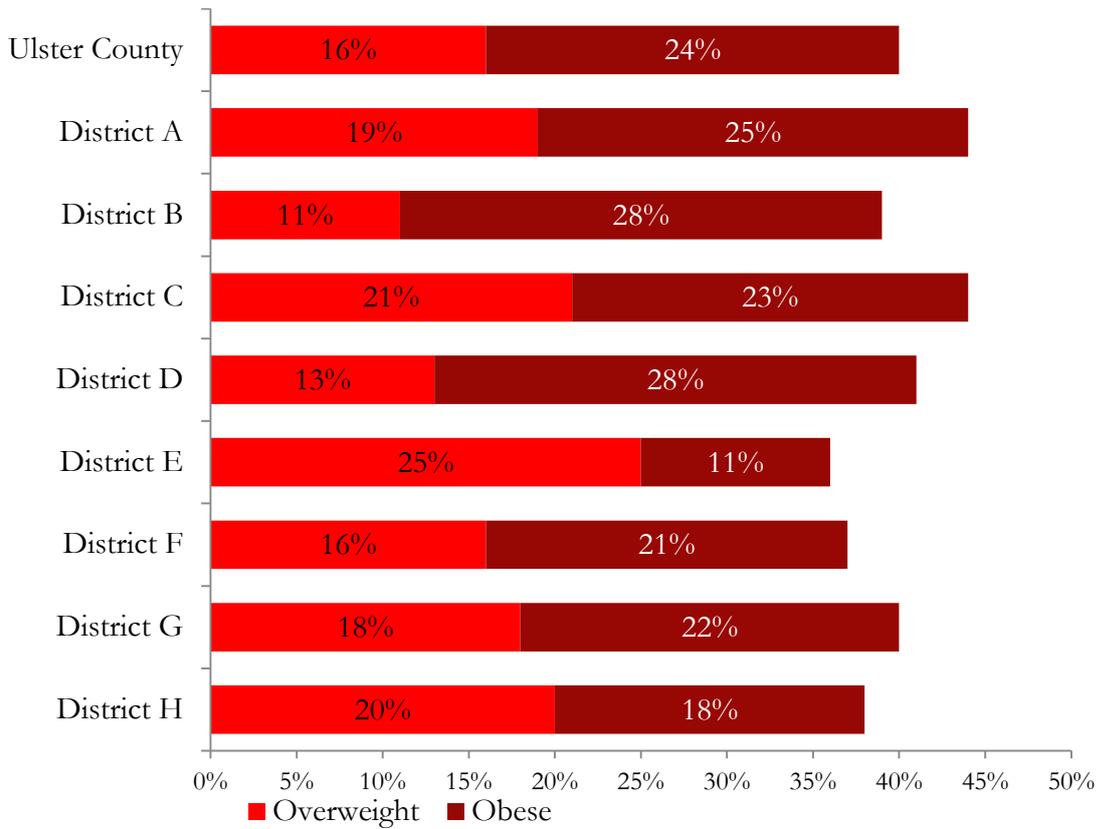
Among 5<sup>th</sup> graders in Ulster County, 3% were identified as underweight, 56% as normal weight, and 40% were obese or overweight, with 22% being obese. Girls had a slightly higher rate of above normal weight; however, there are slightly more obese boys than girls in this age group. Among 5<sup>th</sup> grade boys, in every district in the county the prevalence of high risk (overweight or obese) children is well

**Figure 7. BMI Distribution in Ulster County: 5th Grade**

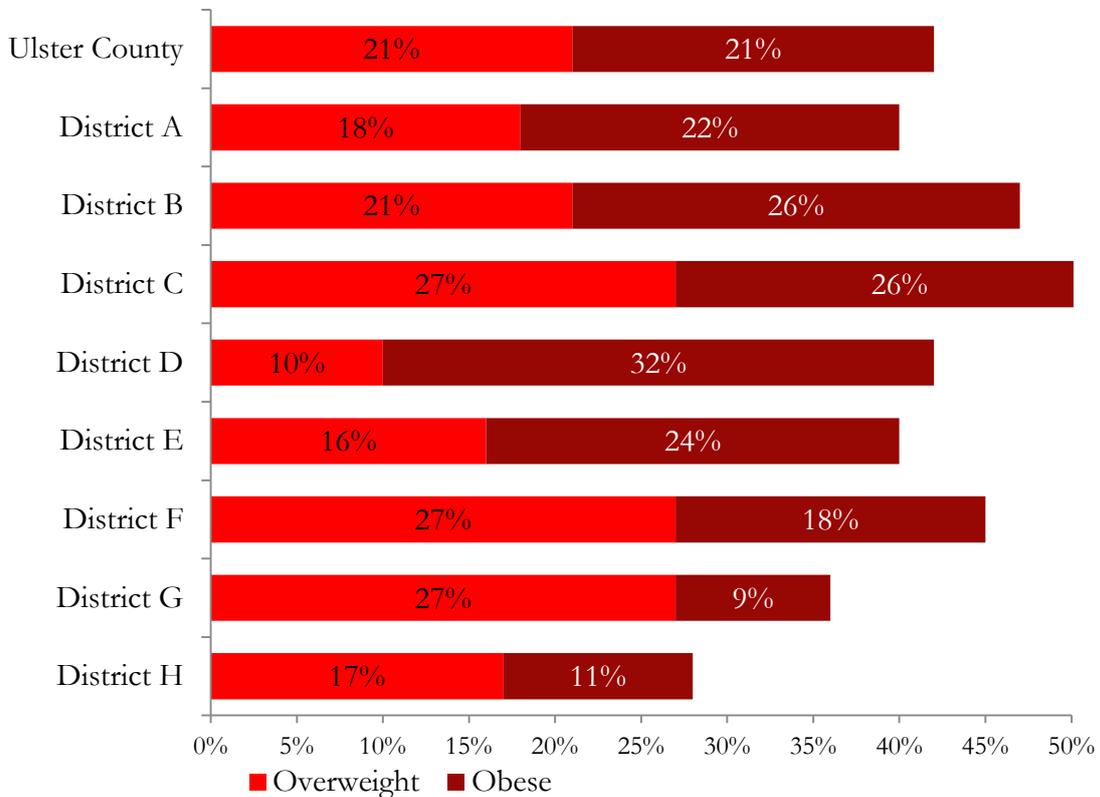


over one third. With two exceptions (District E and H), there is a higher rate of obesity, compared with overweight. Among 5<sup>th</sup> grade girls, the districts show greater disparity with one (District C) just exceeding a 50% prevalence while the lowest (District H) has a 28% prevalence of overweight or obese girls in this age group.

**Figure 8. Comparison of Percent Overweight and Obese in Ulster County and Across Sampled School Districts: Fifth Grade Boys**



**Figure 9. Comparison of Percent Overweight and Obese in Ulster County and Across Sampled School Districts: Fifth Grade Girls**



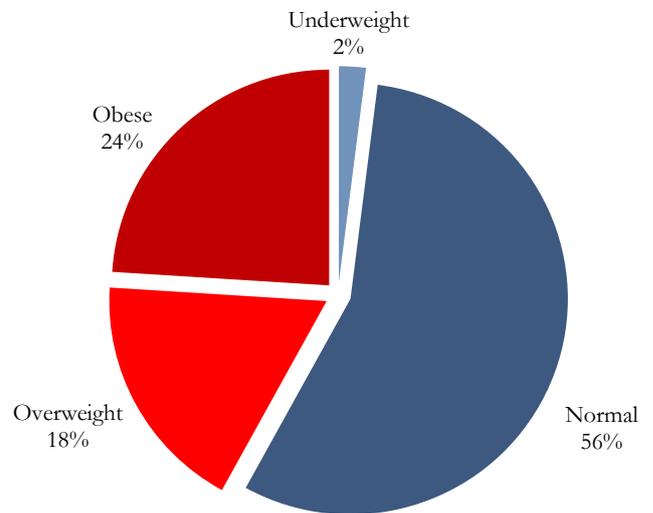
## 7<sup>th</sup> GRADE

**Table 4. BMI Distribution Overall and by Gender in Ulster County: 7th Grade**

<b>Total</b>	<b>(N=1304)</b>
Underweight	2%
Normal	56%
Overweight or obese	42%
Overweight	18%
Obese	24%
<b>Boys</b>	<b>(n=649)</b>
Underweight	3%
Normal	56%
Overweight or obese	41%
Overweight	15%
Obese	24%
<b>Girls</b>	<b>(n=655)</b>
Underweight	2%
Normal	57%
Overweight or obese	41%
Overweight	20%
Obese	21%

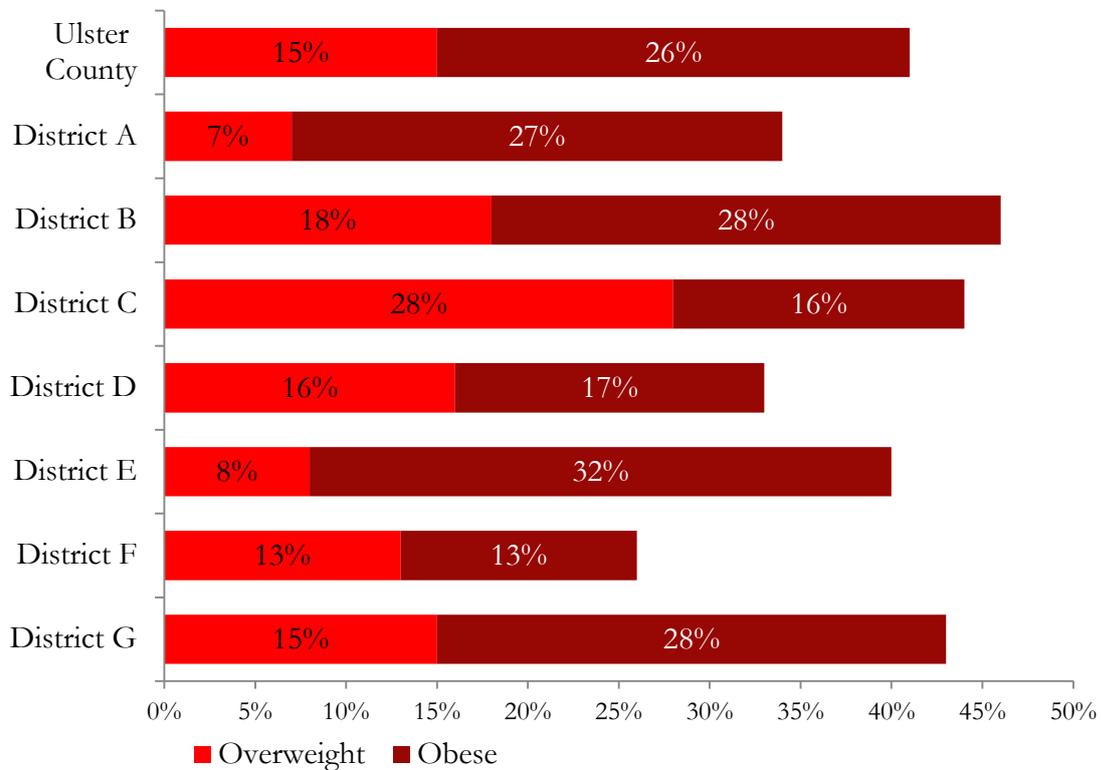
Among 7<sup>th</sup> graders in Ulster County, 2% were identified as underweight, 56% as normal weight, and 42% were obese or overweight, with 24% being obese. Girls had higher rates of overweight compared with boys; and there are more obese boys than girls in this group. In a comparison across 7<sup>th</sup> grade boys in each participating school district there is considerable variation in the prevalence of

**Figure 10. BMI Distribution in Ulster County: 7th Grade**

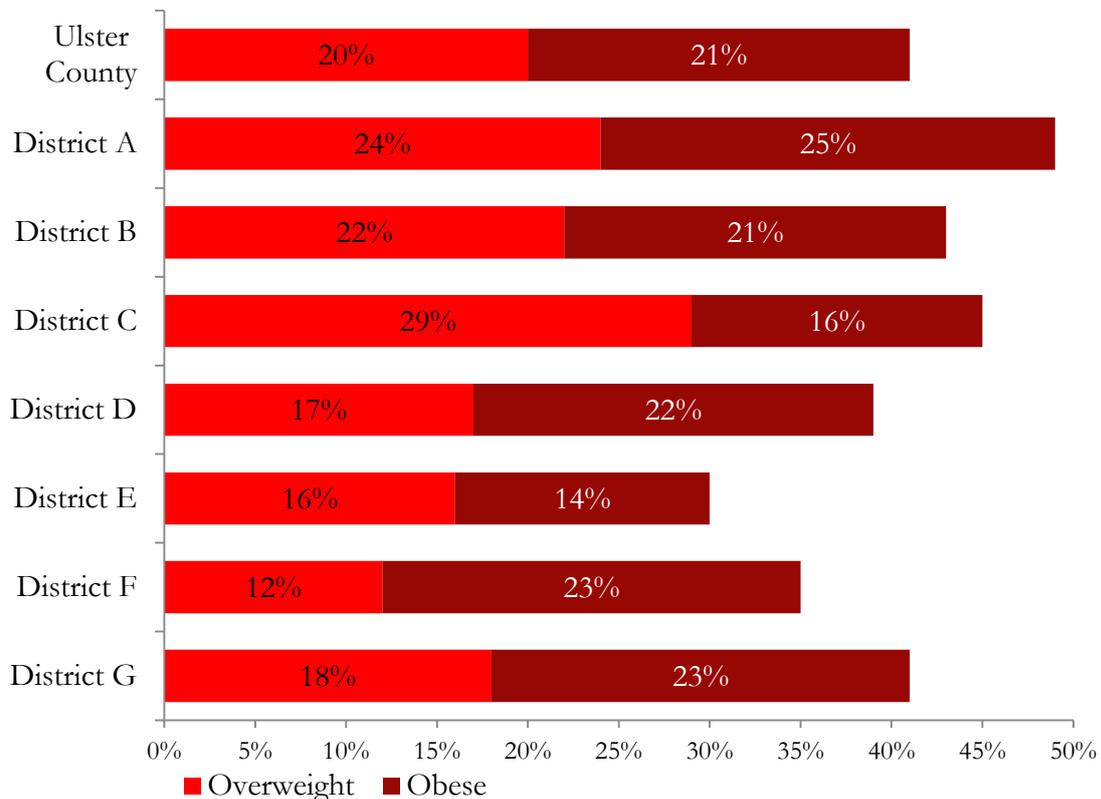


overweight/obesity rates. While four of the seven participating schools have a prevalence of four in ten or more at-risk boys in this age group, the remaining three have less than 35% in this classification. Among the 7<sup>th</sup> grade girls, the comparisons across the districts show a similar pattern; however only two of the participating districts (E and F) fall at 35% or lower in the high risk group.

**Figure 11. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Seventh Grade Boys**



**Figure 12. Comparison of Percent Overweight and Obese in Ulster County and in Sampled School Districts: Seventh Grade Girls**

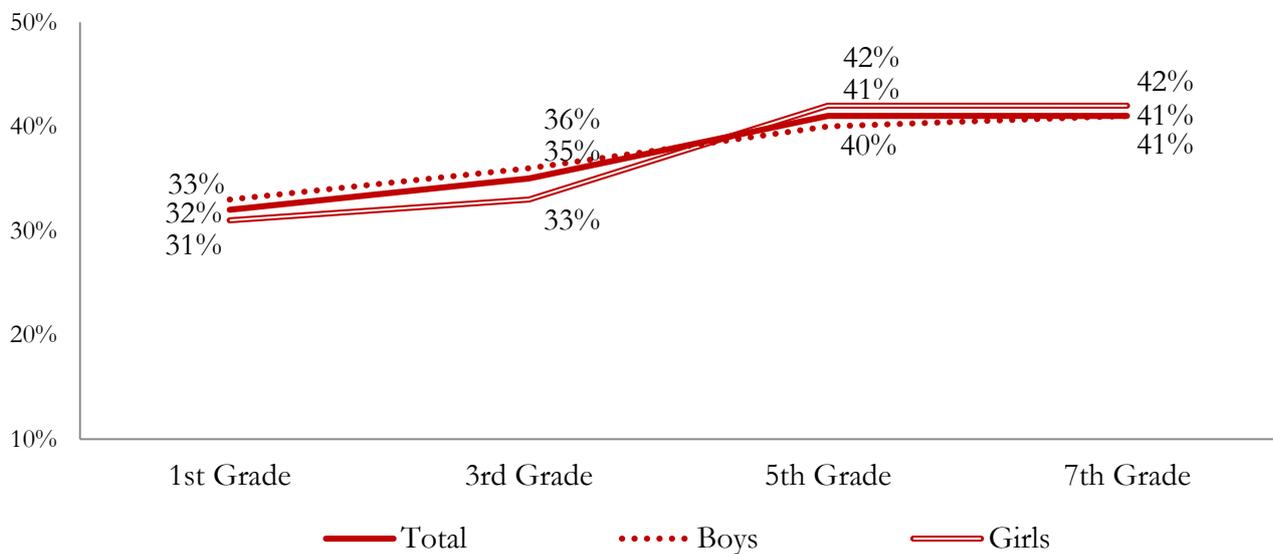


## Trends

The graph below shows the BMI obesity rate for Ulster County school districts comparing 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup> and 7<sup>th</sup> graders in 2010. This graph demonstrates that there is a statistically significant ( $p < .05$ ) increase in overweight/obesity overall and by gender comparing grades 1<sup>st</sup> to 7<sup>th</sup>. However, when examined by sequential grades, the increase is only significant comparing 3<sup>rd</sup> and 5<sup>th</sup> grades.

In fact, comparing 5<sup>th</sup> and 7<sup>th</sup> grade the overall rate remains constant. Among boys, the most notable difference, although not statistically significant (NS), occurs between 3<sup>rd</sup> and 5<sup>th</sup> grade where the 5<sup>th</sup> grade rate shows an 11% increased rate. Similarly, girls show a statistically significant difference between 3<sup>rd</sup> and 5<sup>th</sup> grade whereby rates among female 5<sup>th</sup> graders are 27% higher.

**Table 5. Overweight/Obesity Rate Comparisons by Grade**



P Values	1 <sup>st</sup> – 3 <sup>rd</sup>	3 <sup>rd</sup> – 5 <sup>th</sup>	5 <sup>th</sup> – 7 <sup>th</sup>	1 <sup>st</sup> – 7 <sup>th</sup>
<b>Total</b>	NS	<.01	NS	<.01
<b>Boys</b>	NS	NS	NS	<.01
<b>Girls</b>	NS	<.01	NS	<.01

## CONCLUSION

### County-Wide

Nationwide, there has been a linear trend in an increasing number of overweight or obese boys and girls over time (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). While it appears that as children age in Ulster County they are showing increased rates of overweight and obesity, much of this is a slow steady increase that is statistically significant overall, but not when assessed incrementally. The one exception is significant increases for girls between 3<sup>rd</sup> and 5<sup>th</sup> grade.

Similarly, the prevalence of normal weight children in the county declines moderately and then stabilizes with just under 60% of children falling into this category overall. For the lower risk group of overweight, the most notable increase seems to occur from 1<sup>st</sup> to 3<sup>rd</sup> grade.

Correspondingly, as age increases, incidence in the higher risk group increases; there are more obese children in 3<sup>rd</sup> grade than 5<sup>th</sup> grade and then again from 5<sup>th</sup> grade to 7<sup>th</sup> grade. This pattern demonstrates that the overall BMI increase from 1<sup>st</sup> through 7<sup>th</sup> grade is driven by the higher rate of obesity, the highest risk group, rather than just a steady rise above normal weight among children.

### District Level Comparisons

When comparing across school districts, there were no clear patterns thus discouraging the use of overall county-level findings to understand each district individually. In other words, a district that showed high rates of overweight or obese boys did not necessarily show this same pattern among its girls. Similarly, when looking at districts individually, higher or lower rates of overweight or obesity among one grade did not necessarily correlate with the rate in the other grades within the same district.

### Limitations

There are some data limitations that should be considered when examining this report. The first limitation relates to the data collection methodology used by each district. For several reasons, data collection across districts could not be precisely uniform. In one district, the physical education teacher calculates weight and height for all children annually, thereby providing the most up to date information. In two districts, the school nurses conducted individual screenings for children in each grade. All other districts relied on transcribing existing data from medical records. The New York State Education Law 903 and 904 require each student's health examination form to include BMI and determination of weight status for grades pre-K, K, 2<sup>nd</sup>, 4<sup>th</sup>, and 7<sup>th</sup>. Beginning in 2010, the state mandated school districts to provide aggregated BMI data for these grades utilizing a 50% sample of school districts each year. Four participating districts were among those randomly selected by the state this year to provide data from 2009. Those schools who were selected felt an added burden to provide data for the county, as well for potentially dissimilar grades. Similarly, the non-selected schools were limited to collecting weight and height data only for the state-mandated grades. As this study examined students who in the

2010-2011 school year were in grades 1, 3, 5 and 7, some schools chose to use the previous year's medical reports for their 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> grade while using the current school year's medical records for their 7<sup>th</sup> graders. While this difference in data collection methods is not ideal, no major error is expected to have occurred as a result because variations in BMI any particular year is random and small.

A second limitation results because BMI is not a diagnostic tool, and as such, further evaluation is needed by a healthcare provider in order to determine if the high BMI is a cause for concern (CDC, 2009). Children who are on the short or tall ends of the height spectrum may have an inaccurate BMI (Council on Sports Medicine and Fitness and Council on School Health, 2006). In addition, BMI does not account for muscle mass which, for some part, explains the higher prevalence of BMI among older students who, on average, have greater muscle mass compared with their younger counterparts.

## **Implications**

---

Data collection for this report allows for statistical evaluation of the prevalence of obesity or overweight in any given district. BMI data can track trends of weight status for school districts to determine effectiveness of obesity prevention programs already in place, or whether programs need to be initiated (Soto & White, 2010). It can identify particular age groups at risk so that interventions may be more appropriately directed (Nihiser et al., 2007). While it appears from the county-level results, that girls and boys between the grades of 3<sup>rd</sup> and 5<sup>th</sup> grade would be the ideal target population for healthy weight education, each school district when examined individually should use their specific data to further refine their best target population for intervention. In addition, school districts can use the benchmarking comparisons to better understand their particular rates of overweight and obesity within the county context.

## REFERENCES

- Barlow SE; Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics*. 2007 Dec;120(suppl 4):S164-92.
- Centers for Disease Control and Prevention. (2009). *About BMI for children and teens*. Division of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion. Retrieved from <http://www.cdc.gov/healthyweight/assessing/bmi>.
- Council on Sports Medicine and Fitness and Council on School Health (COFMP/COSH). (2006). Active healthy living: Prevention of childhood obesity through increased physical activity. *Pediatrics*, 117, 1834-1842.
- Li, J., & Hooker, N. H. (2010). Childhood obesity and schools: Evidence from the national survey of children's health. *Journal of School Health*, 80, 96-103.
- New York State Department of Health (NYDOH). (2005). New York State strategic plan for overweight and obesity prevention. Retrieved from [http://www.health.state.ny.us/prevention/obesity/strategic\\_plan/strategic\\_plan\\_index.htm](http://www.health.state.ny.us/prevention/obesity/strategic_plan/strategic_plan_index.htm).
- Nihiser, A. J., Lee, S. M., Wechsler, H., McKenna, M., Odom, E., Reinold, C., Grummer-Shawn, L. (2007). Body mass index measurement in schools. *Journal of School Health*, 77, 651-671.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., Lamb, M. M., & Flegal, K. M. (2010, reprinted), January 20). Prevalence of high body mass index in US children and adolescents, 2007-2008. *Journal of the American Medical Association*, 303(3), 245-249.
- Soto, C., & White, J. H. (2010, August 2). School health initiatives and childhood obesity: BMI screening and reporting. *Policy, Politics, & Nursing Practice*, 11, 108-114.
- United States Department of Health and Human Services (USDH). (2010). *Healthy People 2020: Leading Health Indicators: Nutrition and Weight Status*. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=29>

## HOW TO PREVENT OBESITY

Take Action!

Overweight and obesity in children can lead to serious problems, like:

- Type 2 diabetes
- Asthma
- Heart disease
- Sleep problems
- Low self-esteem
- Getting bullied

There are many ways schools can help prevent and reduce overweight and obesity among children adapted from the United States Department of Health and Human Services. Retrieved from:

<http://www.healthfinder.gov/prevention/ViewTopicFull.aspx?topicID=62#Take%20Action!>

**Put at least 1 hour of physical activity into the children's day.**

Be sure your child is doing different types of activity, including:

- **Aerobic activities**, like running, skipping, or dancing
- **Muscle-strengthening activities**, like climbing trees or playground equipment
- **Bone-strengthening activities**, like jumping rope or playing basketball

**Educate children to eat healthy meals.**

1. Serve more vegetables, fruits, and whole grain foods.
2. Teach children to read the nutrition label on packages.
3. Lower the calories and fat in the meals you serve in the cafeteria.
4. Help children know when they've had enough. Give your kids a chance to stop eating when they feel full.

**Make sure your children know to get enough sleep.**

If kids don't get enough sleep, they are at higher risk of being overweight or obese. School-aged and preschool children need 10 to 12 hours of sleep.

**Share these Web sites with your kids.**

These safe Web sites can help children learn about healthy habits.

- [BAM! Body and Mind](#)
- [MyPyramid Blast Off Game](#)
- [Best Bones Forever](#)
- [Small Step Kids](#)

**Be good role models**

When teachers and school staff eat right and are physically active, your child will be more likely to make these choices, too. Make healthy eating and exercise a school project.