

A Report  
On Body Mass Index  
of Henry County's  
Third Graders

2006-2007



**Introduction:**

Since the 1970s, the digital age has ushered in high-tech video games, high-definition television and high-speed Internet. The fast-food industry has fed the country super-quick, super-cheap and super-sized meals. And now, children face an epidemic large in weight, large in cost and even larger in risk.

The epidemic is childhood obesity, and according to the Center for Disease Control and Prevention (CDC) in 2002, it engulfed 16% of children between the age of 6 and 19, a percentage that has increased five percent since 1994 and nearly tripled over the past three decades. This number is expected to triple by 2010, which would make nearly half of all 6- to 19-year-olds overweight.

In terms of sheer pounds, there is no exact number to determine who is or is not obese. Instead, a mathematical formula tracking accurate height and weight measurements creates a person's body mass index, or BMI. The end product of the formula, i.e. 22, estimates body composition and makes it simple to place each person into a category: underweight, normal, at risk for overweight and overweight.

Because children grow at different rates according to their age and sex, BMI placement is categorized accordingly. For example, an 8-year-old boy with a BMI of 20 would be considered overweight, while a 9-year-old boy with the same BMI would be considered at risk for overweight. Similarly, an 8-year-old girl with a BMI score of 20 also would be considered at risk for overweight, rather than overweight like her 8-year-old counterpart.

The aforementioned categories all are specific to BMI-for-age, but are as follows: Underweight persons would be below the fifth percentile; normal-weight persons would range from the fifth to 85<sup>th</sup> percentile; those considered at risk for overweight fall from the 85<sup>th</sup> to 95<sup>th</sup> percentile; and overweight individuals would be above the 95<sup>th</sup> percentile. In children, the CDC does not recognize any scientific standards for obesity, thus there is no "obese" category.

Yet these "overweight" children tend to become "obese" adults. Already, the national health care costs related to adult obesity and overweight have been estimated at \$98 to \$129 billion (Koplan, et al., 2). These numbers do not take into account the additional money spent on overweight children.

But the biggest cost of childhood overweight and obesity is to their health. Those children who are overweight are more likely to have high blood pressure, cholesterol and insulin levels. Because of this fact, for the first time in history, children are predicted to have a shorter average lifespan than their parents, and the Surgeon General's Office expects obesity to soon bypass smoking as the leading preventable cause of death in the U.S.

Other health problems caused by extra weight, as cited by the Ohio Department of Health, include asthma, bone and joint problems, sleep apnea and deprivation, Type 2 Diabetes, early growth and puberty and psychological issues such as depression, loneliness and poor self-esteem.

**Background Information:**

But combating the epidemic requires awareness and knowledge of its severity. Therefore, in 2004 and 2005, the Ohio Department of Health Division of Family and Community Health Services sampled third grade students in 387 public schools across the state. Of the 14,451 BMI estimates correctly collected, 18.9% of third grade students in Ohio were overweight and another 16.7% were at risk for overweight.

Through the random sampling by the Ohio Department of Health, an estimate for Henry County third grade students was obtained, showing that 16.4% were overweight. Additionally, 16.8% were considered at risk for overweight.

This data remained only a sample of the students, however, and did not represent all third graders in Henry County. Thus, the Henry County Health Department found it necessary to conduct a study using all public school third grade students, not only to confirm or refute the state's sample, but also to provide accurate information for future studies.

In May of both 2006 and 2007, third grade students in the county's four public school districts were measured for their height and weight. In 2006, students' heights were recorded using a stadiometer and their weights using a typical bathroom scale; in 2007, a physician's stadiometer with a built-in scale was purchased for measuring purposes. After students' measurements were recorded, the data, along with their ages and genders, was put into a computer program to instantly and anonymously record their BMI.

Locally, Henry County's results seem to show a greater prevalence of at-risk and overweight children than the statewide sampling reveals. The study, conducted in the six public elementary schools housing third graders, obtained data from 347 and 301 students in 2006 and 2007, respectively. These totals account for most students in the grade, but some pupils were not included due to absence or parental refusal.

The Napoleon Local School District is the largest district in Henry County, with three elementary schools containing at least two classes of third grade students. These children were students at C.D. Brillhart Elementary, Central Elementary and West Elementary. Outside Napoleon, students from Holgate Elementary, Liberty Center Elementary and Malinta Elementary also took part.

The following data documents the trends on a school-by-school basis and divided into three categories: overweight, at-risk for overweight and not at-risk for overweight.

### **Third Grade Students Measured As Overweight**

Overall, in 2006, 85 of the 352 students tested were considered strictly overweight, while 68 of the 301 students fell under this category the following year. These statistics amount to 24.15% and 22.59% in 2006 and 2007 respectively. According to data collected by the Ohio Department of Health, 20.6% of third-graders across the state were overweight. This places Henry County above the statewide average in regards to the percentage of third-grade students overweight.

At C.D. Brillhart, 39 students took part in the study in 2006, with exactly one-third, or 13, of the students currently overweight. In 2007, however, the BMI scores for the 40 third-graders participating drastically dropped, but still remained a cause for concern. In 2007, 20% of the students (eight children) were currently overweight.

Sixty Central Elementary third-graders contributed to the study in 2006, with 17 of them (28.33%) classified as overweight. Similar to the results at C.D. Brillhart in 2007, the percentage of those students who were ranked as overweight declined to 20.93% of the 43 students tested, or nine children.

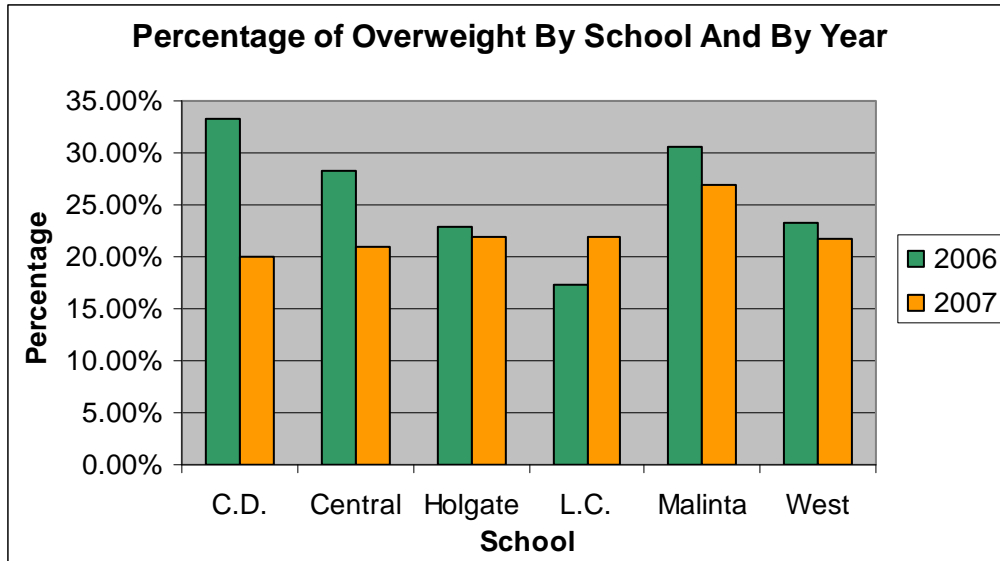
The largest sampling size in the Napoleon Local School District came from West Elementary, with 69 students in 2006. That year, 23.19 % (16 students) were overweight, compared to 21.82% of the 55 students weighed and measured in 2007 (12 students).

Outside of Napoleon, the percentage of those third grade students considered overweight still remained prevalent. At Holgate Elementary, part of the smallest school district in the county, 11 (22.92%) of its 48 students were overweight. The percentage of

students overweight remained steady the following year, with 21.88% (seven students) of Holgate's 32 participants falling under this category.

Liberty Center Elementary measured 87 third graders for their BMIs in 2006, the largest school sampling conducted. Fifteen of the students (17.24%) were overweight. In comparison, 14 students were characterized as overweight in 2007, but only 64 students were tested, making this number 21.88% of the class.

Finally, Malinta Elementary, in the Patrick Henry School District, measured 49 students in 2006, with 30.61%, or 15 students, overweight. The 2007 study documented 67 students, with 26.87%, or 18 students, classified as overweight.



### Third Grade Students Measured As At-Risk for Overweight

In addition to the 87 Henry County students overweight in 2006, another 112 were at-risk for overweight. Together, more than 57% of the students tested in 2006 fell into these categories. The following spring, 52 students were labeled at-risk for overweight. When compiled with the currently overweight students, these 120 pupils made up nearly 40% of the countywide study. While this is a sharp decline from 2006, it still remains a cause for grave concern.

The percentage of students at-risk for overweight in Henry County numbered 32.28 and 17.28 in 2006 and 2007, respectively. The state-wide data shows that 17% of students were at-risk for overweight, which is a notable difference from Henry County's 2006 results, but nearly exact with the results of 2007.

Similar to the findings of the students currently overweight at C.D. Brillhart, another one-third of the students at the elementary school were considered at-risk for overweight in 2006. The following year, only three (7.5%) of the students were at-risk for overweight.

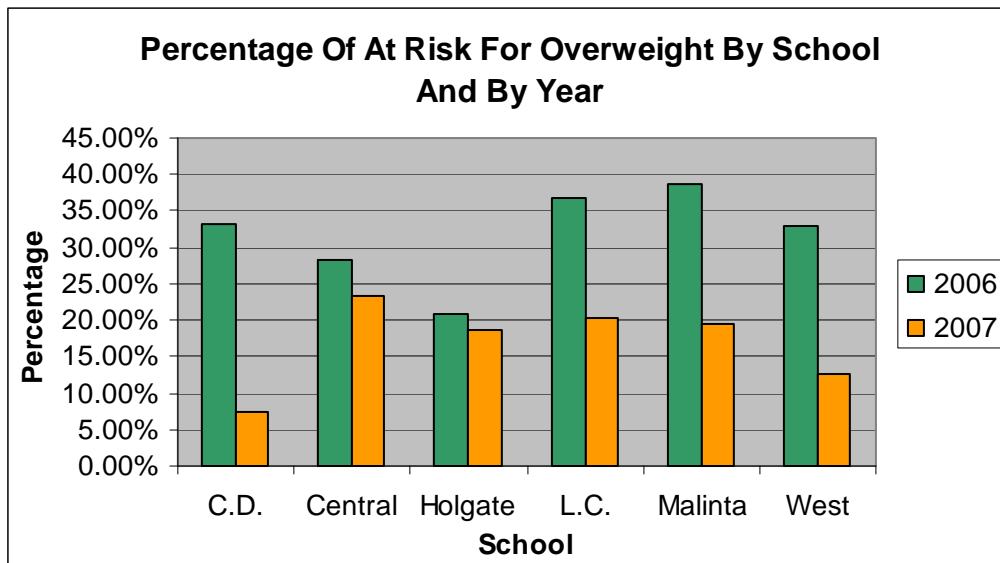
In 2006, the percentage of students at-risk for overweight and those who were overweight at Central Elementary was the same, at 28.33%, or 17 students. Slightly lower than the previous year, the study in 2007 found 23.26%, or 10, of the students at-risk for overweight.

Of the 64 third graders from West Elementary in 2006, 32.81% of the students were at-risk for overweight. These 37 students is a far larger number than the data found the following year. In 2007, only nineteen students (12.73%) were measured at-risk.

In 2006, Holgate’s percentage of its 48 students considered overweight is approximately the same as those considered at-risk for overweight, at 20.83%, or 10 students. The following year, six of Holgate’s 32 students (18.75%) were at-risk for being overweight.

Of the 87 person sample at Liberty Center in 2006, 25 people (36.78%) were at-risk for overweight. The 2007 study found half as many students (13) at-risk for overweight, but because of the smaller sample size of 64, this smaller number still comprised 20.31% of the class.

At Malinta Elementary, 19 of the 49 students in the study in 2006 were considered at-risk for overweight (38.78%). Following the pattern of previous data where percentages of students either at-risk or currently overweight lowered in 2007, Malinta Elementary cut its previous statistic in half, with 19.4% of its students, or 13, at-risk for overweight.



### Third Graders Measured Not At-Risk for Overweight

The third grade class at C.D. Brillhart Elementary in 2006 was evenly split into thirds among the classifications, which left 13 students not at-risk for overweight. A vast improvement came in 2007 in the BMI scores of the third-graders at the school, with 72.5% (29 children) not at-risk for overweight.

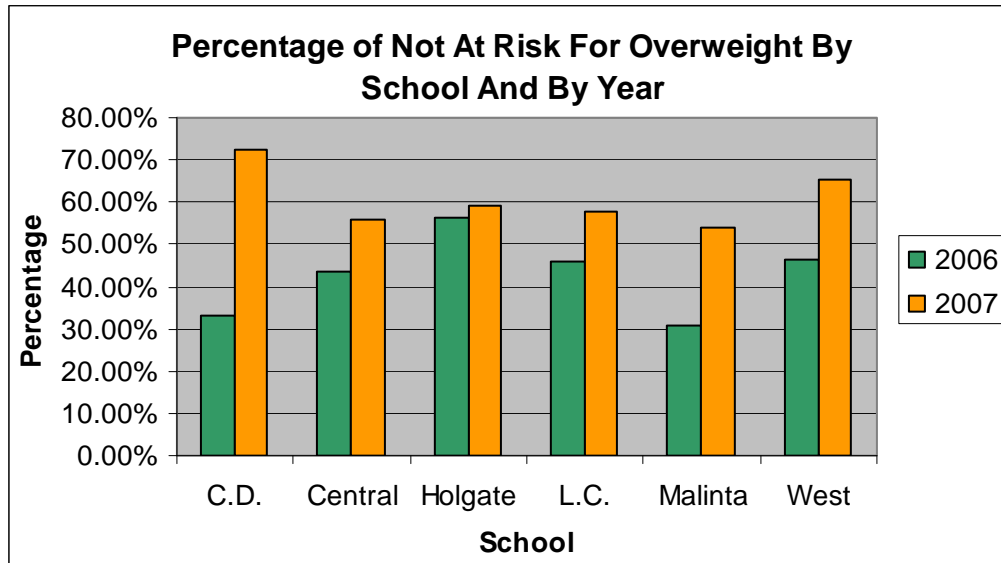
The study conducted in 2006 at Central Elementary brought higher numbers of students not at-risk for overweight when compared to C.D. Brillhart. That year, 26 students (43.33%) were not at-risk. Corresponding to the previous statistics, more than half of the 43 students measured in 2007 (55.81%) were not at-risk for overweight.

At West Elementary, 27 out of 64 students sampled were not at-risk for overweight in 2006, or 42.19%. This number pales in comparison to the 65.45%, or 36 out of 55, of West Elementary third-graders not at-risk in 2007.

Of the 48 students of the third-grade class of 2006 at Holgate Elementary, 27 (56.25%) were not at-risk for overweight. The next year, 19 of the 32 participants were not at-risk (59.38%).

Forty of the 87 students (45.98%) of the 2006 class at Liberty Center were not at-risk for overweight, but a much higher percentage came the following year, when 57.81% (37 of 64 persons) measured not at-risk for overweight.

In 2006, 15 of 49 Malinta Elementary students (30.61%) were not at-risk for overweight. This number equaled the number of those students currently overweight at the school. The percentage increased drastically the following year when more than half (53.73%) of the 67 students at Malinta Elementary were not at-risk for overweight, totaling 36 third-graders.



### Age and Gender

The data also was collected in regards to age and gender of the third grade students. In 2006, 171 males in the county participated, compared to 155 in 2007. Female totaled 176 in 2006 and 146 in 2007.

Of the 171, 103 males (60.23%) were considered overweight or at-risk for overweight, with 40 of the male participants (23%) labeled as currently overweight. The following year, the percentage of those overweight or at-risk fell to 47.74% (74 students), but the number of those strictly overweight remained nearly the same, at 41 males or 26.45%.

Of the 176 females weighed and measured in 2006, 96 fell under the category of overweight or at-risk for overweight. This number equals nearly 55% of the females tested. The 2006 study found 47 of 176 females were classified as currently overweight. The 2007 study found 46 of the 146 female students to be overweight or at-risk, 27 of whom (18.49%) were ranked as overweight.

### C.D. Brillhart

In 2006, 17 males participated at C.D. Brillhart with an average BMI of 21. Included in this study were two 8-year-olds with a mean BMI of 28.65; 12 9-year-olds whose BMI averaged to 18.67; and three 10-year-olds who had a mean body mass index of 25.27. The next year, C.D. Brillhart had 15 males take part in the study with a mean BMI of 17.09. The measurements were conducted on 14 9-year-olds with an average BMI of 16.87 and one 10-year-old with a BMI of 20.15. C.D. Brillhart had 22 females with a mean BMI of 20.9 join in the study in 2006. Four 8-year-olds with a mean BMI of 23.23; 17 9-year-olds with an average body mass index of 20.33; and one 10-year-old with a BMI of 21.4 were measured in the process. In 2007, the average BMI of the 25 females was 19.08. Although similar numbers of students participated, the numbers

varied from the year before: Four 8-year-olds had an average BMI of 17.71, while 20 9-year-olds averaged 19.06 and one 10-year-old's BMI was 25.11.

#### *Central Elementary*

At Central Elementary, 2006 bore 30 male participants with a mean BMI of 20.25, and 2007 had 27 with their average BMI at 19.27. In 2006, two 8-year-olds had an average BMI of 19, while 28 9-year-olds averaged 20.3. The next year, one 8-year-old scored a BMI of 24.34; 18 9-year-olds averaged 18.8; seven 10-year-olds had a mean of 20.25; and an 11-year-old's BMI was 15.78.

Also in 2006, the BMI of 16 females was 18.78. One 8-year-old measured in with a BMI of 26.15, while 12 9-year-olds averaged 18.3, two 10-year-olds had a mean of 17.53 and an 11-year-old had a BMI of 19.62. The following year, 30 females at Central Elementary were part of the study: The body mass index of an 8-year-old was 16.5, while 28 9-year-olds averaged in at 19.5 and a 10-year-old had a BMI of 18.

#### *West Elementary*

Of the 64 students participating from West Elementary in 2006, the average BMI of the 23 males was 19.2. The 17 9-year-olds and six 10-year-olds had average BMIs of 19.5 and 19.6, respectively. The following year, 30 males with a mean BMI of 20.28 took part in the study, 25 of whom were 9-year-olds with an average BMI of 18.9 and five of whom were 10-year-olds averaging 19.63.

In the study's first year, 41 females from West Elementary aided in the collection of data, with an average BMI of 20.2. Of the nine 8-year-olds, 25 9-year-olds and seven 10-year-olds, their BMIs were 19.7, 19.6 and 23.2, respectively. In its second year, West Elementary measured an average BMI of 18.62 for 25 females: one 8-year-old with a BMI of 17.29; 17 9-year-olds with averages of 18.5; six 10-year-olds with a mean BMI of 19.3; and one 11-year-old at 17.77.

#### *Holgate Elementary*

At Holgate Elementary, 24 males had a mean BMI of 18.5 in 2006, compared to 19 males with an average of 17.3 in 2007. The first year brought seven 8-year-olds, 16 9-year-olds and one 10-year-old with mean BMIs of 17.9, 18.9 and 16.6, respectively. In the next year, BMI data was collected from three 8-year-olds, 14 9-year-olds and two 10-year-olds. In order of age, their means were: 16.18, 18.33 and 20.9.

In the female realm, 24 girls with a mean BMI of 19.9 were part of the study, comprised of two 8-year-olds with a mean BMI of 21.3, 18 9-year-olds averaging 19, and four 10-year-olds whose averages measured 23.3. Eleven fewer girls from Holgate took part in the study in 2007. These 13 girls averaged 19.9 in body mass index, comprised of three 8-year-olds, nine 9-year-olds and one 10-year-old. Their respective mean BMIs were 18.05, 20.95 and 16.4.

#### *Liberty Center Elementary*

Male participation in Liberty Center brought in 47 males with a mean BMI of 18.7 in 2006; in comparison, the 2007 third-grade class contained 35 participants with a slightly higher mean BMI of 19.01. In 2006, five 8-year-olds with mean BMIs of 17.4, 41 9-year-olds averaging in at 18.8 and one 10-year-old with a BMI score of 21.3 composed the data reports. The next year, five of the 35 participants were 8-year-olds, 26 were 9-year-olds and four were 10-year-olds. Respectively, their BMI rankings were 19.55, 19.02 and 18.38.

For the females, 2006 participation at Liberty Center amassed nearly the same BMI score as their male classmates: 18.6. Of the 40 females, seven 8-year-olds averaged a BMI of 17.6, 30 9-year-olds had BMI mean scores of 18.8 and three 10-year-olds were recorded at an average of 18.3. As with Holgate, 11 fewer girls participated in the study's second year, and the average BMI of the 29 females was 19.38. Seven of these females were 8 years of age and averaged 16.92; 21 were 9 years old with mean BMIs of 20.3; and one 10-year-old had a body mass index score of 17.19.

#### *Malinta Elementary*

At Malinta Elementary, 30 out of the 49 participants were male. These male students had an average BMI of 19.9, which was made up of 10 8-year-olds, 19 9-year-olds and one 10-year-old. For the 8-year-olds, the average BMI was 20.1, while the 9- and 10-year-olds had averages of 20 and 16.5, respectively. In the study's second year, the results from the male students at Malinta were similar to the first: 29 males averaged a BMI score of 20.12. Three 8-year-olds, 23 9-year-olds and three 10-year-olds made up the study that year, with averages at 18.22, 19.98 and 23.15, respectively.

In the 2006 third-grade class at Malinta Elementary 19 females participated, with five students age 8, 13 students age 9 and one student age 10. For the 8-year-olds, the average BMI was 20.1, while the 9-year-olds marked in at 19.6 and the 10-year-old was 15.8. The following year, the number of females participating doubled to 38. For the six 8-year-olds that participated, the average BMI score was 19.2, while the 28 9-year-olds had mean BMIs of 18.68 and four 10-year-olds averaged in at 19.17.

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