



# **Bethel School District Report: Elementary Student BMI Measurement<sup>1</sup>**

## ***Descriptive Summary for the 2008 and 2009 School Years***

### **A Report from the Communities and Schools Together (CAST) Project<sup>2</sup>**

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CAST is a 5-year project that seeks to improve child health in the Bethel School District. The project includes seven elementary schools with an enrollment of nearly 3,000 students. CAST brings together schools, local organizations, and families to assess and respond to children's health and nutrition needs at both a school and community level.

A primary goal of CAST is to document changes in the frequency of overweight and obesity among children in the District across the life of the project. Children are classified as overweight or obese based on their Body Mass Index (BMI), a measure of the relationship between height and weight. Percentile scores for the BMI define four categories: Underweight (BMI less than 5<sup>th</sup> percentile), Normal (BMI between 5<sup>th</sup> and less than 85<sup>th</sup> percentile), Overweight (BMI between 85<sup>th</sup> and less than 95<sup>th</sup> percentile) and Obese (BMI 95<sup>th</sup> or greater percentile).

Child obesity varies greatly within regions, within states, and by race, gender, maturation age, and ethnicity. Overall, the national proportion of children who were obese in 2008 (19.6%) was almost 3 times larger than was the case in 1980 (7.0%). This increase has become a national concern and has been called an "epidemic" because of the swift and pervasive rise of obesity in the U.S. and abroad. Excessive weight in childhood has been found to persist into adulthood and increases the risk of debilitating and life shortening disease such as diabetes and cardiovascular problems.

This report provides a brief description of Bethel School District students who participated in CAST. Their BMI data were collected in the school years 2008–2009 and 2009–2010. Figures and tables presented in this report show the percent of students in selected BMI categories for the district and by gender, race/ethnicity, school, and grade for each of the two data collection years. The figures and tables are intended to stimulate initial discussion of possible changes that might be made by the district and/or families to reduce the percent of overweight/obese students.<sup>3</sup>

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<sup>1</sup>This report is intended both to inform the staff and parents of Bethel school children about the health of their children and to serve as a model for researchers and administrators in other districts who may wish to track the percentage of overweight/obese students. To assist the latter, an Appendix contains details of the collection procedures and methods used by the project.

<sup>2</sup>Grant 5R01HD057839-04 from the National Institute of Child Health & Human Development, National Institutes of Health. Report published 2010, Oregon Research Institute, Eugene, Oregon.

<sup>3</sup>Detailed analyses of other factors related to the BMI (e.g., Family Food Security, barriers to physical activity, etc.) across time are also being conducted by CAST and will be published separately.

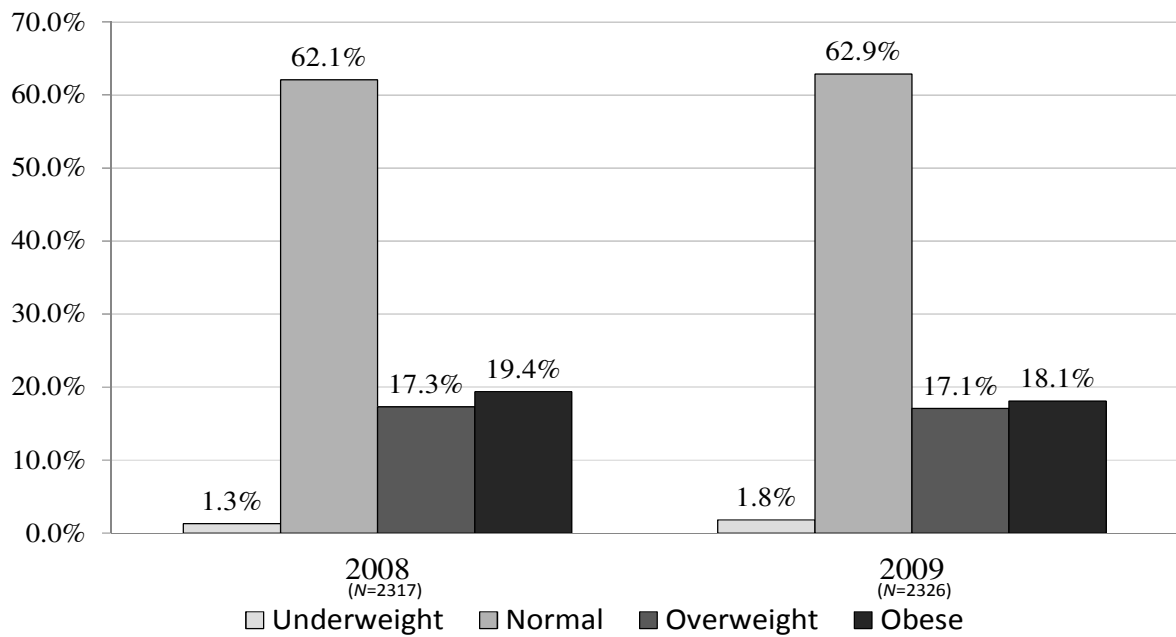
## *Demographics of students in the study*

<i>Demographics of Sample</i>				
Characteristic	Year 2008/09		Year 2009/10	
	<i>N</i>	% or Mean ( <i>SD</i> )	<i>N</i>	% or Mean ( <i>SD</i> )
Gender				
Male	1184	51%	1172	51%
Female	1132	49%	1149	49%
Ethnicity				
African American	67	3%	66	3%
Asian/Pacific Islander	58	3%	72	3%
Hispanic	348	16%	279	12%
Native American	44	2%	67	3%
White	1717	77%	1777	79%
Age in years	8.2	1.75	8.2	1.74
Siblings				
No grade K–5 sibs	1272	55%	1284	55%
1 or more grade K–5 sibs	1044	45%	1037	45%
Free & Reduced Lunch				
Yes	1068	46%	1043	45%
No	1248	54%	1278	55%
School ESL status				
ESL–designated	1009	44%	967	42%
Non-ESL-designated	1307	56%	1354	58%
Grades				
K	362	16%	357	15%
1	371	16%	397	17%
2	372	16%	398	17%
3	393	17%	359	15%
4	398	17%	399	17%
5	420	18%	411	18%

## District

The proportion of Bethel elementary school children in the obesity range was slightly higher than that of the U.S. in 2008 (~17%).

**Figure 1**  
**Bethel District Wide BMI Results**  
*Fall 2008 and 2009*

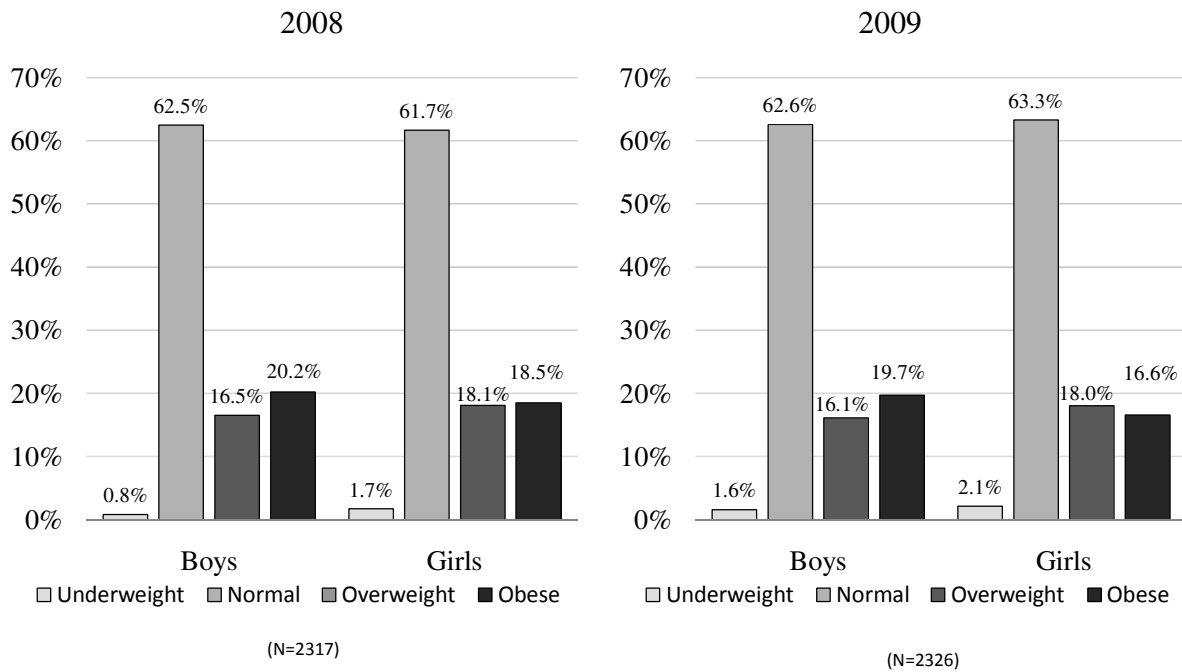


BMI (Weight)	Year	
	2008 (N=2317)	2009 (N=2326)
Underweight	1.3%	1.8%
Normal	62.1%	62.9%
Overweight	17.3%	17.1%
Obese	19.4%	18.1%

## Gender

Boys and girls in the school district showed a similar distribution of Normal, Overweight, and Obesity across the two years.

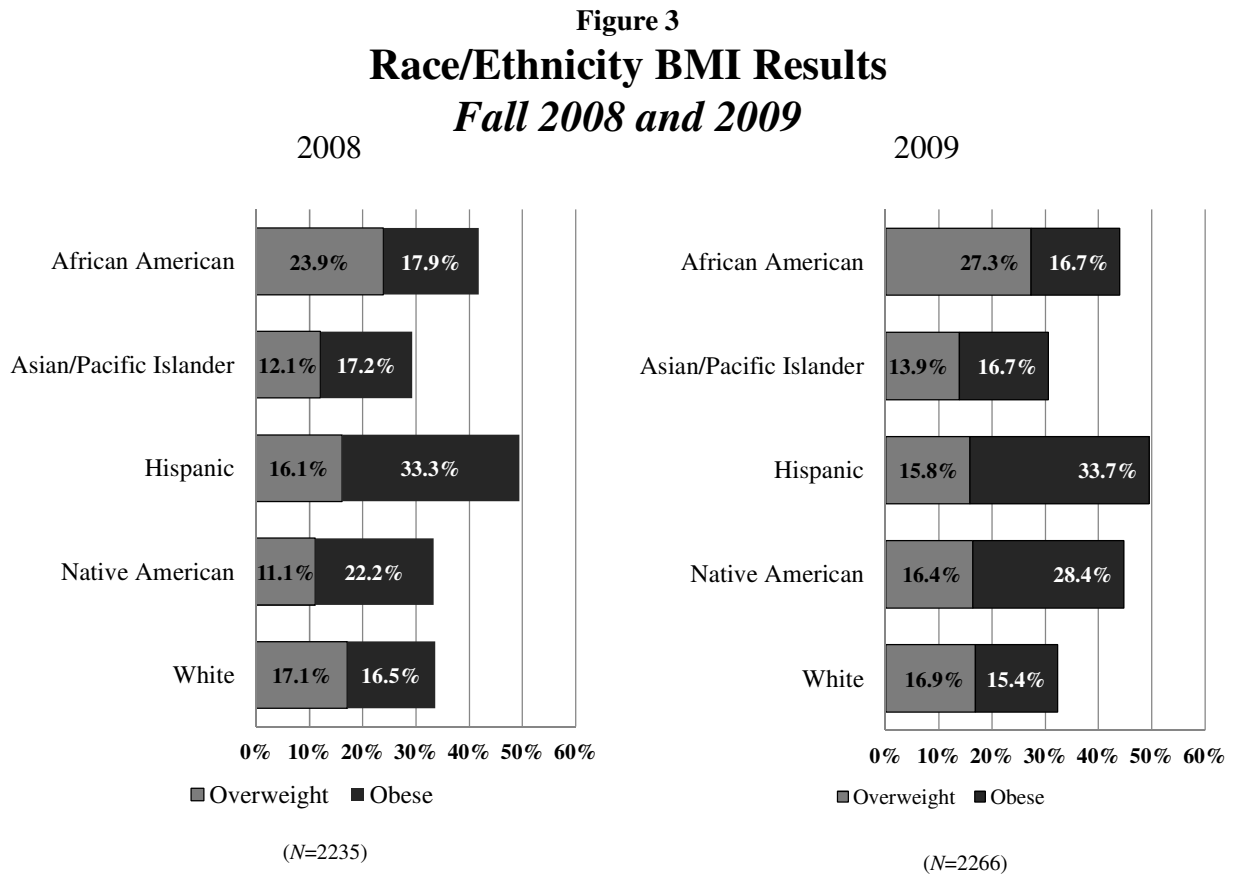
**Figure 2**  
**Boys and Girls BMI Results**  
*Fall 2008 and 2009*



BMI/Weight	2008 (N=2317)		2009 (N=2326)	
	Boys	Girls	Boys	Girls
Underweight	0.8%	1.7%	1.6%	2.1%
Normal	62.5%	61.7%	62.6%	63.3%
Overweight	16.5%	18.1%	16.1%	18.0%
Obese	20.2%	18.5%	19.7%	16.6%

## Race/Ethnicity

The highest percentage of combined Overweight/Obesity for children were among Hispanic elementary students (~ 50%).

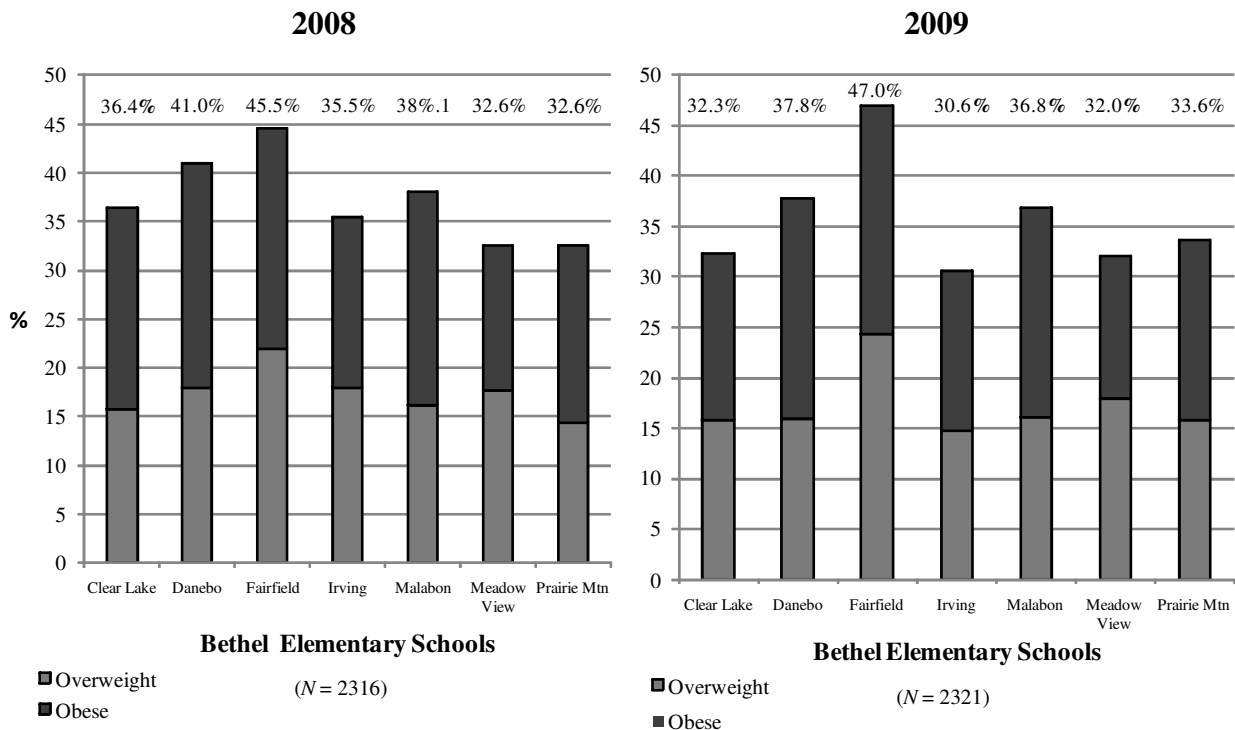


Race/Ethnicity	2008 (N=2235)		2009 (N=2266)	
	Overweight	Obese	Overweight	Obese
African American	23.9%	17.9%	27.3%	16.7%
Asian/Pacific Islander	12.1%	17.2%	13.9%	16.7%
Hispanic	16.1%	33.3%	15.8%	33.7%
Native American	11.1%	22.2%	16.4%	28.4%
White	17.1%	16.5%	16.9%	15.4%

## School

Two of the schools with the highest percentage of Overweight/Obesity among students (Fairfield and Danebo) are ‘magnet’ schools for Hispanic students.

**Figure 4**  
**Overweight and Obese Combined BMI by School**  
*Fall 2008 and 2009*



School	2008			2009		
	Overweight	Obese	Total	Overweight	Obese	Total
Clear Lake	15.8%	20.6%	36.4%	15.8%	16.5%	32.3%
Danebo	18.0%	23.0%	41.0%	16.0%	21.8%	37.8%
Fairfield	21.9%	22.6%	44.5%	24.4%	22.6%	47.0%
Irving	18.0%	17.5%	35.5%	14.8%	15.8%	30.6%
Malabon	16.1%	22.0%	38.1%	16.1%	20.7%	36.8%
Meadow View	17.7%	14.9%	32.6%	17.9%	14.1%	32.0%
Prairie Mountain	14.4%	18.2%	32.6%	15.8%	17.8%	33.6%

## Grade

Prevalence of Overweight/Obesity increased with grade levels among students in both years.

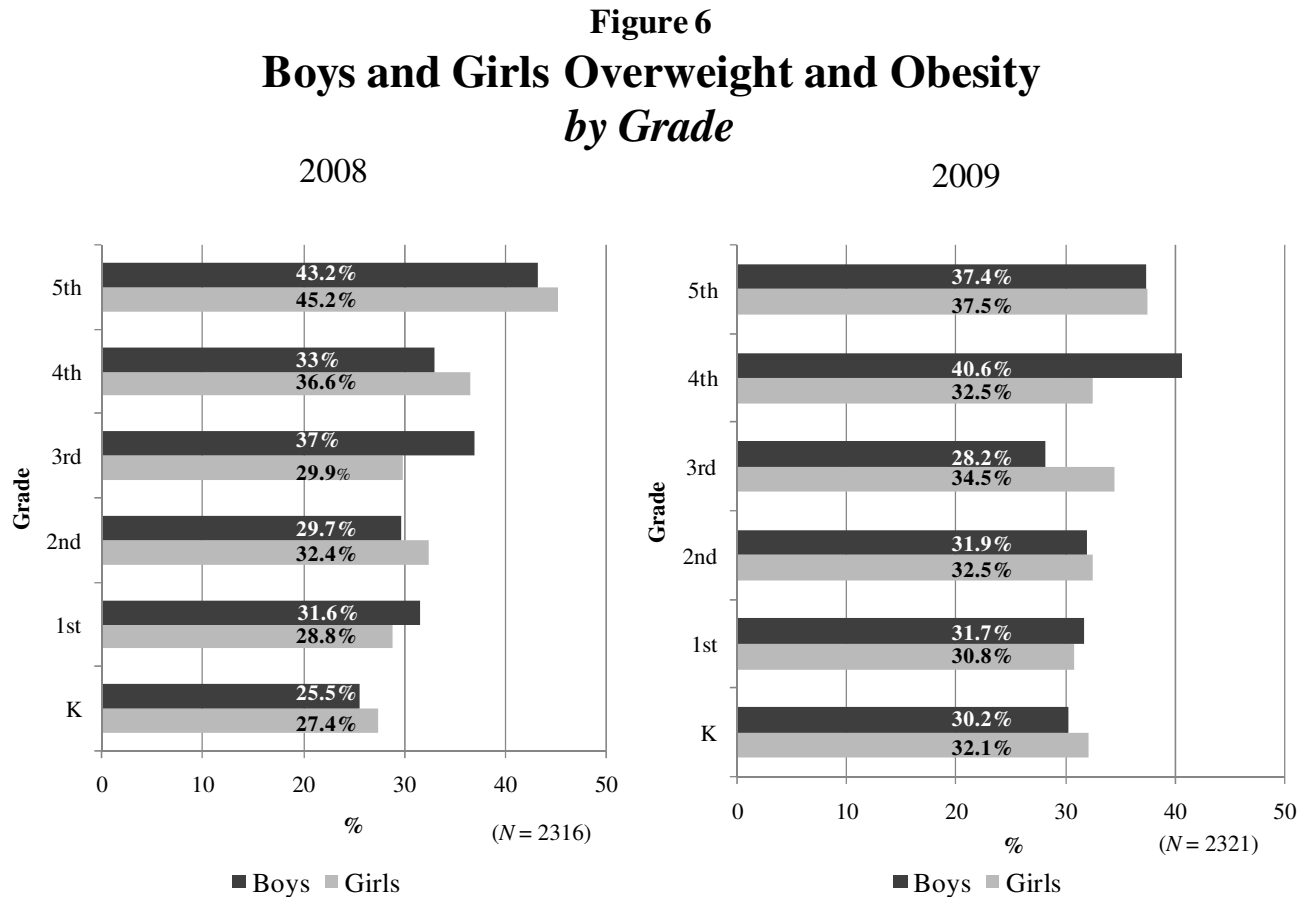
**Figure 5**  
**Grade Differences in Overweight and Obesity**  
*District Results*



Grade	2008		2009	
	Overweight	Obese	Overweight	Obese
K	13.5%	17.4%	17.6%	17.9%
1 <sup>st</sup>	17.2%	17.2%	14.1%	18.1%
2 <sup>nd</sup>	19.4%	15.9%	16.0%	17.0%
3 <sup>rd</sup>	15.3%	21.1%	18.3%	17.2%
4 <sup>th</sup>	17.3%	19.8%	17.3%	20.5%
5 <sup>th</sup>	20.5%	24.0%	19.2%	18.0%

## Gender by grade (obesity)

Prevalence of Overweight/Obesity varied by gender and grade across the two years.



Grade	2008		2009	
	Boys	Girls	Boys	Girls
K	25.5%	27.4%	30.2%	32.1%
1 <sup>st</sup>	31.6%	28.8%	31.7%	30.8%
2 <sup>nd</sup>	29.7%	32.4%	31.9%	32.5%
3 <sup>rd</sup>	37.0%	29.9%	28.2%	34.5%
4 <sup>th</sup>	33.0%	36.6%	40.6%	32.5%
5 <sup>th</sup>	43.2%	45.2%	37.4%	37.5%



## APPENDIX

Obesity among children and adults in the U.S. has increased dangerously over the last 30 years. Recent data suggest that the proportion of obese American children has increased from 7% in 1980 to 19.6% in 2008 (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Childhood overweight and obesity have become a national concern because excessive weight during childhood has been found to persist into adulthood and is the second highest cause for life threatening diseases after tobacco.

The prevalence of child obesity varies greatly regionally, within states, and across the population by race, gender, maturation age, and ethnicity of children (Bethell et al., 2009). Ideally, obesity is best diagnosed based on the percentage of fat mass (% FM), a method requiring in vivo assessment of % FM. This method, however, is expensive, time consuming, and difficult in school settings, and the **Body Mass Index** (BMI) has been shown to be an effective measure of body fat mass in children (Goran, Driscoll, Johnson, Nagy, & Hunter, 1996; Hannan, Wrate, Cowen, & Freeman, 1995; Pietrobelli et al., 1998). Since BMI is a number calculated from a child's weight and height and varies with age in both sexes, the Center for Disease Control/National Center for Health Statistics (CDCP, 2009) has developed population-based gender-specific percentile charts for BMI. A BMI above the 95th percentile is considered as a cut-off limit for obesity in children (CDCP, 2009).

BMI measures of elementary school students (K–5) are currently being conducted in the Bethel School District in Eugene, Oregon. This data is being collected annually by a partnership with the Communities and Schools Together for Childhood Obesity Prevention Project (CAST). This project (Grant #R01HD057839) is funded through the National Institute of Child Health And Human Development, National Institutes of Health. This report describes BMI assessment procedures and BMI findings for the first 2 years of data collection during the 5-year study.

### Method

#### *Consenting Procedures*

During Fall 2008, all parents of children at the seven Bethel elementary schools were sent a description of the CAST project by mail. Included with the description was a passive decline or “opt out” card, metered for postage and translated into Spanish. These cards are a means by which research projects at ORI which are not considered invasive or highly sensitive recruit parents to an initial phase of a study.

The mailing itself was prepared at Oregon Research Institute using mailing labels provided by the school district. The mailing was prepared over two days. During Fall 2008, approximately 2,697 families were sent the CAST opt out card and letter, of which 189 (7%) students were declined by their parents. During the following Fall (2009), only parents of new Kindergartners and K–5 students new to the district were sent the opt out cards. Approximately 630 families received the mailing, of which 48 (7.6%) declined.

In both years, after the close of the 3-week mailing window, school secretaries were enlisted to distribute CAST opt cards to new enrollees for the duration of the school year.

### Measuring procedures

In Fall 2008, at the beginning of the school year, each student was measured for height and weight as part of the Bethel School District's yearly health screening. Children were weighed using a portable Tanita BWB-800S digital scale. Height was measured using a portable child–adult measuring board with inch/foot measuring tape and auto head lock (ShorrBoard). The height measurements were done by two individuals trained in anthropometric measurements. One individual did the actual measurement while the other monitored placement of the child. Both individuals read the stadiometer and if there was a discrepancy of more than 0.25 inches the child was remeasured.

Each child's Body Mass Index (BMI) was calculated and their BMI-for-Age percentile was determined from the height and weight. BMI is used as a guideline to help assess whether a person is overweight or underweight. The CAST project uses the Centers for Disease Control (CDC) analysis tool called NutStat (included in the EpiInfo program) to calculate the BMI from the raw data. NutStat is a nutrition anthropometry program that calculates BMI, percentiles and z-scores using the 2000 CDC/WHO growth reference. Epi Info™ is a public domain software to be used by national and international public health practitioners and researchers. The project also uses the CDC guidelines for determining BMI categorization.

Weight status category	Percentile range
Under weight	Less than the 5 <sup>th</sup> percentile
Healthy weight ("Normal")	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
Obesity	Equal to or greater than the 95 <sup>th</sup> percentile

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