

**Fit Kids at School:  
Executive Report Part I  
Summer 2014**

**For questions/comments, please contact:**

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## Introduction

This report includes data from the Fit Kids at School project from the Fall of 2012 through the Spring of 2014. This time period included 4 measurement points: fall of 2012, spring of 2013, fall of 2013 and spring of 2014. This report includes four main parts:

- 1) The First part describes the information available about program implementation at the schools and answers questions such as: *“Was the Fit Kids at school program implemented at each school?”* *“What activities were offered?”* and *“How many minutes per week of activities were offered at each school?”*
- 2) The second part summarizes the characteristics of all the children in the database. This includes the summary statistics of **‘the cohort’** of children who have participated in all **four measurement times**. In this section, we also present **‘baseline’** (time 1, fall 2012) information on **risk status by Body Mass Index Percentile values**, which is the primary outcome measure for the project. BMI percentile score is an indicator of body composition and strongly related to future health risks. Associations between BMI percentiles and demographic factors such as **age, ethnicity and socio-economic status** are described here as well.
- 3) The third part shows **BMI percentiles across the four time periods**, and includes the proportion of children who are overweight and obese at each of the four time points. This information can illustrate the **specific time periods** when children worsen their BMI percentile status. In addition, we contrast the **characteristics of children who improved** their BMI-based risk status over time (i.e. from overweight to healthy weight) versus children who worsened their risk status.
- 4) The fourth and final part of this report includes ‘other data’ that was available, such as standardized test scores and physical fitness testing. This part also includes several recommendations for future measurements.

## **Executive Summary**

### Program Implementation:

The program appears to have been implemented as intended. The health aides' records on their minutes of activity and number of children who participated in their activities were almost 100% complete. The total instructional time the health aides worked was about 15 hours per week, or 5 sessions of 35-40minutes per day. About two thirds of this time was spent on teaching the health activity class, 25% on lunch recess activities and 10% on prior to arrival to school activities. The total minutes per week available to each child to participate in were approximately 260min/wk, which met the pre-set objective. The activity offerings have been implemented very consistently across schools and through the three time periods (data in this report for health aides was complete through the fall of 2013). All schools participated in all three activities: prior to arrival at school, during lunch recess and the health activity class. Despite being optional, about 200 children participated in lunch recess activities and 100 children in prior to school activities.

### Body Mass Index Percentiles

The proportion of children in the school district who are overweight or obese is very constant at about 25% in the elementary schools (12.5% overweight, 12.5% obese). Based on one data point in the spring 2014, the middle school prevalence of obesity and overweight was a combined 37%. Age, socio-economic status and ethnicity were strongly associated with overweight/obesity prevalence. Combined overweight and obesity rates were about 20% at age 7, and up to 35% at age 10. Prevalence among children of Native American and Hispanic ethnicity was over 35%, compared to 15% for children of Asian and White ethnicity. Schools with 80% or more of children on free or reduced lunch had a prevalence of 35%, compared to 17% within schools that had 30% or fewer children on free and reduced lunch.

The prevalence for elementary schools has not changed much over the past 1.6 years. However, based on data from the cohort of children (n=2,349) that has been measured at all four time points, it is estimated that approximately 85 fewer children have progressed to overweight/obesity than expected based on them growing older. Moreover, it appears that rates of overweight and obesity are kept from increasing during the school year, and adverse changes occur largely during the summer period. During year 1, a net total of 2 children worsened their overweight/obesity status during an 8-month period, whereas during the summer, 39 children worsened their status in 4 months.

### Standardized Testing and Other:

### Future Recommendations:

## **Part I: Program Implementation: Minutes of activity**

One of the major program objectives of the Fit Kids at school program was to increase the physical activity *offerings per week up to 260 minutes. This means that if a child participates in every mandatory and optional activity , they will engage in 260 minutes of activity per week (in addition to PE, and any after-school activities).* To achieve the goal, a health aide was hired at each school. The Fit Kids at school program had three components to achieve this goal:

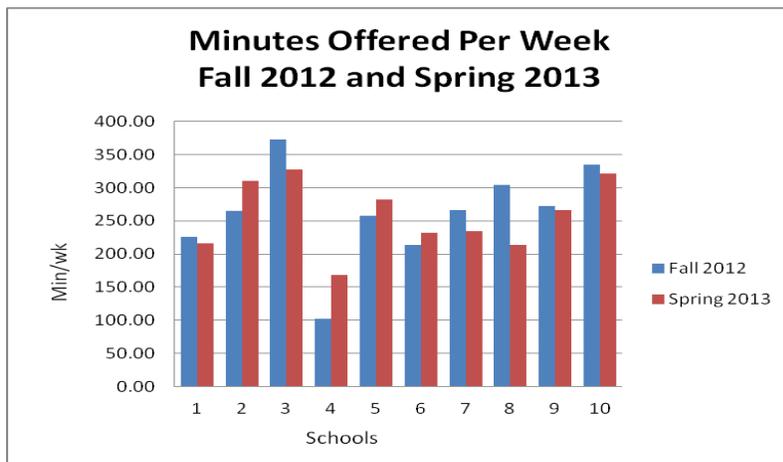
- 1) Activities prior to arrival (optional)
- 2) Activities during the lunch hour (optional)
- 3) An activity special class taught every week for at least one class period (mandatory)

The health aides **recorded their activities every day** and **also recorded the number of children** that attended their classes and lunch recess and prior to school activities. The record completion is high (>95% of records are included in the data).

First, the minutes per week of activity offered at each school is presented in **Figure III.1**. On average, the **objective of offering an additional 260 minutes of activity per week appears to have been met.** The average minutes per week offered across the first year and a half was almost exactly 260 minutes over week (range from 261.4min/wk in fall 2012, to 257.2 min/wk in spring 2013 to 258.4min/wk in fall 2013).

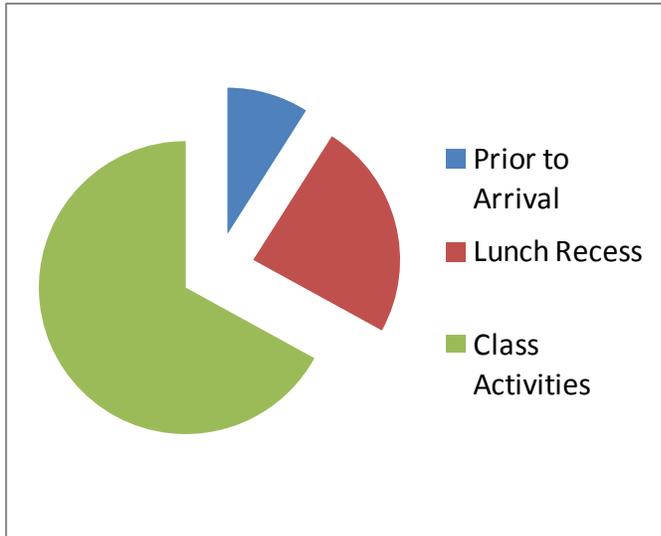
Although there was some variability across schools, **every school** implemented the program and **engaged in all three activities.** The total activity time across an entire school year add up to approximately 30,000 minutes of activity time that the health aide engaged in (about 15 hours of instructional time a week, or about 5 sessions of 35 minutes per day).

**Figure I.1:** Minutes per week of activity offered in the fall of 2012 and the spring of 2013



The health aides spend about two thirds of their weekly workload time on the health activity class special. They spend about 25% of their time on lunch recess and 10% of their time on activities prior to arrival.

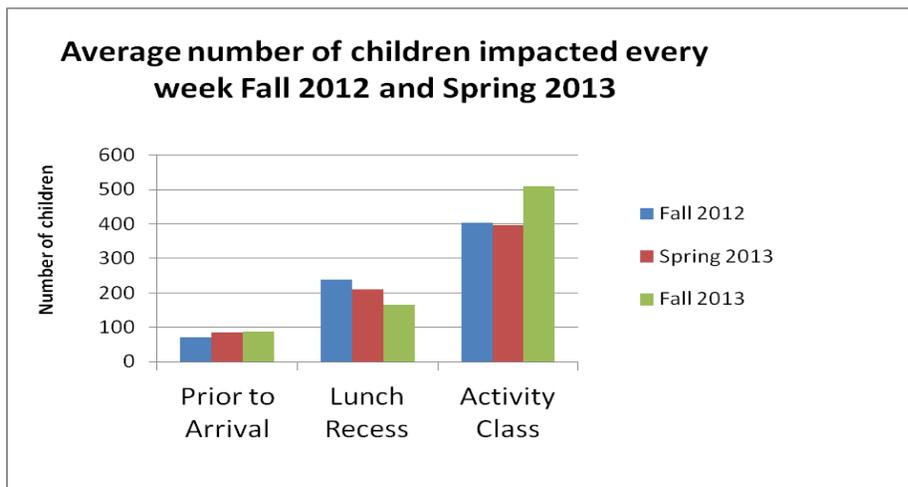
**Figure I.2:** Health aide distribution of minutes of activity every week by type of activity



Since the health aides also recorded the number of children participated in every activity, we have a clear picture of how many children participate in each of the three activities. **All the children in the school** (between 400 and 500 children typically) participate in the mandatory health class every week.

However, in addition, **about 200 children participate in optional lunch recess activities every week, and almost 100 children participate in optional pre-school activities every week.**

**Figure I.3:** Number of children participating in each type of activity



## **Overall Conclusion Part I: Program implementation**

The program appears to have been implemented as intended. The health aides' records on their minutes of activity and number of children who participated in their activities were almost 100% complete. The total instructional time the health aides worked was about 15 hours per week, or 5 sessions of 35-40minutes per day. About two thirds of this time was spent on teaching the health activity class, 25% on lunch recess activities and 10% on prior to arrival to school activities. The total minutes per week available to each child to participate in were approximately 260min/wk, which met the pre-set objective. The activity offerings have been implemented very consistently across schools and through the three time periods (data in this report for health aides was complete through the fall of 2013). All schools participated in all three activities: prior to arrival at school, during lunch recess and the health activity class. Despite being optional, about 200 children participated in lunch recess activities and 100 children in prior to school activities.

## **Part II: The characteristics of the children in the database.**

A total of **8,385 children** are included in the entire database. Some of these children are measured at all 4 time points (Fall 2012, Spring 2013, Fall 2013, Spring 2014), whereas others were only measured at some of these time points (for example, they may have moved to middle school, or are no longer in the school district). At each time point, about 4,500 children were measured. Since total enrollment is about 4,800, this means that **almost 95% of children** in the district are being measured.

On average, the children in FUSD elementary schools are 8 years old by the fall semester and about 8.7 years old by the spring semester measurement time. Just over **half the children in the district are of White ethnicity, just over a quarter are Native American.**

**Table II.I: Characteristics of all children**

	<b>Number of Children</b>	<b>Age</b>	<b>Gender</b>	<b>Ethnicity</b>
<b>Fall 2012</b>	4,457	8.02 years old (standard deviation= 1.76) Age range 3.52-12.00 (99.7% between 5-11)	47.7% Girls 52.3% Boys	53.4% White 25.9% Native American 15.8% Hispanic 2.7% Black 1.7% Asian 0.5% Pacific Islander
<b>Spring 2013</b>	4,479	8.65 years old (sd=1.75)	48.0% Girls 52.0% Boys	52.7% White 26.7% Native American 15.8% Hispanic 2.7% Black 1.7% Asian 0.5% Pacific Islander
<b>Fall 2013</b>	4,484	7.98 years old (sd=1.77)	47.0% Girls 53.0% Boys	56.1% White 28.8% Native American 11.8% Hispanic 2.9% Black 2.0% Asian 0.5% Pacific Islander
<b>Spring 2014 Elementary</b>	4,519	8.59 years old (sd=1.73)	48.1% Girls 51.9% Boys	54.6% White 28.6% Native American 11.5% Hispanic 2.8% Black 2.0% Asian 0.6% Pacific Islander
<b>Spring 2014 Middle School</b>	1,632	13.16 years old (sd=0.91)	45.9% Girls 55.1% Boys	52.9% White 25.6% Native American 23.3% Hispanic 2.0% Asian 2.0% Black 0.7% Pacific Islander

**A total of 2,349 children** were measured on their height and weight (and BMI was calculated) **at all four time points**. Because we can track these children over time and we know they were exposed to the Fit Kids at school program, this is called **‘our cohort.’** The cohort started at the age of 7.6 years old and they have been measured 4 times between the ages of 7.6 and 9.15 years old (measurement time 4). The cohort allows us to estimate whether prolonged exposure to the Fit Kids at school program may have an impact and answer questions such as: *“are children more likely to increase their BMI percentile during the school year or during the summer?”*

**Table II.2:** ‘The Cohort’: 2,349 elementary school children

	<b>Age</b>	<b>Gender</b>	<b>Ethnicity</b>
<b>Fall 2012</b>	7.57 years old (sd=1.45)	48.4% Girls 51.6% Boys	55.6% White 24.2% Native American 15.9% Hispanic 2.3% Black 1.6% Asian 0.4% Pacific Islander
<b>Spring 2013</b>	8.17 years old	Same	Same
<b>Fall 2013</b>	8.54 years old	Same	Same
<b>Spring 2014</b>	9.14 years old	Same	Same

**Body Mass Index Percentiles at ‘Baseline’ (Fall 2012 measurement time)**

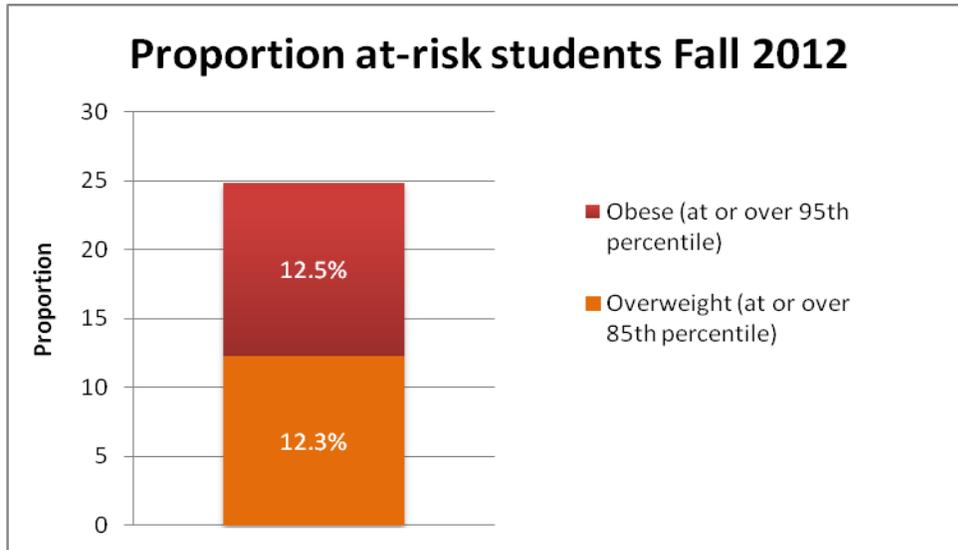
**Body Mass Index Percentile scores** are indicators of body composition. Body Mass Index (BMI) is based on height and weight and calculated as weight in kilograms/ height in meters squared. Percentile scores are based on a child’s BMI, their age and gender. High percentile scores have been related to **many adverse health consequences**, such as high risk for cardiovascular disease and diabetes. There are several percentiles published (by the World Health Organization (WHO); Centers for Disease Control and Prevention (CDC); and The International Obesity Task Force (IOTF)), but the most commonly used are the CDC growth curves. These curves describe the percentiles of a reference population consisting of prior U.S. populations who ‘grew up under ideal conditions for health.’

According to these percentiles (using recent terminology), a child whose BMI for their age and sex is **at or over the 85<sup>th</sup> percentile is considered overweight**, a child **at or over the 95<sup>th</sup> percentile is obese**. We will use this terminology and categorization for the remainder of the report.

**It is paramount to know the exact age of the child.** For example, a girl who is 9 years and 1 day old, and has a BMI of 19.4kg/m<sup>2</sup> is at the 87<sup>th</sup> percentile, and classified as overweight. However, a girl who is 9 years and 11 months old is at the 83<sup>rd</sup> percentile, and classified as having a healthy weight.

At the first measurement time-point, during the fall of 2012, a total of 24.8% of children in FUSD were classified as either overweight or obese. The distribution between overweight and obesity was about equal with just over 12% of children in either category.

**Figure II.1:** Fall 2012 proportion of children who were overweight or obese at baseline in FUSD



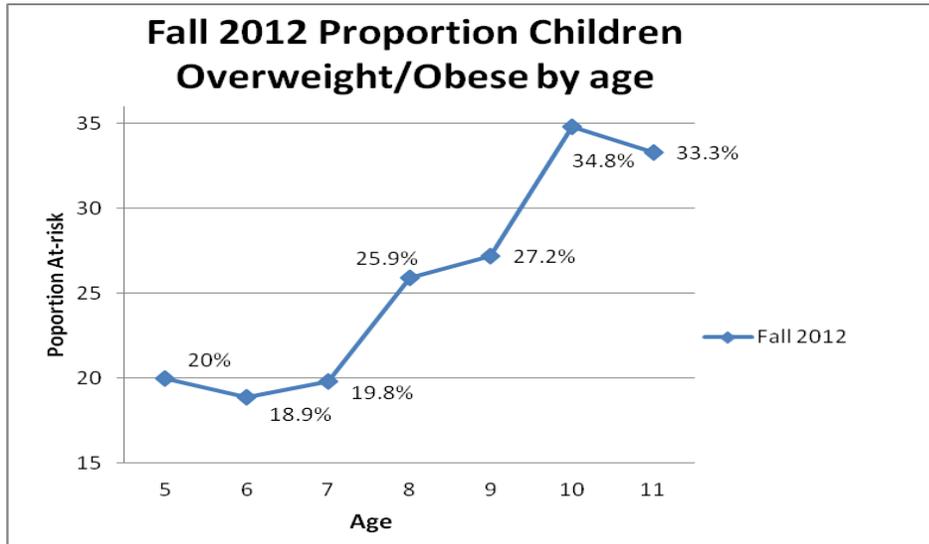
The average percentile score is 57.7. A total of 1.5% of children are considered underweight (under the 5<sup>th</sup> percentile on the CDC growth curves). A total of 71.8% of children are of healthy weight. The mean Body Mass Index is 17.3kg/m<sup>2</sup>.

**Table II.3:** Body Composition at the first measurement time point in the fall of 2012

	Height Average (standard deviation)	Weight Average (sd)	BMI Average (sd)	Percentile Average (sd)	BMI Percentile Category
<b>Fall 2012</b>	50.17 inches (4.75) Range 34.5-74.8	63.51 lbs. (22.21) Range 27.8-221.6	17.28 kg/m <sup>2</sup> (3.34)	57.71 Percent (29.66)	Underweight 1.5% Healthy Weight 71.8% Overweight 12.3% Obese 12.5%

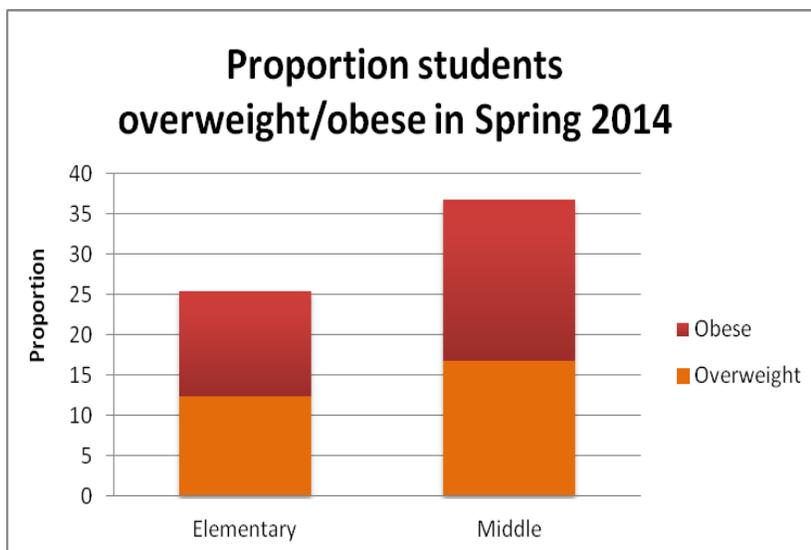
There is a substantial difference in **prevalence of overweight and obesity by age**. This is confirmed in all national studies, and also found in the current database. In FUSD, at age 5 through 7, prevalence of overweight and obesity (combined) is similar and around 20%. However, compared to the children who are 7 years old, prevalence of overweight/obesity is substantially higher the older children are. By age 10, overweight/obesity prevalence is 35% in FUSD.

**Figure II.2:** Proportion of children who were overweight or obese at baseline (Fall 2012 measurement point) by age



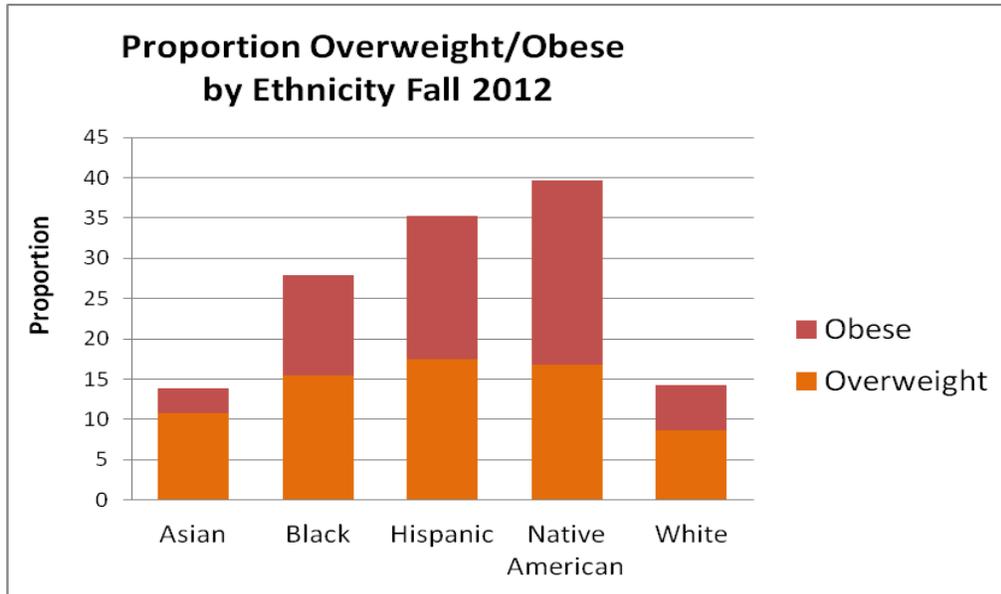
Another illustration of the same concept (just like in Figure II.2 above) that more children become at risk as they grow older is shown in Figure II.3. This graph demonstrates the proportion of children who are overweight and obese in FUSD in elementary school and middle school at the spring 2014 measurement point. On average, in middle school, prevalence of overweight/obesity is 5% higher (about 37% compared to 25% in elementary).

**Figure II.3:** Comparing the proportion overweight/obese Elementary and Middle school students in the Spring of 2014



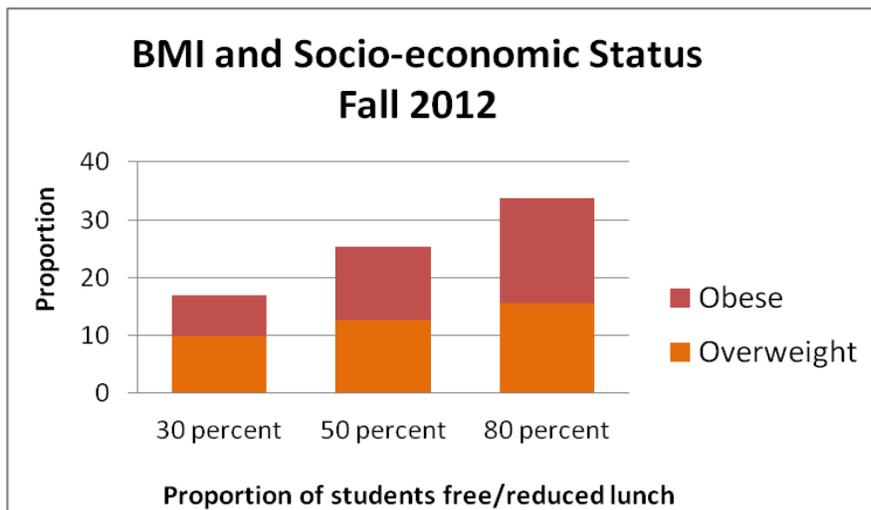
Ethnicity is strongly associated with the proportion of children who are overweight and obese. Less than 15% of children of White and Asian ethnicity are overweight or obese. More than 35% of children of Hispanic ethnicity and almost 40% of children of Native American ethnicity are overweight or obese.

**Figure II.4:** Body Mass Index Percentile and Ethnicity



The graph below (Figure II.5) demonstrates the proportion of overweight and obese children grouped by socio-economic category of the school. Schools with a greater proportion of children on free or reduced lunch have higher rates of overweight/obesity. Specifically, among schools that have fewer than 30% of their children on free or reduced lunch, overweight and obesity rates are about 17%. In contrast, in schools where 80% or more of their children are on free or reduced lunch, overweight/obesity is 35%.

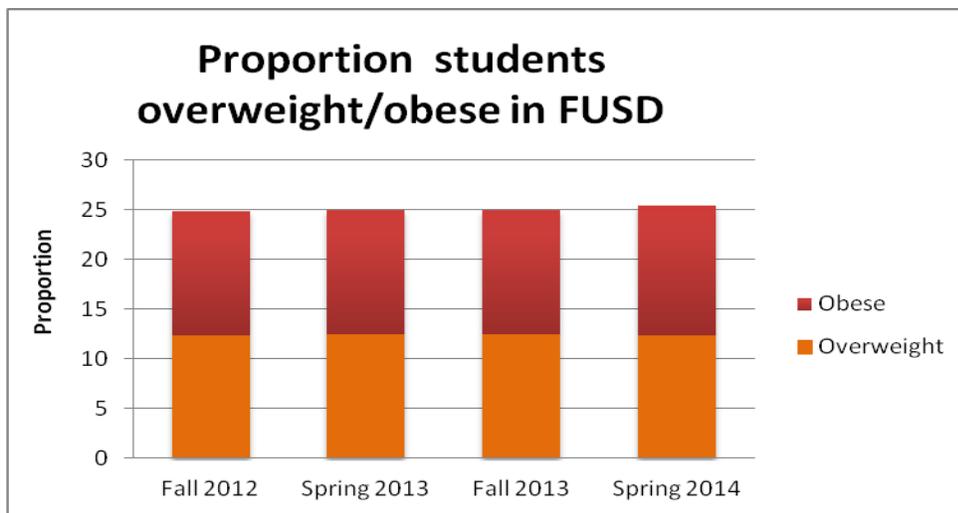
**Figure II.5:** Proportion of children who are overweight or obese by socio-economic status *of the school*



### Part III: Overweight and obesity over time:

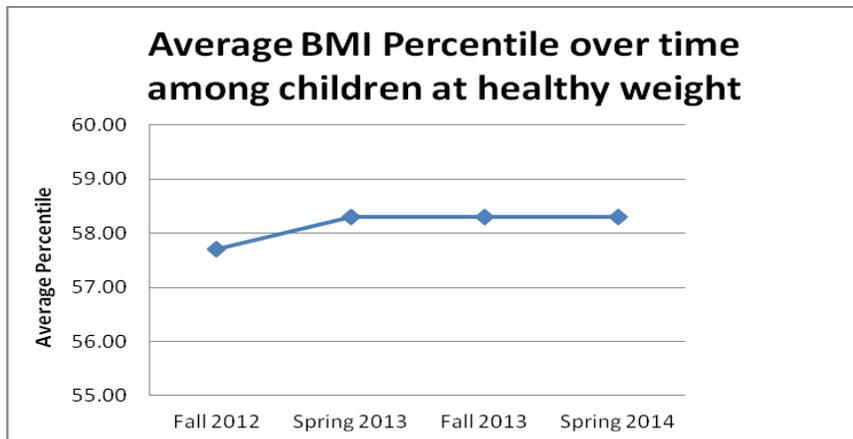
First, we start by presenting the BMI percentile changes over the 1.6-year time-period across all elementary schools. From **Figure III.1** it can be seen that there is very little change in rates of overweight/obesity. The total proportion of elementary school children who are overweight or obese is **right around 25%, or 1,100 children** (1,101 in the fall of 2012). It has to be noted that during the schoolyear (from the fall to the spring semester), we would **expect an increase** in proportion of overweight/obese **by about 3%** based on the children getting older, but **during the schoolyear, very few new children become overweight/ at-risk.**

**Figure III.1:** Proportion children overweight and obese over 4 time points including all elementary school children (*\*Note: these are not all the same children at every time point!\**)



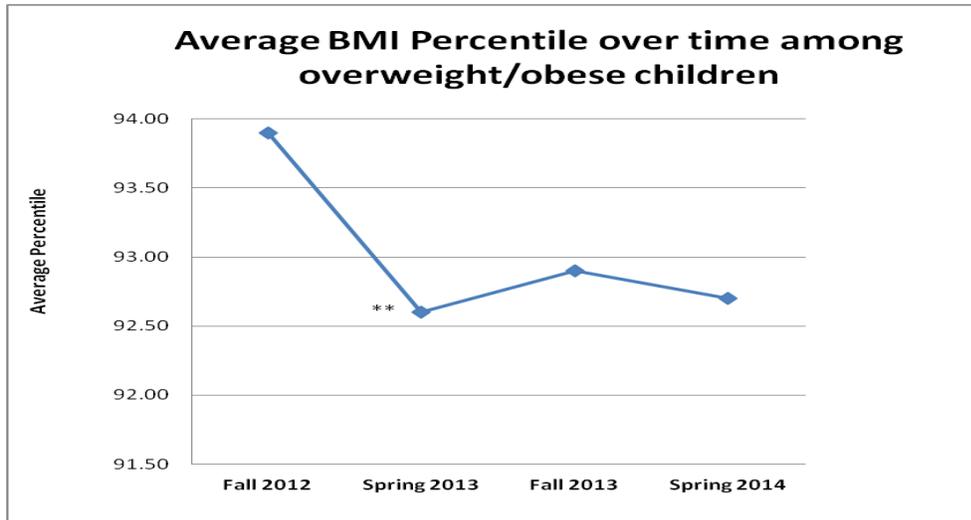
The average BMI percentile shows the same pattern with no change over time. The average is right around the 58<sup>th</sup> percentile.

**Figure III.2:** Change in mean percentiles scores for children who weren't overweight or obese at baseline



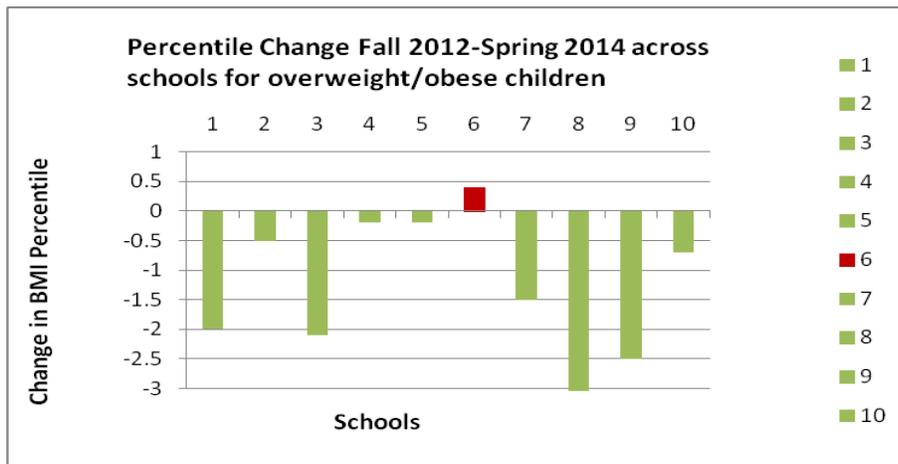
However, when we look at **the cohort** data, we see a different pattern. When we look at the children who were overweight or obese at the first measurement point, we see a **significant decrease in BMI percentile** (which is significant with a p-value of  $p < .001$ ). There is a slight increase during the summer and another slight decrease during the next school year.

**Figure III.3:** Sub-group analysis of mean BMI percentile for children who were overweight or obese at the first measurement time point



Further, if we look at change in average BMI percentile among overweight/obese children across schools from Fall 2012-Spring 2014, it appears that findings are consistent. **Improvement is seen in 9 of 10 schools** (\*the 1 school not seeing improvement is the school that actually had the lowest rates of overweight/obesity).

**Figure III.4:** Change in BMI percentile among children who were overweight or obese at the Fall of 2012 across schools



There is a wealth of evidence showing that rates of obesity increase as we get older (**see also Figures II.2 and II.5**). For example, 18% of children ages 6-11 are considered obese in the US (CDC; <http://www.cdc.gov/nchs/fastats/obesity-overweight.htm>), but 35% of U.S. adults are obese (and 69.0% overweight or obese).

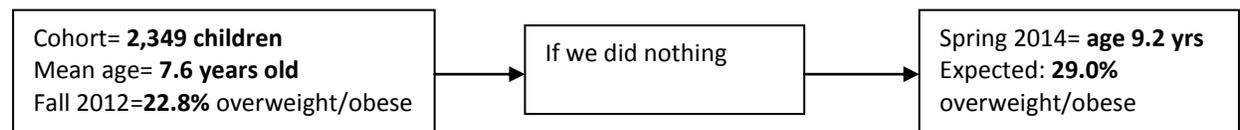
As illustrated from the data in section I, in FUSD, between the ages of 7 and 10 years old, prevalence of overweight and obesity is much higher with older age. Whereas 20% of children at age 7 are overweight or obese, 35% of children at age 10 are. Without any intervention, it is likely that a significant proportion of the children who are 7 years old today in FUSD who are at a healthy weight are expected to become overweight by age 10. For children who are currently overweight or obese, this trajectory also appears to accelerate over time. Children do not stay on the curve, they get further away from the curve as they age.

Thus, we believe the appropriate question from an evaluation/ research perspective is to compare our findings to **where we would expect these children to be without doing any intervention.**

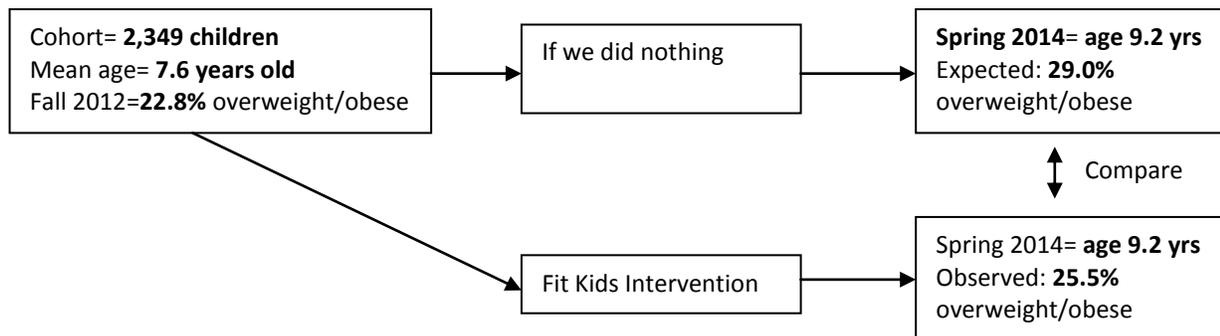
<b><u>Evaluation objective:</u></b>
<b><i>Compare the BMI Percentile changes over time to where these children would have been without the Fit Kids intervention</i></b>

**Figure III.5:** Graphical depiction of research question:

First, we have to understand where we would have been without any intervention. We were able to use local data from the FUSD district to predict the changes of the children over the past 1.6 years.

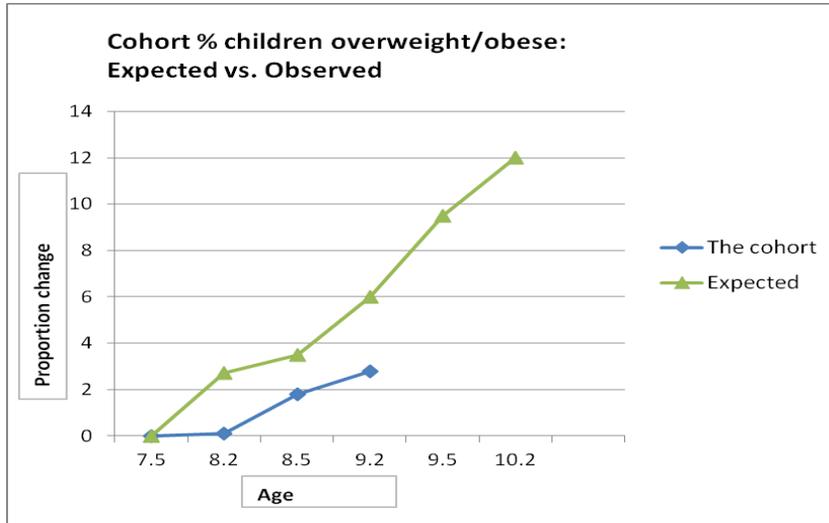


But an intervention occurred: Fit kids at school.



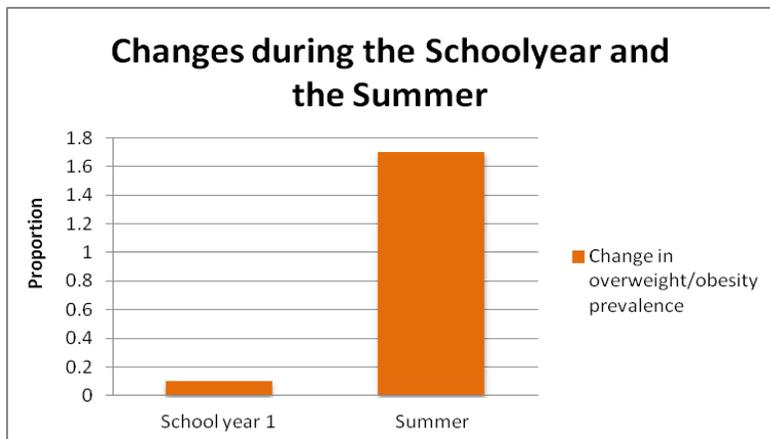
This graph shows the expected (where we would expect these children to be) versus observed proportion of children who were overweight in the cohort. Our best estimate is that we would expect the cohort to be at an overweight/obesity prevalence of 29% at their current age of 9.2 years. However, the prevalence is just over 25%, **lower than expected by 3.5%. In the cohort alone, this translates into approximately 85 children who are not overweight/obese where we would have expected them to be.**

**Figure III.6:** Changes in proportion of children who were overweight or obese in the cohort: expected versus observed



Another important question is to delineate when children get better or worse. For example, in the cohort above, greater changes occurred during the summer versus the schoolyear. Despite the summer being a much shorter period, in the first full year of the Fit Kids at school program, **during the schoolyear, over an 8-month period, overweight/obesity prevalence almost stayed the same (increase by 0.1%, from 536 children to 538 children in the cohort). In the summer, during a 4-month period, prevalence increased by 1.7% (from 538 children to 577 children in the cohort).**

**Figure III.7:** Improvement and worsening during the school year and summer year 1



Another question we asked is: *Who improved their BMI-percentile based health status and who got worse?* It is possible that learning who was able to positively change their health status can provide insights into program effectiveness. As can be seen from the tables II.1 and II.2 below, there were few clear differences. The children who worsened their health status during the schoolyear were slightly more likely to be boys and to be of Native American ethnicity. However, during the summer boys and Native American children were slightly more likely to be among those who improved their health status.

**Table III.1:** Changes in health status During the School Year from the Fall 2012 to Spring 2013

<b>DURING SCHOOL YEAR</b>	<b>Improved overweight/obese status</b>	<b>Worsened overweight/obese status</b>
Percentile at start of schoolyear	91.5	92.7
Age	7.96 years	<b>8.28 years</b>
Male	46.4%	<b>60.4%</b>
Ethnicity	32.7% Native American	<b>42.6% Native American</b>

**Table III.2:** Changes in health status During the Summer from the Spring 2013 to Fall 2013

<b>SUMMER</b>	<b>Improved</b>	<b>Worsened</b>
Percentile at start of summer	92.4	92.2
Age	7.64 years	7.68 years
Male	<b>63.6%</b>	52.8%
Ethnicity	<b>39.4% Native American</b>	31.9% Native American

### **Overall Conclusion Parts II and III**

The proportion of children in the school district who are overweight or obese was very constant at about 25% in the elementary schools (12.5% overweight, 12.5% obese). Based on one data point in the spring 2014, the middle school prevalence of obesity and overweight was a combined 37%. Age, socioeconomic status and ethnicity were strongly associated with overweight/obesity prevalence. Combined overweight and obesity rates were about 20% at age 7, and up to 35% at age 10. Prevalence among children of Native American and Hispanic ethnicity was over 35%, compared to 15% for children of Asian and White ethnicity. Schools with 80% or more of children on free or reduced lunch had a prevalence of 35%, compared to 17% within schools that had 30% or fewer children on free and reduced lunch.

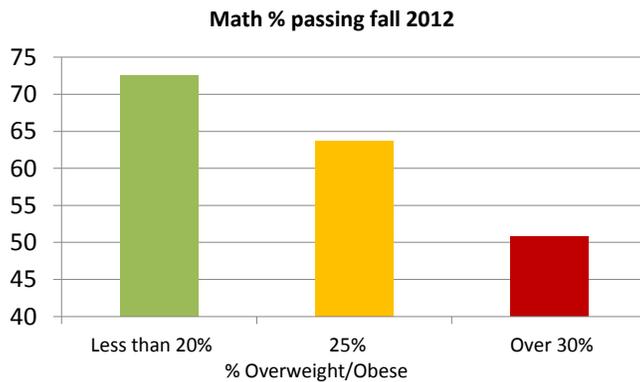
The prevalence for elementary schools has not changed much over the past 1.6 years. However, based on data from the cohort of children (n=2,349) that has been measured at all four time points, it is estimated that approximately 85 fewer children have progressed to overweight/obesity than expected based on them growing older. Moreover, it appears that rates of overweight and obesity are kept from increasing during the school year, and adverse changes occur largely during the summer period. During year 1, a net total of 2 children worsened their overweight/obesity status during an 8-month period, whereas during the summer, 39 children worsened their status in 4 months.

## Part IV: Other

Figure IV.1. Standardized testing scores and BMI percentiles

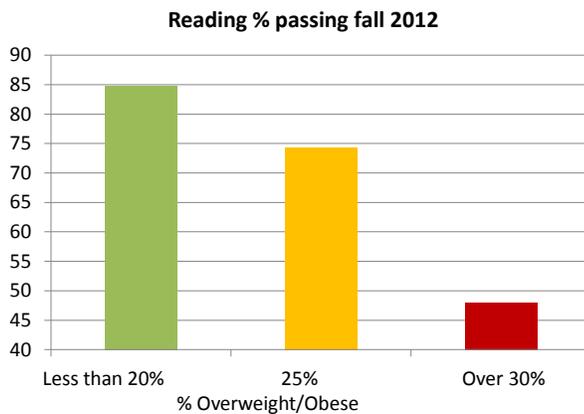
### 1C. BMI and Standardized testing

- Schools with children with mean lower BMI have higher standardized test scores: math



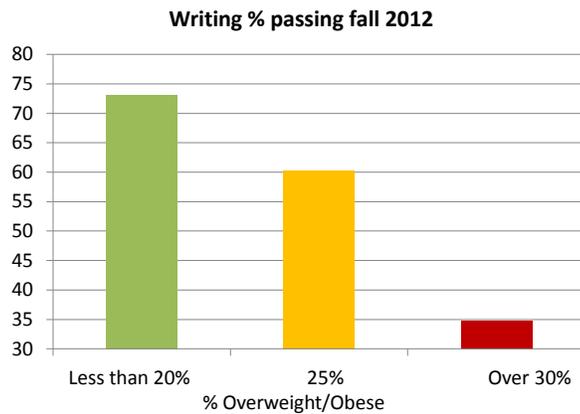
### 1C. BMI and Standardized testing

- Reading



## 1C. BMI and Standardized testing

- Writing



## 1D. Other areas

- **Physical Fitness Testing (endurance, strength, flexibility):**
  - Not consistently collected across the district
  - Only 3 schools had any data, only 2 schools over time
- **Nutrition:**
  - Weight loss strongly related to nutrition
  - Food production records show what is being consumed
  - No access to these yet
- **Behavioral problems:**
  - Activity strongly related to (decrease) in behavioral problems
  - We have permission to request summary data from the AZ Safe system
  - But: differences in collection across the district
- **Interviews/ Qualitative data:**
  - Interviews with principles and health aides approved and underway

Figure IV.2. Standardized testing scores and SES

### Physical Fitness Testing

## **Nutrition**

**Interviews with principals and health aides**

**Future recommendations**

## **General Conclusion**