

Del Norte County 2016

A Look at Childhood Obesity



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The California Center for Rural Policy at Humboldt State University is a research and policy center committed to informing policy, building community, and promoting the health and well-being of people and environments.

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**Building Health
Communities**

Del Norte and Adjacent Tribal Lands



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Executive Summary

Background

In 2010 Del Norte and Adjacent Tribal Lands (DNATL) was one of 14 places in California that was selected by The California Endowment for participation in the Building Healthy Communities initiative. The Building Healthy Communities initiative sought to invest in community endeavors to promote health. Rather than focusing on pre-determined strategies for health promotion, The California Endowment engaged the communities in defining outcomes.

The California Center for Rural Policy assembled the Del Norte and Adjacent Tribal Lands Building Healthy Communities Learning and Evaluation Advisory Committee. The committee consisted of DNATL community members and included the Superintendent of the Del Norte Unified School District, director of Del Norte County Health and Human Services, Director of Del Norte First 5, family practice physician, and a representative from the Del Norte Workforce Center.

After months of evaluation of potential community health indicators, the advisory committee selected childhood obesity as one of the 20 measures to be used as indicators of community health in Del Norte and Adjacent Tribal Lands.

This report focuses on answering the following questions about childhood obesity in Del Norte County and Adjacent Tribal Lands:

What is the prevalence of childhood obesity and overweight in Del Norte school children?

How do these values compare to the rest of the Nation?

How do these values compare to the goals set forth in Healthy People 2020?

Are certain groups of children more likely to be obese or overweight when compared to others?

Has the proportion of students who are obese or overweight changed over time?

Summary of Findings

The following findings are based on data from the Del Norte County Unified School District and County Office of Education data provided to California Center for Rural Policy to evaluate.

21.5% of Del Norte School youth (kindergarten to 9th grade students) are obese

18.9% of Del Norte School youth are overweight

The prevalence of obesity is higher in older youth (5th, 7th and 9th grade students) when compared to younger children (kindergarten, 1st and 3rd grade students)

The proportion of children in Del Norte County who are obese is higher than the Healthy People 2020 goals and higher than that seen in the Nation

Data from the California Department of Education may underestimate rates of obesity and overweight in school children

The proportion of students who are obese does not differ by race/ethnicity

Obesity or overweight was higher in Hispanic children who had financial hardship when compared to Hispanic children that did not have financial hardship

Obesity was not more prevalent in Caucasian, Hmong or Native American youth who had financial hardship when compared to those youth who did not have financial hardship

There appears to be little change in the prevalence in obesity in Del Norte youth since the academic year 2011 – 2012 when annual anthropometric data has been collected

Implications for Programs, Policy and Research

A high proportion of Del Norte County youth are overweight or obese. Program and policies should be put into place that expand opportunities for students for physical activity and healthy eating. The Del Norte County Unified School district in collaboration with the Del Norte Advisory Council developed the “Guide to School Wellness.” This guide was approved by the school board in the 2015-2016 academic year. The Guide to School Wellness indicates that all foods available to students during school hours shall be as follows:

1. Selected so as to contribute to student’s nutritional well-being and the prevention of disease.
2. Prepared in ways that will appeal to students, retain nutritive quality and foster lifelong healthful eating habits.
3. Proved to give a variety of healthy choices at all site including ethnic and cultural favorites.

The Del Norte County Unified School district’s Wellness Policy also indicates how students will be provided opportunities for physical activity. These opportunities include the following:

1. Provide daily physical activity for all students in grades kindergarten to 8th grade, through recess and physical education.
2. Provide two years of physical education during high school years (225 minutes every two weeks).

The Wellness Policy can be used as a resource for parents, teachers, ancillary school staff and community members for programs and activities that can guide future work in ensuring a healthy school environment.

Background

Obesity in childhood has reached epidemic proportions. Seventeen percent or 12.5 million children between the ages of 2 and 19 years are obese (1). In the United States, the prevalence of obesity in preschool children has doubled and in school-aged and teenaged youth it has tripled since the 1970s (2). Obesity in childhood has been associated with a number of chronic illnesses that were formerly only seen in adult populations. Obesity in childhood increases the risk for insulin resistance and diabetes mellitus II, hypertension, hyperlipidemia, and sleep apnea (3-6). Since obesity in childhood increases the risk of obesity in adulthood (7), the national trend of high prevalence of childhood obesity portends rising rates of obesity in American adults for years to come.



The current understanding of the causes of childhood obesity are envisioned to be multifactorial, ranging from changes in dietary and physical activity behaviors, the physical environment, and policies affecting the food system. Changes in the patterns of physical activity in the form of active transportation, performance of chores, engagement in play with peers and exercise for fitness have changed for children in the recent past and may be a contributing factor to the rise in childhood obesity (8-10). Changes in eating patterns and nutritional content of foods have occurred, and these changes may also be contributing to the rise in childhood obesity.

National food policies that resulted in a greater prevalence of corn syrup in foods and a reduction in cost of low nutrient content foods is seen as contributing to the rise in obesity in both children and adults (11-12). The built environment, including parks, green space, sidewalks, and street lighting, all seem to be related to the prevalence of obesity in the population that lives within that environment (13). Genetics seems to play a role in the susceptibility of obesity. Familial obesity confers a greater risk of obesity in offspring (14-16). Maternal obesity or maternal hypo-nutrition during gestation increases the risk of obesity in her children (17-20). Childhood obesity is a complex issue that needs a multifactorial approach to ameliorating this health issue.



Measuring Childhood Obesity in Del Norte County

This report contains information about childhood obesity in Del Norte County. School nurses in the Del Norte County Unified School District (DNCUSD) and County Office of Education (COE) have been measuring height and weight of students annually since the 2012-2013 academic year. The school nurses employ the protocol for assessing height and weight as described by the CDC. In February, March and April, the nurses have performed these anthropometric measurements on children in kindergarten, 1st, 3rd, 5th, 7th and 9th grades. Height and weight measurements are then used to calculate body mass index (BMI). BMI was calculated from weight in pounds divided by the square of height in feet and multiplying by a conversion factor of 703 (21). BMI is used as a proxy measure of body fatness. The BMI for each child is compared to a reference population. The reference population is a national sample of children who are the same age and gender (22). In comparing the individual BMI scores of the Del Norte children to the reference population, a percentile score for the Del Norte child's BMI is obtained. A BMI percentile of 25% would indicate that 25% of the BMI scores from the national reference population are below the Del Norte Child's BMI score. The Centers for Disease Control has set BMI percentile parameters for four weight categories (23). According to the CDC, BMI percentile scores over the 95th percentile are classified as obese. BMI percentile scores between of 85 and 94 are classified as overweight. BMI percentile scores between 5 and 84 are classified as healthy weight, and BMI under the 5th percentile is classified as underweight (23).



Exhibit 1: Weight Status Categories

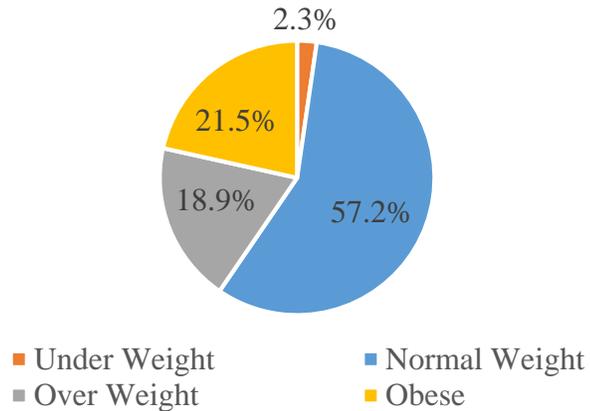
Weight Status Category	BMI Percentile
Underweight	< 5 th Percentile
Healthy Weight	5 th to 85 th Percentile
Overweight	85 th to 94 th Percentile
Obese	≥ 95 th Percentile

Source: Centers for Disease Control and Prevention (23)

Del Norte County Weight Categories for All Youth Measured

In the 2015-2016 academic year, height and weight of youth in the Del Norte schools were measured for over 1600 students. Over half of the school children measured for height and weight had a BMI that placed them in a healthy weight category (57.2%). Overall the prevalence of obesity in Del Norte school children was 21.5%. An additional 18.9% of the youth measured were overweight (23).

Exhibit 2: Prevalence of Each Body Mass Index Category

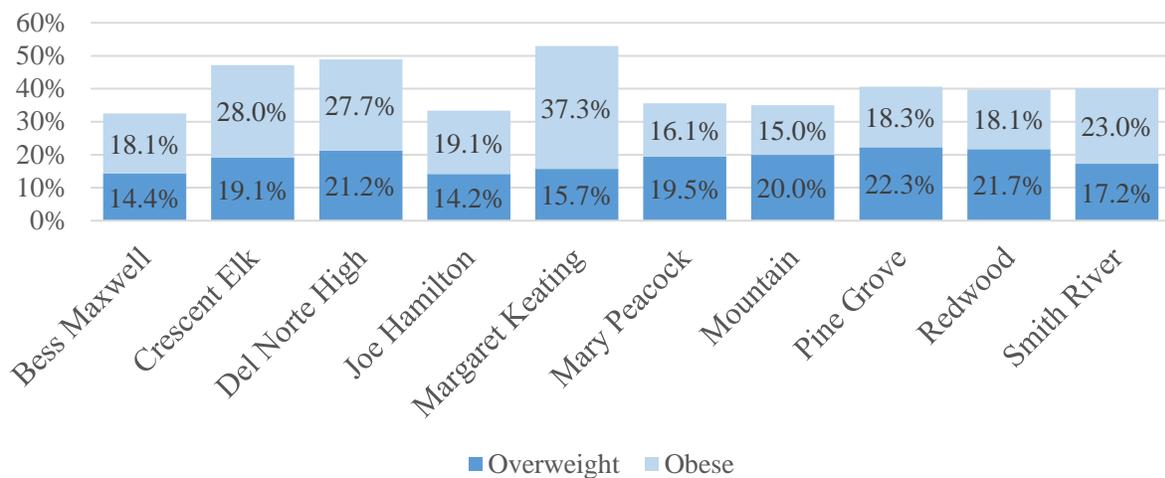


Source: 2015-2016 measurements performed by school nurses in Del Norte Unified School District

Prevalence of Obesity by Schools in the Del Norte County School District

The prevalence of obesity and overweight at each of the schools in the district are presented below. It is expected that differences in a number of factors, both inside and outside of the school setting, contribute to the differences seen in the prevalence of obesity among the schools.

Exhibit 3: Weight Category Distribution at Individual Schools



Source: 2015-2016 measurements performed by school nurses in Del Norte Unified School District

Obesity by Age Group National Comparison

The Healthy People 2020 report has set a goal of reducing prevalence of childhood obesity (24). The expert panel has set age specific goals for obesity rates. The 2020 Healthy People goal for children aged 2 to 5 is to reduce the proportion of children who are obese to 9.4% (24). In Del Norte schools, 16.8% of 5 year-old students were obese. In a 2011 – 2012 national sample, 8.4% of children aged 2 to 5 years had a BMI that placed them in the obese weight category (25). The proportion of 5 year old students in the Del Norte students who were obese was significantly higher than the Healthy People 2020 goal and the 2011-2012 national sample.

Exhibit 4: Prevalence of Obesity by Age Group

Age Range (years)	Del Norte County 2015-2016	National Data 2011-2012	Healthy People 2020 Goal
2 – 5	16.8%	8.4%	9.4%
6 – 11	19.6%	17.7%	15.7%
12 - 19	26.0%	20.5%	16.1%

Sources: 2015-2016 measurements performed by school nurses in DNCUSD; Healthy People 2020 (24); Ogden et al, 2014 (25).

Overweight and Obesity in Young Children

The Healthy People 2020 report did not set goals regarding the proportion of the population that is overweight. Being overweight presents a risk of becoming obese. Thus, it is important to monitor both the proportion of the population that is obese and that is overweight. Thirty-five percent of 5 year-old children in Del Norte County were either overweight or obese. The proportion of overweight or obese 5 year-olds in Del Norte County is higher than previously reported in a National sample of 2 to 5 year old children (35% versus 22.8%, $p < .05$). The difference between Del Norte data and the national data may be the difference ages of the populations. The rates of obesity in children differs by age group; older children have greater prevalence of obesity than do younger children (25). The national sample included young children, aged 2 to 5 years; whereas the Del Norte sample only included 5 year old children.

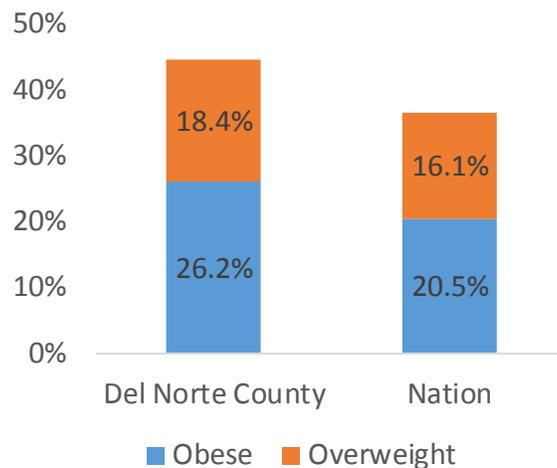
Overweight and Obesity in Children 6 – 11 years

The 2020 Healthy People 2020 goal for children ages 6 to 11 is to reduce the proportion of children who are obese to 15.7% (24). In the Del Norte schools, 19.6% of students aged 6 to 11 years had a BMI that placed them in the weight status of obese. A national study found that 17.7% of children aged 6 to 11 have a BMI that places them in the weight category of obese (25). The proportion of Del Norte students who are age 6 to 11 years who are obese is higher than the target set by 2020 Healthy People and higher than seen in a national study. The proportion of Del Norte youth between the ages of 6 and 11 years who were either obese or overweight was only slightly higher than seen in a national sample. Del Norte children have a higher incidence of obesity than that seen on a national level.

Overweight and Obesity in Older Youth 12 – 19 years

The 2020 Healthy People goal for children aged 12 to 19 years is to reduce the proportion of children who are obese to 16.1% (24). In Del Norte schools, 26.2% of students aged 12 to 18 years had a BMI that placed them in the weight status of obese. A national study found that 20.5% of youth aged 12 to 19 years have a BMI that places them in the weight category of obese (25). Youth in Del Norte schools have higher prevalence of obesity when compared to the Healthy People 2020 goals and when compared to national data. In Del Norte County, 46.7% of the youth aged 12 to 18 were either overweight or obese. This is higher than National data for youth aged 12 to 19 years old (46.7% versus 34.5%, z score > 1.96).

Exhibit 6: Prevalence of Overweight and Obese in 12 – 19 Year Olds

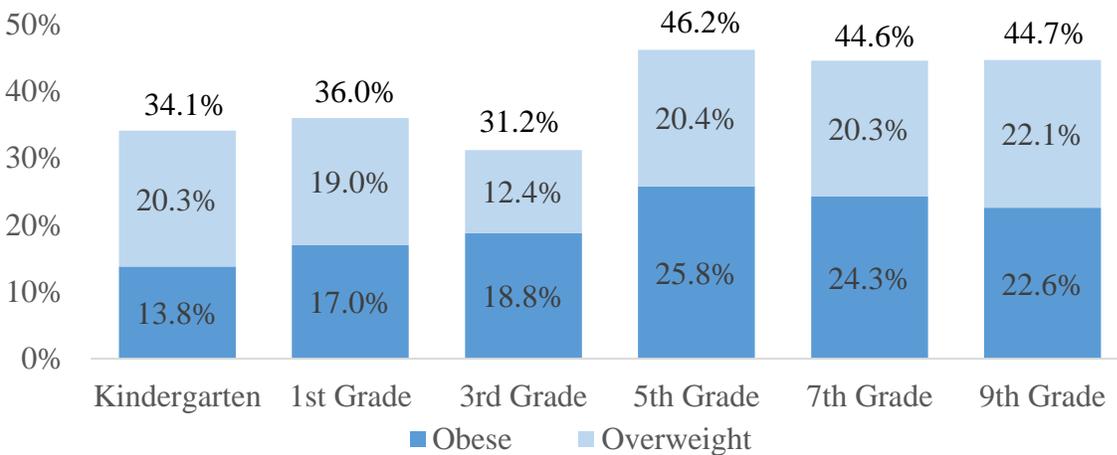


Sources: 2015-2016 measurements performed by school nurses in Del Norte Unified School District; Ogden et al, 2014 (25)

Difference in Prevalence of Obesity by Age

National data shows that the prevalence of obesity is higher in older youth when compared to younger children (25). National data indicates that the rates of obesity in children aged 2 to 5 years is 8.4%, in children aged 6 to 11 is 17.7% and in youth aged 12 to 19 is 20.5% (25). BMI data from the 2015-2016 school year in Del Norte County also show a difference in prevalence of obesity between the younger and older children. Rates of obesity appear to be lower in the younger students (Kindergarten, 1st and 3rd grade) when compared to rates of obesity in the older students (5th, 7th and 9th grade). There was no clear age related trend in prevalence of having a BMI in the overweight category.

Exhibit 7: Prevalence of Obese and Overweight by Grade in Del Norte County



Sources: 2015-2016 measurements performed by school nurses in Del Norte Unified School District.

Obesity and Overweight by Grade California Department of Education Data

The California Department of Education (CDE) requires schools to report body composition for all 5th, 7th, and 9th grade students. The 2015-2016 academic year data for BMI is not available on the CDE website presently. The 2014-2015 academic year data from the California Department of Education shows that 46.1% of 5th grade students, 52.0% of 7th grade students, and 50.8% of 9th grade students in Del Norte County schools were in a healthy fitness zone (HFZ) (26). The CDE data shows that the proportion of Del Norte County students who were in the HFZ was significantly lower than that seen in the state (26). The proportion of youth whose body composition places them in the “needs improvement” and “health risk” categories were higher in Del Norte County when compared to youth in California in the 2014-2015 academic year.

Exhibit 8: Prevalence of Students in Healthy Fitness Zone for Body Composition

Grade	Del Norte County	California
5 th	46.1%	59.7%*
7 th	52.0%	61.5%*
9 th	50.8%	64.0%*

* Significantly higher (z score > 1.96)

Source: CDE, 2014 (26).

According to the CDE, schools may assess body composition through skinfold measurements, bio impedance analysis, or calculating body mass index (27). When BMI is utilized to assess body composition, the values are compared to a reference population that is not gender normed. The reference population has been developed by the Cooper Institute and is a part of the FITNESSGRAM program that assess a number of physical health indicators (27). The body composition cut point for the CDE category of “health risk” for a 12 year old is a BMI of 25.8. Using the gender normed curves of the CDC, a BMI of 24.2 for a 12 year old boy and a BMI of 25.2 for a 12 year old girl would place them in the obese weight category. Thus, the BMI cut point for the category of “health risk” is higher using the CDE categories than the cut point for the category of “obese” as defined by the CDC. A higher BMI threshold is also seen for the CDE definition of “needs improvement” when compared to the CDC’s weight category of “overweight”. The BMI cut points utilized by the CDE underestimate the proportion of students that are either overweight or obese. Further, the underestimation is greater for males than it is for females. The use of the CDE cut points for defining healthy body mass index lead to underreporting of the prevalence of overweight and obese youth in California schools.

The weight categories using the BMI data from 2015-2016 were evaluated using the FITNESSGRAM standards employed by the CDE and the cut points used by the CDC. When using the HFZ as defined by The Cooper Institute, there is an underreporting of youth outside of the healthy BMI range as defined by the CDC criteria, and an over-reporting of youth in the healthy fitness zone. There was a gender difference in over reporting of youth in the HFZ using the FITNESSGRAM cut points. Males were less likely to be identified as having a body composition that the CDC would recognize as being overweight or obese when compared to females. A change to the cut points for the healthy fitness zone is proposed for the 2015-2016 academic year (27).

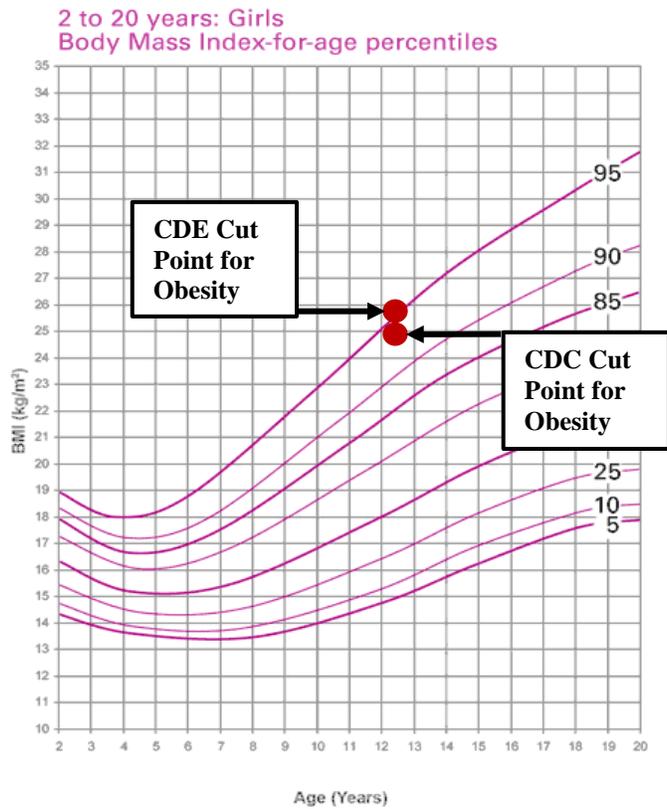


Exhibit 9: Prevalence of Students in Healthy Fitness Zone for Body Composition or Normal Weight

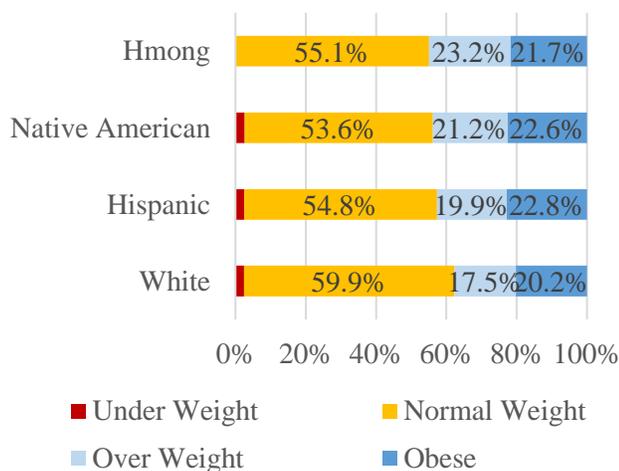
Grade	CDE	CDC
5 th	75.9%	48.9%
7 th	67.9%	55.7%
9 th	57.4%	50.4%
Female		
Grade	CDE	CDC
5 th	76.9%	53.0%
7 th	70.0%	50.8%
9 th	67.6%	56.8%
Male		

Source: 2015-2016 BMI data evaluated by CDC (23) and CDE (27) standards.

Obesity and Overweight by Ethnicity

Although the high incidence of childhood obesity can be seen in all ethnic/racial groups, national data shows that obesity is more prevalent in non-white children (28-30). In Del Norte County school children, the incidence of obesity was not significantly different among Caucasian, Native American, Hispanic, and Hmong children. There was also no difference in the proportion of Hispanic children in Del Norte who were obese when compared to a national sample (21.2% versus 22.4%). Obesity was more common in Del Norte youth who were Caucasian when compared to a national sample of Caucasian children (20.2% versus 14.3%)(25). The Del Norte County data appears to be different than national data as it failed to demonstrate a difference in rates of obesity between Caucasian and other ethnic groups.

Exhibit 10: Prevalence of Obese/Overweight Youth By Ethnicity



Source: 2015-2016 measurements performed by school nurses in Del Norte Unified School District.

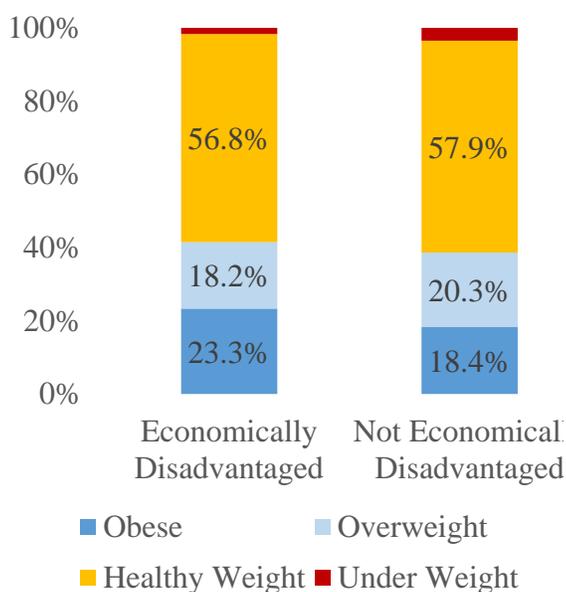
The incidence of being either overweight or obese has been shown to be higher in Hispanic and African American children when compared to Caucasian and Asian children (28). The number of Del Norte children who indicated their race/ethnicity as Asian or African American students was too small to provide stable data. The BMI data from the Del Norte schools shows no difference in the incidence of children having a BMI greater than 84 kg/m² (i.e., obese and overweight categories) among the race/ethnicity categories of Caucasian, Native American, Hispanic or Hmong. The Del Norte data differs from national data in that the Caucasian children did not have lower incidence of obesity and overweight when compared to other ethnicities. It appears there is a driving force contributing to childhood obesity in Del Norte County that outweighs the cultural and/or genetic drivers that have produced race/ethnic differences in rates of obesity seen in national studies.

Obesity by Financial Need

Obesity has been shown to be associated with income level. For children who live in families with income below 130% of the Federal Poverty Limit, the risk of obesity is higher than for children whose family have a higher income (31). Del Norte County has a high rate of poverty. The U.S. Census Bureau estimates that 22.4% of the population in Del Norte County have an income that is below the Federal Poverty Threshold (32). Poverty may be a major driving force in the high rates of obesity in Del Norte Children.

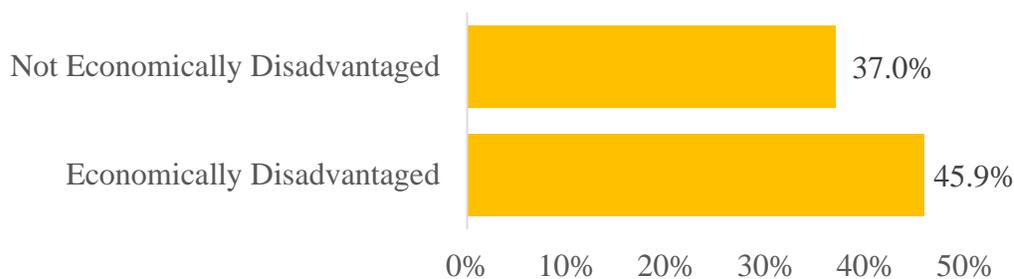
In Del Norte County school children, obesity was more prevalent in economically disadvantaged children when compared to children who were not economically disadvantaged (23.3% versus 18.4%, z score > 1.96). Financial hardship did not have a uniform effect on rate of obesity or overweight among race/ethnic categories. In Del Norte County data there was a higher prevalence of Hispanic children who were either obese or overweight that lived in families with financial hardship when compared to Hispanic children who lived in families with no financial hardship. There was no statistical difference in prevalence of obesity or overweight by financial hardship for Caucasian, Native American or Hmong children. Income seems to play a role in risk for obesity or overweight in Hispanic children in Del Norte County.

Exhibit 11: Weight Category Distribution Difference by Economic Hardship



Source: 2015-2016 measurements performed by school nurses in Del Norte Unified School District.

Exhibit 12: Prevalence of Obese/Overweight in Hispanic Youth



Source: 2015-2016 measurements performed by school nurses in DNCUSD

Obesity and Overweight by Grade over Time

Despite considerable public health focus on childhood obesity, the rate of obesity has largely remained the same in the past decade (25). Modest reductions in rates of obesity in young children aged 2 to 5 have been seen in national data in the past decade (25). There has been a plateau in the rates of obesity in children who are 6 to 19 years old. Examination of BMI data from Del Norte County shows that over the academic years of 2011-2012 to 2015-2016 there may be a modest rise in the prevalence of obesity in the upper grades (5th, 7th and 9th) and a modest reduction in the prevalence of obesity in the lower grades (K, 1st, 3rd).

Exhibit 13: Prevalence of Overweight or Obese Over Time in Del Norte Youth

	2011	2012	2013	2014	2015
kindergarten	30%	45%	37%	33%	34%
1 st grade	39%	38%	32%	34%	36%
3 rd grade	47%	49%	40%	41%	31%
5 th grade	49%	46%	46%	54%	45%
7 th grade	43%	44%	43%	49%	45%
9 th grade	42%	43%	43%	50%	49%

Source: Annual measurements performed by school nurses in DNCUSD academic years starting in 2011 through 2015.

Once established, obesity seems to be difficult to reverse (33-35). Thus, obese children tend to be obese throughout childhood and into adulthood (35). Children who are obese in 1st grade will likely also be obese in 3rd grade. In the Del Norte County data, many of the children who had their height and weight measured in 1st grade in 2012-2013 also had their height and weight measured in 3rd grade in 2014-2015. Evaluating changes in prevalence of obesity in cohorts provided a similar picture of changes in prevalence of obesity in Del Norte youth. For instance youth who were in kindergarten in 2011 (i.e., kindergarten cohort of 2011) had a change in prevalence of children who were obese or overweight from 30% in 2011 to 38% in their 1st grade year in 2012, to 41% in their 3rd grade year in 2014. The kindergarten cohort of 2012-2013 had a much higher rate of obesity in their kindergarten year (45.0%) than either their first grade year in 2013-2014 (31.4%) or their 3rd grade year in 2015-2016 (31.2%). Some cohorts had a reduction in prevalence of youth who were either obese or overweight over time, but other cohorts had an increase in prevalence of youth were either obese or overweight over time. Neither of the discussed means to evaluate change in prevalence of obesity provides the most accurate assessment of change in BMI over time. Evaluating change in BMI over time would be done by comparing BMI for individual children through the years. The longitudinal evaluation would provide a better picture of the trends in obesity rates in Del Norte County.

Exhibit 14: Prevalence of Overweight or Obesity across Academic Years

Kindergarten Cohort Year	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	Net Change (%/year)
2015					34%	NA
2014				33%	36%	+ 3
2013			37%	34%		- 3
2012		45%	31%		31%	- 4.7
2011	30%	38%		41%		+ 3.7
2010	39%		40%		45%	+ 1.5
2009		49%		54%		+ 3
2008	47%		46%		45%	- 0.5
2007		46%		49%		+ 1.5
2006	49%		43%		49%	0
2005		44%		50%		+ 3
2004	43%		43%			0

← See explanation of this example in text above

Source: Annual measurements performed by school nurses in Del Norte Unified School District

Longitudinal Look at BMI

Data is available for individual students from the years 2013 and 2015. Half of the students in the district that were measured for BMI in 2013 were also measured in 2015. There was no difference in mean BMI percentile between 2013 and 2015 for the entire group. There was a reduction in BMI percentile from 2013 to 2015 in the first and third grade students from 2013. On the other hand, there was an increase in the BMI percentile scores from 2013 to 2015 in the 5th and 7th grade students. With the exception of 7th grade students, there a slight increase in prevalence in obesity over the 2013 to 2015 academic school years. The persistence of body morphology is evident in this data. Since, school-based interventions to reverse childhood obesity have only been able to demonstrate small changes in prevalence of obesity in school youth, the fight against childhood obesity must begin before children become obese.

Exhibit 15: Longitudinal Change in BMI Percentile and Prevalence in Obesity

Grade Level in 2013	BMI Percentile 2013	BMI Percentile 2015	Change in BMI Percentile	Sample Size
1 st	66.57	64.13	-2.4*	191
3 rd	72.33	71.79	-1.7*	188
5 th	72.33	74.09	+1.8*	201
7 th	70.17	73.32	+2.3*	168
Grade Level In 2013	Obesity Prevalence 2013	Obesity Prevalence 2015	Change in Obesity Prevalence	Sample Size
1 st	15.7%	18.3%	+2.6%	191
3 rd	22.9%	28.2%	+5.9%	188
5 th	22.8%	24.3%	+1.5%	201
7 th	21.9%	20.8%	-1.1%	168

Source: Annual measurements performed by school nurses in DNCUSD; * statistically different at the $p < .05$ level.

Weight Status in 2013	Weight Status in 2015	Mean Change in BMI Percentile
Obese (n= 164)	84% stay Obese	-1.0
	12.3% now are Overweight	
	3.7% now are Healthy Weight	
Over Weight (n=144)	25% become Obese	-2.5
	51.4% stay Overweight	
	23.6% now are Healthy Weight	
Healthy Weight (n=452)	2.0% become Obese	+1.5
	9.3% become Overweight	
	88.7% stay in Healthy Weight	
Under Weight (n=12)	25% become Healthy Weight	+3.2
	75% stay Underweight	

Longitudinal Look at BMI

The pattern of change in BMI was evaluated by weight category to determine if the changes in wellness policy in the Del Norte County schools impacted weight loss in the obese children. Changes in BMI percentile and change in weight category were evaluated by establishing the baseline in 2013 and comparing the baseline to the 2015 data. Sixteen percent of the youth who had a BMI that placed them in the obese weight category had improvements in BMI percentile sufficient to move them out of the obese weight category. However, the change in BMI percentile for this group over 2 years was only 1.0. For these two facts to be congruent, it means that a portion of the youth who were obese in 2013, increased their BMI percentile in 2015. The obese youth in 2013, who gained enough body weight to increase their BMI percentile scores became further entrenched in this unhealthy weight category. For those youth who were overweight in 2013, an equal proportion had BMI changes that put them in the obese weight categories as compared to those who had BMI changes that moved them into the Healthy Weight category. Overall, the overweight group of youth in 2013 had a reduction in BMI percentile (change in BMI percentile = -2.5). For the youth with a healthy weight in 2013, 9.3% gained weight and became overweight and 2.0% gained sufficient weight to become obese. Overall, the healthy weight group in 2013 had a slight increase in BMI percentile in 2015 (change in BMI percentile = 1.5). A trend in change of BMI percentile in relation to initial weight status was evident in the data.

School Setting

The school setting provides multiple opportunities for interventions designed to prevent and reduce childhood obesity. Schools have access to the majority of American youth. Ninety-six percent of American children between the ages of 5 and 17 years, over 53.4 million students, share the school environment (37-38). While at school, children consume between 19% and 50% of their total daily calories (39). Free time during recesses is important time for students to engage in physical activity. It has been estimated that children are engaged in vigorous activity 63% of the time during recess, and take about one-quarter of the daily walking steps during lunch and recess breaks (40-41). Thus, both the food environment and recesses at school provide opportunities to modify diet and exercise habits of most American youth.



Active Transportation to School

Schools have been shown to be an important setting for physical activity, yet opportunities for exercise in and around school have decreased. In the past, most children used some form of active transportation to get to and from school. This trend has changed significantly in the past 20 years. For example, in 1987, 87% of school-aged children walked or rode their bike to school, and in 2008 only 18% participated in active transportation to school (10). Children are not expending energy commuting to school.



Active Transportation in Del Norte County

Data regarding the beliefs and patterns of active transportation to school in Del Norte is available. In 2012, a convenience sample of 521 Del Norte parents from six schools provided information regarding active transportation to school. The study found that the majority of children arrived to school (74%) and departed from school (63%) via a family vehicle. Only 14% of children arrived to school via an active mode of transportation; where as 23% of children departed school via an active mode of transportation (42). Thus, for 9% of children who engaged in active transportation they did so only when leaving school. This trend in higher prevalence of active transportation to home after school when compared to active transportation from home to school was seen when the child lived $\frac{1}{4}$ mile to up to 2 miles from school campus (42). Schools can work toward promoting walking to school. If more children walked to school, the traffic congestion around schools in the morning would be less. Since 36% of parents in this survey indicated that traffic was a barrier to allowing their child to walk or bike to school, promotion of walking to school in children who are walking from school may lead to additional children engaging in active transportation. The Del Norte County Safe Routes to School Research and Policy Report identifies policy and action recommendations to promote active transportation to Del Norte Schools.



Physical Activity at School

The Del Norte County Unified School district has a wellness policy that addresses physical activity and nutrition (43). This policy was adopted in 2006. The wellness policy indicated that children in elementary school should receive 20 minutes each day for recess and 200 minutes of physical education every 2 weeks (43). The wellness policy indicated that all students in grades 9 - to 12 should receive two years of physical education during their high school years (43).

More recently, the Del Norte Advisory Council developed the “Guide to School Wellness” (44). The guide was approved by the Del Norte County Office of Education in November 2015. The Wellness Policy addresses promotion of physical activity in school children as follows:

“All students shall be provided opportunities to be physically active on a regular basis. Opportunities for moderate to vigorous physical activity shall be provided through physical education (PE) and recess and may also be provided through school athletic programs, extracurricular programs, before and after-school programs, summer learning programs, programs encouraging students to walk or bicycle to and from school, in-class physical activity breaks, and other structured and unstructured activities.”

In the Guide to Wellness it is recognized that teachers and schools play a role in enabling children to engage in adequate physical activity to promote health. The guide indicates that elementary school children in Del Norte Unified schools should engage in 150 minutes of PE every 2 weeks. Further, the wellness guide indicates that elementary school students should have at least 20 minutes of recess daily. In addition, children attending after school programs should be engaged in physical activity for a minimum of 30 minutes per day. The guide indicates that secondary school children should be engaged in 225 minutes of PE every 2 weeks. However, an exception to this recommendation is made for any 2 years of PE courses during grades 10 – 12. Only 10 units, or 2 full years of PE courses are required for graduation from high school. The policies set forth in this Wellness Guide are new and evaluation of teacher/school fidelity with the recommendations have not yet been determined.



Physical Fitness Performance

The Del Norte School district measures physical fitness in their students using the FITNESSGRAM test designed by The Cooper Institute. The fitness test includes assessment of aerobic capacity, strength and flexibility. Fitness data from the 2015-2016 school year is not yet posted on the CDE website. In the 2014-2015 academic year, school youth who had adequate aerobic capacity to be classified as being in the healthy fitness zone (HFZ) differed by grade level. Only 58.3% of 5th grade students had aerobic capacity in the HFZ; where as 82.5% of 7th grade students and 77.1% of 9th grade students had aerobic fitness capacity in the HFZ (26). The lower prevalence of 5th grade students have sufficient aerobic capacity to be in the HFZ when compared to 7th and 9th grade students was also evident in 2013-2014 and 2012-2013 CDE data (26). The prevalence of 5th grade students who had aerobic capacity in the HFZ was lower in Del Norte when compared to other students in California (26). This was not true for 7th and 9th grade students in Del Norte County. A higher proportion of students in Del Norte County were in the HFZ when compared to the proportion of grade matched students in California (26). The FITNESSGRAM also assess flexibility and upper body strength. In 2014-2015, Del Norte 5th grade students were less often in the HFZ than their grade matched California peers. Elementary school students in Del Norte County may benefit from increasing the duration, frequency or intensity of physical activity in their PE curriculum.

Exhibit 14: Prevalence of Students in a Healthy Fitness Zone for Aerobic Capacity

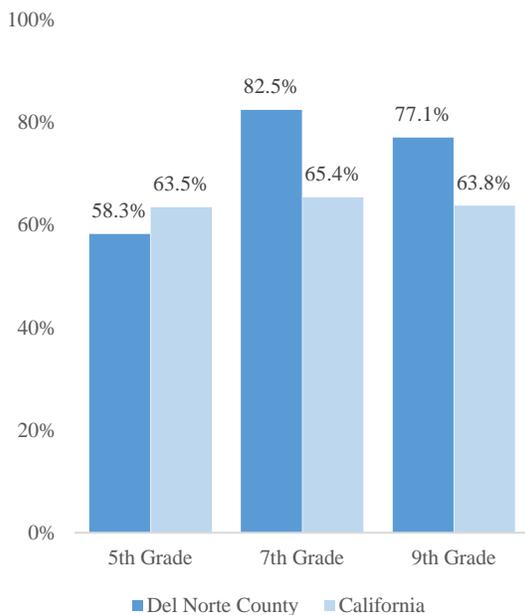
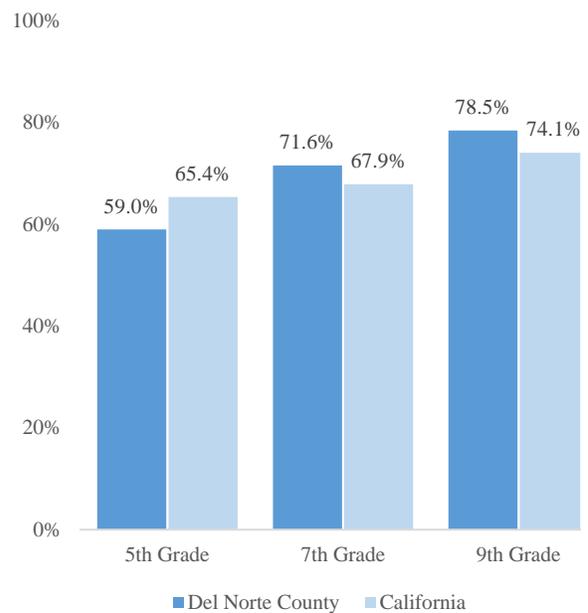


Exhibit 15: Prevalence of Students in a Healthy Fitness Zone for Upper Body Strength



Source: California Department of Education, 2014 (26).

Food at School

The food landscape of schools has the potential to effect the diet of the majority of children and adolescents. The U.S. Department of Agriculture subsidizes meals in schools through the National School Lunch Program (NSLP) and the National School Breakfast Program (NSBP). It has been estimated that on an average day 30 million students consume a school lunch (44) and 10 million students consume a school breakfast (45). The USDA sets nutritional standards for the school breakfast and lunch meals and mandate minimum micronutrients and minimum caloric content in the meals.

In 2012 the USDA set a maximum caloric content for meals in the NSLP based on age of child being served (46). In 2013 a maximum caloric content for NSBP was also established. These caloric content of meals is lower for younger children, as their metabolic needs are less than those of older youth. For grades kindergarten through 5th the range is 350 – 500 Kcal and for grades 9 to 12 the range is 750 – 850 calories. Prior to 2013, children were being presented with school meals that contained more calories than the recommended daily allowance for children their age.

Foods sold outside of school meals are an important factor in the dietary landscape within the school setting. These competitive foods are sold in vending machines, snack bars or as a la carte items in the school cafeteria. These competitive foods are often sugar sweetened beverages and low-nutrient energy dense foods and their availability are associated with increased intake of these poor nutritional quality items (47). The California Department of Education now requires schools that receive funding for the National School Lunch Program to only allow competitive foods that comply with the National School Lunch Program nutritional restrictions (48). The U.S. Department of Agriculture's Smart Snacks in School rule became effective in July 2014 (49). The food landscape at school influences the eating behavior and diet quality of its students and may be contributing to the problem of obesity in childhood. Recent changes to Federal and State regulations creating a healthier food landscape in schools may help reduce unhealthy weight gain in school children.



Food Policies in Del Norte Schools

The Healthy, Hunger-Free Kids Act of 2010 (48) requires agencies participating in the NSLP to establish a local school wellness policy. The Del Norte County Unified School district have developed Nutrition Guidelines that meet or exceed all State and Federal Requirements. The Nutritional Guidelines address the food landscape in schools as follows:

All foods available on each campus during the school day, the district shall adopt nutritional guidelines which are consistent with state and federal regulations and which support the objectives of promoting student health and reducing childhood obesity.

The Superintendent or designee shall provide access to free, potable water during meal times in the food service area.

All foods and beverages sold to students at district schools, including those available outside the district's food services program, should support the health curriculum and promote optimal health.

Nutritional standards adopted by the district for foods and beverages provided through student stores, vending machines, or other venues shall meet or exceed state and federal nutritional standards.

The Superintendent or designee shall encourage school organizations to use healthy food items or non-food items for fundraising purposes.

The Superintendent shall encourage school staff to avoid the use of non-nutritious foods as a reward for students' academic performance, accomplishments, or classroom behavior.

School staff shall encourage parents/guardians or other volunteers to support the district's nutrition education program by considering nutritional quality when selecting any snacks which they may donate for occasional class parties.

The Del Norte Advisory Council was assembled to develop a "Guide to School Wellness". The guide was approved by the Del Norte County Office of Education in November 2015. The Del Norte Advisory Council recommends all foods, competitive foods NSLP, fundraisers and celebrations should meet the nutritional standards set forth by the NSLP. Further, that children will be offered fresh fruits and vegetables and water with meals. The Unified School District website has links to resources to help parents, students and teachers employ healthy eating activities. Nutrition services also participates in the Harvest of the Month Program, and provides links to educational tools and resources to promote eating fresh fruits and vegetables.

Implications for Programs, Policy & Research

The current understanding of the causes of childhood obesity are envisioned to be multi-factorial, ranging from changes in dietary and physical activity behaviors, the physical environment, and policies affecting the food system.

Food

There is an association of poor access to food and childhood obesity (REF). The USDA has defined some communities as food deserts. Food deserts are characterized as communities that have poverty rates over 20% and commutes to a grocery store greater than 10 miles (REF). Del Norte County has been identified as a food desert based both on the USDA low-income criteria and the low-access criteria (REF). A recent study in Del Norte County and Adjacent Tribal Lands found that over 50% of families who have an income below the poverty limit are food insecure. Community members, community agencies, and institutions should continue to focus on increasing access to nutritious food community members. Current programs and recommendations for future work in this area are provided below:

Availability

Bring new farmer's markets to outlying communities

Establish more community gardens and school gardens

Continue with the Seamless Summer Food Program

Continue to provide nutritious meals to student

Continue to restrict the availability of non-nutritious foods on school campuses



Affordability

Develop avenues for farmers to distribute local harvests to schools, local markets, and food banks

Consider subsidizing locally grown fruits and vegetables

Continue to provide food through the National School Lunch Program (NSLP) and the National School Breakfast Program (NSBP)

Increase access to low cost nutritious foods to families with young children

Provide low cost nutritious foods to daycare and preschools

Awareness

Create transparency regarding nutritional and caloric content of foods served at schools

Continue to introduce healthy food option through the harvest of the month program

Continue to provide resources on the County Office of education website for healthy food choices and recipes, dietary guidelines and the healthy snack calculator

Develop nutrition related curriculum that is age appropriate for teachers within the district

Perform outreach to families in the community to provide information regarding healthy food options

Create a healthy meal recipe book to be distributed to families in the school district

Use a mobile kitchen for cooking classes and demonstrations of healthy recipes using locally sourced foods

Employ the strategies of “Cooking Matters”, to train community members to provide nutrition and cooking lessons to other community members

Build community leadership through Champions for Change recruitment and Leadership and Community Engagement trainings

Acceptability

Expose children to healthy food choices throughout their school years

Engage families in nutrition education

Encourage families to experiment with new foods that are healthy

Use community members who are trained in Cooking Matters to create healthy recipes for culturally relative foods



Physical Activity

Physical activity is an important aspect of health and sense of well-being. Physical activity was once embedded in the requirements of daily chores and transportation. Today, physical



activity is less often a requirement of activities of daily living, and more often a choice made for leisure time. Characteristics of a community's environment have been shown to affect the level of engagement in physical activity for the residents of that community. This is because access to sites and locations for leisure activity that are convenient, affordable and safe influence physical activity behavior.¹In a recent survey of Del

Norte County and adjacent tribal lands residents, the majority indicated that there were clean parks, playgrounds or green space that they felt safe going to in their community. However, only 28.7% of the survey respondents indicated that there were public indoor facilities that they could use during bad weather. Current programs and recommendations for future work in this area are provided below:

Availability

- Increase access to indoor spaces for recreational activities to be used to inclement weather

- Provide daily PE classes to all students

- Expand community youth recreation programs to include fitness, dance and other non-competitive physical activities

- Create after school opportunities for organized activities

- Establish safe routes to school for walking or biking

- Engage PE specialists to lead PE classes in all grades

Affordability

- Allow use of indoor spaces and participation in recreation programs without fees

- Recruit family and community members to lead exercise classes

- Apply for grants to fund expansion of the physical activity program in the schools

Awareness

- Promote physical activity as an effective means to combat childhood obesity

Develop public campaigns promoting physical activity that is focused on the community

Implement a public campaign to reduce sedentary activities

Devise incentive programs for children to engage in 60 minutes of moderate to vigorous physical activity daily

Build community leadership through Champions for Change recruitment and Leadership and Community Engagement trainings

Support implementation and Evaluation of the current School Wellness Policy

Acceptability

Promote engagement of the entire family in physical activities

Develop culture of walking to school as norm

Improve perception of safety for students who walk to school

Demographics:

The school nurses collected anthropometric data in the 2015-2016 in the schools within the Del Norte County district wide. A total of 1621 students participated in the data collection process. Slightly more than 50% of the 1621 students were female. The majority of the students qualified for the national Free and Reduced Lunch program. The majority of the students were Caucasian.

Exhibit 15: Demographics for the 2015-2016 academic year data collection

Gender	805 male	816 female
Financial Need	35.3% no	64.7% yes

Ethnicity	54.6% Caucasian	21.5% Hispanic	14.9% Native American	4.3% Hmong	4.7% Other
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Grade	K	1st	3rd	5th	7th	9th	10th	11th
Number	246	247	282	275	251	226	13	41

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