

*A Review of the*  
**Clark County School District  
Height and Weight Data Collection,  
2011-2014 School Year**



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This report provides an initial assessment of data on childhood obesity collected via a collaborative relationship between the Clark County School District and the Southern Nevada Health District.

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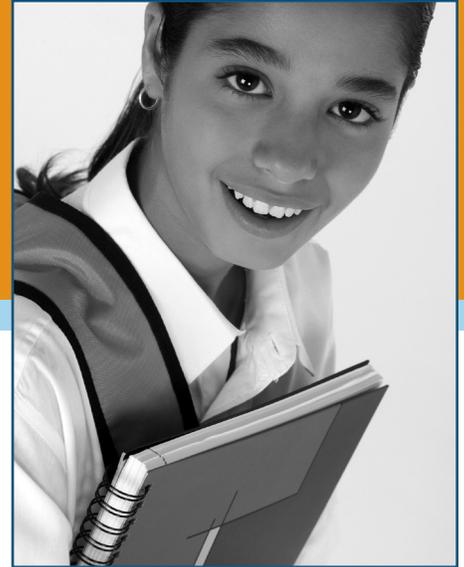
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# Weight Status of selected Clark County Students, 2011-2014



## Introduction

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In 2010, the Southern Nevada Health District (SNHD) collaborated with the Clark County School District (CCSD) to evaluate the collection of height and weight data of school aged children as required by Assembly Bill 354 (2007) and Assembly Bill 191 (2009)<sup>1</sup>. Since 2011, SNHD and CCSD have allocated funding from Centers for Disease Control and Prevention (CDC) grants to support and expand data collection to include students in additional grade levels.

This report examines the data collected by the CCSD during 2011-2014, provides an analysis of the weight status of the selected schools and participants, and compares the results to similar data from the Youth Risk Behavior Surveillance System (YRBSS) and the National Health and Nutrition Examination Survey (NHANES). Data from 2011-2014 were also compared to CCSD enrollment statistics for corresponding years to assess completeness of data collection.

## Methods

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On September 6, 2007, a meeting was held in Carson City at the Nevada Division of Public and Behavioral Health (NDPBH) with the Chief School Nurses from the 17 Nevada school districts and other interested parties regarding the data collection required under Assembly Bill 354. The nurses agreed to collect height and weight data from a convenience sample of 4th, 7th, and 10th graders. These grades were selected to coincide with the timing of existing screenings for vision, hearing, and scoliosis, and because of the even spacing of ages between those grades. CCSD chose to collect measurements on a sample rather than all of its students within these grade levels due to the large population size of its student body. By using a sample methodology provided by NSHD, a total of 19 schools (12 elementary, 4 middle, and 3 high schools) were selected to participate (Appendix A).

For the 2011-2012 school year, a portion of funding from CDC's Communities Putting Prevention to Work (CPPW) program was used to establish a Prevention First position responsible for coordinating screenings with schools, developing a more robust data collection protocol (Appendix B), and conducting trainings for CCSD staff involved in data collection. Stadiometers and scales for selected schools were also purchased with CPPW funds. Beginning with the 2012-2013 school year, funding from the Community Transformation Grant (CTG) program was used to expand data collection to the 3rd, 6th and 9th grades using physical education teachers to collect the data using the protocol

developed under CPPW. CPPW and CTG programs funded communities to reduce chronic disease related to obesity and tobacco using the evidence-and practice-based MAPPs (Media, Access, Point of decision information, Price, and Social support services) strategies.

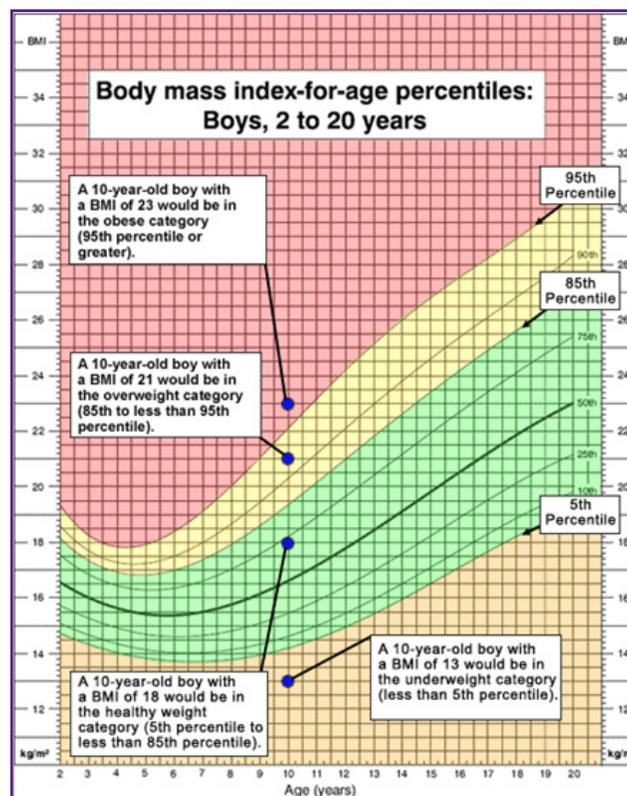
Body mass index (BMI) expresses the weight-for-height relationship as a ratio, that is, weight (in kilograms)/[height (in meters)].<sup>2</sup> While BMI is calculated the same way for children and adults, the values cannot be interpreted in the same way.<sup>3</sup> Since body fat levels change with age and differ by gender, CDC BMI-for-age growth charts are used to account for these differences and translate a BMI number into a percentile for a child's sex and age. BMI-for-age weight status categories and corresponding percentiles are shown in Table 1.

**TABLE 1 — BMI for Weight Status Categories and Percentiles**

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy Weight	5th percentile to less than the 85th percentile
Overweight	85th to less than the 95th percentile
Obese	Equal to or greater than the 95th percentile

**FIGURE 1 — Body mass index-for-age percentiles, boys 2 to 20 years of age**

The following example (Figure 1) demonstrates how sample BMI numbers would be interpreted for a 10-year-old boy:



BMI percentiles for the CCSD dataset were calculated using a CDC-developed SAS® (Cary, NC) macro. Along with the ability to calculate BMI and to determine the percentile assignment for each student record, the program also identifies outlier observations, those that are considered to be biologically implausible. Typically, these outliers are the result of data entry errors or mismeasurement rather than from true extreme growth. The range for these outliers was defined as being too low or too high based on the World Health Organization (WHO) fixed exclusion ranges.<sup>4</sup>

## Results

Data for the 2011-2012 school year were collected from 4,356 students from the 19 selected schools. The CDC-developed SAS® macro flagged outliers. Data from the remaining 4,303 students with BMI values within the acceptable normal range were further analyzed for overall trends, by race/ethnicity, and by gender. Although data were available for racial/ethnic groups other than non-Hispanic White, non-Hispanic Black, and Hispanic, the numbers of students for those individual groups were too low to generate meaningful results when stratified by gender and grade. For the 2012-2013 school year, data were collected from 3,598 students and 3,513 observations were acceptable for analysis. Data were collected from 2,941 students in the 2013-14 school year with 2,917 acceptable observations included as part of the final analysis. Table 2 presents the data from 2011-2012, 2012-2013, and 2013-2014 school years stratified by selected racial/ethnic groups. Additional stratification of these data, by grade, gender, and selected racial/ethnic groups, is presented in Appendixes C-E.

<b>Weight Status</b>	<b>CCSD 2011-2012</b>	<b>CCSD 2012-2013</b>	<b>CCSD 2013-2014</b>	<b>NMAHES 2009-2010</b>
<b>All racial/ethnic groups</b>				
Overweight & Obese	43.0	41.2	39.8	33.2
Overweight Only	19.0	17.5	17.8	15.0
Obese Only	24.0	23.7	22.0	18.2
<b>Non-Hispanic White</b>				
Overweight & Obese	34.7	34.5	37.0	29.0
Overweight Only	16.6	17.0	17.1	13.8
Obese Only	18.1	17.5	19.9	15.2
<b>Non-Hispanic Black</b>				
Overweight & Obese	39.3	39.0	39.7	41.8
Overweight Only	19.2	16.1	17.4	16.1
Obese Only	20.1	22.9	22.3	25.7
<b>Hispanic</b>				
Overweight & Obese	49.7	46.8	45.4	41.7
Overweight Only	20.7	18.3	20.2	18.8
Obese Only	29.0	28.5	25.2	22.9

\*BMI Percentile ≥ 85

Although it is important to examine information at the local level, the ability to compare Clark County data to other local sources and national data is just as critical. NHANES is a survey program designed to assess the health and nutritional status of adults and children in the United States. The survey is unique in that it combines interviews and physical examinations. The examination component consists of medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel. Findings from this survey are used to determine the prevalence of major diseases and risk factors for diseases in the United States. NHANES findings are the basis for national standards for such measurements as height, weight, and blood pressure.<sup>5</sup> The ability to compare data collected in Clark County to national estimates, like the ones available from NHANES, provides a reference point to place local results into perspective.

From the NHANES survey conducted during 2009-2010, the prevalence of overweight or obese school-age children (aged 6-19 years) was estimated to be 33.2%.<sup>6</sup> In comparison, the CCSD data collected during 2011-2014 showed a higher proportion of overweight or obese Clark County students for all three years (ranging 39.8-43.0%). Furthermore, the proportion of overweight only and obese only students in Clark County during the same timeframe was also higher than the NHANES estimate. When comparing students sampled in Clark County to NHANES estimates by race/ethnicity, estimates in Clark County were generally higher than national values for non-Hispanic White and Hispanic students. For non-Hispanic Black students, the proportion of overweight and obese students was lower than national estimates. However, the proportion of overweight only students was equal or higher than for NHANES.

**TABLE 3 — Comparison of percentage of High\* BMI, Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014 and NHANES (6-19 years old, 2009-2010), Males only.**

Weight Status	CCSD 2011-2012	CCSD 2012-2013	CCSD 2013-2014	NHANES 2009-2010
All racial/ethnic groups				
Overweight & Obese	46.2	43.3	40.4	34.0
Overweight Only	18.1	16.9	15.8	14.2
Obese Only	28.1	26.4	24.6	19.8
Non-Hispanic White				
Overweight & Obese	36.5	36.1	38.1	31.1
Overweight Only	14.7	15.8	15.9	13.9
Obese Only	21.8	20.3	22.2	17.2
Non-Hispanic Black				
Overweight & Obese	38.4	33.0	37.1	38.8
Overweight Only	18.7	16.2	15.3	13.4
Obese Only	19.7	17.8	21.8	25.4
Hispanic				
Overweight & Obese	53.7	50.8	45.9	41.5
Overweight Only	19.4	17.4	16.6	16.2
Obese Only	34.3	33.4	29.3	25.3

\*BMI Percentile  $\geq$  85

When comparing students sampled in Clark County to NHANES estimates by gender, estimates for school aged males in Clark County followed a similar trend (Table 3). From 2011-2014, the proportion of male Clark County students who were overweight or obese was higher than the national estimate of 34.0%. Similar to students overall, the proportion of male non-Hispanic Black students who were overweight only was higher than for NHANES, but the proportion of obese only was lower.

**TABLE 4 — Comparison of percentage of High\* BMI, Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014) and NHANES (6-19 years old, 2009-2010), Females only.**

Weight Status	CCSD 2011-2012	CCSD 2012-2013	CCSD 2013-2014	NHANES 2009-2010
All racial/ethnic groups				
Overweight & Obese	39.4	38.8	39.1	32.4
Overweight Only	20.0	18.1	20.0	15.9
Obese Only	19.4	20.7	19.1	16.5
Non-Hispanic White				
Overweight & Obese	32.5	32.6	35.6	26.6
Overweight Only	18.6	18.6	18.5	13.6
Obese Only	13.9	14.0	17.1	13.0
Non-Hispanic Black				
Overweight & Obese	40.2	43.7	42.3	44.7
Overweight Only	19.7	16.0	19.4	18.6
Obese Only	20.5	27.7	22.9	26.1
Hispanic				
Overweight & Obese	45.2	42.7	44.8	40.9
Overweight Only	22.0	19.4	24.1	20.5
Obese Only	23.2	23.3	20.7	20.4

\*BMI Percentile  $\geq$  85

Overall, from 2011-2014, the proportion of female students in Clark County who were overweight or obese was also higher than the national estimate from NHANES (Table 4). Generally, the non-Hispanic White and Hispanic female students were higher than national estimates, regardless of weight category. However, the proportion of female non-Hispanic Black students who were obese was generally lower than national values.

Although available NHANES estimates do not stratify respondents by grade, it is important to note that when Clark County students were subset by grade level (Appendixes C-E), the proportion of overweight or obese students, as well as overweight only and obese only, was still higher than overall national estimates for school-age children.

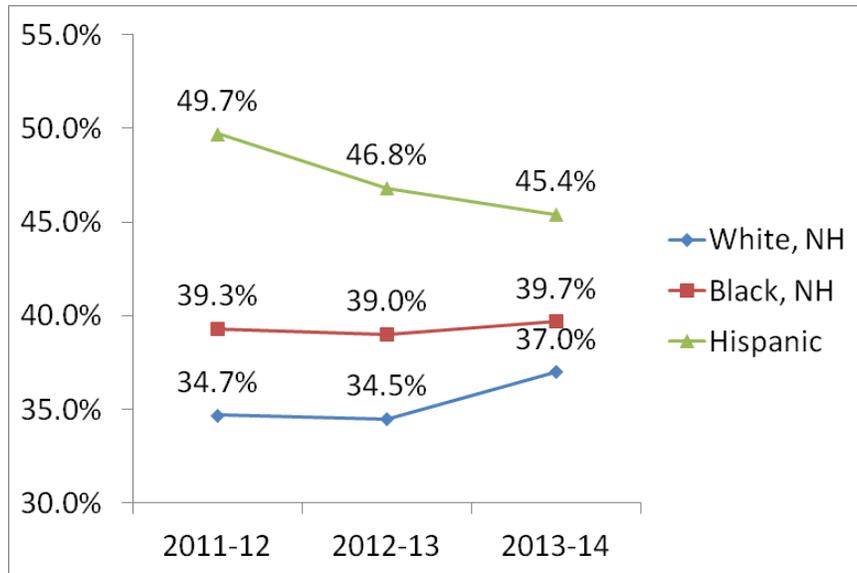
The YRBSS is another relevant survey. It captures data on six types of health-risk behaviors that contribute to the leading causes of death and disability among youth, as well as the prevalence of obesity and asthma among youth. The YRBSS includes a national school-based survey conducted by CDC along with surveys conducted by state, territorial, and local education and health agencies and tribal governments. It is conducted in the spring of odd-numbered years and results are released in the summer of the following year. Unlike the NHANES, the YRBSS relies on self-reported data to determine height and weight to calculate an individual's BMI.<sup>7</sup> As part of the CPPW project, a modified YRBSS survey that included standard YRBSS physical activity, nutrition, and tobacco questions was conducted in the fall of 2010 and spring of 2013 to assess baseline levels of certain health and risk behaviors at the beginning and end of the project period.



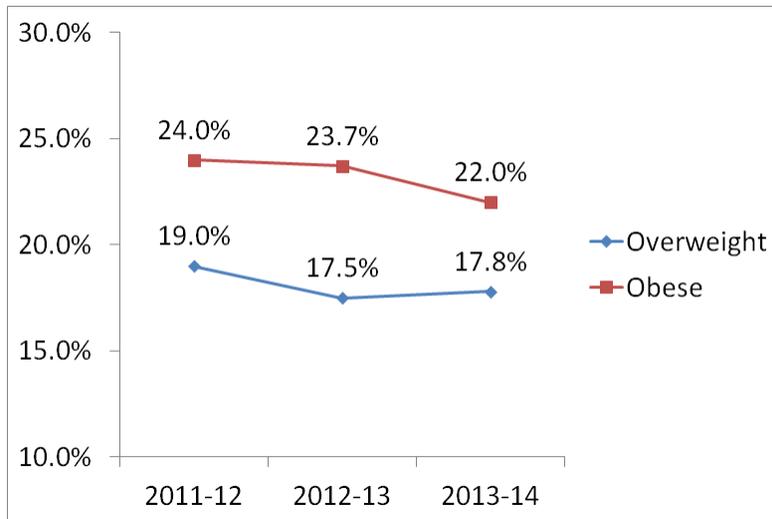
**TABLE 5 —**  
**Comparison of Percentage of High\* BMI,**  
**Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014) and NHANES (6-19 years old, 2009-2010), Females only.**

<b>Weight Status</b>	<b>2010-2011</b>	<b>2011-2012</b>	<b>2012-2013</b>	<b>2012-2013</b>	<b>2013-2014</b>
<b>OVERALL</b>	YRBSS	CCSD	YRBSS	CCSD	CCSD
Overweight or Obese	27.5	42.4	28.2	41.7	38.5
Overweight Only	15.9	18.0	14.4	18.9	17.8
Obese Only	11.6	24.4	13.8	22.8	20.7
<b>Males</b>					
Overweight or Obese	29.7	44.7	32.2	42.1	36.2
Overweight Only	16.2	17.8	13.7	16.1	14.1
Obese Only	13.5	26.9	18.5	26.0	22.1
<b>Females</b>					
Overweight or Obese	25.1	39.6	24.2	41.0	42.6
Overweight Only	15.6	18.4	15.1	22.4	12.8
Obese Only	9.5	21.2	9.1	18.6	29.8
<b>Non-Hispanic White</b>					
Overweight or Obese	20.8	32.9	22.6	40.0	34.4
Overweight Only	12.9	15.3	11.0	19.5	14.8
Obese Only	7.9	17.6	11.6	20.5	19.6
<b>Non-Hispanic Black</b>					
Overweight or Obese	35.9	41.0	31.5	47.5	41.5
Overweight Only	18.7	17.0	19.8	14.6	21.4
Obese Only	17.2	24.0	11.7	22.9	20.1
<b>Hispanic</b>					
Overweight or Obese	33.2	48.3	33.9	46.0	43.4
Overweight Only	19.4	20.0	16.3	20.1	21.7
Obese Only	13.8	28.3	17.6	25.9	21.7
<i>*BMI Percentile ≥ 85</i>					

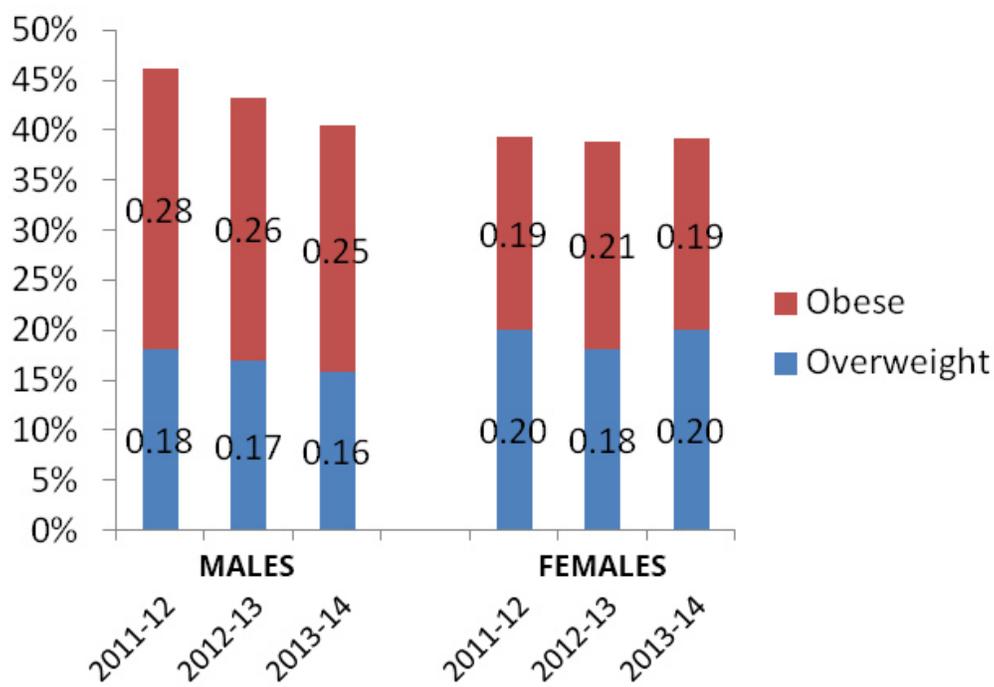
When comparing the self-reported data from the two special YRBSS administrations to physical measurements for selected 10th grade students, the results were higher in all but two categories (overweight only non-Hispanic Black 2011-2012 and 2012-2013) for physical measurements (Table 5). Because only 10th grade CCSD students were used for the comparison to YRBSS results, counts were too small to stratify by gender and race/ethnicity simultaneously.



**FIGURE 2 — Percentage of Overweight or Obese, Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014), by race/ethnicity.**



**FIGURE 3 — Percentage of Overweight or Obese, Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014), overall.**



**FIGURE 4 — Percentage of Overweight or Obese, Selected CCSD Students (2011-2012, 2012-2013, and 2013-2014), by gender**

In addition to comparing local data to other sources, we examined trends within the CCSD dataset itself. Overall, during 2011-2014, the proportion of students who were obese only was greater than those who were overweight only (Figure 2). When stratifying the data by race/ethnicity, Hispanic students had the highest proportion of overweight only and obese only individuals, while White non-Hispanic students had the lowest proportion for all three years of data collection (Figure 3). There was also a consistent difference when examining the data by gender. A greater proportion of males were obese only for the data collection period than females, while the proportion of females who were overweight only was consistently higher than the proportion of males who were overweight only during the same period (Figure 4).

## Discussion

### DATA COLLECTION

Because the need for uniform equipment and consistency in methodology between screeners was recognized, funds from the CPPW grant were allocated to CCSD prior to the 2011-2012 school year to establish a Prevention First position responsible for coordinating screenings with schools, developing a more robust data collection protocol, and conducting trainings for CCSD staff involved in data collection. Stadiometers and scales for selected schools were also purchased with CPPW funds. At the end of the CPPW funding cycle, the Prevention First position was not renewed but data collection did continue through the CTG funding cycle.

Although “Count Day” enrollment numbers are not as exact as attendance records for the days that height and weight screenings are conducted, they do provide a point of reference to compare what proportion of the selected student population was captured during the screening process. During 2011-2012, the year the Prevention First staff

**TABLE 6 — Comparison of Measured and Registered Students at Selected CCSD Schools (2011-2014), (measured/registered)**

School	2011-2012	2012-2013	2013-2014
A Tech	257/258	234/304	268/322
Rex Bell Elementary School	149/133	104/118	43/116
M. J. Christensen Elementary School	122/105	106/118	57/87
Del Sol High School	526/481	355/459	208/469
P. A. Diskin Elementary School	107/92	95/113	79/101
Victoria Fertitta Middle School	418/483	339/482	385/499
Roger D. Gehring Elementary School	172/133	108/106	68/103
Lomie Gray Heard Elementary School	90/89	81/95	56/81
Marc A. Kahre Elementary School	88/89	68/86	52/74
Clifford J. Lawrence Junior High School	450/494	369/482	336/503
Jacob E. Manch Elementary School	140/119	95/135	175/121
Mojave High School	399/534	312/537	228/565
D'Vorre & Hall Ober Elementary School	163/135	112/69	128/125
Dell H. Robison Middle School	355/381	302/378	193/366
Lewis E. Rowe Elementary School	125/116	101/110	43/100
Wayne N. Tanaka Elementary School	135/149	148/168	112/160
Vegas Verdes Elementary School	44/72	62/71	21/81
Thurman White Middle School	435/477	393/473	369/473
Gwendolyn Woolley Elementary School	128/104	129/135	96/116
Clark County School District Overall	4303/4444	3513/4439	2917/4462

member was available to coordinate the screenings (which were performed by nurses), the proportion of the student population that was captured and for which valid observations were recorded, when compared with expected “Count Day” numbers was nearly 97%. However, in the subsequent years when the Prevention First position was no longer funded (and the nurses were no longer prompted to record heights and weights), that proportion decreased to 79% (2012-2013) and 65% (2013-2014), respectively. Although the initial data collection plan developed by NSHD placed the responsibility of screenings on school nurses, the decline in the proportions of students who were measured for height and weight from 97% to 65% after nurses were no longer prompted to perform these measurements suggests that a different group of individuals may be better suited to conduct height and weight measurements. As part of CTG funding, physical education teachers were selected to conduct height and weight screenings for 3rd, 6th, and 9th grade students as BMI is calculated as part of some physical fitness assessments. However, those data are not available for presentation in this report as consent to publish those values as part of a publication was not obtained from participants. Theoretically, physical education teachers would have a higher probability of measuring 100% of students as they should have multiple opportunities during the course of a school year, while school nurses might only encounter students on days when vision and hearing screenings are conducted.

## DISTRIBUTION OF SAMPLE

When interpreting and applying the results of this analysis, it is important to keep in mind that the data presented are from a convenience sample of Clark County students. Students were selected for screening based upon the timing coinciding with other current screenings required for students during the 4th, 7th, and 10th grade years. Common criticisms of convenience sampling are sampling bias and that the sample selected was not representative of the entire population.<sup>10</sup> Therefore, while the estimates shown here provide an anecdotal perspective on the current weight status among CCSD students, they may not be generalizable for the entire CCSD student population and have low external validity. However, should the responsibility for height and weight data collection be shifted from school nurses to another group, such as physical education teachers, a more valid estimate of weight status among school aged children could theoretically be calculated as a larger number of students could be screened. This would provide invaluable information to help target specific subpopulations for improved health.

Differences in factors such as socio-economic status could also affect the comparability of schools included in the sample. NHANES estimates showed that low-income children and adolescents are more likely to be obese than their higher income counterparts.<sup>11</sup> Eligibility for free or reduced lunch is one common indicator of poverty status. Table 7 shows the percentage of students in sampled schools eligible for Free/Reduced Lunch, compared to overall district eligibility.



**TABLE 7 — Percentage of Students Eligible for Free/Reduced Lunch Among Sampled CCSD Schools, 2011**

School	Percentage Eligible
Clark County School District (Overall)	50.8
A Tech	3.8
Rex Bell Elementary School	85.7
M. J. Christensen Elementary School	44.4
Del Sol High School	58.0
P. A. Diskin Elementary School	70.7
Victoria Fertitta Middle School	35.8
Roger D. Gehring Elementary School	42.7
Lomie Gray Heard Elementary School	24.8
Marc A. Kahre Elementary School	46.1
Clifford J. Lawrence Junior High School	47.4
Jacob E. Manch Elementary School	89.7
Mojave High School	54.9
D'Vorre & Hall Ober Elementary School	21.9
Dell H. Robison Elementary School	80.1
Lewis E. Rowe Elementary School	73.2
Wayne N. Tanaka Elementary School	39.8
Vegas Verdes Elementary School	90.3
Thurman White Middle School	46.9
Gwendolyn Woolley Elementary School	84.6

Source: Nevada Annual Reports of Accountability<sup>12</sup>

The percentages provided in Table 7 show that some sampled schools had a proportion of students eligible for Free/Reduced Lunch that was higher than the overall eligibility for CCSD. While eligibility for Free/Reduced Lunch is available publicly at the school level, that information was not available to SNHD on an individual basis for sampled students. Access to this information would allow the sample to be compared to the overall Free/Reduced Lunch eligibility for CCSD to determine if the sample is biased towards students from low-income families.

## DATA SOURCES

When comparing the heights and weights specifically collected for this analysis to other height and weight data sources for CCSD students, we observed that the proportions of students with unhealthy weights were higher than the other data sources show. However, in the case of the 2010 and 2013 CPPW YRBSS estimates, height and weight data were self-reported by students and not measured. Some research has shown that bias in reporting weight and height can be much greater among overweight or obese adolescents than among normal/underweight adolescents.<sup>13</sup> The ability to measure height and weight data, as opposed to relying on self-reported data from students, can provide much more accurate data on which to base decisions regarding policies and programs. While the YRBSS is a representative sample of high school students, it does not provide information on elementary or middle school students. The ability to track students through time to monitor weight status also helps provide a more accurate picture of weight trends. Currently our sample design only allows for collection of cross-sectional data at selected schools. Therefore, the conclusions that can be drawn from the results of the data are not generalizable beyond the school level. Adding grade levels to the screening program would enhance the ability to track student height and weight trends longitudinally. Extending the screening program to more schools would improve the representativeness of the data across CCSD. These expansions would enable additional assessments to be performed, including making more extensive comparisons with YRBSS data. Collecting additional data would expand the ability to assess combinations of factors associated with overweight and obesity, including potentially beneficial effects of interventions, specifically among CCSD students.

## RECOMMENDATIONS

Unhealthy weight among school-aged children in Clark County has become a significant issue and data collected as a part of AB 354 and 191 show that the problem in Clark County is more severe than nationally, on average. Overweight children and adolescents are more likely to become overweight or obese adults.<sup>14</sup> Overweight children are at risk for a number of diseases and conditions, including diabetes, cardiovascular disease, and certain types of cancers as adults.<sup>15</sup> Schools can play an important role in preventing obesity because >95% of young people are enrolled in schools.<sup>16</sup> We recommend continuing to monitor the weight status of CCSD students and expanding the program over time as funding becomes available. These actions would allow for continued and improved identification of subgroups at greatest risk for obesity. They would also allow school administrators to monitor the effects of school-based physical activity and nutrition programs and policies and allow for greater accountability of the objectives of those programs and policies. Additionally, information obtained from regular, large scale screenings could be used in grant applications to secure future funding opportunities. However, the ability to do so would depend on collecting the most accurate and reliable data possible. Although the process would require a continuous investment of financial and human resources, the benefits of this type of surveillance outweigh the initial cost of creating and maintaining a surveillance system for monitoring weight status.

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**APPENDIX A — Selected Schools for Height and Weight Data Collection**

<b>Elementary</b>	<b>Middle / Junior</b>	<b>High</b>
Rex Bell	Victoria Fertitta	A Tech
M. J. Christensen	Clifford J. Lawrence	Del Sol
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**APPENDIX B —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

**BODY MASS INDEX DATA COLLECTION  
PROCEDURES TRAINING MANUAL FOR  
PHYSICAL EDUCATION TEACHERS**

Guidelines for Measuring Height and Weight in  
Clark County School Children

**CLARK COUNTY SCHOOL DISTRICT**

This manual is written through a grant from the Centers for Disease Control and  
Prevention's Communities Putting Prevention to Work Initiative and in collaboration with  
coalition partners including:

SOUTHERN NEVADA HEALTH DISTRICT

STATE OF NEVADA HEALTH AND HUMAN SERVICES DIVISION

NEVADA DEPARTMENT OF AGRICULTURE  
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Guidelines for Measuring Height and Weight in Clark County School Children**

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**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children****Introduction**

The purpose of this training manual is to provide guidance to physical education teachers who will be measuring the height and weight of students in their school environment. The intent of collecting this data is to determine prevalence and identify patterns in Clark County School District (CCSD) students. Data collected will be used to create policies and programs that promote healthier environments for CCSD children. The height and weight data collected will not be used for diagnosing any individual student with a weight problem.

Growth is a primary health indicator in school-aged children. It is a simple way to identify expected physiological development and determine healthy lifestyle, which includes nutritional status, environmental conditions and adequate physical activity. When improper growth occurs, an underlying medical problem may be the cause. Identification of abnormal growth in the school-age child can facilitate early intervention, often resulting in treatment outcomes that are more successful. In addition, mostly overlooked or unmentioned, but immeasurably important, are the social stresses of atypical growth. Particularly the potential negative social interactions, teasing, bullying, alienation, withdrawal, and psychological development implications; poor self-concept, poor self-esteem, ineffective coping, and resulting suffering (Partners for Healthy Growth: Resource Kit, 2002).

Typical growth is signified by appropriate increases in height and weight. Precise biometric data collection of height and weight are essential to accurate body mass index (BMI) calculation. BMI measures weight in relation to height; age and sex are considered. It is a tool to indicate the level of body fat relative to lean body tissue. The information can also assist in identifying increased risk of morbidity and mortality (this includes disease, disability, poor health, diminished quality of life, and death), help establish criteria for individual and community interventions, identify changes and trends across certain populations, provide evidence of the effectiveness of community health intervention and determine the need for change in public policy. Ultimately, high quality evidenced-based BMI data is a powerful tool that will influence how health dollars are directed for education programs and public health.

Research indicates that regardless of the number of years of experience that an individual has collecting height and weight data, experienced staff benefit from regular training and measurement accuracy increases. "Many measurers believe the procedures to be so straightforward and obvious that they do not require any training to accurately perform the measures. However, standardization exercises have demonstrated that even experienced measurers can be inaccurate or even careless in performing weight and length or stature measurements" (U. S. Department of Health and Human Services, Health Resources and Services Administration, Division of Science, Education and Analysis, 1997).

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children****Population Screened**

The Nevada Legislature mandates height and weight measurement on a representative sample of elementary, middle or junior high, and high school students. The Clark County School District (CCSD) and the Nevada State Health Division (NSHD) have designated students in grades 4, 7, and 10 for this screening; for the purposes of the NSHD study, the NSHD identified a representative sample of students via a selection of 19 schools. Data collected pursuant to NRS 392.420 are the property of CCSD and may be shared with the NSHD in a limited manner after all identifying components have been carefully protected according School District and Federal policy. These policies are in accordance with the Family Educational Rights and Privacy Act (FERPA).

CCSD was recently awarded the Community Transformation Grant (CTG) which will add 31 additional schools to collect BMI data through the physical education department. Physical education teachers will measure students in grades 3, 6, and 9. The data collected through the CTG grant will be shared with the Southern Nevada Health District and will be in compliance with FERPA.

The data is primarily used to monitor trends in child growth, estimate prevalence of overweight and obesity in the student population, and examine associations between BMI, health, physical activity, and nutrition. Other than pregnant females, there are no medical, safety, or other exclusions for the height and weight measurement protocol. All declines are documented as excluded to determine the number of students that were not included in the population.

**Equipment**

The equipment and technique for taking the measurements must be similar for all BMI CTG surveillance schools to ensure uniformity of data collected. In order to ensure accuracy, the Curriculum and Professional Development Division (CPDD) will provide the following equipment to each identified school: PD-100 Digital Scale, Digital Scale A/C Power Adapter, Digital Scale Carrying Case, Seca 213 Stadiometer, SECA Stadiometer Carrying Case, and a Lufkin Self-Centering 25' L725SCT tape measure. The provided equipment will be used for all height and weight measurements collected. The equipment is property of CPDD and must be checked out by an individual physical education teacher.

**Verification of Accuracy****Stadiometers**

Stadiometers are used at all of the schools reporting data to the NSHD and all CTG grant identified schools may have accuracy verified before measurements are collected. This procedure involves checking the stadiometers with the same tape measure. Each school site will have one Lufkin Self-Centering 25' L725SCT tape measure that is to be used only for this purpose. It is important that while using the tape measure, the blade is

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

never allowed to rapidly recoil and slam into position. A rubber band is to be kept in placed around the end of the tape to protect the metal end piece. Do not use a measuring device if the end piece or any part of the tape becomes loose or damaged.

1. With the stadiometer assembled and the bar free standing, place the calibration device (rod or tape measure) with the bottom metal piece flat on the foot plate.
2. Verify that the inch indication marks match the measurement standard device at all four connection points or check accuracy at a minimum of three points.
3. Check at the 22 inch (“), 44”, and 66” marks.
4. Complete the Inventory Loan Form. (Exhibit A)
5. Return equipment and completed Equipment Verification Logs to the K–12 Physical Education Coordinator located at the Curriculum and Professional Development Division by the end of the school year.

### Digital Scales

Verification of accuracy procedures requires six 25 pound certified weights. All calibration will be done at CPDD.

1. Check that the scale is level, with the air bubble in the center of the circle.
2. Press the ON/OFF key. The display will show all digits, the software version (UEr0.0), and then a small o moves across the top of the display until a stable zero is established (0.0).
3. Once the display shows 0.0, place two certified 25-pound weights in the center of the scale. The scale should read 50.0
4. Add weights to 100.0 and 150.0
5. For 0-100 pounds accuracy must be within 0.2 pounds.
6. For 100-200 pounds, accuracy must be within 0.4 pounds as consistent with the Nevada Department of Agriculture Department of Measurement Standards. (National Institute of Standards and Technology, Weights and Measures Division, 2010)
7. If the scale is inaccurate (by more than 0.2-0.4 pounds) it must be calibrated.
8. Calibration means resetting the device to accurate measurements according to the manufacturer’s instructions.
9. Document the scale serial number and “pass” or “action taken” in the comment section. Use the Inventory Loan Form found in Exhibit A.
10. If the scale is dropped or exposed to an impact it will need accuracy verified before use to determine if calibration is necessary. Please handle equipment with care.

**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

## Assembly

### Seca 213 Stadiometers

The portable stadiometer is a collapsible device with 7 parts; a sliding head piece, a foot plate, a top lean cap, and four connecting rods marked with a measured scale. Please take great care of this equipment. It is delicate and expensive. Particular care needs to be paid when assembling, dismantling, and repacking for storage.

1. Assemble the parts carefully and slowly with the foot plate close to a wall.
2. The extension with the red word Seca is inserted into the foot plate. The pieces assemble in one direction. Match the circles, triangles, and diamonds at each connection. Attach the head piece after the second extension is in place. Attach the top lean cap before inserting the final extension. The cap points backwards towards the wall. Never force the pieces together. They are designed to connect smoothly.
3. Check that the extension connections match at the circles, triangles, and diamonds. After the pieces are assembled the accuracy should be verified in order to detect faulty equipment or assembly errors before measurements are collected. Each study school will be provided with one tape measure to be used for verification of accuracy of stadiometers.
4. Check that there are no cracked or broken parts and that the head piece slides easily.
5. Place the stadiometer with the bar towards a wall. The bar should be free standing, and the top lean device should not touch the wall.
6. Do not attempt measurements with a stadiometer that is broken or damaged.

### PD-100 Digital Scales

1. Plug the A/C adapter into the receptor on the side of the scale base. (Before using the A/C adapter be sure that batteries are NOT in place.) Use batteries, if a power source is unavailable in the screening area, OR the A/C adapter, NEVER BOTH. This will damage the scale.
2. Carefully turn the scale over with the foot plate on the floor.
3. Locate the battery access cover on the bottom of the base.
4. Remove the cover, install six (6) "AA" size batteries and then replace the cover. (The school nurse should have six unused AA batteries available as a backup.)
5. Always place the scale on a flat, level floor or low cut carpet away from heating or cooling vents.
6. Check that the scale is level. If the scale is not level the bubble will not be in the center of the level indicator. This is a circle at the top-center of the foot plate. If the scale needs adjustment, loosen the locking ring on all four (4) feet and adjust them as required to center the dot to attain a level scale. Once the scale is level, lock the feet in place by tightening the adjustment locking rings against the bottom of the scale.

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

7. Press the ON/OFF key. The display will show all digits, the software version (UEr0.0), and then a small o moves across the display until a stable zero is established (0.0).
8. Always wait for the display to show 0.0 and a small word ZERO before the student steps onto the scale.
9. When the small letters STA are displayed, the weight is stable and the measurement can be recorded.
10. Press the ON/OFF key to turn the scale off.
11. The digital display unit has a plastic backing for wall mounting or table top placement. Carefully attach the four extension feet to stabilize table top placement. When wall mounting the display unit attach the 4 extension feet inside the backing for storage. Refer to the manual for details.
12. **IMPORTANT!** Any time a scale is moved or re-located, be sure to check that the scale is level before collecting measurements.

### Dismantling

When properly assembled, Seca Stadiometers are designed with handles for carrying short distances. Use the black Seca bag to store the stadiometer and transport to different sites. The black SECA bags have two sections. Place the stadiometer on the side that has the red word "SECA" for best fit.

1. Dismantle the stadiometer slowly and carefully.
2. Do not bend the headpiece or base plate.
3. Do not bend the extensions.
4. Do not drop it, and be careful not to knock the corners of the extensions or the footplate connection point.
5. For storage, turn the footplate upside down and set the top lean cap into the indicated slot first.
6. Then set the headpiece into the marked location.
7. Attach each rod with the opening under the plastic lip and gently snap the protruding end into place as the diagram on the footplate indicates.
8. With all four rods snapped in place the stadiometer is secure for hand carrying or storage in the Seca bag and/or original box.

PD-100 Digital Scales do not disassemble, except for the digital display unit mounting bracket parts. Keep any unused parts with the scale manual in a large manila envelope. Store the manila envelope in a labeled file so that it can be easily located if needed.

**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children****Maintenance and Storage**

Care includes cleaning the scale and stadiometer with a clean damp cloth as needed. Mild soap may be used with a damp cloth if necessary. Footplates become quite dirty and will need to be cleaned often when debris accumulates and after every screening day. If the stadiometer head piece does not slide smoothly, be sure to clean the bar. If the scales are not zeroing but stabilizing at 0.2, clean the foot plate. Never use acetone, thinner, or solvents for cleaning. Do not expose equipment to temperature extremes. If your school has a scale or stadiometer that is not in use, store it in the carrying case and store in a safe and secure location. Any lost equipment will be replaced by the responsible party.

**Quality Control**

It is critical to remember that assessment of students is only as good as the data. It is important to know that all measurements are imperfect and that some measurement error is unavoidable. The most common sources of error from physical measurement data are due to inadequate equipment, unacceptable technique, or recording error. Because this data is critical to individual as well as community health determinations, there is good reason for scrupulous adherence to details and consistent implementation of method. Our best efforts aim to eliminate or consistently maintain controllable variables. When collecting biometric measurement data precision is very important because there are so many factors that can't really be controlled. Consider these obvious factors: weight of clothing (based on environmental temperature), whether food has been ingested (before lunch would logically weigh less than after lunch), where a menstruating female is in her cycle, if significant perspiration has recently occurred (as in before and after physical activity), level of hydration, time of day (spinal disks compress during the day and rehydrate during sleep resulting in decreased height at the end of the day), whether or not the bladder and bowel are empty or full, certain hair styles, and body jewelry or accessories.

**Reliability**

Reliability is addressed with training, practice, repeat measurements, and observations. It is important to remember that measurements may vary to a certain degree, and it would be unusual if the readings were always the same.

1. All individuals collecting height and weight data will be trained and provided opportunity to practice the technique before screening students. Training will be prior to screening of students. CTG identified physical education teachers will attend a mandatory training prior to taking measurements.
2. If reliability is being assessed:
  - a. One class will be randomly selected on each screening day. This class will be

**APPENDIX B (CONTINUED) —****Guidelines for Measuring Height and Weight in Clark County School Children**

a test/retest group. Measurements will be collected once, the students will step off/away from the measuring device, the device will be zeroed, the student will be repositioned on the same equipment, and the measurement will be collected a second time by the same screener. If the two values differ by (weight  $\geq 0.2$  pounds and height  $\geq 0.25$  inch) a third measurement will be taken and the two closest numbers will be averaged. Document all measurements collected.

b. A trained screener will observe measurement procedures and take some random replicate measurements. This provides an opportunity to identify and correct errors data collection technique. These measurements will be collected immediately after the screener collects the first measurement. The equipment will be zeroed and the physical education teacher will then immediately reposition the individual on the same equipment and a second measurement will be collected.

c. Class rosters must be printed prior to the collection of data and measurements will be recorded on the roster. Secure the completed roster in safe location.

d. The recorded data will be collected by the CTG Project Facilitator.

**Common Errors**

The height and weight collection methods used at CCSD along with multiple other protocols were reviewed prior to developing this training manual. Reliability and validity were specifically considered. Rigor has been improved with the new protocol. Items addressed include anecdotal observations from CCSD School Nurses, which coincide with the issues found in the literature to be the most common to interfere with measurement accuracy. The most common difficulties and suggested interventions are listed below.

1. Amount of clothing – Students are instructed to remove shoes, wear only one top outer garment (pants and skirts are not to be removed) and empty their pockets before measuring.
2. Hair styles— Students are instructed to remove any hair ornaments and undo any hair styles that may interfere with measuring from the top of their head (if it is within reason to do so and the student does not object). The head piece will be positioned with sufficient pressure to compress the hair.
3. Managing students when measurements are taken— Volunteers and teachers are encouraged to assist during the measurements.
4. Data collection documentation paperwork errors— Routinely document height first and weight second. Student class lists need to be consistent, with spaces for height measurements first and weight measurements second, just as they are to be entered into the Healthmaster. Also include an additional comment space for refusals, body weight greater than the scale's capacity, interfering hair styles, or any other pertinent information.

**APPENDIX B (CONTINUED) —****Guidelines for Measuring Height and Weight in Clark County School Children**

5. Equipment— Height and weight equipment will be standardized for schools collecting BMI data reported to the SNHD, with back-ups available should equipment failure occur. All equipment will have the accuracy verified in conjunction with the State of Nevada Department of Agriculture’s Division of Measurement Standards on a yearly basis and as needed. The procedure for accuracy verification is outlined in this document. The responsibility to calibrate the PD-100 Digital Scales falls under CPDD staff. All screeners will be trained on proper use and maintenance of equipment.

**Screening Preparations**

Prior to data collection, discuss the BMI project with the school nurse. Physical education teachers identified through the CTG grant will schedule pre-measurements and post-measurements. Pre-measurements will be given during the first two weeks of class. Post-measurements will be given at the end of the class. Please be advised that post-measurements are taken at different times depending on the grade level. Elementary and high schools will take post-measurements at the end of the year while middle schools will take measurements at the end of each semester. Permission is requested of parents/guardians to collected measurements of students (Exhibit B). One or two days before the screening print class lists from SASI. Use a method to generate class lists that will work best for each school site.

**Measurement Procedures****Sensitivity Considerations**

Use care to establish rapport with the student and handle the measurement procedure in a matter-of-fact way. It is the screener’s responsibility to make the student feel comfortable about the measurements being taken and to recognize that the student can decline at any time. If this should occur, handle it in a light-easy manner, and tell the student that it is perfectly okay, without placing any pressure on him/her. Be non-judgmental and reaffirm the student’s right to choose to refuse participation. Always respect privacy; it is an expectation, not an option (National Association of School Nurses, 2006). **Ensure that the screening area provides adequate privacy so that only screeners observe the results. Do not read measurements aloud.** No other students are allowed to hear results. Treat the results as confidential health information, taking care that data documentation is also kept confidential. This does not prohibit the physical education teacher from informing the student of his or her results, but do not comment on the height or weight measurements taken (National Association of School Nurses, 2006).

**Suggested Comments/Instructions to Students**

Be sensitive to the students and use neutral comments.

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

Before collecting measurements

- “I’m going to take two measurements – your height and your weight.”
- “The numbers will not be read aloud, but you may write them down.”
- “Please take off your shoes, empty your pockets, and remove multiple layers of clothing. Do not take off your socks, and leave on one shirt along with your pants or skirt.”
- “Please remove hair ornaments and undo hair styles, if possible, that interfere with measuring from the top of your head.”

Height

- “Please stand on the center of the base with your back to the bar.”
- “Put your feet together and move them until your heels touch the back.”
- “Stand with your buttocks and shoulders just touching the bar.”
- “Look straight ahead.”
- “Please raise (or lower) your chin.” (If student’s head is not horizontal)
- “Take a deep breath, hold it for a few seconds, and stand up straight.”
- “That’s fine; you can step away from the bar.”

Weight

- “Please step onto the center of the scale with your weight on both feet.”
- “Relax and don’t move. Thank you.”
- “You can step off the scale now.”

Before the test/retest group

“I’m going to take two repeat measurements of your height and two of your weight, and if these measurements are very different you will be measured a third time.”

“First I’ll measure your height and have you step away from the measuring device. Then you will be repositioned, and an additional height measurement will be done. Then I’ll do the same for your weight.”

“Some students will have one screener measure first then another screener measure second.”

### **Measurement Protocol for Student Height and Weight Screening**

This screening is completed as a component of all initial health assessments and for all 3<sup>rd</sup>, 6<sup>th</sup> and 9<sup>th</sup> grade students participating in body mass index (BMI) data collection. Privacy may require the use of screens. In addition, a table should be available for students to empty pockets.

#### **Height**

Definition: Height is the perpendicular distance between the top of the head (the vertex) and the bottom of the feet.

1. The first step is to let the student know what you are going to do. See Student Instruction/Comments Suggestions.

**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

2. Student should step onto the measurement area with heels together and placed at the back of the measurement surface. Arms should hang loosely at the side, legs should be straight, shoulders should be relaxed, and the student should look straight ahead. The head should be horizontal. If the head is not aligned properly (often it won't be), request the student raise or lower the chin. See Exhibit C.
3. The heels, buttocks, and shoulders should just touch the vertical surface of the measurement area (e.g., the wall or stadiometer). See Exhibit D.
4. The head may, but does not have to, touch the stadiometer bar.
5. Instruct the student to stand up tall, take a deep breath, and hold it for a few seconds. Then slide the headpiece down.
6. The headpiece should compress the hair, and it should be level.
7. Read the height at the screener's eye level. If the student is as tall as or taller than the screener use a stool, or if the student is shorter kneel down as indicated to achieve eye level.
8. Immediately document the measurement, before moving the headpiece, or zeroing the stadiometer. If hairstyle or ornaments interfere with measurement, enter value observed, add exempt to the RAD (R), and enter a note in comments. Height will be rounded up to the nearest quarter inch. If the screener wishes, he or she may use eighth inch measurements, but ensure that the correct decimals listed below are documented in Healthmaster.

1/8 inch = **0.125**

3/8 inch = **0.375**

5/8 inch = **0.625**

7/8 inch = **0.875**

2/8 inch = **0.25**

4/8 inch = **0.50**

6/8 inch = **0.75**

8/8 inch = **1.00**

Tolerance of a Measure: Acceptable Error— If two values vary (weight >0.2 pounds or height >0.25 inch), take a third measurement. Enter all values collected in individual growth exam visits.

**Weight NEVER READ ALOUD**

Definition: Weight is the force the matter in the body exerts in a standard gravitational field.

1. Always place the scale on a flat-hard surface or low, dense carpet.
2. Wait for the scale to reach zero and display 0.0 before taking measurements. (Clean the foot plate with a damp towel if the scale is not zeroing.)
3. Ask the student to stand on the center of the scale without support, with their arms loosely by their sides, head facing forward, and with their weight distributed evenly on both feet.
4. Take the measurement when the scale stabilizes. Immediately record the numbers exactly as they appear on the digital display. **Document weight to the 0.1 pound;** do not round numbers.
5. If body weight exceeds the scale's maximum (record the weight at 440.00 lbs.), if accurate weight cannot be collected due to interfering item such as a cast, brace, etc. (enter displayed value), add exempt to the Healthmaster RAD (R) results/outcome, and enter a note into the Healthmaster comment section.

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

### **Understanding BMI Data**

Growth is best monitored over time. As children grow they typically stay along the same percentile line or within the same channel between percentile lines. If previous measurements are available, the nurse may note any changes in the growth percentile or growth channel. Children from 2 years of age until puberty (between 11-13 years of age) generally grow 2-2.5 inches a year. During puberty, (about 2 years) growth is rapid and variable, girls may grow 2.5 to 4.5 inches and boys may grow 3 to 5 inches. In general, growth stops when the growth plates fuse. This occurs on average at 13-15 years of age for girls and 14-17 years of age for boys (Welch, Reed, & Manning, 2002).

If the BMI is  $\geq 85$ th percentile for age and gender but  $< 95$ th percentile it falls in the overweight range, a BMI  $\geq 95$ th percentile for age and gender falls in the obese category, and a BMI  $< 5$ th percentile would be considered in the underweight range (National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion, 2010). Due to the complex and variable conditions of growth in children, precise measurements are critical. When a student's BMI falls into these categories, or if either height or weight individually are  $\geq 95$ th percentile or  $< 5$ th percentile, the measurements should routinely be rechecked by the site nurse. A referral may be sent home notifying the parents or guardians of the results.

**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

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**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

**Exhibit List**

1. **Exhibit A – Inventory Loan Form**
2. **Exhibit B - HS-112 Parent Notification Letter**
3. **Exhibit C - Frankfort Horizontal Plane Diagram**
4. **Exhibit D - Standing Position Diagram**

**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

Exhibit A

**INVENTORY LOAN FORM**

**School Year** \_\_\_\_\_

Issued to: \_\_\_\_\_ School Phone: \_\_\_\_\_

School Location Name and Number: \_\_\_\_\_

Pick up Date \_\_\_\_\_ Return Date \_\_\_\_\_

Issued by (please print name of CPDD Staff): \_\_\_\_\_

Signature: \_\_\_\_\_

**The BMI Equipment will be loaned out for one full year. Signature of Site Administrator is required.**

*I understand that I am accepting the responsibility for paying for any damages to this equipment while it is removed from CPDD district premises, including the cost of replacing the equipment if damaged beyond repair or lost. I further agree to return this equipment on the above due date.*

Signature \_\_\_\_\_ Date \_\_\_\_\_

Administrator \_\_\_\_\_ Date \_\_\_\_\_

-----  
**CPDD USE ONLY**

Returned by (please print name): \_\_\_\_\_

Return Date: \_\_\_\_\_

CPDD Staff Signature: \_\_\_\_\_

**Equipment Received:**

- Digital Scale (PD 100)**
- Digital Scale Carrying Case**
- Digital Scale A/C Power Adapter**
- Stadiometer (Seca 213)**
- SECA Stadiometer Carrying Case**
- Lufkin Self-Centering 25' L725SCT tape measure**

**APPENDIX B (CONTINUED) –**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

Exhibit B

**Clark County School District**

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**Curriculum and Professional Development Division**  
**K–12 Physical Education**

**Height/Weight Measurements**  
**Parent/Guardian Permission Form**

**Date:**

Dear Parent/Guardian:

Your child's physical education department has been chosen to be part of the Community Transformation Grant. One of the requirements of this grant is to change physical education instruction by making the connection between student height and weight measurements to the intensity level that occurs during physical education instruction. CCSD is looking to obtain permission from the parent/guardian of students who attend physical education where height and weight pre- and post-measurements will be taken.

Students to be measured are in grades 3<sup>rd</sup>, 6<sup>th</sup>, and 9<sup>th</sup>. Height/weight screening results will be reported to the Southern Nevada Health District (SNHD), who shall compile the information in order to monitor the health status of Clark County School District children. Identifying information relating to individual children will be excluded. The procedure for height/weight collection follows the recommendations of CCSD's Health Division. Your child's trained physical education teacher will measure height and weight. Student privacy will be maintained within the constraints of the school setting.

If you approve of your child's height and weight pre- and post-measurements to be taken during physical education, please indicate your approval by signing this permission form below on the appropriate line.

Keep this portion of the letter for your reference.

.....

Please complete this form and return it to your child's physical education teacher.

Please check:  Yes, I want my child to be measured for height and weight.

No, I do not want my child to be measured for height and weight.

Child's name: \_\_\_\_\_

Parent and/or guardian's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please contact Shannon La Neve, Coordinator K–12 Physical Education if you have any questions about the project.

**APPENDIX B (CONTINUED) —**  
Guidelines for Measuring Height and Weight in Clark County School Children

Exhibit B

**Distrito Escolar del Condado de Clark**

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**Servicios de Salud**

**Revisión de la Estatura/Peso  
Carta de Notificación para los Padres**

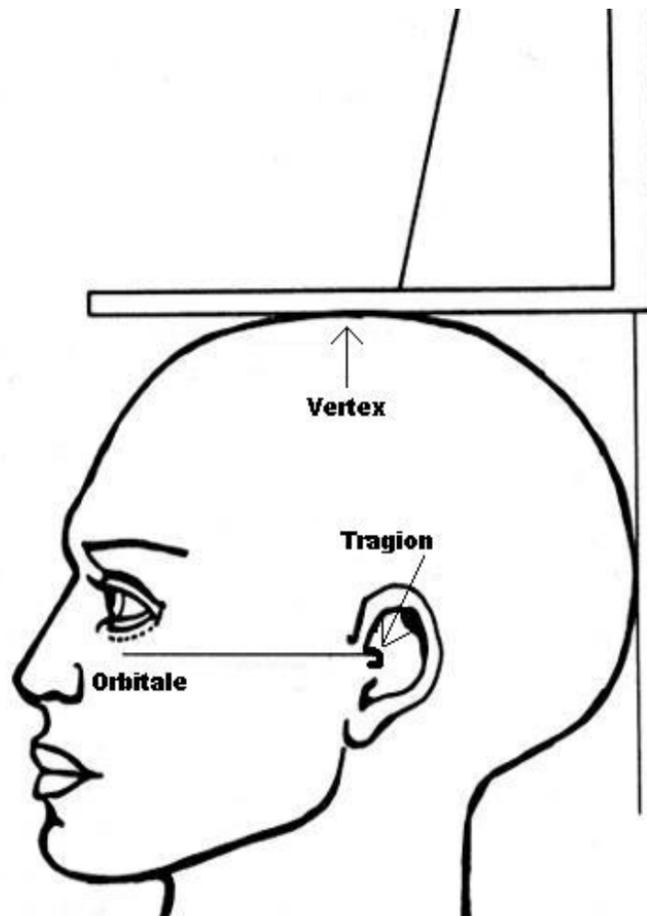
**Fecha:** \_\_\_\_\_

**APPENDIX B (CONTINUED) —**  
Guidelines for Measuring Height and Weight in Clark County School Children

Exhibit C

**Exhibit C: Frankfort Horizontal Plane**

Source: Adapted from the ISAK Manual, 2001

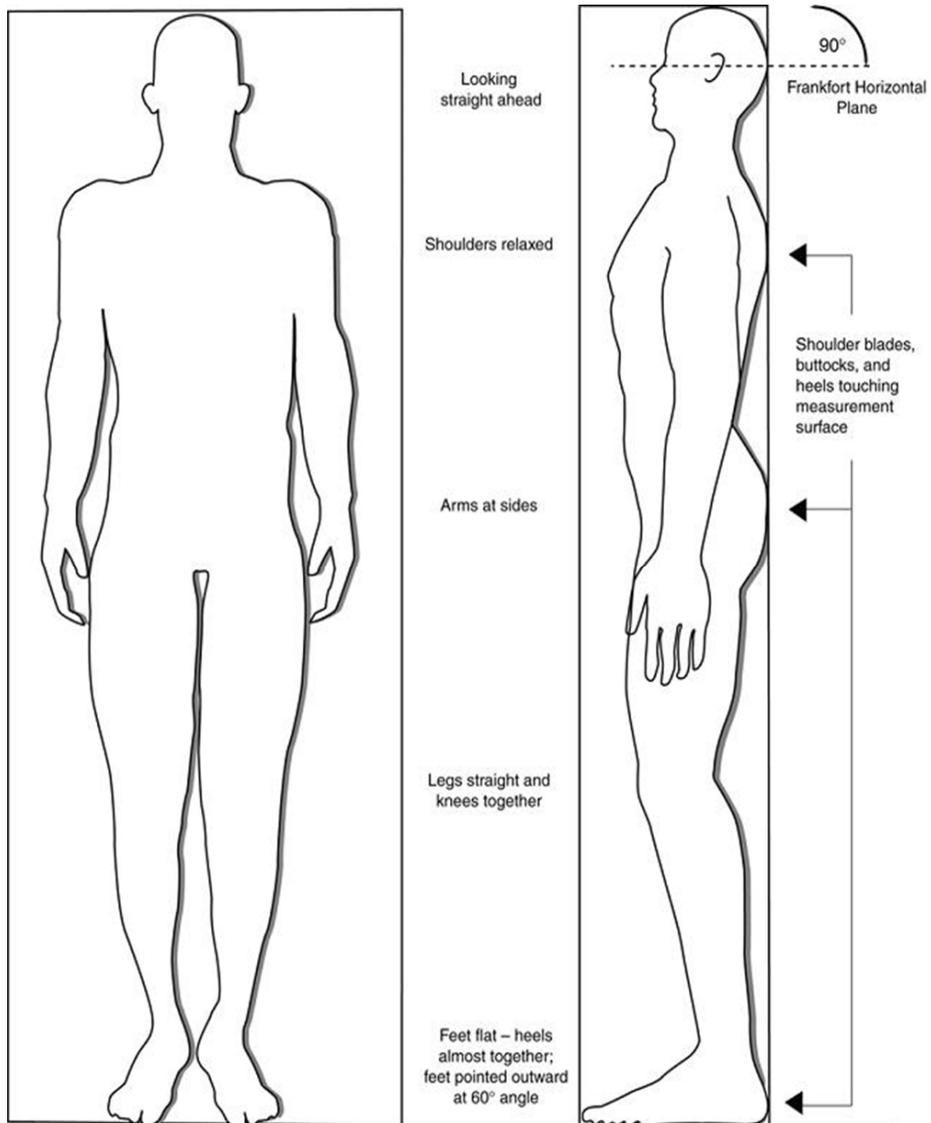


**APPENDIX B (CONTINUED) —**  
**Guidelines for Measuring Height and Weight in Clark County School Children**

Exhibit D

**Exhibit D: Standing Position Diagram**

Source: PhenX Toolkit funded by a grant from the National Human Genome Research Institute (Hamilton, 2009)



<b>APPENDIX C —</b>				
<b>Percentage of High BMI in CCSD Students in Selected Schools for 2011-2012 School Year of (4th, 7th, 10th Grades) (n=4303)</b>				
<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Both Sexes</b>				
All racial/ethnic groups (n=4303)				
Overweight & Obese	42.6	43.6	42.4	43.0
Overweight Only	19.2	19.5	18.0	19.0
Obese Only	23.4	24.1	24.4	24.0
Non-Hispanic white (n=991)				
Overweight & Obese	33.4	36.5	32.9	34.7
Overweight Only	16.4	17.3	15.3	16.6
Obese Only	17.0	19.2	17.6	18.1
Non-Hispanic black (n=543)				
Overweight & Obese	37.2	39.9	41.0	39.3
Overweight Only	19.6	20.8	17.0	19.2
Obese Only	17.6	19.1	24.0	20.1
Hispanic (n=1984)				
Overweight & Obese	49.5	50.1	48.3	49.7
Overweight Only	20.4	21.4	20.0	20.7
Obese Only	29.1	29.7	28.3	29.0
<b>Males</b>				
All racial/ethnic groups (n=2260)				
Overweight & Obese	45.4	48.3	44.7	46.2
Overweight Only	18.5	18.2	17.8	18.1
Obese Only	26.9	30.1	26.9	28.1
Non-Hispanic white (n=583)				
Overweight & Obese	34.0	38.7	36.4	36.5
Overweight Only	13.5	14.6	16.7	14.7
Obese Only	20.5	24.1	19.7	21.8
Non-Hispanic black (n=289)				
Overweight & Obese	39.1	39.6	36.2	38.4
Overweight Only	21.8	19.8	13.3	18.7
Obese Only	17.3	19.8	22.9	19.7
Hispanic (n=1037)				
Overweight & Obese	52.7	56.7	51.8	53.7
Overweight Only	18.5	19.6	20.1	19.4
Obese Only	34.2	37.1	31.7	34.3

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<b>APPENDIX C —</b>				
<b>Percentage of High BMI in CCSD Students in Selected Schools for 2011-2012 School Year of (4th, 7th, 10th Grades) (n=4303)</b>				
<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Females</b>				
All racial/ethnic groups (n=2043)				
Overweight & Obese	39.9	38.7	39.6	39.4
Overweight Only	20.0	20.9	18.4	20.0
Obese Only	19.9	17.8	21.2	19.4
Non-Hispanic white (n=468)				
Overweight & Obese	32.8	34.3	27.4	32.5
Overweight Only	19.3	20.2	13.1	18.6
Obese Only	13.5	14.1	14.3	13.9
Non-Hispanic black (n=254)				
Overweight & Obese	34.8	40.3	45.5	40.2
Overweight Only	16.9	22.1	20.5	19.7
Obese Only	17.9	18.2	25.0	20.5
Hispanic (n=947)				
Overweight & Obese	46.0	45.3	44.2	45.2
Overweight Only	22.3	23.4	20.0	22.0
Obese Only	23.7	21.9	24.2	23.2

<b>APPENDIX D —</b>				
<b>Percentage of High BMI in CCSD Students in Selected Schools for 2012-2013 School Year of (4th, 7th, 10th Grades) (n=3513)</b>				
<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Both Sexes</b>				
All racial/ethnic groups (n=3513)				
Overweight & Obese	37.5	44.1	41.7	41.2
Overweight Only	14.5	19.2	18.9	17.5
Obese Only	23.0	24.9	22.8	23.7
Non-Hispanic white (n=886)				
Overweight & Obese	25.7	38.9	40.0	34.5
Overweight Only	13.8	18.4	19.5	17.0
Obese Only	11.9	20.5	20.5	17.5
Non-Hispanic black (n=410)				
Overweight & Obese	33.6	46.2	47.5	39.0
Overweight Only	16.4	17.4	14.6	16.1
Obese Only	17.2	28.8	22.9	22.9
Hispanic (n=1593)				
Overweight & Obese	45.0	49.2	46.0	46.8
Overweight Only	14.3	20.8	20.1	18.3
Obese Only	30.7	28.4	25.9	28.5
<b>Males</b>				
All racial/ethnic groups (n=1832)				
Overweight & Obese	41.1	46.2	42.1	43.3
Overweight Only	15.6	18.7	16.1	16.9
Obese Only	25.5	27.5	26.0	26.4
Non-Hispanic white (n=493)				
Overweight & Obese	28.0	39.5	41.2	36.1
Overweight Only	15.2	17.1	14.3	15.8
Obese Only	12.8	22.4	26.9	20.3
Non-Hispanic black (n=197)				
Overweight & Obese	34.5	41.1	28.8	33.0
Overweight Only	19.7	12.5	16.3	16.2
Obese Only	14.8	28.6	12.5	17.8
Hispanic (n=824)				
Overweight & Obese	49.6	52.5	49.6	50.8
Overweight Only	14.0	21.4	15.8	17.4
Obese Only	35.6	31.1	33.8	33.4

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<b>APPENDIX D —</b>				
<b>Percentage of High BMI in CCSD Students in Selected Schools for 2012-2013 School Year of (4th, 7th, 10th Grades) (n=3513)</b>				
<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Females</b>				
All racial/ethnic groups (n=1681)				
Overweight & Obese	33.9	41.8	41.0	38.8
Overweight Only	13.4	19.7	22.4	18.1
Obese Only	20.5	22.1	18.6	20.7
Non-Hispanic white (n=393)				
Overweight & Obese	23.1	38.3	38.1	32.6
Overweight Only	12.2	20.0	28.2	18.6
Obese Only	10.9	18.3	9.9	14.0
Non-Hispanic black (n=213)				
Overweight & Obese	32.9	50.1	48.4	43.7
Overweight Only	13.7	21.1	12.5	16.0
Obese Only	19.2	29.0	35.9	27.7
Hispanic (n=769)				
Overweight & Obese	40.2	45.5	41.8	42.7
Overweight Only	14.5	20.2	24.9	19.4
Obese Only	25.7	25.3	16.9	23.3

**APPENDIX E —****Percentage of High BMI in CCSD Students in Selected Schools for 2013-2014 School Year of (4th, 7th, 10th Grades) (n=3513)**

<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Both Sexes</b>				
All racial/ethnic groups (n=2917)				
Overweight & Obese	38.7	41.3	38.5	39.8
Overweight Only	16.0	19.0	17.8	17.8
Obese Only	22.7	22.3	20.7	22.0
Non-Hispanic white (n=978)				
Overweight & Obese	34.3	39.8	34.4	37.0
Overweight Only	14.4	19.7	14.8	17.1
Obese Only	19.9	20.1	19.6	19.9
Non-Hispanic black (n=506)				
Overweight & Obese	38.2	39.5	41.5	39.7
Overweight Only	17.1	14.1	21.4	17.4
Obese Only	21.1	25.4	20.1	22.3
Hispanic (n=727)				
Overweight & Obese	45.0	46.8	43.4	45.4
Overweight Only	19.4	20.1	21.7	20.2
Obese Only	25.6	26.7	21.7	25.2
<b>Males</b>				
All racial/ethnic groups (n=1559)				
Overweight & Obese	39.8	43.6	36.2	40.4
Overweight Only	13.6	18.4	14.1	15.8
Obese Only	26.2	25.2	22.1	24.6
Non-Hispanic white (n=540)				
Overweight & Obese	36.8	41.5	33.6	38.1
Overweight Only	13.2	18.8	13.6	15.9
Obese Only	23.6	22.7	20.0	22.2
Non-Hispanic black (n=248)				
Overweight & Obese	40.5	36.9	33.8	37.1
Overweight Only	14.3	13.1	18.8	15.3
Obese Only	26.2	23.8	15.0	21.8
Hispanic (n=379)				
Overweight & Obese	42.6	50.0	42.6	45.9
Overweight Only	17.4	18.2	12.8	16.6
Obese Only	25.2	31.8	29.8	29.3

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<b>APPENDIX E —</b>				
<b>Percentage of High BMI in CCSD Students in Selected Schools for 2013-2014 School Year of (4th, 7th, 10th Grades) (n=3513)</b>				
<b>Weight Status</b>	<b>4th Grade</b>	<b>7th Grade</b>	<b>10th Grade</b>	<b>Overall Sample</b>
<b>Females</b>				
All racial/ethnic groups (n=1358)				
Overweight & Obese	37.7	38.7	42.1	39.1
Overweight Only	18.3	19.7	23.4	20.0
Obese Only	19.4	19.0	18.7	19.1
Non-Hispanic white (n=438)				
Overweight & Obese	30.8	38.2	34.6	35.6
Overweight Only	15.0	20.8	18.8	18.5
Obese Only	15.8	17.4	15.8	17.1
Non-Hispanic black (n=258)				
Overweight & Obese	36.3	42.0	50.0	42.3
Overweight Only	19.8	15.1	24.3	19.4
Obese Only	16.5	26.9	25.7	22.9
Hispanic (n=348)				
Overweight & Obese	46.9	42.9	44.4	44.8
Overweight Only	21.0	22.6	33.3	24.1
Obese Only	25.9	20.3	11.1	20.7



Southern Nevada Health District  
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 (702) 759-1000 | [www.SNHD.info](http://www.SNHD.info)