

ALABAMA SMILES 2020-2022
Body Mass Measures for Alabama's Kindergarten & 3rd Grade Children
Data Tables – July 2022

Prepared for the Alabama Department of Health by:

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Terminology:

- **Body mass index (BMI)** is an anthropometric index of weight and height that is defined as body weight in kilograms divided by height in meters squared. BMI is the commonly accepted index for classifying adiposity in adults and it is recommended for use with children and adolescents. BMI is a screening tool used to identify individuals who are underweight or overweight. Because BMI changes substantially as children get older, BMI-for-age is the measure used for children ages 2 to 20 years.
- CDC recommends the following [BMI-for-age cutoffs](#) in children and adolescents:
 - < 5th percentile – Underweight
 - ≥ 5th to < 85th percentile – Healthy weight
 - 85th to < 95th percentile – Overweight
 - ≥ 95th percentile – Obese

Sampling and Data Analysis:

- The sampling frame for this survey was all non-virtual public schools with 20 or more students in 3rd grade (657 schools with 54,507 3rd grade students). The sampling frame was stratified by public health region, then schools within each strata were ordered by percent of students eligible for the National School Lunch Program (NSLP). A systematic probability proportional to size cluster sampling scheme was used to select 50 schools with 3rd grade students. Three of the selected schools did not have kindergarten so the appropriate feeder schools were added to the sample (53 schools representing 50 sampling intervals). In May 2021, the state decided to oversample the smaller regions – 3 additional schools were selected in the Southeastern, Southwestern, and West Central regions. This resulted in 62 schools representing 50 sampling intervals.
- Fifty-two (52) schools participated, and data are available for 44 of the 50 sampling intervals. Data are not available for the following six sampling intervals
 - Jefferson region, 19.4% NSLP
 - Jefferson region, 65.8% NSLP
 - Jefferson region, 69.5% NSLP
 - Northern region, 32.0% NSLP
 - Northern region, 47.8% NSLP
 - Southeastern region, 93.8% NSLP

- Children had their height and weight measured during the 2020-2021 and 2021-2022 school years using a combination of active and passive consent.
- Data analyses for height, weight and BMI were completed using the complex survey analysis features of SAS 9.4 and the BMI-for-age analysis program developed by CDC for the CDC growth charts (<http://www.cdc.gov/nccdphp/dnpao/growthcharts/resources/sas.htm>). All results are adjusted for the complex sampling scheme.
 - Strata = health region
 - Cluster = sampling interval
- The data were weighted to represent the kindergarten and 3rd grade population within each sampling interval.
 - Weight = # of children in sampling interval / # children screened in sampling interval
- Unless otherwise noted, all analyses have been weighted for the complex sampling scheme.

Number of Children with Body Mass Data

Height and weight: 5,200 children
 Height, weight, and sex: 5,199 children
 Height, weight & BMI within biologically plausible limits: 5,133 children

Number of Children with Outlier Values (based on WHO fixed exclusion ranges)

| Variable | Too Low | Normal Range | Too High |
|----------------------|---------|--------------|----------|
| Height | 15 | 5,166 | 21 |
| Weight | 6 | 5,188 | 6 |
| BMI | 15 | 5,154 | 30 |
| Height, Weight & BMI | -- | 5,133 | -- |

BMI data is available for 5,133 of the 8,871 children (4,411 kindergarteners and 4,460 3rd graders) enrolled in the 52 participating schools; an overall response rate of 58%.

IMPORTANT NOTE: Tables 1-9 are restricted to the 5,133 children *with biologically plausible values for height, weight and BMI* (the variables `_BIVHT`, `_BIVWT` AND `_BIVBMI` = 0). The Centers for Disease Control and Prevention (CDC) recommends that states report obesity surveillance data with outliers excluded.

Table 1: Mean Height (cm), Weight (kg), and BMI Stratified by Grade and Sex, 2020-2022

| Variable | Males | Females | Both Sexes |
|---------------------|----------------|----------------|----------------|
| Kindergarten | n=1,388 | n=1,311 | n=2,699 |
| Height (cm) | | | |
| Mean | 116.5 | 115.8 | 116.1 |
| Standard error | 0.45 | 0.45 | 0.42 |
| 95% CL of mean | 115.6 – 117.4 | 114.8 – 116.7 | 115.3 – 117.0 |
| Weight (kg) | | | |
| Mean | 23.7 | 23.6 | 23.7 |
| Standard error | 0.25 | 0.26 | 0.22 |
| 95% CL of mean | 23.2 – 24.2 | 23.1 – 24.2 | 23.2 – 24.1 |
| BMI for age | | | |
| Mean | 17.3 | 17.5 | 17.4 |
| Standard error | 0.11 | 0.13 | 0.10 |
| 95% CL of mean | 17.1 – 17.6 | 17.3 – 17.8 | 17.2 – 17.6 |
| Third Grade | n=1,305 | n=1,129 | n=2,434 |
| Height (cm) | | | |
| Mean | 136.2 | 136.1 | 136.1 |
| Standard error | 0.42 | 0.37 | 0.36 |
| 95% CL of mean | 135.3 – 137.0 | 135.3 – 136.8 | 135.4 – 136.9 |
| Weight (kg) | | | |
| Mean | 37.8 | 38.1 | 38.0 |
| Standard error | 0.50 | 0.71 | 0.47 |
| 95% CL of mean | 36.8 – 38.8 | 36.7 – 39.6 | 37.0 – 38.9 |
| BMI for age | | | |
| Mean | 20.1 | 20.3 | 20.2 |
| Standard error | 0.23 | 0.29 | 0.19 |
| 95% CL of mean | 19.7 – 20.6 | 19.7 – 20.9 | 19.8 – 20.6 |
| Both Grades | n=2,693 | n=2,440 | n=5,133 |
| Height | | | |
| Mean | 126.2 | 125.6 | 125.9 |
| Standard error | 0.46 | 0.63 | 0.50 |
| 95% CL of mean | 125.2 – 127.1 | 124.3 – 126.9 | 124.9 – 126.9 |
| Weight | | | |
| Mean | 30.6 | 30.6 | 30.6 |
| Standard error | 0.34 | 0.54 | 0.36 |
| 95% CL of mean | 29.9 – 31.3 | 29.5 – 31.7 | 29.9 – 31.4 |
| BMI for age | | | |
| Mean | 18.7 | 18.9 | 18.8 |
| Standard error | 0.14 | 0.17 | 0.12 |
| 95% CL of mean | 18.4 – 19.0 | 18.5 – 19.2 | 18.5 – 19.0 |

Table 2: BMI-For-Age Cutoffs Stratified by Grade and Sex, 2020-2022

| BMI-For-Age | Males | | | Females | | | Both Sexes | | |
|---------------------|----------------|--------------|--------------|----------------|--------------|--------------|----------------|--------------|--------------|
| | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL |
| Kindergarten | n=1,388 | | | n=1,311 | | | n=2,699 | | |
| Underweight | 2.6 | 1.7 | 3.6 | 3.0 | 1.6 | 4.3 | 2.8 | 2.0 | 3.6 |
| Healthy Weight | 55.5 | 51.8 | 59.3 | 55.8 | 52.9 | 58.7 | 55.7 | 53.1 | 58.2 |
| Overweight | 18.3 | 16.1 | 20.6 | 18.6 | 15.9 | 21.4 | 18.5 | 16.5 | 20.4 |
| Obese | 23.5 | 19.9 | 27.1 | 22.6 | 19.3 | 25.9 | 23.1 | 20.2 | 25.9 |
| Third Grade | n=1,305 | | | n=1,129 | | | n=2,434 | | |
| Underweight | 1.4 | 0.4 | 2.5 | 1.4 | 0.7 | 2.1 | 1.4 | 0.7 | 2.2 |
| Healthy Weight | 51.5 | 48.0 | 54.9 | 49.5 | 44.7 | 54.3 | 50.6 | 47.4 | 53.7 |
| Overweight | 15.4 | 12.9 | 17.8 | 17.1 | 14.5 | 19.8 | 16.2 | 14.4 | 18.0 |
| Obese | 31.7 | 27.9 | 35.5 | 31.9 | 26.3 | 37.5 | 31.8 | 28.2 | 35.4 |
| Both Grades | n=2,693 | | | n=2,440 | | | n=5,133 | | |
| Underweight | 2.1 | 1.3 | 2.8 | 2.2 | 1.4 | 3.0 | 2.1 | 1.6 | 2.7 |
| Healthy Weight | 53.5 | 50.4 | 56.6 | 52.8 | 49.9 | 55.7 | 53.2 | 50.7 | 55.7 |
| Overweight | 16.9 | 15.1 | 18.6 | 17.9 | 15.9 | 19.9 | 17.4 | 15.9 | 18.8 |
| Obese | 27.5 | 24.9 | 30.2 | 27.1 | 23.7 | 30.5 | 27.3 | 24.8 | 29.8 |

CL=Confidence Limit

Summary: Compared to kindergarten children, third grade children have a significantly higher prevalence of obesity (23% vs. 32%). Regardless of grade, the prevalence of obesity is similar for boys and girls.

Table 3: BMI-For-Age Cutoffs Stratified by Race/Ethnicity, 2020-2022

| BMI-For-Age | Black/African American n=1,336 | | | Hispanic n=647 | | | White n=2,720 | | | Another Race Or Multi-Racial n=257 | | |
|----------------|-----------------------------------|-----------------|-----------------|-------------------|-----------------|-----------------|------------------|-----------------|-----------------|--|-----------------|-----------------|
| | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL |
| Underweight | 1.9 | 1.0 | 2.8 | 0.9 | 0.0 | 2.0 | 2.0 | 1.4 | 2.7 | 4.7 | 1.5 | 7.8 |
| Healthy Weight | 49.9 | 45.5 | 54.3 | 43.9 | 35.8 | 52.0 | 56.2 | 53.0 | 59.4 | 53.1 | 41.4 | 64.8 |
| Overweight | 17.3 | 15.3 | 19.3 | 20.9 | 17.5 | 24.3 | 17.6 | 15.3 | 19.8 | 13.9 | 8.0 | 19.7 |
| Obese | 31.0 | 26.8 | 35.1 | 34.3 | 27.2 | 41.4 | 24.2 | 21.9 | 26.5 | 28.4 | 18.8 | 38.0 |

CL=Confidence Limit

Summary: Compared to non-Hispanic White children, the prevalence of obesity is significantly higher among Black/African American and Hispanic children (24% vs. 31% and 34% respectively).

Table 4: BMI-For-Age Cutoffs Stratified by Percentage of Students Eligible for the National School Lunch Program (NSLP), 2020-2022

| BMI-For-Age | < 25% Eligible for NSLP n=621 | | | 25% - 49% Eligible for NSLP n=1,827 | | | 50% - 74% Eligible for NSLP n=2,106 | | | ≥ 75% Eligible for NSLP n=579 | | |
|----------------|----------------------------------|-----------------|-----------------|--|-----------------|-----------------|--|-----------------|-----------------|----------------------------------|-----------------|-----------------|
| | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL | Percent | Lower 95% CL | Upper 95% CL |
| Underweight | 3.2 | 1.3 | 5.2 | 1.4 | 0.6 | 2.2 | 2.7 | 1.9 | 3.4 | 1.1 | 0.2 | 2.0 |
| Healthy Weight | 69.7 | 64.3 | 75.2 | 54.9 | 50.5 | 59.3 | 50.4 | 47.5 | 53.3 | 50.3 | 43.9 | 56.8 |
| Overweight | 14.3 | 10.5 | 18.1 | 17.5 | 14.5 | 20.5 | 18.7 | 16.7 | 20.7 | 14.6 | 12.0 | 17.2 |
| Obese | 12.7 | 5.3 | 20.1 | 26.2 | 22.1 | 30.3 | 28.3 | 25.5 | 31.0 | 34.0 | 29.2 | 38.7 |

CL=Confidence Limit

Summary: Compared to children attending schools with <25% of children eligible for NSLP, children attending schools with ≥25% of students eligible for NSLP have a significantly higher prevalence of obesity (13% vs. 26%, 28% and 34% respectively).