

Ohio Department of Health
School and Adolescent Health

**Guidelines for Measuring
Heights and Weights
and Calculation of
Body Mass Index-for-Age
in Ohio's Schools**

I. Introduction

The purpose of these guidelines is to provide practical guidance to school personnel who choose to collect heights and weights of the school-aged population. Screening for health problems in school has been viewed as an appropriate and important part of school health services. The intent of screening is not to diagnose, but to separate those screened into two groups: those with no apparent problem in the area being screened and those who need follow-up. Data collected during the screening can be used to influence policy and programming to create a healthier school environment.

Screening for height and weight can have value when there is sound purpose and follow-up such as to establish baselines, develop programs, measure progress or provide parents with information regarding their student's body mass index (BMI)-for-age. Sensitive and supportive safeguards need to be in place. Labeling a student as overweight, too fat, too thin or skinny based on a single height/weight measurement at one point in time is inappropriate. The physical and emotional well-being of students is also jeopardized when they develop poor self-esteem because of their body size, experience weight discrimination or use unsafe weight loss practices.

The following guidelines were developed to help you measure students in a way that is sensitive and supportive, as well as accurate.

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II. Appropriate Procedure for Screening

- Step 1 Review school district procedures regarding health screenings.**
Support from the district's administration is essential for a successful screening program.
- Step 2 Parental notification/permission should be consistent with other screenings.**
Refer to your school district's screening procedures.
- Step 3 Prepare the school faculty, staff and students for the screening process and value of the screen.**
Important concepts that need to be conveyed to students include:
- There are different body types; some body types are naturally associated with a higher body weight.
 - A range of weights is normal. People can be healthy at many weights and look very different from one another. It is not normal or possible for every person to be the same size or shape.
 - BMI does not directly measure body fatness.
 - Normal growth and development patterns affect body shapes and sizes, especially at puberty. There may be sudden shifts in height and/or weight during growth spurts.
 - Subtle media messages suggesting that only thin people are happy or attractive should be challenged.
 - Students have the ability to make healthy food choices.
 - Daily physical activity contributes to overall health and a healthy weight.
 - Sedentary behaviors can contribute to weight gain.
- Step 4 Train and monitor assistive personnel in the screening process.**
It is preferred that a health care professional such as the school nurse conduct height and weight screenings. If assistive personnel are utilized, training must be provided. Interpretation of results of the screening is the responsibility of the health care professional.
- Step 5 Respectful Screening**
Design a screening process that protects the self-esteem of students:
- The student's privacy needs to be protected in the screening process. In order to assure privacy, no other students should be present. Only the screener should observe the results. Height and weight should not be announced for other students to hear.
 - The results of the screening should be kept confidential. No comments on height or weight should be offered during the measurement process; however, if the student requests results, height/weight can be shared but refrain from using language that labels or diagnoses. Do not label any student as overweight, obese, underweight, too thin, too short or too tall.
 - Younger students and students who are anxious about the weighing process can be positioned with their backs to the scale during measurement.

- If a student makes a negative remark or has concerns about his or her own weight, it is appropriate to respond with a supportive comment. You may want to meet with the student in private at a later time to discuss his/her feelings, contact his/her parent/guardian(s) and offer resources.
- All students should undergo the same measurement procedures. No one student should be singled out for additional measurements because of physical appearance or weight.

Step 6 Conduct Weight/Height Screening

When weight/height screening is conducted, the process must assure the results are accurate. Ideally, growth assessment is conducted annually over a student's entire K–12 career.

Measure Weight

Students should be weighed using a platform scale on a uncarpeted floor. This may be a balance beam scale with nondetachable weights (no bathroom scales or spring scales) or a medical grade digital scale. Check your equipment regularly to make sure you are getting accurate measurements. Scales should be calibrated on a routine basis. Calibration involves putting known weights on the scale to check accuracy.

Procedure

1. Ask the student to remove shoes and bulky clothing.
2. Place the sliding beam weights in the “zero” position before the student steps on the scale.
3. Ask the student to stand still with both feet in the center of the platform.
4. Record the measurement to the nearest $\frac{1}{4}$ pound.
5. Return the sliding beam weights to the “zero” position.

Measure Height

A standing height board or stadiometer should be used. This device has a flat, vertical surface on which a measuring rule is attached. It also has a moveable right angle block or headpiece and either a permanent surface to stand on or the entire device is mounted on the wall of a room with a level, uncarpeted floor. If this is not an option, a metal wall mounted measuring tape is preferred over plastic or cloth that may stretch and provide an inaccurate measurement. Measuring rods attached to scales should not be used. The surface is not always stable and the measuring rod's hinge tends to become loose, causing inaccurate readings.

Procedure

1. Before you begin, ask the student to remove shoes, hat and bulky clothing such as coats and sweaters. Ask the student to remove or undo hairstyles and hair accessories that interfere with the measurement. If the student is unwilling to undo an intricate hairstyle, locate the crown of the head to the best of your ability.
2. Direct the student to stand erect with shoulders level, hands at sides, heels together and weight evenly distributed on both feet. The student's feet should be flat on the floor or foot piece, with heels comfortably together

diagram 1

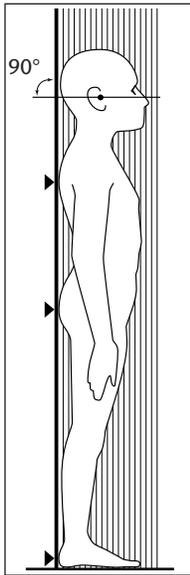
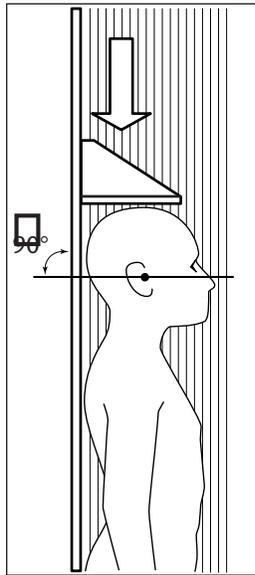


diagram 2



and touching the base of the vertical board. There are four contact points between the body and the stadiometer: head, upper back, buttocks and heels (see diagram 1).

3. Ask the student to look straight ahead. When the chin is correctly positioned, the back of the head may no longer make contact with the board (see diagram 2).
4. Ask the student to breathe in and maintain his or her position. Lower the headpiece until it firmly touches the crown of the head and is at a right angle with the measurement surface. Check the contact points to ensure the lower body stays in the proper position and the heels remain flat. Read the measurement at eye level.
5. Record the height to the nearest $\frac{1}{8}$ inch.

III. Calculate Body Mass Index-for-Age

Body Mass Index-for-Age Definition

BMI-for-age is the measure used for children ages 2 to 20 years. BMI-for-age is the only indicator that allows us to plot a measure of weight and height with age on the same gender specific chart. BMI is more highly correlated with body fat than weight alone. A committee comprised of members from the Maternal and Student Health Bureau, the American Academy of Pediatrics and the American Medical Association, with support from the Centers for Disease Control and Prevention (CDC), recommends that BMI-for-age be used to routinely screen for weight status.

- Convert height and weight to BMI by using one of the following methods:
 - ▼ Align the student's height and weight on a BMI wheel that is specific for ages 2–20, or
 - ▼ Calculate BMI using the following formula:

$$[\text{weight in pounds}] \div [\text{height in inches}] \div [\text{height in inches}] \times 703$$
, or
 - ▼ Use the CDC's online BMI calculator at <http://www.cdc.gov/healthyweight/assessing/bmi/index.html>
- Determine the student's age prior to plotting the measurements on the appropriate chart. When plotting the measurements on the charts for 2–20-year-olds, the student's age should be rounded to the nearest quarter of a year.
- Plot the results on the sex-specific BMI-for-age percentile chart published in 2000 by the CDC (a sample copy of the BMI-for-age charts for males and females ages 2–20 is included in this packet). The charts can be accessed at the following Web site: <http://www.cdc.gov/growthcharts>. All measurements for one student, grades K–12, should be plotted on the same BMI-for-age chart.
- Growth patterns that fall outside the established parameters of $\geq 5^{\text{th}}$ and $< 85^{\text{th}}$ percentiles suggest the need to recheck measurements, plots and calculations and make any necessary corrections or adjustments.

IV. Interpret BMI-for-Age Results

The following information is for school districts that are monitoring **individual** students BMI-for-age over grades K–12.

The BMI-for-age charts are designed to *screen* for weight problems, not to *diagnose* them. A BMI equal to or above the 85th percentile or below the 5th percentile on the BMI-for-age charts indicates further assessment is appropriate but does not mean that a student is underweight or overweight. The following established cut-off points are used to identify underweight and overweight students and adolescents:

Healthy weight (≥5% to <85%)	Height and weight are within normal range	No action is necessary*
Underweight (<5%)	Considered underweight	Recommend medical assessment
Overweight (≥85% to <95%)	Considered at risk for becoming overweight. Additional risk factors such as family history, blood pressure, cholesterol, etc. may increase risk for future chronic diseases	Consider a medical assessment at the time of the next annual physical exam
Obese (≥95%)	Considered overweight. Increased risk for chronic diseases such as diabetes	Recommend medical assessment

* Physical activity and healthy nutrition are highly recommended for all students, regardless of their BMI results.

BMI does not directly measure body fatness. A very muscular student can have a high BMI-for-age percentile and have very little body fat. Conversely, a student can fall into “normal” percentiles and have excessive body fat.

BMI-for-age interpretation is complicated by the fact that there are sudden shifts in height and weight during growth spurts. When both height and weight are changing, the BMI is unstable. BMI-for-age can be misinterpreted in students, because height and weight growth spurts occur at different times. A normal, temporary accumulation of weight preceding a height spurt can be misinterpreted as an impending weight problem. The pattern of growth is far more informative than the height and weight at any given time. To accurately interpret BMI-for-age, a series of measurements is needed.

V. Identify Community Resources to Help Families with Weight Concerns

Schools should identify sources of help in the community for families with weight concerns prior to implementing the screening.

Community Resources

- Identify resources available to families in the community for nutrition counseling and physical activity.
- Identify multidisciplinary weight treatment programs in the community, if they exist. Research has shown the most promising approach to dealing with childhood weight problems is multidisciplinary involving physicians, nurses, dietitians, exercise professionals, mental health professionals and families. This multidisciplinary model may not be available in every community.

VI. Parent Notification of BMI-for-Age Results and Referral Mechanisms

- Parental notification of BMI-for-age results should be consistent with other screenings.
- If a student's BMI-for-age is equal to or exceeds the 85th percentile or falls below the 5th percentile on the BMI-for-age growth chart, a respectfully worded letter should be developed to notify parents that their student's weight may present a health risk. The letter should suggest the parents seek further assessment by their family physician. The physician, in turn, will be able to do a complete medical assessment, make further referrals or implement a weight management program, if warranted. Sample letters are included in this packet.

References

CDC BMI Guidelines with links to the growth charts
<http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm>

Ellison, Alison, RN, PNP, NCSN, Children's Healthcare of Atlanta. Chapter 9.
"Screening Guidelines: Height and Weight Screening in the School Setting" 20-28.

Florida Department of Health. Healthy School Initiative. 2001.
http://www.doh.state.fl.us/Family/school/healthy_school/hsinitiative.html

Guidelines for Collecting Heights and Weights on Children and Adolescents in School Settings. How to Measure in a Private, Respectful Way. September 2000. Center for Weight and Health, College of Natural Resources, University of California.
<http://www.CNR.Berkeley.EDU/cwh/index.html>

The Role of Michigan Schools in Promoting Healthy Weight: A Consensus Paper. September 2001. Michigan Dept. of Education, Michigan Dept. of Community Health, Governors Council on Physical Fitness, Health and Sports, Michigan Fitness Foundation.
<http://www.michigan.gov/mde>

Zaiger, D., *School Nursing Practice: An Orientation Manual, 2nd Edition*, NASN, 2000.

Zive, M. and Pelletier, R., *Nursing Assessment of the School Aged Youth: Nutritional Status*, NASN, 1999.

Resources

The following is a list of agencies that could provide expertise/assistance in the area of childhood nutrition and physical activity.

Local Health Departments

American Cancer Society—local affiliate

American Heart Association—local affiliate

Ohio Dietetic Association—<http://www.eatrightohio.org>

American Diabetes Association—local affiliate

Local hospitals—check with the dietetics/nutrition department

OSU Cooperative Extension Service

Local YMCA/YWCA

Parks and Recreation Departments

Dairy Council Mid East—<http://www.drink-milk.com>

Acknowledgement

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Appendix

Sample Letters to Parent/Guardian

Sample letter #1

Dear (Parent/Guardian),

Your child was recently weighed and measured in our school to determine how he/she is growing. Your child's weight was found to be low/high for his/her height and age. This does not necessarily mean your child is underweight/overweight but may be at risk for this condition. The best person to evaluate your child's weight status is his/her regular physician.

We encourage you to make sure your child has annual medical exams by a physician. The doctor should weigh and measure your child, may ask questions about growth since birth and may ask about the height and weight of biological relatives. Your doctor is a good resource for advice about nutrition and physical activity. If you do not have health insurance or access to health care, please contact us for information about possible health care services.

Please do not put your child on a weight gain/loss diet. Instead, we encourage good nutritional practices and daily physical activity. If you have any questions or would like information on available community resources, please do not hesitate to call me at _____.

Sincerely,

School Nurse

Date

Dear Parent or Guardian:

Your child's growth is important because it is an indicator of overall health. A child's growth is determined by monitoring a child's height and weight over time. As part of our continuing effort to help ensure our students' health, we have measured your child's height and weight. The results are recorded below:

Height	Weight	BMI-for-Age Percentile
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Body mass index (BMI) is a measure of body heaviness and an indirect measure of body fat. According to the Centers for Disease Control and Prevention, a BMI-for-age at or above the 85th percentile, or lower than the 5th percentile may be a health risk for your child. Your child's BMI-for-age was in the following percentile grouping:

- At or above the 95th percentile (considered overweight)
- 85th–94th percentile (considered to be at risk for becoming overweight)
- 5th–84th percentile (considered average or typical, most children are in this group)
- Below the 5th percentile (considered underweight)

If your child is at or above the 95th percentile or below the 5th percentile, we recommend you contact your family doctor to discuss your child's health. If your child is between the 85th and 94th percentile, bring these findings to your family doctor's attention at your child's next scheduled visit.

If you have questions, do not have a doctor or health insurance for your child, would like information on available community resources or would like to discuss these results with the school nurse, please call _____.

School Nurse	Date
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