Maternal and Child Health Bureau. (n.d.). *Accurately Weighing and Measuring: Developing and Rating Your Measurement Technique.* http://depts.washington.edu/growth/index.htm
National Institute of Mental Health. (2017, November). *Eating Disorders.* *https://www.nimh.nih.gov/health/statistics/eating-disorders.shtml*

*Resources:*
This website list was compiled for parents, school personnel and interested individuals. The websites listed are reliable sources of nutrition, physical activity and weight management.

- Tennessee Department of Education, Office of Coordinated School Health
- Tennessee Department of Education, School Nutrition
- Tennessee Department of Health, School Nutrition Program Resources
- Academy of Nutrition and Dietetics
- Center for Health and Health Care in Schools
- CDC - Adolescent and School Health
- CDC – Healthy Weight, Nutrition, and Physical Activity
- CDC – Tips for Parents – Tips to Help Children Maintain a Healthy Weight
- Fruits and Veggies: More Matters
- Girls Health
- Healthier Tennessee
- MyPlate
- UT Extension Service
- NIH, Helping Your Child Who is Overweight

# Blood Pressure (BP) Screening

## *BP Screening Recommendations*

The TDOE encourages LEAs to conduct annual BP screenings for all students in grades Pre-K, 2, 4, 6, 8, and one year or class of high school (usually wellness class). The LEA should screen the same high school grade-level or class year after year. For example, if the LEA conducts BP screenings for those students enrolled in a wellness class, then the LEA should conduct BP screenings for students enrolled in the same wellness classes every year thereafter.

Additionally, all students who present with signs and symptoms that indicate a need should have their BP status assessed and monitored. Education, counseling, and referral should be offered as indicated by the assessment.

## *BP Screening Rationale*

1. Mortality due to hypertension (high BP) and heart disease in Tennessee is among the highest in the nation.
2. High BP in youth is associated with health problems later in life. Early identification followed by successful treatment may prevent heart disease, stroke, and kidney failure.
3. Elevated BP may indicate the presence of other diseases.
4. Screening presents an excellent opportunity for health promotion related to cardiovascular health with a population of emerging adults.

5. A CDC study found that more than 1 in 7 U.S. youth ages 12 to 19 had high BP or elevated BP between 2013 to 2016.

## *BP Screening Program*

School staff will organize and implement a BP assessment program which includes screening and education of risk factors associated with hypertension and cardiovascular disease. Screening can be accomplished as a collaborative community effort with qualified staff from other agencies or with appropriately trained volunteers. If volunteers are used, training regarding confidentiality should be a component of the training content.

Work with the appropriate people within the school to coordinate the screening activity. The process for coordination with teachers varies among schools. There may be preferred classes during which screenings are usually allowed.

Develop or obtain forms for recording the results of the screening for each student (Appendix A). Develop or obtain parent/guardian notification forms (Appendix B) and educational brochures.

### Equipment Needed

A manual or hospital grade BP cuff can be used. The **preferred** method of BP measurement is auscultation (sphygmomanometer and stethoscope). Measures obtained by oscillometric devices (automated BP monitors) that exceed the 90th BP percentile should be repeated by auscultation. When measuring BP, use a stethoscope, sphygmomanometer, and correct size cuffs (pediatric, adult, or large adult).

When measuring the student's height for use in assessing the student's BP a vertical measurement board (stadiometer), metallic measuring tape or yardstick attached to a flat wall with no baseboard should be used. A movable right triangular headboard should be used to site the accurate height. This may be attached to the measurement board or separate if using a metallic measuring tape or yardstick.

Equipment should be maintained and calibrated according to the manufacturer's guidelines to ensure accurate measurements. Some sources recommend calibration of aneroid manometers on a semi-annual basis. Equipment should be cleaned prior to each use and when necessary to minimize the spread of infection.

### Setting Up the Screening Area

1. Every effort should be made to ensure the students' privacy during the screening process.
2. Locate a quiet room for conducting the BP screenings.
3. Prior to conducting the screening, set up the room for screening one student at a time or use a privacy partition if more than one screener will be working in the same room.
4. Preferably, the student being screened should not be able to see or hear other students.
5. The room should have an area without a baseboard for mounting the metallic yardstick or stadiometer that will be used for measuring height.
6. To assist with the flow of students, you may wish to have a teacher or staff assistant monitor students waiting to be screened in an adjacent room or hallway. Once a student has been screened, he/she can join his/her classmates and the next student to be screened can then enter the screening room.

7. Have supplies available to clean equipment per the manufacturers' suggestions between each student.

### Student Preparation for BP Screening

Talk with the student using age and developmentally appropriate terms. You may need to use words like "pressure" rather than BP, and "arrow" rather than needle. As appropriate, prior to checking a student's BP, the examiner should ask the caretaker or the student about the student's health history to determine if any risk factors exist that may cause BP readings to vary from the norm. Prior to screening, students should be given an explanation of hypertension, ways to help maintain a normal BP, and an overview of the screening process.

Advise students of the possibility that shoes will need to be removed and hairstyles may need to be adjusted to secure an accurate height measurement. Also advise students of clothing options that allow ease of baring the right arm for BP measurement. This may be done via a classroom instructional unit or if necessary, individually. Explain to the student that you will be measuring his/her BP to determine if it is within a normal range or high range. Let the student know that a person's BP changes during the day depending upon many factors (e.g., activity level, diet, medications). Advise the student that if the measurement is high, you will recheck his/her BP and may want to check it again on another day to see if the BP measurement is still high.

Help the student to understand that if his/her BP remains high after you have checked it several times, you will suggest that the student's parents/guardians have a health care practitioner check to determine if the student has hypertension. The results of the BP screening do not mean that the student has hypertension; it means that the BP measurement was high during the screening activity.

## *BP Screening Procedure*

In children and adolescents, normal BP levels are determined by age, sex, and height. Screening should be conducted in a manner congruent with infection control and standard precautions. Trained personnel should follow standard practices and procedures for measuring BP. Screen for BP using an age and developmentally appropriate screening process.

### BP Measurement

1. Check to be sure that the sphygmomanometer has been calibrated in accordance with the manufacturer's suggestions.
2. Check the functionality of all equipment.
    a. Sphygmomanometer and stethoscope.
    b. Automated BP monitors (oscillometric devices). Note: The **preferred** method of BP measurement is auscultation.
3. The screener may choose to stand or be seated during the BP measurement phase of the procedure.
4. Assess the BP:
    a. Prior to measuring BP, stimulant drugs or food should be avoided.
    b. Prior to measuring BP, allow the student to rest at least 3-5 minutes.
    c. Explain the process to the student.
    d. Position student appropriately:
        i. The student should be seated with feet flat on floor.

ii. The student should be leaning gently against back of chair, not on arm.
iii. The entire arm in which the BP will be measured should be fully supported on a firm surface (table) with the right arm (brachial artery) at heart level.
iv. Upper arm should be bare – do not apply cuff over clothing.

e. Choose appropriate cuff size:
   i. The BP cuff should have a bladder width that is approximately 40% of the circumference of the upper arm midway between the olecranon and the acromion. The length of the cuff bladder should encircle 80 to 100% of the circumference of the upper arm at the same position. Most modern cuffs are marked with range lines to denote the need to use a larger or smaller cuff.
   ii. Proper cuff size is essential for measuring BP accurately. A cuff that is too small may result in an artificially elevated BP whereas a cuff that is too wide may produce falsely low reading.
f. Place the BP cuff on the upper right arm.
   i. Leave enough room at the top of the cuff to prevent obstruction to the axilla and enough room at the bottom to place the stethoscope in the antecubital fossa.
   ii. Position the right arm so that the brachial artery is at heart level.
   iii. The right arm is preferred for consistency and comparison with standard tables for BP parameters and because of the possibility of coarctation of the aorta, which might result in false low readings in the left arm.
g. To determine how far to inflate the cuff for measuring the student's BP:
   i. Palpate for the radial pulse.
   ii. Inflate the cuff while palpating the radial pulse.
   iii. Note the level at which the radial pulse disappears.
   iv. Release air from cuff rapidly and wait 15 seconds prior to measuring the student's BP.
   v. When measuring the BP, inflate the cuff 20–30 mm Hg above the point where the radial pulse disappeared.
h. After the 15 second wait period, measure the student's BP:
   i. Palpate the brachial pulse.
   ii. Place the ear tips of the stethoscope in your ears with tips facing forward.
   iii. Place the diaphragm of the stethoscope over the brachial artery. The diaphragm of the stethoscope should not touch the cuff.
   iv. Rapidly inflate cuff 20–30 mm Hg above the point at which the radial pulse disappeared.
   v. Release cuff pressure at a rate of 2–3 mm Hg per second, while auscultating brachial artery.
   vi. The systolic BP reading is determined at the onset of a clear 'tapping' sound (Phase I Korotkoff sound).
   vii. The diastolic BP reading is determined at the disappearance of Korotkoff sounds (Phase V Korotkoff sound). After the disappearance of Korotkoff sounds, continue to deflate the cuff slowly for another 10 mm Hg. If no further sounds are heard, rapidly release all air in the cuff and record the BP measurement.
   viii. If the Korotkoff sounds continue to 0 mm Hg or is very low, repeat the BP measurement with less pressure on the head of the stethoscope. In

some children, Korotkoff sounds can be heard to 0 mmHg. Under these circumstances, the BP measurement should be repeated with less pressure on the head of the stethoscope.

ix. If the very low 5th Korotkoff sound persists, record the 4th Korotkoff (muffling of the sounds) as the diastolic BP.

x. At least two BP measurements should be obtained and spaced one or two minutes apart. The values should be less than 5 mmHg apart. BP should be remeasured until a stable value is obtained. The recorded value on the student's chart is the average of the last two measurements.

## Height Measurement

If you do not already have a current height measurement for the student, measure the student's height and plot it on the appropriate gender specific CDC stature-for-age growth charts. Children who are able to stand on their own should be measured standing, without shoes, using a vertical measurement board (stadiometer) or a metallic measuring tape/yardstick attached to a flat wall with no baseboard. A movable right triangular headboard should be used when measuring height. Do not use the measuring rod attached to the platform scale. Prior to starting, check the measurement board to ensure it is working correctly. The headboard should slide easily but should not be so loose or worn that it slips when measuring the height.

1. Remove the child's shoes, hats, and bulky clothing, such as coats and sweaters. Undo or adjust hairstyles and remove hair accessories that interfere with measurement.
2. Have the student stand erect, with shoulders level, hands at sides, knees, or thighs together and weight evenly distributed on both feet.
3. The student's feet should be flat on the floor or foot piece, with both heels at base of the vertical board. When possible, all four contact points (i.e., the head, back, buttocks, and heels) should touch the vertical surface while maintaining a natural stance. Some students will not be able to maintain a natural stance with all four contact points touching the vertical surface. For these students, at a minimum, two contact points; the head and buttocks, or the buttocks and heels, should always touch the vertical surface.
4. Position the student's head by placing a hand on the student's chin to move the head into the Frankfort Plane. The Frankfort Plane is an imaginary line from the lower margin of the eye socket to the notch above the tragus of the ear. When aligned correctly, the Frankfort Plane is parallel to the horizontal headboard and perpendicular to the vertical measurement board. This is best viewed and aligned when the screener is directly to the side and at eye level with the child.
5. Assure student's legs are straight, arms are at sides, and shoulders are relaxed.
6. Ask the child to look straight ahead, inhale deeply and to stand fully erect without altering the position of the heels.
    a. Lower the headpiece until it firmly touches the crown of the head with sufficient pressure to compress the hair and is at a right angle with the measurement surface.
    b. Check contact points to ensure that the lower body stays in the proper position and heels remain flat. Some students may stand up on their toes, but verbal reminders are usually sufficient to get them in the proper position.
    c. Position yourself so that your eyes are parallel with the head piece, read the measurement to the nearest ⅛ inch, and make note of the first measurement.

d. Move the headboard away; check the posture, and re-measure the student.
e. Measurements should agree within ¼ inch, re-measure and select the average of the two measures that agree the most.
f. Immediately record the results in the student health record or data log.

## *BP Status*

In 2017, the guidelines for high BP in children and adolescents, including the definitions of BP categories and stages, were updated (see Table 1). The diagnosis of hypertension is made when repeat BP values on **three** separate clinical visits are greater than the 95th percentile for the age, sex, and height of the patient, or ≥130/80 mmHg.

**Table 1: Definitions of BP Status and Categories for Children and Adolescents**

| BP Category | For Children Aged 1-13 years | For Children Aged ≥13 years |
|---|---|---|
| **Normal BP** | <90th percentile | <120/<80 mm Hg |
| **Elevated BP** | ≥90 percentile to <95th percentile or 120/80 mm Hg to <95th percentile (whichever is lower) | 120/<80 to 129/<80 mm Hg |
| **Stage 1 HTN** | ≥95th percentile to <95 percentile +12 mm Hg, or 130/80 to 139/89 mm Hg (whichever is lower) | 130/80 to 139/89 mm Hg |
| **Stage 2 HTN** | ≥95th percentile + 12 mm Hg, or ≥140/90 mm HG (whichever is lower) | ≥140/90 mm Hg |

*Source:*

Flynn JT, Kaelber DC, Baker-Smith CM, et al. (2017, September). Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics 2017. 140(3). https://pediatrics.aappublications.org/content/pediatrics/early/2017/08/21/peds.2017-1904.full.pdf

### Using the BP Screening Tool

The 2017 American Academy of Pediatrics (AAP) *Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents* includes a new, simplified table for initial BP screening. This table is designed as a screening tool to identify children and adolescents who need further evaluation of their BP**. The screening tool should not be used to diagnose elevated BP or hypertension by itself.** Values in the table are based on the 90th percentile BP for age and sex for children at the 5th percentile of height, resulting in a negative predictive value of >99%. It's important to note, however, that children with above-average height may be over-identified with the screening tool. For adolescents ≥13 years of age, a threshold of 120/80 mm Hg is used in the screening tool (regardless of sex) to align with adult guidelines for the identification of

elevated BP.

If the BP values (systolic and diastolic) are less than the values listed in the table, the student's BP does not require further evaluation. If the BP values (systolic and/or diastolic) are ≥ values listed in the table, the student's BP requires further evaluation. Further evaluation includes repeat measurements and utilizing the complete BP tables based on sex, age, and height.

**Table 2: BP Screening Tool**

| BP, mmHg | | | | |
|---|---|---|---|---|
| | Boys | | Girls | |
| Age | Systolic | Diastolic | Systolic | Diastolic |
| 1 | 98 | 52 | 98 | 54 |
| 2 | 100 | 55 | 101 | 58 |
| 3 | 101 | 58 | 102 | 60 |
| 4 | 102 | 60 | 103 | 62 |
| 5 | 103 | 63 | 104 | 64 |
| 6 | 105 | 66 | 105 | 67 |
| 7 | 106 | 68 | 106 | 68 |
| 8 | 107 | 69 | 107 | 69 |
| 9 | 107 | 70 | 108 | 71 |
| 10 | 108 | 72 | 109 | 72 |
| 11 | 110 | 74 | 111 | 74 |
| 12 | 113 | 75 | 114 | 75 |
| 13 | 120 | 80 | 120 | 80 |
| 14 | 120 | 80 | 120 | 80 |
| 15 | 120 | 80 | 120 | 80 |
| 16 | 120 | 80 | 120 | 80 |
| 17 | 120 | 80 | 120 | 80 |
| 18 | 120 | 80 | 120 | 80 |

## Using the BP Tables

The updated BP tables from the AAP include systolic BP and diastolic BP values arranged by age, sex, height (in centimeters and inches) and height percentile. The BP values are also categorized according to the BP definitions presented in Table 1 as normal (50th percentile), elevated BP (>90th percentile), stage 1 HTN (≥95th percentile), and stage 2 HTN (≥95th percentile + 12 mm Hg).

1. Determine height percentile of the student using the appropriate gender specific CDC growth chart.

2. If the student's height percentile is between two percentiles, use the higher percentile.

3. Measure and record the student's systolic BP and diastolic BP.
4. On the Sex-Specific BP Levels by Age and Height table find the child's age on the left side of the table. Follow the age row horizontally across the table to the intersection of the line for the student's height or height percentile (columns labeled 5%, 10%, 25%, 50%, 75%, 90%, and 95% – see BP tables). If the student's height is between percentiles, use the larger height percentile.
5. Now, compare the student's systolic and diastolic BP measurements with the level provided in the BP tables to determine if the measurement falls in a normal or abnormal category. If the initial BP reading is greater than or equal to the 90th percentile, the BP should be repeated twice at the same visit, and an average systolic and diastolic BP should be used. Measures obtained by oscillometric devices that exceed the 90th BP percentile should be repeated by auscultation.
    a. The **50th percentile** row represents a normal blood pressure value or a blood pressure that is normotensive (NT).
    b. The **≥ 90th percentile** row represents **elevated blood pressure** and should be repeated within one week.
    c. The **≥ 95th percentile** row represents **stage 1 hypertension** (Stage 1 HT) and should be repeated within one week. If the BP readings remain at the Stage 1 HT level, referral is required.
    d. The **≥ 95th percentile plus 12 mmHg** row represents **stage 2 hypertension** (Stage 2 HT) and requires prompt referral for evaluation and therapy. If the patient is symptomatic, **immediate priority referral** and treatment are indicated.

## Assessment and Referral Criteria

In presenting these guidelines we acknowledge that the school nurse may exercise her/his clinical judgment regarding referral decisions.

1. If BP (systolic and diastolic) values are less than the screening BP values listed in the BP Screening Tool
    a. Provide educational material regarding healthy diet, sleep, and physical activity for maintaining a healthy cardiovascular system.
2. If BP (systolic and/or diastolic) values are ≥ values listed in the BP Screening Tool, but the values are normal (i.e. BP < 90th percentile) in the BP Tables.
    a. Provide educational material regarding healthy diet, sleep and physical activity for maintaining a healthy cardiovascular system.
3. If the average BP (systolic and/or diastolic), after being repeated at least twice at the same visit, is at an **elevated blood pressure level**, the student's BP requires further evaluation.
    a. Provide educational material regarding healthy diet, sleep, and physical activity.
    b. Assess for other symptoms of hypertension (e.g., headaches, blurred vision, feeling faint) and/or other activities that might explain a high BP (e.g., exercise prior to BP measurement, caffeine intake, medications).
        i. If symptomatic, ask the student to rest for 15 minutes; then recheck the student's BP. Average the two measurements.
            1. Refer for evaluation by the student's health care practitioner.
            2. A telephone call to the student's parent/guardian should be placed immediately to discuss the BP screening results

and to assist with referral completion.

ii. If not symptomatic, recheck the student's BP again within one week, on two separate visits that are a few days apart. Average the measurements.

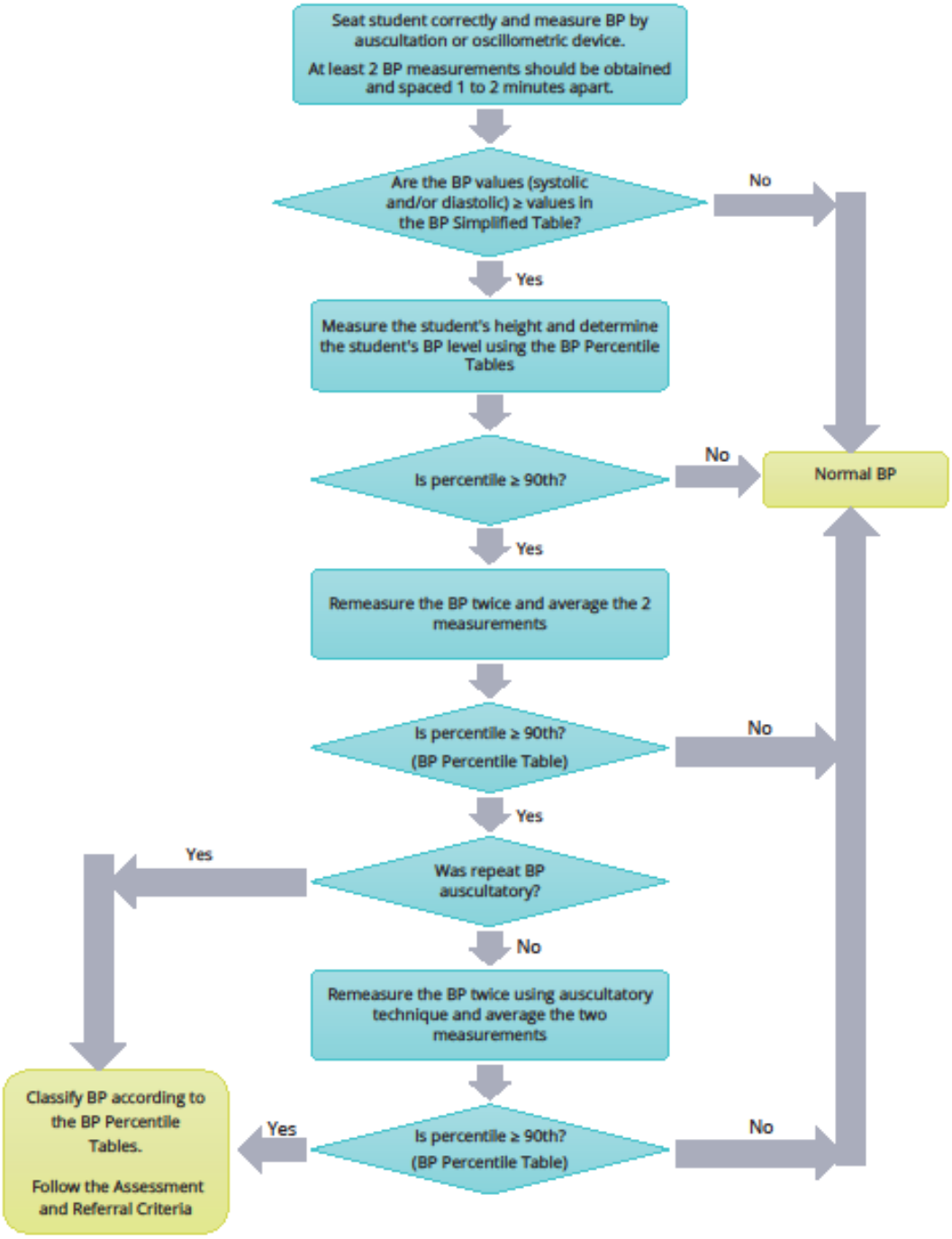
1. If the average BP (systolic and/or diastolic) remains at the elevated BP level, contact the parent/guardian and refer for an evaluation by the student's health care practitioner.

4. If BP (systolic and/or diastolic), after being repeated at least twice at the same visit, is at the **stage 1 hypertensive** (Stage 1 HT) level:
    a. Assess for other symptoms of hypertension (e.g., headaches, blurred vision, feeling faint) and/or other activities that might explain a high BP (e.g., exercise prior to BP measurement, caffeine intake, medications).
        i. If symptomatic, ask the student to rest for 15 minutes; then recheck the student's BP. Average the two measurements.
            1. Refer for evaluation by the student's health care practitioner.
            2. A telephone call to the student's parent/guardian should be placed immediately to discuss the BP screening results and to assist with referral completion.
        ii. If not symptomatic, recheck the student's BP again within one week, on two separate visits that are a few days apart. Average the measurements.
            1. If the average of the measurements is elevated, contact the parent/guardian, and refer for an evaluation by the student's health care practitioner.
    b. Provide educational material regarding healthy diet, sleep, and physical activity.

5. If BP (systolic and/or diastolic), after being repeated at least twice at the same visit, is at the **stage 2 hypertensive** (Stage 2 HT) level, it is a **priority referral**:
    a. Assess for other symptoms of hypertension (e.g., headaches, blurred vision, feeling faint) and/or other activities that might explain a high BP (e.g., exercise prior to BP measurement, caffeine intake, medications).
        i. If symptomatic, ask the student to rest for 15 minutes; then recheck the student's BP. Average the two measurements.
            1. Immediate referral for evaluation by the student's health care practitioner.
            2. Call the student's parent/guardian immediately to discuss the BP screening results and to assist with referral completion.
    b. Provide educational material regarding healthy diet, sleep, and physical activity.

## BP Screening in Schools Algorithm

The following algorithm is based on the modified BP measurement algorithm from the American Academy of Pediatrics' *Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents*.



## *Parent/Guardian Notification*

Parents/guardians should be notified of their child's screening results and provided information regarding cardiovascular health maintenance. Education and counseling should be provided about normal findings, deviations from normal, and for any specific concerns identified during the visit. Referrals for assessment, treatment, and follow-up may be made using an appropriate parent notification form found in Appendix B.

All students with a BP assessment that varies from normotensive should receive a referral to their health care practitioner for evaluation and treatment as indicated. Efforts should be made by the school nurse to assist parents/guardians with referral completion. All findings, referrals, and follow-up should be documented in the student's school health record.

*Sources:*


Centers for Disease Control and Prevention, (2010, September). *Growth Charts.* https://www.cdc.gov/growthcharts/

Jackson SL, Zhang Z, Wiltz JL, et al. Hypertension Among Youths — United States, 2001–2016. MMWR Morb Mortal Wkly Rep 2018;67:758–762. DOI: http://dx.doi.org/10.15585/mmwr.mm6727a2

Flynn JT, Kaelber DC, Baker-Smith CM, et al. (2017, September). Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics 2017. 140(3). https://pediatrics.aappublications.org/content/pediatrics/early/2017/08/21/peds.2017-1904.full.pdf

## *BP Tables*

### BP Levels for Boys by Age and Height Percentile[5]

| Age (years) | Systolic BP (mmHg) | | | | | | | Diastolic BP (mmHg) | | | | | | | BP Percentile |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Heigh Percentile or Measured Height | | | | | | | Heigh Percentile or Measured Height | | | | | | | |
| | 5th | 10th | 25th | 50th | 75th | 90th | 95th | 5th | 10th | 25th | 50th | 75th | 90th | 95th | |
| 2 | 33.9 | 34.4 | 35.3 | 36.3 | 37.3 | 38.2 | 38.8 | 33.9 | 34.4 | 35.3 | 36.3 | 37.3 | 38.2 | 38.8 | Height - *inches* |
| | **87** | **87** | **88** | **89** | **89** | **90** | **91** | **43** | **43** | **44** | **44** | **45** | **46** | **46** | **NT** |
| | **100** | **100** | **101** | **102** | **103** | **103** | **104** | **55** | **55** | **56** | **56** | **57** | **58** | **58** | **Elevated BP** |
| | **104** | **105** | **105** | **106** | **107** | **107** | **108** | **57** | **58** | **58** | **59** | **60** | **61** | **61** | **Stage 1 HT** |
| | **116** | **117** | **117** | **118** | **119** | **119** | **120** | **69** | **70** | **70** | **71** | **72** | **73** | **73** | **Stage 2 HT** |
| 3 | 36.4 | 37.0 | 37.9 | 39.0 | 40.1 | 41.1 | 41.7 | 36.4 | 37.0 | 37.9 | 39.0 | 40.1 | 41.1 | 41.7 | Height - *inches* |
| | **88** | **89** | **89** | **90** | **91** | **92** | **92** | **45** | **46** | **46** | **47** | **48** | **49** | 49 | **NT** |
| | **101** | **102** | **102** | **103** | **104** | **105** | **105** | **58** | **58** | **59** | **59** | **60** | **61** | 61 | **Elevated BP** |
| | **106** | **106** | **107** | **107** | **108** | **109** | **109** | **60** | **61** | **61** | **62** | **63** | **64** | 64 | **Stage 1 HT** |
| | **118** | **118** | **119** | **119** | **120** | **121** | **121** | **72** | **73** | **73** | **74** | **75** | **76** | 76 | **Stage 2 HT** |
| 4 | 38.8 | 39.4 | 40.5 | 41.7 | 42.9 | 43.9 | 44.5 | 38.8 | 39.4 | 40.5 | 41.7 | 42.9 | 43.9 | 44.5 | Height - *inches* |
| | **90** | **90** | **91** | **92** | **93** | **94** | **94** | **48** | **49** | **49** | **50** | **51** | **52** | **52** | **NT** |
| | **102** | **103** | **104** | **105** | **105** | **106** | **107** | **60** | **61** | **62** | **62** | **63** | **64** | **64** | **Elevated BP** |
| | **107** | **107** | **108** | **108** | **109** | **110** | **110** | **63** | **64** | **65** | **66** | **67** | **67** | **68** | **Stage 1 HT** |
| | **119** | **119** | **120** | **120** | **121** | **122** | **122** | **75** | **76** | **77** | **78** | **79** | **79** | **80** | **Stage 2 HT** |
| 5 | 41.1 | 41.8 | 43.0 | 44.3 | 45.5 | 46.7 | 47.4 | 41.1 | 41.8 | 43.0 | 44.3 | 45.5 | 46.7 | 47.4 | Height - *inches* |
| | **91** | **92** | **93** | **94** | **95** | **96** | **96** | **51** | **51** | **52** | **53** | **54** | **55** | **55** | **NT** |
| | **103** | **104** | **105** | **106** | **107** | **108** | **108** | **63** | **64** | **65** | **65** | **66** | **67** | **67** | **Elevated BP** |
| | **107** | **108** | **109** | **109** | **110** | **111** | **112** | **66** | **67** | **68** | **69** | **70** | **70** | **71** | **Stage 1 HT** |
| | **119** | **120** | **121** | **121** | **122** | **123** | **124** | **78** | **79** | **80** | **81** | **82** | **82** | **83** | **Stage 2 HT** |
| 6 | 43.4 | 44.2 | 45.4 | 46.8 | 48.2 | 49.4 | 50.2 | 43.4 | 44.2 | 45.4 | 46.8 | 48.2 | 49.4 | 50.2 | Height - *inches* |
| | **93** | **93** | **94** | **95** | **96** | **97** | **98** | **54** | **54** | **55** | **56** | **57** | **57** | **58** | **NT** |
| | **105** | **105** | **106** | **107** | **109** | **110** | **110** | **66** | **66** | **67** | **68** | **68** | **69** | **69** | **Elevated BP** |
| | **108** | **109** | **110** | **111** | **112** | **113** | **114** | **69** | **70** | **70** | **71** | **72** | **72** | **73** | **Stage 1 HT** |
| | **120** | **121** | **122** | **123** | **124** | **125** | **126** | **81** | **82** | **82** | **83** | **84** | **84** | **85** | **Stage 2 HT** |
| 7 | 4.5.7 | 46.5 | 47.8 | 49.3 | 50.8 | 52.1 | 52.9 | 45.7 | 46.5 | 47.8 | 49.3 | 50.8 | 52.1 | 52.9 | Height - *inches* |
| | **94** | **94** | **95** | **97** | **98** | **98** | **99** | **56** | **56** | **57** | **58** | **58** | **59** | **59** | **NT** |

[5] The 90th percentile is 1.28 SD, the 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean. **NT** = normotensive (50th percentile). **PreHT** = pre-hypertensive (90th percentile). **HT** = hypertensive (95th percentile for stage 1 and 99th% + 5 mmHg for stage 2).

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **106** | **107** | **108** | **109** | **110** | **111** | **111** | **68** | **68** | **69** | **70** | **70** | **71** | **71** | **Elevated BP** |
| | **110** | **110** | **111** | **112** | **114** | **115** | **116** | **71** | **71** | **72** | **73** | **73** | **74** | **74** | **Stage 1 HT** |
| | **122** | **122** | **123** | **124** | **126** | **127** | **128** | **83** | **83** | **84** | **85** | **85** | **86** | **86** | **Stage 2 HT** |
| **8** | 47.8 | 48.6 | 50.0 | 51.6 | 53.2 | 54.6 | 55.5 | 47.8 | 48.6 | 50.0 | 51.6 | 53.2 | 54.6 | 55.5 | Height - *inches* |
| | **95** | **96** | **97** | **98** | **99** | **99** | **100** | **57** | **57** | **58** | **59** | **59** | **60** | **60** | **NT** |
| | **107** | **108** | **109** | **110** | **111** | **112** | **112** | **69** | **70** | **70** | **71** | **72** | **72** | **73** | **Elevated BP** |
| | **111** | **112** | **112** | **114** | **115** | **116** | **117** | **72** | **73** | **73** | **74** | **75** | **75** | **75** | **Stage 1 HT** |
| | **123** | **124** | **124** | **126** | **127** | **128** | **129** | **84** | **85** | **85** | **86** | **87** | **87** | **87** | **Stage 2 HT** |
| **9** | 49.6 | 50.5 | 52.0 | 53.7 | 55.4 | 56.9 | 57.9 | 49.6 | 50.5 | 52.0 | 53.7 | 55.4 | 56.9 | 57.9 | Height - *inches* |
| | **96** | **97** | **98** | **99** | **100** | **101** | **101** | **57** | **58** | **59** | **60** | **61** | **62** | **62** | **NT** |
| | **107** | **108** | **109** | **110** | **112** | **113** | **114** | **70** | **71** | **72** | **73** | **74** | **74** | **74** | **Elevated BP** |
| | **112** | **112** | **m** | **115** | **116** | **118** | **119** | **74** | **74** | **75** | **76** | **76** | **77** | **77** | **Stage 1 HT** |
| | **124** | **124** | **125** | **127** | **128** | **130** | **131** | **86** | **86** | **87** | **8** | **88** | **89** | **89** | **Stage 2 HT** |
| **10** | 51.3 | 52.2 | 53.8 | 55.6 | 57.4 | 59.1 | 60.1 | 51.3 | 52.2 | 53.8 | 55.6 | 57.4 | 59.1 | 60.1 | Height - *inches* |
| | **97** | **98** | **99** | **100** | **101** | **102** | **103** | **59** | **60** | **61** | **62** | **63** | **63** | **64** | **NT** |
| | **108** | **109** | **111** | **112** | **113** | **115** | **116** | **72** | **73** | **74** | **74** | **75** | **75** | **76** | **Elevated BP** |
| | **112** | **113** | **114** | **116** | **118** | **120** | **121** | **76** | **76** | **77** | **77** | **78** | **78** | **78** | **Stage 1 HT** |
| | **124** | **125** | **126** | **128** | **130** | **132** | **133** | **88** | **88** | **89** | **89** | **90** | **90** | **90** | **Stage 2 HT** |
| **11** | 53.0 | 54.0 | 55.7 | 57.6 | 59.6 | 61.3 | 62.4 | 53.0 | 54.0 | 55.7 | 57.6 | 59.6 | 61.3 | 62.4 | Height - *inches* |
| | **99** | **99** | **101** | **102** | **103** | **104** | **106** | **61** | **61** | **62** | **63** | **63** | **63** | **63** | **NT** |
| | **110** | **111** | **112** | **114** | **116** | **117** | **118** | **74** | **74** | **75** | **75** | **75** | **76** | **76** | **Elevated BP** |
| | **114** | **114** | **116** | **118** | **120** | **123** | **124** | **77** | **78** | **78** | **78** | **78** | **78** | **78** | **Stage 1 HT** |
| | **126** | **126** | **128** | **130** | **132** | **135** | **136** | **89** | **90** | **90** | **90** | **90** | **90** | **90** | **Stage 2 HT** |
| **12** | 55.2 | 56.3 | 58.1 | 60.1 | 62.2 | 64.0 | 65.2 | 55.2 | 56.3 | 58.1 | 60.1 | 62.2 | 64.0 | 65.2 | Height - *inches* |
| | **101** | **101** | **102** | **104** | **106** | **108** | **109** | **61** | **62** | **62** | **62** | **62** | **63** | **63** | **NT** |
| | **113** | **114** | **115** | **117** | **119** | **121** | **122** | **75** | **75** | **75** | **75** | **75** | **76** | **76** | **Elevated BP** |
| | **116** | **117** | **118** | **121** | **124** | **126** | **128** | **78** | **78** | **78** | **78** | **78** | **79** | **79** | **Stage 1 HT** |
| | **128** | **129** | **130** | **133** | **136** | **138** | **140** | **90** | **90** | **90** | **90** | **90** | **91** | **91** | **Stage 2 HT** |
| **13** | 57.9 | 59.1 | 61.0 | 63.1 | 65.2 | 67.1 | 68.3 | 57.9 | 59.1 | 61.0 | 63.1 | 65.2 | 67.1 | 68.3 | Height - *inches* |
| | **103** | **104** | **105** | **108** | **110** | **111** | **112** | **61** | **60** | **61** | **62** | **63** | **64** | **65** | **NT** |
| | **115** | **116** | **118** | **121** | **124** | **126** | **126** | **74** | **74** | **74** | **75** | **76** | **77** | **77** | **Elevated BP** |
| | **119** | **120** | **122** | **125** | **128** | **130** | **131** | **78** | **78** | **78** | **78** | **80** | **81** | **81** | **Stage 1 HT** |
| | **131** | **132** | **134** | **137** | **140** | **142** | **143** | **90** | **90** | **90** | **90** | **92** | **93** | **93** | **Stage 2 HT** |
| **14** | 60.6 | 61.8 | 63.8 | 65.9 | 68.0 | 69.8 | 70.9 | 60.6 | 61.8 | 63.8 | 65.9 | 68.0 | 69.8 | 70.9 | Height - *inches* |
| | **105** | **106** | **109** | **111** | **112** | **113** | **113** | **60** | **60** | **62** | **64** | **65** | **66** | **67** | **NT** |
| | **119** | **120** | **123** | **126** | **127** | **128** | **129** | **74** | **74** | **75** | **77** | **78** | **79** | **80** | **Elevated BP** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **123** | **125** | **127** | **130** | **132** | **133** | **134** | **77** | **78** | **79** | **81** | **82** | **83** | **84** | **Stage 1 HT** |
| | **135** | **137** | **139** | **142** | **144** | **145** | **146** | **89** | **90** | **91** | **93** | **94** | **95** | **96** | **Stage 2 HT** |
| **15** | 62.6 | 63.8 | 65.7 | 67.8 | 69.8 | 71.5 | 72.5 | 62.6 | 63.8 | 65.7 | 67.8 | 69.8 | 71.5 | 72.5 | Height - *inches* |
| | **108** | **110** | **112** | **113** | **114** | **114** | **114** | **61** | **62** | **64** | **65** | **66** | **67** | **68** | **NT** |
| | **123** | **124** | **126** | **128** | **129** | **130** | **130** | **75** | **76** | **78** | **79** | **80** | **81** | **81** | **Elevated BP** |
| | **127** | **129** | **131** | **132** | **134** | **135** | **135** | **78** | **79** | **81** | **83** | **84** | **85** | **85** | **Stage 1 HT** |
| | **139** | **141** | **143** | **144** | **146** | **147** | **147** | **90** | **91** | **93** | **95** | **96** | **97** | **97** | **Stage 2 HT** |
| **16** | 63.8 | 64.9 | 66.8 | 68.8 | 70.7 | 72.4 | 73.4 | 63.8 | 64.9 | 66.8 | 68.8 | 70.7 | 72.4 | 73.4 | Height - *inches* |
| | **111** | **112** | **114** | **115** | **115** | **116** | **116** | **63** | **64** | **66** | **67** | **68** | **69** | **69** | **NT** |
| | **126** | **127** | **128** | **129** | **131** | **131** | **132** | **77** | **78** | **79** | **80** | **81** | **82** | **82** | **Elevated BP** |
| | **130** | **131** | **133** | **134** | **135** | **136** | **137** | **80** | **81** | **83** | **84** | **85** | **86** | **86** | **Stage 1 HT** |
| | **142** | **143** | **15** | **146** | **147** | **148** | **149** | **92** | **93** | **95** | **96** | **97** | **98** | **98** | **Stage 2 HT** |
| **17** | 64.5 | 65.5 | 67.3 | 69.2 | 71.1 | 72.8 | 73.8 | 64.5 | 65.5 | 67.3 | 69.2 | 71.1 | 72.8 | 73.8 | Height - *inches* |
| | **114** | **115** | **116** | **117** | **117** | **118** | **118** | **65** | **66** | **67** | **68** | **69** | **70** | **70** | **NT** |
| | **128** | **129** | **130** | **131** | **132** | **133** | **134** | **78** | **79** | **80** | **81** | **82** | **82** | **83** | **Elevated BP** |
| | **132** | **133** | **134** | **135** | **137** | **138** | **138** | **8l** | **82** | **84** | **85** | **86** | **86** | **87** | **Stage 1 HT** |
| | **144** | **145** | **146** | **147** | **149** | **150** | **150** | **93** | **94** | **96** | **97** | **98** | **98** | **99** | **Stage 2 HT** |

## BP Levels for Girls by Age and Height Percentile[6]

| Age (years) | Systolic BP (mmHg) | | | | | | | Diastolic BP (mmHg) | | | | | | | BP Percentile |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Heigh Percentile or Measured Height | | | | | | | Heigh Percentile or Measured Height | | | | | | | |
| | 5th | 10th | 25th | 50th | 75th | 90th | 95th | 5th | 10th | 25th | 50th | 75th | 90th | 95th | |
| 2 | 33.4 | 34.0 | 34.9 | 35.9 | 36.9 | 37.8 | 38.4 | 33.4 | 34.0 | 34.9 | 35.9 | 36.9 | 37.8 | 38.4 | Height - *inches* |
| | **87** | **87** | **88** | **89** | **90** | **91** | **91** | **45** | **46** | **47** | **48** | **49** | **50** | **51** | **NT** |
| | **101** | **101** | **102** | **103** | **104** | **105** | **106** | **58** | **58** | **59** | **60** | **61** | **62** | **62** | **Elevated BP** |
| | **104** | **105** | **106** | **106** | **107** | **108** | **109** | **62** | **63** | **63** | **64** | **65** | **66** | **66** | **Stage 1 HT** |
| | **116** | **117** | **118** | **118** | **119** | **120** | **121** | **74** | **75** | **75** | **76** | **77** | **78** | **78** | **Stage 2 HT** |
| 3 | 35.8 | 36.4 | 37.3 | 38.4 | 39.6 | 40.6 | 41.2 | 35.8 | 36.4 | 37.3 | 38.4 | 39.6 | 40.6 | 41.2 | Height - *inches* |
| | **88** | **89** | **89** | **90** | **91** | **92** | **93** | **48** | **48** | **49** | **50** | **51** | **53** | **53** | **NT** |
| | **102** | **103** | **104** | **104** | **105** | **106** | **107** | **60** | **61** | **61** | **62** | **63** | **64** | **65** | **Elevated BP** |
| | **106** | **106** | **107** | **108** | **109** | **110** | **110** | **64** | **65** | **65** | **66** | **67** | **68** | **69** | **Stage 1 HT** |
| | **118** | **118** | **119** | **120** | **121** | **122** | **122** | **76** | **77** | **77** | **78** | **79** | **80** | **81** | **Stage 2 HT** |
| 4 | 38.3 | 38.9 | 39.9 | 41.1 | 42.4 | 43.5 | 44.2 | 38.3 | 38.9 | 39.9 | 41.1 | 42.4 | 43.5 | 44.2 | Height - *inches* |
| | **89** | **90** | **91** | **92** | **93** | **94** | **94** | **50** | **51** | **51** | **53** | **54** | **55** | **55** | **NT** |
| | **103** | **104** | **105** | **106** | **107** | **108** | **108** | **62** | **63** | **64** | **65** | **66** | **67** | **67** | **Elevated BP** |
| | **107** | **108** | **109** | **109** | **110** | **111** | **112** | **66** | **67** | **68** | **69** | **70** | **70** | **71** | **Stage 1 HT** |
| | **119** | **120** | **121** | **121** | **122** | **123** | **124** | **78** | **79** | **80** | **81** | **82** | **82** | **83** | **Stage 2 HT** |
| 5 | 40.8 | 41.5 | 42.6 | 43.9 | 45.2 | 46.5 | 47.3 | 40.8 | 41.5 | 42.6 | 43.9 | 45.2 | 46.5 | 47.3 | Height - *inches* |
| | **90** | **91** | **92** | **93** | **94** | **95** | **96** | **52** | **52** | **53** | **55** | **56** | **57** | **57** | **NT** |
| | **104** | **105** | **106** | **107** | **108** | **109** | **110** | **64** | **65** | **66** | **67** | **68** | **69** | **70** | **Elevated BP** |
| | **108** | **109** | **109** | **110** | **111** | **112** | **113** | **68** | **69** | **70** | **71** | **72** | **73** | **73** | **Stage 1 HT** |
| | **120** | **121** | **121** | **122** | **123** | **124** | **125** | **80** | **81** | **82** | **83** | **84** | **85** | **85** | **Stage 2 HT** |
| 6 | 43.3 | 44.0 | 45.2 | 46.6 | 48.1 | 49.4 | 50.3 | 43.3 | 44.0 | 45.2 | 46.6 | 48.1 | 49.4 | 50.3 | Height - *inches* |
| | **92** | **92** | **93** | **94** | **96** | **97** | **97** | **54** | **54** | **55** | **56** | **57** | **58** | **59** | **NT** |
| | **105** | **106** | **107** | **108** | **109** | **110** | **111** | **67** | **67** | **68** | **69** | **70** | **71** | **71** | **Elevated BP** |
| | **109** | **109** | **110** | **111** | **112** | **113** | **114** | **70** | **71** | **72** | **72** | **73** | **74** | **74** | **Stage 1 HT** |
| | **121** | **121** | **122** | **123** | **124** | **125** | **126** | **82** | **83** | **84** | **84** | **85** | **86** | **86** | **Stage 2 HT** |
| 7 | 45.6 | 46.4 | 47.7 | 49.2 | 50.7 | 52.1 | 53.0 | 45.6 | 46.4 | 47.7 | 49.2 | 50.7 | 52.1 | 53.0 | Height - *inches* |
| | **92** | **93** | **94** | **95** | **97** | **98** | **99** | **55** | **55** | **56** | **57** | **58** | **59** | **60** | **NT** |
| | **106** | **106** | **107** | **109** | **110** | **111** | **112** | **68** | **68** | **69** | **70** | **71** | **72** | **72** | **Elevated BP** |
| | **109** | **110** | **111** | **112** | **113** | **114** | **115** | **72** | **72** | **73** | **73** | **74** | **74** | **75** | **Stage 1 HT** |
| | **121** | **122** | **123** | **124** | **125** | **126** | **127** | **84** | **84** | **85** | **85** | **86** | **86** | **87** | **Stage 2 HT** |
| 8 | 47.6 | 48.4 | 49.8 | 51.4 | 53.0 | 54.5 | 55.5 | 47.6 | 48.4 | 49.8 | 51.4 | 53.0 | 54.5 | 55.5 | Height - *inches* |

[6] The 90th percentile is 1.28 SD, the 95th percentile is 1.645 SD, and the 99th percentile is 2.326 SD over the mean. **NT** = normotensive (50th percentile). **PreHT** = pre-hypertensive (90th percentile). **HT** = hypertensive (95th percentile for stage 1 and 99th% + 5 mmHg for stage 2).

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **93** | **94** | **95** | **97** | **98** | **99** | **100** | **56** | **56** | **57** | **59** | **60** | **61** | **61** | **NT** |
| | **107** | **107** | **108** | **110** | **111** | **112** | **113** | **69** | **70** | **71** | **72** | **72** | **73** | **73** | **Elevated BP** |
| | **110** | **111** | **112** | **113** | **115** | **116** | **117** | **72** | **73** | **74** | **74** | **75** | **75** | **75** | **Stage 1 HT** |
| | **122** | **123** | **124** | **125** | **127** | **128** | **129** | **84** | **85** | **86** | **86** | **87** | **87** | **87** | **Stage 2 HT** |
| | 49.3 | 50.2 | 51.7 | 53.4 | 55.1 | 56.7 | 57.7 | 49.3 | 50.2 | 51.7 | 53.4 | 55.1 | 56.7 | 57.7 | Height - *inches* |
| **9** | **95** | **95** | **97** | **98** | **99** | **100** | **101** | **57** | **58** | **59** | **60** | **60** | **61** | **61** | **NT** |
| | **108** | **108** | **109** | **111** | **112** | **113** | **114** | **71** | **71** | **72** | **73** | **73** | **73** | **73** | **Elevated BP** |
| | **112** | **112** | **113** | **114** | **116** | **117** | **118** | **74** | **74** | **75** | **75** | **75** | **75** | **75** | **Stage 1 HT** |
| | **124** | **124** | **125** | **126** | **128** | **129** | **130** | **86** | **86** | **87** | **87** | **87** | **87** | **87** | **Stage 2 HT** |
| | 51.1 | 52.0 | 53.7 | 55.5 | 57.4 | 59.1 | 60.2 | 51.1 | 52.0 | 53.7 | 55.5 | 57.4 | 59.1 | 60.2 | Height - *inches* |
| **10** | **96** | **97** | **98** | **99** | **101** | **102** | **103** | **58** | **59** | **59** | **60** | **61** | **61** | **62** | **NT** |
| | **109** | **110** | **111** | **112** | **113** | **115** | **116** | **72** | **73** | **73** | **73** | **73** | **73** | **73** | **Elevated BP** |
| | **113** | **114** | **114** | **116** | **117** | **119** | **120** | **75** | **75** | **76** | **76** | **76** | **76** | **76** | **Stage 1 HT** |
| | **125** | **126** | **126** | **128** | **129** | **131** | **132** | **87** | **87** | **88** | **88** | **88** | **88** | **88** | **Stage 2 HT** |
| | 53.4 | 54.5 | 56.2 | 58.2 | 60.2 | 61.9 | 63.0 | 53.4 | 54.5 | 56.2 | 58.2 | 60.2 | 61.9 | 63.0 | Height - *inches* |
| **11** | **98** | **9** | **101** | **102** | **104** | **105** | **106** | **60** | **60** | **60** | **61** | **62** | **63** | **64** | **NT** |
| | **111** | **112** | **113** | **114** | **116** | **118** | **120** | **74** | **74** | **74** | **74** | **74** | **75** | **75** | **Elevated BP** |
| | **115** | **116** | **117** | **118** | **120** | **123** | **124** | **76** | **77** | **77** | **77** | **77** | **77** | **77** | **Stage 1 HT** |
| | **127** | **128** | **129** | **130** | **132** | **135** | **136** | **88** | **89** | **89** | **89** | **89** | **89** | **89** | **Stage 2 HT** |
| | 56.2 | 57.3 | 59.0 | 60.9 | 62.8 | 64.5 | 65.5 | 56.2 | 57.3 | 59.0 | 60.9 | 62.8 | 64.5 | 65.5 | Height - *inches* |
| **12** | **102** | **102** | **104** | **105** | **107** | **108** | **108** | **61** | **61** | **61** | **62** | **64** | **65** | **65** | **NT** |
| | **114** | **115** | **116** | **118** | **120** | **122** | **122** | **75** | **75** | **75** | **75** | **76** | **76** | **76** | **Elevated BP** |
| | **118** | **119** | **120** | **122** | **124** | **125** | **126** | **78** | **78** | **78** | **78** | **79** | **79** | **79** | **Stage 1 HT** |
| | **130** | **131** | **132** | **134** | **136** | **137** | **138** | **90** | **90** | **90** | **90** | **91** | **91** | **91** | **Stage 2 HT** |
| | 58.3 | 59.3 | 60.9 | 62.7 | 64.5 | 66.1 | 67.0 | 58.3 | 59.3 | 60.9 | 62.7 | 64.5 | 66.1 | 67.0 | Height - *inches* |
| **13** | **104** | **105** | **106** | **107** | **108** | **108** | **109** | **62** | **62** | **63** | **64** | **65** | **65** | **66** | **NT** |
| | **116** | **117** | **119** | **121** | **122** | **123** | **123** | **75** | **75** | **75** | **76** | **76** | **76** | **76** | **Elevated BP** |
| | **121** | **122** | **123** | **124** | **126** | **126** | **127** | **79** | **79** | **79** | **79** | **80** | **80** | **81** | **Stage 1 HT** |
| | **133** | **134** | **135** | **136** | **138** | **138** | **139** | **91** | **91** | **91** | **91** | **92** | **92** | **93** | **Stage 2 HT** |
| | 59.3 | 60.2 | 61.8 | 63.5 | 65.2 | 66.8 | 67.7 | 59.3 | 60.2 | 61.8 | 63.5 | 65.2 | 66.8 | 67.7 | Height - *inches* |
| **14** | **105** | **106** | **107** | **108** | **109** | **109** | **109** | **63** | **63** | **64** | **65** | **66** | **66** | **66** | **NT** |
| | **118** | **118** | **120** | **122** | **123** | **123** | **123** | **76** | **76** | **76** | **76** | **77** | **77** | **77** | **Elevated BP** |
| | **123** | **123** | **124** | **125** | **126** | **127** | **127** | **80** | **80** | **80** | **80** | **81** | **81** | **82** | **Stage 1 HT** |
| | **135** | **135** | **136** | **137** | **138** | **139** | **139** | **92** | **92** | **92** | **92** | **93** | **93** | **94** | **Stage 2 HT** |
| | 59.7 | 60.6 | 62.2 | 63.9 | 65.6 | 67.2 | 68.1 | 59.7 | 60.6 | 62.2 | 63.9 | 65.6 | 67.2 | 68.1 | Height - *inches* |
| **15** | **105** | **106** | **107** | **108** | **109** | **109** | **109** | **64** | **64** | **64** | **65** | **66** | **67** | **67** | **NT** |
| | **118** | **119** | **121** | **122** | **123** | **123** | **124** | **76** | **76** | **76** | **77** | **77** | **78** | **78** | **Elevated BP** |
| | **124** | **124** | **125** | **126** | **127** | **127** | **128** | **80** | **80** | **80** | **81** | **82** | **82** | **82** | **Stage 1 HT** |
| | **136** | **136** | **137** | **138** | **139** | **139** | **140** | **92** | **92** | **92** | **93** | **94** | **94** | **94** | **Stage 2 HT** |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 59.9 | 60.8 | 62.4 | 64.1 | 65.8 | 67.3 | 68.3 | 59.9 | 60.8 | 62.4 | 64.1 | 65.8 | 67.3 | 68.3 | Height - *inches* |
| | **106** | **107** | **108** | **109** | **109** | **110** | **110** | **64** | **64** | **65** | **66** | **66** | **67** | **67** | **NT** |
| **16** | **119** | **120** | **122** | **123** | **124** | **124** | **124** | **76** | **76** | **76** | **77** | **78** | **78** | **78** | **Elevated BP** |
| | **124** | **125** | **125** | **127** | **127** | **128** | **128** | **80** | **80** | **80** | **81** | **82** | **82** | **82** | **Stage 1 HT** |
| | **136** | **137** | **137** | **139** | **139** | **140** | **140** | **92** | **92** | **92** | **93** | **94** | **94** | **94** | **Stage 2 HT** |
| | 60.0 | 60.9 | 62.5 | 64.2 | 65.9 | 67.4 | 68.4 | 60.0 | 60.9 | 62.5 | 64.2 | 65.9 | 67.4 | 68.4 | Height - *inches* |
| | **107** | **108** | **109** | **110** | **110** | **110** | **111** | **64** | **64** | **65** | **66** | **66** | **66** | **67** | **NT** |
| **17** | **120** | **121** | **123** | **124** | **124** | **125** | **125** | **76** | **76** | **77** | **77** | **78** | **78** | **78** | **Elevated BP** |
| | **125** | **125** | **126** | **127** | **128** | **128** | **128** | **80** | **80** | **80** | **81** | **82** | **82** | **82** | **Stage 1 HT** |
| | **137** | **137** | **138** | **139** | **140** | **140** | **140** | **92** | **92** | **92** | **93** | **94** | **94** | **94** | **Stage 2 HT** |

# Scoliosis Screening

The Scoliosis Research Society (SRS), American Academy of Orthopedic Surgeons (AAOS), Pediatric Orthopedic Society of North America (POSNA) and American Academy of Pediatrics (AAP) recommend that scoliosis screening be performed twice for females at age ten and twelve years, while males should be screened once at age 13 to 14 years. It is recommended to screen females twice and at younger ages because females reach puberty earlier and have scoliosis requiring treatment more frequently than males.

To be congruent with age-specific scoliosis screening recommendations, schools are encouraged to screen all 5th grade girls, 7th grade girls and 8th grade boys for scoliosis once a year. Screening girls in only 6th grade is a reasonable alternative. Staff training for scoliosis screenings is required and specific LEA protocols must be used. If your school system chooses to screen for scoliosis, it is recommended to partner with a local orthopedic doctor, osteopathy doctor or other trained professional to provide specific training for school staff and/or volunteers.

## *Scoliosis Screening Rationale*

Scoliosis is a physical condition characterized by an abnormal curvature of the spine. Its cause is unknown in most cases. The amount of curvature is measured in degrees after an X-ray and can vary from mild to severe. It is most often seen in the middle school age group when rapid growth is occurring. Both girls and boys may be affected, but the risk of curve progression is ten times higher in females. Treatment ranges from observation to bracing to corrective surgery in severe cases. After scoliosis is identified or suspected, follow-up is essential to measure the degree of curvature and determine treatment options. Kyphosis, an accentuated spinal hump, and lordosis, or swayback, may occur independently or in conjunction with scoliosis.

## *Scoliosis Screening Program*

Scoliosis screening consists of a primary screen by school personnel. Specially trained PE (Physical Education) teachers, clinic personnel, or volunteers can complete or assist school nurses with primary screening. Female examiners are preferable for female students. A second screening of those who appear to deviate from normal shall be performed at a separate session