

**Table 2: Evidence for Hypertension Screening for Children Who are Overweight or Obese**

Type of Evidence	Key Findings	Level of Evidence (USPSTF Ranking*)	Citations
<b>Expert recommendation</b>	Hypertension is a risk factor for cardiovascular disease; approximately 13% of overweight children have elevated systolic blood pressure, and approximately 9% have elevated diastolic blood pressure. Blood pressure should be assessed at all health supervision visits, and offices should have large cuffs, including thigh cuffs, which allow accurate assessment of blood pressure for severely obese youths. The National Heart, Lung and Blood Institute has updated tables defining elevated blood pressure levels, according to age, gender, and height percentile, which offices should have for easy reference. Three or more readings above the 95 <sup>th</sup> percentile for either systolic or diastolic blood pressure indicate hypertension. The expert committee recommends that physicians and allied health care providers obtain a focused family history for obesity, type 2 diabetes, and cardiovascular disease (particularly hypertension), and early deaths resulting from heart disease or stroke, to assess the risks of current or future comorbidities associated with a child's overweight or obese status.	III	Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. <i>Pediatrics</i> 2007; 120(Suppl 4):S164-S192
<b>Consensus statement</b>	Hypertension occurs more commonly in obese persons of every age, and childhood obesity is the leading cause of pediatric hypertension. Genetic, metabolic, and hormonal factors such as insulin resistance, increased serum aldosterone levels, salt sensitivity, and possibly elevated leptin levels are linked to the hypertension of obesity. Systolic blood pressure correlates positively with BMI. Laboratory assessments for children with a BMI above the 95 <sup>th</sup> percentile should include screening for comorbidities, including hypertension. Obese children with hypertension will require the services of specialists in the setting of a specialized obesity clinic.	III	Speiser PW, Rudolf MC, Anhalt H, et al. Childhood obesity. <i>J Clin Endocrinol Metab</i> 2005; 90(3):1871-1887
<b>Integrated guidelines</b>	Atherosclerotic cardiovascular disease remains the leading cause of death in North America. Risk factors and risk behaviors accelerate the development of atherosclerosis, and risk reduction delays progression toward clinical disease, which culminates in thrombosis,	III	Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents; National Heart, Lung and Blood Institute. Expert Panel

	<p>vascular rupture, or acute ischemic syndrome. Overweight and obesity, nutrition/diet, physical inactivity, and blood pressure are all factors to be evaluated to determine risk. Over the last 20 years, blood pressure levels have been increasing, and the prevalence of hypertension and pre-hypertension are also increasing, explained partially by obesity rates. Higher BMI in childhood is directly associated with increased coronary heart disease in adult life. Extrapolation from current data suggest that adolescent obesity will likely increase adult coronary heart disease by 5% to 16% over the next 25 years, with more than 100,000 excess cases of coronary heart disease attributable to increased obesity in childhood. Guidelines call for measuring blood pressure annually for all children ages 3 through 17 years; charting results for age, gender, and height; reviewing results with parent; and offering management. If blood pressure is <math>\geq 90^{\text{th}}</math> percentile, further evaluation is called for.</p>		<p>on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents: Summary Report. <i>Pediatrics</i> 2011; 128: (Suppl5):S213-S256</p>
<p><b>Clinical guidelines</b></p>	<p>Primary hypertension is detectable in children and adolescents and, as in adults, is associated with obesity, lifestyle, and a positive family history of hypertension. The childhood obesity epidemic has led to an increasing population prevalence of high blood pressure in children. Although death and cardiovascular disability don't occur in children with hypertension, intermediate markers of target organ damage (left ventricular hypertrophy, thickening of the carotid vessel wall, retinal vascular changes, and even subtle cognitive changes) are detectable in children and adolescents with high blood pressure. Given the rates of hypertension and pre-hypertension in asymptomatic children and adolescents, high blood pressure should be considered a long-term health problem in childhood.</p>	<p>III</p>	<p>Falkner B. Hypertension in children and adolescents: Epidemiology and natural history. <i>Pediatr Nephrol</i> 2010; 25:1219-1224</p>

*Note: USPSTF criteria for assessing evidence at the individual study level are as follows: I) Properly powered and conducted randomized controlled trial (RCT); well-conducted systematic review or meta-analysis of homogeneous RCTs. II) Well-designed cohort or case-control analytic study. III) Opinions of respected authorities, based on clinical experience; descriptive studies or case reports; reports of expert committees.*