

# Health Maintenance in School-Aged Children: Part I. History, Physical Examination, Screening, and Immunizations

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The goals of the health maintenance visit in school-aged children (five to 12 years) are promoting health, detecting disease, and counseling to prevent injury and future health problems. During the visit, the physician should address patient and parent/caregiver concerns and ask about emergency department or hospital care since the last visit; lifestyle habits (diet, physical activity, daily screen time, secondhand smoke exposure, hours of sleep per night, dental care, safety habits); and school performance. Poor school performance may indicate problems such as learning disabilities, attention-deficit/hyperactivity disorder, or bullying. Pre-visit questionnaires and psychosocial screening questionnaires are also useful. When performing a physical examination, the physician should be alert for signs of abuse. Children should be screened for obesity (defined as body mass index at or above the 95th percentile for age and sex), and obese children should be referred for intensive behavioral interventions. Although its recommendations are primarily based on expert opinion, the American Academy of Pediatrics recommends screening for hypertension annually, vision and hearing problems approximately every two years, and dyslipidemia once between nine and 11 years of age; regular screening for risk factors related to social determinants of health is also recommended. There is insufficient evidence to recommend routine screening for depression before 12 years of age, but depression should be considered in children younger than 12 years presenting with unexplained somatic symptoms, restlessness, separation anxiety, phobias, or hallucinations. Children living in areas with inadequate levels of fluoride in the water supply (0.6 ppm or less) should receive daily fluoride supplements. Age-appropriate immunizations should be given, as well as any catch-up immunizations. (*Am Fam Physician*. 2019;100(4):213-218. Copyright © 2019 American Academy of Family Physicians.)



Illustration by Jennifer Fairman

**The goals** of the health maintenance visit in school-aged children (five to 12 years) are promoting health, detecting disease, and counseling to prevent injury and future health problems. It is also an opportunity for family physicians to stay connected with children and their families. Health

maintenance visits should focus on evidence-based screening and counseling interventions that have a beneficial effect on children's health. This article, part I of a two-part series, discusses history, physical examination, screening, and immunization recommendations for health maintenance in school-aged children. Part II, in this issue of *American Family Physician (AFP)*, focuses on counseling recommendations.<sup>1</sup>

## History

During a health maintenance visit for a school-aged child, the history should include screening questions and address any concerns raised by the child and parent or guardian. The patient's medical history, including surgeries or emergency department or hospital care since the last visit;

**This is part I** of a two-part article on health maintenance in school-aged children. Part II, "Counseling Recommendations," appears in this issue of *AFP* on page 219.

**CME** This clinical content conforms to AAFP criteria for continuing medical education (CME). See CME Quiz on page 205.

**Author disclosure:** No relevant financial affiliations.

## SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	Evidence rating	Comments
School-aged children should be screened for obesity by measuring body mass index. Those with obesity (i.e., body mass index at or above the 95th percentile) should be offered resources and referral for comprehensive, intensive behavioral interventions. <sup>13,14,18</sup>	<b>B</b>	Based on studies showing that intensive (more than 26 contact hours) behavioral interventions can result in reduced weight; evidence for less-intensive interventions is inconclusive
The American Academy of Pediatrics recommends annual blood pressure measurements in school-aged children, or at every health care encounter in those who have risk factors. <sup>12,17</sup>	<b>C</b>	Based on expert opinion from the American Academy of Pediatrics; the U.S. Preventive Services Task Force, however, found insufficient evidence to assess the benefits and risks of universal blood pressure screening in children and adolescents <sup>15</sup>
Children living in areas with inadequate fluoride in the water supply (0.6 ppm or less) should take a daily fluoride supplement. <sup>27,28</sup>	<b>B</b>	Based on expert opinion and a small number of placebo-controlled trials
School-aged children should receive age-appropriate immunizations, as well as catch-up immunizations if needed. <sup>29,30</sup>	<b>A</b>	Based on consistent evidence from randomized controlled trials showing reduced incidence of disease and complications when children receive immunizations

**A** = consistent, good-quality patient-oriented evidence; **B** = inconsistent or limited-quality patient-oriented evidence; **C** = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to <https://www.aafp.org/afpsort>.

medications; allergies; and family history should be briefly reviewed. Social history can be particularly important in this age group. Living situation and lifestyle habits, including diet, physical activity, daily screen time, secondhand smoke exposure, hours of sleep per night, and dental care practices, should be assessed. Physicians should also inquire about safety habits, such as use of protective equipment (e.g., helmets) and seat belts and the presence of firearms and smoke and carbon monoxide detectors in the home.<sup>2</sup>

Because there are many topics to cover during a health maintenance visit, physicians should consider giving a questionnaire to the family to complete beforehand. This approach can help identify issues most relevant to the child and maximize efficiency of the visit.<sup>2</sup> Examples of previsit questionnaires specific to different age groups are available in the American Academy of Pediatrics (AAP) Bright Futures toolkit at <https://toolkits.solutions.aap.org/bright-futures/core-forms>; however, a \$375 subscription is required to access the toolkit and forms.

### Developmental Surveillance

Although formal developmental screening is not recommended beyond the toddler years, physicians should still ask about social development, particularly school performance.<sup>2</sup> If a child is struggling in school, referral for formal testing for learning disabilities should be considered. Symptoms of attention-deficit/hyperactivity disorder may become apparent in school-aged children as the complexity of schoolwork increases. Stress at home or in school, such as from bullying, can also affect school performance.

The AAP recommends using the Pediatric Symptom Checklist or the Pediatric Symptom Checklist–Youth Report to screen for cognitive, emotional, and behavioral

problems. These instruments are available at [https://www.brightfutures.org/mentalhealth/pdf/professionals/ped\\_sympton\\_chklst.pdf](https://www.brightfutures.org/mentalhealth/pdf/professionals/ped_sympton_chklst.pdf) and take as little as five minutes to complete and score.

The AAP also recommends asking how many school days students have missed to screen for chronic absenteeism, defined as missing more than 15 days per school year. Chronic absenteeism is linked to lower educational attainment and its associated health risks.<sup>3</sup> A recent article in *AFP* that addresses identification and management of chronic absenteeism is available at <https://www.aafp.org/afp/2018/1215/p738.html>.

### Physical Examination

A physical examination should be performed during any health maintenance visit in school-aged children and is required for insurance billing. However, few specific examination elements have been validated as having a positive or negative health effect, and different organizations have different recommendations. For example, the AAP recommends screening for scoliosis, whereas the U.S. Preventive Services Task Force (USPSTF) concludes that the evidence is insufficient to assess the benefits and harms of such screening.<sup>4,5</sup> The AAP recommends yearly genitalia and breast examinations for sexual maturity rating beginning at seven years of age, with an additional annual evaluation to look for masses (cancer), hydrocele, hernias, and varicocele in boys beginning at 11 years of age.<sup>2</sup> In contrast, the USPSTF recommends against testicular cancer screening in asymptomatic adolescents, because it has been found to be more harmful than beneficial.<sup>6</sup>

During any physical examination of a child, physicians should remain alert for signs of abuse. More than

1.25 million maltreated children are identified annually in the United States.<sup>7</sup> Signs of abuse that may be apparent on examination were outlined in a previous *AFP* article (<https://www.aafp.org/afp/2013/1115/p669.html>).

## Screening Tests

The AAP and USPSTF have made a variety of recommendations about specific screening tests for school-aged children (Table 1).<sup>2,4,5,8-17</sup>

### OVERWEIGHT AND OBESITY

After three decades of steady increase, rates of childhood overweight and obesity have begun to stabilize. Nonetheless, 32% of children and adolescents in the United States are considered overweight or obese.<sup>13</sup>

The USPSTF recommends measuring body mass index (BMI) in children beginning at six years of age, and the AAP recommends annual BMI measurement beginning at

two years of age.<sup>2,13,14</sup> Overweight in children is defined as a BMI at or above the 85th percentile for age and sex, and obesity as a BMI at or above the 95th percentile.<sup>18</sup> Children with obesity should be offered resources and referral for comprehensive, intensive (more than 25 contact hours) behavioral interventions to promote improvement in weight status; evidence for less intensive interventions is inconclusive.<sup>13</sup>

### HYPERTENSION

Although the USPSTF found insufficient evidence to assess the benefits and risks of universal blood pressure screening in asymptomatic children and adolescents,<sup>11</sup> the AAP recommends annual blood pressure measurement beginning at three years of age or at every health care encounter in those who have risk factors for elevated blood pressure (e.g., obesity, kidney disease, aortic arch obstruction, coarctation of the aorta, diabetes mellitus, taking a medication known to increase blood pressure).<sup>12</sup>

TABLE 1

### Screening Recommendations for School-Aged Children

Screening topic	USPSTF	AAP Bright Futures	Suggested screening test
Depression	Recommended for patients 12 to 18 years of age, insufficient evidence for patients seven to 11 years of age <sup>8</sup>	Recommended beginning at 12 years of age <sup>2,9</sup>	Patient Health Questionnaire-2 <sup>2,9</sup>
Dyslipidemia	Insufficient evidence <sup>10</sup>	Once between nine and 11 years of age <sup>2</sup>	Lipid profile <sup>2</sup>
Hearing	No recommendation for this age group	At five, six, eight, and 10, and once between 11 and 14 years of age <sup>2</sup>	Audiometry <sup>2</sup>
Hypertension	Insufficient evidence <sup>11</sup>	Annually beginning at three years of age, or at every health care encounter in those who have risk factors for elevated blood pressure (e.g., obesity, kidney disease, aortic arch obstruction, coarctation of the aorta, diabetes mellitus, taking a medication known to increase blood pressure) <sup>12</sup>	Blood pressure measurement <sup>12</sup>
Obesity	Beginning at six years of age <sup>13</sup>	Annually starting at two years of age <sup>2,14</sup>	Body mass index measurement <sup>2,13,14</sup>
Scoliosis	Insufficient evidence <sup>5</sup>	Screen girls at ages 10 and 12 years, and boys once at age 13 or 14 years <sup>4</sup>	Visual inspection
Social determinants of health	No recommendation	Annually <sup>2</sup>	AAFP social needs screening tool ( <a href="https://bit.ly/2HBwi1M">https://bit.ly/2HBwi1M</a> ) <sup>15</sup>
Vision	No recommendation	At five, six, eight, 10, and 12 years of age <sup>2,9</sup>	Snellen chart <sup>2</sup>

**Note:** AAFP supports the USPSTF recommendations. For hypertension, AAFP also gives an Affirmation of Value to the AAP recommendation.<sup>16,17</sup>

AAFP = American Academy of Family Physicians; AAP = American Academy of Pediatrics; USPSTF = U.S. Preventive Services Task Force.

\*—Update from AAP but not yet reflected in Bright Futures.

Information from references 2, 4, 5, and 8-17.

Elevated blood pressure in children 12 years and younger is defined as a blood pressure at or above the 90th percentile for age, sex, and height, and hypertension is defined as a blood pressure at or above the 95th percentile.<sup>12</sup> The AAP has published recommendations for the workup and management of blood pressure abnormalities in children and adolescents.<sup>12</sup> These recommendations were summarized in a recent *AFP* article (<https://www.aafp.org/afp/2018/1015/p486.html>) and have been given an Affirmation of Value by the American Academy of Family Physicians (AAFP).<sup>17</sup>

### HEARING AND VISION

The AAP recommends routine vision testing at five, six, eight, 10, and 12 years of age using an age-appropriate visual acuity test, such as a Snellen chart.<sup>2,9</sup> The USPSTF recommends vision screening at least once in all children three to five years of age to detect amblyopia or its risk factors.<sup>19</sup> Referral for formal optometry evaluation is recommended for visual acuity less than 20/40 for children three to five years of age or less than 20/30 for children older than five years, and in all children if there are more than two lines of difference between the eyes.<sup>20</sup>

The AAP recommends screening for hearing loss using audiometry at five, six, eight, and 10 years of age, and once between 11 and 14 years of age.<sup>9</sup> Conduction hearing thresholds greater than 20 dB indicate possible impairment and warrant referral.<sup>21</sup> The USPSTF does not have an active recommendation regarding hearing screening in school-aged children.

### DYSLIPIDEMIA

Children with lipid disorders are at risk of atherosclerotic vascular disease in adulthood.<sup>22</sup> The AAP recommends universal screening for dyslipidemia with a lipid profile once between nine and 11 years of age,<sup>2</sup> which is consistent with guidelines from the National Heart, Lung, and Blood Institute.<sup>22</sup> The USPSTF, however, found that current evidence is insufficient to assess the benefits and harms of routine dyslipidemia screening in children; AAFP supports this position.<sup>10,16</sup>

### DEPRESSION

The prevalence of major depressive disorder in children eight to 15 years of age is 2% for boys and 4% for girls.<sup>23</sup> Depression in children is a serious issue, because 10% of children five to 13 years of age with major depressive disorder attempt suicide.<sup>24</sup> Children and adolescents with major depressive disorder typically have functional impairment across several domains, including family, social, school, and work.<sup>23</sup>

The USPSTF and AAP recommend depression screening starting at 12 years of age.<sup>2,8,9</sup> The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine depression screening in children younger than 12 years.<sup>8</sup> Although these younger children may not be able to communicate a depressed mood, physicians should consider depression in children presenting with unexplained somatic symptoms, restlessness, separation anxiety, phobias, and hallucinations.<sup>25,26</sup>

### SOCIAL DETERMINANTS OF HEALTH

Social determinants of health are the conditions under which people are born, grow, live, work, and age. There is growing evidence that addressing and improving these conditions can potentially improve health outcomes.

The AAP recommends surveillance for risk factors related to the social determinants of health during all patient encounters.<sup>2</sup> The AAFP has developed tools and resources designed to help physicians identify and address social determinants of health for their patients, including a social needs screening tool (available at <https://bit.ly/2HBwi1M>).<sup>15</sup>

### Fluoride

Children six months to 16 years of age living in areas with inadequate fluoride in the water supply (0.6 ppm or less) should be counseled on taking a daily fluoride supplement (*Table 2*)<sup>27</sup> to prevent dental caries.<sup>2,27,28</sup> Physicians can contact their local health departments for information on how to find out about a community's water fluoride concentration.

### Immunizations

Immunizations are a cornerstone of health maintenance, and the AAFP strongly recommends immunizing children and adolescents.<sup>29</sup> The Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices has released its 2019 recommended child and adolescent immunization schedules, which are approved by the AAFP, AAP, and the American College of Obstetricians and Gynecologists.<sup>30</sup>

TABLE 2

#### Recommended Daily Dietary Fluoride Supplementation in School-Aged Children and Adolescents

Age	Fluoride concentration in the water supply		
	< 0.3 ppm	0.3 to 0.6 ppm	> 0.6 ppm
Three to six years	0.5 mg per day	0.25 mg per day	None
Six to 16 years	1.0 mg per day	0.5 mg per day	None

Information from reference 27.

There are two sets of immunizations recommended for all school-aged children. The first set should be administered at four to six years of age and includes series doses of diphtheria and tetanus toxoids and acellular pertussis (DTaP); inactivated poliovirus; measles, mumps, and rubella (MMR); and varicella. The second set should be administered at 11 or 12 years of age and includes tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap); the first dose of meningococcal vaccine; and the first dose of human papillomavirus vaccine if not started previously.<sup>30</sup>

In addition to these primary vaccines, the influenza virus vaccine is recommended annually for all children six months and older. Certain high-risk groups may need additional vaccines (see immunization schedule for more information). In addition, immunization records should be reviewed at every visit to assess whether catch-up immunizations are needed.<sup>30</sup>

In the United States, there is a high level of completion for the four- to six-year-old vaccines, with median immunization rates greater than 93% for the MMR, DTaP, and varicella vaccines.<sup>31</sup> The completion rate for Tdap is also high at up to 88%.<sup>32</sup> However, completion rates for the human papillomavirus and meningococcal vaccine series are low at 49% and 44%, respectively.<sup>32,33</sup> There is also significant regional and local variation in immunization rates, in part because of varying school requirements, along with misconceptions and dissemination of incorrect information about vaccines.<sup>34</sup> Physicians and their staff should adopt strategies to increase immunization completion among their patients. A primary care physician's strong recommendation to vaccinate is key to increasing vaccination rates.<sup>35</sup>

**This article** updates a previous article on this topic by Riley, et al.<sup>36</sup>

**Data Sources:** We began with an initial evidence summary that included relevant POEMs, Cochrane reviews, and other evidence-based guidelines. The USPSTF guidelines related to children and the AAP Bright Futures guideline were reviewed, including a review of the evidence referenced in those publications. Finally, a PubMed search was performed using the key terms well child, health maintenance, prevention, children, and pediatrics. The search included meta-analyses, randomized controlled trials, clinical trials, and reviews. Search dates: July 2018 through April 2019.

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