

# Health Screening & Appraisals

## Introduction

Appraisals of the health of school-age children and youth are a traditional aspect of the role of the school nurse. Health screenings provide a significant secondary prevention strategy. In a 2011 Position Statement on the Role of the School Nurse<sup>1</sup>, the National Association of School Nurses included health screenings as a component of providing quality care and intervention for actual and potential health problems. The American Academy of Pediatrics also identified the importance of health screenings provided by the school nurse in a 2008 Policy Statement.<sup>2</sup>

School nurses conduct health screenings and appraisals to detect previously unrecognized conditions or pre-clinical illnesses. That proactive approach facilitates early intervention and remediation while also limiting the potential for disabilities and adverse academic achievement. The school nurse also uses the results of appraisals, screening tests, and physical examinations to inform parents, provide direct services, or refer to appropriate community-based care providers.

To become competent at developing and implementing effective school-based health screening and appraisal programs, nurses and key district staff members should do the following:

- Review state laws and regulations that require screening of students for specific health conditions.
- Review best-practice standards, and obtain necessary manuals and training (if required) to enhance knowledge of and skills in conducting specific health screenings and appraisals.
- In cooperation with district administrators and the local health advisory committee, review and revise, as necessary, district policies, procedures, and forms to reflect best-practice guidelines and principles of health screening and appraisal programs.
- Prepare school staff, students, parents, and volunteers for the appraisal and screening process and practices.
- Provide training and ongoing monitoring of nonprofessional school health personnel and volunteers (if any) participating in health screenings and appraisals.
- Annually, establish health screening and appraisal programs based on agency guidelines, the documented health needs of the population served, and the value the screening or appraisal provides commensurate to the resources required and allocated for its implementation.

To assist school nurses and staff members to implement effective screening programs, this chapter will focus on:

- Legal Considerations
  - Federal Initiatives and Programs
  - State Laws and Initiatives
- Role of the School Nurse

- Types of Health Appraisals
  - Policies and Procedures Development
  - Personnel
  - Follow-Up Activities
- Common Health Appraisals
  - Health History
  - Physical Examinations
  - Developmental Screening
- Blood Pressure Screening
  - Procedure
  - Equipment
  - Referral and Follow-Up
  - Recordkeeping and Documentation
- Dental Screening
  - Personnel
  - Equipment
  - Procedure
  - Referral and Follow-Up
  - Recordkeeping and Documentation
  - Role of the Classroom Teacher
- Growth Screening
  - Personnel
  - Equipment
  - Procedure
  - Recordkeeping and Documentation
  - Referral and Follow-Up
  - Role of the Classroom Teacher
- Hearing Screening
  - Legal Considerations
  - Types and Degree of Hearing Loss
  - Personnel
  - Equipment
  - Procedure
  - Referral and Follow-Up
  - Recordkeeping and Documentation
  - Role of the Classroom Teacher
- Vision Screening
  - Legal Considerations
  - Some Common Eye Problems
  - Personnel
  - Equipment
  - Standards
  - Procedure

- Recordkeeping and Documentation
- Role of the Classroom Teacher
- Postural and Scoliosis Screening
  - Personnel
  - Procedure
  - Referral and Follow-Up
  - Recordkeeping and Documentation
- Conclusion

## Legal Considerations

Federal and state laws provide few universal directives for specific health screenings and appraisals. However, there are some federal and state statutes that reflect a belief that health appraisals are an appropriate and important component of school health services.

### Federal Initiatives and Programs

The national health plan, [Healthy People 2020](#), supports prevention efforts across the United States to create a healthier nation. Sections included in the 2020 Topics and Objectives are: Adolescent Health, Early and Middle Childhood Health and Education and Community-Based Programs.

The Individuals with Disabilities Education Act requires identification of children with disabilities who may need special education and related services ([34 CFR sec. 300.304](#)). Additionally, Head Start requirements ([45 CFR sec. 1304.20\(b\)](#)) call for developmental, sensory, and behavioral screening, in collaboration with the child's parent, within 45 calendar days of the child's entry into the program. Nutritional needs must be identified, taking into account information about the child's and family's eating patterns and relevant health exam and screening data (height, weight, and blood tests for anemia) ([45 CFR sec. 1304.23](#)).

### State Laws and Initiatives

Wisconsin special education law ([Wis. Stat. sec. 115.77\(1\)\(m\)](#)) requires local school boards to identify, locate, and evaluate all children with disabilities who are in need of special education and related services, including such children who are not yet three years of age. To date, Wisconsin state law does not require any other health appraisal in the schools.

[The Healthiest Wisconsin 2020 State Health Plan](#) notes the importance of conducting prevention, screening, assessment, and intervention to promote healthy growth and development across the life span.

The Wisconsin Health Check (WHC) program, a preventive health program for medical assistance recipients under the age of 21, provides health and developmental histories, physical examinations, immunizations, lab tests, eye exams, hearing checks, mouth exams, nutrition checks (eating habits), anticipatory guidance, health information, and other services as needed. All children beginning at age three years should be referred to a Medicaid dentist, unless they

report dental care during the previous six months, where a dentist is available. The WHC screening protocol, which is outlined in the Wisconsin Medicaid Provider Handbook, is a highly regarded practice schedule that could serve school nurses and staff members well. For more information, refer to the Wisconsin Medicaid Services [Health Check Handbook](#).

## Role of the School Nurse

Because school is a place where children spend an extended amount of time each year engaging in a wide variety of academic, recreational, and relational activities, it lends itself to early identification and follow-up of health problems through carefully developed health assessment programs.

### Types of Health Appraisals

An effective health appraisal program includes health histories, selected screening modalities, and planned follow up of referrals. Health appraisal programs evolve from the understanding of the community needs and screening outcome accountability. Careful analyses of screening programs are essential for efficiency and effectiveness. Screening programs might include:

- blood pressure
- dental
- depression
- developmental
- hearing
- scoliosis
- vision

### Policies and Procedures Development

In best-practice situations, a school health advisory committee regularly assesses a district's health service policies regarding health appraisals. This helps ensure that the policies and corresponding procedures are reflecting best-practice guidelines and population health needs, and that each appraisal provides a value commensurate with the resources allocated for its implementation. A school advisory committee may include the school district administrator, teacher representatives, the medical advisor, local medical care providers, parent(s)/guardian(s), and older students. In the absence of a school health advisory committee, the school nurse should gather policies, screening protocols, staff time needed, statistical information regarding screening referral rate, and significant findings. A school nurse is then in a position to consult with key school and community members to develop school screening recommendations for the future.

Most experts agree that children benefit from health supervision offered over time in a health care “medical home.” [Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents](#)<sup>3</sup> acknowledges that increased integration and coordination of services from various community resources, including the schools, enhances care for all children and their families. Health appraisals are one tool to help school nurses be more effective in establishing

---

partnerships with community providers. To assist school nurses in providing such care where it is otherwise absent, Bright Futures offers:

- guidelines for promotion of family support, child development, mental health, healthy weight, nutrition, physical activity, oral health, sexual development, and injury control;
- schedules for health supervision visits of children;
- trigger questions to support a health supervision interview; and
- screening procedures which enhance basic health supervision visits.

Because of the potential to make positive changes in the school environment by identifying student health needs and then modifying or removing barriers to students achieving their health and academic potential, the school nurse should be adept at using program management skills in planning, developing, and evaluating the health appraisal component of school health services.

The following basic screening principles should be considered when deciding if a screening program is appropriate. Because screenings are not diagnostic, and positive screening results require further evaluation, the following principles should be observed:

- screenings must address a common condition that is relatively serious and affects a large number of the population;
- early intervention must be available, affordable, and with sufficient time between screening and referral to allow for early intervention;
- availability of appropriate and accessible referral sources; and
- early identification, diagnosis, and intervention positively alter outcome.<sup>4</sup>

Once a district establishes a health screening and appraisal program, the nurse will need to obtain necessary administration policies, manuals, testing materials, and reporting forms. The nurse may also be responsible for:

- identifying and recruiting people, including parents, senior citizens, secondary school students with an interest in health careers or service opportunities, and health care professionals, to competently conduct screening procedures;
- developing and leading training programs for screening personnel;
- educating administrators, teachers, parents, and students regarding the purpose and value of the screening;
- notifying parent(s)/guardian(s) of the screening and ability to opt-out their child's participation;
- preparing students and staff for actual screening and follow-up processes; and
- gathering and processing outcome data to evaluate the effectiveness of the health appraisal program.

Screening personnel must implement screening protocols efficiently, accurately, and with as little academic disruption as possible. This requires a basic understanding of the tools being used. Screeners should also be familiar with or trained to recognize age or developmentally appropriate responses, particularly from preschoolers and other students who may be distracted

---

during the assessment, and be able to quickly incorporate appropriate cueing alternatives in order to complete the appraisal.

### Personnel

Attentive and effective screening personnel are an essential program component for two reasons:

- Any failure to accurately identify a health problem will delay treatment.
- Referrals for inappropriate or excessive follow-up services may result in unnecessary stress and expense to the student and family.

Many school nurses use volunteers to implement screening programs. If volunteers are used, careful attention to proper training regarding confidentiality is essential. Confidentiality of patient health care records generated in a school setting is governed by [Family Educational Rights and Privacy Act \(FERPA\)](#), Wis. Stat. secs. [118.125](#) and [146.82](#). Although volunteers can assist with screening programs, they must be instructed to keep confidential any information seen or heard in the process of the screening activities. Breaches of confidentiality could result in fines and court costs.

The expertise and judgment of the school nurse is necessary to complete the follow-up and evaluation components of each appraisal program. For example, should a child not pass the initial screening conducted by a volunteer, the school nurse will want to rescreen the child and determine whether the initial results were accurate or whether they may have been skewed by situational factors during the screening. Parent(s)/guardian(s) should be notified of the screening results and options for care if uninsured or underinsured. After the referral, the school nurse should follow up with the parent(s)/guardian(s) and the student (if appropriate) to determine if care was received, and any significant results of the treatment. The rate of referral compared with the rate of significant results will determine if there was an over-referral rate. If a large percentage of students who received referrals did not require treatment, it is recommended that the school district look at flaws in the screening process and referral criteria.

### Follow-Up Activities

Throughout the process, the school nurse is responsible for compiling and maintaining accurate records of the findings, referrals, and other follow-up activities. In most cases, district policies and procedures will establish secondary activities as well as criteria for referral based on current standards. Where such policies and procedures do not exist, the school nurse should play an integral role in developing them in cooperation with the school health advisory committee, other school staff members, and administrators.

The school nurse's contact with the family regarding the screening referral can assist with providing knowledge, answering questions, and determining if the family needs additional resources to obtain the medical evaluation. School nurses are often aware of low or no cost resources for families in need. Careful evaluation of the medical findings from screening programs can identify problems in the screening process and need for modifications of policies and procedures.

---

As with any proposed screening and appraisal program, the evaluation of the implementation and the results of the procedures should be carefully considered in determining the benefit of the health appraisals. Results of evaluations provide important information to justify changes, elimination, continuation, and expansion of the programs. If school nurses find that the students being referred from these programs are not in need of further assessment or treatment, they should consult with medical experts to modify the design for the program.

## Common Health Appraisals

### Health History

A focused health history is an essential first step whenever the school nurse implements health appraisals, physical examinations, or selected screening programs. In many districts, focused health history questionnaires are commonly used to gather an initial database when a child begins school. Such histories offer school nurses a perspective on a variety of developmental factors, including:

- perinatal, developmental, and immunization histories;
- illnesses, injuries, surgeries, and hospitalizations;
- allergies;
- medications;
- daily self-care patterns, including nutritional intake, elimination, sleep, recreation, and other activities;
- psychosocial considerations; and
- other family information, including extended health history, access to and use of a primary health-care provider, family dynamics, current priorities, and living arrangements.

While parent(s)/guardian(s) have primary responsibility for their children's health, the school district is responsible for the safety and well-being of students while they are in the school setting. Information concerning a child's past health experience assists school personnel to understand the child's present health status and conditions that may adversely affect the child's safety and the ability to learn.

Although best practice endorses the right of every child to have a complete health history appraisal, the district may need to obtain more comprehensive data for those students with known health or learning impairments. Such information will help with the development of effective individualized health care and education plans.

The health history becomes part of a student's health record and may be updated according to school district policy. Updates on changes in a child's health status or health care experiences can be obtained through parental and student questionnaires elicited according to an identified schedule.

### Physical Examinations

A periodic physical examination is important for all children and adolescents. Its objectives are to identify and follow up on health conditions that may adversely affect the student's health, well-being, and ability to learn. Although physical examinations are recommended, Wisconsin does not require that school children have a physical examination prior to entrance into school.

When physical examinations are conducted in the school setting, it is essential that efforts be made to ensure parental permission, and that the privacy and confidentiality needs of the child are met.

Currently, physical examinations are not commonly conducted by school health personnel in the school setting. While each school district has the discretion to determine the necessity of a physical examination, sports physicals are required every other year for students wishing to participate in interscholastic athletics. The Wisconsin Interscholastic Athletic Association (WIAA) provides further guidance on athletic physical examinations. (Note: Physical examinations taken after April 1 are valid for the following two school years; those taken before April 1 are valid only for the remainder of the current school year and for the following school year). As primary care providers, nurse practitioners may legally sign athletic physical examination cards for both regional and state interscholastic athletic competitions. WIAA physical examination forms are available at their [website](#).

The Wisconsin HealthCheck program is the means by which the state carries out the requirements of the federal Early and Periodic Screening, Diagnosis, and Treatment Program that offers child care and health screening services to medical assistance-eligible children from birth to 21 years of age. HealthCheck is based on a preventive health philosophy of detection and treatment of health problems before they become chronic or disabling and, ultimately, more costly to treat in terms of human and financial resources. The program provides early identification, diagnosis, and treatment of physical, emotional, or developmental problems.

In order to ensure periodic assessment of children, school districts should:

- be aware of area HealthCheck programs,
- refer students who have not yet had a physical exam and have no medical provider, and
- contract with the local public health department to provide physical examinations if it is determined that the school setting provides a needed access point for children and their families.

Information and technical assistance about HealthCheck policy, clinical service components, certification, and billing are available from the Wisconsin Department of Health Services HealthCheck Program [website](#).

### Developmental Screening

In schools, developmental screening tests are typically administered by education professionals. However, the school nurse plays an important role in collaborating with staff members assessing

a student's health and developmental status. For example, the nurse may share insights and observations regarding the age-appropriate behavioral competencies demonstrated or absent during structured and non-structured interactions with the child, a review of health and developmental history, current health status data, and health practices. Through an analysis of assessment findings, the school nurse identifies actual or potential health or developmental problems and the relationship of those problems to the child's ability to learn.

## **Blood Pressure Screening**

Elevated blood pressure increases the risk for the development of hypertension and cardiovascular morbidity during one's lifetime. Prevention of hypertension in childhood and adolescence could extend the years of healthy life for many Americans. Proper diet, regular exercise, weight management, and abstinence from smoking help prevent high blood pressure. Hypertension has become a significant health issue in the pediatric population due to the strong association of high blood pressure with overweight, and the increase in the prevalence of overweight children.<sup>5</sup> While there is no specific legal requirement to provide blood pressure screening, blood pressure readings offer a physiological indicator of cardiovascular status. Elevated blood pressure is a risk factor for the development of hypertension and cardiovascular morbidity, if not during childhood, then during adulthood.

### **Procedure**

Blood pressure measurement should not be considered an isolated procedure, but should be included in the physical assessment and continuing care of students. As always, trained personnel should follow standard practices for blood pressure measurement, equipment, referral, and follow-up.

### **Equipment**

Equipment required for blood pressure screening include a stethoscope, blood pressure cuff (digital or manual sphygmomanometer), and referral criteria for elevated blood pressures. If measuring blood pressure on young children or large students and adults, pediatric and extra-large cuffs may be required for accurate readings.

### **Referral and Follow-Up**

Due to variability in individual blood pressure measurements, which may result from instrument, observer, and patient factors, it is recommended that hypertension be referred only after two or more elevated readings are obtained on at least two screenings over a period of one to several weeks. Hypertension in children and adolescents is defined as systolic BP (SBP) and/or diastolic BP (DBP), that is, on repeated measurement,  $\geq 95^{\text{th}}$  percentile for gender, age, and height. Blood pressure between the  $90^{\text{th}}$  and  $95^{\text{th}}$  percentile is considered prehypertensive.<sup>5</sup> If any blood pressure reading is elevated in the critical range, immediate referral to a medical provider is necessary. For additional information, refer to the Centers for Disease Control and Prevention's [High Blood Pressure Fact Sheet](#).

## Record Keeping and Documentation

Blood pressure readings and referrals should be documented in the student health record. In addition, the summary results of referral, examinations, treatment, and medications should be recorded on the child's physical health record, or according to district guidelines.

## Dental Screening

While dental screening is designed to detect early dental and oral health problems in children, it does not replace the need for regular dental examinations in a dentist's office. In fact, dental screening provides an ideal opportunity for school nurses to emphasize the prevention of dental diseases, enhance the promotion of good dental self-care, and help build a positive attitude in children who have not received prior dental care. It also provides baseline information so that periodic evaluations and, if necessary, referrals may be made.

While Wisconsin does not require that children entering school have a dental examination, it is highly recommended that children undergo a dental screening or preferably, a dental examination, before entering school. Dental caries is the most common chronic disease in children and many hours of school are missed each year due to pain or other dental problems.<sup>3</sup> Districts may wish to recommend a dental examination along with vision and physical examinations for children entering school.

## Personnel

The nurse may wish to consult with the chief dental officer in the Wisconsin Department of Health Services during early planning phases. The nurse should coordinate efforts with a local dentist, if available, to ensure that all program criteria are met and that a high-quality screening is conducted. A dental hygienist, dentist, or school nurse can perform a screening inspection with a mouth mirror and explorer, or with a tongue blade and penlight. Some districts are able to offer school-based dental sealant programs. Dental sealants have been shown to reduce tooth decay in school-age children. Based on reviewed evidence, a CDC sponsored expert work group in 2009 updated their recommendations for school-based dental sealant programs.<sup>6</sup>

## Equipment

Although mouth mirrors are useful, a wet tongue depressor (to prevent adhesion to oral tissues) and light source is all that is needed to facilitate direct vision. Gloves and mask should be worn to prevent disease transmission.

Additional equipment that may be needed includes:

- cotton gauze,
- penlight,
- dental picks and floss,
- dental mirrors,
- plastic bags for disposable non-reusable equipment used during the inspection, and
- handwashing facilities.

### Procedure

The school nurse conducting the screening should review the child's

- dental health history;
- date of last dental examination;
- name of dentist last seen;
- dental habits, including brushing and flossing; and
- snack habits.

The most feasible and simple type of screening in the school setting is an inspection using tongue blades and adequate lighting/illumination. This procedure is recommended by the American Dental Association and includes systematic inspection of the

- face and neck for lesions or swollen glands;
- mucous membranes (lips, tongue, soft and hard palates, tonsils, and cheeks) for redness, exudate, swelling, blisters, and growths;
- teeth and gums for age-appropriate dentition, evidence of dental caries, broken or chipped teeth, gross malocclusion, infection or swelling, bleeding, and inflammation; and
- changes in color, texture, and position of gum tissue, poor oral hygiene, and mouth odor.

In addition, the school-based screening provides, during the examination, an opportunity for the nurse to offer the student dental health education which emphasizes:

- importance of healthy tooth development,
- prevention of tooth decay,
- importance of preventive dental care,
- role of diet and fluoride in dental health,
- tooth brushing and flossing procedures, and
- protection from dental injury.

### Referral and Follow-up

When a school screening has revealed a dental problem, the school nurse should refer the child for a complete dental examination by a licensed dentist. A complete dental examination with x-rays is most appropriately carried out in a licensed dental office. Follow-up by the school nurse is important to help families overcome barriers they may face in obtaining dental care. As a liaison between families and dental care professionals, the school nurse may be aware of dentists who accept Medicaid or who will provide dental services on a sliding-fee scale for families in need of such financial considerations.

### Recordkeeping and Documentation

Results of the dental screening should be recorded on the student's school health record. In addition, the summary results of referral, examinations, and treatment should be recorded on the child's physical health record or according to district guidelines. The school nurse should also inform the child's teacher of any dental or other oral problems that may affect the child's ability to participate in the classroom or other school activities.

---

### Role of the Classroom Teacher

Teachers play an important role in the promotion of a child's oral health by being aware of children who have tooth pain, hot and cold sensitivity, or have speech defects that may be attributed to missing teeth. Teachers can reinforce the importance of daily brushing and other oral hygiene practices. In addition, because teachers see students on a daily basis, the teacher may observe behavior that may cause dental or speech problems, such as finger sucking and nail biting. The teacher may also be able to make allowances for children who, for example, need more time to eat lunch because of an oral infection or missing teeth. Resources for teachers and classroom dental education programs can be found at [NEA's National Children's Dental Health Month](#) website or the [ADA's Mouth Healthy](#).

### Growth Screening

While no legal requirement to provide height and weight screening exists, height and weight measurement is commonly done in physical education, general health, and science classes and should be included in the physical assessment and continuing care and education of a child. Linking growth screening to appropriate nutritional and weight management resources and programs is essential.

As with developmental screening, height and weight screening should not be viewed as an isolated screening procedure. Trained health personnel should follow standard practices for height and weight measurement, assessment, referral, and follow-up.

Height and weight measurements provide a simple and effective method of detecting growth abnormalities. These may indicate other health problems, including:

- systemic disorders, such as malnutrition and intestinal conditions;
- psychosocial conditions, such as eating disorders;
- congenital disorders, such as Turner's Syndrome; and
- conditions of the endocrine system, such as hypothyroidism and growth hormone deficiency.

The range of normal height and weight varies for each child, though general growth remains relatively constant. After rapid growth in the first two years of life, growth generally slows to two to two-and-one-half inches per year until puberty (approximately ages 11-13 years). Growth dramatically increases during puberty and lasts until development of secondary sexual characteristics is complete. Growth patterns should follow normal growth curves of students of the same age and sex and fall between the 5<sup>th</sup> and 95<sup>th</sup> percentile curves on the standard growth chart.

“[To Weigh and Measure](#),” a guidance document for school districts to implement growth screening, is available from the Wisconsin Department of Health Services.<sup>7</sup> This document has been developed with the following objectives:

- to help schools to be better informed when making the decision of whether or not to weigh and measure students;
- to provide guidance and policy recommendations to schools that choose to weigh and measure students; and
- to provide resources for schools to create environments supportive of healthy lifestyles.

The Centers for Disease Control and Prevention (CDC) has a tool that can assist with growth screening called the Children's [BMI Toolkit for Schools](#).

Body mass index (BMI) is a measurement that determines appropriate weight for height. For children and teens, BMI is age- and sex-specific. BMI does not differentiate between body fat and lean muscle mass. For example, a fit athlete may have extensive muscle mass that skews the body mass index to a high value without high body fat. To calculate BMI, height and weight are entered into a mathematical equation and the resulting number estimates whether one is underweight, healthy weight, overweight, or obese. Various tools, such as FitnessGram™ and CDC's [Children's BMI Tool for Schools](#) automatically calculates BMI based on height and weight, and gives estimated ratings based on age and gender.

#### Personnel

The school nurse should be responsible for overseeing height and weight screenings, although the task may be properly delegated to other trained school personnel or volunteers. Staff and volunteers should be trained to gather reliable data and provide for sensitivity and confidentiality.

#### Equipment

Equipment should include a weight and height measuring device. Use only high quality beam balance or electronic scales that can be calibrated. Bathroom scales are unreliable. Use a stadiometer, a height measuring device consisting of a vertical ruler with a sliding horizontal rod or paddle which is adjusted to rest on the top of the head. The stadiometer may be portable or fixed to the wall. Height rods attached to scales are not considered to provide reliable measurement of a student's height.

#### Procedure

Use of evidence-based height and weight measuring techniques is essential for reliable height, weight, and body mass screening results. This includes proper positioning of the child on the scale when measuring weight and use of a stadiometer when determining height. It is advisable to have one person responsible for taking height and weight measurements. Measurements can be repeated to ensure reliability.

It is essential to provide privacy when weighing and measuring individuals to reduce embarrassment and ridicule. Also, this may offer an opportunity for identifying other health concerns and for brief one-to-one health counseling about nutrition, exercise, and other health-promotion strategies.

### Recordkeeping and Documentation

Measurements should be both accurate and plotted on the standardized [CDC Growth Chart](#).<sup>9</sup> Height and weight are plotted against age and compared with standardized percentiles and previous measurements. From a student's height and weight, a school nurse can determine the body mass index and also plot this statistic on a growth chart comparing against same-age peers.

#### Metric Body Mass Index Formula

$$\text{BMI} = \frac{\text{weight in kilograms}}{(\text{height in meters})^2}$$

#### Imperial Body Mass Index Formula

$$\text{BMI} = \frac{(\text{weight in pounds} \times 703)}{(\text{height in inches})^2}$$

After calculating the BMI<sup>10</sup>, the figure can be manually plotted on the CDC [BMI for age growth chart](#) to judge whether a child's weight is appropriate for their height. See the CDC's [BMI Measurement in Schools: Executive Summary \(2007\)](#) for further information.

The CDC provides thresholds for weight status categories based on body mass index percentiles.

Weight Status Category	Percentile Range
Underweight	Less than the 5 <sup>th</sup> percentile
Healthy weight	5 <sup>th</sup> percentile to less than the 85 <sup>th</sup> percentile
Overweight	85 <sup>th</sup> to less than the 95 <sup>th</sup> percentile
Obese	Equal to or greater than the 95 <sup>th</sup> percentile

The growth chart results and BMI, if calculated, should be a part of the student's health care record maintained by the school. In addition, the summary results should be recorded on the student's physical health record or according to district guidelines, including any indication of referral and follow-up.

### Referral and Follow-up

The school nurse is in an ideal position to ensure the early identification of students at risk for growth problems by providing appropriate screening and referrals. Students should be referred for further assessment when

- weight, height, or body mass index for age is above the 95<sup>th</sup> percentile;
- body mass index for age, weight for age, or height for age is below the 5<sup>th</sup> percentile; or
- a student's growth pattern changes dramatically without an obvious explanation for weight gain or loss.

The school nurse, medical advisor, or school health advisory committee can establish the criteria that will be followed for the necessary referrals for follow-up assessments. BMI can be used as a screening tool, but does not measure the percentage of body fat or health of an individual. A trained healthcare provider should perform appropriate health assessments in order to evaluate an individual's health status and risks. After appropriate medical assessments, school nurses can provide information regarding nutritional and community resources.

Growth should be charted on a standard growth chart so it can be meaningfully interpreted by health care providers. It is important to note if a child's growth pattern makes a major shift from one growth curve to another. For example, a child whose growth pattern drops from the 80<sup>th</sup> percentile to the 50<sup>th</sup> percentile may have acquired an unknown health condition which needs investigating. Conversely, a child whose growth pattern remains at the 50<sup>th</sup> percentile over an extended period of time offers little or no cause for concern.

The school nurse should provide a nonjudgmental attitude in providing information to the students and families, so they may benefit from the screening information and act on the recommendations for follow up.

### Role of the Classroom Teacher

Classroom health and physical education teachers have important roles in growth assessments and in providing education about nutrition and physical activity. Physical education teachers commonly measure height and weight as part of the fitness assessment. Physical education, health education, family and consumer education, and classroom teachers help students develop skills and knowledge needed for healthy eating and physical activity.

## Hearing Screening

Hearing loss early in life will have profound consequences on a child's development, as hearing impairment may pose a significant barrier to:

- development of speech and language skills,
- academic progress, and
- social and emotional development.

The effects of a hearing loss are variable, depending on the nature and degree of loss as well as the appropriateness of the interventions. Any hearing loss may have a negative effect on a child's ability to communicate effectively and achieve academically. Undetected or unmanaged hearing loss may result in:

- delayed speech and language skills;

- language deficits, which may lead to learning problems and limited academic achievement;
- difficulties in communication, which may lead to social isolation and a poor self-concept that can result in behavioral problems; or
- a negative impact on a child's vocational and educational choices.

School hearing screening programs can provide early identification of hearing loss and interventions to reduce the obstacles to learning.

### Legal Considerations

Hearing screening should be included in any regular physical assessment, in continuing care (when appropriate), and when assessing whether a child has a disability which requires modifications and related services to fully participate in a regular or special education program.

Wisconsin special education law ([Wis. Stat. sec. 115.777](#) and [Wis. Admin. Code sec. PI 11](#)) states that each school board is required to identify and evaluate all students with disabilities who may need special education and related services. This includes preschool children and children who have not graduated from high school, who reside in the school district or in a state or county residential facility located in the school district. While these rules do not require specific screening procedures for individual disabilities, the intent to identify disabilities in children of all ages is clear.

When hearing loss constitutes a disability, school districts are required to provide special education or related services. The following types of hearing impairments constitute a disability under special education law ([34 CFR Part 300.8\(c\)](#)):

- Hearing impairment means impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance, but that is not included under the definition of deafness.
- Deafness means a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification that adversely affects a child's educational performance.
- Deaf-blindness means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational needs that cannot be accommodated in special education programs solely for children with deafness or children with blindness.

Wisconsin and federal laws do not describe targeted grades for hearing screening in schools.

Hearing screening for newborns before they leave the hospital or maternity center is mandated by law ([Wis. Stat. sec 253.115](#)). Midwives performing home deliveries must ensure the newborn has a hearing test within 30 days of delivery.

### Types and Degree of Hearing Loss

Hearing screening identifies students with possible hearing loss. Such students should be referred to appropriate medical providers who can provide a diagnosis of whether a hearing loss exists and the type of hearing loss. The types of hearing loss include: conductive, sensorineural, or central hearing loss, functional, mixed loss in one or both ears, or auditory processing disorder.

- *Conductive hearing loss* is due to any condition that interferes with the transmission of sound through the outer and middle ear to the inner ear. In cases of conductive hearing loss, sound waves are not transmitted effectively to the inner ear because of some interference such as Eustachian tube dysfunction, obstruction in opening to inner ear, mobility or perforation of eardrum or problems with the three bones inside the middle ear. This type of hearing loss can be successfully treated in most cases with medications or surgical intervention. If people with conductive hearing loss are not candidates for medical or surgical intervention, they stand to benefit from a hearing aid, because what they need most is amplification.
- *Sensorineural hearing loss* results from damage in the inner ear, the acoustic nerve, or both. The sensorineural hearing loss can be caused by illnesses, medication side effects, genetics, aging, malformation of the inner ear, exposure to loud noises, exposure to ototoxic chemicals, and physical trauma. This hearing loss is very challenging to treat and often results in a permanent hearing disability.
- *Functional hearing loss* is the loss of hearing due to psychological or emotional problems. This type of hearing loss might be caused by an emotional traumatic event. Medical professionals must carefully assess this type of hearing loss because the condition may be exacerbated by medical interventions.
- *Mixed hearing loss* is a combination of several types of hearing loss.
- *Auditory processing disorder (APD)* is often described as greater than expected difficulty hearing and understanding speech even though no measureable hearing loss exists. Some people can hear perfectly well, but have trouble interpreting or understanding what is being said. In these circumstances, a child with auditory processing problems may be a candidate for special education service to learn techniques to accommodate the learning barrier.<sup>11</sup>

A specialist will always try to localize where in the hearing pathway the problem exists, so the hearing loss can be classified. This is most important in determining the appropriate treatment.

Also, hearing loss can be identified by degree. The following table gives ranges for the varying degrees of hearing loss:

Degree of Hearing Loss

Degree	Hearing Loss Range (in dB HL)
Normal	10-15
Slight	16-25

Mild	26-40
Moderate	41-55
Moderate Severe	56-70
Severe	71-90
Profound	91+

The website of [The American Speech-Language-Hearing Association](#) has more information on hearing loss, hearing screening and testing, types of hearing loss, and prevention of hearing loss.

### Personnel

While screening for hearing loss in toddlers and children in high-priority designated populations may be difficult, a firm commitment to building a well-trained, supervised, and experienced team of screening personnel can make such a screening effort successful.

The program coordinator (commonly a school or public health nurse) is responsible for all aspects of a hearing screening program. The nurse should coordinate efforts with a local licensed audiologist, if available, to ensure that all program criteria are met and to ensure a quality screening program. If the district needs help in locating an audiologist in or near the school district, the nurse should contact the district medical advisor or the local public health department. The extent of the audiologist's involvement will vary with the population being screened, the skills and experience of others in the program, and the degree of community collaboration and consensus in the screening process.

The screener is the most important component of the hearing screening program; screening should not be conducted without well-trained, experienced, and supervised screening personnel. The screener's primary responsibility is to efficiently and accurately screen children using current recommended measures for designated grades and priority populations. This requires a basic understanding of the screening tools, the methods for applying the tools, normal and abnormal auditory mechanisms, and the impact of hearing loss on communication and learning.

### Equipment

Hearing screenings rely on three specific pieces of equipment.

1. **Pure-tone audiometers** generate single-frequency tones at varying volume and frequency levels for the purposes of testing hearing acuity and screening for hearing loss. Pure-tone audiometric screening can be successfully conducted with children who are functioning at a developmental age of at least three years. Audiometers used for pure-tone screening must meet American National Standards Institute (S3.6-2010) specifications and should be calibrated annually to those specifications.
2. **Tympanometers** identify abnormalities of the middle ear and are frequently used in hearing screening programs for specific populations of school-age children. Tympanometers measure compliance changes in the middle ear as air pressure is varied in the ear canal. Tympanometer specifications must be in accordance with the ANSI standard on aural acoustic immittance instruments and must reliably and clearly provide:

- a plot of changes in the compliance of the middle ear system as pressure in the ear canal is continually varied from positive to negative values (tympanogram),
- quantification of the compliance value measured at the most compliant point on the tympanogram,
- quantification of the equivalent ear canal volume, and
- quantification of the ear canal pressure value corresponding to the most compliant point on the tympanogram.

Currently, no national standard for the calibration of tympanometers exists. Tympanometers may, however, be calibrated to the equipment manufacturer's specifications.

3. **Otosopic** examination prior to administering hearing screening tests can facilitate prompt referrals for active ear disease and medically significant ear canal and ear drum abnormalities. It can also reveal the presence of excessive amounts of cerumen (ear wax) and foreign bodies, which are common causes of hearing screening failure in children.

Visualizing, examining, and detecting abnormalities of the ear canal and ear drum require training and experience. Because such testing is often difficult with young children, the decision to include otoscopy should be made in consultation with an audiologist or health care provider (physician, nurse practitioner, or physician's assistant) experienced in otoscopic examinations of the target population.

### Procedure

Development of a policy and a procedure for hearing screening increases the reliability and validity of the testing. The students can be prepared for the screening with information regarding the hearing screening process. Hearing screening should occur in a quiet room with limited distractions. Ask the student to respond by raising their hand when the sound is heard.

Place the headphones on the child and present a 1000 Hz tone at 40 dB in the right ear. If the child responds, decrease the level to 20 dB and test at 1000, 2000, and 4000 Hz. Then adjust the audiometer to 30 dB and administer the 500 Hz tone. If the child responds to all these tones, then test the left ear in the same way, starting with the 500 Hz tone at 30 dB. Then reduce the intensity to 20 dB and continue with the left ear at 20 dB at 1000, 2000, and 4000 Hz.

If the child hears all frequencies the result is a **pass**. Record the results and no further action is required. If the child fails, it is recommended that the child receive an otoscopic examination. If there is the presence of acute ear infection or disease, immediately refer to a medical provider. If the child does not have signs of active disease, rescreen in one to two weeks. If the results remain abnormal, contact the parent(s)/guardian(s) with the results and refer to a medical provider.

Conditioned play audiometry is a technique that can increase your success in screening preschool children or children with disabilities. It is widely used with children between two and three years of age. The child is taught to perform an activity each time a sound is heard. The activity may be

putting a block in a box, placing pegs in a hole, putting a ring on a cone, etc. The child is taught to wait, listen, and respond.

The onset of hearing loss and disease processes that lead to some common childhood hearing losses can develop at any time. Hearing screenings are usually conducted upon school entry and at specified intervals. There is little research that demonstrates when screening will most efficiently identify students with educationally significant hearing loss. In addition to specified intervals, it may be important to screen individual students under the following circumstances:

- students known to have recurrent or chronic ear disease;
- students with other medical conditions known to be associated with hearing loss;
- as part of an assessment or evaluation for special education;
- upon grade repetition;
- upon entering a new school system without evidence of having passed a previous hearing screening;
- students referred by teachers, parent(s)/guardian(s), or others because of suspected hearing loss;
- students known to be at risk for noise-induced hearing loss, including those who regularly engage in very noisy leisure or recreational activities; and
- students enrolled in vocational training programs and employment.

### Referral and Follow-Up

When a child fails a hearing screening, the process of facilitating prompt medical evaluation should begin. When working with parent(s)/guardian(s), the school nurse should:

- promptly notify them of the test results;
- explain the screening process;
- emphasize that the screening results are not diagnostic but advisory, and suggest the possible presence of a hearing loss;
- explain the need for prompt medical and hearing evaluations that document any hearing loss and provide a diagnosis;
- explain that there are potentially negative developmental consequences for a child when hearing loss is ignored;
- assist families in locating evaluation and treatment services and financial assistance, if necessary and available; and
- follow up to determine if evaluation occurred and whether ongoing treatment is necessary.

Parental education about the screening process and the causes, consequences, and treatment of childhood hearing impairment is important. Program personnel may find it beneficial to use commercially available brochures, pamphlets, and other publications.

When working with health care providers, the school nurse should (1) provide complete screening information, including the screening tests used and dates of the failures, and (2) request feedback about the evaluation results.

### Recordkeeping and Documentation

Hearing screening results should be a part of each student's school health record. The summary results should be recorded on the student's physical health record or according to district guidelines, including referral and follow up of significant findings.

### Role of the Classroom Teacher

Classroom teachers have the opportunity to observe students daily over an extended period of time. Consequently, teachers may, with the exception of the student's parent(s)/guardian(s), be in the best position to detect any early signs of unusual reactions, conditions, or behavior changes that may signal a hearing problem. Hearing problems may be detected by a teacher when a student:

- does not respond to normal speech;
- favors one ear (indicated by turning one ear to the speaker);
- speaks too loudly or too softly;
- strains to hear the speaker;
- shows facial evidence of intense concentration;
- is inattentive in oral activities;
- frequently asks to have words or statements repeated;
- mispronounces common words;
- makes frequent or unusual mistakes in following directions;
- regresses academically following a serious illness; or
- is not reaching his or her academic potential.

Also, if the teacher notices drainage coming from the student's ear canal, they should immediately refer the student to the school nurse or medical provider.

For further information, refer to the American Speech-Language-Hearing Association website, [Hearing Screening and Testing](#).

### Vision Screening

More than 20 percent of school-aged youth have some kind of vision problem. Children in poverty living in urban environments have twice the frequency of vision problems compared to all children.<sup>12</sup> Undiagnosed and uncorrected vision problems are disproportionately prevalent among school-aged youth who are low income and urban minority.<sup>13</sup> Vision problems that are not recognized early can worsen over time and cause permanent vision loss. Early recognition, diagnosis, and treatment of ocular disorders are critical to maximize learning and avoid life-long vision impairments. Since children are not aware that they see differently than other children, screening helps identify students in need of care.

The U.S. Preventive Service Task Force and the American Academy of Pediatrics recommend vision screening beginning at age three.<sup>14, 15</sup> Many school districts have three to five year-old early childhood or four year-old kindergarten programs. These preschool programs are excellent

venues for the vision screening program. Due to inadequate insurance coverage and medical care, not all students are screened for vision prior to school entrance. These factors underscore the need for preschoolers to receive vision screening on early entrance to school.

### Legal Considerations

Vision screening should be included in any regular physical assessment, in continuing care (when appropriate), and when assessing whether a child has exceptional educational needs or a disability requiring modifications and/or related services to succeed in a regular or special education program.

Wisconsin special education law, [Wis. Stat. sec. 115.777](#) and [Wis. Admin. Code sec. PI 11](#), state that each school board is required to identify and evaluate all students with disabilities who may need special education and related services. This includes preschool children and children who have not graduated from high school, who reside in the school district or in a state or county residential facility located in the school district. While these rules do not require specific screening procedures for individual disabilities, the intent to identify disabilities in children of all ages is clear. The Wisconsin statutes do not list specific grade levels where screening must occur.

[Wisconsin Statute section 118.135](#) requires school districts to request that each student entering kindergarten have an eye examination by an optometrist or licensed physician. If a student complies with the eye examination or evaluation, the student's parent(s)/guardian(s) should provide information regarding the exam to the school by December 31st of the school year when the student enters kindergarten.

### Some Common Eye Problems

- Refractive error is caused by a defect in the optics of the eye causing a failure of the light rays to focus directly on the retina of the eye resulting in blurry vision.
- Nearsightedness (myopia) is a type of refractive error caused by the light rays focusing in front of the retina. Myopia results in distant objects becoming blurry with objects in close range seen with clarity.
- Farsightedness (hyperopia) is a type of refractive error caused by the light focusing behind the retina. Hyperopia results in objects at close range becoming blurry and distant objects seen with clarity.
- Unequal refractive error (anisometropia) is caused when the two eyes have differences in vision acuity. In some cases, one eye is myopic and the other hyperopic or both eyes have distinct differences in the degree of myopia or hyperopic vision in both eyes.
- Astigmatism is caused by a curvature of the cornea or lens preventing light rays from focusing on a single point on the retina resulting in blurry vision.
- Crossed eyes (strabismus) is caused by the muscles attached to the eye not working together to provide for proper alignment. The weakened muscle can cause one or both eyes to independently turn in or out. Some of the causes of strabismus include: birth

injuries, heredity, misalignment of muscle attachments, excessive farsightedness, and illness.

- Lazy eye (amblyopia) is a reduced vision in one eye due to misuse in early childhood. If amblyopia is not identified and treated before age six, this can result in permanent vision loss. Lazy eye can be caused by cataracts, strabismus, unequal refractive error and drooping eyelid. An estimated two to three percent of the general population has amblyopia.<sup>16</sup>
- Stereopsis is the binocular visual process leading to the sensation of depth from the two slightly different projections of the world onto the retinas of the two eyes. Stereopsis is the result of eyes working together. Differences in stereopsis can be due to the eyes' position in the head.
- Color vision is the perception of all spectra of white light entering the eye and is based on adequate amounts of photochemical receptors present in the cones inside the eye. Cones' photochemical receptors are sensitive to red, green, and blue light. There are three types of color deficiency that are the result of a great reduction or missing cones.
  - Protanopia—shades of red are greatly reduced, if present at all, in depth and brightness
  - Deuteranopia—shades of green are greatly reduced, if present at all, in depth and brightness
  - Tritanopia—very rare case where shades of blue are greatly reduced, if present at all, in depth and brightness

Color deficiencies are more common in males than females. About five percent of males are color deficient.

### Personnel

The program coordinator (commonly the school or public health nurse) is responsible for overseeing the vision screening program. Vision screening may be delegated to properly trained school personnel or volunteers. Screening personnel are the most important component of the screening program. Without competent screening personnel, screening is ineffective. The screener must have a basic understanding of the screening tools, the methods for applying the tools, normal and abnormal findings, and the implications of visual impairment on learning. After trained personnel conduct the initial screening, the school nurse should rescreen students who failed the initial screening, and follow up with information and referral for parents as indicated by results of the rescreening activities.

[Prevent Blindness Wisconsin](#) provides vision screening training and certification to school personnel and volunteers.

As part of the training for vision screening volunteers, the school nurse should emphasize the need for confidentiality regarding screening results.

## Equipment

A variety of instruments are available to screen for vision impairments. Some instruments require only minimal student skills and level of involvement, while others require some cognitive, language, motor, and perceptual motor skills. To achieve the most accurate vision screening results, school districts will want to choose the most evidence-based tool the student is capable of using. The involvement of the school nurse in the selection of an instrument or variety of instruments is critical in ensuring vision screening success.<sup>17</sup>

Vision charts are the primary tool for vision screening in the school setting. Not all vision charts, however, are considered evidence-based. School nurses should be aware of the established guidelines for screening charts. The Committee on Vision (1980), International Council of Ophthalmology (1984), and the World Health Organization (2003) have adopted recommendations for vision screening charts (Figure 1). Optotypes refers to the letters, numbers, and pictures used in the charts.

Figure 1

The National and International Eye Chart Design Guidelines:

1. Optotypes should be of approximate equal legibility.
2. Each line on an eye chart should have the same number of optotypes.
3. The horizontal spacing between optotypes should be equal to the width of the optotypes on a line.
4. The vertical spacing between lines should be the height of the optotypes in the next line down.
5. The size of the optotypes should progress geometrically up or down the chart approximately .1 log units.
6. Optotypes should be black with white background under good lighting conditions.

Committee on Vision (1980), International Council of Ophthalmology (1984), and the World Health Organization (2003).

A number of vision screening tools are available from a variety of manufacturers of vision testing equipment. It is important that all tools used during the screening be available well in advance to train screeners. To ensure valid screening results, it is important that all vision screening equipment be properly maintained and used according to manufacturer's instructions. The school nurse should also investigate the screening instrument's validity and reliability with the age group of students being screened. There are a variety of screening tools available for the testing of vision acuity, stereopsis, and color blindness.

### Vision acuity tools:

1. Vision acuity screening charts are used a prescribed distance from the student. Ideal screening conditions provide adequate light without glare from windows and limited visual distractions near the chart and during the screening process. The following are some common visual acuity charts used in schools.

- Lea Symbol<sup>®</sup> is a chart that uses house, apple, square, and circle symbols. The student can identify the symbol or match the symbol seen to the symbols on a card in front of them. This tool can be used with preliterate young children and is highly sensitive for detection of amblyopia. The Lea Symbol Chart<sup>®</sup> meets the guidelines for the National and International Eye Chart Design Guidelines and consequently is considered evidence-based for typically developing children.
  - HOTV is a chart that uses four different, yet equally recognizable letters of H, O, T, and V. Subsequent rows have increasing numbers of letters that decrease in size. These letters can be identified verbally by preliterate children or matched to a chart with the letters located in front of the student. The chart is useful for detecting early signs of amblyopia in children between the ages of three to five years. This chart meets all but one national and international eye chart design guidelines.
  - Snellen<sup>®</sup>(Sloan) is a chart with 11 lines of block letters. The first line consists of one very large letter. Subsequent rows have increasing numbers of letters that decrease in size. A patient taking the test covers one eye, and reads aloud the letters of each row, beginning at the top. The smallest row that can be read accurately indicates the patient's visual acuity in that eye. The Snellen<sup>®</sup> chart requires students to have letter identification and does not meet the national and international guidelines.
  - Near Vision Screeners are small charts with standardized letters or symbols. The chart is held a specific distance in front of the student while seated. Charts such as the Snellen<sup>®</sup>(Sloan), Good Lite<sup>®</sup>, and Rosenbaum<sup>®</sup> have been used.
2. Photoscreening is a technique that uses a camera to take a picture of the eyes under prescribed lighting conditions. The camera produces an instant photograph showing the child's red light reflex in both pupils. A certified reader can determine the presence of strabismus, refractory errors, media opacities (cataracts), and retinal abnormalities (tumors). The photo screener is not a substitute for a visual acuity measurement and eye examination.
  3. Retinomax is a hand-held tool that measures the visual refractor error. The screener places the instrument on the forehead of the student, while the student is focused on an internal target. The screening will result in up to eight measured values, including a confidence value. The confidence value determines if the instrument is giving accurate results. Unfortunately, the confidence value for preschool children is often low, indicating poor accuracy of the results. Strict adherence to the operation manual procedure is critical for accurate measurements. The advantage of the tool is that it does not require any student response, so it can be used with students with limited cognitive and language skills. The tool is fast, efficient, reproducible, and highly reliable in older children.<sup>18</sup>
  4. The Plus OptiX<sup>®</sup> device uses photorefraction/photoscreening to identify the presence and magnitude of refractive error, rather than providing a measurement of visual acuity.

5. The Spot<sup>®</sup> vision screener uses photorefraction/photoscreening to identify the presence and magnitude of refractive error, rather than providing a measurement of visual acuity.

### Color Vision Testing

A variety of color vision charts and pediatric pseudoisochromatic plates are available to test a student's ability to see color.

### Standards

Information regarding each of the recommended screening or examination tools and corresponding pass or fail and referral criteria is available from [Prevent Blindness Wisconsin](#) including, screening tool manufacturers, clinical assessment literature, and local health and eye care providers.

Prevent Blindness Wisconsin recommends that vision screening be performed by the pediatrician or primary care physician at each well-child exam through the grade school years and any child who experiences vision problems or shows symptoms of eye trouble at any time should receive a comprehensive eye examination by an ophthalmologist or an optometrist.

Prevent Blindness Wisconsin also recommends that if one or more of these signs appear, a child should be referred for a complete eye exam:

- eyes do not line up, one eye appears crossed or looks out;
- eyelids are red-rimmed, crusted, or swollen;
- eyes are watery or red (inflamed);
- rubs eyes a lot;
- closes or covers one eye;
- tilts head or thrusts head forward;
- has trouble reading or doing other close-up work, or holds objects close to eyes to see;
- blinks more than usual or seems cranky when doing close-up work;
- things are blurry, hard to see, or double vision;
- squints eyes or frowns;
- child states “my eyes are itchy, burning” or “I cannot see very well”; or
- after doing close-up work, child states “I feel dizzy,” “I have a headache” or “I feel sick/nauseous.”

### Procedure

The American Academy of Pediatrics, American Association of Certified Orthoptists, American Association of Pediatric Ophthalmology and Strabismus, and American Academy of Ophthalmology recommend vision screening in the preschool population. The American Optometric Association recommends a complete screening schedule at the following ages:

- Initial exam (age 3-5)

- Second screening (1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> grade)
- Third screening (4<sup>th</sup> or 5<sup>th</sup> grade)
- Fourth screening (7<sup>th</sup> or 8<sup>th</sup> grade)
- Fifth screening (10<sup>th</sup> or 11<sup>th</sup> grade)

Other circumstances where vision screening would be recommended include:

- as part of an assessment or evaluation for special education;
- grade retention;
- entrance into a new school district without evidence of vision screening; and
- referral by teachers, parent(s)/guardian(s), or others because of suspected vision impairments.

The nurse should notify parent(s)/guardian(s) of all children who do not perform satisfactorily on the vision screening and any subsequent retest. A referral means that there is sufficient deviation in the child's visual condition to warrant a more complete examination for diagnosis and treatment by a qualified eye care specialist.

When a child fails the vision screening, the process of facilitating prompt evaluation by an eye care specialist should begin. When working with parent(s)/guardian(s), the school nurse should:

- immediately notify them of the test results;
- explain the screening process;
- emphasize that the screening results are not diagnostic but advisory, and suggest the presence of a possible vision impairment;
- explain the need for prompt evaluation by an eye care specialist who can provide a diagnosis and document any vision impairment;
- explain that there are potentially negative developmental consequences for a child when a vision impairment is ignored;
- assist families in locating evaluation and treatment services and financial assistance, if necessary and available; and
- follow up to determine if an evaluation occurred and whether ongoing treatment is necessary.

Parental/guardian education about the screening process and the causes, consequences, and treatment of childhood vision problems is important. School health personnel may find it easy to use commercially available brochures, pamphlets, and other publications.

When working with health care providers, the school nurse should:

- provide complete screening information, including the screening tests used and the dates of the failures;
- request feedback about the evaluation results; and
- provide appropriate resources for students who need vision devices and glasses.

---

It is important to note that an eye care specialist, such as an optometrist or ophthalmologist, may recommend appropriate educational adjustments or modifications to be carried out by school personnel.

### Recordkeeping and Documentation

All vision screening results: passes, failures, referrals, and follow-ups, should be recorded on the student's school health record. If a referral confirms a vision problem, documentation should indicate the nature of the abnormality as determined by the specialist and a summary of any treatment prescribed.

Reporting your final screening results data to [Prevent Blindness Wisconsin](#) allows information to be collected statewide, so that educational vision programs continue.

### Role of the Classroom Teacher

Classroom teachers have the opportunity to observe students daily over an extended period of time. Consequently, teachers may, with the exception of the student's parent(s)/guardian(s), be in the best position to detect any early signs of a possible vision problem. When a teacher sees any of the signs noted earlier in the vision screening section of this chapter, the student should be referred to the school nurse. If the teacher or nurse detect a vision problem that significantly influences the child's ability to learn, the student should be referred to the district special education director or teachers of the visually impaired in the local district or cooperative educational service agency to discuss possible classroom modifications or potential special education referral.

## Postural and Scoliosis Screening

Adolescent idiopathic scoliosis is a medical term for a lateral or rotational curvature of the spine that may occur in the cervicothoracic, thoracic, or thoracolumbar regions. Scoliosis affects school-age children during their rapid growth years. Scoliosis is present in two to four percent of children between 10 and 16 years of age. The ratio of girls to boys with small curves of ten degrees is equal, but increases to a ratio of 10 girls for every one boy with curves greater than 30 degrees.<sup>19</sup> Postural screening may detect early signs of spinal problems that warrant further medical evaluation.

In 2004, the [U.S. Prevention Service Task Force](#) “recommended against the routine screening of asymptomatic adolescents for idiopathic scoliosis,”<sup>20</sup> based on low predictive value, percentages of children where curves progress, and lack of clear evidence of the efficacy of bracing.

The American Academy of Orthopedic Surgeons, Scoliosis Research Society, the Pediatric Orthopedic Society of North America, and the American Academy of Pediatrics do not support any recommendation against scoliosis screening. In 2007, they issued a joint statement regarding scoliosis screening in schools.<sup>21</sup> The statement recommends that students should be screened according to the following schedule:

- Girls should be screened twice (once in grade five and once in grade seven).

- Boys should be screened once (in grade eight or nine).

There is no legal requirement to provide postural or scoliosis screening in Wisconsin schools. Given the lack of evidence for the benefit of school-based scoliosis screening, arguments have been made for the discontinuation of routine school-based screening for scoliosis for asymptomatic students.<sup>22</sup> It is helpful to know, however, how to assess for this condition as part of any regular physical assessment and continuing care, when appropriate.

### Personnel

The school nurse responsible for implementing and supervising a postural and scoliosis screening program should consult with the school administrator, the health advisory committee, the medical advisor, and others, as appropriate, to discuss the screening program's importance, implementation, and connections with the entire school health program and health services provided in the community.

Screening personnel may include trained school personnel under the supervision of the school nurse or medical advisor. Competent postural and scoliosis screeners have a basic understanding of the:

- screening tools,
- methods for applying the tools,
- normal and abnormal findings, and
- implications of a spinal deformity on the child's ability to participate in his or her own learning.

After trained personnel conduct the initial screening, the school nurse should rescreen students who failed the initial screening. Screeners should also take part in annual update training.

### Procedure

The screening program has two components, an initial educational session with students and the screening.

In the educational session, screening personnel will inform students:

- how, when, and where the screening will be done;
- what the screener will be looking for;
- about special clothes to be worn during the screening (female students are asked to bring a two-piece swimsuit or halter top and shorts);
- about postural problems; and
- about the distribution of a letter to parents describing scoliosis screening procedures.

A schedule for screening should be prepared and coordinated in advance with classroom teachers whose students will take part in the screening.

Students should be appropriately dressed and privacy maintained during screening procedures. Adam's Forward Bend Test<sup>®</sup> is a screening tool used most often in schools and in the offices of pediatricians and primary care doctors. The child bends forward at the waist, dangling the arms, with the feet together and knees straight. The curve of structural scoliosis is more apparent when bending over. In a child with scoliosis, the examiner may observe an imbalanced rib cage, with one side being higher than the other, or other deformities. The Adam's test does not require a scoliometer or humpometer. Children who have positive findings during the initial screening should be rescreened later by the school nurse. If using a scoliometer, findings of five to seven degrees should be rescreened or referred. Referral is also recommended if there is asymmetry in two or more areas of visual assessment.<sup>23</sup>

### Referral and Follow-Up

Following rescreening to determine if there is sufficient deviation to warrant a more complete examination by a student's primary care provider, the school nurse should contact the parent(s)/guardian(s) of children with positive findings to make a referral.

Parental/guardian education about the screening process and the causes, consequences, and treatment of postural problems and scoliosis is important. School health personnel may find it beneficial to use commercially available brochures, pamphlets, and other publications.

When working with parent(s)/guardian(s), the school nurse should:

- promptly notify them of the test results;
- explain the screening process;
- emphasize that the screening results are not diagnostic but advisory;
- explain the need for prompt evaluation by the student's physician to provide a diagnosis and document any spinal problem;
- explain that there are potentially negative developmental consequences for a child when possible spinal problems are ignored;
- assist families in locating evaluation and treatment services and financial assistance, if necessary and available; and
- follow up to determine if evaluation occurred and whether ongoing treatment is necessary.

When a child shows early signs of possible spinal problems, the process of facilitating prompt evaluation by the child's physician should begin. It is vital that the nurse follow up with the student and parent(s)/guardian(s) to ensure that the suspected spinal problem has been diagnosed and treated by a competent specialist.

When working with health care providers, the school nurse should:

- provide complete screening information, including the dates of the screening and rescreening and the screening methods used; and
- request feedback about the evaluation results.

It is important for districts to note that a family physician or orthopedic specialist may recommend appropriate educational adjustments or modifications to be carried out by school personnel.

### Recordkeeping and Documentation

All postural and scoliosis screening results, whether passes or failures, should be recorded on the student's school health record. If a referral confirms a spinal problem, documentation should indicate the examination results; the nature of the abnormality, as determined by the specialist; and a summary of any treatment prescribed.

### Conclusion

Population-based health screening and appraisals are an important component of a school health program, designed to provide early intervention and remediation and to limit potential disability and negative effects on students' health status and academic achievement. School nurses, school health advisory committees, school district administrators, school board members, and the medical advisor can work together to assess the types of screening needed and resources available; and to determine which school health screening and appraisal programs will be performed.

## References

1. National Association of School Nurses. (2011) *Position statement: Role of the school nurse*. <http://www.nasn.org/portals/0/positions/2011psrole.pdf>. (Accessed August 13, 2014)
2. American Academy of Pediatrics. (2008). Role of the School Nurse in Providing School Health Services, *Pediatrics* 121, pp.1052-1056. doi: 10.1542/peds.2008-0382.
3. Green, Morris. 2008. *Bright Futures: Guidelines for Health Supervision of Infants, Children and Adolescents*. 3<sup>rd</sup> ed. American Academy of Pediatrics. [http://brightfutures.aap.org/3rd\\_Edition\\_Guidelines\\_and\\_Pocket\\_Guide.html](http://brightfutures.aap.org/3rd_Edition_Guidelines_and_Pocket_Guide.html). (Accessed August 13, 2014)
4. Bobo, N, Kimel, L, & Bleza, S. (2013) Promoting health at school. In J. Selekman (Ed.), *School Nursing: A Comprehensive Text*. (2<sup>nd</sup> ed. p.455) Philadelphia, PA: F. A. Davis.
5. National Heart, Lung and Blood Institute. (2004). The 4<sup>th</sup> report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics*, 114 (2), ii. (Accessed August 13, 2014) [http://pediatrics.aappublications.org/content/114/Supplement\\_2/555.full](http://pediatrics.aappublications.org/content/114/Supplement_2/555.full).
6. Center for Disease Control and Prevention. Division of Oral Health; *School-based dental sealant programs*. [http://www.cdc.gov/oralhealth/dental\\_sealant\\_program/#recommendations](http://www.cdc.gov/oralhealth/dental_sealant_program/#recommendations). (Accessed August 13, 2014)

7. Wisconsin Department of Health Services. (2008). *To Weigh and Measure: Guidance and Recommendations for Schools*. <http://www.dhs.wisconsin.gov/physical-activity/school/index.htm>. (Accessed August 13, 2014)
8. Centers for Disease Control and Prevention, National Center for Health Statistics. *CDC growth charts: United States*. <http://www.cdc.gov/growthcharts/>. (Accessed August 13, 2014)
9. Centers for Disease Control and Prevention. *About BMI for children and teens*. [http://www.cdc.gov/healthyweight/assessing/bmi/childrens\\_BMI/about\\_childrens\\_BMI.html](http://www.cdc.gov/healthyweight/assessing/bmi/childrens_BMI/about_childrens_BMI.html). (Accessed August 13, 2014)
10. Centers for Disease Control and Prevention. *BMI percentile calculator for child and teen*. <http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx>. (Accessed August 13, 2014)
11. American Speech-Language-Hearing Association. *Auditory processing disorder*. <http://www.asha.org/public/hearing/Auditory-Processing-Disorder/>. (Accessed August 13, 2014)
12. Ethan, D. and C. Basch. (2008). *Promoting healthy vision in students: Progress and challenges in policy, programs and research*. *Journal of School Health*. doi: 10.1111/j.1746-1561.2008.00323.x
13. Basch, C. (2011). *Vision and the achievement gap among urban minority youth*. *Journal of School Health*. doi: 10.1111/j.1746-1561.2011.00633.x
14. U.S. Preventive Services Task Force. (2011). *Vision screening for children 1 to 5 years of age: Recommendation statement*. <http://www.uspreventiveservicestaskforce.org/uspstf11/vischildren/vischldrs.htm>. (Accessed August 13, 2014)
15. Kemper, A. and Delmonte, M. (2010) *Screening vision*. In American Academy of Pediatrics Performing Preventive Services: A Bright Futures Handbook. pp. 155-157. <http://brightfutures.aap.org/pdfs/Preventive%20Services%20PDFs/Screening.PDF>. (Accessed August 13, 2014)
16. Yen, K. (2014) Amblyopia. Medscape. <http://emedicine.medscape.com/article/1214603-overview>. (Accessed August 13, 2014)
17. Nottingham Chaplin, P. K & Bradford, G. (2011) *A historical review of distance vision screening eye charts: What to toss, what to keep, and what to replace*. *NASN School Nurse*, 26 (4) 221-228. doi: 10.1177/1942602X11411094
18. Vision in Preschoolers Study Group. (2007). *Impact of Confidence Number on the Screening Accuracy of the Retinomax Autorefractor*. *Optometry and Vision Science*, 84(3)181-188.
19. Reamy, B.V. & Slakey, J.B. (2001). *Adolescent idiopathic scoliosis: Review and current concepts*. *American Family Physician*, 64 (1), pp. 111-117. <http://www.aafp.org/afp/2001/0701/p111.html>. (Accessed August 13, 2014)
20. United States Preventative Service Task Force. (2004). *Screening for idiopathic scoliosis in adolescents: Brief evidence update*. <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/idiopathic-scoliosis-in-adolescents-screening> (Accessed August 13, 2014)

21. Richards, B.S. & Vitale, M. (2007). *AAOS-SRS-ROSNA-AAP Information statement: Screening for idiopathic scoliosis in adolescents*. American Academy of Orthopedic Surgeons, Scoliosis Research Society, the Pediatric Orthopedic Society of North America and the American Academy of Pediatrics.  
<http://www.aaos.org/about/papers/position/1122.asp>. (Accessed August 13, 2014)
22. Jakubowski, T.L. & Alexy, E.M. (2014). *Does school scoliosis screening make the grade?* NASN School Nurse. doi: 10.1177/1942602X14542131.
23. Bobo, N, Kimel, L, & Bleza, S. *Promoting Health at School*. In J. Selekman (Ed.), *School Nursing: A Comprehensive Text*. (2<sup>nd</sup> ed. pp. 462-464) Philadelphia, PA: F. A. Davis.