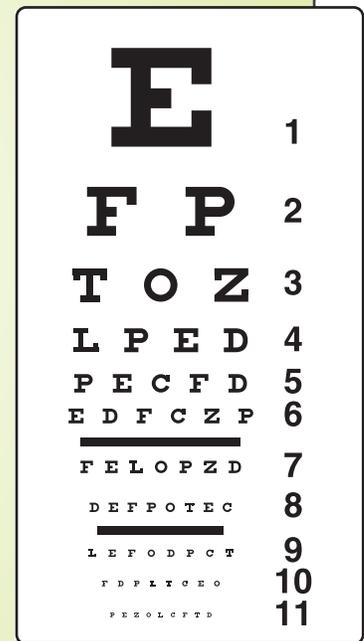


# Guidelines for *Health Screenings*



## Vision



## *Postural*



## Hearing

Connecticut State Department of Education

2004

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# Guidelines for *Health Screenings*



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Connecticut State Department of Education  
2004



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## Preface and Acknowledgments

Health problems and physical defects, if not detected and treated, may prevent a child from learning and taking full advantage of the educational opportunities provided in school. The most common problems which can be detected and for which early intervention can be successful are vision, hearing and posture. Connecticut statutes and regulations mandate screening in these important areas.

The purpose of the *Guidelines for Health Screenings* is to provide more detailed information on the rationale, proper procedures and recommendations for implementation of screening for vision, hearing and postural defects. Such information is essential to preparing the community, school staff, parents and students for implementation of screening programs.

The guidelines are based on initial work by the Connecticut Advisory School Health Council, which was in existence from 1954 to 1993 and again from 1988 to 1999. Representatives from the State Department of Education (SDE), Connecticut Speech-Language-Hearing Association, Association of School Nurses of Connecticut, Prevent Blindness and staff members from Connecticut Children's Medical Center participated in the development of these guidelines. The SDE gratefully acknowledges the work of these contributors. Special recognition is given to Elaine Brainerd and Nadine Schwab, former SDE school health consultants and to Antonia Maxon, director of the New England Center for Hearing Rehabilitation.

Feedback regarding the content of the guidelines is welcomed. You may direct your comments or questions to Cheryl Carotenuti, health promotion consultant, at (860) 807-2108 or [cheryl.carotenuti@po.state.ct.us](mailto:cheryl.carotenuti@po.state.ct.us). For the hearing screening section, you may also contact Carolyn Isakson, speech/language consultant, at (860) 713-6924 or [carolyn.isakson@po.state.ct.us](mailto:carolyn.isakson@po.state.ct.us).

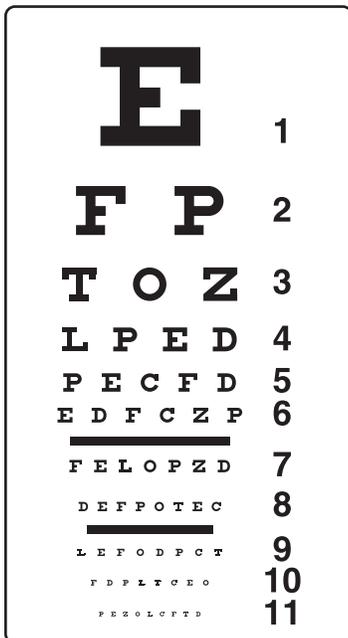


# Section A

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## Vision Screening



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# Vision Screening

## Introduction

Vision screening as mandated under Connecticut General Statutes Sec. 10-214 consists of a screening for distance visual acuity. Vision screening is required annually in kindergarten through Grade 6, and again in Grade 9. Vision screening is also mandated as part of the school health assessments under CGS 10-206. This is to identify children with visual difficulties that may affect learning ability and school adjustment.

The National Society to Prevent Blindness Vision Statistics Department has reported that “Among school-age children, an estimated 1 in 4 has a vision problem.” Vision screening in schools should never be considered diagnostic. Screening will not identify every child who needs eye care, nor will every child so referred need glasses or treatment. Screening only identifies most of those children who may have a vision problem. The Society noted in its *Children’s Eye Health Guide* that “a screening for **distance visual acuity** is considered by authorities to be **the most important single test** of visual ability. This test will identify more children who require eye care than any other single test.”

Any student who has significant reading difficulties or other learning problems, who experiences scholastic failure, who is suspected of being mentally retarded, who has a hearing impairment, or who has medical problems such as cerebral palsy or diabetes should have a thorough eye examination by an eye specialist included in his physical, mental and emotional evaluation. When a student has an eye examination by an eye doctor, the school nurse may find it necessary to interpret the findings to the teacher(s) and/or principal.

## Goal

The purpose of vision screening is to identify possible vision problems and treat recoverable loss, especially amblyopia, at a very young age, before it interferes with the learning process.

## Objectives

1. To screen at the mandated grades to identify changes in vision which may occur from one grade to another.
2. To identify students with problems of visual acuity and refer for evaluation and treatment.
3. To follow up on referrals to ensure that students receive the necessary treatment.

# Implementation

Implementation of an effective vision screening program depends on the collaboration and cooperation of the school health services personnel, educational staff, administrators, the medical community, parents and students.

## Education

### 1. Screening Personnel

Adequate preparation of all individuals performing the screening is extremely important. A training session, such as that offered by the Connecticut Society to Prevent Blindness or equivalent, is recommended. A return demonstration should be included in all training to ensure the proper performance of screening for all age groups. According to the Regulations of Connecticut State Agencies (RCSA), Section 10-214-5, any individual properly trained may conduct the vision screening. Health aides or volunteers may be prepared to carry out vision screening. The school nurse or school medical advisor would be responsible for the supervision of health aides or volunteers conducting the screenings.

### 2. Other School Staff Members

The school nurse should inform school staff members of the vision screening program. They should be aware of various types of visual problems and their impact on educational performance. The National Society to Prevent Blindness has prepared the following list which may be used by teachers to identify students with signs of possible vision problems.

The student:

- ⇒ Rubs eyes frequently
- ⇒ Attempts to brush away blur
- ⇒ Has dizziness, headaches or nausea following close work, or
- ⇒ Is inattentive during lessons from chalkboard, wall chart or map
- ⇒ When looking at distant objects:
  - holds body tense,
  - contorts face in attempt to see distant things clearly,
  - thrusts head forward, or
  - squints eyes excessively.
- ⇒ When reading:
  - blinks excessively,
  - holds book too far from face,
  - holds book too close to face,
  - makes frequent change in distance at which book is held,
  - is inattentive during lesson,
  - stops after brief period,
  - shuts or covers one eye,
  - tilts head to one side,
  - tends to reverse words or syllables,

- tends to look cross-eyed,
- tends to lose place on page, or
- confuses words or letters.

Teachers should know the importance of continuously observing students for potential vision problems. Children observed to have any of the above signs should be referred to the school nurse for a vision screening regardless of age or grade placement.

### **3. Parent Education**

Parents should be informed of the screening program in the schools. The information should include the purpose of the vision screenings, the approximate screening dates and how parents will be notified if referral to a community health care provider is recommended. Written material may be distributed through the school newsletter or by individual notices. (See appendix A- sample letter). Written approval for the screenings is not mandated; however, notification is required. Parents must provide the school with a written request for their child to be exempt for religious reasons.

### **4. Public Awareness Education**

Community understanding of the purpose of screening is essential. The school nurse should interpret the program to parents, professionals and other people in the community. Information should be included about the purpose and objectives of the program, students to be screened, screening personnel, the referral process, follow-up procedures and the availability of community services. This may be done in the form of a letter to parents, school newsletters and local media.

## **Screening Preparation**

### **1. Environment**

A quiet area free from distracting influences should be selected for testing visual acuity. Prior to screening, each student should not hear other students responding to the test or see the chart.

When using a wall chart, the following criteria should be used for adequate screening:

- a. place the chart on an uncluttered wall away from windows;
- b. ensure the area is well illuminated, without bright lights or glare in the child's field of vision;
- c. ensure that no shadows fall on the chart;
- d. place the chart so that the 30-foot line is at the eye level of the child during screening; and
- e. with ribbon or tape, measure exactly a 20-foot distance from the face of the chart to the heel line. If a chair is used, the student's back is at the 20-foot line.

## **2. Equipment and Materials**

RCSA Section 10-214-5 (c) recommends the Snellen Test as the preferred method of screening distance visual acuity. Other devices may be used for initial screening. (See Rescreening, page 9).

The Snellen Chart is available in either the alphabet, E or HOTV chart. When using the Snellen Chart, the following equipment is also needed:

- a. a tape measure to measure distance from the chart;
- b. colored tape for marking a 20-foot line on the floor;
- c. a pointer;
- d. occluders (one for each child), which may be made from paper with rounded edges;
- e. a wooden E for younger children and for teaching purposes;
- f. recording forms;
- g. doctors' referral forms; and
- h. pamphlets for educational purposes.

*Note:* The LEA chart is available for preschool-age children.

## **3. Preparation of Students**

The screening program should be explained to all students before the screening begins. This will help to develop a more cooperative attitude. For the preparation of young children, the screening may be introduced as a game. The E symbol may be interpreted as a table if a child does not know the alphabet, and the child may be taught to point with his or her arm or hand or the wooden E in the same direction as the “table legs” on the chart. The examiner may demonstrate the occluder on himself or herself, explaining that sometimes the game is played covering one eye. When it is observed that the child understands this “game,” he or she is ready for screening.

## **4. Scheduling of Grades**

Visual acuity screening should be completed by December 1. Kindergarten students who have not been screened prior to school attendance should be scheduled first.

# Screening Procedures

## 1. Visual History

Prior to the screening, a history should be completed, including a review of pertinent records (in particular, the health assessment record, HAR-3, previous screening results, and any parent information).

RCSA Section 10-214-1(h) defines screening as “the presumptive identification of disease or physical defect.” Therefore, when the history indicates that a child has a documented visual impairment or defect, other than acuity difficulties requiring glasses, there is no need to carry out the visual screening. Instead, screening personnel need to monitor that the child is receiving appropriate medical and ophthalmological follow up. Records of visual examinations from outside providers should be on file in the cumulative health record, and as appropriate in the special education file.

For children with diagnosed visual impairments who are receiving special education and related services or have a 504 plan, the planning and placement or 504 team meeting is the appropriate place for discussion about medical and ophthalmological management. For children receiving an annual vision evaluation through an Individualized Education Program (IEP), a 504 plan or other medical recommendations, the vision screening could be omitted with evidence of a completed vision evaluation report.

## 2. Screening

1. Position student in a chair or standing with heels on the line. Determine if the student has been prescribed glasses. If glasses are used for distance, screen **with** glasses. When glasses are used only for reading, screen **without** glasses. If glasses have been prescribed but the student doesn't wear them, test **with** (if possible) and **without** glasses. *Note: Inform teacher(s) that the student has glasses but chooses not to wear them.*
2. Direct the student or assistant screener to occlude left eye first. Check for proper position. Test the right eye, then occlude the right eye and test the left eye.
3. Always expose one entire line on the chart at a time. Do not use the isolated letter method. Proceed according to the following:

**Prekindergarten through 2nd Grade:** start at 20/50 line  
**Grade 3 and Above:** start at 20/40 line  
**Children Suspected of Poor Vision:** start at 20/100 line.

4. Use a red pointer to make a straight line directly below each symbol to be read without actually touching the symbol. Move from one symbol to the next in progression.

A passing score is given for each line if **half of the letters plus one** have been correctly identified. If the student reads a line correctly, proceed to the next smaller line and reverse the direction in which symbols are presented.

If the student fails any line, i.e., cannot read one more than half of the letters on that line, continue moving up on the chart until the student passes a line. Then move down the chart again until the student fails to pass a line a second time. If a student fails **any** line below the starting line, repeat the line in reverse order.

5. It is recommended that students in pre-K through Grade 2 be screened **as far as each child is capable and cooperative**, i.e. through the 20 line, if possible. This procedure helps identify numerous eye problems, including amblyopia.
6. Record visual acuity in order tested (right eye, left eye).
7. Refer all students exhibiting the following behaviors during the screening, regardless of visual acuity:
  - a. thrusting head forward;
  - b. tilting head;
  - c. watering eyes;
  - d. frowning, scowling or squinting;
  - e. puckering the face;
  - f. blinking excessively; or
  - g. crossed eyes.

**Do not permit the student to go on, but record the last line read correctly with ease.**

## **Criteria for Passing Screening**

### **Prekindergarten through Grade 3:** (Ages 4-7)

The student should be able to pass the 20/30 line with each eye.

### **Grade 4 and above:** (8 years and older)

The student should be able to pass the 20/20 line with each eye.

The student should **not** have more than one line difference in acuity between the eyes, even when able to pass the critical line with each eye, e.g., a 20/40 result for one eye and 20/20 for the other eye requires a referral.

# Rescreening Procedures

Rescreening is carried out in order to minimize inappropriate referrals for medical and ophthalmological evaluation or treatments. Rescreening should be completed several weeks later if the above criteria for passing are not met. All rescreening should be conducted by the school nurse using the Snellen Wall Chart (or lighted chart) at a 20-foot distance. This is especially important if the student was originally screened at 10 feet or with an alternative test.

## Referral and Follow Up

### 1. Parent Notification

If a student is unable to be screened or fails a second time to meet the passing criteria for either eye, then this student should be referred for a professional eye examination. Parents or guardians must be notified in writing and encouraged to take the child to an eye doctor for the examination.

A student should also be referred regardless of the screening score if an obvious undiagnosed muscle imbalance is suspected, if symptoms of visual disturbance (see the list on page 4) are repeatedly observed or if the behaviors listed on page 8 are observed. For a sample referral form, see Appendix B.

### 2. Coordinating Referrals

The school nurse is responsible for coordinating referral and follow-up for further diagnosis. The parent or physician should return the completed physician's report to the school nurse. If a referral form sent to the parent/guardian is not returned within a reasonable period of time, the school nurse should contact the parent or guardian to determine follow-up plans. It may be necessary to have an authorization form signed by the parent to communicate directly with the health care provider. Ultimately, the results of a referral should be noted on the student's cumulative health record.

### 3. Teacher Notification

All school personnel responsible for the education of a student failing a vision screening should be notified. They will also need to be informed of the outcomes of the referral and should participate in any educational evaluations, accommodations and interventions needed. Students with visual deficits affecting educational performance should be referred to the school Planning and Placement Team to determine eligibility for special education and related services.

#### **4. Students Requiring Special Considerations**

Some students may not respond appropriately to the screening procedures.

- a. For those who are unduly fearful or uncooperative, the procedures described in 1, 2 and 3 above should be followed.
- b. For those who have severe impairments that interfere with the screening (e.g., pervasive developmental delays, social-emotional maladjustments or neurological impairment), and whose Individualized Education Programs (IEPs) or 504 plans do not currently include exemption from screening or medical/visual referral, in addition to the procedures in 1, 2 and 3, the PPT or 504 Team should be advised.
- c. Students with identified histories of visual impairments need to be monitored medically, visually and educationally, whether or not they are receiving special education or 504 services. Periodic vision screenings may be necessary in conjunction with consultation with the child's primary health care provider.

IDEA requires school districts to be fiscally responsible for medical and visual evaluations during the initial evaluation if the PPT decides such testing is necessary to determine eligibility for special education and related services [34 C.F.R. § 300.532 (g)] or 504 services [34 C.F.R. § 104.35 (a) and (b)]. IDEA also requires school districts to reevaluate a student with a disability if the child's condition warrants it, or if parents or a teacher request it, but at least every three years [34 C.F.R. § 300.536 (b)]. Again, districts are fiscally responsible if the PPT determines that visual or medical reevaluation is necessary. Families are responsible for the costs otherwise, although school personnel may be able to link the family with resources to assist with these expenses.

#### **5. Reports**

The results of the vision screening and the screening done as part of the health assessment (HAR) should be recorded on the student's cumulative health record (CHR-1). The results of the referral should be also be recorded on the CHR. If the student is receiving special education or accommodations through a 504 plan, screening information should be included in those files as well.

# Glossary

**Amblyopia** (lazy eye) - dimness of vision, sometimes without known cause. Crossed eyes and other vision defects may lead to amblyopia, a condition in which a child unconsciously suppresses the vision of one eye and relies on the other.

**Anisometropia** - a condition in which the refractive error in each eye is different

**Astigmatism** - defects of the curvature of the cornea or lens resulting in a distorted image because light rays cannot focus on a single point of the retina

**Binocular vision** - coordinated use of the two eyes to see a single, fused, three-dimensional image

**Color deficiency** - inability to recognize certain colors, primarily red or green, but rarely blue

**Conjunctiva** – the delicate mucous membrane that lines the eyelids and covers the front part of the eye except the cornea

**Conjunctivitis** - inflammation of the conjunctiva

**Depth perception** - the blending of slightly dissimilar images from the two eyes for the perception of depth and solidity

**Distance vision** - ability to distinctly perceive objects at a distance, usually 20 feet

**Esophoria** - a latent tendency of the eye to turn inward

**Esotropia** - observable turning in of one or both eyes

**Exophoria** - latent tendency of the eye to turn outward

**Exotropia** - observable turning outward of one or both eyes

**Fusion** - the combination of the separate images in the two eyes into a single mental image

**Heterotropia** - a binocular condition in which under ordinary conditions, one eye turns away from the point looked at by the other eye

**Hyperopia** (farsightedness) - a refractive error in which the focal point for light rays is behind the retina

**Hypertropia** - deviation in heterotropia where one eye turns upward higher than the other

**Hypotropia** - deviation in heterotropia where one eye turns downward lower than the other

**Keratoconus** - an abnormal conical protrusion and thinning of the cornea accompanied by decreased visual acuity and marked astigmatism

**Legal blindness** - central visual acuity of 20/200 or poorer in the better eye with corrective lenses, or limited fields of vision such that the widest diameter subtends an angle no greater than 20 degrees

**Lens, concave** - minus lens (-); lens with power to diverge parallel rays of light; used to correct myopia

**Lens, convex** - plus lens (+); lens with power to converge rays of light and bring them to a focus; used to correct hyperopia

**Myopia** - (nearsightedness) - a refractive error of the eye where the image of a distant object (more than 20 feet) is formed in front of the retina and cannot be seen distinctly

**OD** (oculus dexter) - used to designate the right eye

**Ophthalmia** - severe inflammation of the eye or of the conjunctiva

**OS** - (oculus sinister) - used to indicate the left eye

**OU** - (oculus unitas) - used to indicate both eyes together or oculus uterque, each eye

**Phoria** - abbreviation for heterophoria, any tendency for deviation of the eyes to turn away from normal

**Pink eye** - contagious conjunctivitis

**Pseudoisochromatic charts** - charts with colored dots of various hues and shades indicating numbers, letters or patterns, used for testing color discrimination and color deficiency

**Stereopsis** - normal perception of the solidity of objects and their relative position in space without such cues as shadow, size, and overlapping

**Strabismus** - inability of both eyes to look directly at an object at the same time; see esotropia, exotropia, hypertropia, hypotropia

**Sty** (hordeolum) - inflammation of one or more of the sebaceous glands of the eyelids, producing pus, and usually due to an infection

**Visual acuity** - measurement of the ability of the eye to perceive the shape of objects in the direct line of vision and to distinguish detail; generally determined by identifying correctly the smallest line of Snellen symbols from a 20-foot distance

## Appendix A

### **Sample Letter: Notification of Parents Prior to Screening**

Dear Parents:

On \_\_\_\_\_, a vision screening program to detect possible visual acuity problems will be conducted for all students in Grades \_\_\_\_ at the \_\_\_\_\_ school. The purpose of this program is to identify possible visual problems as early as possible so that the need for intervention can be determined. Early detection and intervention may prevent educational implications such as difficulty reading.

The school nurse and/or trained volunteers will be doing the screenings. These trained examiners will conduct the screening by having the student read an eye chart from 20 feet away with one eye while covering the other eye with an eye occluder. The process is repeated with the opposite eye. If a visual problem is suspected, the student will be re-checked at a second screening.

If further consultation is recommended, parents will be notified of the findings and will be asked to seek further evaluation from their own physician.

If you have any questions concerning the vision screening, please contact the school nurse.

Sincerely yours,

---

Principal

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School Nurse



## Appendix B

### Suggested Form for Medical Referral/Report

#### Referral for Eye Examination:

\_\_\_\_\_  
(Student's Name) (DOB) (Sex) (Grade)

To: \_\_\_\_\_  
(Parent's Name)

\_\_\_\_\_  
(Address) (Telephone)

From: \_\_\_\_\_  
(Name of School Nurse) (School Name)

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Recently we have administered vision screening tests to students in our school. Based on these test results, it would be desirable for your child to have a thorough eye examination. Therefore, it is suggested that you take her or him to an eye specialist (ophthalmologist, optometrist) for further examination or that you follow the recommendations of your family physician.

Date of Test(s): \_\_\_\_\_

Glasses worn for test: Yes No

Distance Visual Acuity: Right eye \_\_\_\_\_ Left eye \_\_\_\_\_

Other Symptoms: \_\_\_\_\_

\_\_\_\_\_

## Report of Eye Examination

		<u>Distance Vision</u>		<u>Near Vision</u>	
		Without	With	Without	With
		Correction	Correction	Correction	Correction
A.	Right Eye	_____	_____	_____	_____
	Left Eye	_____	_____	_____	_____
B.	Type of Eye Problem:	_____			
C.	Glasses needed:	No <input type="checkbox"/>	Yes <input type="checkbox"/>		
	To be worn:	Constantly <input type="checkbox"/>	Classroom <input type="checkbox"/>	Distance <input type="checkbox"/>	Close Work <input type="checkbox"/>
D.	Reexamination advised in:	_____			
E.	Eye Muscle Coordination:	Adequate <input type="checkbox"/>			
	Remarks :	_____			
F.	Ability to change focus quickly and easily: (Example: chalkboard to book)				
	Adequate <input type="checkbox"/>	Remarks: _____			
G.	Ability to maintain focus at reading distance:	Adequate <input type="checkbox"/>			
	Remarks:	_____			
H.	Color Vision:	Normal <input type="checkbox"/>			
	Remarks:	_____			
I.	Physical Activity:	Restricted <input type="checkbox"/>			
	Remarks:	_____			
J.	Other Comments:	_____			
		_____			

Signature of Examiner \_\_\_\_\_

Date of Examination \_\_\_\_\_

*Please forward this report to school nurse, address above.*

## Appendix C

### **Educational Resources are available from:**

The Connecticut Optometric Society  
638 Prospect Ave.  
Hartford, CT 06105

Connecticut Society to Prevent Blindness  
1 Meriden Road  
Middletown, CT 06457

State Department of Education  
Cheryl Carotenuti  
School Nurse Consultant: 860-807-2108  
Bureau of Early Childhood, Family and Student Services  
25 Industrial Park Road  
Middletown, CT 06457  
[cheryl.carotenuti@po.state.ct.us](mailto:cheryl.carotenuti@po.state.ct.us)

National Association of School Nurses  
P.O. Box 1300  
Scarborough, Maine  
1-207-883-2117  
[www.nasn.org](http://www.nasn.org)



## Section B

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# Pure Tone Hearing Screening and Screening of Middle Ear Function



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# Pure Tone Hearing Screening and Screening of Middle Ear Function

## Introduction

Schools are primarily auditory-verbal environments where the interpersonal interactions associated with teaching and learning depend heavily on the auditory channel. Undetected hearing loss in students — congenital or acquired, sensorineural or conductive, bilateral or unilateral, chronic or fluctuating, stable or progressive, with or without accompanying middle ear disease — presents a potentially critical barrier to academic, social and vocational success. Early identification of hearing loss and middle ear disease (which may have immediate or cumulative effects on hearing acuity) is imperative so that medical, technological and educational interventions can be implemented to avoid or reduce the adverse impact of these impairments.

In the 2002-2003 school year, there were 820 children with hearing impairments and 60 children who were deaf-blind among K-12 public school students. This translates to a prevalence rate of .15 percent for hearing impairments and .01 percent for deaf-blindness. In the same school year, there were 51 children with hearing impairments and 2 who were deaf-blind among public school prekindergarten children. The prevalence rate for hearing impairments and deaf-blindness combined was 1 percent. These identification rates, which represent children identified under the Individuals with Disabilities Education Act (IDEA), have remained fairly stable over the last several years (Connecticut State Department of Education).

These data do not tell the whole story, however. The state does not track the number of students with other disabilities (e.g., autism, neurological impairments) who may have co-occurring hearing impairments. Nor does it collect information about children whose hearing difficulties are addressed through Section 504 of the Rehabilitation Act or other regular education programs, (e.g., remedial services, classroom instructional or acoustic modifications) or those who require temporary medical treatment, but whose problems may have some developmental, educational or social consequences.

Hearing screening is required by Connecticut General Statutes Sec. 10-206 at three grade levels as part of required health assessments (school physicals): (1) prior to entry into school, (2) at 6th or 7th grade and (3) at 10th or 11th grade. This may be done by the child's health care provider or through the school's mass screening programs. C.G.S. Sec. 10-214 requires that audiometric screening occur annually in kindergarten through Grade 3, Grade 5 and Grade 8. While hearing screening is not required for students enrolled in public school preschool programs, school districts are encouraged to include hearing screening for this population because of the benefits of early identification (*Guidelines for Audiologic Screening*, American Speech-Language-Hearing Association, 1997). All students should be screened early in the school year to maximize early identification and intervention. Additional grades may be screened at the option of the local school district.

For a variety of physical, environmental and cultural reasons, many children are prone to middle ear disease, which may manifest as various forms of otitis media. These problems may vary in severity, frequency and duration. Pure tone hearing screening alone does not identify middle ear disease, because not all middle ear problems are accompanied by hearing loss. Screening for middle ear disease (tympanometry) is not currently mandated in Connecticut schools. However, due to the high prevalence of this disease among young children, and its potentially serious medical, developmental and educational consequences (“Identification of Hearing Loss and Middle Ear Dysfunction in Children,” *Audiology Today*, American Academy of Audiology, 1997 ; ASHA, 1997), tympanometry should be included in a comprehensive screening program for children below seven years of age (ASHA, 1997) and for at-risk populations, including children in group day-care settings; living in crowded conditions; from certain ethnic backgrounds, especially Native American and Eskimo; with craniofacial anomalies, stigmata or other conditions associated with otitis media with effusion (e.g., cleft palate, Down’s Syndrome); with sensorineural hearing impairments; learning disabilities and, possibly, those exposed to cigarette smoke in the home (American Academy of Audiology, 1997; ASHA, 1997).

## **Pure Tone Audiometric and Tympanometric Screening**

### **Goal**

The purpose of audiometric and tympanometric screening is to identify students suspected of hearing impairments or middle ear disease. Through identification, appropriate medical, technological and educational services can be provided to minimize the adverse effects of auditory impairments on speech, language, educational and social-emotional development.

### **Objectives**

1. To identify and refer for medical and audiological follow-up those students who do not pass the audiometric or tympanometric screening.
2. To document follow-up medical and audiological evaluation and treatment.
3. To refer students with an identified hearing loss to the school early intervention team (e.g., Child Study Team) for development, implementation and monitoring of educational strategies, or to the planning and placement team for evaluation to determine the need for special education and related services, as appropriate.

# Implementation

## Education

### 1. Screening Personnel

According to the Regulations of Connecticut State Agencies (RCSA), Section 10-214-3(a), “School nurses, registered nurses, speech pathologists, audiologists, trained aides to school nurses, licensed practical nurses, and trained volunteers may perform audiometric screening. All persons who conduct audiometric screening shall have completed six (6) hours of training in this area including practice supervised by a properly trained school nurse, speech pathologist or audiologist. Children under age six (6) or handicapped students shall be screened by persons with specific training and experience in screening children in these categories.”

Professional ethics, good practice standards and liability protection make specialized training for personnel conducting tympanometry a priority as well. Tympanometric screening should be carried out by personnel who meet the standards prescribed under RCSA Section 10-214-3 and should be supervised by an audiologist, speech and language pathologist (SLP), physician, or school nurse who has had appropriate training in tympanometric screening techniques.

The school district coordinator of the hearing screening program should determine the training needs of personnel who will be conducting the screening. Documentation should be kept on file of dates, content and attendance at training sessions. Even individuals who have been administering screening for a long time can benefit from periodic updates. This is important, as legal requirements and best practices for screening change and new equipment is acquired.

In addition to conducting or supervising screenings, audiologists can assist school personnel by measuring, or training others to measure, the noise levels in the screening rooms. These professionals also are useful resources for explaining the results and educational implications of follow-up testing to families and school personnel and for helping schools to design educational plans for children with identified hearing loss. Area audiologists, who may be evaluating school-age children after screening by school personnel, should be informed about the screening program, especially the referral and follow-up procedures. School personnel should be familiar with the range of community audiological services that might be useful to them.

### 2. Other Personnel

School personnel involved in the screening program need to know the purpose, objectives and procedures of the program. They also should be made aware of various types, degrees and configurations of hearing loss and their potential impact on educational performance.

Administrators need to be informed of the requirements for the hearing screening site. Personnel who will coordinate the appropriate medical, audiological and educational referrals need to be identified. Teachers and administrators need to be advised about their students who do not pass the screening and the type and status of follow-up referrals, so that appropri-

ate educational management procedures can be implemented. They should be made aware of resources in and out of the school system, such as the school medical advisor, school nurse, SLP, audiologist or the child's physician, all of whom may provide additional information or direct medical or educational support for these children.

### **3. Parent Education**

A plan for informing parents about the screening program should be developed. This should include the provision of written information to individual parents that addresses the importance of early identification of hearing loss and middle ear disease; the purpose of the screening program; the screening date(s); basic information about the screening procedures; how the results will be shared with them; and the importance of parental involvement in following the recommendations of screening personnel. (See Appendix A for a sample letter.) Written material might also be distributed to all parents by way of school newsletters. In addition to written information, parent awareness may be addressed in school orientation activities or parent-teacher organization meetings early in the school year.

Written approval by parents for their child to participate in the hearing and middle ear disease screening program is not mandated. However, school districts may find it useful to secure such permission as a liability protection, or to provide a form for parents to request exemption of their child for religious or other reasons.

### **4. Public Awareness Education**

Local media such as radio, television and newspapers may be used for the dissemination of information about the screening program. Information should be included about the purpose and objectives of the program, students to be screened, screening personnel, the referral process, follow-up procedures, and the availability of community services. Presentations at civic group meetings also serve as a means of promoting greater public awareness.

# Screening Preparation

## 1. Environment

“Screening shall be performed in an acoustic environment sufficiently quiet for a person with normal hearing sensitivity to hear the test stimuli at the screening levels.” [RCSA Section 10-214-3(b)] It is important to address this requirement when selecting the site for the hearing screening program, in order to ensure the validity and reliability of screening results. Consideration should be given to the noise inside and outside the screening room that will occur when the screening is conducted. While personnel with documented normal pure tone thresholds may be used as a biological check, it is preferable to have a sound level meter available at the time of screening to monitor noise levels. According to the American Speech-Language-Hearing Association (ASHA, 1997), the maximum ambient noise levels allowable for audiometric screening at specific frequencies are as follows:

Screening Frequency	Maximum Ambient Noise Level
1000 Hz	49.5 dB SPL
2000 Hz	54.5 dB SPL
4000 Hz	62.0 dB SPL

In addition, the environment should be well lit and have minimal visual distraction in order to facilitate the child’s attention to the task. To reduce the risk of infection, a sink, soap and towels or disinfectant towelettes should be available for hand washing by screening personnel and for disinfecting equipment prior to screening each child. Use of disposable earphone guards is another way to guard against infection. Although disposable gloves are generally not necessary, they should be used if needed to reduce infection risk.

## 2. Audiometry Equipment

RCSA Section 10-214-3 requires audiometers used in the screening program to meet the current American National Standards Institute (ANSI) specifications for audiometers. The most recent standard is ANSI S3.6-1996. The statute further requires that the audiometers be assessed at least annually for adequate calibration and that a statement showing the date and results of the last calibration be kept with each audiometer. In addition to the mandated calibration, each audiometer should also be subject to visual, listening and biologic checks prior to each screening session.

If any problems present during the following examinations, the audiometer should not be used for screening and should be sent for service. The chart on page 26 may be used to monitor the condition of the audiometer.

<b>Type of Examination</b>	<b>Red Flags</b>	<b>Rationale</b>
Visual inspection of equipment	<ul style="list-style-type: none"> <li><input type="checkbox"/> Cracked or frayed cords</li> <li><input type="checkbox"/> Cords not tightly connected</li> <li><input type="checkbox"/> Broken earphones</li> <li><input type="checkbox"/> Static or unwanted noise during presentation of test signal</li> </ul>	Valid screening results depend on proper transmission of acoustic signal.
Listening check of audiometer	<ul style="list-style-type: none"> <li><input type="checkbox"/> Static or intermittent signal when cords are moved</li> <li><input type="checkbox"/> Mechanical noise when attenuator control (HTL) is moved</li> <li><input type="checkbox"/> Failure of test signal to increase or decrease when attenuator level is increased or decreased</li> <li><input type="checkbox"/> Audibility of test signal in nontest phone</li> </ul>	Valid screening results depend on the child responding to the acoustic test signal in the test ear, instead of to mechanical noise.
Biologic check of test signal intensity	<ul style="list-style-type: none"> <li><input type="checkbox"/> Inability of specified personnel with documented normal hearing to hear all the test signals (1000, 2000 at 20 dB HL; 4000 Hz AT 25 dB HI) in a quiet environment. (See #1 Environment, page 25, for acceptable ambient noise levels.)</li> </ul>	Valid screening results depend on the test signal's audibility at the mandated intensity level and ruling out noise as an explanation for screening failure. The normally hearing individual serves as a control subject.

### **3. Tympanometry Equipment**

Equipment used for tympanometry should be capable of assessing physical volume of the external auditory canal, middle ear pressure, static compliance or admittance, gradient or analysis of tympanogram width. Examiners doing the screening should be familiar with their equipment's standard for normal or abnormal static admittance or compliance.

Equipment used to screen for middle ear disease should be subject to an annual electroacoustic evaluation, according to current ANSI standards (ANSI S3.39-1987). Prior to each session, the equipment should be checked using the calibration chambers that come with it. Preparations prior to use with each child include disinfecting all tips according to product directions; rinsing the tips with water to remove disinfectant residue; and checking the probe for cerumen or debris, which, if present, should be removed according to the instructions in the manual that accompanies the equipment. Use of disposable tympanometry tips is another way to guard against infection.

### **4. Preparation of Students**

The purpose of hearing screening and specific procedures that students will encounter should be explained to the students by screening personnel just prior to screening. This may be done as a whole class activity. For students in prekindergarten through Grade 1, a demonstration of the audiometric screening process to the whole class should include listening to the stimulus signal from an earphone held in the demonstrator's hand three feet away from the children, with the attenuator dial set at 100dB at 1000 Hz. This signal should be heard easily by the whole classroom. The demonstrator should then model the expected response behavior under earphones (handraising by students in first grade and dropping blocks into a container for younger children). This should be followed by observation of earphones being placed on one or two students and simulation of the screening (using a signal no louder than 40-60 dB HL).

Explanation of procedures and equipment that will be used for tympanometry screening can be provided to students selected for such screening prior to or at the time of the screening. This may be done in groups or on an individual basis. When planning explanations and demonstrations, time should be allotted for the demonstrator and teacher to respond to children's questions.

### **5. Scheduling the Screening**

RCSA Section 10-214-2(d)(5) mandates that audiometric screenings be completed by June 30. However, it is recommended that the initial screening of all mandated grades be completed by December 1 so that early identification and referral can minimize the impact of identified hearing loss on educational performance. Preschool and kindergarten children should be screened first.

Documentation of which children were screened needs to be maintained in order to ensure that screening of children who were absent from school or otherwise unavailable at the time of the initial screening is not overlooked.

# Screening Procedures

## 1. Otologic History

Prior to screening, a history should be completed, including a review of pertinent records (in particular, the health assessment record, HAR-3, and any parent information).

If the history indicates the presence of pressure equalizing (PE) tubes, the audiometric screening may proceed. Screening personnel may attempt to conduct tympanometric screening when PE tubes are present. However, it is possible that a proper seal may not be obtained which would yield unreliable results. Therefore, audiological consultation is advised if personnel attempt to conduct a tympanometric screening with PE tubes in place. Or, personnel may decide to postpone the tympanometric screening. In this case, the medical status of the affected ear(s) should be monitored and the tympanometric screening should be scheduled upon notification by the physician that the tube(s) has (have) been removed and the health of the ear(s) allows for such screening. In the case of a unilateral PE tube, the unaffected ear may be screened using audiometry and tympanometry.

RCSA Section 10-214-1(h) defines screening as “the presumptive identification of disease or physical defect.” Therefore, when the history indicates that a child has a documented sensorineural hearing loss or a permanent conductive hearing loss, hearing screening may not be necessary or useful. Instead, screening personnel need to monitor that the child is receiving appropriate medical and audiological follow-up. Records of hearing test results should be on file in the nurse’s office and, as appropriate, in special education or 504 files. Even though children with permanent conductive or sensorineural hearing losses are not candidates for audiometric screening, they are at risk for middle ear disease and they should undergo tympanometric screening.

For children with diagnosed hearing impairments who are receiving special education and related services or have a 504 plan, the Planning and Placement (PPT) or 504 Team meeting is the appropriate place for discussions about medical and audiological management, including the frequency of reevaluation. For children receiving an annual audiological evaluation through an Individualized Education Program (IEP), a 504 plan or other medical recommendations, the hearing screening could be omitted with evidence of a completed audiological evaluation report.

## 2. Visual Inspection of the Child’s Ears

The child’s ears should be inspected externally and internally for physical deformity, cerumen (wax) impaction or foreign bodies, inflammation, blood, middle ear effusion (fluid) and the physical integrity of the eardrum. Internal examination is carried out through otoscopic inspection, which can be performed only by personnel with special qualifications in this area. While this is not within the current scope of practice for ASHA-certified SLPs (ASHA, 2001), it is for ASHA-certified audiologists (ASHA, 1996). This activity is also within the scope of practice for school nurses.

The child with a draining ear, cerumen impaction, a foreign body in the ear canal, a physical deformity of the ear or a complaint of ear pain should be provided with a medical referral. The medical status of the affected ear(s) should be monitored and screening should be scheduled upon notification by the physician that the health of the ear(s) allows for screening.

### 3. Pure Tone Screening

Pure tone stimuli should be presented to each ear at the following frequencies and intensities, as specified in Connecticut General Statutes Sec. 10-214-3, only if ambient noise levels are appropriate (see Screening Preparation, item #1, page 25).

Frequency	Intensity
1000 Hz	20 dB HL
2000 Hz	20 dB HL
4000 Hz	25 dB HL *

*\*ASHA recommends screening at 20 dB HL at 4000 Hz to increase screening sensitivity. Regulatory change is being proposed to change the intensity level at this frequency. While screenings may be done at the ASHA standard, until the regulatory change is made, the Connecticut standard should be used for referral purposes.*

ASHA's recommended screening *frequencies* are the same as those mandated by state regulations. Screening at 500Hz or 250Hz is unlikely to yield useful results in the typical school setting where screening is conducted.

Seat the child with his or her back to the audiometer and the examiner so that he or she cannot see the examiner's face or any of the buttons or dials on the audiometer. The examiner may want to have a kindergarten or preschool child seated facing to the left or to the right of the examiner. This would allow the examiner to observe the child's face during the testing procedure and give the examiner cues as to whether or not the child is hearing the tone. All other students should be sitting or standing facing away from the examiner. Screening personnel need to confirm that students have understood their instructions before proceeding with the screening. Restatement of the instructions, adding pictures or other visual cues or other methods may be required to ensure students' comprehension of the procedures. For children 3 to 5 years of age, it may be necessary to present each test stimulus at least twice to obtain a reliable response (ASHA, 1997).

**Criteria for Passing Audiometric Screening:** The child must respond to **all** mandated screening frequencies at the legally prescribed decibel level. Failure to respond to any one test tone constitutes failure of the screening and warrants rescreening (see page 31). Before assuming failure rests with the child, screening personnel should confirm that the equipment is operating properly, that it has been applied correctly, and the student has understood the instructions.

#### 4. Tympanometric Screening

Tympanometric screening is not mandated. Since middle ear disease is not common after age 7, it is not cost effective to conduct mass tympanometric screening of children after this age (ASHA, 1997). However, as noted in the introduction to these guidelines, tympanometric screening is recommended for certain at-risk populations. In addition, it should be considered when a child fails the audiometric screening twice.

In view of the variety of instrumentation available to perform tympanometric screening, procedures for obtaining and recording tympanograms should be carried out according to the equipment manufacturer's instructions. The use of a low frequency (220, 226 Hz) probe tone and positive to negative air pressure sweep is recommended. Measurement of both acoustic admittance and tympanogram width should be attempted for each ear. Inappropriate procedures or measures for screening for middle ear disease include acoustic reflectometry, tympanometric peak pressure, acoustic reflex and otoacoustic emissions (ASHA, 1997).

**Criteria for Passing Tympanometric Screening:** Measurements for both pressure and volume should be taken in each ear. Since tympanometers vary in how the standards for these measures are reported, screening personnel should consult the technical manual accompanying the equipment being used. Before assuming failure rests with the child, screening personnel should confirm that the equipment is operating properly and that the procedures have been followed properly and understood by the student.

# Rescreening Procedures

Rescreening is carried out in order to minimize inappropriate referrals for medical and audiological evaluation or treatment. Coordinating audiometric and tympanometric rescreenings whenever possible is desirable in order to minimize disruptions to children's, teachers' and screeners' schedules and to facilitate well-informed parent notification and referrals for follow-up evaluation or treatment.

- 1. Audiometric rescreening** should be implemented within two weeks of the initial screening (for students who failed to respond at one or more frequencies in either ear, but who were not referred to a physician for a medical condition at that time). In order to ensure timely attention to students' potential hearing problems, the entire rescreening process should take no more than six weeks. Rescreening procedures are the same as those for the initial screening.
- 2. Tympanometric rescreening**, as appropriate, should be carried out within six to eight weeks of the initial screening, because middle ear disease often resolves itself in that time (ASHA, 1997).
- 3. All students under medical management for conductive hearing loss** should be rescreened by the nurse or SLP at regular intervals throughout their school years. The determination of the interval for such rescreenings should be made by appropriate school personnel or teams (e.g., nurse, SLP, Child Study Team, 504 Team or PPT) in collaboration with the student's physician or audiologist, as appropriate. The students in this population who continue to fail rescreening and who are having academic problems may need a more comprehensive evaluation by an audiologist in order for the school district to consider the educational implications of the loss. Otoscopic inspection should be repeated at the time of rescreening.

## Referral and Follow-Up

### 1. Parent Notification

C.G.S. Sec. 10-206(e) and 10-214(b) require the superintendent of schools to give written notice to the parent or guardian of each pupil found to have a hearing impairment.

Districts may provide parents notice of results of the initial screening, with information about rescreening activities to be scheduled prior to initiating referrals for medical and audiological follow-up. Depending on the projected time lapse between initial screening and rescreening, it might be more appropriate to wait to notify parents after the rescreening. Parents should also be notified if their child was unable to be screened. Timely notification is important so that parents can pursue full evaluation of their child's hearing and middle ear health status. (See Appendix B for sample referral form.)

For children identified through hearing screening done as part of the health assessments

mandated under C.G.S. Sec. 10-206, the statute directs the superintendent to make reasonable efforts to determine whether or not the parent or guardian obtained the necessary testing or treatment and, if they have not, to advise them how such testing or treatment may be obtained. This practice also makes good sense for the audiometric screening mandated under C.G.S. Sec. 10-214 and for any tympanometric screening that may be performed. For all practical purposes, the superintendent's responsibilities regarding parent notice may be delegated to the coordinator of the screening program.

## **2. Coordinating Referrals**

The school nurse generally is responsible for coordinating referral and follow-up for further diagnosis. This may be done via a letter to parents with an accompanying medical referral report form. The parents or physician should return the completed physician's report to the school nurse. The sample in Appendix B incorporates the parent notification into the medical referral report form. If the physician's report is not returned within a reasonable period of time, the school nurse should follow up. In this case, it may be necessary to have an authorization form signed by the parent in order to communicate with the physician. Parents may need encouragement and assistance in accessing medical and audiological services in the community. Documentation should be kept of parent contacts regarding referrals.

## **3. Teacher Notification**

All school personnel responsible for the education of a student who has failed audiometric or tympanometric rescreening should be notified of the screening results. They should also be apprised of the outcomes of referrals for medical and audiological evaluation and should participate in planning educational accommodations, evaluations and interventions. Districts should develop procedures for this notification that address the confidentiality of health information.

## **4. Students Requiring Special Consideration**

Some students may not respond appropriately to the screening procedures.

- a. For those who are unduly fearful or uncooperative, the procedures described in #1, 2 and 3 above should be followed.
- b. For those who have severe impairments that interfere with the screening (e.g., pervasive developmental delay, emotional disturbance or neurological impairment), and whose IEPs or 504 plans do not currently include exemption from screening or medical/audiological referrals, in addition to the procedures in #1, 2 and 3 above, the PPT or 504 Team should be advised.
- c. Students with identified hearing disabilities under IDEA or Section 504 should have annual audiological follow-up included in their IEPs or 504 plans, as appropriate. Medical follow-up may also be necessary.
- d. Children with known histories of middle ear problems need to be monitored medically,

audiologically and educationally, whether or not they are receiving special education or 504 services. Periodic puretone and tympanometric screening may be necessary in conjunction with consultation with the child's primary health care provider.

IDEA requires school districts to be fiscally responsible for medical and audiological evaluation during the initial evaluation if the PPT decides such testing is necessary to determine eligibility for special education and related services [34 C.F.R. §300.532(g)] or 504 services [34 C.F.R. §104.35 (a) and (b)] and to develop an appropriate IEP or 504 plan for eligible students. IDEA also requires school districts to reevaluate a student with a disability if the child's condition warrants it, or if parents or a teacher request it, but at least every three years [34 C.F.R. §300.536(b)]. Section 504 requires periodic reevaluation as well. Again, districts are fiscally responsible if the PPT or 504 team determines that audiological or medical reevaluation is necessary. Families are responsible for the costs otherwise, although school personnel (e.g., nurse, social worker, SLP) may be able to help families find resources when the evaluation or reevaluation is at their expense.

## **5. Reports**

Results of the audiometric screening and the health assessment hearing screening should be recorded on the student's cumulative health record (CHR-1). Results of any tympanometric screening should also be recorded on this form. The results of other referrals or assessments should be retained in the student's health record. If the student is receiving special education or accommodations through a 504 plan, screening information should be included in those files as well.

# Glossary

**Acoustic Admittance** (also acoustic imittance) – flow of acoustic energy into the ear

**Acoustic Impedance** – resistance to the flow of acoustic energy; used to detect middle ear pathology; full battery includes measures of static acoustic impedance (comparison of maximum and minimum compliance of eardrum to sound introduced into external ear canal), acoustic reflex (see below), and tympanometry (see below)

**Acoustic Reflectometry** – measurement of the acoustic reflex

**Acoustic Reflex** – relative contraction of ear muscles in response to sound; contraction of middle ear muscles is one focus of impedance measurements to determine status of middle ear function

**Ambient Noise** – sounds of the environment

**Attenuator Dial** – the part of the audiometer that is used to regulate the intensity (loudness) of the pure tone signals to be administered

**Audiological Evaluation** - comprehensive evaluation of hearing sensitivity (and middle ear status, as appropriate) by a licensed audiologist

**Audiometer** – electronic instrument used for measuring hearing sensitivity (with pure tones that sound like musical notes) through air and/or bone conduction. For purposes of these guidelines, pure tones are administered only through air conduction (i.e., to the ear canal).

**Audiometric Screening** – a brief administration of pure tones at fixed frequencies (pitch) and intensity (loudness) to detect possible hearing loss

**Calibration** – adjusting equipment to required standards of operation

**Decibel (dB)** – the unit of measurement for hearing levels; uses a logarithm with a base of 10, which means that, for example, using 0 dB as the base, a tone presented at 10 dB is 10 times louder; a sound at 20 dB is 100 times louder ( $10^2$  or  $10 \times 10$ ); a sound at 30 dB is 1000 times louder ( $10^3$  or  $10 \times 10 \times 10$ ) etc.

**Frequency** – cycles per second of a sound wave; perceived by humans as pitch

**Hearing Level (HL)** – decibel level at which an individual indicates that he or she has received a particular pure tone sound stimulus; usually referenced to a particular frequency (e.g., 20 dB at 1000 Hz)

**Hearing Loss** – failure to respond to normal hearing levels at one or more frequencies; may vary in type, severity and cause and have varying outcomes

**Types:**

<b>Acquired</b>	develops after birth; may result from illness or accident
<b>Bilateral</b>	occurring in both ears. One ear may have better hearing than the other.
<b>Chronic</b>	persistent; reoccurring frequently
<b>Conductive</b>	resulting from failure of sound waves to reach inner ear via outer or middle ear at normal hearing levels; may be congenital or acquired
<b>Congenital</b>	exists at birth; may be the result of heredity or prenatal or birthing conditions
<b>Fluctuating</b>	periodic changes, including frequency of episodes and severity of loss; generally associated with conductive loss due to middle ear disease
<b>Sensorineural</b>	resulting from defect or pathology in the inner ear or along the auditory nerve; may be congenital or acquired
<b>Unilateral</b>	occurring in one ear

**Severity:**

Slight/Minimal	15-25 dB HL
Mild	26-40 dB HL
Moderate	41-55 dB HL
Moderately Severe	56-70 dB HL
Severe	71-90 dB HL
Profound	>91 dB HL

Note: Normal hearing level is 0-15 db HL.

**Hertz (HZ)** – measure of the frequency (pitch) of a sound, measured in cycles per second. For purposes of these guidelines, pure tone screening is done at 1000, 2000 and 4000 Hz.

**Impaction** – blockage; usually of the external ear canal from wax (cerumen) accumulation

**Intensity** – energy in a sound wave; perceived as loudness by humans

**Middle Ear Disease** – an abnormal condition of the middle ear that may manifest as inflammation with or without infection and that may vary in type, severity, frequency and duration and may or may not be accompanied by hearing loss

**Types:**

- Otitis Media** – inflammation
- Serous (Nonsuppurative) Otitis Media** – fluid without infection
- Otitis Media with Effusion** – fluid with infection
- Suppurative (Purulent) Otitis Media** – infection with pus formation

**Otoacoustic Emissions** – acoustic signals generated by the inner ear that are used to evaluate inner ear function; can be measured by placing a microphone at the opening of the ear canal; may be spontaneous (occur in the absence of acoustic stimuli) or evoked (occur in response to acoustic stimuli)

**Otoscope** – instrument used to visually inspect the ear canal and the eardrum

**Otoscopic inspection** – use of an otoscope to inspect the ear canal and eardrum

**Pressure Equalizing (PE) Tube** – tube surgically inserted into the eardrum to equalize pressure in the middle ear with that in the external ear canal

**Pure Tone** – a single pitch sound

**Pure Tone Threshold** - lowest intensity at which a person responds to a pure tone stimulus at a specific frequency

**Sound Level Meter** – instrument for measuring the intensity (loudness) of sound in a specific environment (e.g. screening room, classroom)

**Sound Pressure Level (SPL)** – ratio of sound intensity to a reference sound of 0.0002 dyne/cm<sup>2</sup>; recorded in decibels

**Threshold Evaluation** - The process by which a licensed audiologist determines an individual's minimal response levels for pure tone stimuli at varying frequencies following a referral for failing audiometric screening.

**Tympanometer** – instrument used for tympanometric measurement

**Tympanometric screening** – a brief procedure used to measure the mobility of the eardrum and middle ear bones in response to the introduction of air pressure into the ear canal

# Appendix A

## **Sample Letter: Notification of Parents Prior to Screening**

*Note: Insert District name or use school letterhead stationary. This letter should be edited if no tympanometric screening will be conducted.*

Dear Parents:

On \_\_\_\_\_, a hearing screening program to detect possible hearing impairment and middle ear disease will be conducted for all students in Grade(s) \_\_\_\_\_ at your child's school.

Undetected hearing loss or middle ear disease in students presents a potentially critical barrier to academic, social and vocational success. Early identification of hearing loss and middle ear disease is important so that medical, technological and educational interventions can be implemented to avoid or reduce the adverse impact of these impairments.

The School Nurse, Speech and Language Pathologist and/or other trained personnel (select as appropriate) will be doing the screenings. The procedure for examination is a simple one, requiring 15 minutes or less. The screening uses headphones and other equipment to measure responses to musical tones at certain pitches, examine the condition of the ears and check middle ear pressure.

Usually the youngster will be rechecked at a second screening if a problem is suspected. If further consultation is recommended following the initial screening or the rescreening, you will be notified of the findings and will be asked to seek further evaluation from your own physician.

If you have any questions concerning the hearing screening, please contact  
\_\_\_\_\_ (name), the \_\_\_\_\_ (title) at  
\_\_\_\_\_ (phone number).

Sincerely yours,

---

Principal



# Appendix B

## Suggested Form for Medical Referral/Report

*Note: Edit if no tympanometric screening was conducted.*

\_\_\_\_\_ School Health Services  
(name of district)

### REFERRAL FOR EAR EXAMINATION

TO: (Parent/Guardian) \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

FROM: \_\_\_\_\_

(School Nurse)

(Speech and Language Pathologist)

RE:

Student's Name \_\_\_\_\_ D.O.B. \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_

Teacher \_\_\_\_\_ Grade \_\_\_\_\_

School \_\_\_\_\_ Address \_\_\_\_\_

Your child participated in our hearing screening program. This included pure tone audiometric screening at hearing levels required by Connecticut regulations and/or tympanometric screening for middle ear disease. Your child did not meet the criteria for passing the screening. This means that your child may have a hearing impairment or middle ear condition that requires further attention by one or more of the following: your physician; an ear, nose and throat doctor; and an audiologist. The attached results include:

_____ initial audiometric screening	date _____
_____ audiometric rescreening	date _____
_____ tympanometric screening	date _____
_____ tympanometric re-screening	date _____

**COMMENTS FROM SCHOOL PERSONNEL:** (e.g., history of performance on previous hearing screenings; medical history of middle ear problems; learning performance or behavior in the classroom)

*Please take this information, along with the attached Physician's Medical Report form to your physician for completion and return to school.*



# Physician's Medical Report

Student's Name \_\_\_\_\_ D.O.B. \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_

Parent/Guardian \_\_\_\_\_

Address \_\_\_\_\_ Phone \_\_\_\_\_

School Nurse \_\_\_\_\_

School \_\_\_\_\_

Address \_\_\_\_\_ Phone \_\_\_\_\_

## Diagnosis

### 1. External Ear

Clear: \_\_\_\_\_ Right \_\_\_\_\_ Left  
Cerumen: \_\_\_\_\_ Right \_\_\_\_\_ Left  
External Otitis \_\_\_\_\_ Right \_\_\_\_\_ Left  
Other: (Please describe) \_\_\_\_\_  
\_\_\_\_\_

### 2. Middle Ear

Clear: \_\_\_\_\_ Right \_\_\_\_\_ Left  
Retracted TM: \_\_\_\_\_ Right \_\_\_\_\_ Left  
Fluid: \_\_\_\_\_ Right \_\_\_\_\_ Left  
Otitis Media: \_\_\_\_\_ Right \_\_\_\_\_ Left  
Other: (Please describe) \_\_\_\_\_  
\_\_\_\_\_

Medical Confirmation of Hearing Loss: Yes \_\_\_\_\_ No \_\_\_\_\_

## Treatment Plan (Check where appropriate)

	Date	Right Ear	Left Ear
Removed Cerumen	_____	_____	_____
P.E. Tubes	_____	_____	_____
Myringotomy	_____	_____	_____
Tonsillectomy	_____		
Adenoidectomy	_____		

No Treatment Necessary \_\_\_\_\_

Medication Prescribed (Specify type, dosage and duration and possible effects on school performance) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Follow-Up Plan:**

Referrals

\_\_\_\_\_ Otolaryngologist    \_\_\_\_\_ School Nurse    \_\_\_\_\_ Audiologist  
\_\_\_\_\_ Speech and Language Pathologist  
\_\_\_\_\_ Other (specify \_\_\_\_\_)

Management Plan

\_\_\_\_\_ No follow-up necessary  
\_\_\_\_\_ Schedule for medical recheck (Date \_\_\_\_\_)  
\_\_\_\_\_ Schedule for surgery (Date \_\_\_\_\_)  
\_\_\_\_\_ Inform school nurse of medical findings  
\_\_\_\_\_ Periodic pure tone screening by school personnel  
\_\_\_\_\_ Periodic acoustic immittance screening by school personnel

**Other Comments:**

---

Physician's Signature

---

Address

---

Phone

*Please forward this report to the school nurse at the address on the front page. Thank you for your cooperation.*

# Appendix C

## Educational Resources

American School for the Deaf  
139 North Main Street  
West Hartford, CT 06107  
(860) 570-2300 (voice)  
(860) 570-2222 (TTY)  
[www.asd-1817.org](http://www.asd-1817.org)

Alexander Graham Bell Association for the Deaf and Hard of Hearing  
3417 Volta Place NW  
Washington, DC 20007  
(202) 337-5220 (voice)  
(202) 337-5221 (TTY)  
[www.agbell.org](http://www.agbell.org)

American Speech-Language-Hearing Association  
10801 Rockville Pike  
Rockville, MD 20852  
(800) 498-2071 (members)  
(800) 638-8255 (consumers)  
[www.asha.org](http://www.asha.org)

Clarke School for the Deaf/Center for Oral Education  
Round Hill Road  
Northampton, MA 01060  
(413) 584-3450 (voice/TDD)  
[www.clarkeschool.org](http://www.clarkeschool.org)

Commission on the Deaf and Hearing Impaired  
1245 Farmington Avenue  
West Hartford, CT 06107  
(860) 566-7414  
[www.state.ct.us/cdhi/](http://www.state.ct.us/cdhi/)

Connecticut Council of Organizations Serving the Deaf  
[www.ccosd.org](http://www.ccosd.org)

Connecticut Speech-Language-Hearing Association  
213 Back Lane  
Newington, CT 06111-0144  
(860) 666-6900  
[www.ctspeechhearing.com](http://www.ctspeechhearing.com)

Department of Communication Sciences  
Division of Communication Disorders  
University of Connecticut  
Box U-85  
850 Bolton Road  
Storrs, CT 06268  
(860) 486-2817

Department of Communication Disorders  
Southern Connecticut State University  
501 Crescent Street  
New Haven, CT 06515  
(203) 392-5960

Gallaudet University  
800 Florida Avenue NE  
Washington, DC 20002  
(202) 651-5000 (TTY/Voice)  
[www.gallaudet.edu](http://www.gallaudet.edu)

Soundbridge/Capitol Region Education Council  
123 Progress Drive  
Wethersfield, CT 06109  
(860) 529-4260

State Department of Education  
Carolyn Isakson  
Education Consultant, School Speech and Language Services  
Bureau of Special Education  
165 Capitol Avenue  
Hartford, CT 06106  
(860) 713-6924  
[carolyn.isakson@po.state.ct.us](mailto:carolyn.isakson@po.state.ct.us)

State Department of Education  
John Purdy  
Education Consultant, Deafness and Hearing Impairment  
Bureau of Special Education  
165 Capitol Avenue  
Hartford, CT 06106  
(860) 713-6921  
[john.purdy@po.state.ct.us](mailto:john.purdy@po.state.ct.us)

# Section C

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## Postural Screening



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# Postural Screening

## Introduction

Postural screening consists of screening for scoliosis and kyphosis. Connecticut General Statutes Sec. 10-206 and 10-214 specify that postural screening be done in Grades 5 through 9 and at the time of the 6th or 7th grade and 10th or 11th grade health assessments. While only four percent of young people 10 to 14 years of age have some signs of scoliosis, it is advisable to screen annually from ages 10 through 15. Early identification enables early treatment and the prevention of a severe deformity.

## Goal

The purpose of this screening program is early identification of spinal deformities so that treatment can be initiated to prevent, if possible, the need for surgery and the discomfort and complications which occur with these deformities.

## Objectives

1. To identify students, age 10-15 years, who have physical signs of spinal deformity.
2. To increase the public awareness of the importance of early detection of spinal deformities.
3. To provide appropriate services to children with spinal deformities through the collaboration of health care educators and providers.

## Implementation

Effective implementation of a postural screening program involves collaborative effort and support among screeners, school personnel, the medical community, parents and students. To ensure success all involved must understand the goals and objectives of this screening program.

## **Education**

The educational program is a major component of implementation and should include the following:

### **1. Screening Personnel**

Adequate preparation of all personnel conducting the screenings is necessary. According to the Regulations of State of Connecticut Agencies (RCSA), Section 10-214-4(a), only the school nurse, registered nurse or physical education teacher properly trained may perform the screenings for scoliosis. A training session such as those offered by the Connecticut Children's Medical Center or the Special Education Resource Center is recommended.

### **2. School Personnel**

The school nurse should inform the school staff about the basics of the screening program and any possible adaptations that may be required for a student under active treatment for scoliosis.

### **3. Parent Education**

A program should be planned and offered through the school system specifically for parents. In addition to the basic information about the screening program, parents should be made aware of the need for early diagnosis and treatment, referral resources available, and current treatment modalities. Written material should be distributed to all parents via school newsletters or individual mailings stating the screening dates, basics of the program, and resources for further information (see sample letter in Appendix A).

### **4. Student Education**

Classroom preparation of the student should include what curvature of the spine is, how it is detected, the importance of early recognition, who will do the screening, how it will be done, and what to expect if physical signs are noted.

### **5. Public Awareness Education**

Community understanding of the purpose of screening is essential. The school nurse should interpret the program to parents, professionals and other people in the community. Information should be included about the purpose and objectives of the program, students to be screened, screening personnel, the referral process, follow-up procedures, and the availability of community services. This may be done in the form of a letter to parents, school newsletters, and local media. In addition, local pediatricians, other primary care providers and orthopedists should be informed about the initiation of the postural screening program in the school system to facilitate referral and follow-through. This may be done via a letter to care providers from the school nurse and/or school physician.

# Screening Site and Preparation

## 1. Environment

The screening area should be private, warm, well lighted and free of visual distractions. A chair and desk may be provided for recording of findings.

## 2. Preparation

- a. Boys and girls should be screened separately.
- b. Each student should be screened individually, in private.
- c. Students should be informed ahead as to the screening process, who the screener will be, and the date of screening.
- d. Shoes or sneakers and socks should be removed before screening.
- e. The entire back, from shoulders to hips, should be visible without covering.
  1. Boys should be required to remove shirts and to lower pants to hips, or wear gym shorts, so that waistline and hips can be observed.
  2. Girls should be observed wearing a two-piece bathing suit or bra and underpants. Body suits, one-piece bathing suits or T-shirts are not acceptable.
- f. Students who have been screened by their pediatrician and show documentation that it has been done may be excused from school screening upon parental request.

## Screening Procedures

Each student should be screened in the following manner:

1. The student should be directed to stand erect, with back to screener, feet together, knees straight, arms relaxed at sides, head up and looking straight ahead. Encourage the student to avoid standing “at attention” or slouching. The screener should observe:
  - a. Shoulder height discrepancy.
  - b. Shoulder blade prominence or unequal height.
  - c. Waistline or hip asymmetry.
  - d. Unequal arm-to-flank distances.
  - e. Obvious curve or trunk asymmetry.
2. Next, the student should be directed to place palms together and bend forward at the hips at 90°, while keeping knees straight. Viewing from behind, from in front and again from the side, the screener should observe:
  - a. Rib or thoracic fullness on one side.
  - b. Lumbar or muscle mass fullness on one side.
  - c. A fullness or sharp angle of the thoracic spine from the side view.

3. The screener should record the specific findings of the examination, e.g., right shoulder higher, right scapula more prominent, left hip more prominent, right thoracic fullness on forward bend, etc., on a form, such as the Spinal Screening Program Control Form developed by the Scoliosis Research Society.

## **Rescreening Procedures**

All students with positive findings from the first screening should be rescreened to validate the findings before a referral is made, thus decreasing the possibility of unnecessary referrals. The second screening should be conducted by the school nurse and/or the school physician.

## **Referral and Follow-Up**

### **1. Parent Notification**

Any student who is unable to be screened, refuses to be screened, or is observed to have rib or flank fullness upon forward bend or any three of the other key signs should be referred for further evaluation. Parents should be informed of the findings via a telephone call and/or a letter from the school nurse. The written referral form should state the specific physical findings noted and a choice of options for medical evaluation. It should be stated that the physical findings are consistent with a curvature of the spine, but further evaluation is needed for a diagnosis. (See sample form, Appendix B).

The referral options should include:

- Local pediatricians or family practitioners, preferably.
- Local orthopedists.
- State of Connecticut, Children with Special Health Care Needs Clinics.
- Hospitals with scoliosis clinics.

### **2. Coordinating Referrals**

The school nurse is responsible for coordinating referral and follow-up for further diagnosis. If the referral form is sent to the parent/guardian is not returned within a reasonable amount of time, the school nurse should contact the parent or guardian to determine follow-up plans. A form to be completed following medical evaluation should be included in the referral process and returned to the school nurse for inclusion in the student's health record.

### 3. Students Requiring Special Considerations

Some students may not respond appropriately to the screening procedures.

1. For those who are unduly fearful or uncooperative, the procedures described in #1 and #2 above should be followed.
2. For those who have severe impairments (e.g. pervasive developmental delays, social-emotional maladjustments or neurological impairment), and whose IEPs or 503 plans do not currently include exemption from screening the procedures described in #1 and #2 should be followed.

### 4. Reports

The results of the scoliosis screening and the screening done as part of the health assessment (HAR) should be recorded on the student's cumulative health record (CHR-1). The results of the referral should be recorded on the CHR and the referral report filed in the student's record.

### 5. Data Analysis

Although it is not required by state statute, it is recommended that a system of data retrieval for statistical analysis be considered. Each school system is encouraged to note the number of pupils screened, the ages and/or grades screened, the number of referrals made, and the results of medical evaluations. The effectiveness of the postural screening programs cannot be validated without following the recommended procedure.

## Glossary

**Scoliosis** - a lateral curve of the spinal column.

**Kyphosis** - a rounded curve in the upper spine when viewed from the side.

**Idiopathic scoliosis** - spinal deformity of no known cause.



# Appendix A

## **Sample Letter: Notification of Parents Prior to Screening**

Dear Parents:

On \_\_\_\_\_, a postural screening program to detect a possible curvature of the spine will be conducted for all students in Grade(s) \_\_\_\_\_ at the \_\_\_\_\_ School. The purpose of this program is to recognize the signs of spinal curvature at its earliest stages so that the need for treatment can be determined. Specifically, scoliosis is a sideways curvature of the spine. In its early years, it is painless and develops gradually, especially during the years of rapid adolescent growth. Kyphosis, sometimes called roundback, is an exaggerated forward bend of the spine and is often confused with poor posture. Many cases of curvature of the spine are mild and require only on-going observation by a doctor after first diagnosis. Others get progressively more severe as the child grows and require active treatment. Early treatment can prevent the development of a severe deformity which can affect a person's appearance and health.

The school nurse and/or physical education teachers will be doing the screenings. The procedure for examination is a simple one, requiring less than one minute. These trained examiners inspect the youngster's spine as he or she stands and then bends forward. If a spinal problem is suspected, the youngster will be rechecked at a second screening.

If further consultation is recommended, parents will be notified of the findings and will be asked to seek further evaluation from their own physician.

If you have any questions concerning the postural screening, please contact the school nurse.

Sincerely yours,

\_\_\_\_\_  
Principal

\_\_\_\_\_  
School Nurse



# Appendix B

## Suggested Form for Medical Referral/Report

Dear Parents:

Recently, I wrote to you explaining that a postural screening program would be conducted to detect possible spinal problems in children. Your child \_\_\_\_\_ was screened, and further evaluation is recommended. The following physical signs were observed:

\_\_\_\_\_ Uneven Shoulders

\_\_\_\_\_ Uneven Hips

\_\_\_\_\_ Uneven Shoulder Blades

\_\_\_\_\_ Rib or Flank Fullness on Bending

\_\_\_\_\_ Uneven Waistline

\_\_\_\_\_ Other

I would like to emphasize that the examiner's recommendation is based on the above physical findings which may be consistent with a curvature of the spine. A complete examination by your doctor is suggested to establish whether a spinal problem actually exists. If so, the doctor may wish to refer your child to an orthopedist for treatment. If you do not have a physician, please call me at the number below. I will assist you in making arrangements for proper follow-up.

The enclosed form should be given to the physician at the time of the evaluation with the request that it be completed and returned to me as soon as possible.

Sincerely,

---

School Nurse  
(\_\_\_\_-\_\_\_\_)



*To be completed by physician:*

## **School Postural Screening Program**

### **Physician's Findings and Recommendations**

Name of Student \_\_\_\_\_ Age \_\_\_\_\_

Parent Name \_\_\_\_\_

Address \_\_\_\_\_

School Nurse \_\_\_\_\_

School Name \_\_\_\_\_

Address \_\_\_\_\_

Date Examined \_\_\_\_\_

Results of Examination:

\_\_\_\_\_ No significant findings at this time

\_\_\_\_\_ Scoliosis

\_\_\_\_\_ Kyphosis

\_\_\_\_\_ Referred for further evaluation to \_\_\_\_\_

\_\_\_\_\_ Re-examined

\_\_\_\_\_ Scheduled for re-examination \_\_\_\_\_

\_\_\_\_\_ Rescreen in school

Signed \_\_\_\_\_ M.D.

Address \_\_\_\_\_

Telephone \_\_\_\_\_

*To be completed by physician and returned to the school nurse at the address indicated.*



# Appendix C

## Educational Resources

Connecticut Children's Medical Center  
Public Relations Department  
282 Washington St, Hartford, CT 06106

Hartford Easter Seal Rehabilitation Center  
80 Coventry Street  
Hartford, CT 06112  
243-9741

Scoliosis Research Society  
222 South Prospect, Suite 127  
Park Ridge, IL 60068  
312-698-1627

State Department of Education  
Cheryl Carotenuti  
School Nurse Consultant: 860-807-2108  
Bureau of Early Childhood, Family and Student Services  
25 Industrial Park Road  
Middletown, CT 06457  
cheryl.carotenuti@po.state.ct.us

National Association of School Nurses  
P.O. Box 1300  
Scarborough, Maine  
1 (207) 883-2117  
www.nasn.org



**Connecticut State  
Department of Education**

Division of Educational Programs and Services  
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Bureau of Early Childhood, Family  
and Student Services  
Paul Flinter  
Bureau Chief

Cheryl-Ann Carotenuti  
Project Manager

Bureau of Special Education  
George Dowaliby  
Bureau Chief

Carolyn Isakson  
Project Manager

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