HEARING SCREENING

The screening protocol for a hearing screening program in schools as recommended by the American Speech-Language-Hearing Association (ASHA) should consist of

-- visual inspection,
-- pure-tone audiometry, and
-- acoustic immittance (tympanometry)

This combination would avoid excessive over referral rates.

It is beyond the scope of a screening program to obtain a complete case history on every student screened. However, it is important to know the case history of students with special ear problems.

Overall external visual inspection of the student's ears is a natural occurrence prior to screening.

Otoscopic inspection is a helpful adjunct to the overall assessment of the student's ears. The school nurse who becomes adept at the use of the otoscope will be able to view structural defects, ear-canal abnormalities, and eardrum abnormalities requiring immediate medical referral.

Screening tests are not diagnostic. They merely identify students who may need further attention by a primary caregiver or hearing specialist.

Audiologists are available in some schools for consultation and assistance with hearing programs.

AUDIOMETRIC SCREENING

ASHA defines the primary goal of identification audiometry as the use of pure-tone air conduction testing to identify students who have hearing loss that potentially interferes with communication.

Equipment should be calibrated according to manufacturer and ANSI S3.6-1996 specifications. Perform a listening check daily to determine that no defects exist in major components.

A. Age/Grade for Audiometric Screening

Individual limited-frequency screening should be administered annually to children functioning at a developmental level of 3 years through Grade 3 and to any high-risk
children including those above Grade 3.

It is recommended that preschoolers (3 to 4 years of age), kindergarten, first, second, third, fifth and/or sixth and ninth or tenth grade students be screened annually.

B. Special Cases Audiometric Screening

In addition to the above screening schedule, the following children should also be screened:

-- All new students and transfer students
-- Students with known hearing loss and/or failed previous screenings
-- Academic and/or behavior problems in the classroom
-- Speech patterns suggesting hearing problems
-- Students referred for special education
-- Students who repeat a grade
-- Health histories of high risk factors for hearing problems including students with a history of exposure to noise
-- Students referred by school personnel, parent, or student self-referral

School-age children who receive regular audiologic management need not participate in a screening program

C. Screening

The ASHA Guidelines for Audiologic Screening (1996) recommend conducting screening in a manner congruent with appropriate infection control and universal precautions.

Conditioned play audiometry (CPA) or conventional audiometry are the procedures of choice.

Conduct screening in a quiet environment with minimal visual and auditory distractions.

Conduct screening using earphones at 1000, 2000, and 4000 Hz tones at 20 dB HL.
ASHA currently does not recommend 3000 Hz, 6000 Hz, or 8000 Hz as screening frequencies.

Pass if responses are judged to be clinically reliable at criterion dB level at each frequency in each ear.

If a student does not respond at criterion dB level at any frequency in either ear, the student should be reinstructed, earphones repositioned, and screened again in the same session.

All hearing screening programs should include an educational component designed to provide parents with information, in lay language, on the process of hearing screening, the likelihood of their child having a hearing impairment, and follow-up procedures.

D. Re-screening

All students failing the initial individual pure tone screening should be rescreened and assessed utilizing otoscopic and/or additional acoustic immittance within a 3 – 4 week period of the initial screen and a medical referral if indicated.

E. Referral

Refer students who fail the screening or fail to condition to the screening task for an audiologic assessment.

Refer for medical examination of the ears if:

1. ear drainage is observed,

2. visual identification of previously undetected structural defect(s) of ear occurs,

3. ear canal abnormalities such as obstruction, impacted cerumen or foreign objects, blood or other secretions, stenosis or atresia, otitis externa, and perforations or other abnormalities of the tympanic membrane are apparent.

Hearing status of referred students should be confirmed within one month, and no later than 3 months, after initial screening.

F. Annual Audiometric Rescreening

All students with previously identified hearing losses will need annual threshold pure-tone audiometric tests. These usually include students with:
-- A family history of hearing impairment

-- A history of temporary hearing loss, tinnitus, or prolonged exposure to firecrackers, firearms, loud farm machinery, or loud music

-- Speech, language, and communication problems

-- Identified losses with no known cause

**ACOUSTIC IMMITTANCE SCREENING**

The *tympanometer* provides *acoustic immittance screening* by objective measurement of middle ear mobility (compliance) and pressure within the middle ear system. This test helps in identifying students with potential medically significant middle ear disorders that have been undetected or untreated.

Immittance screening is not intended to be a diagnostic procedure; nor is isolated immittance screening advocated by ASHA. Otoscopic exam is a prerequisite to acoustic immittance screening.

The *acoustic immittance instrument* should be properly maintained and checked annually to make sure it complies with the current ANSI standards for aural acoustic immittance instruments (ANSI S3.39-1987).

**A. Age/Grade for Acoustic Immittance Screening**

The Importance of Acoustic Immittance Screening for All Students

If time permits and equipment is available, *all students* at any grade level selected to receive audiometric screening can also receive *acoustic immittance screening*. Ultimately this screening can yield invaluable information, thereby enhancing the overall hearing screening findings on any child.

Middle ear problems are most apt to occur in the younger child. Therefore, it is recommended that *preschoolers* (3 to 4 years of age), *kindergarten, first, second*, and *third grade* students receive an annual screening.

Note: ASHA guidelines state that *when otoscopic evidence of middle ear infection is present* or *when a pressure-equalization tube is in place*, *tympanometry should not be performed* unless requested by a physician.
B. Screening

Assistance in understanding and learning how to perform acoustic immittance screening is available from school audiologists, experienced school nurses, and private providers. In addition, the School Nurse should be sure to:

- Utilize the operating instructions provided with the tympanometer equipment.
- Test both ears each time the student is screened.
- Read the manual which accompanies the tympanometers, especially the information regarding normal and abnormal test results.

C. Re-screening and Referral

ASHA guidelines for re-screening and referral are as follows:

Refer for rescreening if:
- initial tympanometric screening test results are outside of test cutoffs
  (Peak Admittance ($Y_{tm}$) < 0.3 mmho or Tympanometric Width (TW) > 200 daPa)

The ASHA guideline recommends that a child with unilateral or bilateral tympanogram meeting referral criteria other than those that are consistent with a TM perforation should be rescreened 6 – 8 weeks after the initial test. Because middle ear disease is often self-limiting, referral based on a single screening is generally not recommended.

Refer for medical examination of the ears if:
1. ear drainage is observed,
2. visual identification of previously undetected structural defect(s) of ear occurs,
3. ear canal abnormalities such as obstructions, impacted cerumen or foreign objects, blood or other secretions, stenosis or atresia, otitis externa, and perforations or other abnormalities of the tympanic membrane are apparent,
4. tympanometric equivalent ear canal volume ($V_{ec}$) is greater than 1.0 cm$^3$ accompanied by a flat tympanogram (i.e., there is no admittance peak) to select those at risk for TM perforation,
5. follow-up tympanometric screening (i.e., rescreen) test results are outside the test criteria (Peak Admittance $>200$ daPa)

Do not refer if tympanostomy tube is in place or a perforation of the TM is under management of a physician.
For more accurate interpretation of screening results which warrant a referral, become familiar with normal and abnormal test results as described in your instrument manual, review and compare your screening print-outs, consult with an audiologist, and study the literature.

At this point in the Screening Process, refer to the "Structure, Process and Outcome Criteria" as outlined in the Introduction to this section.
HEARING SCREENING:
AUDIOMETRIC and ACOUSTIC IMMITANCE

GUIDELINES, PROCEDURES, and REFERENCES

Information regarding hearing screening is available from the following publications:

Guidelines for Audiologic Screening, 1996

Guidelines for Screening for Hearing Impairment and Middle-Ear Disorders
(Acoustic Immitance Measurement)

Both of the above documents are available from:

American Speech-Language-Hearing
Association 10801 Rockville Pike
Rockville, Maryland 20852
Phone: 1-800-638-8255
www.asha.org/

Hearing Screening Guidelines For School Nurses

National Association of School
Nurses, Inc. Lamplighter Lane
P.O. Box 1300
Scarborough, Maine 04074
Phone: 1-207-883-2117
www.nasn.org/

Hearing in Children by Jerry L. Northern and Marion P. Downs

Williams & Wilkins
428 East Preston Street
Baltimore, MD 21202
Phone: 1-800-638-0672
Contact the Nebraska Health and Human Services School Nurse Coordinator for further information and assistance at the following:

Nebraska Health and Human Services
Perinatal, Child and Adolescent Health
301 Centennial Mall South
P.O. Box 95044
Lincoln, Nebraska 68509-5044
Phone 401-471-0160