2011
Arizona Pediatric Audiology Guidelines

The development of these guidelines was facilitated by the Arizona Early Hearing Detection and Intervention (EHDI) program. The intent is to assist audiologist who are new to Arizona or that need a review of the practice guidelines available to them. This document is a compilation of guidelines, scope of practice documents, state and federal statute and rules and other resources. The document has numerous hyperlinks indicated in bold, blue underlined type. The reader should be aware that things change and this document may not contain the most current information available. If you have updates or questions about the document please contact Lylis Olsen, MS, MPH at lylisolsen@msn.com or 602-690-3975.

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1. Licensure

Arizona requires a state license to practice audiology and to dispense hearing aids. The statute (law) can be found at the Arizona State Legislature website under Chapter 17

Link to: Arizona Licensure Statute

The Administrative code (rules) can be found at:

Link to: Arizona Administrative Code Title 9

More information and application forms can be found on the Arizona Department of Health Services (ADHS) website:

Link to: ADHS Licensure website

2. Newborn Hearing Screening

The Arizona Department of Health Services (ADHS) mandates reporting of all hearing screening and diagnostic testing through age two years. The Statute can be found at:

Link to: Newborn Hearing Screening Statute 36-694

The Administrative Code (rules) can be found below:

Link to: Administrative Code for Newborn Hearing Screening

Hospital screening program fulfills their reporting requirements weekly to ADHS, through HI*Track Web Companion which is the Early Hearing Detection and Intervention (EHDI) tracking and follow-up database.

The reporting requirements for outpatient screening can be met through submission of updated HI*Track data through the birth hospital or through the submission of the Hearing Outpatient Screening (HOPS) form (see link to forms below). For facilities that do not have a data link between their birthing hospital and outpatient screening or for those who only see outpatients, the HOPS form, supplied by the ADHS must be submitted within one week of screening. Screening results should only be submitted for those children age two and under who missed (may include those with unknown results) or referred on their inpatient screen.

Programs screening children ages birth to three, in early childhood education settings, or physicians' offices conducting OAE screening, may use the Arizona OAE Hearing Screening and Reporting Form provided

Link to: Current ADHS forms

The American Academy of Audiology has guidelines for the use of support personnel for newborn hearing screening that can be found through this link

Link to: AAA use of Support Personnel for Newborn Hearing Screening

The Joint Committee on Infant Hearing screening provides the most current best practices. JCIH 2007 is the basis for the newborn hearing screening program in Arizona. JCIH 2007 position statement can be found in the link below.

Link to: Joint Committee on Infant Hearing 2007 Position Statement

3. Diagnostic Evaluation of Infants

State Requirements

Any diagnostic evaluation completed on a child two years of age and younger (regardless of outcome) should be submitted with the following form and a copy of the diagnostic report within one week of testing. Diagnostic evaluations that rule out a hearing loss are important to report as the ADHS provides active follow-up to the families of children who miss or refer on their newborn screening.

Link to: Diagnostic Report Forms

It is especially important to report:

- **Normal** or **Abnormal** results on any child who has failed or missed a newborn screen
- A newly diagnosed hearing loss for any age child

If a hearing loss is diagnosed in a child (even if older than two years) it should be reported to the Arizona Department of Health Services using the same diagnostic report forms. This allows the State Early Hearing Detection and Intervention program to provide surveillance of childhood hearing loss and to determine if the newborn hearing screening program is effective.

For a child younger than three years with bilateral sensorineural or permanent conductive hearing loss, the same form can be used to refer a child for early intervention services. The referral form and the diagnostic report should be faxed to the appropriate Arizona State Schools for the Deaf and the Blind, Parent Outreach Coordinator (by region).

Link to: Regional Report/Referral Forms

If a bilateral, sensorineural or permanent conductive hearing loss is diagnosed, the following steps should be taken:

- ✓ Referral to the ASDB Outreach Program (ages 0 – 3) within 48 hours
- ✓ Complete a diagnostic audiology testing form and submit to the Arizona Department of Health Services within one week
- ✓ Referral for Parent to Parent support (such as **Arizona Hands & Voices**)
- ✓ Provide family with written information about hearing loss, in their native language
- ✓ Referral to Otologist / Otolaryngologist
- ✓ Referral to Genetics
- ✓ Referral to child's home school district (over age 3)
- ✓ Referral for hearing aid fitting consultation with a Pediatric Audiologist
- ✓ Referral for pediatric speech/language assessment

The following section is taken directly from the National Center on Hearing Assessment and Management. The original can be found at:

Link to: **NCHAM Newborn Hearing Screening Information**

Infants referred from their newborn hearing screen should receive a follow-up diagnostic audiological evaluation before 3 months of age. This evaluation serves to verify the type and severity of hearing loss.

Data show that an infant with a significant hearing impairment who receives intervention by 6 months of age will perform significantly better in language development than the infant who is identified after 6 months of age (Yoshinago-Itano et al, 1998)[1].

When Should a Diagnostic Audiological Evaluation Be Performed?

Diagnostic Audiology occurs after a baby doe not pass a follow-up rescreen. Usually the rescreen is completed between 1 and 3 weeks of age. If the baby has been in the Neonatal Intensive Care Unit for more than five days there should be a referral directly for a diagnostic evaluation. The diagnostic evaluation including any confirmatory testing should be completed by three months of age.

Key Components in Diagnostic Audiology of Infants and Children

- Pediatric Audiologist
  This refers to the Audiologist who is trained, has the technical expertise and desire to work with infants and children. The Audiologist performs an audiological test battery to include physiologic measures and developmentally appropriate behavioral techniques.
- Case History Documentation
  A completed child and family case history to include congenital family history of hearing loss, medical factors, and risk indicators for hearing loss that may be present.
- Auditory Brainstem Response (ABR)
  This should include: Clicks, Tone bursts, and Bone Conduction testing. (This technology reflects the activity of the cochlea, auditory nerve, and auditory brainstem pathways.)
- Otoacoustic Emissions (OAE)
  (This technology is sensitive to outer hair cell dysfunction.)
- Acoustic Immittance
  Tympanometry capabilities that use probe tones greater than 220/226 Hz for infants less than six months of age. This should also include acoustic reflexes using a higher frequency probe tone.
- Behavioral Audiometry
  Visual reinforcement audiometry can be effectively used with infants as young as 5 months. A confirmatory audiologic test battery for infants and toddlers age 6 through 36 months should include this procedure in addition to the components previously mentioned. (This procedure assesses the infant/child's behavioral response to auditory stimuli in a sound treated booth.)
- Audiological Monitoring

If a child has unilateral, mild, or chronic conductive hear loss or is "at risk" for progressive or delayed onset hearing loss, ongoing audiological services should include audiologic monitoring every 6 months until at least 3 years of age.

References

O'Neal,J., Finitzo,T., & Litman,T. (2000). Neonatal Hearing Screening: Follow-Up and Diagnosis: In: R.J. Roeser, M. Valente, H. Hosford-Dunn (ed.) Audiology Diagnosis, (pp. 527-544).New York, New York: Thieme.

Yoshinaga-Itano, C., Sedey, A., Coulter, D.K., & Mehl, A. L. (1998). Language of early and later identified children with hearing loss. *Pediatrics, 102*, 1161-1171.

Other Resources

- **Joint Committee on Infant Hearing**
- **Audiology Guidelines for Diagnosis and Treatment of Otitis Media in Children**
- **ASHA Preferred Practice Patterns**
- **BoysTown Resources for Professionals**
- **NCHAM EHDI e-book**
- **AAA Childhood Hearing Screening Guidelines**
- **Hands & Voices and the local chapter Arizona Hands & Voices**

Auditory Neuropathy Spectrum Disorder

- **Auditory Neuropathy Spectrum Disorder Guidelines**
- **UK Assessment and Management of Auditory Neuropathy/Auditory Dys-synchrony** (under #4 Audiology guidelines and protocols)

Counseling

- **ASHA Guidelines for Counseling Families of Infants and Young Children**
- **CDC Insights into Hispanic Culture**
- **CDC Insights into Communication with Moms**

4. *Fitting Hearing Aids*

The Arizona Dispensing Audiology licensure has specific requirement for dispensing audiologists. The statute can be found at in Chapter 17 **Arizona Licensure Statute**. The Administrative code (rules) can be found at **Arizona Administrative Code Title 9.**

One of the requirements is or what must be included in the Bill of Sale. A new requirement can be found in C and D below and relates to an audio switch and the Arizona telecommunications equipment distribution program.

> *36-1909. Bill of sale; requirements*
> *A. A hearing aid dispenser or dispensing audiologist shall deliver a bill of sale to each person supplied with a hearing aid by the hearing aid dispenser or the dispensing audiologist or at that person's order or direction.*
> *B. A bill of sale shall contain the hearing aid dispenser's or the dispensing audiologist's signature and shall show the address of that person's regular place of practice and the number of that person's license, a description of the make and model of the hearing aid and the amount charged. The bill of sale shall also state the serial number and the condition of the hearing aid as to whether it is new, used or rebuilt.*
> *C. A bill of sale shall contain language that verifies that the client has been informed about audio switch technology, including benefits such as increased access to telephones and assistive listening devices. If the hearing device purchased by the client has audio switch technology, the client shall be informed of the proper use of the technology. The client shall be informed that an audio switch is also referred to as a telecoil, t-coil or t-switch.*
> *D. A bill of sale shall contain language that informs the client about the Arizona telecommunications equipment distribution program established by section 36-1947 that provides assistive telecommunications devices to residents of this state who have hearing loss.*

In addition to state law and rules regarding the fitting of hearing aids, the state references specific federal statute and rules regarding the fitting of hearing aids as noted below:

Link to: **Federal Rules** and additional **Federal Rules**

Definition of Hearing Loss: any child that demonstrates a significant hearing loss, including sensorineural, conductive, mixed or neural (auditory neuropathy/dyssynchrony) types. [1]

Requirements for an Appropriate Pediatric Amplification Fitting

- ✓ Threshold estimates
- ✓ Parental Consent
- ✓ Medical clearance from a Physician, preferably an otolaryngologist or otologist
- ✓ RECD (real-ear-to-coupler difference measures)

[1] Joint Committee on Infant Hearing. Year 2007 position statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs. *Pediatrics*, Vol. 120, pages 898-921.

Protocol for Pediatric Amplification Fittings

The American Academy of Audiology's current Pediatric Amplification Protocol (October 2003) is a comprehensive document that provides a detailed guideline that outlines what is considered best practice in the field of Audiology for the fitting of amplification in children. This document can be retrieved at:

Link to:AAA Pediatric Amplification

The above document describes in detail the following recommendations when performing a pediatric amplification fitting[2]. The AAA Pediatric Amplification Protocols includes:

1. ***Personnel qualifications:*** *Audiologists are the only professional qualified to fit amplification on children. Further, the audiologist must meet all state licensure requirements, have the expertise and necessary equipment to complete the hearing aid selection, evaluation and verification procedures and must adhere to current standards of practice.*
2. ***Candidacy:*** *Amplification should be considered when a child is diagnosed with significant hearing loss. The degree and basic configuration of the hearing loss as assessed via electrophysiologic and/or behavioral measures, the child's health, cognitive status, functional needs and family goals must be considered when determining candidacy. Special consideration must be made when assessing those children that exhibit unilateral hearing loss, minimal-mild hearing loss, profound hearing loss and normal peripheral sensitivity (auditory neuropathy dyssynchrony). However, these special considerations do not necessarily preclude a child from being an amplification candidate.*
3. ***Pre-selection Issues and Procedures:*** *Many decisions are made when selecting an appropriate amplification device for a child. The type of transducer (air versus bone conduction), style, routing of the signal, bandwidth, memories, earmold, sound channel, microphone, programming ability, telephone access, compatibility with assistive listening technology (FM system or direct audio input), tamper resistant battery doors, volume controls and signal processing must be considered on an individual basis when selecting the appropriate amplification technology for a child.*
4. ***Hearing Instrument Selection/Fitting Considerations:*** *It is imperative to have frequency specific threshold estimates when performing the hearing aid fitting process. Further, consideration of the young child's ear size and acoustics is essential to ensure that the final output in the child's ear is correct. Employing the use of real-ear-to-coupler-difference (RECD) measurements accomplishes this goal. Prescriptive formulas should be utilized to obtain target values for gain and output in conjunction with the RECD.*
5. ***Verification:*** *Electroacoustic performance measures, aided soundfield threshold measures, probe microphone measurements and inventories should be used to ensure an appropriate fitting.*

[2] American Academy of Audiology. Pediatric Amplification Protocol. October 2003.

6. ***Hearing Instrument Orientation and Training:*** *Orientation and training should include family members, caregivers, the child and other appropriate professionals that work with the child.*
7. ***Validation:*** *Validation should occur to ensure that the amplification is providing optimal speech input from others and from the child's own voice. Objective and subjective measures should be utilized when validating aided auditory function.*
8. ***Follow-up and Referral:*** *On-going monitoring of a child's amplification fitting and progress is imperative. Audiologic evaluations, communication and other developmental progress, function of the amplification, physical fit of the earmold and long-term academic progress should be closely monitored.*[3]

Link to: Real-Ear Measurement: Basic Terminology and Procedures

The advent and clinical implementation of probe microphone real-ear measurements has introduced hearing health care professionals to a range of new terminology and procedures. Often, confusion arises as clinicians attempt to sort through the real-ear literature. Unfortunately, this confusion precludes some clinicians from conducting real-ear measurements which could improve hearing instrument fittings.

To address this concern, this article will offer an overview of real-ear measurement procedures. Specifically, we will provide the reader with various real-ear measurement terms, explanations of how they are conducted, and most importantly, a rationale as to why you might want to perform them.

Link to: Remote Microphone Hearing Assistance Technologies for Children and Youth from Birth to 21 Years:

This document was prepared by the American Academy of Audiology Task Force on Guidelines for Remote Microphone Hearing Assistance Technology (HAT). HAT includes a variety of assistive hearing devices. However for the purposes of this document, HAT will only refer to hearing assistance technology that utilizes a remote microphone. Specific statements and recommendations are based on evidence from peer-reviewed and non-peer-reviewed literature, and on consensus practice. This guideline addresses eligibility for, implementation of, and validation of remote microphone HAT for children and youth who have special acoustic and listening needs resulting from deficits of hearing, language, processing, attention, or learning, or who are learning through a second language. The document is designed to address the general provision of remote microphone HAT in Sections 1-9. Supplements contain the specific procedures for fitting and verification for ear-level frequency-modulation (FM), sound field and desktop systems, and induction loop systems. This version of the guidelines contains the first supplement (Supplement A) addressing ear-level FM.

[3] American Academy of Audiology. Pediatric Amplification Protocol. October 2003.

Baha-This section is a "DRAFT" until further review

Candidacy:

There are three main audiological indications for Baha®:

- Conductive hearing loss
- Mixed hearing loss
- Single-sided sensorineural deafness (SSD)

Conductive hearing loss

- The conductive component of the hearing loss is greater than 30 dB.Very little amplification required as the conductive component is bypassed via direct bone conduction.

Mixed hearing loss

- The conductive component of the hearing loss is greater than 30 dB.
- Mild to moderate sensorineural component to the hearing loss. The greater the air-bone gap, the more the candidate will benefit from Baha. Single-sided deafness (SSD)
- Normal hearing in the good ear. The head shadow effect is overcome leading to improved speech understanding and 360° sound awareness.

The Baha® sound processor can be fitted to infants and children in need of amplification via bone conduction. The indications for a Baha device are generally the same as for adults, except that in the U.S., only children aged five and older are FDA cleared for implantation. Younger children may be fitted with a Baha using the Softband.

Medical indications

Audiological indications for Cochlear Baha System candidacy

Conductive/mixed losses

- Cholesteatoma
- Chronic mastoiditis/mastoid cavity
- Chronic otitis media
- Conditions precluding the use of conventional hearing aid
- Congenital aural atresia
- Draining ears
- Ear canal stenosis
- External otitis
- Genetics
- Ossicular disease
- Otosclerosis
- Other middle ear dysfunctions
- Syndromic hearing losses

SSD

- Acoustic neuroma
- Genetics
- Meniere's disease
- Neurological degenerative disease
- Ototoxic treatments
- Sudden idiopathic deafness
- Surgical intervention
- Trauma

Pediatric Candidate evaluation

Test:

- Use age appropriate tests to evaluate audibility and speech understanding.
- Use a Baha Softband to determine the benefit of Baha.

Considerations:

- Fit a Baha Softband prior to surgery and until sound processor fitting.

• When demonstrating with a Baha Softband, consider using a stronger head worn sound processor than indicated by the audiogram. This provides an experience that more closely demonstrates the benefits of the implanted device.

Pediatric fitting with Baha Softband:

1. Attach the sound processor to the plastic snap connector disc on the Baha Softband.
2. Test that the Baha Softband works by putting it on yourself, plugging your ears and introducing sound.
3. Put the Baha Softband around the child's head, quite loosely at first.
4. Place the plastic snap connector disc against the mastoid or another bony location of the skull. Avoid placing it on the temple, as this may be uncomfortable.
5. Check that the entire snap connector disc is in contact with the skull bone.
6. Tighten the Baha Softband until it is close-fitting enough to ensure effective sound transmission but loose enough not to cause the child any discomfort.

Tip: Make sure your finger fits between the skull and Baha Softband – this will ensure that the Baha Softband is not too tight.

Note: Once the Baha Softband is tight enough to transmit sound

7. Make sure the sound processor does not touch the auricle or have any other contact with the skin, to prevent feedback.
8. Turn the sound processor on at volume setting 2 for a child with an inner ear that functions normally. It is better to amplify too little than too much in the beginning.
9. Present some noise and observe the child. Verify that there is adequate gain via soundfield audiometry or other age-appropriate testing.
10. If necessary increase the volume, monitoring the child to check that the sound is not too loud.

Note: The amount of sound that gets transferred is based on both the volume setting and the contact area of the plastic snap connector disc.

Period of Use:

1. Keep the Baha Softband on for very short periods (10 –15 minutes) for the first few occasions.
2. Use for longer periods once the child accepts the Baha Softband.
3. Rotate the position of the plastic snap connector disc regularly.
4. Reduce the time of use if there is any sign of discomfort. This is to ensure that the child maintains positive associations with using the Baha Softband.

Note: Cochlear recommends rotating the position of the plastic snap connector disc regularly to avoid discomfort and soreness. If soreness arises, avoid placing the plastic snap connector disc on this area for a couple of days. Should the soreness persist, discontinue use of the Baha Softband for a couple of days or until the soreness is gone.

Safety line

Important! Cochlear recommends that the safety line is used to attach the device securely to the child's clothing.

Note: Ensure that infants have adult supervision when wearing the Baha Softband.

Pediatric Considerations:

For children who have been fitted with a Baha device it is important that the parent

or caregiver help with inspection, cleaning and maintenance of the abutment area and sound processor. Provide the parents or caregivers with the following information..

- Demonstrate the sound processor using the test rod.
- Review care and maintenance of the abutment area and the sound processor.
- Go through troubleshooting the sound processor.
- Advise the parent/caregiver that the test rod or Baha® Softband can also be used to check that the sound processor is working properly. A demonstration may be needed.

5. Cochlear Implantation

A cochlear implant is a surgically implanted electronic device placed in the cochlea that uses electrical stimulation to stimulate the auditory nerve. The American Academy of Otolaryngology and the American Academy of Audiology recognize the cochlear implant as the standard treatment for bilateral hearing loss in children who receive limited to no benefit from amplification. The cochlear implant has been an FDA approved device for adults since 1985 and for children since 1990. Currently there are three FDA approved cochlear implant manufacturers in the United States, Cochlear Corporation, Advanced Bionics and Med-El Corporation

Qualifications

- Age 12-23 months with profound sensorineural hearing loss (>90 dB) in both ears (if all other candidacy criteria are met, hearing threshold levels are reviewed on an individual basis)
- Age 2 years and older with severe-profound sensorineural hearing loss (>70 dB) in both ears
- Receive little or no useful benefit from hearing aids
    - Younger children (12 months-5 years) defined as failure to develop basic auditory skills as quantified by either a Meaningful Auditory Integration Scale (IT-MAIS/MAIS) or Early Speech Perception (ESP) Test
    - Older children (5 years and up) defined as minimal open-set word recognition i.e. <20% correct on the Mulitsyllabic Lexical Neighborhood Test (MLNT) or the Lexical Neighborhood Test (LNT) and sentence recognition tests, such as the Hearing in Noise Test-Children (HINT-C).
- Medical contraindications may include:
    - Absence of cochlear or VIII nerve development
    - Active middle ear disease
    - Tympanic membrane perforation in the presence of active middle ear disease
    - Other contraindications for surgery, such as unacceptable candidacy for general anesthesia
    - Psychological contraindications
    - High motivation and appropriate expectations by the family and the child (if age appropriate)

The Cochlear Implant Team and Appropriate Referrals:

A **physician** who is trained in the delivery of medical care that is specific to implantation in pediatric patients (i.e. assessment of potential implant candidates, surgical procedures and post-operative management)

An **audiologist** who is trained in the delivery of audiological service that is specific to implantation in pediatric patients (i.e. assessment of potential implant candidates, device fitting, application of electrical stimulation, and post-operative management)

Speech-language pathologists who have experience with pre-implant evaluations and post-implant aural habilitation.

Additionally, members of a cochlear implant team may include educational specialists, psychologists, and social workers, all of whom provide additional valuable information for the pre-implant evaluation and post-implant rehabilitation/habilitation.

Bilateral Implantation

There is ever-accumulating evidence of the proven effectiveness of binaural cochlear implants in improving audition over monaural implants (Murphy & O'Donoghue, 2007). Current FDA criteria does not specify monaural or binaural implantation. Several insurance companies (Aetna, Blue Cross Blue Shield) have revised criteria and have stated that binaural cochlear implantation is standard of care. Children with bilateral profound hearing loss should be evaluated for bilateral cochlear implantation.

Further Information

American Academy of Audiology
Link to: AAA Statement on Cochlear Implants in Children

American Speech Language Hearing Association:
Link to: Technical Report on Cochlear Implants

Education Audiology and Cochlear Implants
Link to: Position Statement

Arizona Health Care Cost Containment System
Link to: CRS Clinical Practice Guidelines

6. Educational Audiology

School Hearing Screenings

The goal of a hearing screening program is to quickly and efficiently distinguish normal hearing students from those needing further evaluation. This provides a venue for early identification and intervention when appropriate.

Arizona Department of Health Services Sensory Program oversees the legislatively mandated requirement that all Arizona educational institutions provide hearing screening and referrals to school-aged children. The following **link to: ADHS website for school hearing screening** provides the Sensory Program's specific oversights including:

- Compliance monitoring of hearing screening mandates applying to all preschools, private, accommodation, charter, and public schools in Arizona.
- Mandated hearing screener certification process.
- Free loaner program for hearing screening equipment.
- Required forms for the mandated annual program report.

In Arizona school hearing screening is mandated for children entering into public, private or charter schools and periodically thereafter. The specific statute can be found under chapter 7.2 **Link to: Arizona School Hearing Screening Statute**

The administrative code (rules) can be found at: **Arizona Administrative Code Title 9.** The following information is included in the rules:

- population to be tested
- hearing screening requirements
- criteria for passing/failing
- referral/notification follow-up
- screener qualifications
- equipment standards
- recordkeeping/reporting requirements.

Screeners and/or schools shall provide to ADHS the annual hearing screening report of students screened, due no earlier than April 1 and no later than June 30 of each year. A copy of their training certificate must be attached to ensure that the screening was conducted by a qualified screener. If the Annual Screening Report is submitted without proof of a qualified screener the school will be considered out of compliance.

Individual student hearing screening records must be retained and available for review for three complete school years following July 1 after the student's last date of attendance at the school/district. Students newly diagnosed as deaf or hard of hearing during the current and previous school year must be included in the report.

Standardized Training for Hearing Screeners

Arizona T3 Child Care Training Collaborative provides a standardized screening curriculum that meets the requirements in the rules. A list of qualified trainers can be found at the T3 site. **Link to: T3 Trainers**

Educational Audiology Assessment, Referral, and Monitoring

The following principles underlie these guidelines:

- Audiologic assessment should be initiated after a two stage screening process unless there are other concerns such as speech, language, parental concerns or family history of documented hearing loss. If these concerns exist, the child should go directly to the audiologic assessment.
- Audiologic assessment should occur within 30 days and no later than 90 days of the screening.
- Audiologic assessments should be comprehensive educationally and developmentally relevant, using procedures that are free of ethnic and cultural bias and are appropriate to the subject's receptive and expressive native-language skills, cognitive abilities, and behavioral functioning.
- Audiologic assessment includes behavioral, physiologic and developmental measures.
- Audiologic services should be provided by persons who have knowledge of and experience in pediatric or educational audiology.
- Equipment must be calibrated to current ANSI standards annually.

Assessment of the School-age Population:

The goal of the assessment is to obtain separate ear, discreet frequency, hearing threshold information.[1] The assessment method and materials used is dependent to a large extent on the chronologic age of the child, the developmental level of the child, the language skills of the child and/or any physical limitations. The following assessment(s) are suggested: [1, 2, 3]

1. **History:** History is gathered from available sources in the areas of: auditory behavior, health and family, birth, developmental status and stated concerns of family or school personnel
2. **Otoscopy:** Visual inspection of the external auditory canal (EAC) and the tympanic membrane to ensure that there are no contraindications to placing insert ear tips or probe tips in the ear canal and to identify any abnormalities that may affect or preclude testing.
3. **Physiologic Assessment:**
   Acoustic Immittance Assessment.
   - Tympanometry: Tympanograms should be obtained using a low-frequency (226-Hz) probe tone.
   - Acoustic reflex threshold: Ipsilateral acoustic reflex thresholds should be obtained for pure-tone frequencies 500, 1000, and 2000 Hz. Contralateral reflexes should be measured at the same frequencies if there is a question of neural pathology.

4. **Pure-tone Audiometry (air and bone conduction) with appropriate masking**
    - Visual Reinforcement Audiometry (VRA)
    - Conditioned Play Audiometry (CPA)
    - Behavioral Observation Audiometry (BOA)
    - Conventional audiometric testing
    - Frequency-Specific Thresholds, if possible
        - Use of insert earphones for both ears is best practice when available
        - With normal sound field responses, follow up in 3-6 months with another attempt at ear specific assessment is advised
        - Hearing levels must be within normal limits in both ears for hearing to be considered normal. Normal hearing is defined as: thresholds in the range of 0 to 20 dB HL across all frequencies of sound

5. **Speech Audiometry in quiet and noise with appropriate masking**
    - Speech Awareness Threshold (SAT)
    - Speech Recognition Threshold Audiometry (SRT) by repeating words, identifying pictures of spondee words, or using identification of objects or body parts.
    - Word Recognition Testing by repeating words or identification of pictures. *(see appendix)*

6. **Electrophysiologic Tests**
    - If the child is Difficult to Test (unable or unwilling to tolerate ear specific testing), soundfield testing should be completed.
    - If the only results obtained are soundfield BOA, it is advised that hearing levels be confirmed with Electrophysiologic measures.
    - Otoacoustic Emissions (OAE) is an appropriate measure to use with the Difficult to Test especially when the validity or adequacy (ear-specific information) of behavioral test results is limited or if the neurologic integrity of the auditory pathways to the level of the brainstem is in question.
    - If OAE responses are not present at expected levels across the frequency range, or are inconsistent with behavioral responses, observation and/or case history, ABR testing may be warranted.

Monitoring of Hearing Sensitivity for the School-age Population

Following identification of hearing loss in children, audiological follow-up should occur at least: every 3 to 6 months to age 3, every 6 months age 3 - 6 years, and annually thereafter. Monitoring for children who are at risk for progressive hearing loss should occur at least every 6 months or more frequently as determined by the audiologist and the parent/caregiver. If at any time a decrease in hearing sensitivity is suspected, an audiological evaluation should occur as soon as possible, followed with appropriate recommendations for medical referral and consideration of appropriate changes in amplification as indicated.

Referral

ASHA indicates that an educational audiologist must make appropriate medical, educational, community referrals to other services deemed necessary for the identification and management of children with hearing loss and/or Auditory Processing Disorder (APD) and their families/ guardians. This document does not include guidelines for APD at this time.

Recommendations for referrals should be considered on an individual basis, and may include but are not limited to the following:

- Medical referral to an Otologist/Neurotologist/Otorhinolaryngologist, preferably with pediatric experience
- Referral to the Arizona Schools for the Deaf and the Blind Parent Outreach Program for children under the age of 3 years
- Referral to the child's local district for Child Find services
- Referral for speech/language assessment, preferably with a speech language pathologist with pediatric experience
- Referral for a hearing aid consultation with an audiologist, preferably with pediatric experience
- Referral to Children's Rehabilitative Services (CRS) for further evaluation of hearing loss and other potentially associated findings if enrolled in AHCCCS
- Referral to the child's primary care physician as needed

References:

1. **Guidelines for the Audiologic Assessment of Children from Birth to 5 Years of Age.** American Speech-Language-Hearing Association. (2004).
2. **Guidelines for Audiology Service Provision in and for School.** American Speech-Language-Hearing Association. (2002).
3. **Hearing Assessment**. American Speech-Language-Hearing Association.
4. **Hearing Screening.** American Speech-Language-Hearing Association.
5. **Draft Childhood Hearing Screening Guidelines.** American Academy of Audiology

Amplification in the Educational Setting

Three significant forces currently shape the fitting of hearing aids in children. First, school-age children with hearing loss are more likely to have a longer history of hearing aid use than their predecessors due to Early Hearing Detection and Intervention programs. These new populations of children have had more, better, and longer access to the auditory signal, potentially making them more sophisticated hearing aid users. Second, technological advances in hearing-aid signal processing evolve faster than the technologies can be verified for use in children. Third, research in the field of pediatric hearing science is expanding to include aspects of communication specific to children with hearing loss. Traditionally, the efficacy of amplification is evaluated relative to a listener's speech perception. Recent research suggests that the amplification should be evaluated in terms of the child's ability to learn as well as the effort required to listen.

Fitting Children with Amplification

Information regarding the audiological evaluation of a child may be found in Section 3 of this guide. Information on equipment monitoring and training may be found in Section 4.

Link to: AAA Pediatric Amplification Guidelines

The role of the public school

IDEA 300.6 (Assistive technology service) specifies the public school's broad range of responsibility with regard to amplification devices. Responsibilities include: 1) evaluating the needs of the child, 2) acquiring or assisting in the acquisition of the devices, 3) selecting, fitting, maintaining, repairing, or replacing the devices, 3) familiarizing the child with the device (when appropriate) , and 4) training personnel regarding the proper function of the devices.

Cochlear Implants in the Educational Setting

IDEA 300.34 clarifies the public schools' role regarding the CI (cochlear implant) student by stating that related services are not considered services that "apply to children with surgically implanted devices, including cochlear implants". The Department of Education specifically excludes a CI as assistive technology device. Public schools therefore are not responsible for the following in regards to cochlear implants:

- Optimization of the device.
- Mapping or programming of the device (referred to under optimization).
- Replacement or maintenance of the device or parts for the device.

However, the school district must routinely check external components of surgically implanted devices to ensure proper functioning. The child using a CI is entitled to related services (i.e., audiology, speech pathology) if the related service is deemed necessary by the IEP team in order for the child to benefit from special education.

The Educational Audiologist may consider the following as regards to their professional responsibility to the CI student:

Product familiarization

- Investigate product and professional websites for information related to school age children and the device.
- Contact company reps for materials about the CI.
- Consult with FM companies to discuss compatibility with the CI.

Communication with related professionals and family

- Educate the student's teacher(s) and school nurse as to proper placement of the transducer and sound processor.
- Educate the student's teacher about effective communication for the CI user.
- Discuss and define (possibly in written form) the school's responsibilities regarding the CI with the parents including safety considerations at school.
- Form a relationship with the child's managing CI audiologist and/or CI team and have contact information available for quick access when necessary.
- Formulate a back-up plan in case the CI becomes non-functional.

For more specific information regarding the public schools' responsibility to students using a cochlear implant you may refer to the following:

2006 IDEA Part B (see appendix B)

- 300.5 Assistive technology device
- 300.34(b)(1) re: related services
- 300.34(b)(2) re: right to receive related services
- 300.113 (b) re: routine checking of hearing aids and external components of surgically implanted medical devices.

Monitoring of Hearing aids, Cochlear Implants, and FM systems

Hearing Aids

Each public agency must ensure that hearing aids worn in school by children with hearing impairments, including deafness, are functioning properly. (IDEA Part B, 300.113)

Monitoring of hearing aids should include:

- Visual inspection of the equipment. Look for wear or breaks in cords, corrosion in the battery compartment etc.
- Confirm use of appropriate volume/sensitivity level if applicable
- Daily listening checks by trained personnel
- Check batteries as needed
- Electro-acoustic analysis at least twice a year
- Monitoring of classroom performance with amplification.

Cochlear Implants

Monitoring of cochlear implants should include:

- Visual inspection of the equipment. Look for wear or breaks in cords, corrosion in the battery compartment, etc.
- Check batteries as needed
- Check all connections to the device (FM, cords, battery door)
- Listening check (if equipment is available)
- Listen and look for any features of the CI meant to alert you to a problem. This will be specific to the device and may include a beeping sound or flashing light.
- If appropriate, question the child about how he/she is hearing with the CI. Possibly perform a quick "in situ" listening check by asking simple questions
- Check FM components if applicable
- Educating the student's teacher(s) and school nurse when to contact the audiologist for assistance with the device

FM Systems

Monitoring of FM systems should include:

- Visual inspection of the equipment
- Are the receiver and audio shoe correctly attached to the hearing aid?
- Listening Check by trained professionals

- Trouble shooting common causes of malfunction (dead batteries, clogged earmolds etc.)

References:

-Arizona Pediatric Audiology Guidelines
-**Educational Audiology Association Guidelines**
-**American Speech-Language Hearing Association Position Statements**
-**Assistive Technology, (ASHA)**
-**Children and Hearing Aids, (ASHA)**
-**Phonak eSchool Desk**

Additional Resources:

Educational Audiology Handbook; Cheryl de Conde Johnson, Peggy V. Benson, Jane Seaton; Delmar Cengage Learning.com

For more information regarding cochlear implants and children wearing cochlear implants in schools please refer to the following:

- **American Speech-Language Hearing Assoc.**
- **Educational Audiology Association**
- **Advanced Bionics**
- **MedEl**
- **Cochlear Americas**
- **American Academy of Audiology**

Scope of Practice and Qualifications for Educational Audiologists

The educational audiologist is uniquely qualified to ensure that all students have access to auditory information in the educational environment. The responsibilities of educational audiologists may vary from one setting to another. This section broadly defines the services that audiologists provide, as case managers and members of a multidisciplinary team in the educational setting. Educational audiology requires unique skills that may vary according to the service delivery model.

Qualifications and Competencies for Educational Audiologists

- Meet required course work and practicum requirements for a Master's Degree or Doctorate in Audiology from an accredited graduate university program
- Hold a current license to practice Audiology in Arizona
- Hold a current license to dispense hearing aids in Arizona, if required
- Experience or demonstrate competency in performing educationally relevant audiological assessments in the pediatric population using procedures appropriate to the child's language skills, cognitive abilities and behavioral functioning.
- Demonstrate competency in evaluation of the need for, selection of and functioning of hearing aids, individual or group amplification systems, cochlear implants, and other hearing assistive technology (HAT), including making earmold impressions and modifications.
- Able to provide written and/or verbal interpretation of audiological assessment results, functional implications for communication, and management recommendations appropriate to the intended audience, including parents, guardians, physicians and other professionals.
- Familiar with community resources and provide appropriate referrals for medical management, cerumen removal, and other related services as appropriate.
- Able to identify coexisting factors that may require further evaluation or referral.
- Demonstrate an understanding of federal, state and local regulations related to audiology services for school-aged children.
- Competency in the coordination and administration of hearing identification programs, including the training and supervision of support personnel according to state guidelines for school screening programs.
- Comply with the scope of practice, the preferred practice patterns, and the code of ethics statements of applicable professional organizations and licensing bodies.
- Understanding of acoustical standards for learning environments, the combined effects of hearing loss and poor classroom acoustics, as well as appropriate modifications to improve auditory access for all students.

*Adapted from **Minimum Competencies for Educational Audiologists.** Educational Audiology Association.

Scope of Practice for Educational Audiology

Children with hearing loss experience auditory deprivation, which affects communication, learning, and psychosocial development. Management of hearing loss must then address the child's medical referral, communication, education, and psychosocial needs. Audiologists provide identification, assessment, and non-medical treatment/rehabilitative services for auditory, vestibular and related impairments. Federal legislation (IDEA), as well as state and local regulations outline the role of the audiologist in the schools to include the following:

- Identification of children with hearing loss
- Determination of the range, degree, and nature of the hearing loss.
- Referral for medical or other professional attention necessary for the habilitation of children with hearing impairment
- Provision of habilitative services, including auditory training, aural habilitation, speech reading, and listening device orientation
- Creation and administration of hearing loss prevention programs
- Counseling and guidance of children, parents, and teachers regarding hearing loss and the resulting effects on learning.
- Determination of a child's needs for group and individual amplification, hearing aid selection, and verification of hearing aid performance using standard protocols.
- Ensure the appropriate use and function of hearing aids worn in school by children with hearing impairments, including inservicing of school personnel on the proper use of student amplification and troubleshooting techniques.
- Analysis of the listening dynamics within the learning environment, and make appropriate recommendations for modifications to make instruction accessible to students with hearing loss.
- Make appropriate medical, educational, and community referrals for other services necessary for the management of children with hearing loss

In addition to these considerations for services in the schools, audiologists should follow the Audiology scope of practice policies of national professional licensing organizations as well as state licensure laws.

References:

Licensing Audiologists and Speech-Language Pathologists. Arizona Administrative Code; Title 9 Health Services, Chapter 16, Article 2:

Guidelines for Audiology Service Provision in and for Schools. ASHA (2002).

Recommended Professional Practices for Educational Audiology. Educational Audiology Assoc. (1997).

Minimum Competencies for Educational Audiologists. Educational Audiology Assoc.

Advocacy for Audiologists Working in the Schools. Educational Audiology Assoc. (2006).

ANSI S12.60-2002 **American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools.** Acoustical Society of America.

Interdisciplinary Teams in the Schools

Proper management children who are Deaf or Hearing Impaired requires the collaboration and cooperation of many professional disciplines. As part of an interdisciplinary team, the educational audiologist works closely with professionals both within and outside the school setting. Involvement of other disciplines often includes both educational and medical personnel, and will vary based on each individual child's needs. The concurrent importance of parent or guardian involvement cannot be overemphasized.

The interdisciplinary team may include, but is not limited to:
Professionals within the school setting:

- Classroom personnel such as teachers, interpreters, and aides of various specialties
- Health services staff such as school nurses and hearing screening personnel
- Related service staff such as physical and occupational therapists, speech language pathologists, counselors, and psychologists

Professionals outside the school setting:

- Otologist, neurotologist, and/or otorhinolaryngologist
- Other specialized physicians such as neurology or ophthalmology
- Managing audiologist and/or cochlear implant center
- Physical and occupational therapists, speech language pathologists, counselors, and psychologists
- Vocational Rehabilitation Counselors

Required audiologic services for the schools are outlined in the following:

- The Individuals with Disabilities Education Act (IDEA)
- State regulations
- The child's Individualized Educational Plan (IEP), if applicable

The educational audiologist should only provide services within guidelines of state licensure and within nationally recognized professional scope of practice. Professionals must recognize the need for referral and deference of evaluation and treatment to the appropriate individual(s).

Working as a team with multiple professionals often requires the sharing of information. It is imperative that the educational audiologist recognizes a child's and family's right to privacy of protected information, and establishes controls for the appropriate release of such information to others. Professionals are urged to work within guidelines for dissemination of protected information as outlined in the Health Information Portability and Accountability Act (HIPAA), and Family Educational Rights and Privacy Act (FERPA). Districts or agencies may have internal policies and procedures for exchange of such information. The audiologist should be familiar with and abide by these policies.

References:

[1] **Scope of Practice in Audiology** Ad Hoc Committee on Scope of Practice in Audiology. American Speech, Language, and Hearing Association (ASHA), 2004.
[2] **Arizona Administrative Code:** State Requirements for Licensing.
[3] **Recommended Professional Practices for Educational Audiology,** Educational Audiology Association, April, 1997.

APPENDIX- Speech Audiometry Materials

The following list of assessments is appropriate for the school-age population but is by no means exhaustive. The professional should use best judgment in determining materials that are age and language appropriate for each child.

- Speech Recognition Threshold Audiometry (SRT)
  - ASHA Child Spondees
  - ASHA Spondees NU6 and W-22
  - Spondee Word List CID W-1
  - Ling Six Sound Test
- Word Recognition Testing
  - Northwestern University Children's Perception of Speech (NU-CHIPS)
  - Word Intelligibility by Picture Identification (WIPI)
  - Minimal Pairs Test (MPT)
  - Phonetically-Balanced Monosyllabic Kindergarten Word Test (PB-K 50)
  - Hearing in Noise Test (HINT)
- Additional Materials for Cochlear Implant Patients
  - Lexical Neighborhood Test (LNT)
  - Multisyllabic Lexical Neighborhood Test (MLNT)
  - Early Speech Perception Test (ESP)
  - Glendonald Auditory Screening Procedure (GASP)
  - Common Phrases Test
  - Meaningful Auditory Integration Scale (MAIS)
  - BKB-SIN Test
- Foreign Language Materials
  - Spanish Auditory Test (Monosyllables, Bisyllables, Trisyllables)
  - Synthetic Sentences Identification –Spanish Version (SSI-S)

Resources:

Advanced Bionics Corporation
Auditec of St. Louis
Central Institute for the Deaf (CID)

APPENDIX- Rules and Regulations Governing School Audiology Services

State: Arizona Revised Statutes

Title 9: Health Services
Chapter 13: Department of Health Services / Health Programs Services
Supp. 06-2
Article 1. Hearing Services

Title 15: Education
Chapter 7: Instruction
Article 4. Special Education for Exceptional Children

Title 36: Public Health and Safety
Chapter 7.2: Child Hearing Program
Article 1: Program of Hearing Evaluation Services

Federal: Individuals with Disabilities Education Act (IDEA) – 2004
IDEA – Part B 300.34 Related Services (including Audiology) Link to: IDEA
(a) General. Related services means transportation and such developmental, corrective, and other supportive services as are required to assist a child with a disability to benefit from special education, and includes speech-language pathology and audiology services, interpreting services, psychological services, physical and occupational therapy, recreation, including therapeutic recreation, early identification and assessment of disabilities in children, counseling services, including rehabilitation counseling, orientation and mobility services, and medical services for diagnostic or evaluation purposes. Related services also include school health services and school nurse services, social work services in schools, and parent counseling and training.
(b) Exception; services that apply to children with surgically implanted devices, including cochlear implants.

(1) Related services do not include a medical device that is surgically implanted, the optimization of that device's functioning (e.g., mapping), maintenance of that device, or the replacement of that device.
(2) Nothing in paragraph (b)(1) of this section-- (i) Limits the right of a child with a surgically implanted device (e.g., cochlear implant) to receive related services (as listed in paragraph (a) of this section) that are determined by the IEP Team to be necessary for the child to receive FAPE.
(ii) Limits the responsibility of a public agency to appropriately monitor and maintain medical devices that are needed to maintain the health and safety of the child, including breathing, nutrition, or operation of other bodily functions, while the child is transported to and from school or is at school; or
(iii) Prevents the routine checking of an external component of a surgically-implanted device to make sure it is functioning properly, as required in Sec. 300.113(b).

(c) Individual related services terms defined. The terms used in this definition are defined as follows:

(1) Audiology includes--

(i) Identification of children with hearing loss;
(ii) Determination of the range, nature, and degree of hearing loss, including referral for medical or other professional attention for the habilitation of hearing;
(iii) Provision of habilitative activities, such as language habilitation, auditory training, speech reading (lip-reading), hearing evaluation, and speech conservation;
(iv) Creation and administration of programs for prevention of hearing loss;
(v) Counseling and guidance of children, parents, and teachers regarding hearing loss; and
(vi) Determination of children's needs for group and individual amplification, selecting and fitting an appropriate aid, and evaluating the effectiveness of amplification.

IDEA – Part B 300.113 Routine checking of hearing aids and external components of surgically implanted medical devices.

(a) Hearing aids. Each public agency must ensure that hearing aids worn in school by children with hearing impairments, including deafness, are functioning properly.
(b) External components of surgically implanted medical devices.
(1) Subject to paragraph (b)(2) of this section, each public agency must ensure that the external components of surgically implanted medical devices are functioning properly.
(2) For a child with a surgically implanted medical device who is receiving special education and related services under this part, a public agency is not responsible for the post-surgical maintenance, programming, or replacement of the medical device that has been surgically implanted (or of an external component of the surgically implanted medical device).

IDEA-Part B 300.5 Assistive Technology Device

Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability. The term does not include a medical device that is surgically implanted or the replacement of such device.

IDEA-Part B 300.6 Assistive Technology Service

Assistive technology service means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. The term includes:
(a) The evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child's customary environment;
(b) Purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by children with disabilities;
(c) Selecting, designing, fitting, customizing, adapting, applying, retaining, repairing, or replacing assistive technology devices;
(d) Coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs;
(e) Training or technical assistance for a child with a disability or, if appropriate, that child's family; and
(f) Training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of that child.

IDEA-Part B 300.7 Definitions:

[2] .Deaf-blindness means concomitant hearing and visual impairments, the combination of which causes such severe communication and other developmental and educational problems that they cannot be accommodated in special education programs solely for children with deafness or children with blindness.

[3] .Deafness means a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification that adversely affects a child's educational performance.

[5] .Hearing impairment means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but that is not included under the definition of deafness in this section.