GUIDELINES FOR PEDIATRIC AMPLIFICATION

- EARLY HEARING DETECTION AND INTERVENTION -

Section 3 of the Early Hearing Detection and Intervention (EHDI) Guidelines for Audiologists

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DEPARTMENT OF HEALTH

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Introduction

This document provides recommended guidelines for early fitting of amplification (when chosen by the family) for infants or children identified with permanent/persistent hearing loss. It is intended to promote a more standardized approach to ensure consistency in outcomes. This document describes optimal processes based on current evidence and combined clinical experience.

Expanded guidance is included on several main topic areas that research has shown can influence outcomes. Those factors, which parents can have an impact on, are detailed on pages 11-12.

Fitting of amplification (when chosen by the family) should be consistent with the national Early Hearing Detection and Intervention (EHDI) goal of providing amplification within one month of diagnosis of permanent hearing loss (JCIH, 2019). Resources are available from the MDH EHDI Program to assist with program support, implementation, and quality assurance.

Respect for Identities Statement

Minnesota Department of Health (MDH) recognizes that everyone has their own unique identity, and we respect the terms people want to use to identify themselves. People may self-identify as deaf, deafblind, hard of hearing, a person with hearing loss, Deaf Plus, a person with a hearing difference, Deaf Disabled, etc.

When referring to this population, MDH may use “deaf, deafblind, and hard of hearing (DHH/DB),” in an all-inclusive manner. The term “hearing loss” may be used when talking about a medical diagnosis.

Background

Hearing loss is one of the most common congenital conditions with an estimated incidence of two to three per 1000 births. Over 90% of deaf children are born to hearing parents (National Institute on Deafness and Other Communication Disorders [NIDCD], 2025). Without early diagnosis and intervention, children who are deaf and hard of hearing are at risk for delays in a variety of developmental areas including social/emotional, language, vocabulary, articulation and intelligibility (McCreery & Walker, 2017, p. 2).

Birth through age 2 years is a critical period for brain development in the infant/young child, and access to robust communication and language system(s) is critical for early development. Families benefit from learning all the possible ways for their child to access language early. Multiple spoken and visual languages and their combinations are opportunities to be considered for each child and family. Early identification and intervention can substantially reduce or eliminate developmental delays that too often stem from a late detection of hearing levels outside the typical range. Children who receive intervention very early in their critical language learning years are more likely to have language scores that more closely match their cognitive abilities (Yoshinaga-Itano, et al., 1998).

The goal of amplification is to provide access to as much of the auditory environment as possible. Once the family has chosen to pursue amplification, the audiologist plays a critical role in guiding the family through appropriate device selection, verifying device function, and partnering with the family to promote successful communication and language acquisition outcomes.

Use of amplification for auditory access is one tool for language access. Use of amplification does not preclude the use of a visual language like ASL or visual access to language such as cued American English, and families who choose amplification should not be discouraged from also providing visual access through a signed language to their child. Recent research in linguistic development of children who are DHH highlights that learning a sign language does not keep a child from acquiring a spoken language (Pontecorvo et al., 2022).

Some children can become bilingual, and some research suggests that sign language can scaffold spoken language outcomes (Delcenserie et al., 2023). Learning sign language can be protective against language deprivation (Hall et al., 2019). Minnesota provides a rich system of supports for families with whatever communication opportunities they wish to explore. See Minnesota Low Incidence Project's Exploring Communication Opportunities[1] for more information.

Child & Family Centered Communication

In family centered care, families are recognized as the experts in determining what is best for their children and families. No one understands their child's needs more than their parents do. Family centered care is a crucial component of best clinical practice (American Academy of Pediatrics, 2022) and is beneficial to children and their families. Clinicians are encouraged to use a teach-back method[2] to ensure parental understanding of test results and recommendations. When discussing communication opportunities and amplification, an awareness of family's preferences and values is essential. Sharing resources and recommendations in an unbiased manner that recognizes each family's unique situation and background helps support parents to make the most

informed choices for their child and family. Professionals should deliver information in a positive manner with sensitivity to the emotional needs of the parent.

Facility & Professional Considerations

A licensed audiologist is the only professional qualified to select and fit all forms of amplification for children including personal hearing aids, bone conduction devices, cochlear implants, remote microphone systems, and other assistive devices. Audiologists must follow all Minnesota Audiologist licensing and hearing aid despenser regulations[3], which are not discussed in this document. The audiologist must have experience with the assessment and management of infants and children with hearing loss, and must have the test equipment necessary for pediatric hearing aid selection, verification, and validation procedures. The process of ongoing follow-up and validation of amplification will require the audiologist to have close collaboration with the family and early intervention team to ensure that amplification provides appropriate auditory access and supports age appropriate language development. Facilities that lack the expertise or necessary equipment should establish cooperative arrangements with professionals and facilities that provide pediatric hearing services.

Equipment

Facilities must have equipment for real-ear measurement and related hearing aid verification and validation procedures to optimize audibility with amplification. Equipment must be calibrated annually in accordance with current American National Standards Institute (ANSI) Specifications or other applicable standards.

Insurance / Medicaid Coverage

Minnesota Statute 62Q.6751[4] requires that health plans must cover hearing aids for all individuals for hearing loss that is not correctable by other covered procedures. Coverage varies depending on the health plan. Parents may wish to contact their insurance provider to investigate their specific coverage. In some cases plans will award this benefit through a hearing aid appeals[5] process. Children may also be eligible for coverage under the Minnesota Medicaid program. Eligibility criteria and information about how to apply for coverage can be found on the Department of Human Services website.[6] When full coverage is not available through private or state health plans, additional financial support may be available through various foundations or community based civic organizations. A list of Hearing aid financial resources[7] is provided by the Minnesota Department of Human Services (DHS) Deaf, DeafBlind and Hard of Hearing Services Division.[8] Parents can also reach DHS at 800-657-3663 with additional questions.

Loaner Devices

Fitting of amplification should not be delayed for financial reasons. Appropriate loaner amplification devices may be available through a variety of local, state, and national sources to allow families time to secure funds for amplification devices or await medical interventions. One source, the State of Minnesota Pediatric Hearing Device Loaner Program,[9] provides short-term loaner devices, typically for a time frame of 6 months. Inventory includes air conduction hearing aids, bone conduction devices, remote microphone options,

and more. This program is supported through partnerships with device manufacturers and grant support from the Minnesota Department of Health.

Amplification Candidacy Criteria

Amplification should be considered for any type or degree of hearing loss that could possibly interfere with normal developmental processes (American Academy of Audiology [AAA], 2013). According to the Joint Committee on Infant Hearing (JCIH, 2019), if families choose to pursue amplification for their child, the fitting should take place within one month of diagnosis. In accordance with Food and Drug Administration (FDA) regulations, medical clearance must be obtained prior to fitting hearing aids on children (FDA, 2025). Following medical clearance, ongoing treatment of middle ear effusion should not delay fitting of amplification when there is also permanent hearing loss (Centers for Disease Control and Prevention [CDC]: National Center on Birth Defects and Developmental Disabilities, 2014; Grimes, 2007). The decision for amplification (when chosen by family) should be based on the child's unique factors as a whole, factors which could include audiological data, unaided speech intelligibility index (SII) (American National Standards Institute [ANSI], 1997), family preferences, and the existence of other educational or medical conditions, language delays or special needs.

Infants with hearing loss who experience an extended hospital stay should be offered fitting with appropriate amplification as soon as medically feasible, after appropriate clearance for amplification is received from the treating physician. This timeframe should be adjusted as appropriate given other medical priorities and family situations.

Frequency specific thresholds obtained via auditory brainstem response testing must be converted to estimated hearing level (dB eHL) to appropriately fit amplification. At least two frequencies (low and high frequencies) in each ear and an estimate of any conductive component are minimally necessary to begin the fitting process. Given this, fitting should proceed while efforts to fully define the audiogram are ongoing (AAA, 2013; Audiology Practice Standards Organization [APSO], 2022; Grimes, 2007).

Audibility-based hearing aid candidacy

The speech intelligibility index (SII) is a measure that predicts the proportion of acoustic cues that are audible to a listener. It is often shown as a value or percentage between 0 (no audibility) and 100 (full audibility). The SII considers the weighted importance of different frequency bands to speech understanding (ANSI, 1997). There are several ways to calculate the SII. Some online calculators and hearing aid analyzers can also incorporate hearing levels as well as ear canal acoustics like the real-ear-to-coupler difference (RECD). The Knowledge and Implementation in Pedatric Audiology (KIPA) group provides an online calculator[10] for unaided SII.

The use of unaided SII has emerged in recent years to counsel parents about hearing aid candidacy especially for milder degrees of hearing loss. The terms "mild" or "slight" can be confusing for parents and make it harder for some parents to understand the need for amplification. Conversely, using the unaided SII gives a numerical measure of how much of the average speech spectrum (65 dB SPL) is available (or unavailable) to the child. With this more descriptive information using the SII, some parents are motivated to start a trial with hearing devices sooner, rather than taking a "watchful waiting" approach. Within the category of "mild" hearing loss, the unaided SII can vary greatly (i.e. from 50 to 95). Research suggests that children who have an unaided SII for average speech of less than or equal to 80% may benefit from a hearing aid. This recommendation applies to both bilateral and unilateral hearing loss (McCreery et al, 2020).

For children with mild hearing loss or high frequency configurations with an unaided average SII greater than 80, hearing aids may not provide significant benefit unless the measured aided SII can result in an aided SII that is 10 points higher than unaided. For these borderline cases, audiologists should look at factors beyond audibility-based candidacy (i.e. presence of language delays or educational needs) to

determine whether a trial with hearing devices is warranted. Clinical audiologists can confer with the child's educational audiologist or educational team to closely monitor how they are functioning in their educational setting and make a group decision with the family. If a trial with amplification is desired, loaner devices could be used. If hearing devices are not recommended, children with hearing loss should be closely monitored for progression of hearing loss, stability of SII, and the emergence of concerns for communication development (British Columbia Early Hearing Program [BCEHP], 2024).

See "The Speech Intelligibility Index: Tutorial and Applications for Children who are Deaf and Hard of Hearing[12]" for a detailed review of applications of SII (Wiseman et al., 2025).

Bilateral candidacy

Bilateral amplification (when chosen) should always be provided to young children with who are candidates for hearing aids in both ears unless there is a contraindication (AAA, 2013; APSO, 2022).

If the child's hearing cannot be adequately aided to achieve sufficient audibility the child could be a cochlear implant candidate and should be referred to a cochlear implant center if desired by the family (AAA, 2013; Wiseman et al., 2025).

Unilateral candidacy

Children with unilateral hearing loss are at risk for academic difficulties and speech and language delays. Amplification for aidable unilateral hearing loss should be considered when measurable hearing loss is confirmed in the affected ear and when supported by needs assessment (AAA, 2013; APSO, 2022). When chosen by the family, a closely monitored trial with amplification is suggested.

Sometimes unilateral hearing loss is judged to be unaidable by air conduction (i.e. unaided SII < 5 and aided SII of < 50 (BCEHP, 2024)). This is often referred to as single sided deafness (SSD) or limited useable hearing unilaterally (LUHU), and all available alternative amplification strategies should be explored. These strategies (bone conduction, remote microphones, contralateral routing of signal (CROS) devices and cochlear implants) are discussed in later sections on Style of Device and Device Features.

Auditory Neuropathy Spectrum Disorder (ANSD)

Auditory Neuropathy Spectrum Disorder (ANSD) is "a hearing disorder in which the inner ear successfully detects sound, but has a problem with sending sound from the ear to the brain" (NIDCD, 2018). Accurate threshold information cannot be obtained for children with ANSD via ABR testing. Therefore, additional behavioral information is needed to determine management options. When behavioral audiological information has established that hearing sensitivity will not allow conversational level speech to be sufficiently audible, a closely monitored trial with amplification is recommended (AAA, 2013; Roush, Frymark, Venediktov, & Wang, 2011; Walker, McCreery, Spratford, & Roush, 2016). Benefit from air conduction amplification for children with this condition is not clearly predictable. If expected progress is not demonstrated, alternative strategies for effective access to language should be explored.

One of these strategies may include cochlear implants. Some children with genetic auditory neuropathy may be eligible for emerging medical interventions and may benefit from a conversation with their geneticist.

Pre-Selection of Device Characteristics

Style of Device

The goal of amplification is to provide the best possible amplified access to the speech signal. Behind the-ear (BTE) hearing aids are the optimal style for young infants and most children (AAA, 2013). In-the-ear (ITE) and completely in the canal (CIC) hearing aids are not recommended for use with infants and young children due to the small size and rapid growth of the outer ear.

A bone conduction aid may be appropriate if the loss is conductive and BTEs cannot be used due to medical or physical contraindications (such as atresia). Bone conduction aids can also be considered for unilateral hearing loss (SSD or LUHU) where an air conduction aid cannot provide audibility. A bone anchored (surgically implanted) hearing aid may be appropriate for some older children on a case by case basis once they reach the FDA approved age of 5 years.

CROS/BICROS hearing aids may be considered for children with severe or profound unilateral hearing loss or bilateral asymmetrical hearing loss when they are older and able to control their environment. It is important to note that in noisy classroom situations, remote microphone solutions may be preferable over CROS devices (AAA, 2013).

A cochlear implant may be considered for children who gain limited benefit from amplification. Any family considering cochlear implantation should consult with their audiologist and a cochlear implant center to determine candidacy, per current FDA guidelines.

Device Features

Flexibility in setting electroacoustic parameters is critical when selecting appropriate amplification for infants and children.

Advancements in technologies should be considered on a regular basis to assess for developments that may help improve outcomes and meet specific audiological needs. A summary of evidence supporting the consideration to use many of the currently available signal processing options can be found in the AAA Clinical Practice Guidelines for Pediatric Amplification (AAA, 2013). Capability to access direct audio input (DAI), telecoil, and remote microphones should be considered. Wireless connectivity will become valuable as the child becomes more mobile and needs to listen to speech at greater distances, to improve signal-to-noise ratio, or when increased signal strength is desired to improve audibility of speech (i.e. in cases of severe or profound hearing loss). Remote microphones and comparable technologies are the systems of choice to reduce the negative effects of background noise, distance from the talker and high reverberation levels.

Safety features and warranty

Safety features should include a tamper resistant battery compartment, deactivated buttons and controls for younger children, tamper proof ear hooks, and possibly a retention clip/cord as appropriate for each child's age. A hearing aid maintenance kit should also be provided to parents that includes basic items such as a battery tester, dry aid kit, device manual, listening stethoscope, extra case, batteries, and clinic contact information. Coverage of the device for loss and damage or extended warranties may ease financial burdens for families if devices are lost or damaged.

Physical fit / earmolds

The physical fit of the hearing aids and earmolds is important for comfort, retention, and acoustic response. Earmolds should be made of a soft material for safety and comfort. They should be replaced whenever feedback is excessive at optimal settings or when retention or comfort issues occur. Retention devices may help increase parents' confidence in venturing out into more challenging listening environments with their children without fear of losing their devices. This can increase hearing aid use

time during outdoor play. Audiologists should help parents explore the wide range of retention options available, which may include elastic sleeve covers, security loops, clips and cords, two-sided tape, headbands, bonnets, and caps. Many options are available online. (McCreery & Walker, 2017, p. 117).

Verification of Electroacoustic Characteristics

The following section focuses on verification of acoustic hearing aids. Fitting and verification of other device types (bone conduction, cochlear implants, and remote microphone technology) is beyond the scope of this document. See Ontario's Protocol for the Provision of Amplification[11] for more details about verifying bone conduction aids (using skull simulator) and remote microphone technology.

The use of a systematic approach when selecting electroacoustic characteristics of hearing aids for children is considered of utmost importance to ensure optimal amplification. Two prescriptive methods validated for children are Desired Sensation Level (DSLm [i/o]) ® method (Scollie et al., 2005) and National Acoustics Laboratory-Nonlinear formula Version 2 (NAL-NL2) (Keidser, Dillon, Flax, Ching, & Brewer, 2011). Though the underlying design goals of the prescriptive methods differ, both are expected to provide sufficient amplification (McCreery & Walker, 2017, p. 83). Electroacoustic gain and maximum output targets for these methods are usually available in hearing instrument electroacoustic analysis systems. Gain and output targets should incoporate ABR thresholds appropriately converted to estimated hearing level (dB eHL) or behavioral thresholds.

Electroacoustic verification systems (coupler and probe microphone) optimally utilize speech-like stimuli or calibrated recordings of speech to verify audibility for soft, average, and loud speech. Pure tones are most ideal to verify maximum power output (MPO). With infants and small children, simulated real-ear verification should be done by measuring the real-ear-to-coupler difference (RECD) and applying it to hearing thresholds and 2 or 0.4 cc coupler measurements of hearing aid output to simulate sound pressure level (SPL) in the ear canal. If current measured RECD's cannot be obtained, published age-norms for average RECD can be used (Bagatto et al., 2002; 2005). Real-ear (in situ) measures should be attempted as soon as a child has sufficient head control and can cooperate (McCreery & Walker, 2017, p. 78), and may often be possible with a sleeping infant. In situ measures may be preferable to simulated measures in older children with larger earmolds or large vents (Bagatto et al., 2005).

Prior to direct evaluation of the hearing aid on the child (in situ), the hearing aid may be preset in a hearing aid test box or real-ear simulator to verify that specified targets are met using the child's RECD. At a minimum, new in situ real-ear measures or RECD and simulated measures should be completed when new earmolds are fit. Children under 1 year old need frequent verification (every three months) and children age 1-3 years should be seen every six months or more frequently if there are risk factors for progressive hearing loss. Older children can be seen annually for verification if their hearing is stable (McCreery & Walker, 2017, p. 93). Along with routine verification, it is important to have current audiological information when utilizing real-ear measures. As ear canals grow, acoustic properties

change, which affects hearing thresholds and hearing aid prescriptions (Ontario Infant Hearing Program, 2023).

The aided SII is a measure of audibility while using a hearing aid, and is often a feature embedded in the hearing aid analyzer. Degree of hearing loss can limit the amount of audibility that can be achieved. An aided SII (using 65 dB SPL average speech input in quiet) of less than 68 may put a child at risk for spoken language delay, and an aided SII less than 53 is not enough audibility to support speech and language development. Children with aided SIIs lower than 53 might need a more powerful device, reprogramming, cochlear implant referral or other support to access language (Wiseman et al., 2025).

The University of Western Ontario Pediatric Amplification Protocol (PedAmp) (Bagatto et al., 2011; 2016) shows normative aided SII range by degree of hearing loss for children birth-6 years old fit to DSL targets. If aided SII values are outside the normative range for a child's hearing loss, the clinician should make further attempts to adjust amplification. These norms are available in a worksheet[12] (Bagatto, 2016), and are sometimes plotted by the hearing aid analyzer, depending on the included software.

Determine and verify maximum power output (MPO) or real ear saturation response (RESR) levels by using prescriptive output targets (i.e. DSLm [i/o] ®), temporarily disabling some features like feedback suppression if needed, and applying probe microphone measures to verify output in the child's real ear. This can be done using RECD and 2cc coupler measures, or MPO measures can be performed in situ with the probe in the child's ear if the signal is not alarming to the child (McCreery & Walker, 2017, p. 88).

Verification of other activated hearing device features (i.e. directional microphones, feedback suppression, frequency lowering, noise reduction) is important to ensure they are working appropriately and do not interfere with audibility of speech (McCreery & Walker, 2017, p. 94). Procedures for advanced feature verification are beyond the scope of this document. Audiologists may wish to check with the manufacturer's user manuals for the specific feature verification options available on their equipment and for more detailed discussion, review Ontario's Protocol for the Provision of Amplification (2023).[11]

Continued observation, re-assessment of the child's hearing levels, and modification of prescriptive amplification settings should be completed at regular intervals as new information becomes available about the child's hearing, new technology, or prescriptive methods. See Follow-up and Monitoring section.

Orientation & Counseling

The initial orientation will likely include information counseling that focuses on insertion and removal as well as how to operate the device controls, how to clean and maintain devices, warranty information, battery size, and safety. Parents/caregivers should practice these skills during the visit following demonstration (Tharpe, Ryan, & Gustafson, 2017). In addition to helping parents feel confident in their skills, it is also important to help them understand their vital role and enlist them as partners in improving the quality and quantity of their child's auditory and linguistic experience (McCreery & Walker, 2017; Tharpe, Ryan, & Gustafson, 2017).

Partnering with parents

Over the course of the continued clinical relationship, counseling should include explanations of the main malleable (or changeable) factors that shape a child's cumulative auditory experience and influence communication development for children who use hearing aids (Moeller, Tomblin, & OCHL Collaboration, 2015; McCreery & Walker, 2017).

Ensuring Audibility for Speech

Audiologists need current data to ensure the quality of the hearing aid fitting and appropriate aided audibility. Parents may need help understanding the importance of returning to the clinic for periodic hearing testing on a planned schedule to ensure that hearing thresholds used to set devices are current, that earmolds are fitting appropriately, and that ear canal acoustics are measured regularly. This is important to maintain the child's consistent auditory

access as the child grows. It is helpful for parents to know that the recommended frequency of visits may change with age or risk factors, and that the clinic may have a system to remind families to follow-up.

Consistency and duration of Hearing Aid Use

Help parents understand that children who wear hearing aids have better outcomes when they wear their hearing aids consistently.

- Help them find appropriate retention options for the devices so they are more likely to keep devices on during family outings and outdoor play.
- Explain data logging and how it can be beneficial to parents, especially when used collaboratively to problem-solve (i.e. if there is a discrepancy between the log and parent's report of hearing aid use) (Munoz, Preston, & Hicken, 2014).
- Recognize the challenges parents face when working toward having the child use amplification during "all waking hours" and be their supportive partner. As they work toward increasing device use time, focus efforts to wear devices during highly communicative periods of time to increase the child's exposure to spoken language (McCreery & Walker, 2017).
- Provide support to increase parent's self-confidence. Parents who are more confident in their ability to manage their child's devices are often able to get their children to wear devices more often. Check in with them about how they are feeling. Help them learn to troubleshoot and teach other caregivers how to manage devices.
    - Connect them to parent-to-parent support (McCreery & Walker, 2017).
    - Make sure families are connected with early intervention (Help Me Grow). For a short video to share with families about early intervention, see Supporting Deaf and Hard of Hearing Children Early.[13]
    - For more information on referrals, see the MDH Guidelines for Audiologist Referral to Early Intervention, Medical Specialties, and Connection to Parent-to-Parent and Family Support.

Quality and quantity of linguistic input

Parents and families provide the first, primary source of communication and linguistic input for their child in the early years of life. In addition to ensuring parents are connected to early intervention, an audiologist's counseling may include ideas for parents to improve the quality of their child's linguistic environment (Ambrose, Walker, Unflat-Berry, Olesen & Moeller, 2015). This might include regular reading with their child, using expansive conversation style (more open-ended questions and less directives/ commands), and making conversational turn-taking easier by reducing other distractions (like background television) (McCreery & Walker, 2017).

Validation of Aided Auditory Progress

The child's own speech and that of others should be audible, comfortable, and clear. Validation is ongoing and accomplished through use of the following:

- Speech, language, and communication assessments obtained during the habilitation process. Parents, audiologists, and early intervention providers should be in regular communication with one another about the

child's progress and any need for amplification fine-tuning. Many children require speech-language services alongside optimized audibility to achieve speech and language levels expected for the child's age (Wiseman et al., 2025).

- Direct measurements of the child's performance in clinical and natural environments may include aided speech perception measures. These could include Ling sounds spoken from various distances, NU-CHIPS, WIPI, PB-K words, or Pediatric Minimum Speech Test Battery[14] (Uhler, Warner-Czyz, Gifford & PMSTB Working Group, 2017) as child becomes older.
- Parent report questionnaires, i.e., for birth to age 2: LittlEARS Auditory Questionnaire (Coninx et al., 2009); for birth to age 3: Infant Toddler Meaningful Auditory Integration Scale (IT-MAIS) (Zimmerman-Phillips & Osberger, 1997); for age 2-7 years: PEACH: Parents' Evaluation of Aural/Oral performance of Children (Ching & Hill, 2007).
- Cortical auditory evoked potentials (CAEPs) can provide information to clinicians and families about how acoustic amplification provides excitation of the auditory pathways for children too young for behavioral methods (Soleimani et al., 2021).

Validation should also include other assistive listening devices used in the child's habilitation (e.g. remote microphone systems).

Follow-up and Monitoring

In addition to more frequent verification, as noted in the Verification of Electroacoustic Characteristics section, periodic audiological re-evaluations are essential. Hearing should be re-evaluated 1 month following initial fitting, at 3-month intervals thereafter for the first three years of amplification, every 6 months from years 3-5, and yearly thereafter (Uhler, Warner-Czyz, Gifford & PMSTB Working Group, 2017). The frequency of follow-up may need to be increased if fluctuation or progression of the hearing loss is noted and/or if progress is not as expected. A similar schedule is important for older children with a new diagnosis since progressive loss is a possibility.

Earmolds should be checked and remade as necessary, often every 2-3 months during periods of rapid growth.

Hearing aid re-checks should include regular coupler and real-ear measures of performance. When a hearing aid needs to be sent for repair, the child should have access to a loaner hearing aid.

Chronic or recurrent middle ear conditions can affect hearing thresholds and the effective use of hearing aids. Periodic immittance testing is recommended in all cases of pediatric amplification, using age appropriate immittance protocols. Close monitoring of aided benefit is warranted. Infants with chronic middle ear conditions (e.g. otitis media with effusion (OME)) should be referred for medical treatment. Modifications to earmold configuration or transition from air conduction to a bone conduction device may also be considerations.

Audiologists and families should communicate at each visit to answer questions regarding care and use of amplification devices. Regular communication is also necessary at each visit to ensure that appropriate referrals continue to be made and that the family is receiving desired services.

Ongoing communication between the clinical audiologist, family, members of the early intervention team, educational audiologist, and the medical home is critical. Clinical audiologists can ask families for a release of information to share information and coordinate care with their early intervention team, and ask families for a specific early intervention contact person. A written care plan/action plan is recommended for optimal communication success. Family support and counseling needs are ongoing. Families benefit from referrals to parent-to-parent support (MN Hands and Voices).

Documenting and Reporting

Minnesota Statute 144.966 (Revisor of Statutes, State of Minnesota, 2019) [15] outlines responsibilities for the Early Hearing Detection and Intervention Program for healthcare providers, the Minnesota Department of

Health, and for the Newborn Hearing Screening Advisory Committee. One requirement includes evaluating program outcomes to increase effectiveness and efficiency. To do this, MDH-EHDI requests reporting of the amplification information related to child outcomes after diagnosis. The report form can be accessed at www.health.state.mn.us/docs/people/childrenyouth/improveehdi/audioreportingform.pdf.

Quality Assurance / Quality Improvement

The Minnesota Newborn Hearing Screening Advisory Committee sets benchmarks and indicators for Minnesota to ensure all infants and children with hearing loss will receive timely and appropriate early intervention services (medical, audiological, and developmental). MDH tracks number and percent of infants with bilateral permanent confirmed hearing loss whose parent(s) chose personal amplification and who were fitted within 1 month of diagnosis.

Similar to tracking screening by 1 month, diagnosis by 3 months and early intervention by 6 months, MDH is charged with tracking this amplification indicator. Audiologists fitting Minnesota children with amplification are asked to report the initial fitting date to MDH so that stakeholders can assess the timeliness from diagnosis to amplification across clinics and geographic regions of Minnesota. Clinics can use this data to work on improving amplification timeliness within their clinic. Stakeholder groups (i.e. state agencies and others) can use this data to identify statewide issues that affect timeliness to amplification for children.

Selected Links

[1] Exploring Communication Opportunities for Children with Hearing Differences: An Overview www.mnlowincidenceprojects.org/documents/ehdi/communicationOpp/ExploringCommOppForChildren_Overview_Dec2020.pdf

[2] Teach Back www.health.mn.gov/docs/people/childrenyouth/improveehdi/teachback.pdf

[3] Speech-Language Pathologist and Audiologist Licensing, Minnesota Department of Health www.health.state.mn.us/facilities/providers/slpa

[4] Minnesota Statute 62Q.675 Hearing Aids. www.revisor.mn.gov/statutes/cite/62Q.675

[5] Hearing aid insurance appeals. https://edocs.dhs.state.mn.us/lfserver/Public/DHS-7915-ENG

[6] Minnesota Department of Human Services: Applying for Medical Assistance. https://mn.gov/dhs/people-we-serve/adults/health-care/health-care-programs/programs-and-services/adults-apply.jsp

[7] Hearing aid financial resources. https://mn.gov/deaf-hard-of-hearing/assistive-technology/hearing-aids/hearing-aid-resources.jsp

[8] Minnesota Department of Human Services- Deaf, DeafBlind and Hard of Hearing Services Division. https://mn.gov/deaf-hard-of-hearing/

[9] State of Minnesota Pediatric Hearing Device Loaner Program. https://hearbank.web.health.state.mn.us/home.xhtml

[10] Knowledge and Implementation in Pediatric Audiology (KIPA) online calculator for unaided SII. https://kipagroup.org/charts

[11] Ontario Infant Hearing Program: Protocol for the Provision of Amplification. https://uwo.scholaris.ca/items/2278f359-d927-43f5-8bb6-c18f5159c397.

[12] Aided Speech Intelligibility Index (SII) Normative Values v1.0, Revision 2, www.uwo.ca/nca/dsl/assets/Aided-SII-Normative-Values_App-A.pdf

[13] Supporting Deaf and Hard of Hearing Children Early (video) https://youtube.com/playlist?list=PLnv1INVkmxmsF8ZHH1N13vHvjqnxEFS17&si=WM-UOHRzWf9uDJfD

[14] Pediatric Minimum Speech Test Battery. https://pubmed.ncbi.nlm.nih.gov/28277214/

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Minnesota Department of Health
Early Hearing Detection and Intervention
Newborn Screening Program
601 Robert St. N
Saint Paul, MN 55115

Children and Youth with Special Health Needs
PO Box 64975
Saint Paul, MN 55164-0975

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