

Identifying Permanent Hearing Loss: Making a *sound* difference in the lives of infants and young children through screening technology



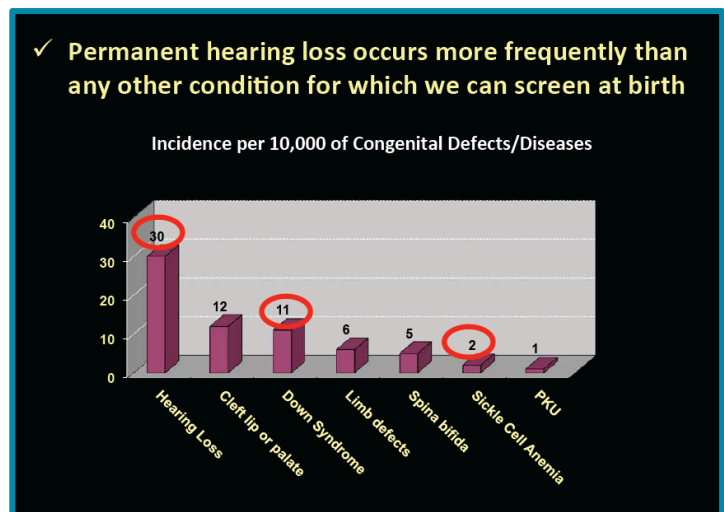
In early education and health care settings across the country, providers routinely engage young children in activities intended to assess and promote language development – completely unaware that some of children they serve have an unidentified hearing loss.

While education and health care providers commonly understand that language development is at the heart of cognitive development, social-emotional progress and school readiness, they often overlook that hearing is at the heart of typical language development and that any child with an unrecognized hearing loss will fall further behind each day. Most providers and parents appreciate the value of newborn screening, but are unaware that hearing loss can occur at any time during the critical language-learning years. In the absence of periodic screening, hearing loss is likely to remain an “invisible condition,” either missed completely, or misdiagnosed, by professionals and parents alike. Despite providers’ commitment to language development and school readiness, one critical element is missing -- they are not screening for hearing loss.

By screening the hearing of young children, we can make a “sound” difference in their lives. Easy-to-use hearing screening technology exists that lay screeners can employ in a variety of settings to identify children who need further audiological assessment and assistance. Children do not need to suffer the negative academic and social consequences that have been historically associated with childhood hearing loss. By incorporating objective, periodic hearing screening into routine service delivery, children who are deaf or hard of hearing can be identified and served so that they can succeed along with their hearing peers.

Background

Permanent hearing loss is the most common birth defect in the United States and most deaf and hard of hearing babies are born to hearing parents who have no expectation they will have a child with a hearing loss. Over the past two decades, screening newborns for hearing loss has become the standard of care with over 95% of infants now being screened at birth. As a result, approximately 1- 3 infants per thousand are being identified with a permanent hearing loss.^{1,2} However, of babies not passing the newborn screen, over 35% may be lost to follow-up before the needed assessment to determine



hearing status can be conducted or documented.² This means that many infants at high risk for hearing loss are likely to remain unidentified, and untreated, for months or years. In addition, illness, injury and genetic factors can cause hearing loss to occur at any time during the early childhood years. It is estimated that the incidence of permanent hearing loss actually doubles between birth and the time children enter school, rising from approximately 3 per thousand at birth to 6 per thousand by school age.^{3,4,5}

Periodic hearing screening benefits all children, heightening parent and professional awareness of the importance of promoting language development through rich auditory experiences. Most importantly, periodic screening, followed by audiologic assessment and early intervention, can dramatically improve options and outcomes for children identified as deaf or hard of hearing. For example, some infants may be fitted with hearing aids by 4 weeks of age. Children who are identified and receive intervention early are more likely to demonstrate language development within the normal range by the time they enter school than those who are not and they require fewer special services throughout their lives. Hence, the benefits of early identification of hearing loss last a lifetime both for the child and for society as a whole.

Hearing Screening Methods

The availability of reliable, objective screening methods means that it is no longer appropriate to rely on subjective methods such as ringing a bell behind a child's head or depending solely on caregivers' perceptions of a child's hearing. While newborn hearing screening results are valid at the time of the screening, they do not necessarily reflect a child's hearing status in the years following that screening. And, although a small number of health care providers do attempt to incorporate objective screening into well-child visits, this is not standard practice, particularly for infants and toddlers. Routine examinations of ears by health care providers should not be mistaken as hearing screening. Fortunately, there are reliable screening methods that service providers can easily integrate into educational and health care settings.

Children 0 - 3 Years of Age. Otoacoustic Emissions (OAE) screening is the most appropriate method for lay screeners to use to identify infants and toddlers who need further audiological assessment. During OAE screening, a small probe is placed in the ear canal that delivers sound stimuli into the auditory system. In a healthy, normally functioning ear, the sound stimuli are transmitted through the middle ear to the inner ear where outer hair cells of the cochlea produce an active response or emission. These emissions are picked up by a microphone in the probe, analyzed by the screening unit, and an automated *pass* or *refer* result is displayed on the unit's screen.



OAE is the recommended method for screening infants and toddlers because it is:

- Accurate & feasible--does not require a behavioral response from the child.
- Quick & easy—most children can be screened in just a minute or two—sometimes in as little as 30 seconds per ear.
- A flexible tool that can be used in a variety of environments, including classroom, home, or health care settings.

Effective in identifying children who may have a mild hearing loss, or a loss in just one ear, as well as those who have a severe, bilateral loss. In addition, it can be helpful in drawing attention to a broader range of hearing-health conditions that may need further medical attention.

Children 3 - 5 Years of Age. Pure tone audiometry (PTA) is the method traditionally recommended for lay screeners to use to identify children three years and older who need further audiological assessment. PTA is performed by placing earphones on a child's ears and presenting a series of sounds to each ear. The child is conditioned to provide a behavioral response, like raising a hand or dropping a block in a bucket, each time a sound is perceived.

PTA screening is recommended for children over three years of age because it:

- Targets the entire auditory system, leading to the identification of a broad range of hearing problems
- Is economical
- Is possible for lay individuals to learn to effectively conduct the screening



It is important to note that while PTA has typically been recommended as the screening method for children over three years of age, it is estimated that at least 25% of children in this age bracket are unable to complete PTA screening because they are developmentally unable to follow directions or reliably provide behavioral responses. In these cases, the OAE method is the recommended hearing screening option. Providers serving children 3 to 5 years of age should therefore have the capacity to provide both OAE and PTA hearing screenings.

Steps for Incorporating Quality Hearing Screening into Service Settings

Developing an effective hearing screening program for infants and young children depends on a variety of key ingredients including:

- Partnering with a pediatric audiologist
- Selecting appropriate equipment and supplies
- Identifying and preparing key participants
- Implementing appropriate screening techniques
- Establishing a hearing screening and follow-up protocol
- Documenting outcomes and tracking follow-up
- Evaluating outcomes

The National Center for Hearing Assessment & Management (NCHAM), Early Childhood Hearing Outreach (ECHO) Initiative

Led by NCHAM at Utah State University, the ECHO Initiative represents a focused effort to establish evidence-based, periodic hearing screening and follow-up for children birth to three years of age. Since 2001, the ECHO Initiative has received funding from the Office of Head Start to update hearing screening practices in Early Head Start programs. Additional support over the past five years from the Maternal and Child Health Bureau has allowed exploratory expansion of these practices to be initiated in a variety of other early care and health settings.



The ECHO Initiative has established model hearing screening and follow-up practices in selected Early Head Start programs in every state and territory. These serve as examples for the hundreds of remaining programs that still need training and assistance in updating their hearing screening methods. To establish evidence-based hearing screening and follow-up practices, the ECHO Initiative provides:

- ❖ Needs assessment & program planning
- ❖ Webinars & podcasts
- ❖ Web-based & on-site workshops
- ❖ Train-the-trainer workshops
- ❖ Online multi-media instructional modules
- ❖ Online screening program resources:
 - Planning tools
 - Access to audiologist mentors
 - Equipment selection information
 - Screening protocols & forms
 - Letters to parents & providers
 - Tracking & follow-up system
 - Resources for identified children

ECHO Initiative staff capacity to lead program improvement efforts includes:

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| ✓ Needs assessment | ✓ Project management |
| ✓ Program planning | ✓ Screening program |
| ✓ Instructional design | resource development |
| ✓ Online learning | ✓ Meeting facilitation |
| ✓ Video production | ✓ Workshops |
| ✓ Website development | ✓ Program evaluation |

Expanding the ECHO

Over 100,000 infants and toddlers in Early Head Start have been screened as a result of this effort. Children identified with permanent hearing loss are being provided with the services they need for language learning and school readiness. The success of the ECHO Initiative in helping diverse, underserved families is a model for what could be undertaken in many early care, education and health care settings, including:

- ❖ All Early Head Start and Head Start programs. All Head Start programs must ensure that every child receives a hearing screening within 45 days of enrollment, but at present, the majority are not using evidence-based practices to meet this requirement. The ECHO Initiative has provided technical assistance and training to many Early Head Start programs, but an estimated half of all programs nationwide remain in need of this training and support. Additionally, thousands of Migrant Head Start, American Indian/Alaska Native Head Start and Regular Head Start programs, serving children 3 to 5 years of age, need core training to ensure that all children receive quality hearing screenings and follow-up.
- ❖ Home Visiting Programs. The Maternal, Infant, and Early Childhood Home Visiting (MIECHV) program supports the improvements in health and development outcomes for at-risk children through evidenced-based home visiting programs. Committed to

promoting language-development, these home visiting programs represent an excellent venue for documenting the hearing status of young children. With appropriate training and support, home visiting programs could help address the nearly 40% of children who are lost to follow-up from newborn hearing screening programs as well as undertaking additional periodic screening efforts.

- ❖ **Early Intervention Programs.** Speech and language delays are the most common developmental delays of the children served by early intervention programs across the country. Unfortunately, many of these children are not being screened for hearing loss. Proceeding with speech and language intervention without adequate information on hearing status contradicts best practice. Objective hearing screening is a vital step in determining whether the observed speech or language delay is related to a hearing loss and in defining appropriate intervention. Educational outreach could be targeted to professionals at both the in-service and pre-service levels.
- ❖ **Health Care Clinics.** Most parents and early childhood educators assume that objective hearing screenings are being provided as a part of well-child visits during the early years of life. It is not uncommon for an ear exam to be misinterpreted as a passing hearing screening. The feasibility and efficacy of incorporating objective hearing screening into well child visits for young children has been documented in recent studies. Private and public health care settings represent a venue for improved follow-up to newborn screening as well as for provision of periodic hearing screening.

Replication is the essence of an “echo” and is the key to extending the Initiative’s activities and benefits to children and families in all of these early childhood settings.

References

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