

Identifying Hearing Loss in Young Children

Technology Replaces the Bell

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How many children in your program may have a hearing loss that you have not yet identified?

The question, “Are there children in my program who have an unidentified hearing loss?” is a sobering one for early childhood education and early intervention providers. Hearing loss is one of the most commonly unidentified and misdiagnosed conditions in early childhood. Approximately 1 out of every 300 children in the United States is born with a permanent hearing loss (White, 1996). About that same number will lose their hearing after birth, and before entering school, because of illness, injury or genetic factors (Bamford et al., 2007; National Institute on Deafness and Other Communication Disorders, 2005). Although newborn hearing screening is successful in identifying many children with hearing loss shortly after birth, of the children who do not pass the newborn screening, almost half cannot be documented as having received the needed follow-up diagnostic or intervention services (Centers for Disease Control and Prevention, 2007). Hearing screening during early childhood is therefore vital for identifying infants lost to follow-up from newborn screening, as well as children with postneonatal hearing loss.

Hearing loss is an “invisible” condition because it is extremely difficult for parents or professionals to recognize. Parents may feel that “something is wrong,” without being able to accurately pinpoint that the child is not responding reliably to sound. One retrospective study found that only 25% of parents of children with significant hearing loss suspected that their child might have a hearing problem (Watkin, Baldwin, & Laoide, 1990). Even more worrisome, less than 10% of parents suspected that their child had such a hearing loss during infancy. Professionals may determine that a child has a speech/language delay or behavioral concern but remain

Abstract

Hearing loss can too easily be misdiagnosed or overlooked by providers serving young children. Parents and professionals may observe a language delay—an “invisible” condition—while failing to identify the underlying cause. Otoacoustic emissions (OAE) hearing screening technology, used extensively with newborns, is becoming an essential tool, relied on by early childhood service providers in identifying young children who need comprehensive audiologic evaluation and intervention. With accurate screening/evaluation practices, hearing loss can be identified and early and appropriate intervention can be initiated without delay.

unaware of the underlying hearing loss and erroneously conclude that speech/language services alone will ameliorate the problem. This is especially true for children who have mild or moderate hearing losses that allow them to respond to loud noises while being unable to hear all parts of speech. Parents, teachers, and doctors too often exclaim regretfully, "How could I have overlooked a hearing loss?" In reality, however, the manifestations of hearing loss are subtle and easily confused with other issues.

This is why it is so important for children to receive objective hearing screening throughout early childhood. Parents, educators, and health care providers cannot rely solely on informal observations of a child's response to sound, noisemakers, or questionnaires. Not even specialists such as speech/language pathologists can reliably identify a hearing loss on the basis of observing a child's behavior. Continued reliance on these outdated, subjective screening methods increases the likelihood that children with hearing loss will remain unidentified, receive inappropriate treatment or no services at all, and, most important, fall even further behind in language development until the hearing loss is identified.

Fortunately, a highly reliable, objective hearing screening method can help to prevent underidentification or misdiagnoses. Otoacoustic emissions (OAE) hearing screening technology, used widely in hospital-based newborn screening programs and validated by professional organizations as an objective and reliable screening method (American Academy of Pediatrics Task Force on Newborn and Infant Hearing, 1999; Joint Committee on Infant Hearing, 2007), is being demonstrated as the most practical method for screening children from birth to 3 years of age (Eiserman et al., 2008). OAE screening has been found to be far more effective than informal behavioral screening using soundmakers (Chan & Leung, 2004). It can be used reliably by nonaudiologists to identify children who may have a permanent hearing loss and need comprehensive medical and audiological evaluation. With proper screening and evaluation, hearing loss can be identified and effective intervention can be initiated for children as young as a few weeks old.

How OAE Screening Works

DURING OAE SCREENING, the screener places a small probe, fitted with an extremely sensitive microphone, into the child's ear canal. The probe delivers a soft sound into the ear. In a healthy ear, the sound is transmitted through the middle ear to the inner ear, where the cochlea responds by producing an emission similar to an "echo." This



OAE screening in a Head Start classroom.

emission is then picked up by the microphone and analyzed by the screening unit, and a "pass" or "refer" result is displayed on the unit's computer screen. Every normal, healthy inner ear produces an emission that can be recorded in this way (Gorga et al., 1997). The total screening process, including documenting the outcomes, typically takes less than 5 minutes per child.

If a child has a structural problem in the middle ear that interferes with hearing, if excess fluid is present in the middle ear (which is often due to ear infection), or if the cochlea itself is not responding to sound, the ear will not pass the screening. Thus, OAE screening can help to identify children who have fluctuating loss associated with ear infection as well as children who have a permanent hearing loss associated with physical abnormalities of the middle or inner ear.

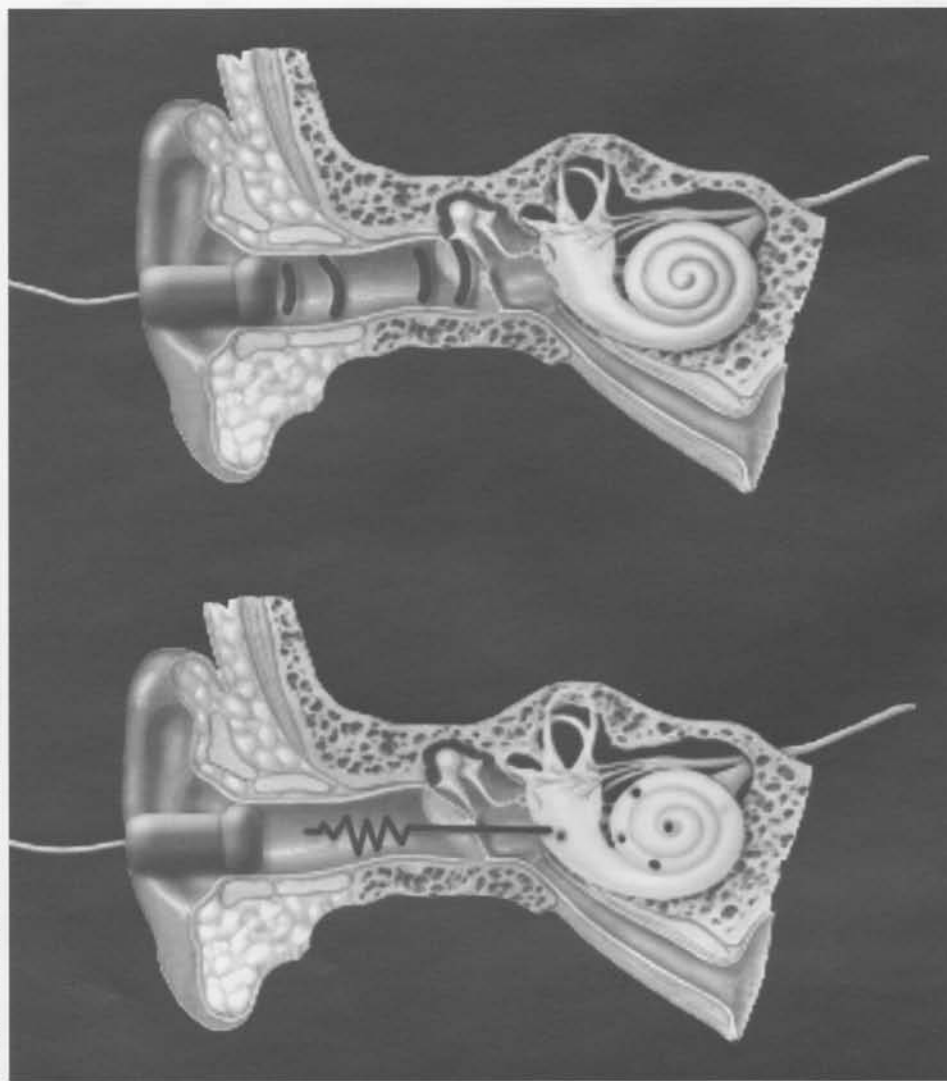
On a practical level, OAE screening is ideal because it can be conducted by nonaudiologists in a variety of natural settings, does not require a behavioral response from the child, is quick and painless, and can help to detect permanent hearing loss and call attention to many other hearing disorders. Audiometry has traditionally been the preferred method for screening older

children who are developmentally mature enough to respond to instruction and provide a consistent behavioral response. There are, however, many children 3–5 years of age who have developmental delays or difficulty following directions and are therefore unable to complete pure-tone audiometric screening. Thus, for a large percentage of preschool children, OAE is the most reliable screening method. As with any type of initial screening or evaluation, children who do not pass the OAE screening must then be referred for appropriate medical and audiological diagnoses and treatment.

Current Hearing Screening Availability

MANY PARENTS AND providers of early childhood education and developmental services assume that quality hearing screenings are conducted by health care providers as a routine part of well-child visits. This is not currently the case, however. Health care providers are able to evaluate a child for middle ear conditions, but most do not have OAE equipment to screen young children for permanent hearing loss. Although the American Academy of Pediatrics's guidelines suggest that children receive

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Graphic representations of a probe sending sound stimuli into the ear canal and picking up the OAE responses generated by the cochlea (inner ear).

an objective hearing screening as newborns and again at 4 years of age, the reality is that most children do not have access to periodic hearing screening until they enter school.

Head Start and Part C and Part B/619 programs are examples of early childhood settings in which children may have access to periodic hearing screening. Head Start requirements state that all children must receive a hearing screening upon enrollment, but the guidelines have not recommended specific methodologies. Although the use of OAE screening is growing steadily in Head Start programs serving children from birth to 3 years of age, far too many providers continue to rely on out-of-date methods such as noisemakers, parent questionnaires, or health care provider observations to satisfy the hearing screening requirement. Similarly, Part C and Part B/619 programs are required to provide evaluations and assessments including those for hearing; however, no guidelines specify how these hearing

screenings/evaluations should be conducted. A recent survey of 155 Part C providers from 17 states revealed that the most commonly used methods were informal observations of the child's response to sounds/noisemakers and family-completed questionnaires. Similarly, of the 175 Part B/619 providers in 11 states who responded, 45% reported using subjective methods with the majority of the children enrolled, (Eiserman, Behl, & Shisler, 2009). Less than 20% of the programs reported that most of their children received a full audiological evaluation, and only a quarter of the programs reported that they used OAE technology as a primary screening/evaluation method.

These results suggest that there is an increasing awareness of the importance of periodic hearing screenings throughout early childhood, but that access to quality screening has been limited. Hence, it is important to identify what types of hearing screenings are available in your community and what role

you may play in ensuring that all children receive quality, periodic hearing screenings throughout their early language-learning years.

Efforts to Expand OAE Screening

IT WOULD BE ideal if every child in early childhood programs and, especially in early intervention programs, could receive a complete audiological evaluation. Unfortunately, this is rarely feasible because of cost and the shortage of audiologists trained to work with young children.

OAE screening has now been incorporated successfully into many Head Start programs. Since 2001, the Office of Head Start has funded initiatives conducted by the National Center for Hearing Assessment and Management (NCHAM) to help Early Head Start, Migrant/Seasonal Head Start, and American Indian/Alaska Native Head Start programs to update their hearing screening practices for children from birth to 3 years of age with OAE technology. As a result, more than 20 states have established Early Childhood Hearing Outreach (ECHO) training teams led or supported by pediatric audiologists and state Early Hearing Detection and Intervention (EHDI) coordinators. Data gathered on screening and follow-up suggest that approximately 2 of every 1,000 children screened in early childhood settings are being identified with a permanent hearing loss and an additional 18 children per 1,000 are being identified and treated for transient conductive hearing loss (Eiserman et al., 2008). The 2009 Survey of Part C and Part B/619 providers indicated that, although OAE screening is not the most common screening method, it is being used by a quarter of the programs surveyed. There is also growing evidence of the efficacy of using OAE screening as a part of well-child visits. In a recent study, 846 children were screened during well-child visits in community health care clinics and 3 were identified with permanent hearing loss (Foust, Eiserman, & Shisler, 2010). Taken together, these data underscore the feasibility and the importance of implementing objective, periodic screening during early childhood.

Getting Started With OAE Screening

NCHAM'S MULTIDISCIPLINARY STAFF has worked for over a decade to help hospitals and states implement and improve universal newborn hearing screening and comprehensive EHDI systems. Since 2001, NCHAM has also partnered with Early Head Start programs in 20 states to implement up-to-date hearing screening practices. Our work in both of these settings has revealed a significant need to assist early

PARTNERING WITH AUDIOLOGISTS

Early childhood education professionals who are updating their hearing screening/assessment practices are strongly encouraged to partner with a local pediatric audiologist who can provide help with training, technical support, and program planning. It is extremely valuable to have a working relationship with a pediatric audiologist in the community who understands the screening protocol, who can promptly evaluate children who are referred, and who can be available to answer questions as they arise. Audiologists can also play a valuable supervisory role in monitoring screening and follow-up activities that significantly contribute to the long-term quality of the screening program.

Program staff and the consulting audiologist can work together to plan and implement the following checklist items:

- 1. Decide on the specific hearing screening and follow-up protocol that meets your program needs (when and how often children will be screened, where children who do not pass the OAE screening will be referred for medical and audiological assessment).
- 2. Select and purchase OAE equipment demonstrated to work effectively for screening young children. Designate where the OAE equipment will be stored and who will be responsible for care, maintenance, ordering supplies, coordinating use, etc.
- 3. Determine how many screeners are needed and provide training.
- 4. Determine how each individual child's screening results, and any subsequent diagnostic or treatment information, can be thoroughly documented in your tracking system. Determine what documentation of outcome results will be provided to parents, health care providers, and audiologists when children are referred from screening and need further evaluation.
- 5. Monitor pass/refer rates, adherence with protocol and timelines, and follow-up on referrals. The audiologist should be prepared to provide additional technical assistance and support when needed.



PHOTO: WILLIAM EISENMAN

Young child being screened with OAE equipment.

intervention providers in improving hearing screening practices so that children with hearing loss are identified early and provided with the supports and services they need.

Each state has an EHDI program that oversees hospital-based newborn hearing screening efforts. The EHDI coordinators work closely with pediatric audiologists and Part C programs in their respective states to ensure that children who do not pass the screening receive diagnostic evaluations and, when needed, are enrolled in early intervention programs. Contacting the EHDI coordinator to find out what assistance might be available and obtaining contact information for local pediatric audiologists within the state is often a valuable place to start. In addition, in some locations, Head Start programs are actively reaching out to pediatric audiologists, early intervention providers, and community clinics to share their hearing screening expertise (see sidebar, Partnering With Audiologists).

Each day, children with unidentified hearing loss attend early childhood education and early intervention programs. To ensure that these children are identified as early as possible so that they can receive timely support and intervention, it is critical that up-to-date methods be used to periodically screen hearing during the critical language-learning years. When complete audiological evaluations are not feasible as a screening

Learn More

Resources to Help You Implement OAE Screening

A variety of resources can be viewed and downloaded from NCHAM's Web site. The following are examples of print materials that are especially useful for providers in early childhood education settings, available at www.infanthearing.org/earlychildhood/hss_resources.html

- **Elements to Consider When Selecting Equipment.** Provides an overview for selecting OAE screening equipment appropriate for use with young children.
- **OAE Screening Protocol.** Provides an overview of a screening and referral protocol used widely in Head Start programs implementing OAE screening.
- **Getting a Hearing Head Start: Updating Early Childhood Hearing Screening Practices Instructional Guide.** To be used with the companion training video to teach early childhood education providers how to conduct OAE screening. (Available in English and Spanish.)
- **Online Tracking and Monitoring Tools.** Provides tools for tracking hearing screening outcomes and computing pass and referral rates for quality monitoring purposes.

Video resources available at www.infanthearing.org/videos/earlychildhood.html#hhs1 to assist early childhood education providers in understanding and getting started with OAE screening include:

- **Getting a Hearing Head Start: Updating Early Childhood Hearing Screening Practices.** A four-part training video instructing early childhood education providers on how to conduct OAE screening. (Available in English and Spanish.)
- **Video Examples of OAE Screening in Early Head Start Settings.** A 3-minute video showing examples of young children being screened with OAE technology in Early Head Start settings

Print and audiovisual training materials designed specifically for providers implementing screening in health care settings are available at www.infanthearing.org/earlychildhood/hcs_resources.html

Contact information for Early Hearing Detection and Intervention (EHDI) programs in each state can be found at www.infanthearing.org/status/cnhs.html

strategy, OAE screening represents the best currently available method for screening young children for hearing loss in a variety of settings. Using resources that have already been developed, you can help children in your community gain access to quality hearing screening and follow-up services. ♣

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The Early Experiences Matter Policy Guide: Good Health

www.zerotothree.org/earlyexperiences

The "Good Health" section of the Early Experiences Policy Guide offers a wealth of policy options and strategies to use in your efforts to affect policy change for infants, toddlers, and their families. *Good Health* is one of five sections in the Guide and each includes mini-policy briefs, practical tools, in-depth policy papers, and more.

What We Can Do to Prevent Childhood Obesity

www.zerotothree.org/health

Offers information on childhood obesity and explains how a foundation for healthy eating is established in the first 3 years. Also outlines strategies parents may use to support healthy weight gain in their children from birth to 3 and beyond.

Parenting Infants and Toddlers Today Webinar

www.zerotothree.org/parentsurvey

Just released, our new national parent survey offers critical insight into the issues facing parents of very young children. Read the detailed report, listen to experts discuss the findings, and explore our resource kit that includes downloadable handouts and more.