

# Hearing Screening in Early Childcare Settings

The potential for enhancing newborn screening follow-up by improving Head Start screening is capturing the attention of early hearing detection and intervention communities nationwide.

by William D. Eiserman, Lenore Shisler, and Terry Foust

**D**oes the following scenario ring a bell? A toddler sits on a caregiver's lap and a small bell is rung behind her head. The toddler's gaze shifts, a "pass" is recorded as the "ear" or "hearing" result, and the parents and early childhood providers assume, "She can hear just fine!"

We might like to think this scenario is only a memory of practices in days gone by. Not so. If toddlers are fortunate enough to receive a hearing screening, it typically employs a subjective method such as bell-ringing, hand-clapping, or parental perception of a child's ability to hear. Many parents erroneously assume that a child's hearing is thoroughly checked as part of well-child visits. In reality health care providers look for middle-ear disorders like otitis media, but are usually unable to screen for permanent hearing loss. Parents who want their child's hearing screened during early language-learning years rarely access that service unless specific concerns warrant an assessment by an audiologist who has expertise in pediatrics.

One of the few places where some young children traditionally obtain an annual hearing screening is in Head Start programs, which serve children from birth to 3 who are economically disadvantaged. Head Start has long recognized that hearing health is central

to language development, educational achievement, and socialization. However, the programs often have employed outdated, subjective methods recommended by local health and educational specialists who are seldom expert in the most appropriate hearing screening methods for children birth to 3 years of age.

## Progress in Periodic Screening

Since 2002 the federal Office of Head Start has funded initiatives carried out by the National Center for Hearing Assessment and Management to update hearing screening practices using otoacoustic emissions (OAE) technology. As a result, 17 states have established Early Childhood Hearing Outreach (ECHO) training teams led or supported by pediatric audiologists. To date these teams have provided preparatory consultation, hands-on training, and follow-up technical assistance to hundreds of Head Start programs. Preliminary data analysis indicates that approximately two of every 1,000 children are identified with a permanent hearing loss and an additional 18 children per 1,000 are identified with transient conductive hearing loss.



Alexis Fullmer listens during her hearing screening in Utah.

photos by Mark Devenup

In addition to identifying children with post-neonatal hearing loss, periodic screening during early childhood can reduce loss to follow-up from newborn hearing screening programs. Data from the Centers for Disease Control and Prevention show that among the 2% of infants referred for follow-up after newborn screening, fewer than 40% had received a diagnostic evaluation. The potential for enhancing newborn screening follow-up by improving Head Start screening is capturing the attention of early hearing detection and intervention communities nationwide.

In the same way that audiologists' roles expanded from performing hearing screenings in nurseries to supervising hospital-based screening programs, speech-language pathologists and other professionals can supervise such programs in early childhood care settings. An expanded set of skills—training screeners, developing programs, and monitoring outcomes—is required for these professionals. A number of program components should be discussed with early childhood care providers to implement a screening program.



## Screening Method Identification

Audiologists must be involved in identifying the most appropriate screening method available for the population being served. Older children who are developmentally mature enough to respond to instruction and to provide a consistent behavioral response should be screened using standard or play audiometry. OAE is an optimal tool for screening infants, toddlers, and other children because it does not require a behavioral response and is painless, portable, and reliable. In addition, nonaudiologists who are skilled at working with children can learn to use the technology effectively.

## Equipment Selection

Audiologists who have used OAE equipment exclusively in nursery or diagnostic settings may be surprised to learn that it can function effectively in educational, home, and health care environments. However, units for use with newborns are not all equally well-designed to screen infants and toddlers in early childhood environments.

It is worthwhile to test the performance of several different models by screening a sample of children in the environment in which the screening will take place. Some equipment distributors lend units so that audiologists can determine what model best meets

their needs. In general, equipment with many “bells and whistles” or advanced diagnostic options that go beyond the basic screening task will not be optimal for lay screeners. Although these options may be attractive to audiologists, advanced features increase the difficulty of screener training. An added risk is that the options may encourage program personnel to go beyond their roles as screeners and interpret results inappropriately. A unit that is simple to use, reliable, and holds up well with repeated use will be the best investment for screening programs (see sidebar above).

## Establishing a Screening Protocol

An effective OAE screening protocol must balance the risk of false positive results and potentially over-referring children for assessment against the need for timely referrals. A multi-step screening protocol (see sidebar online) addresses this concern.

## Selecting Equipment to Check Children's Hearing

Equipment used to check children's hearing should include:

- The capacity to screen quickly and effectively in settings with a modest amount of ambient sound.
- A probe that is well-designed for screening children who are in upright and varying positions and disposable probe covers designed to help the probe stay seated securely in the ear canal. Foam probe covers that compress and conform to the ear canal are typically easier to use than plastic covers. The cost of probe covers should also be considered.
- A probe-to-screening unit cord length of about 50 inches that will allow the unit to be placed on a table or floor.
- User-friendly displays that clearly communicate the screening results and prompt screeners on actions to take if the screening is not proceeding.

A more detailed list of equipment selection criteria can be found at [www.infanthearing.org/earlychildhood/hss\\_gettingstarted.html](http://www.infanthearing.org/earlychildhood/hss_gettingstarted.html).

All children receive an initial OAE screening (OAE 1) of both ears. With this particular age group (0–3), 25%–30% of children may not pass the initial screening on one or both ears.

Children who do not pass the initial screening are screened again (OAE 2) within two weeks. Approximately 30%–40% will not pass the rescreen and will need to be referred to a health care provider for middle-ear evaluation. (This number represents only 8% of the children receiving an initial screening.)

Children who do not pass OAE 2 are evaluated for conditions affecting the outer and middle ear, such as otitis media (a common cause of an OAE referral). Screeners should facilitate referrals quickly so that such conditions can be diagnosed correctly and treated. Screening staff also should communicate with the health care provider about diagnosis and treatment so that after medical clearance, the child receives an OAE rescreening. (Note: If OAE screening is being conducted where health care providers are present, the protocol may be streamlined with a middle-ear evaluation performed immediately upon referral from the OAE 1 screening.)

Children who do not pass the OAE rescreening when the outer and middle ear are clear are referred to an audiologist who specializes in pediatrics for a full diagnostic evaluation. Less than 1% of the total number of children in a program, however, typically require such a referral.

Adherence to the protocol sequence and time frame is critical to program success in identifying children with hearing loss. Program staff will find it helpful to consider the estimates of the number of children requiring each type of follow-up as they plan for screening program implementation.

Although OAE screening will help to identify hearing loss due to outer hair cell dysfunction in the

cochlea, it cannot detect neural dysfunction (originating in the eighth nerve or auditory brainstem pathway). When parents or caregivers express concerns about a child's hearing or language development, screeners should be instructed to refer the child for a complete audiological assessment even if the child passes OAE screening.

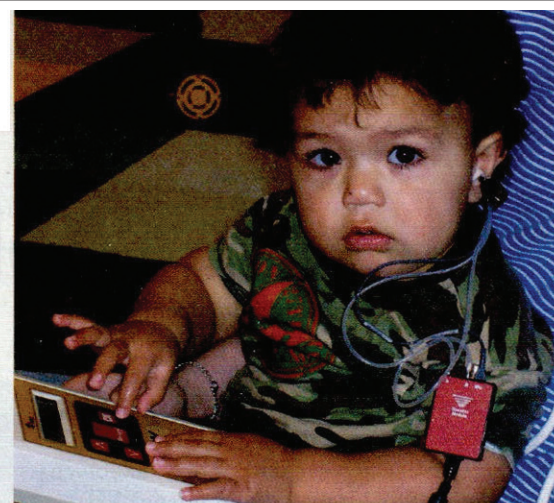
## Who Should Screen?

Once program personnel understand the protocol, they must identify who will be trained as OAE screeners. Anyone who is effective at working with young children can be trained to perform OAE screenings. The Head Start ECHO project included health specialists, nurses, home visitors, and teachers as OAE screeners.

It is a good idea to train more than one screener in a given program, while limiting the number trained because competence increases by screening a large number of children. The number of screeners and pieces of equipment necessary per the number of children depends on protocol elements and staff availability. These factors drive the decision of who to train.

## Tracking and Follow-up

The success of an OAE screening program in identifying children with hearing loss and who need intervention depends heavily on the program's capacity to track and follow up accurately with children who do not pass the initial screening. As an initial



Head Start provides hearing screenings to toddlers such as Christopher Weeks in Utah.

part of program planning, it is helpful to ask staff to determine how screening results will be documented and accessed to ensure timely and appropriate follow-up. Go through the protocol with program staff as they describe how children with each outcome will be tracked and who will be responsible for follow-up actions.

## Training

It is essential that a pediatric audiologist be involved in training and mentoring screeners as they gain screening skills. Training materials used in the Head Start ECHO project, including a training video and manual, are effective in conveying essential information to screeners ([http://infanthearing.org/earlychildhood/hss\\_resources.html#im](http://infanthearing.org/earlychildhood/hss_resources.html#im)).



Basic information to cover during the training includes:


- Purpose of OAE screening
- Overview of screener's roles and responsibilities
- Introduction to OAE equipment and how it works
- Use of a screening and follow-up protocol
- Equipment care and maintenance

Perhaps the most important training element is supervised, hands-on experience screening children. After being introduced to key concepts, learners should break into small groups and become comfortable with the equipment by screening one another in preparation for supervised screening of children. It is important that enough experienced screeners be available so the instructor-to-learner ratio is approximately 1:4 and that each group of learners has a screening unit.

It can be beneficial for screeners to gain initial experience screening children who are around 3 years old (because they tend to cooperate more readily), rather than to work sequentially with younger infants and toddlers, who can be more challenging to screen. It also is very helpful to teach screeners to work in teams, with one person playfully distracting the child while the other places the probe in the child's ear and conducts the screening. Each screener should have the opportunity to screen several children in this support-

## State and Local Resources

It is helpful to connect staff from early childhood hearing screening programs with the state newborn hearing screening system, which can help with screening program activities ([www.infanthearing.org/states/index.html](http://www.infanthearing.org/states/index.html)). These resources can be especially valuable when children are identified with hearing loss and families need to access resources and support.

The future holds great potential for identifying young children with hearing loss in a variety of venues so they can receive needed services at the earliest possible time. We hope the information and resources provided above are helpful and will "ring a bell" when opportunities arise to help early childhood programs undertake periodic hearing screening. 

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References and additional resources for this article can be found at *The Leader Online*. Search on the title of the article.



## Tips for Monitoring Hearing Program Quality

Several methods can help program staff monitor the quality of their hearing screening program:

- **Monitor screening skills.** Experienced peers or supervisors can observe screeners to ensure they are using appropriate techniques.
- **Monitor pass, refer, and can't test rates for the OAE 1.** Initial pass rates should be approximately 75%. Pass rates may be slightly lower with new screeners but should improve over time. Referral rates may be expected to increase during cold and flu season.
- **Monitor adherence to the screening and follow-up protocol.** The more closely programs comply with the sequence and the timing of steps recommended in the screening and follow-up protocol, the more effective they will be in identifying children with hearing-health needs. Monitoring should include the sequence (i.e., are the steps for rescreening and referral occurring in the recommended order?) and timing (i.e., are the steps for rescreening and referral occurring within the recommended timeframe?) of screening and follow-up activities.

Additional resources, such as an OAE Screening Skills Acquisition Checklist and Monitoring for Program Quality, can be found at [http://infanthearing.org/earlychildhood/hss\\_resources.html](http://infanthearing.org/earlychildhood/hss_resources.html).

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