

Frequently Asked Questions about Otoacoustic Emissions (OAE) Hearing Screening for Children Birth to Three Years of Age



Otoacoustic Emissions (OAE) screening is an appropriate hearing screening tool for children birth to three years of age that can be used in a variety of health and education settings.

Q: What is the incidence of permanent hearing loss in young children?

A: In the U.S., it is estimated that about 1 – 3 babies per thousand are born with a permanent hearing loss. Approximately that same number will lose their hearing before they enter school due to illness, accident or genetic factors.

Q: How can children 0 – 3 years of age be screened for hearing loss?

A: Otoacoustic Emissions (OAE) hearing screening is conducted with a portable unit connected to a small earphone or “probe.” Placed in the child’s ear, the probe delivers a series of quiet sounds that travel through the ear canal and the small bones in the middle ear to reach the inner ear (cochlea). A cochlea that is functioning normally responds to sound by sending a signal to the brain, while also producing an “acoustic emission” – a very small sound wave response -- that travels back through the ear. The emission is picked up by a tiny, sensitive microphone inside the probe, the response is analyzed by the screening unit, and in about 30 seconds the result is summarized on the screen as a “pass” or a “refer.” The OAE screening can be conducted in classroom, home or health care settings. It can even be done while a child is playing quietly or sleeping. If a child does not pass the OAE screening, then further evaluation by a health care provider or audiologist is needed to determine the cause of the problem and the appropriate intervention.

Q: Are audiologists the only ones who can do OAE screening?

A: No, the equipment is designed so that any professional who is skilled and comfortable working with children can be trained to conduct the screening. It is best, however, when a screening program can partner with a local pediatric audiologist who can help with the training and answer questions as they arise.

Q: What part of the hearing system is screened by OAE equipment?

A: When the pathway through the ear is clear, the OAE response is a reliable indicator that the inner ear (cochlea) is functioning normally. If the equipment does not pick up a sufficient cochlear response, the ear will not pass the screening. If blockage or fluid in the hearing pathway impedes the sound going to the cochlea or the response coming back out, the ear will not pass the screening. Thus, OAE screening is designed primarily to identify children whose cochlear function may be permanently impaired, but it will also help identify children who may have a temporary hearing loss due to otitis media (middle ear infection) or excessive wax buildup in the ear canal. When a child doesn’t pass, further professional evaluation is required to determine the source of the problem and possible treatment.

Q: Can OAE screening be used when children have Pressure Equalization (PE) tubes?

A: Yes, if the PE tube is free from blockage or fluid, and the child’s inner ear is functioning normally, the child can pass the OAE screening. If a child with PE tubes refers from

screening, further professional evaluation is needed to determine whether the tube is clear and functioning properly.

Q: Do health care providers screen young children’s hearing during well-child visits?

A: No, health care providers typically check for middle ear problems (using otoscopy or tympanometry) but they rarely have the OAE equipment needed to conduct objective hearing screening with young children. Most children in the U.S. receive a hearing screening at birth, but the majority are not screened again until they enter school. This means that many children with hearing loss remain undiagnosed during the critical, language-learning years. Although not currently standard practice, some health care providers are beginning to recognize the value of conducting OAE screening during well child visits. Procedure and Diagnosis codes for billing/reimbursement are in place to support OAE screening.

Q: What are the Early and Periodic Screening, Diagnostic and Treatment Services (EPSDT) requirements for hearing screening?

A: EPSDT specifies the reasonable standards of medical practice deemed acceptable by recognized medical organizations. Many states use the American Academy of Pediatrics/Bright Futures periodicity schedule that specifies objective hearing screenings at birth and 4 years of age with additional risk assessments (subjective screening) at intervals such as 2, 4, 6, 9 months, etc. Subjective screening methods are typically not as effective as objective screenings in identifying hearing loss for very young children. Because the incidence of hearing loss nearly doubles between birth and school age, conducting annual (or more frequent) objective OAE hearing screenings from birth to three years of age, along with prompt follow-up, greatly increases the likelihood that a loss will be identified at the earliest possible time. Early identification leads to improved linguistic, cognitive and social-emotional outcomes for children.

Q: What does the OAE equipment cost and which works best with young children?

A: On the average, a portable OAE unit costs between \$3,400 and \$4,000. In addition, the disposable probe covers, at least one per child, range from about 20 cents to a dollar each. Equipment calibration is usually done each year costing \$200 or less. More expensive equipment is likely to include features that are useful to audiologists, but these features are rarely worth the added cost when the unit will be used primarily by lay screeners.

Not all OAE equipment works well with young children in natural environments. Some OAE equipment that can be used successfully with newborns in hospital settings does not work well with young who children are upright and wiggling! A set of selection criteria is available on kidshearing.org, to help providers assess various aspects of equipment functionality. There is also a bulletin board (kidshearing.org/oaereviews) where early childhood education and health care providers can post comments and reviews of equipment they have used and benefit from others’ experiences and insights. Having a pediatric audiologist partner to assist with equipment selection is also extremely helpful.

Q: How can early childhood education programs find funding to purchase OAE equipment?

A: The Office of Head Start encourages grantees to include the cost of OAE equipment in their budgets. Some grantees and other early childhood program personnel have also sought funding successfully from service and charitable organizations. A mini-grant template can be downloaded from kidshearing.org that programs can modify and use to request funds from a variety of sources outside of the Office of Head Start.

Q: How can early childhood education and health care providers receive training to implement OAE hearing screening?

A: Establishing a relationship with a pediatric audiologist partner is important because it provides a mechanism to receive high-quality screener training. The free, multi-media training materials developed by the Early Childhood Hearing Outreach (ECHO) Initiative, available at www.KidsHearing.org, can be used for self-instruction, but training is enhanced significantly when a pediatric audiologist uses the ECHO materials to train screeners and provide hands-on supervision. Be aware that equipment vendors can typically teach screeners how to operate equipment, but they are rarely skilled in working with young children or knowledgeable about establishing a screening program, appropriate follow-up for children who don't pass the screening.

Q: What roles do ENTs and audiologists play in diagnosing/treating hearing problems?

A: A child's health care provider may make a referral to an **Ear, Nose and Throat (ENT) Specialist** (sometimes called an otolaryngologist or otorhinolaryngologist) to resolve a chronic ear infection or a structural problem in the hearing pathway. ENTs are medical doctors who can provide specialized treatment in the medical aspects of hearing problems (e.g., middle ear infections, surgery, etc.) One of the most common surgical procedures that ENTs perform on young children is the placement of Pressure Equalization (PE) tubes in the eardrum (tympanic membrane) that help to clear fluid from behind the middle ear. **Most ENTs do not have the equipment needed** to perform OAE screening or assess a child's hearing status.

Pediatric audiologists are professionals who have the skills and tools to assess a child's hearing. Pediatric audiologists can perform OAE screening as well as other kinds of hearing assessments that are appropriate for children of different ages. **They can assess hearing and diagnose conditions that cause hearing loss**, but they cannot prescribe medication or perform surgery.