

Testing a Child's Hearing

How/when a child should be tested depends on a number of factors including genetic predisposition for hearing impairment and whether the child has been exposed to certain risk factors. As a child gets older, if they are not making progress in learning to speak or if they are not achieving developmental milestones, a hearing test is often recommended. Depending on the age/abilities of the child, different types of assessments are used to gain information about hearing and possible hearing loss.

Testing a baby (0-10 months of age)

It is standard practice that a child will receive a newborn hearing screening before leaving the hospital or birthing center. Children born at home are also mandated to obtain a newborn hearing screening. It is critical that the baby's hearing loss is diagnosed before three months of age and that intervention begins before the baby is six months of age. The most common screening method, obtained while the baby is asleep, is the Brainstem Auditory Evoked Response test. A baby who does not pass the screening test should be re-screened to confirm results and then receive a diagnostic evaluation in order to determine if hearing loss is present.

- A **Brainstem Auditory Evoked Response (BAER)** test uses electrodes placed at several locations on the baby's head and a small insert earphone is placed into the baby's ear, which delivers sounds. Analysis of the activity in the brainstem reveals the thresholds of hearing.
- Newborns could also receive an **Otoacoustic Emission test (OAE)**, in which a tiny microphone is placed in the baby's ear. Sounds are transmitted into the ear, and the sounds that are emitted by the cochlea are recorded in the ear canal. This test requires the baby to sit/sleep quietly.

Testing an infant (10 months to 2 years of age)

In addition to the above mentioned tests, a hearing test of the infant may include:

- **Sound field testing** with visual reinforcement exposes the infant to a variety of sounds through loudspeakers. The infant is conditioned to turn toward a sound source. When responding, the infant is "rewarded" through an entertaining visual image or toy. Attempts will also be made to obtain this type of testing using insert earphones that fit in the ear or headphones which allow for **ear-specific assessment**. The infant needs to be awake and cooperative for this test.
- **Tympanometry** involves the placement of a small plug in the ear and small amounts of pressure are introduced to the ear. This assessment allows us to determine if the middle ear is functioning as expected. While the infant can be awake, they must sit quietly in order for this assessment to be done.

Testing a toddler (2 to 3 years old)

When evaluating the hearing of a toddler, the following test may also be used, in addition to those described above:

- **Conditioned play audiometry (CPA)** is a headphone/insert earphone test used on toddlers mature enough to perform this type of testing. The test is often made into a game and the toddler is asked to do something with a toy (e.g., place a peg in a bucket) every time a sound is heard. The test relies on the active participation of the toddler.

Testing an older child (4 years and older)

Beginning at four years of age, children are routinely screened at their pediatrician's office using a set schedule that was created by Bright Futures and the American Academy of Pediatrics. They recommend, in the absence of concerns regarding hearing or speech/language development, that children undergo routine hearing screens at birth-2 months of age, at ages 4, 5, 6, 8, 10, once between 11 and 14, once between 15 and 17, and once between 18-21 years of age. For typically developing children, and most other children who are verbal, hearing screenings are fairly straightforward and easily performed as a primary care office procedure. Children who do not pass or cannot perform this assessment are referred for additional testing by an audiologist. The audiologist might use any of the previously described tests to obtain a diagnostic evaluation of hearing.

What are the recommendations for a child who cannot complete a behavioral hearing assessment in the office OR by an audiologist?

For children with developmental issues, particularly those who are non-verbal, hearing assessments can be far more complicated and these children might not be able to complete the behavioral tests used by audiologists. In this case, the only option is to obtain a BAER test while the child is under sedation or anesthesia. The Bright Futures hearing testing criteria allow for variations in the recommendations based upon individual circumstances. Representatives from primary care and specialty providers in the Rady network, Otolaryngology, Developmental-Behavioral Pediatrics, the Autism Discovery Institute and the Department of Audiology collaborated to create guidelines that recommend NOT re-assessing children if the child meets the following criteria:

- Is non-verbal due to developmental issues, or otherwise unable to cooperate with routine hearing screening
- Is age three years and over
- Has had a previously normal audiology evaluation (typically a prior BAER)
- Had no new hearing-related concerns reported by parents, teachers or providers

Should the parent/primary care provider suspect that hearing has changed or that the child might be able to successfully complete an evaluation by an audiologist, a recommendation can be made for reassessment.

What are signs that hearing might have changed in an older child?

While not all children are verbal or able to demonstrate a change in hearing in the ways listed below, these are some common signs that can indicate that hearing may have changed:

- The child seems to hear fine some of the time and then not respond at other times
- The child wants the TV volume louder than other members of the family
- The child says "What?" more often
- The child moves one ear forward when listening, or complains they can only hear out of their "good ear"
- Teachers note that they do not seem to hear or respond as well in the classroom as other children
- The child says or acts like they didn't hear you. This often looks like the child is not paying attention
- The child starts to speak/make sounds more loudly than previously
- The child is better at following visual cues than auditory information
- The parent has a "feeling" something has changed