



JCIH 2019 Position Statement Frequently Asked Questions

◀ Audiology ▶

Q: The new risk factor table seems to recommend diagnostic audiology follow-up for all risk factors. If a baby has passed AABR, is re-screening with OAEs for the risk factor follow-up appropriate? Can the committee expand on this topic and the rationale for diagnostic testing?

A: For follow up due to risk factors, JCIH is recommending a comprehensive diagnostic audiologic evaluation including, tympanometry, OAE, acoustic reflexes and behavioral testing as the gold standard for hearing assessment when developmentally appropriate. Continued use of OAE alone for monitoring hearing is insufficient for assessing children with mild hearing loss.

Q: When should a sedated ABR be done?

A: In keeping with the 1-3-6 (or 1-2-3) EHDI goals, audiologic diagnosis should be completed no later than 2–3 months of age. This earlier age facilitates the diagnostic process as infants are more likely to sleep for prolonged periods of time required to complete all measures. In children with special health needs, delay in diagnosis of hearing loss may be unavoidable due to attention paid to other health/ time-urgent diagnostic and treatment procedures; however, every effort should be made to minimize the delays. When possible, audiologists can evaluate infants in the NICU, pediatric intensive care unit, or in conjunction with examinations or procedures conducted with general anesthesia or sedation. (p.11)

Electrophysiological testing (ABR) with sedation or anesthesia, when not medically contraindicated, is indicated if: 1. conventional/behavioral testing does not provide consistent, reliable, and valid information using the cross-check principle and/or results are inconsistent with parent/caregiver observations, and 2. electrophysiologic testing cannot be completed during natural sleep and 3. results of ABR evaluation will influence the treatment or management of the child.

Q: When middle ear fluid is found during the diagnostic assessment, how soon should an ABR re-assessment be completed?

A: Diagnostic assessment should be completed before 3 months of age. The presence of middle ear fluid should not delay diagnostic assessments. Testing includes bone-conducted stimuli when air-conducted thresholds are elevated to rule out underlying sensory loss and facilitate intervention recommendations. When middle ear fluid is present and bone-conduction testing indicates permanent sensorineural hearing loss, hearing aid fitting, CI candidacy evaluation if indicated, and/or enrollment in early intervention should not be delayed.

As stated on page 15 "management of middle-ear fluid in the infant should be coordinated by the infant's pediatrician/primary-care provider and/or a pediatric otologist, with the audiologist's input, and in conjunction with the family's preferences." Ongoing audiologic monitoring should be completed following resolution of middle ear fluid.

Q: Why does the position statement recommend that very preterm babies in the NICU for an extended time have a diagnostic evaluation before discharge?

A: For an infant in the NICU whose duration of stay would impact the attainment of the 1-3-6 benchmarks, a diagnostic ABR is recommended to meet the 3-month diagnostic benchmark. This is best practice for babies to meet milestones.

Q: In the 2007 position statement it recommends at least one ABR be completed as part of the complete diagnostic evaluation for children younger than 3 for confirmation of a permanent hearing loss. But this is not included in the 2019 position statement. Is this no longer recommended? For example, if you have a 2 ½ year old who can complete ear-specific, behavioral testing that is reliable and valid, would you need to recommend an ABR to confirm?

A: If you cannot get ear specific responses at any age, then an ABR is recommended to obtain ear specific thresholds. If you have the ear specific information with a comprehensive test battery approach, you do not need to do the ABR. The rationale for this change involved two considerations:

- The recommendation to do an ABR on every child was primarily based on detecting auditory neuropathy spectrum disorder. Since 2007, there has been an increasing recognition from the literature that ANSD is relatively rare.
- Most children over 6 months of age will require sedation or anesthesia to have an ABR. There has been an increasing recognition since 2007 that anesthesia is expensive and has associated risks.

Q: What tests need to be included in a diagnostic ABR? If the test is reliable, is a confirmation ABR needed before moving ahead with intervention steps?

A: A complete diagnostic audiology evaluation should include a battery of physiologic tests that define type, degree, and configuration of hearing thresholds for each ear. Key components of a diagnostic audiologic evaluation are noted specifically on page 12. "Auditory brainstem response is the gold standard test for threshold estimation for infants and children who cannot complete behavioral audiologic assessment. ABR provides ear- and frequency-specific threshold estimates that are necessary for the diagnosis of the type, degree, and configuration of hearing loss and provision of amplification."(p.11)

- Frequency-specific (toneburst) stimuli are used to elicit neural responses that enable determination of thresholds and form the foundation for determining hearing aid amplification characteristics. Thresholds for both air-conducted and bone-conducted stimuli are measured to determine type (i.e., conductive, sensorineural, mixed) of hearing loss. Bone conduction thresholds are necessary to estimate additional hearing aid gain and output if there is a conductive component. (p.12) Click stimulus should be included in the ABR to assess for neural (ANS) hearing loss when indicated.
- Confirmatory testing is not indicated to move forward with intervention recommendations if test results are reliable.

Q: What if my hospital or clinic does not have the equipment to complete a diagnostic ABR, or does not have a pediatric audiologist who can perform diagnostic ABR?

A: If your facility does not have the equipment for a diagnostic ABR, we recommend using this document to advocate for diagnostic equipment and pediatric audiologist in your clinic and/or refer the baby to a facility where the equipment **and** pediatric audiologist are available.

Q: Regarding preterm infants with prolonged hospitalization and diagnostic evaluation prior to discharge: In determining justification for diagnostic evaluation, I had an audiologist ask about corrected age vs. chronological age. They mentioned maturation of the brain, etc. How is this determined? For example, I recommended a diagnostic evaluation on a prolong stay NICU baby who was 3 months old, but the audiologist said they look at that baby as 39 weeks, so the baby was screened.

A: JCIH (2019) recommends that for very preterm infants with prolonged hospitalization, a diagnostic audiologic evaluation occur prior to discharge from the NICU. Diagnostic audiologic evaluation may include physiologic testing and/or behavioral testing. Behavioral testing should only be included if developmentally appropriate. The rationale for diagnostic evaluation rather than screening is based on the presence of multiple risk factors which place a child at higher risk for hearing loss.

Q: I was looking for justification on using the 1000Hz acoustic reflex on infants up to 9 months as it is referenced on page 14 of the 2019 JCIH Position Statement. However, when I look at the referenced article (de Lyra-Silva et al 2015) I am not seeing a clear reference to this in infants up to 9 months in this article, as the subjects were 1-3 days old. It does mention other studies, but again for repeatability of the acoustic reflex from days 1-4. Could you add some clarity to justify using this 1kHz acoustic reflex for up to 9 months as opposed to 6 months, as I just did not see that in the article referenced within the JCIH 2019 document.

A: The preferred probe tone frequency for tympanometry is determined by the reactance of the middle ear system. A low frequency probe tone is well-suited to determine the compliance of systems dominated by stiffness (e.g., Mazlan, et al., 2007). A stiffness dominated middle ear is expected in children older than 6-9 months of age. A high frequency probe tone is needed to determine compliance in systems dominated by mass. Infants younger than 6 months of age are likely to have a mass-dominated middle ear (e.g., Swanepoel et al., 2007). Results from studies comparing 226Hz to 1000Hz tympanometry have varied regarding the specific age to transition from 1000Hz to 226Hz. The recommendation to extend the use of 1000hz probe tone to 9 months of age was done in effort to encompass this range. The 2019 position statement cites Hoffman et al. in support of the 9-month of age criterion.

Hofmann, M., Luts, H., Poelmans, H., & Wouters J. (2012). Investigation of a significant increase in referrals during neonatal hearing screening: A comparison of Natus ALGO Portable and ALGO 3i. *International Journal of Audiology*, 51(1), 54–57.

Mazlan, R., Kei, J., Hickson, L., Stapleton, C., Grant, S., Lim, S., Gavranich, J., & Linning, R. (2007). High frequency immittance findings: newborn versus six-week-old infants, *Int. J. Audiol.*, 46 (11), pp. 711-717.

Swanepoel, DW., Werner, S., Hugo, R., Louw, B., Owen, R., & Swanepoel, A. (2007). High frequency immittance for neonates: a normative study, *Acta Otolaryngol.*, 127, pp. 49-56.

Shahnaz, N. (2007). Multi-frequency tympanometry and evidence-based practice, *American speech-language pathology and audiology (ASHA) perspectives on hearing and hearing disorders, Research and Diagnosis*, 1, pp. 2-12.

Q: A question has come up in my region about the risk factor monitoring for a baby with NICU stay greater than 5 days. When they have a NICU baby who does not pass the inpatient newborn testing (AABR), they are being referred to an audiologist for outpatient diagnostic testing. If the infant passes the outpatient diagnostic testing, does this evaluation "count" as their f/u before 9 months of age as recommended in the risk factor guidelines?

The concerns here are that 1) Baby at this state may be very young still--sometimes less than 30 days of age depending on the NICU stay 2) Baby would not be receiving behavioral testing, just ABR. In this scenario where the baby passes the outpatient diagnostic, should they still be referred for a comprehensive diagnostic evaluation around 9 months of age (considering they have a risk factor of NICU stay greater than 5 days)?

A: The diagnostic assessment following the newborn screening does not constitute the follow-up by 9 months of age. The diagnostic assessment following the newborn screening is done as part of the initial identification process. The follow-up by 9 months of age when risk factors are present would occur after this initial diagnostic evaluation to ensure ongoing surveillance. Infants who were in the NICU and received their diagnostic assessment prior to 9 months corrected age still need to return for a follow-up for ongoing surveillance. Additional on-going follow-up for surveillance are warranted depending on risk factors, as well as auditory development and speech/language development. JCIH supports interim re-evaluation on an individualized basis after the initial newborn hearing screen through childhood.