

North Carolina Pediatric Diagnostic Audiology Protocol Birth to 36 Months of Age (revised 9/2017)

When should a diagnostic audiological evaluation be performed?

Infants should be referred for diagnostic audiological evaluation following a “refer” result on two hearing screenings (i.e. initial newborn hearing screening and one follow-up re-screening), which should occur before the age of 1 month. The diagnostic audiological evaluation should be completed by the age of 3 months.

Who should complete the diagnostic audiological evaluation?

The diagnostic audiological evaluation should be completed by a *pediatric* audiologist. A pediatric audiologist is trained, has the technical expertise, and desire to work with the infant population. The pediatric audiologist is well-versed in developmentally appropriate test techniques, general child development, and parent counseling.

In the absence of a specialized certification for pediatric audiology, practitioners are expected to follow their professional code of ethics regarding their capability to provide such services. *If the practitioner does not have the expertise and equipment to follow these guidelines, the infant and family should be referred to a professional equipped for and qualified in infant audiology assessment.*

Audiologists who provide the audiologic assessment must hold a current license in Audiology issued by the North Carolina Board of Examiners for Speech and Language Pathologists and Audiologists.

Where should the diagnostic audiological evaluation be provided?

The diagnostic audiological evaluation should be completed in an audiology setting where audiologic and otologic (ENT) services are well coordinated. Sedation or anesthesia may be required to complete the diagnostic audiological evaluation.

When sedation (or anesthesia) is required, the evaluation should take place in a setting with appropriate medical support. It may be possible to conduct the diagnostic audiological evaluation in conjunction with other procedures where the child will be sedated (i.e. surgery, CT scan, MRI, etc.).

What should be included in the diagnostic audiological evaluation?

The following components should be included in the diagnostic audiological evaluation when hearing loss is suspected: (1) case history, (2) otoscopy, (3) otoacoustic emissions, (4) acoustic immittance, (5) auditory brainstem response, and (6) behavioral audiometry. All of these components should be included as each assesses the function of different portions of the auditory system. It is important to evaluate function of the entire auditory system as part of a diagnostic audiological evaluation and to obtain ear specific information as early as possible. Each component is outlined further below.

I. Case History

- A. Medical history
- B. Developmental history
- C. Family history
- D. Parent/Caregiver perception of child’s auditory response
- E. Informal observation by audiologist
 - 1. Physical stature
 - 2. Physical features
 - 3. Facial appearance
 - 4. Eye contact

5. Vocalizations
6. Responsiveness to parents/caregiver/environmental sounds
7. Age appropriate developmental behaviors

II. Otoscopic Inspection

- A. Outer ear
- B. Ear canal
- C. Tympanic membrane

III. Test Battery- obtain ear specific information as early as possible

- A. Otoacoustic emissions (OAE)
 1. Distortion Product OAE; or
 2. Transient OAE
 - B. Middle ear function tests (should be completed using high frequency probe tone {1000 Hz} for infants 6 months and younger)
 1. Acoustic immittance
 2. Middle ear muscle reflex
 - C. Auditory brainstem response (ABR) – sedation should ONLY be used in settings with appropriate medical care
 1. Click ABR
 2. Frequency-specific ABR (may include auditory steady-state response)
 - a. Low-frequency toneburst (250 Hz or 500 Hz)
 - b. Mid-frequency toneburst (2000 Hz or 3000 Hz)
 - c. Other frequencies as time allows (1000, 2000, 4000, 8000 Hz)
 3. Bone conduction ABR
 - D. Behavioral Audiometry (based on child's developmental, not chronological, age)
 1. < 6 months developmental age: Observe behavioral response to sound (not appropriate for estimation of hearing thresholds)
 2. 6-12 months developmental age: visual reinforcement audiometry (VRA)
- (NOTE: Behavioral testing at this young age may not be successful. It can add additional information to the auditory profile and, if the parent(s) are in the sound suite during testing, may assist in counseling as they can observe "first hand" the response/lack of response from their child to objective stimuli.

IV. Counseling

- A. Informational (i.e. review test results, next steps, etc.)
- B. Supportive
- C. Genetic (referral may be appropriate)
- D. Emotional/Social (refer to appropriate professional if needed)

V. Medical referral (when indicated)

- A. Ear Nose and Throat Specialist (i.e. medical clearance for amplification, indication of middle ear pathology or other medically treatable otologic condition, etc.)
- B. Pediatric Neurology
- C. Ophthalmology
- D. Cardiology
- E. Genetics

VI. Other referrals- When a permanent hearing loss is diagnosed, the diagnosing audiologist should have the family sign the NC Permission For Referral Form (accept or decline) which is available on the state website at www.ncnewbornhearing.org in both English and Spanish.

- A. Birth-3 years
 - a. Beginnings for Parents of Children Who are Deaf/Hard of Hearing
 - b. Infant Toddler Program (Part C Lead Agency)
 - c. EDIS (Must live on a Military Base)
 - d. Early Learning Sensory Support Program – Hearing Impaired

B. 3 years to 21 years

- a) Beginnings for Parents of Children Who Are Deaf/Hard of Hearing
- b) Local Education Agency (Public Schools)
- c) Schools for the Deaf

What are the state-mandated reporting requirements?

All persons performing diagnostic auditory tests shall identify the child and report the outcome of the diagnostic process to the North Carolina State Laboratory for Public Health within 5 days following each evaluation date and the date of any missed scheduled appointments for such evaluations.

History Note: Authority G.S. 130A-125; 10A NCAC 43F.1204

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