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IV. Recommended Protocol for Infant Audiologic Assessment

The following protocol was developed to facilitate the diagnosis of hearing loss, medical clearance for amplification, and use of amplification for infants with hearing loss by three months of age. An audiologist should have the necessary equipment (ABR with bone conduction and tone bursts, OAE, high frequency tympanometry) and be experienced in the assessment of infants. Infants should obtain a diagnostic assessment after a failed/referred (that is, an abnormal) newborn hearing screen. A hearing screen is considered failed when one or both ears do not pass the hospital screen or outpatient re-screen.

Within the first two months of life, the procedures outlined below in Step I and Step II, should be completed on all infants referred from the screening process. Use the Newborn Audiological Assessment Checklist found in Appendix 1 to assure that all recommended follow-up activities have been completed. The activities outlined in Step III, for children with confirmed hearing loss, should occur by three months of age.

STEP I: Initial Audiologic Consultation

- Obtain an Auditory Brainstem Response (ABR):
    - Obtain a 70 or 75 dB nHL response to click stimulus to assess the latency and morphology of waves III, V, I-III, III-V, I-V, and I.
    - Obtain a 30 or 35 dB nHL response to click stimulus to assess latency and morphology of wave V.
- Obtain Evoked Otoacoustic Emissions (OAEs):
    - Transient Evoked Otoacoustic Emissions (TEOAEs) and/or
    - Distortion Product Otoacoustic Emissions (DPOAEs).
- Interpret the results and discuss the results and follow-up recommendations with parents:

- For infants who pass both ABR and OAEs (***robust responses at 3 or more frequencies)***, parents should receive information about hearing, speech, and language milestones and information regarding risk indicators for progressive hearing loss. Parents should be instructed that, if questions about their child's hearing or speech and language development arise at any point, their child should receive an age-appropriate audiologic assessment.

- Infants who pass ABR but who do not pass OAEs may have external and/or middle ear pathology and should be referred to a physician experienced in evaluating external and middle ear function in infants. A repeat audiologic assessment should be completed after this evaluation. The assessment should occur by three months of age and should include repeat OAEs.

- Infants who pass OAEs but who do not pass ABR should continue with the recommended assessments outlined in Step II below.

- Infants who fail both OAEs and ABR in one or both ears should continue with the recommended assessments as outlined in Step II.

STEP II: Audiologic Diagnostic Assessment

A complete assessment should be obtained **bilaterally** even when an infant only fails/refers **unilaterally.**

- Diagnostic ABR assessment:

  - Obtain a threshold search to a click ABR in 10 dB steps; responses should be assessed to 90-95 dB nHL if responses are not observed at softer levels.

  - If a neural response is not identified, compare responses obtained to rarefaction and condensation clicks presented at 80 to 90 dB nHL using a fast click rate (>30 per second). If a response (e.g., cochlear microphonic) is observed, an auditory neuropathy should be suspected.

  - Obtain a threshold response to a tone burst ABR or Auditory Steady State Response (ASSR) for at least 500Hz and 2000 or 3000Hz.

  - Obtain a bone conduction click ABR if conductive hearing loss is suspected.

- Perform an otoscopic evaluation.

- Obtain acoustic immittance measures using a high frequency probe tone stimulus.

- Obtain an evoked otoacoustic emission (TEOAE and/or DPOAE) to further evaluate cochlear function.

- Perform behavioral observation audiometry (BOA) to a speech stimulus and/or a 500 and 2000 Hz tone or noise, by air conduction and bone conduction. Identify any minimal responses and attempt to obtain startle responses.

- Discuss the results and follow-up recommendations with the parents.

- Prepare a written report interpreting test results and describing the diagnostic profile.

- If hearing loss is confirmed, recommend referral to an otolaryngologist for evaluation and clearance for amplification.

- Have the parents complete an informed consent form.

- Disseminate written report and recommendations to the parents, the infant's primary care physician, and other care providers and agencies as requested by the parents.

- Complete the Audiological Assessment reporting form (provided in Appendix 2) as completely and accurately as possible and return to the Colorado Department of Public Health and Environment, Health Care Program for Children with Special Needs (HCP). (HCP's address is provided at the end of this section.) This form should be **resubmitted** whenever a change in demographic or audiologic information is made.

STEP III: The following activities should be completed by three months of age for infants with confirmed hearing loss.

All infants with confirmed hearing loss should be followed audiologically **every three months through age 2** and then **every six months through age 5** or until hearing is stable.

- Review results of the diagnostic audiologic assessment, implications of the audiologic diagnosis, and recommendations for intervention with the parents including:

    - Amplification options including hearing aids, cochlear implants and FM systems.

    - Information regarding the importance of early intervention and communication strategies.

    - Information regarding the need for medical follow-up.

    - The availability and importance of parent-to-parent support (e.g., Colorado Families for Hands & Voices) and deaf/hard of hearing role models.

    - Information and referral for funding assistance, if necessary.

- *The Colorado Resource Guide for Families of Children Who are Deaf/Hard of Hearing* (available from Colorado Families for Hands & Voices, www.handsandvoices.org).

- Initiate the amplification process, if appropriate (given parental choice and medical considerations) after medical clearance for amplification has been obtained. See Guideline V: Recommended Guidelines for Pediatric Amplification.

- Discuss additional specialty evaluations (e.g., genetics, ophthalmology, and child development) with the parents and the infant's primary care physician as appropriate.

- Referral to the Regional Colorado Hearing Resource (CO-Hear) Coordinator for entry into the local Part C system and for specific information regarding intervention options and resources. **Note that Part C requires this referral to occur within 48 hours of the diagnosis!** This referral is for all infants with hearing loss, including those with unilateral hearing loss. For further information, see Guideline VI: Recommended Guidelines for Referral to Early Intervention.

- Complete the Audiological Assessment reporting form (provided in Appendix 2) and send it to the Colorado Department of Public Health and Environment, Health Care Program for Children with Special Needs (HCP):

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