



Newborn Hearing Screening Protocols for Hospitals and Birthing Centers

Hospital and Birthing Center Newborn Hearing Screening programs should be under the direction of a medical provider (pediatrician, otolaryngologist, neonatologist) and in consultation with nursing/midwifery, discharge planning, audiology and laboratory services responsible for metabolic/genetic blood spot screening. It is not required to employ an on staff audiologist for this program.

A. Screening Equipment:

1. Definitions for physiologic hearing screening equipment:
 - ABR – Auditory Brainstem Response. An objective hearing measurement tool utilizing surface electrodes and clicks or transients as stimuli that provides a stable and repeatable response.
 - OAE – Evoked Otoacoustic Emissions. An objective hearing measurement tool utilizing ear probes that measure/record low intensity sounds produced in the ear canal.
2. Hospitals or birthing centers should screen newborn hearing using at least one of the following physiological hearing screening methods:
 - Auditory Brainstem Response (ABR, AABR, BEAR, ABEAR), **OR**
 - Evoked Otoacoustic Emissions (EOAE, OAE, TEOAE, DPOA), **OR**
 - Combination of both methods (ABR-OAE).
3. Screening equipment should be monitored on a regular and scheduled routine per vendor and hospital recommendations to maintain accurate and results.

B. Screening Personnel (Screener) Requirements:

1. Screeners should be trained by individuals with experience in newborn hearing screening techniques and practice. Training should be competency based and involve hands-on components. Screeners may include audiologists, registered nurses, or other trained technical staff. Staff should meet facility employment requirements.
2. Screeners should have adequate skills in soothing and calming newborns.
3. Screeners should be trained in sensitive but thorough communication of testing procedures to parents and caretakers as well as how to handle parent questions.
4. A method for regularly monitoring and assessing screeners' performance should be established.
5. A plan should be established for the initial and periodic training of screeners.

6. A plan should be established for the supervision of screeners. Tools such as a competency checklist and job plan should be considered.
7. Contracting for Screening:
 - a. The facility may choose to contract for hearing screening activities with a private otolaryngology or audiology practice.
 - b. The facility may choose to contract with an agency or practice that specializes in newborn hearing screening.

C. Screening Environment:

1. Care should be taken to select a testing environment that minimizes noise and confusion in the screening area. Screening will be faster and more effective if you test in a quiet and controlled environment.
2. Ideally, a space should be set aside to use for screening
 - a. Close to the nursery
 - b. Available during screening times
 - c. Curtains
 - d. Acoustic dividers
 - e. After nursing/feeding
3. Mother's room
 - a. Turn off television/radio
 - b. Ask family members to be quiet or leave room
4. Nursery
 - a. Test away from other babies
5. Intensive Care Nursery
 - a. Wait until the infant is in a crib
 - b. Perform as close to hospital discharge time or day as possible
 - c. Consider performing after 34 weeks gestational age

D. Screening Procedure

1. Screen both ears of all infants. The goal of universal newborn hearing programs is to screen at least 95% of the hospital births.
2. Two-Step Method of Screening - Hospital based: For the purposes of this protocol, a two step screening means that the newborn may receive up to 2 hearing screenings conducted at separate intervals prior to discharge from the hospital if time allows.

The second screen is only conducted on infants that did not pass the first screen. Record as "Refer" if infant does not pass the second screen.

- a. Screen ABR/ABR
 - I. Screen with ABR (pass)
 - II. Screen with ABR (not pass); perform a second ABR screen

- b. Screen OAE/OAE
 - I. Screen OAE (pass)
 - II. Screen OAE (not pass); perform second OAE screen
 - c. Screen OAE/ABR
 - I. Screen OAE (pass)
 - II. Screen OAE (not pass); perform second screen with ABR
3. If a newborn does not pass a screen:
 - a. Initial screen: 2 attempts may be conducted on each ear before considered a refer
 - b. Second screen: 2 attempts may be conducted on each ear before considered a refer
 - c. Maximum: **Do Not** screen more than 3 times in each ear at either the initial or second screen
 - d. Refer to the hearing screening equipment vendors instruction manual for particular recommendations for screening.
 - e. Report results to mother/parent /guardian (see section H Communication with Parents and Families)
 4. Time of Testing:
 - a. Testing should be completed as close to discharge as possible
 - b. If possible, testing should not be attempted prior to 12 hours of life; it is preferable to screen between 24-72 hours of life.
 - c. Complete the initial screen for newborns discharged prior to 12 hours of age at time of discharge: if passing results not obtained, baby should return as outpatient within 2-3 weeks for second screen.
 - d. C-section babies: wait at least 24 hours for first attempt to allow ear canal debris to clear
 - e. False positive rate decreases after 12-24 hours after birth.
 - f. False positive rate decreases overtime during the first 4 days of life when using OAE.
 - g. If baby **does not pass first screen**: 1) If second step is OAE, wait 12 hours before second screen. 2) If second step is ABR, wait several hours before second screen.
 - h. Test time per baby may vary from 3-6 minutes dependent upon type of equipment and cooperation of the newborn.
 5. Test Refused: Parents may refuse to have a hearing screening conducted on the newborn. Provide information on outpatient hearing screening options to consider (see section H Communication with Parents and Families)
 6. Test Not Done: Develop a plan to determine newborns that have not been screened prior to discharge (no screener available or missed). Develop a plan to notify the parent or caregiver of the need and the location to obtain an out-patient hearing screen.
 7. Outpatient Hearing Screening: Some hospitals may choose to have infants return to the birth facility for further screening and/or diagnostic testing. Develop a plan for outpatient screening if indicated.

E. Referrals

When the infant does not pass the hearing screening prior to discharge:

1. Notify the parent/caregiver in person and in writing.
 - a. To contact their medical provider/medical home regarding follow-up evaluation with an audiologist as soon as possible.
 - b. Provide information on where and when to obtain a re-screen or audiologic diagnostic assessment by an audiologist.
 - c. Provide written information in regard to follow-up assistance available through the Tennessee Early Intervention System (TEIS) Child Find*.
 - d. Advise the parent/family that they may receive a letter from the Department of Health Newborn Hearing Screening program to remind them of the need for further hearing testing.
 - e. Invite the parent to ask questions.
2. Notify physician/medical home in writing. The physician may:
 - a. Encourage the parent/family to obtain follow-up as soon as possible (prior to one month for screen: prior to three months for diagnostic evaluation).
 - b. Provide a medical examination.
 - c. Determine high risk for hearing loss.
 - d. Provide information on the potential of late onset of hearing loss.
 - e. Provide information on developmental milestones in regard to the identification of late onset hearing loss.
 - f. Provide information on where and when to obtain a re-screen or audiologic diagnostic assessment by an audiologist.
 - g. Provide information on where and when to obtain a genetic assessment.
 - h. Provide information in regard to follow-up assistance available through by the Tennessee Early Intervention System (TEIS) Child Find* or for enrollment due to an identified risk of developmental delay*.
3. The facility may notify TEIS Child Find* directly of infants that need further testing or early intervention services. 1-800-852-7157
4. Report to Department of Health on blood spot form or other designated forms.

*Child Find is the process that identifies, locates, and evaluates children to determine the need for early intervention. Child Find is a mandated component of Part C of the Individuals with Disabilities Act (IDEA) 1990 to guarantee that all families receive necessary information concerning early intervention in a timely manner. In Tennessee, providers should refer any child birth to age 3, who is suspected to have a delay or condition likely to result development delay, to the Department of Education, Part C, Tennessee Early Intervention System (TEIS), within 48 hours of identification. 1-800-8527157.

F. Protection of Infants' and Families' Rights

1. Informed Consent

- a. Obtain informed consent to conduct hearing screening and to release results of all hearing screenings to the Department of Health; consent to release information to the Tennessee Early intervention System (TEIS) to comply with IDEA Child Find Regulations. It is recommended that this be incorporated into the birthing facility's current "consent to treat" for other newborn services.
- b. It is recommended that hearing screening be included in the admitting provider's standing orders for newborns.
- c. A separate parent/caregiver informed release may be indicated to release results of all newborn hearing screening to the Department of Health if not incorporated in the "consent to screen" statement as indicated in F.1.a.
- d. Obtain parent/caregiver informed consent to release demographic and hearing screening results to TEIS.
- e. Tennessee Department of Education Early Intervention System (TEIS) is to be notified of all infants that do not pass the hearing screen.
 - I. The State NHS screening program will notify TEIS of all infants reported that DID NOT PASS the hearing screening.
 - II. The hospital or birthing facility may contact TEIS directly for assistance in locating families for follow-up.
 - III. The physician or medical home provider may contact TEIS directly for assistance in locating families for follow-up.

2. Parental Objection

- a. A parent may object to having the newborn hearing screening. (Hearing screening is not mandated in TN)
- b. Obtain a signed written statement from the parent or caregiver when a hearing screening is refused.
- c. Record "refused" in the hearing screening section of the Metabolic/Genetic blood spot lab slip.
- d. Provide the parent with information on where outpatient hearing screening is available.
- e. Assure parents that they may refuse to "release" the information and still have the hearing screening conducted.

3. Confidentiality

- a. To assure the hospital or birthing facility meets the standards of the Health Insurance Portability and Accountability Act (HIPAA) of 1996.

4. Access to Interpreter/Translation Services

- a. To assure the hospital or birthing facility meets the standards of Title VI of the Department of Health and Human Services, Civil Rights Act of 1964 that prohibits discrimination based on race, color, and national origin by federal fund recipients.
- b. Title VI as it pertains to individuals with limited English proficiency or deafness and the need to provide access to interpreter and/or translation services.

G. Documentation and Reporting

1. The hospital or birthing facility will need to develop documentation procedures in accordance with hospital policy.
2. Hearing screening equipment may have a computerized reporting, documentation and tracking system. The equipment vendor will assist the hospital or birthing facility in development of a reporting system that is compatible with in-house policy.
3. Hearing screening results should be documented in the client's medical record by implementing **one or more** of the following options:
 - a. The printed hearing screening results generated by the screening equipment.
 - b. A copy of the blood spot slip with hearing results (tear out form)
 - c. A copy of the "Hearing Screening Only" lab form (tear out form).
 - d. Enter the hearing screening results in the appropriate table, checklist, care plan or progress notes as determined by hospital policy.
4. The nursery or section that performs the hearing screen should develop a method to track the number of individual hearing screenings:
 - a. Completed
 - b. Missed
 - c. Referred
 - d. Refused

H. Communication with Parents and Families:

1. Hearing screen results (pass and refer) should be reported to the parent or guardian in written and oral form prior to discharge. Results are to be provided by the screener, nurse, midwife, audiologist or other health professional.
2. If passing results obtained, parent or guardian should be informed of high risk factors for progressive and/or late onset hearing loss the need for periodic re-testing.
 - a. Infants identified at birth with a high risk for hearing loss should have it documented in the client chart and on the State reporting form.
 - b. Parents should be provided materials on developmental milestones that may alert them of a potential hearing loss.
3. If a newborn does not pass the screen, parent or guardian shall be informed of resources available to them for further testing and treatment.
 - a. Summarize for parent/family with a simple "Contact your baby's doctor and take your baby to an audiologist for a hearing test as soon as possible. No baby is too young for testing."
 - b. Hospital or birthing facility may provide the infant a return appointment to the facility for further testing **OR**,
 - c. Hospital or birthing facility may refer the infant to the medical home provider for further testing **OR**,
 - d. Parent or guardian shall be given list a list of facilities which provide diagnostic testing **OR**,
 - e. Parent or guardian shall be made aware of the role of TEIS to assist them or their medical home provider in locating or accessing diagnostic, follow-up and early intervention services. The local or 1-800 phone number of the TEIS office should be provided.

4. A medical evaluation (physician/medical home provider, otolaryngologist) is to be recommended. The parent or guardian should be provided with information regarding access to services.
5. A genetic evaluation may be recommended by the infant's physician/medical home provider (otolaryngologist). The parent or guardian should be provided with information regarding access to services by the provider.

I. Determination of Infants at Risk for Hearing Loss

The Joint Commission on Infant Hearing (JCIH) modified the risk indicators for hearing loss in the JCIH Position Statement of 2000. If an infant passes a hearing screen, but is considered to be at risk for progressive hearing loss, follow up audiologic testing is recommended. Please see list below for risk factors:

1. Neonates - Birth through age 28 days

These indicators are to be used where universal hearing screening is not yet available.

- a. An illness or condition** requiring admission of 48 hours or greater to a NICU (Cone-Wesson et al., 2000; Fortnum and Davis, 1997).
- b. Stigmata or other findings associated with a syndrome known to include a sensorineural and or conductive hearing loss (Cone-Wesson et al., 2000).
- c. Family history of permanent childhood sensorineural hearing loss (Cone-Wesson et al., 2000; Fortnum and Davis, 1997).
- d. Craniofacial anomalies, including those morphological abnormalities of the pinna and ear canal (Cone-Wesson et al., 2000; Fortnum and Davis, 1997).
- e. In-utero infection such as cytomegalovirus, herpes, toxoplasmosis, or rubella (Demmler, 1991; Littman et al., 1995; Williamson, Demmler, Percy, & Catlin, 1992).

**Such as a condition that may require long term medications associated with hearing loss (ototoxic medications such as gentamicin, loop diuretics, vancomycin).

2. Neonates or Infants - 29 days through 2 years.

These indicators place an infant at risk for progressive or delayed-onset sensorineural hearing loss and/or conductive hearing loss.

Any infant with these risk indicators who has passed the birth screen should receive audiologic monitoring every six months until age three years.

- a. Parental or caregiver concern regarding hearing, speech, language, and or developmental delay.
- b. Family history of permanent childhood hearing loss (Gundfast, 1996)
- c. Stigmata or other findings associated with a syndrome known to include a sensorineural or conductive hearing loss or Eustachian tube dysfunction.
- d. Postnatal infections associated with sensorineural hearing loss including bacterial meningitis (Ozdamar, Kraus, & Stein, 1983).
- e. In-utero infections such as cytomegalovirus, herpes, rubella, syphilis, and toxoplasmosis.
- f. Neonatal indicators – specifically hyperbilirubinemia at a serum level requiring exchange transfusion, persistent pulmonary hypertension of the newborn associated with mechanical

ventilation, and conditions requiring the use of extracorporeal membrane oxygenation (ECMO) (Roizen, 1999).

- g. Syndromes associated with progressive hearing loss such as neurofibromatosis, osteopetrosis, and Usher Syndrome.
- h. Neurodegenerative disorders, such as Hunter Syndrome, or sensory motor neuropathies, such as Friedreich's Ataxia and Charcot-Marie-Tooth Syndrome.
- i. Head trauma
- j. Recurrent or persistent otitis media with effusion for at least 3 months (Stool et al., 1994).

Notes:

The presence of all late-onset risk indicators should be determined in the medical home during early well-baby visits.

Infants with significant late-onset risk factors should be carefully monitored for normal communication and developmental milestones during routine medical care.

Please see "Communication to Parents" section in regard to 1) information to parents on potential progressive (late onset) hearing loss 2) developmental milestones 3) procedures when further testing is recommended.

J. Quality Assurance:

Benchmarks and Quality Indicators for Birth Admission Screening.

1. Recommended by Joint Committee on Infant Hearing (JCIH)

- a. Within 6 months of initiation of a hearing screening program the hospital or birthing center will screen a minimum of 95% of infants during their birth admission or before one month of age.

Quality Indicators:

- 1) Percentage of infants screened during the birth admission
- 2) Percentage of infants screened before one month of age
- 3) Percentage of infants who do not pass the birth admission screen
- 4) Percentage of families who refuse hearing screening on birth admission

- b. The referral rate for audiological and medical evaluation following the screening process (in-hospital and or outpatient follow-up screening) should be 4% or less within one year or less of program initiation.

Quality Indicators:

- 1) Percentage of infants who do not pass the birth admission screen who return for follow-up services (either outpatient screening and/or audio-logic and medical evaluation)
 - 2) Percentage of infants who do not pass the birth admission/outpatient screen(s) who are referred for audio-logic and medical evaluation
- c. The hospital or birthing facility will document efforts to obtain follow-up on a minimum of 95% of infants who do not pass the hearing screen. This may be accomplished by

reporting all hearing screenings to the State Newborn Hearing Screening program and the Tennessee Early Intervention System on the blood spot or other designated form.

Quality Indicators:

- 1) Percentage of infants screened during the birth admission
- 2) Percentage of infants screened before one month of age
- 3) Percentage of infants who do not pass the birth admission screen
- 4) Percentage of infants who do not pass the birth admission screen who return for follow-up services (either outpatient screening and/or audiologic and medical evaluation)
- 5) Percentage of infants who do not pass the birth admission/outpatient screen(s) who are referred for audio-logic and medical evaluation
- 6) Percentage of hospitals and birthing facilities reporting on appropriate forms.

2. Recommended by the Tennessee Department of Health (TDH).

a. Procedures should be in place to ensure that screening results are reported to the health department in a timely manner.

Quality Indicators:

- 1) Documentation procedures as directed by the facility quality assurance system.
- 2) Percentage of infants hearing screens reported on the blood spot or other appropriate form to the TDH Neometrics system as compared to the number of metabolic/genetic screens submitted by the facility. The NHS program will provide reports the facility on a quarterly basis.
- 3) Percentage of infants hearing screens referred for further screening to monitor referral rates. The NHS program will provide reports to the facility on a quarterly basis.
- 4) Measures should be taken to ensure periodic monitoring of equipment calibration as well as establishment of a back up plan for screening in case of equipment failure.