HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Neonatal Intensive Care Unit (NICU)		
Document:	Departmental Policy and Procedure		
Title:	Newborn Screening for Hearing		
Applies To:	All NICU Staff		
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1. PURPOSE:

1.1 To ensure that all infants delivered at Maternity and Children hospital or admitted to the neonatology department receive hearing screening before hospital discharge.

1.2 To identify infants at risk for hearing loss who need further testing and follow up.

1.3 To provide procedural guidelines for newborn hearing screening.

2. DEFINITIONS:

2.1 Definition of hearing loss:

2.1.1 **Mild**: The quietest sounds that can be heard with the better ear are between 20 and 40 dB. People who suffer from mild hearing loss have some difficulties keeping up with conversations, especially in noisy surroundings.

2.1.2 **Moderate**: The quietest sounds heard by people with their better ear are between 40 and 70 dB. They have difficulty keeping up with conversations when not using hearing aid.

2.1.3 **Severe**: The quietest sounds heard by the better ear are between 70 and 95 dB. People who suffer from severe hearing loss will benefit from powerful hearing aids, but often they rely heavily on lip reading even when they are using hearing aids. Some also use sign language.

2.2 The joint Committee on Infant Hearing defines the targeted hearing loss for universal newborn hearing screening programs as permanent bilateral or unilateral, sensory or conductive hearing loss, or neural hearing loss in infants admitted to NICU, averaging 30 -40 decibel (dB) or more (moderate to severe hearing loss) in the frequency region important for speech recognition (approximately 500- 4000 Hz).

2.3 The device currently used detects auditory brainstem responses (ABR). It delivers click sounds at 35 or 40 dB-NHL ("normal hearing level" scale) to the baby's ears through ear phones. It does not identify some infants with mild forms of hearing loss (< 30 dB). Thus, all infants regardless of newborn screening result should receive ongoing monitoring for development of age appropriate auditory behaviours and communication skills.

2.4 Automated Auditory Brainstem Responses (AABR) measurements are obtained from surface electrodes that record neural activity generated in the cochlea auditory nerve, and brainstem in response to acoustic stimuli delivered via an earphone. AABR measurements reflect the status of the peripheral auditory system, the eighth nerve and the brainstem auditory pathway.

2.5 The test may be affected by outer or middle ear dysfunction. Consequently, transient conditions of the outer or middle ear dysfunction may result in a "failed" screening result in the presence of normal cochlear and/or neural function.

2.6 This non-invasive test does not rely on behavioural response so it can be done even when infant is sound asleep during the test.

3. POLICY:

3.1 Neonates delivered at MCH and neonates admitted to the neonatology department units will have hearing screening before discharge.

3.2 Hearing screening should be performed as close to discharge as possible, preferably 24 hours or more after birth, but the screening can be performed sooner if needed i.e. mothers discharged before 24 hours of age.

3.3 Neonates corrected gestational age should be > 34 weeks at the time of testing.

3.4 The method used is Automated Auditory Brainstem Responses (AABR).

3.5 Nurses trained on the hearing screening procedure will perform the test and follow manufacturer's recommendations for the device used.

3.6 Both ears should be screened and rescreened if "pass" results are not obtained i.e. on rescreening, screen both ears even if only one ear failed the initial screening.

3.7 For the test to be considered a "pass", BOTH ears must pass on the same screen.

3.8 If the result of the first screen is "Refer", repeat the screening twice. If the result of the third screening is again "refer", then infant must be given referral to otolaryngologist, audiologist and the on duty neonatology consultant outpatient clinic.

- 3.8.1 Both ears should be assessed, even if only one ear failed the initial screening.
- 3.8.2 Assessment must be finished before three months of age.
- 3.8.3 Infants with confirmed hearing loss should receive appropriate intervention at no later than 6 months of age.

3.9 Assigned physician will inform the parents about results of screening, risk factors for hearing loss, normal language development, resources for more information as needed, explain the condition of "refer" cases, and informs families about the importance and method of follow up.

3.10 Assigned physicians and nurses shall be knowledgeable about the risk factors for hearing loss which includes:

- 3.10.1 Family history of permanent childhood sensorineural hearing loss.
- 3.10.2 Mechanical ventilation lasting 5 days or longer, persistent pulmonary hypertension associated with mechanical ventilation.
- 3.10.3 In utero infections such as cytomegalovirus (CMV), herpes, rubella, syphilis and toxoplasmosis.
- 3.10.4 Culture positive postnatal infections associated with sensori-neural hearing loss including bacterial and viral (especially herpes and varicella) meningitis.
- 3.10.5 Autotoxic medications used for more than 5 days e.g. Gentamycin, Tobramycin or Furosemide.
- 3.10.6 Hyperbilirubinemia that reaches / requires exchange transfusion.
- 3.10.7 Birth weight less than 1500 grams.
- 3.10.8 Severe birth asphyxia.
- 3.10.9 Craniofacial anomalies, including those that involve the pinna, ear canal, ear tags, ear pits, and temporal bone abnormalities.
- 3.10.10 Syndromes known to include sensorineural or conductive hearing loss or Eustachian tube dysfunction e.g. osteoporosis, neurofibromatosis, Alport, Waardenburg syndromes.

3.11 Infants who pass the hearing test but has any of the risk factors listed above, parents will be informed and they should be given appointment referred to ENT/audiology.

3.12 For re-admissions in the first month of life when there are conditions associated with potential hearing loss e.g. hyperbilirubinemia that requires exchange transfusion, culture positive sepsis, then a repeat hearing screening is recommended before discharge.

3.13 Documentation:

- 3.13.1 Hearing screening and its results will be documented in the patient's medical record, hearing screening log book and MOH database.
- 3.13.2 Any referral made in the patient's medical record.
- 3.13.3 Education given to parents/family in the patients' medical record.

3.14 The concerned unit head/charge nurse will supervise the process of hearing screening.

4. PROCEDURE:

4.1 Hearing screening will be done for infants admitted to neonatology units and hospital delivered infants in the postnatal and post-caesarean wards before discharge.

4.2 Hearing screening is performed in a quiet environment. The infant should be sleeping or in a relaxed calm state e.g. after a recent feeding. Place infant in a cot or under the infant resuscitator and swaddle him/her.

4.3 Staff nurse performing the hearing screening will receive training in use of the equipment and follow manufacturer's recommendations for the device in current use.

4.4 The staff nurse performing hearing screening will:

4.4.1 Receive the infant from the nurse assigned to the healthy baby unit with him/her medical record and return the baby back to the healthy baby unit after finishing the screening.

4.4.2 Double matching identification of the infant's ID bracelets with the medical record of the baby is done by both nurses before taking the baby and on returning him/her to the healthy baby unit.

4.4.3 The nurse performing the hearing screening should not receive any baby from his mother's room and should not return any baby directly to his/her mother.

4.5 Identify the patient with two hospital identifiers (four names for Saudi/ complete name for Non-Saudi and medical record number).

4.6 If the infant does not pass the first screen:

4.6.1 Check that electrodes are secure, positioning of the ear couplers or probe is correct, electrodes are oriented away from the top of the baby's head, and wires are not crossed.

4.6.2 Rescreen both ears even if only one ear failed the initial screening i.e. if the initial result is "refer' on one or both ears: Repeat screening for both ears.

4.6.3 Screen no more than two times in the same setting, with both ears tested each time. Excessive rescreening increases the likelihood of obtaining a pass result by chance alone.

4.6.4 Each screen should be considered an independent measure and results should not be aggregated or combined with another result. Both ears must pass a single screen to be considered an overall pass result.

4.6.5 Infants who do not pass the initial hearing screening should repeat screening twice:

4.6.5.1 If possible, repeat the screening in another setting before the infant goes home. If again "refer" give appointment for repeating the screening at MCH within 1-3 weeks.

4.6.5.2 If not possible to repeat the screening before discharge, give appointment for performing the second screening within 1-2 weeks. If again "Refer", then an appointment should be arranged for the third screening after another one to two weeks.

4.7 For infants who do not pass the third AABR screening:

4.7.1 The assigned physician will carefully explain the results of abnormal screening and the importance and methods of follow up to parent.

4.7.2 Refer patient who fail the third screening to otolaryngologist and audiologist for appropriate audiological and medical evaluation to confirm the presence of hearing loss no later than three months of age.

4.7.3 Both ears should be evaluated, even if only one ear failed the initial screening.

4.7.4 Infants with confirmed hearing loss should receive appropriate intervention at no later than 6 months of age.

4.7.5 Babies with confirmed hearing loss should also have their vision assessed by an ophthalmologist.

4.8 Assigned physician will screen infants for risk factors associated with permanent congenital, delayed onset or progressive hearing loss e.g. those listed in policy. Identified infants will require audiologic monitoring:

4.8.1 Every infant with one or more risk factors should have ongoing developmentally appropriate hearing screening and referred for at least 1 diagnostic audiology assessment by 24 to 30 months of age even if they pass the neonatal hearing screening.

4.8.2 The timing and number of hearing re-evaluations for children with risk factors will be individualized depending on the relative likelihood of a subsequent delayed onset hearing loss e.g. earlier and more frequent assessment for infants with CMV, meningitis, family history of hearing loss.

4.9 Assigned neonatology consultant will follow NICU graduates in the hospital outpatient department. Developmental milestones including those of communication and language are regularly assessed. Infants who demonstrate delayed auditory and or communication skills are referred for audiologic assessment even if he/she passed the newborn hearing screening.

4.10 Documentation:

4.10.1 The assigned physician will document the following in the patient's medical record:

4.10.1.1 The meetings with parents, education and information given.
4.10.1.2 All referrals.

4.10.2 The nurse assigned for hearing screening will:
4.10.2.1 Document performing the test whether pass or "Refer" of each ear in the Hearing.
4.10.2.2 Screening Log Book with attached infant's identification addressograph.
4.10.2.3 Enters performing the test and its results in the MOH hearing screening database.
4.10.2.4 Document results on the sheet for hearing screening and attaches it to the infant's medical record.

4.10.3 The nurse assigned to the infant will:
4.10.3.1 Ensure attaching the Hearing Screening sheet with the results in the infant's medical record.
4.10.3.2 Document performing the test and the infant's tolerance on the nurse's progress notes of the infant medical record.
4.10.3.3 Document teaching the parents/patient guardian about the test.
4.10.3.4 Inform the assigned physician of the test results.
4.10.3.5 Referral appointments given.

5. MATERIALS AND EQUIPMENT:

5.1 Hearing screening device (AABR) with its ear couplers, transducers, electrodes, and cables.
5.2 Computer with available access to the ministry of health electronic database for reporting results of newborn hearing screening.

6. RESPONSIBILITIES:

6.1 Physician
6.2 Nurse

7. APPENDICES:

N/A

8. REFERENCES:

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9. APPROVALS:

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