CHILDREN'S HOSPITAL
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Newborn Hearing Screening

*By **Anita Jeyakumar, M.D.,** pediatric otolaryngologist at Children's Hospital and assistant professor of Otorhinolaryngology at LSU Health New Orleans School of Medicine. This issue of Pediatric Review is intended for pediatricians, family physicians and all other interested medical professionals. For CME purposes, the author has no relevant financial relationships to disclose.*

OBJECTIVES

At the end of this activity, the participant should be able to:

1. Describe the significance of newborn hearing screening
2. Identitfy when a child needs to be rescreened or needs diagnostic testing
3. Identify when to refer a patient for further evaluation

WHAT IS NEWBORN HEARING SCREENING?

Newborn hearing screening is a test to tell if a baby might have hearing loss. Hearing screening is easy and not painful. In fact, babies are often asleep while being screened. It takes a very short time, usually only a few minutes.

According to Louisiana State Law, all babies need a hearing screening prior to being discharged from the hospital. Hearing screening is done with automated instruments and can detect if there is a suspicion of hearing loss. If an infant fails the hearing screening, further diagnostic testing is necessary. For babies not born in a hospital setting, hearing screening is needed by the first month of life.

WHAT IS THE HISTORY OF NEWBORN HEARING SCREENING?

Hearing loss is one of the most common congenital anomalies, occurring in approximately 2-4 infants per 1000. Prior to implementation of universal newborn screening, testing was conducted only on infants who met the criteria of the high-risk registry (table 1). However, the high risk registry was found to be insufficient, given that as many as 50% of infants born with hearing loss have no known risk factors.

Table 1. High Risk Registry

HIGH RISK INFANTS
Family History of Sensorineural Hearing loss
Congenital Infections: CMV, rubella, toxoplasmosis, herpes
Craniofacial anomalies (ear/pinna)
Neonatal indicators include: Jaundice; Persistent pulmonary hypertension; Extracorporeal membrane oxygenation
Postnatal infections (meningitis)
Syndromes associated with hearing loss
Neurodegenerative disorders
Parental Concerns
Head trauma

EVOLUTION OF NEWBORN HEARING SCREENING

1965—Babbidge Report: Recommended the development and nationwide implementation of "universally applied procedures for early identification and evaluation of hearing impairment."

1988—Former Surgeon General C. Everett Koop issued a challenge: By the year 2000, 90% of children with significant hearing loss be identified by 12 months of age.

1993—National Institutes of Health (NIH) Consensus Development Program: Recommended all newborns be screened for hearing loss before leaving the hospital.

1994—The Joint Committee on Infant Hearing Position recommended that "all infants with hearing loss should be identified before 3 months of age and receive intervention by 6 months of age."

1999—The American Academy of Pediatrics endorse: Universal newborn hearing screening; detection of hearing loss before three months of age; intervention services initiated by six months of age.

2000—The JCIH Year 2000 Position: Principles and Guidelines for Early Hearing Detection and Intervention Programs (EHDI).

2001—Healthy People 2010: Goal 28-11: Increase the proportion of newborns who are screened for hearing loss by age 1 month, have audiologic evaluation by age 3 months and are enrolled in appropriate intervention services by age 6 months.

COMMON MISCONCEPTIONS ABOUT NEWBORN HEARING LOSS

MISCONCEPTION	CLINICAL FACT
Parents will know by 2-3 months	Prior to NBS, average diagnosis age 2-3 years.
Identification can be done by clapping	Children compensate well
High risk registry sufficient for identification	High risk registry misses 50% of infants
Incidence of hearing loss is low	2-4/1000
Testing unreliable; too many referrals	5-7% referral rate
No need to rush	Children identified > 6 months = language delays
< 12 months cannot fit hearing aids	< 1 month can be fit with hearing aids

How is Newborn Hearing Screening Done?

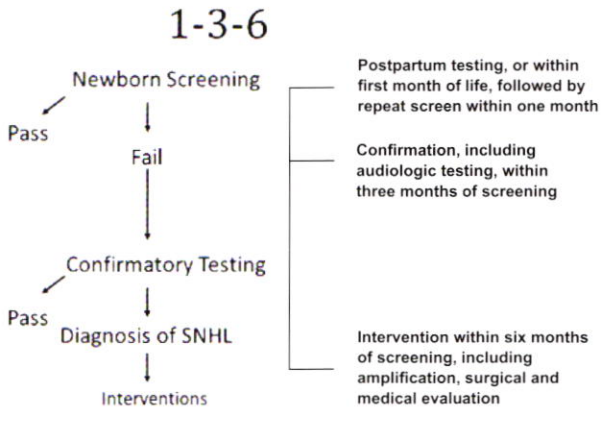
The hearing screening is often done with a machine. Screening can be otoacoustic emissions (OAEs) or auditory brainstem responses (ABR). The type of testing done is dependent on the facility doing the testing. High risk infants need testing with both types of screening. If the baby fails the screening, the child can be rescreened one time only in both ears. If the infant fails the second screening, the baby will need further diagnostic testing to evaluate the infant in more detail. It is imperative that the diagnostic testing happens expediently, ideally by 3 months of life.

Why is it Important that the Diagnostic Testing Happen so Quickly?

If the diagnostic testing can be done when the baby is young enough, all the testing can be done while the baby is naturally sleeping, without the need for sedation or anesthesia. However, once the baby gets older or more active, the baby will need sedation for accurate diagnostic testing.

Each year in the United States, as many as 12,000 babies are born with hearing loss. If a baby has hearing loss, it is important to identify the hearing loss early. Early identification allows families to make decisions about their child's care that can affect future speech, language and social development. Early identification also enables high-quality early intervention, which can start as young as 1 month of life. This is essential for good communication outcomes in children with hearing loss.

Figure 1



What does a pediatrician need to know about Newborn Hearing Screening? 1-3-6

What exactly is 1-3-6? Broadly, an infant needs to be screened and, possibly, rescreened by 1 month of life. If the infant fails, the infant needs diagnostic testing by 3 months of life. If the diagnostic testing shows any kind of hearing loss, the infant needs to get the interventions (referral to specialist, hearing aids and medical evaluation for hearing loss) by 6 months of life. 1-3-6. Figure 1 summarized 1-3-6.

When does a child need a referral for Newborn Hearing Screening?

If an infant fails the initial hearing screening and needs the diagnostic testing, an Otolaryngology or Audiology referral is important. Additionally, if an infant is confirmed to have hearing loss from diagnostic testing, an Otolaryngology referral is important to facilitate the appropriate interventions, ranging from potential hearing aids to a work-up for etiology of hearing loss.

References

1. www.cdc.gov/ncbddd/hearingloss/states/Louisiana
2. report.nih.gov/nihfactsheets/ViewFactSheet.aspx
3. dhh.louisiana.gov/index.cfm/page

American Board of Psychiatry and Neurology elects Children's Hospital neurologist as chair

The American Board of Psychiatry and Neurology (ABPN) elected Ann Tilton, MD, Neurology, as the chair of its 2015 Board of Directors. Tilton will serve a one-year term.

Tilton is a Professor of Neurology, Section Chair of Child Neurology and Director of the Child Neurology Fellowship Program at LSU Health New Orleans Medical Center. She is also the Medical Director of the Gilda Trautman Newman Rehabilitation Program at Children's Hospital. She has served on the Executive Committee of the Professors of Child Neurology and as President of the Child Neurology Society. Tilton has been published on numerous topics and has spoken nationally and internationally on child neurology, rehabilitation and spasticity management. Her interests include neurorehabilitation, Neuromuscular Disorders and clinical applications and research in novel uses of botulinum toxin and intrathecal baclofen in the care of children and young adults with abnormal tone.

The ABPN is a not-for-profit corporation dedicated to serving the public interest and the professions of psychiatry and neurology by promoting excellence in practice through certification and maintenance of certification processes.

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Office Phone: (504) 896-9568
Locations: Children's Hospital, Main Campus

Physicians:
Scott Schultz, MD
Catherine Kiracofe, Psy.D.
Rebecca Rothbaum, Psy.D.

If recognized and treated early and properly, most individuals fully recover from a single concussion. However, people who sustain multiple concussions may take longer to recover each time and are more likely to experience persistent symptoms and lifelong physical, cognitive and psychological problems.

The Children's Hospital Concussion Clinic addresses the needs of those who experience mild traumatic brain injuries and do not need intensive rehabilitation. Treatment and services include assessment of potentially overlooked injuries or ongoing problems and determination of the patients' best path to optimal recovery to facilitate school and community re-integration. We also provide education and recommendations for families with questions about their child's return to school and sports.

Services are provided by an interdisciplinary team of experienced pediatric brain injury specialists, consisting of a physical medicine and rehabilitation physician and a neuropsychologist. We take an interdisciplinary approach to patient care and strive to quickly evaluate children after a concussion in order to facilitate a return to daily activities, such as school and sports.

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- Evaluating for physical, cognitive and emotional symptoms
- Determining when it is safe for athletes to return to play
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During a patient's visit, our team:

- Discusses concussion symptoms and concerns with the patient and family
- Assesses attention, memory, speed and balance
- Develops a treatment plan and follow-up care

SCOTT C. SCHULTZ, MD

Associate Director of the Pediatric Rehabilitation Program at Children's Hospital
Pediatric Physiatrist
Professional School:
George Washington University
Specialty Training:
UCLA/VA Greater Los Angeles Healthcare System
Kennedy Krieger/Johns Hopkins
Special Interests:
Brain injuries, concussion, spinal cord injuries, spina bifida, spasticity management

CATHERINE B. KIRACOFE, PSY.D.

Pediatric Neuropsychologist, Children's Hospital
Professional School:
Institute of Graduate Clinical Psychology at Widener University, Chester, PA
Concentrations in Neuropsychology and School Psychology
Special Interests:
Neuropsychological assessment of central nervous system disorders including traumatic brain injury, stroke, tumor and epilepsy; evaluation of developmental and learning issues to facilitate school performance; family and child adjustment to illness
Specialty Training:
Children's Hospital, New Orleans

REBECCA ROTHBAUM, PSY.D.

Pediatric Neuropsychologist, Children's Hospital
Professional School:
Institute of Graduate Clinical Psychology at Widener University, Chester, PA
Special Interests:
Neuropsychological assessment, cognitive rehabilitation, traumatic brain injury, brain tumors, premature birth, ADHD, epilepsy, and adjustment to illness.
Specialty Training:
Children's Hospital, New Orleans

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Please record your responses to the questions on the form below.
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1. When should a baby have their newborn hearing screen?
   a. Before discharge from the hospital
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   c. By 1 year of life

2. Which ear should be rescreened when a baby fails the initial screen on the left ear?
   a. Left ear
   b. Right ear
   c. Both ears

3. When should diagnostic hearing testing be done?
   a. After a second failed hearing screen
   b. If the parents have concerns about the infants hearing
   c. a and b

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