Hearing Loss

What the Health Care Professional Should Know

MICHAEL GRAFF, MD
DIRECTOR, DIVISION OF NEONATOLOGY
K. HOVNANIAN CHILDREN'S HOSPITAL
JERSEY SHORE UNIVERSITY MEDICAL CENTER
HACKENSACK MERIDIAN HEALTH
NJ AAP CHAPTER CHAMPION EHDI PROGRAM

NCHAM National Center for Hearing Assessment and Management Utah State University

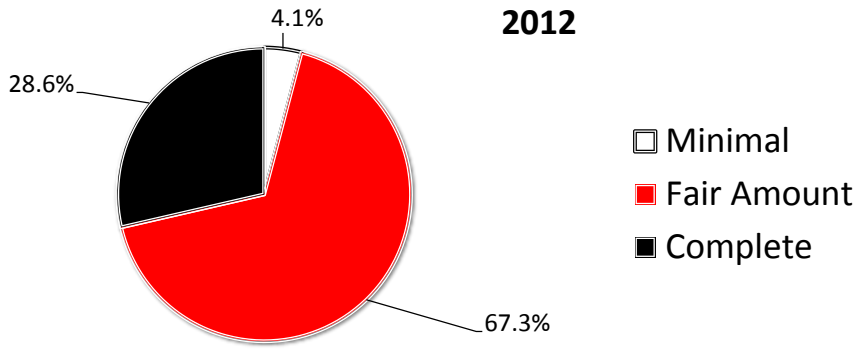
BOYS TOWN National Research Hospital

Knowledge, Attitudes, and Practices of physicians in New Jersey

Regarding Newborn Hearing Screening

2012 FINDINGS

What is your level of trust in the newborn hearing screening results?



What is your best estimate of the earliest age at which:

<1 mo	1-3 mos	4-6 mos	7-9 mos	10-12 mo	>12 mo	
34.4%	60.4%	4.2%	0.0%	1.0%	0.0%	a. A newborn not passing the hearing screening should receive additional testing
20.9%	34.0%	22.0%	4.4%	8.8%	9.9%	b. A child can be definitively diagnosed as having a permanent hearing loss
9.0%	21.3%	25.9%	7.8%	16.9%	19.1%	c. A child can begin wearing hearing aids
32.6%	28.3%			3%	7.6%	d. A child with permanent hearing loss should be referred to early intervention services

30.3%

2012 **Comparison**

How confident are you talking to parents about…..	Very Confident	Somewhat Confident	Not Confident
Causes of HL	29.6%	59.2%	11.2%
Sign language, A/O modes	15.6%	38.5%	45.8%
Unilateral, Mild HL Consequences	32.7%	55.1%	12.2%
Bilateral Moderate- Profound HL Consequences	22.3%	52.1%	25.5%
Candidates for cochlear implants	7.2%	41.2%	51.5%
What to do after diagnosis	33.0%	59.8%	7.2%

National Goals for Hearing Screening
(1-3-6 Plan)

All infants will have access to a hearing screen –using a physiologic measure:

- No later than **1** month of age

All infants not passing initial screening and subsequent rescreening should have confirmatory audio-logical and medical evaluations:

- No later than **3** months of age

All infants with a confirmed permanent hearing loss should receive early intervention as soon as possible:

- No later than **6** months of age

Joint Commission on Infant Hearing (JCIH) – Year 2007 Position Statement

Hearing Screening in New Jersey
Regulations

Hearing screening is required by law

All newborns must be screened using an electrophysiological device

All screening results must be reported to the DHSS via the EBC

Hospital must notify the primary care physician of the test results

Inpatient and outpatient results can also be viewed via the New Jersey Immunization Registry (http://njiis.nj.gov)

Premature infants should be screened with an ABR

Hospital must have a mechanism in place for re-evaluation of any abnormal initial evaluation

Rescreening must be done by same methodology as the original evaluation

All infants should have a standardized screening of globalized development with a validated assessment tool at 9, 18 and 24-30 months

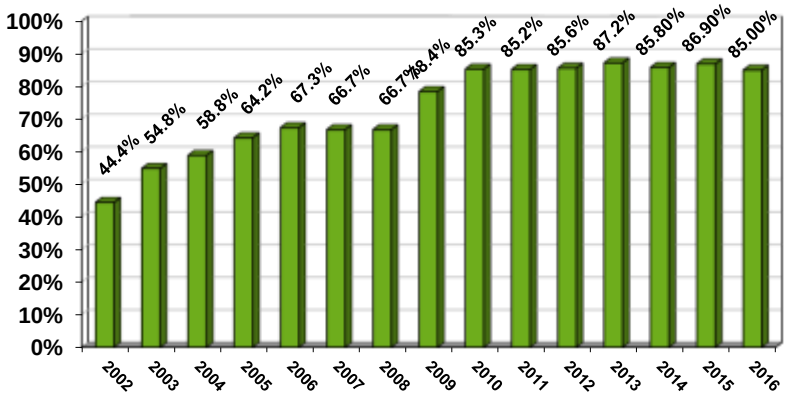
Any infant who fails the speech-language portion should be referred for a speech-language evaluation and an audiology assessment

New Jersey Statewide Rates

Year	Screened by discharge or by 1 month of age
2014	99.9%
2015	99.8%
2016	99.8%

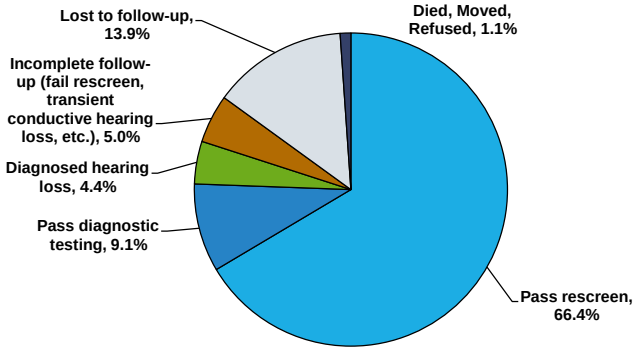
Year	Refer Rate (final inpatient screen)
2014	2.3%
2015	2.3%
2016	2.2%

Documented Repeat Evaluation



Includes both children receiving either outpatient rescreening or diagnostic testing. 2016 rates still incomplete

Outcome of 2015 Births with Inpatient Refer



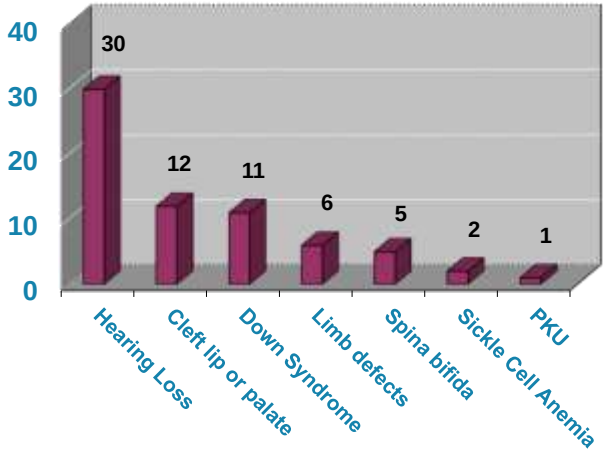
data as of 4/13/17

Why is Early Identification of Hearing Loss Important?

Hearing loss is the most common birth condition

Congenital Defects/Diseases

Incidence per 10,000

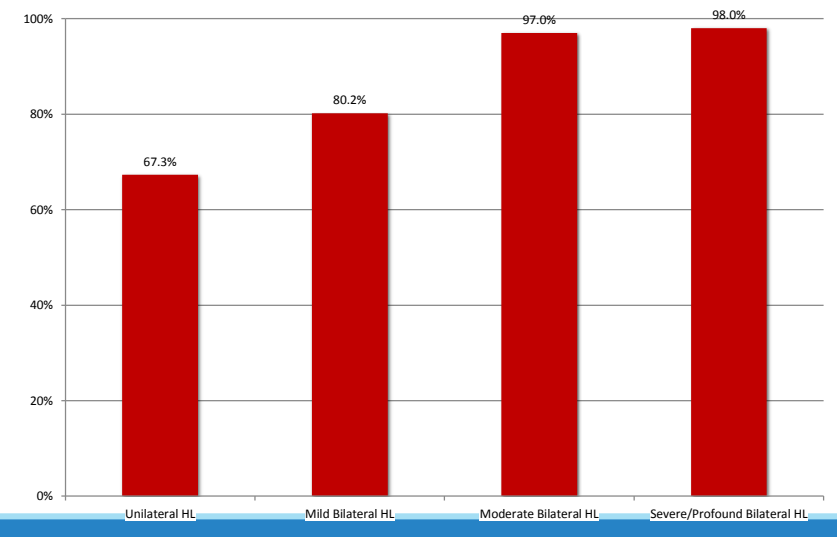


Prevalence of Hearing Loss

- Prevalence estimates vary across studies
- Estimated that 1 to 3 per 1000 infants will have permanent sensorineural hearing loss*
  - 1/1000 from the well baby nursery
  - 10/1000 from the NICU
- Rate increases to 6/1000 by school age
  - Need for continued surveillance

*NIDCD Outcomes Research in Children with Hearing Loss (2005) available at: www.nidcd.nih.gov/funding/programs/hb/outcomes/report/html

Which of the following can have an impact on speech and language development? (Check all that apply):



Why is Early Identification of Hearing Loss Important?

Early identification and intervention can make a difference

Language Development

Effects of Age of Identification

Prospective, longitudinal study of early-identified infants

30 children with mild-profound hearing loss (HL) compared to 96 normal hearing (NH) controls

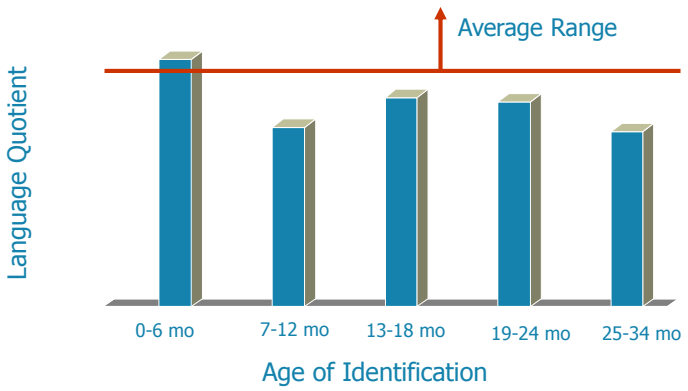
Children identified $\leq$ 3 months had stronger language development at 12-16 months than those identified > 3 months

Children with HL were delayed compared to NH infants

Vohr et al. *Peds* 2008; 122:535-544

Language Development

Effect of Age of Identification



Yoshinaga-Itano, et al, *Peds* 1998; 102:1168-1171

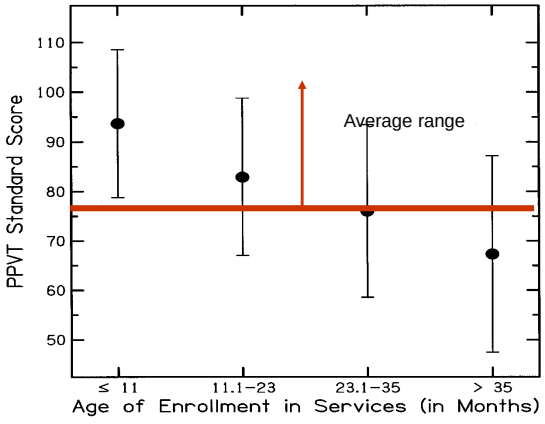
Vocabulary at Age Five

Effect of Age of Intervention

Significant Predictors:

Id Age: 8%

Family Involvement: 37%



Moeller MP. *Pediatrics* 2006;118, 1357-1370

Vocabulary

ITS ALL ABOUT THE WORDS!

Early Intervention is about the Family:
Adult Education

Number of Words heard by the age of 2

- Professional Home - 50 million words
- Working Class Home - 30 million words
- Welfare Home - 11 million words

Hearing Loss

Classification

- Genetic (35%)
  - Non Syndromic (60%)
    - Autosomal recessive (60-70%)
    - Autosomal dominant (30%)
    - X-linked (2%)
    - Other: mitocondrial, multilocus
  - Syndromic (40%)
- Acquired (35%)
  - Prenatal (20%)
  - Perinatal (20%)
  - Later (60%)
- Idiopathic (30%)

Inherited Deafness

Non Syndromic

Autosomal Recessive

- **Usually have normal hearing parents**
- **No history of environmental exposure**
- **Always sensorineural in origin**
- **Autosomal recessive is more severe than dominant**
- **Multiple chromosomal locations associated with hearing loss**
- **Most important gene is connexin 26 (chromosome 13)**
  - **May be responsible for ½ AR hearing loss**
  - **Possible to screen for these genes**

Inherited Deafness

Non Syndromic

Autosomal Dominant

- **Accounts for approximately 30% of non syndromic deafness**
- **Six subdivisions**
  - **Congenital severe-profound**
  - **Progressive early onset**
  - **Unilateral**
  - **Low frequency**
  - **Mid frequency**
  - **High frequency progressive**
- **Usually less severe than autosomal recessive**
- **Hearing loss is usually sensorineural**

Inherited Deafness

Syndromic

(most common syndromes)

Craniosynostosis (1-2%)
- **Crouzon syndrome (50% with conductive loss)**
- **Apert syndrome**

Branchio-Oto-Renal Syndrome (2%)
- **-preauricular sinus or pits**
- **-autosomal dominant**

Branchial Arch Defects (1%)
- **Oculo-auriculo-vertebral spectrum (1/5600)**
- **Treacher Collins Syndrome (hearing loss in 40%)**

Alport Syndrome (1%)
- **-ocular abnl (anterior lenticonus, macular flecks, corneal erosions)**
- **-renal abnl (glomerular sclerosis)**

Pendred Syndrome (1-10%)
- **-associated with a goiter**
- **-defect in sulfate transport protein common in cochlea and thyroid**

Usher Syndrome (3-5%) – associated with Retinits Pigmentosa

Waardenburg Syndrome (2-5%)

Acquired Hearing Loss

Neonatal Intensive Care > 5 days which may include

- Mechanical Ventilation/ECMO
- Hyperbilirubinemia requiring an exchange transfusion
- Exposure to ototoxic medications or loop diuretics

Postnatal infections assoc. w/hearing loss (meningitis)

- Bacterial
- Viral

Intrauterine TORCH infections

- Cytomegalovirus
- Zika
- Herpes
- Rubella
- Syphilis
- Toxoplasmosis

Craniofacial Anomalies involving:

- Pinna
- Ear canal
- Ear tags
- Ear pits
- Temporal bone anomalies

Zika Infections

HEARING LOSS

Birth Defects Among Fetuses and Infants of US Women with Evidence of Possible Zika Virus Infections During Pregnancy

442 Completed Pregnancies (15-50 yrs.) – with lab evidence of Zika Infection

- 271 were asymptomatic (61%)
- 167 were symptomatic (38%)
- 26 had evidence of Birth Defects (6%)

Presence of Birth Defects

- 16/271 asymptomatic pregnant women (6%)
- 10/167 symptomatic pregnant women (6%)
- All defects occurred in women exposed in the first trimester

Types of Defects

- 18/26 had microcephaly (4% of completed pregnancies)
- 4/26 had brain abnormalities w/o microcephaly (i.e. cranial calcifications, absence of the corpus callosum etc.

Hone et al. JAMA 2017:317;59-68

Hearing Loss in Infants with Microcephaly

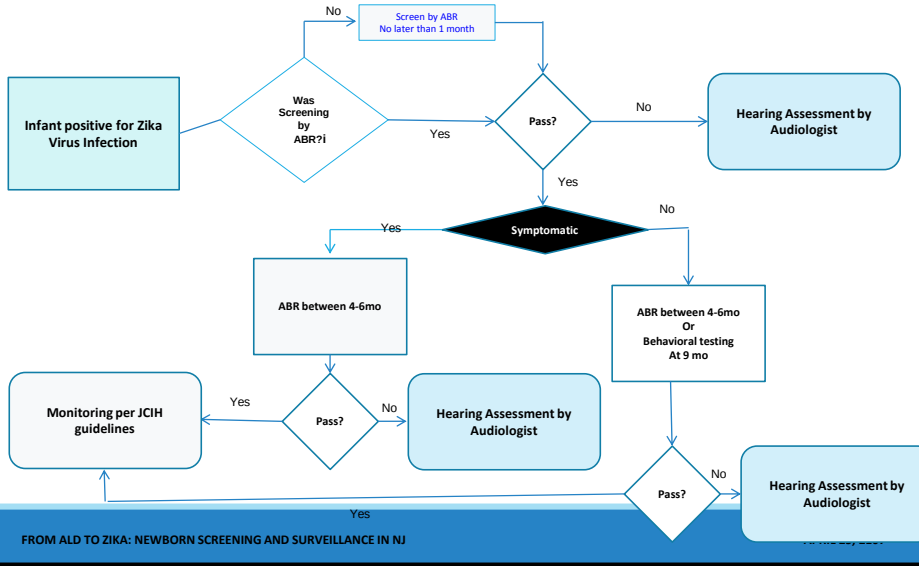
Study conducted in Brazil

70 infants with documented Zika Infection and microcephaly

- 5 (7%) had Sensorineural hearing loss
- Similar to the rate seen with other congenital viral infections
- 16 (22.8%) failed the first screening in at least one ear

Leal et al. MMWR Weekly Sept. 2, 2016/65;917-919

CDC Guidelines – Zika Infection and Hearing Loss
U.S. Department of Health and Human Services



FROM ALD TO ZIKA: NEWBORN SCREENING AND SURVEILLANCE IN NJ

CMV (Cytomegalovirus)

HEARING LOSS

Cytomegalovirus

Knowledge

Condition	2015	2016	Freq in US
Congenital CMV	6.79%	6.70%	6000
Congenital Toxoplasmosis	8.27%	8.53%	400
Group B Strep	17.87%	16.91%	380
Congenital Rubella	16.8%	13.27%	<3
Parvovirus(fifth dis)	22.52%	19.63%	1045
Fetal Alcohol Synd	65.56%	64.54%	1200
Spina Bifida	69.42%	64.54%	1500
SIDS	83.96%	78.7%	1500
Down Syndrome	89.57%	85.44%	6000
HIV/AIDS	91.13%	86.33%	30

HealthStyles survey: questionnaire to over 55000 households with 4000 returned

Cytomegalovirus

Seroconversion (seronegative to seropositive) in pregnancy

- Low income pregnant women have 3 times the incidence (6.8%)
- Middle income pregnant woman – 2.5%
- Women in STD clinics – 37%
- Daycare workers – 7.9-10%

CMV Prevention

- CMV can live for up to 15 min on hard plastic
- CMV can live for up to 5 min on crackers
- No virus can be recovered with any intervention
  - Soap
  - Sanitizer
  - Plain water

Cytomegalovirus

Education helps

- 42% of CMV negative mothers with a CMV positive infant converted without education
- Only 3% of CMV seronegative mothers with a CMV positive infant converted after education about hygiene practices
- Only 34% of first year medical students ever heard about CMV (100% of 4th yr knew)
- Only 18.5% of childcare providers heard of CMV

Hearing Loss

- 10% of asymptomatic Congenital CMV infants will develop HL (only 50% detected at birth)
- 0.1-0.4% of general population will develop HL

Guidelines for CMV

Detection

Laboratory Confirmation

- Gold Standard has been CMV detection in urine
  - Difficult to obtain urine
  - Poor for universal detection
- Saliva (both liquid and dried)
  - Good sensitivity (99.9%)
  - Good specificity (97%)
- Blood Samples
  - Poor sensitivity (34-100%)
  - Estimated that 2/3 of infected infants would be missed with this method
  - Positive results correlated well with other tests

Kadambari et al. Early Human Development 2011:87: 723-728

Guidelines for CMV

Treatment

Treatment (Valganciclovir)

6 weeks vs. 6 months (end point was change in hearing in best ear)

- 6 week group
  - 2 had improvement
  - 36 had no change
  - 5 had worsening
  - Had lower Bayley Scores at 6 months of age
  - Had lower Receptive-communication scale scores
- 6 month group
  - 3 had improvement
  - 37 had no change
  - 3 had worsening

Kimberlin et al. NEJM 2015;372:933-943)

Unilateral Hearing Loss

Effects of Unilateral Hearing Loss

Keller & Bundy (1980)
n = 26; age = 12 yrs)

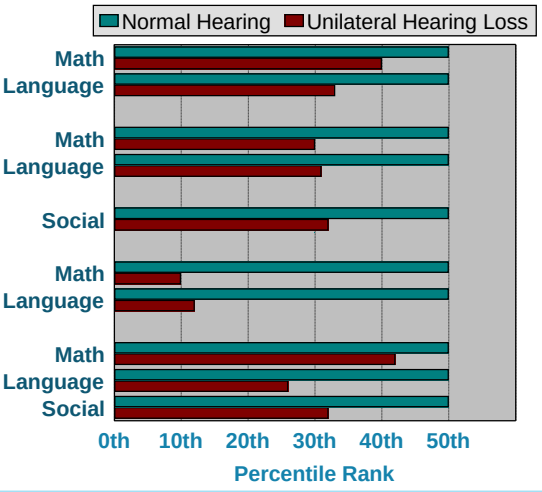
Peterson (1981)
(n = 48; age = 7.5 yrs)

Bess & Thorpe (1984)
n = 50; age = 10 yrs)

Blair, Peterson & Viehweg (1985)
(n = 16; age = 7.5 yrs)

Culbertson & Gilbert (1986)
n = 50; age = 10 yrs)

Average Results
Math = 30th percentile
Language = 25th percentile



Unilateral Hearing Loss

Prevalence

- In newborns – 0.83-2.7/1000
- In school aged children – 30-56/1000

- In the United States it is estimated that 36% of infants with hearing loss had UHL
  - 10% of UHL will become bilateral
- UHL children cannot localize

Unilateral Hearing Loss

Etiology

Causes can include:

- Heredity
  - 59% had a family history of any hearing loss
  - 26% had a family history of UHL
  - 50% of subjects that had imaging had structural abnormalities (more common than in bilateral (5%)
    - Vestibular aqueducts
    - Mondini dyplasia (dysplasia of the temporal bone)
    - Common cavity deformity
  - 67% of children with UHL and cochlear nerve deficiency had ophthalmologic abnormalities
- Head trauma
- Viral causes:: i.e. mumps, rubella, CMV
- Meningitis
- Fetal Alcohol Syndrome

Unilateral Hearing Loss

2/3 of children with UHL reported increased difficulty in challenging environments

- 1/3 had difficulty hearing their teacher
- Children with UHL required a minimum of 2 dB signal-noise ratio to perform as well as their hearing peers

Persists to adulthood

- 95% of UHL adults reported that understanding speech in noise was challenging
- 6.7 of normal hearing reported difficulty in a noisy environment

Academic achievement

- 22-40% of children with UHL repeated a grade compared to 2-4% of hearing children
- 41-45% of children with UHL will require Individual Education Program (IEP) (vs.12%)
- 59% of children with any degree of UHL demonstrated academic and behavioral problems

Unilateral Hearing Loss

Social and Behavioral Development

- 20-33% of UHL have teacher reports of behavioral problems
  - Social withdrawal
  - Inattentiveness
  - Distractibility
  - Lack of co-operation
  - Aggression
- 1/3 were embarrassed by their hearing loss and felt inferior to their peers

Unilateral Hearing Loss

Intervention

Hearing Aids

- Only 26% were recommended for hearing aids
- Does provide some benefit:
  - Improved hearing
  - Better school and social performance
  - Greater ease of hearing in quiet and noisy environments
- Only 26% of children with UHL use their hearing aids

Contralateral routing of signals (CROS) hearing aids

- Works by placing a microphone on the affected ear and delivering the signal to a receiver in the normal ear
- Only work if the user situates themselves with the affected ear away from the noise
- Works best in a quiet environment
- Not an appropriate choice for children

Unilateral Hearing Loss

Intervention

Frequency Modulated (FM) system

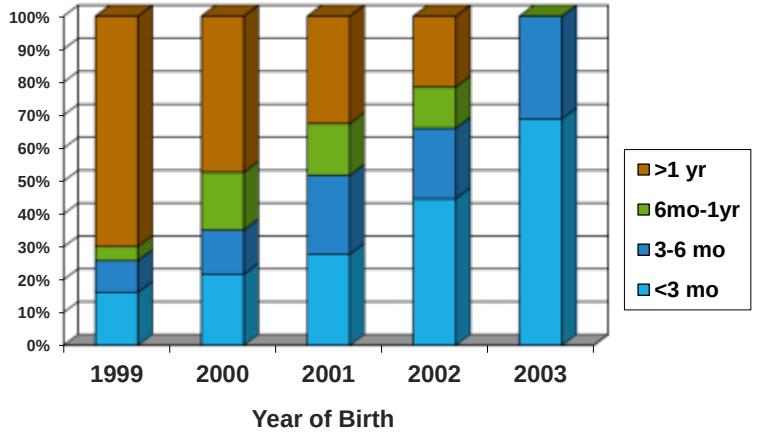
- Wireless transmission of the signal of interest via radio waves to the listener
- Teacher wears a microphone and the student has the signal coupled to the hearing aid
- Multiple studies have shown improvement in speech recognition in both noisy and quiet environments

Cochlear Implants (CI)

- Direct electrical stimulation to the auditory nerve (bypasses the cochlea)
- Not FDA approved for UHL (use is increasing – mostly in adults)
- Early indications are that there is no improvement in social interactions and poor compliance

Age of Referral

New Jersey



State of NJ

2nd Q 2014 Statistics

New Jersey Department of Health - Early Hearing Detection and Intervention
2nd Q 2014 Birthing Facility Summary Inpatient Screening Report

	Inpatient Screening				Outpatient Follow-up					
	Discharges	Screened before discharge	Screened before discharge or by 1 month	Refer rate	Total missed or refused	Percent of AAP follow-up reported	Percent who failed to follow-up reported	Percent loss to follow-up	Percent with missing follow-up	Rate (per 1000 discharges) of Diagnosed Hearing Loss
NJ Total - 2011	102176	99.8%	99.9%	2.9%	3108	84.5%	66.6%	13.6%	1.7%	1.68
NJ Total - 2012	100070	99.8%	99.9%	2.5%	2750	85.0%	66.8%	13.7%	1.3%	1.55
NJ Total - 2013	99974	99.9%	99.9%	2.3%	2418	85.1%	68.8%	12.0%	1.9%	1.35
NJ Total - 1st Q 2014	23826	99.9%	99.9%	2.1%	532	80.8%	71.2%	15.8%	0.8%	
NJ Total - 2nd Q 2014	24385	99.9%	99.8%	2.3%	622	82.3%	60.1%	17.3%	30.5%	
NJ Total - 3rd Q 2014	0				0	NA	NA	NA	NA	
NJ Total - 4th Q 2014	0				0	NA	NA	NA	NA	

Statewide Ranges for 2nd Q 2014:				Statewide Ranges for 1st Q 2014:				for 2013:
Low:	98.3%	85.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00
High:	100.0%	100.0%	11.3%	100.0%	100.0%	100.0%	100.0%	3.11
# of hospitals achieving 100%:	34	38		17	13			

*Audiologic indications of at least 1 child unscreened due to parent refusal. These cases are excluded from inpatient screening rates, but indicated in "by 1 mo." rate unless outpatient refusal is also documented. See the resource for more definitions.

Hearing Screening Techniques

Otoacoustic emissions (OAE)

Auditory brainstem response (ABR)

Two stage screening (OAE + ABR)

Otoacoustic Emissions

- Sounds are presented to the ear canal and a small microphone measures the response in the ear canal
- Average test time is 5-15 minutes/baby

Auditory Brainstem Response

- Sounds are presented and surface electrodes measure brainstem activity
- Average test time 20 min/baby

Two Stage Screening

OAE + ABR

- All babies are screened using OAEs
- Those babies who fail the OAE screening receive an ABR screening prior to leaving the hospital
- Average test time/baby (25-35 min)
- Reduces refer rate; useful when follow up is likely to be difficult or costly
- Initial cost of equipment is higher than OAE or ABR screening alone, but follow-up costs are less

JCIH Position on Screening

2007

NICU

- >5 days in NICU
- ABR should be included to screen for neural loss
- Rescreen BOTH ears, even if only one ear fails
- Non pass – refer to Audiologist
- Readmission – re-screen before discharge

Well baby nursery

- Screen with OAE or ABR
- Repeat screen when necessary before discharge
- When using 2 step protocol test order should be OAE then ABR
- Re-screen BOTH ears, even if only one ear fails

Medical Home

ROLE OF THE HEALTH CARE PROVIDER

Optimal Surveillance in the Medical Home (JCIH, 2007)

At each well visit monitor for:

- Auditory skills, middle ear status
- Developmental milestones (validated global screening tool)
- Listen to parental concerns

If concerns, refer for pediatric audiology and speech-language pathology evaluations

Optimal Surveillance in the Medical Home (JCIH, 2007)

If hearing loss is diagnosed, refer siblings of infant for audio-logical evaluation

Refer infants with any RISK indicators for audio-logic assessment by 24-30 months of age

Carefully assess middle ear status at all well child visits; refer for otologic evaluation if persistent middle ear effusion lasts for 3 months+

List specialists to whom you refer a child with confirmed permanent hearing loss (open ended):

Specialist	2012
ENT/Otolaryngology*	86.1%
Geneticist*	10.9%
Ophthalmologist*	2.0%
Audiologist	50.5%
SLP	24.8%
Occupational Therapist	0.0%
Child Dev./ EI	9.9%
Neurologist	5.0%
Social Worker	0.0%

* = Correct Answer

Follow-up Testing

Referral for follow-up testing

- A repeat OAE and/or ABR screen must be done and if possible completed by 1 month of age
- Any pediatrician conducting re-screening in their office is required to report results to DHSS

If a hearing loss is still suspected…

- Referral to a pediatric audiologist/ENT for diagnostic evaluation to be complete by 3 months of age
- Frequency specific ABR to estimate degree and configuration of hearing loss

Medical Workup

Review the prenatal and perinatal history

Review family history of hearing loss

Look for physical findings associated with HL

- White forelock
- Cardiac anomalies
- External ear anomalies

Refer to ENT Physician

Refer to Genetics, Cardiology, Ophthalmology, Nephrology

Other: CMV, EKG, Developmental evaluation

Vohr, B. (2003)

Amplification

Hearing aids can be fitted as young as 1 month of age

Special Child Health Services County Case Management Units have a hearing aid assistance program for families needing financial aid to pay for hearing aids:

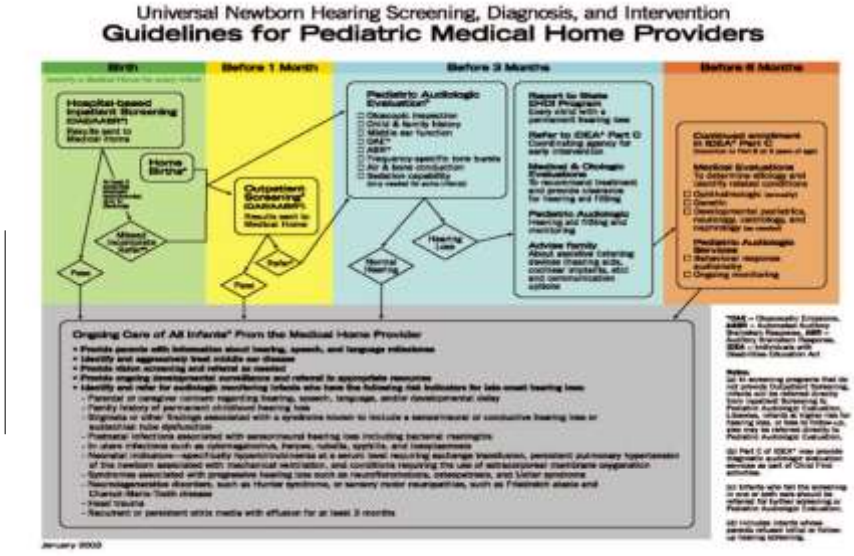
www.nj.govheath/fhs/sch/sccase.shtml

Cochlear Implants

- Parents must be involved in the decision making process
- Six month trial of hearing aids is required for Cochlear Implants
- For additional information:

www.nidcd.nih.gov/health/hearing/coch.asp
www.fda.gov/cdrh/cochlear

American Academy of Pediatrics



Early Intervention Referral

ANY hearing loss (including mild or unilateral) is presumptive eligibility for EI services

Goal is to begin EI services by 6 months of age

County Case Management Units are single point of entry for EI services in NJ

www.nj.gov/health/fhs/documents/schs_cmu.pdf

Do you ever do hearing screening for infants and young children in your office?

Yes – 31.3%

No – 68.8%

If yes, who are you screening? *(n=30)*

Newborns/infants who **do not pass the newborn hearing screening** in hospital	**36.7%**
Newborns/infants for whom you **cannot obtain newborn screening results**	**26.7%**
All newborns regardless of previous tests	**20.0%**
Children 1-3 years of age as part of their **annual check-ups**	**53.3%**
Children of **parents who voice concerns** about their child's hearing	**80.0%**

How often do you use the following to screen hearing in your office?

(n=30)	Never	Occasionally	Frequently	Always
AABR	**60.9%**	**4.3%**	**21.7%**	**13.0%**
Response to noisemakers	**16.0%**	**36.0%**	**28.0%**	**20.0%**
Caregiver interview/questionnaire	**21.7%**	**21.7%**	**21.7%**	**34.8%**
OAE	**14.8%**	**7.4%**	**25.9%**	**51.9%**
Tuning Fork	**57.9%**	**31.6%**	**10.5%**	**0.0%**
Tympanometry	**15.0%**	**40.0%**	**30.0%**	**15.0%**
Other	**0.0%**	**0.0%**	**66.7%**	**33.1%**

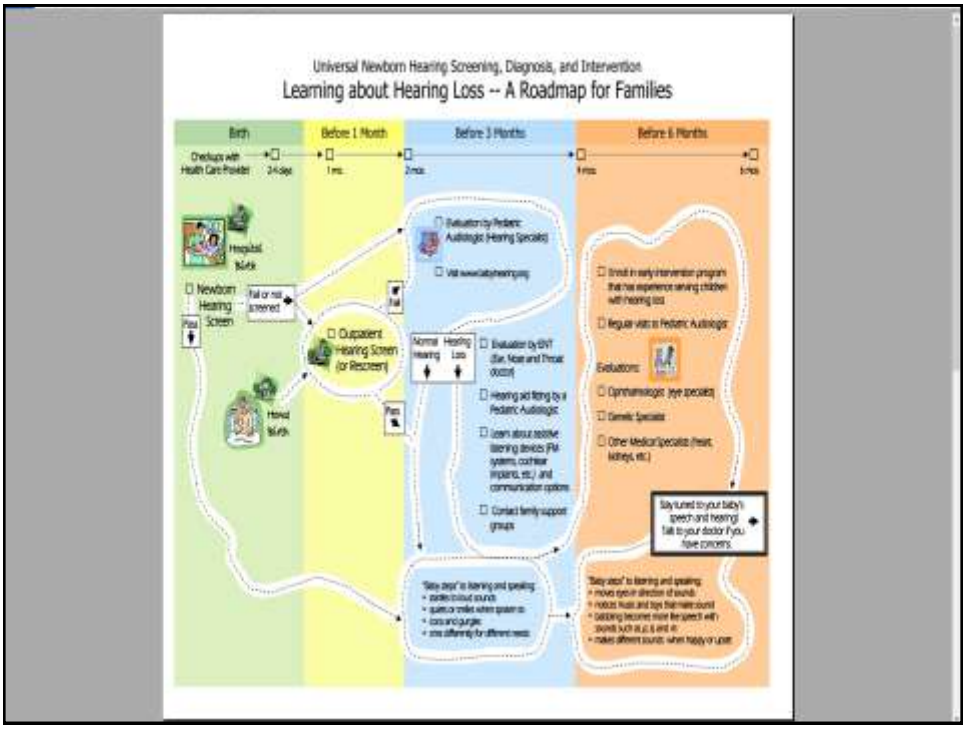
Resources

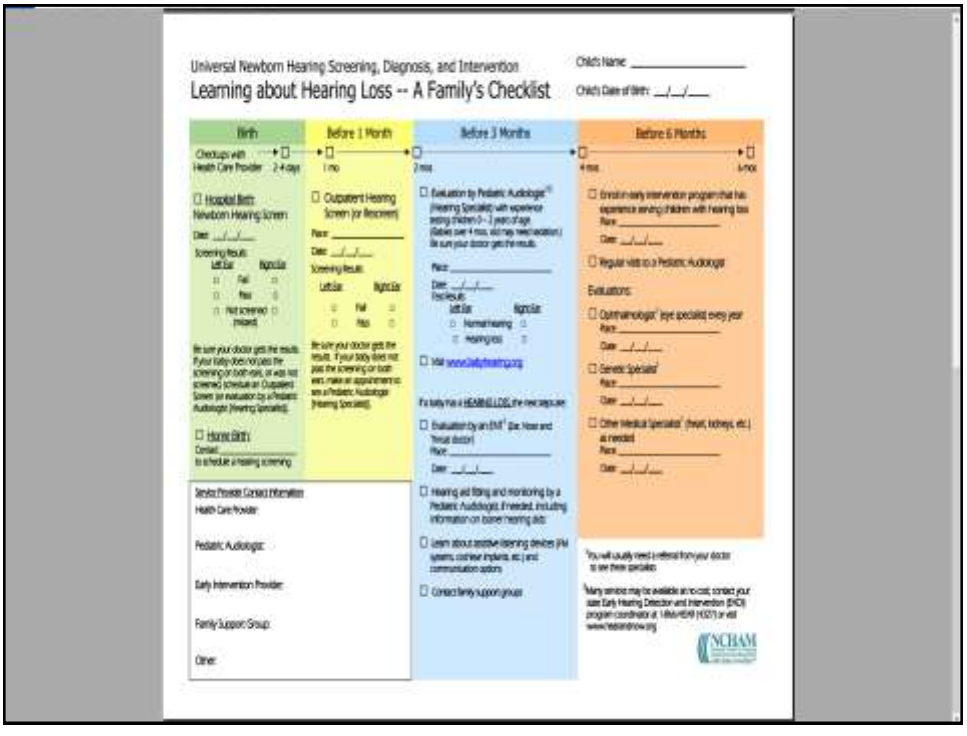
Early Intervention	Contact State EHDI Coordinator www.infanthearing.org www.nectac.org
Parent-to-Parent	www.handsandvoices.org www.babyhearing.org
Physician support	www.aap.org www.medicalhomeinfo.org

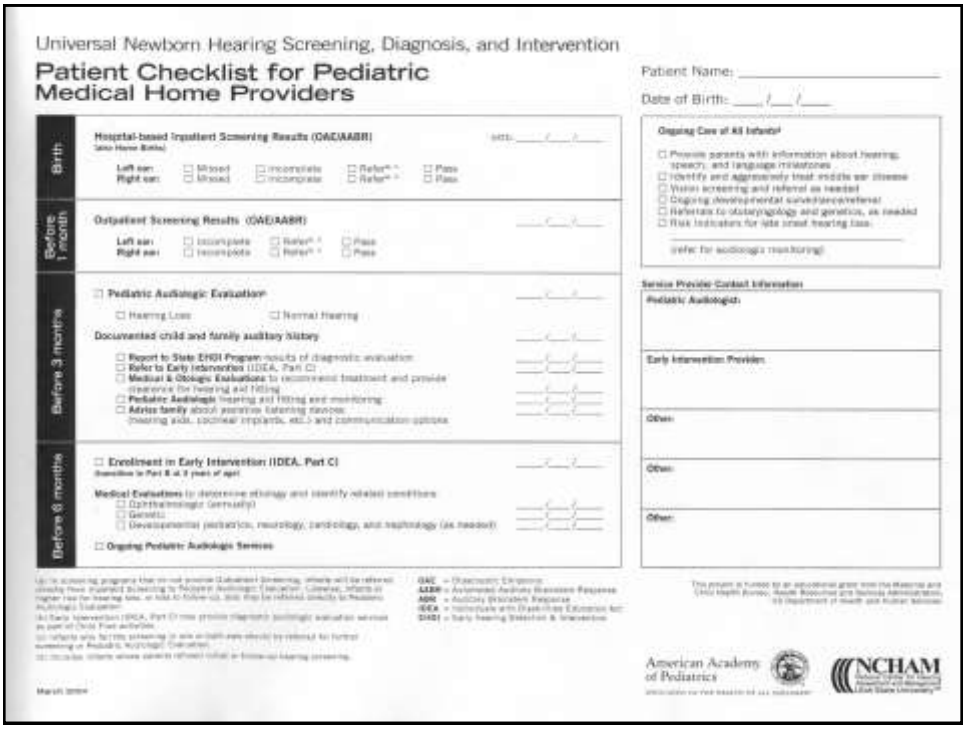
www.babyhearing.org

www.infanthearing.org

www.raisingdeafkids.org/


Universal Newborn Hearing Screening, Diagnosis, and Intervention
Learning about Hearing Loss -- A Roadmap for Families
Birth
Before 1 Month
Before 3 Months
Before 6 Months
Checkups with Health Care Provider
2-4 days
1 mo.
2 mos.
4 mos.
6 mos.
Hospital Birth
Newborn Hearing Screen
Pass
Fail or not screened
Fail
Outpatient Hearing Screen (or Rescreen)
Pass
Home Birth
Normal Hearing
Hearing Loss
Evaluation by Pediatric Audiologist (Hearing Specialist)
Visit www.babyhearing.org
Evaluation by ENT (Ear, Nose and Throat doctor)
Hearing aid fitting by a Pediatric Audiologist
Learn about assistive listening devices (FM systems, cochlear implants, etc.) and communication options
Contact family support groups
Enroll in early intervention program that has experience serving children with hearing loss
Regular visits to Pediatric Audiologist
Evaluations:
Ophthalmologist (eye specialist)
Genetic Specialist
Other Medical Specialists (heart, kidneys, etc.)
Stay tuned to your baby's speech and hearing! Talk to your doctor if you have concerns.
"Baby steps" to listening and speaking:
• startles to loud sounds
• quiets or smiles when spoken to
• coos and gurgles
• cries differently for different needs
"Baby steps" to listening and speaking:
• moves eyes in direction of sounds
• notices music and toys that make sound
• babbling becomes more like speech with sounds such as p, b, and m
• makes different sounds when happy or upset


Universal Newborn Hearing Screening, Diagnosis, and Intervention
Learning about Hearing Loss -- A Family's Checklist
Child's Name: _____
Child's Date of Birth: __/__/____
Birth
Before 1 Month
Before 3 Months
Before 6 Months
Checkups with Health Care Provider
2-4 days
1 mo
2 mos
4 mos
6 mos
Hospital Birth
Newborn Hearing Screen
Date: __/__/____
Screening Results:
Left Ear
Right Ear
Fail
Pass
Not screened (missed)
Be sure your doctor gets the results. If your baby does not pass the screening on both ears, or was not screened, schedule an Outpatient Screen (or evaluation by a Pediatric Audiologist (Hearing Specialist)).
Home Birth
Contact _____ to schedule a hearing screening
Outpatient Hearing Screen (or Rescreen)
Place: _____
Date: __/__/____
Screening Results:
Left Ear
Right Ear
Fail
Pass
Be sure your doctor gets the result. If your baby does not pass the screening on both ears, make an appointment to see a Pediatric Audiologist (Hearing Specialist).
Evaluation by Pediatric Audiologist* (Hearing Specialist) with experience testing children 0 - 3 years of age (babies over 4 mos. old may need sedation.) Be sure your doctor gets the results.
Place: _____
Date: __/__/____
Fax Results:
Left Ear
Right Ear
Normal Hearing
Hearing Loss
Visit www.babyhearing.org
If a baby has a HEARING LOSS, the next steps are:
Evaluation by an ENT* (Ear, Nose and Throat doctor)
Place: _____
Date: __/__/____
Hearing aid fitting and monitoring by a Pediatric Audiologist, if needed, including information on loaner hearing aids
Learn about assistive listening devices (FM systems, cochlear implants, etc.) and communication options
Contact family support groups
Enroll in early intervention program that has experience serving children with hearing loss
Place: _____
Date: __/__/____
Regular visits to a Pediatric Audiologist
Evaluations:
Ophthalmologist* (eye specialist) every year
Place: _____
Date: __/__/____
Genetic Specialist*
Place: _____
Date: __/__/____
Other Medical Specialists* (heart, kidneys, etc.) as needed
Place: _____
Date: __/__/____
Service Provider Contact Information
Health Care Provider:
Pediatric Audiologist:
Early Intervention Provider:
Family Support Group:
Other:
*You will usually need a referral from your doctor to see these specialists
*Many services may be available at no cost; contact your state Early Hearing Detection and Intervention (EHDI) program coordinator at 1-866-HEAR-1121 or visit www.infanthearing.org
NCHAM



Universal Newborn Hearing Screening, Diagnosis, and Intervention

Patient Checklist for Pediatric Medical Home Providers

Patient Name: _____

Date of Birth: ___/___/____

Birth

Hospital-based Inpatient Screening Results (OAE/AABR)

Before 1 month

Outpatient Screening Results (OAE/AABR)

Before 3 months

Pediatric Audiologic Evaluation

Documented child and family auditory history

Before 6 months

Enrollment in Early Intervention (IDEA, Part C)

Medical Evaluations

Ongoing Pediatric Audiologic Service

Ongoing Care of All Infants

Service Provider Contact Information

Pediatric Audiologist:

Early Intervention Provider:

Other:

Other:

Other:

American Academy of Pediatrics

NCHAM

NJ-EHDI Project Contacts

phone: 609-292-5676
TTY: 609-984-1343
fax: 609-633-7830
email: EHDI@doh.state.nj.us
website: www.nj.gov/health/fhs/ehdi

Other helpful websites:
AAP EHDI information:
www.medicalhomeinfo.org/screening/hearing.html
CDC EHDI program:
www.cdc.gov/ncbddd/ehdi