

HEARING SCREENING IN THE NEONATAL INTENSIVE CARE UNIT: CURRENT STATUS AND FUTURE NEEDS



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Acknowledgements

- State EHDI Managers
- 412 NICU representatives in 40 states
- National Center for Hearing Assessment and Management

Sensorineural HL in Infancy

- Prevalence Rate, SNHL
 - ▣ Well-babies: 1-3:1000
 - ▣ NICU 10-20:1000
- Because of the high prevalence of permanent hearing HL in this population, physiologic screening via ABR has occurred in the NICU for over 30 years
- More recently OAEs have been used in the NICU, alone or in combination with a combined ABR/OAE protocol



□ Auditory Neuropathy Spectrum Disorder

- A condition characterized by absent or abnormal auditory brainstem responses in the presence of intact cochlear hair cell function (Starr, Sininger, and Pratt, 2000).
- Prevalence is considerably higher than once thought
 - 7-10 % of infants with SNHL (Rance, 2005); significantly higher in the the NICU population (Berg et al, 2005)
- OAE screening alone will not identify AN

2006 Study of NICU Screening Practices

Hearing Screening in the NICU: Current Practices and Future Needs

Jacobs, Roush, and White (2006)



2006 Study: Methodology

- Survey Instrument
 - ▣ Electronically distributed
 - ▣ 13 Questions
 - Number of Well-Baby and NICU Infants screened
 - NICU Screening Methods and Protocols
 - ▣ Anonymous once submitted
- Distribution
 - ▣ Emailed to State EHDI Managers, January, 2006
 - ▣ EHDI managers asked to determine NICU screen practices for their state
- Results
 - ▣ Responses from 43 states

2006 Study: What technology is used for the initial hearing screening?

- OAE: 8%
- AABR: 35%
- OAE or AABR: 61%

Jacobs, Roush, White, 2006

2006 Study: If re-screening is necessary, what technology/protocol is most often used?

NICU Screening Method and Order	Number of States (%)
OAE followed by OAE	5
OAE followed by AABR	9
AABR followed by AABR	26
AABR followed by OAE	0
Protocols vary	53
Re-screens not conducted	0
Other	7

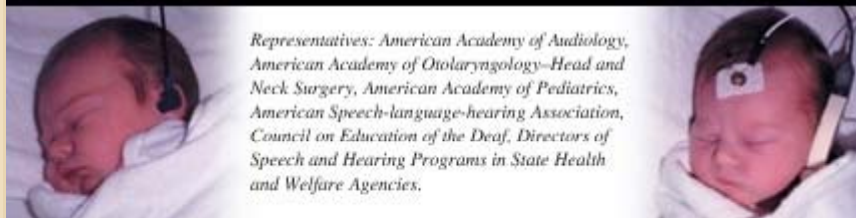
2006 Study: Most significant obstacles or frustrations associated with infant hearing screening in the NICU

- Difficulty with tracking and follow-up
- Discharge before screening completed
- Narrow window of time from when infant is stable and transfer
- Priority of medical concerns
- Lack of qualified screening personnel (especially on weekends)
- Excessive ambient noise levels



(Jacobs, Roush and White, 2006)

JCIH Year 2007: Screening in the NICU



Representatives: American Academy of Audiology, American Academy of Otolaryngology-Head and Neck Surgery, American Academy of Pediatrics, American Speech-language-hearing Association, Council on Education of the Deaf, Directors of Speech and Hearing Programs in State Health and Welfare Agencies.

JCIH 2007: Definition of Targeted Hearing Loss

Expanded from congenital bilateral and unilateral sensory or permanent conductive HL to include neural hearing loss (auditory neuropathy /dyssynchrony) in infants admitted to the NICU > 5 days.



JCIH 2007: Hearing Screen Protocols

- Separate protocols recommended for NICU and well baby nurseries
- NICU babies >5 days are to have ABR included as part of their screen so that neural HL will not be missed



JCIH 2007: Rescreening

- For rescreening, a complete evaluation of both ears is recommended, even if only one ear failed the initial screen.

JCIH 2007: Re-admissions

- Repeat hearing screen is recommended prior to discharge for readmissions of infants in the first month of life, if there are conditions present associated with potential hearing loss

Current Study

Hearing Screening in the NCIU:
Current Status and Future Needs 2010

Current Study

“Hearing Screening in the NICU: Current Status and Future needs”

- ▣ Technology used for screening (OAE/ABR/Both)
- ▣ Protocols (for initial screening and re-screening)
- ▣ Referral criteria
- ▣ Challenges encountered with NICU screening
- ▣ Changes planned or anticipated
- ▣ Recommendations for improvement

Methodology

- Survey Instrument
 - ▣ Electronically distributed (Qualtrix)
 - ▣ Anonymous once submitted (but sorted by state for summary report to EHDl manager)
- Distribution
 - ▣ Email notification to EHDl Managers Jan 2010 (White)
 - Jan-Feb 2010 (Data collection)
 - ▣ EHDl managers asked to identify a knowledgeable respondent at each NICU
 - ▣ EHDl managers asked to forward link to Qualtrix survey
 - ▣ Two reminders sent

Survey Questions

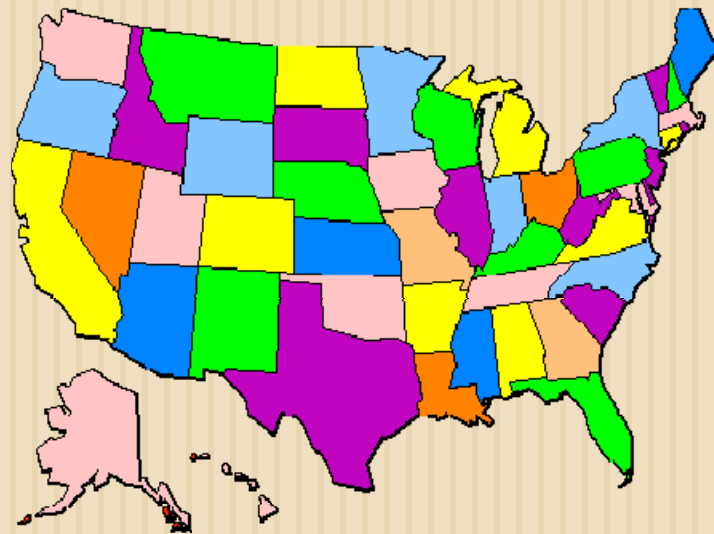
- Please describe the technology you use for initial hearing screenings in your NICU
- If an infant does not pass the initial screening in your NICU, what follow-up is provided?
- If an infant who passed the initial hearing screening is re-admitted for a condition associated with SNHL what procedure is followed?

Survey Questions (continued)

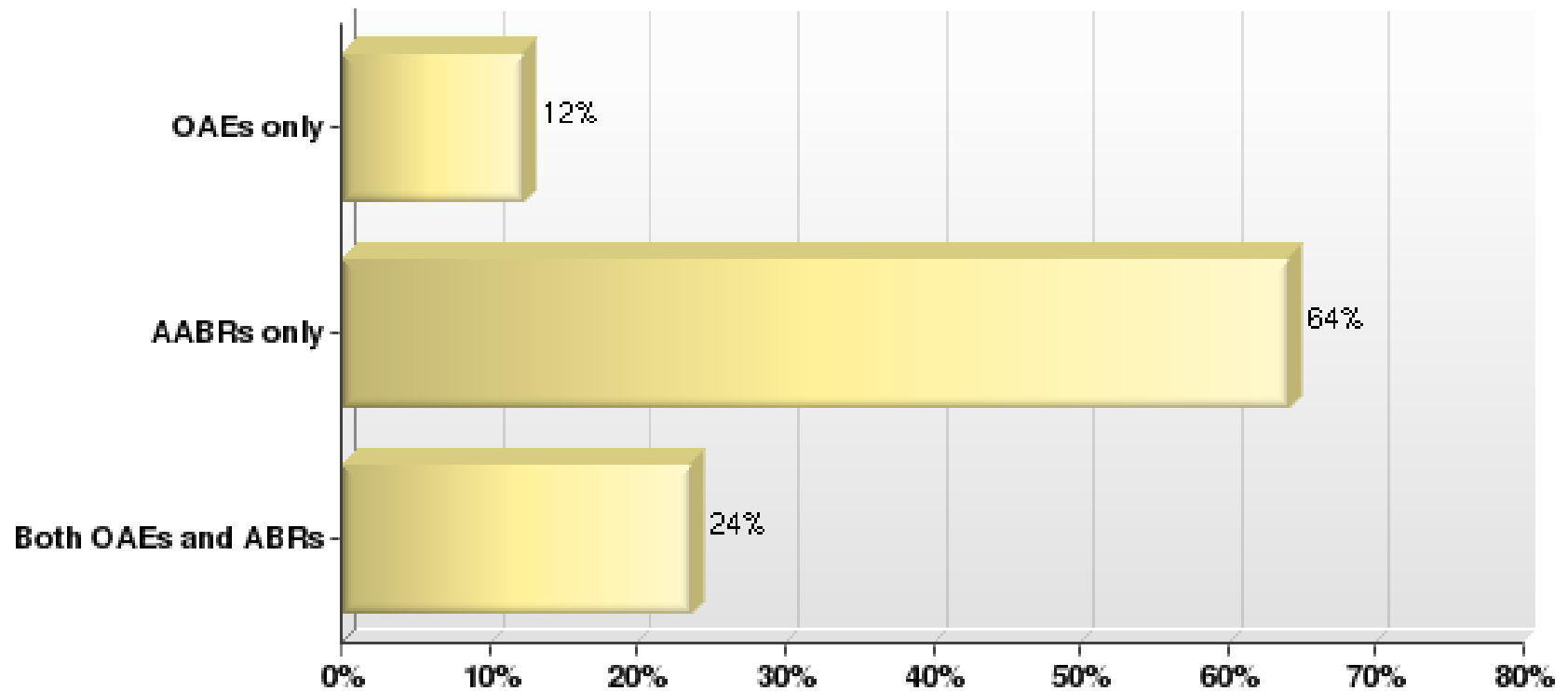
- What do you consider the greatest challenges associated with infant hearing screenings in your NICU?
- Over the next year, what changes, if any, will occur in your hospital with regard to NICU hearing screening or follow-up?
- What recommendations do you have for improving NICU hearing screening and/or follow-up?

Results

- Returns
 - ▣ 412 NICUs in 40 states



Describe the technology you use for initial hearing screenings in your NICU:



If an infant does not pass the initial screening in your NICU, what follow-up is provided?

Answer	%
We provide a second screening by NICU personnel prior to discharge.	49%
We follow another protocol not listed above. Please describe the protocol you follow.	18%
We refer infants/families to an audiologist for follow-up.	16%
We provide a second screening by an audiologist prior to discharge.	12%
We refer infants/families to another professional (not an audiologist) for follow-up. In the space below, please specify the specialist(s).	5%
We alert parents/families of screening results, but don't provide a second screening or a referral for follow-up.	0%
Total	100%

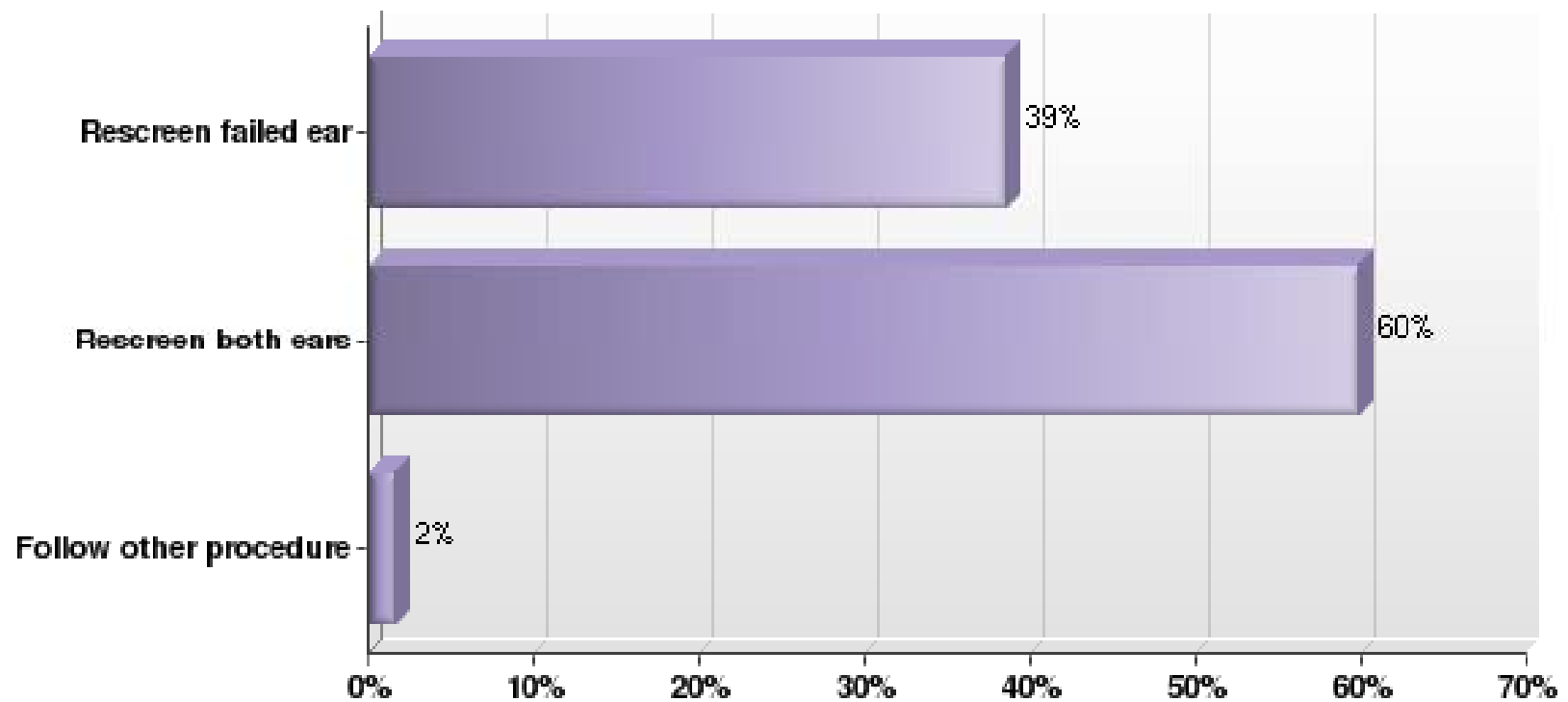
Other protocols employed after failed initial screening

- Rescreen in 2-4 weeks as an outpatient at same hospital
- Rescreen in NICU and schedule diagnostic ABR prior to discharge
- Perform tympanometry and rescreen if tymps were flat; refer if tymps were normal
- Rescreen repeatedly until discharged

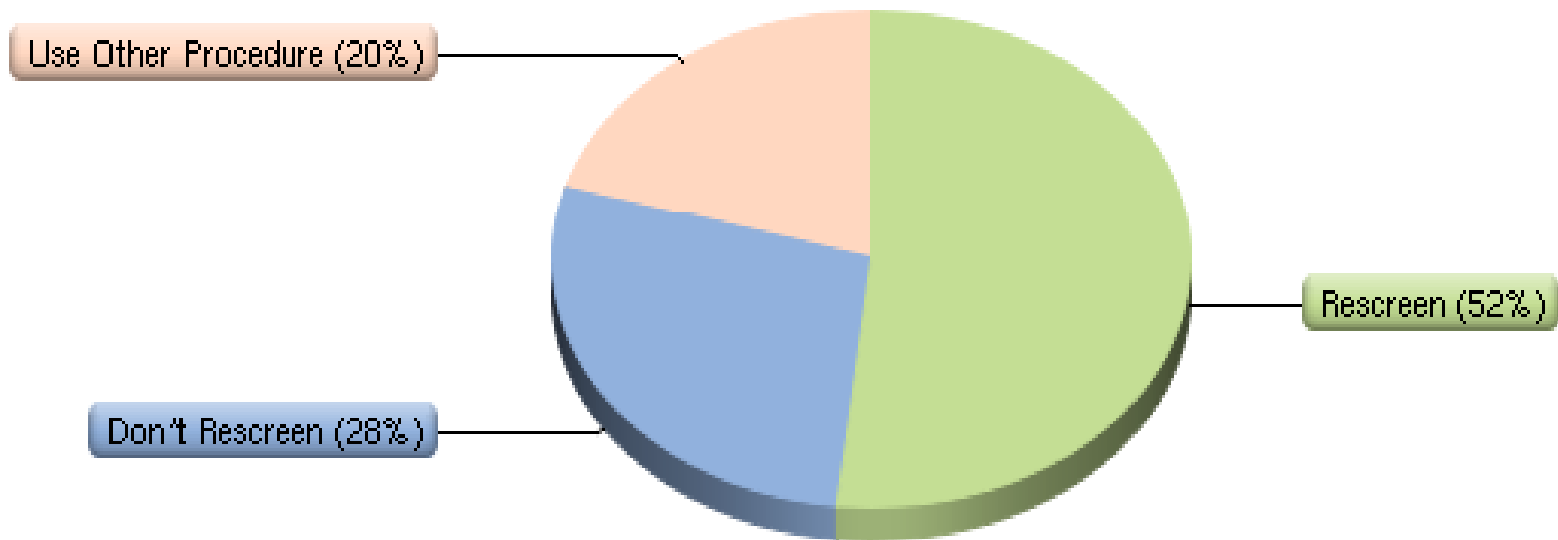
If a second screening is necessary, what is the technology/protocol employed?

Response	%
We use ABR for the initial screening followed by re-screening with ABR.	73%
We use OAEs for the initial screening followed by re-screening with OAEs for infants who do not pass.	12%
We use OAEs for the initial screening followed by re-screening with ABR.	9%
We use another technology/protocol not listed. Please describe the technology and protocol you use.	5%
We use ABR for the initial screening followed by re-screening with OAEs.	1%
Total	100%

If a second screening is performed are both ears re-screened?



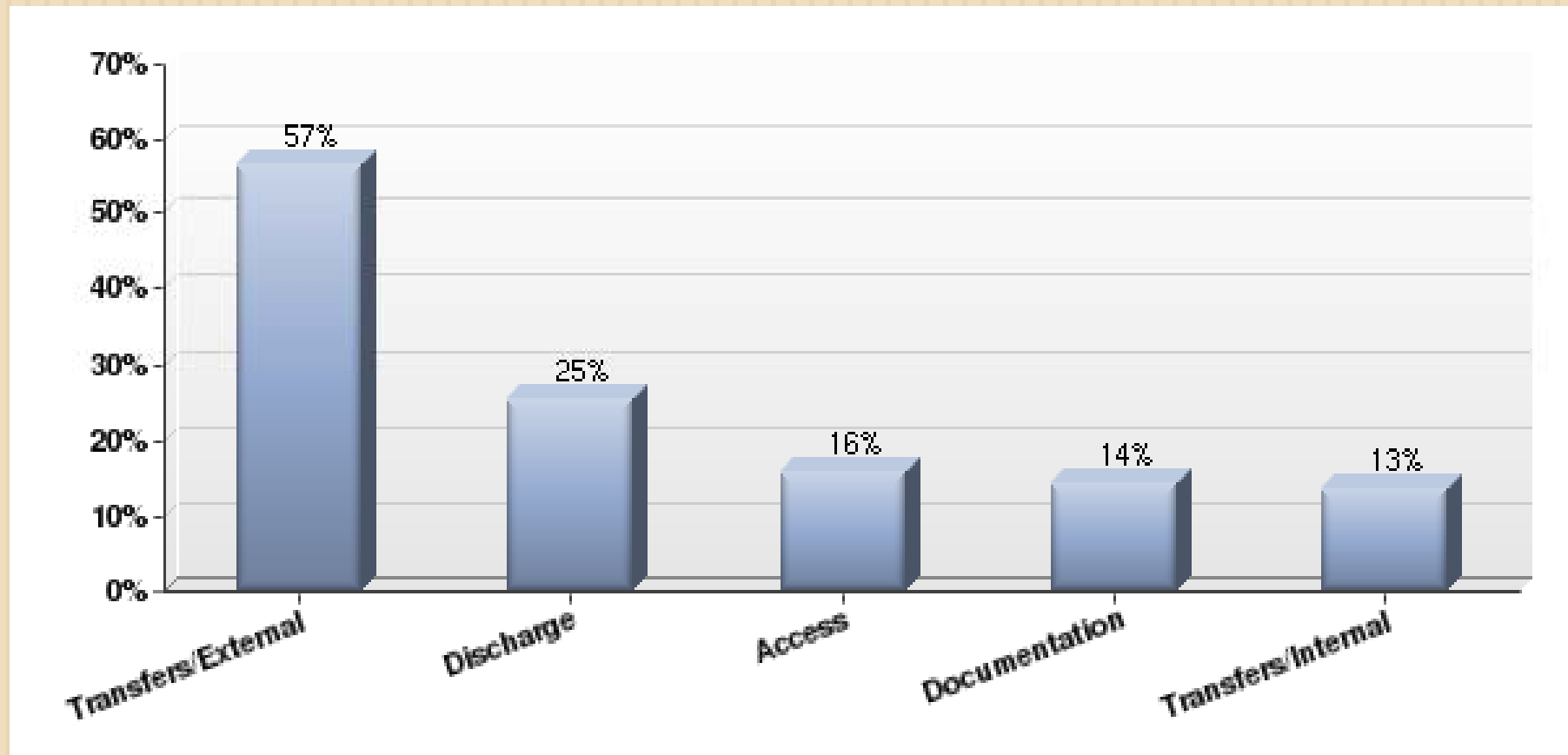
If an infant who passed the initial hearing screening is re-admitted for a condition associated with SNHL, what is the protocol?



Other Re-admission Protocols

- Rescreen per physician or NICU staff request
- Infants are not re-admitted to the NICU and are subject to screening protocols of the unit they enter

What are the greatest challenges associated with infant hearing screenings in your NICU?



Other Challenges

- ❑ NICU professionals are responsible for ordering screenings; screenings ordered inappropriately or not at all
- ❑ Lack of audiologists to do diagnostic follow-up
- ❑ Ambient noise in NICU
- ❑ Equipment problems/availability
- ❑ No guidelines for screening following administration of ototoxic medications

Recommendations from Respondents

- More/better training for NICU nurses, attendings and pediatricians
 - ▣ “...have them attend a conference where they hear families speak on what happened to their child because they missed a screen, or were told inaccurate information. “
 - ▣ “Each baby needs to be a real person to them with a future that will be positive because they were identified early and given intervention, not just a number and another test to perform for that day.”

Recommendations (continued)

- Improve communication between transferring hospitals
- Better take-home materials to educate parents on importance of returning for follow-up
- Better access to specialized audiology services
- More notice before discharge so screenings, diagnostics, and paperwork can be completed

Upcoming Changes

- Purchasing new AABR equipment
- Adding screening staff
- Moving to electronic charting/reporting system
- Moving AABR in all NICU screenings
- More training for NICU staff on high risk factors

Summary

- There is considerable variability in methods and protocols
- Over one-third (36%) of the NICUs surveyed are using OAEs alone or in combination with ABR
- Approximately half the programs surveyed perform a rescreening by NICU personnel prior to discharge; there is considerable variability in the other half
- When a second screening is performed by NICU personnel, nearly three-fourths of the NICUs surveyed use ABR

Summary (continued)

- If a second screening is performed, many NICUs rescreen only the failed ear (39%)
- When infants are readmitted to the NICU for conditions that increase the risk of SNHL, over one-fourth of the NICUs surveyed (28%) do not rescreen
- Challenges to successful NICU screening include: discharge/transfer prior to screening, tracking and surveillance after discharge/transfer

Next steps

- NCHAM will provide a report to each state EHDI manager summarizing:
 - ▣ Number of NICUs responding
 - ▣ Hearing technologies and protocols employed
 - ▣ Challenges and obstacles noted for their state
 - ▣ A list of recommendations for improvement based on the responses obtained from all 42 states
 - ▣ A summary of the JCIH recommendations for NICU hearing screening and a rationale for each