NICU Hearing Screening in North Carolina

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UNC SCHOOL OF MEDICINE

The authors are full-time graduate students in UNC's Doctor of Audiology (AuD) program. They are conducting this investigation in cooperation with the NC-EHDI program in conjunction with their participation as audiology trainees in the North Carolina LEND Program (Leadership Education in Neuro-developmental and Related Disabilities). The findings reported here are part of an ongoing investigation and represent current work in progress.

Introduction

Infants requiring hospitalization in the neonatal intensive care unit (NICU) are known to have a higher prevalence of permanent hearing loss than infants with uncomplicated birth histories. The higher prevalence includes increased risk of both cochlear and neural involvement. The recently published Joint Committee on Infant Hearing *Year 2019 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs* (JCIH, 2019) reaffirmed the Joint Committee's earlier position statement (JCIH, 2007) which recommended automated auditory brainstem response (AABR) as the sole hearing screening technology for infants who have received care in the NICU. Also reaffirmed was direct referral to an audiologist for rescreening infants who did not pass the initial hospital-based screen, and if indicated, a comprehensive audiological evaluation including diagnostic ABR (JCIH, 2019). This poster will report the findings of a project undertaken by four LEND audiology doctoral students working in collaboration with the NC-EHDI program and with mentoring provided by a UNC faculty member and by North Carolina's Unit Manager for Genetics and Newborn Screening. The primary aim is to assess the current status of hearing screening in Level III and Level IV NICU nurseries in North Carolina for purposes of quality improvement.

Specific Aims

Key areas of investigation included selection of screening technology/equipment, calibration and maintenance; protocols for ensuring the competence of screening personnel; communication with the family; linkages to the NC-EHDI program; data entry to the state database *HearingLink*; the role of audiology in oversight of the screening program, monitoring of ototoxic medications, and protocols for referral/follow-up of infants who do not pass the hearing screening. In addition to sharing the findings for North Carolina, we will provide information and resources for replicating this study in other states.

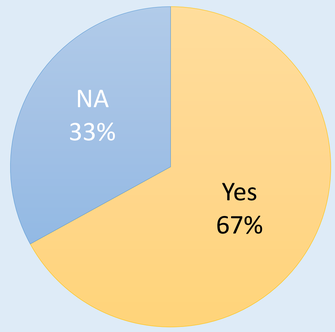
Methods

In February of 2020, a 25-item electronic survey (Qualtrics) was distributed to all 24 hospitals in North Carolina with Level III or Level IV neonatal intensive care units. The survey was directed to a specific individual at each hospital who, according to the NC-EHDI regional consultant, was known to be familiar with their hearing screening procedures and protocols. A member of the research team contacted participating hospitals prior to distribution of the survey to confirm participation and answer any questions. Participants from the 24 NICUs were surveyed the week of February 3, 2020, and responses were received from all 24 NICUs (100% response rate). Two responders reported on behalf of more than one institution. Results were analyzed by the investigators in consultation with NC-EHDI program personnel.

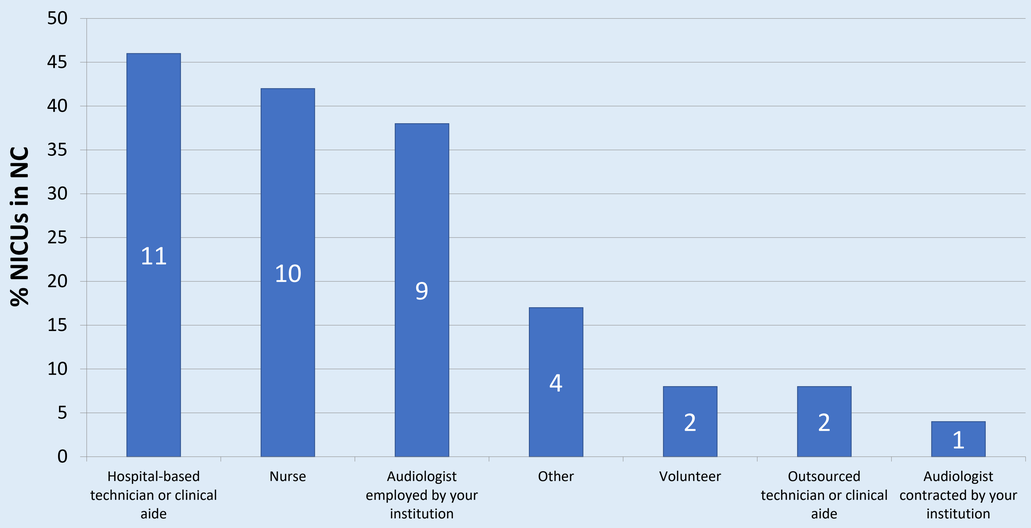
Screening Technology Used in the NICU

Screening Technology	Number of NICUs	% of NICUs
AABR only	20	83%
Both (AABR & OAE)	2	8%
Either (AABR or OAE)	1	4%
Other	1	4%
OAE only	0	0%

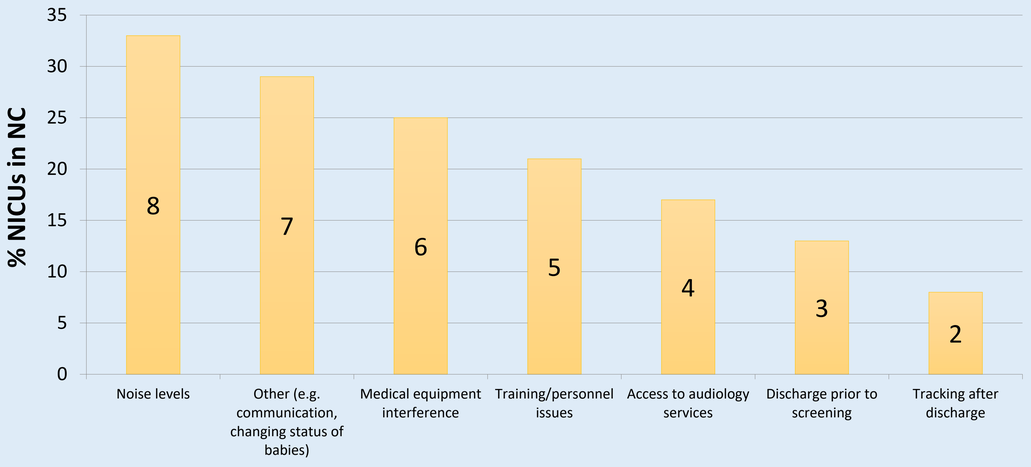
Audiology Involvement/Oversight



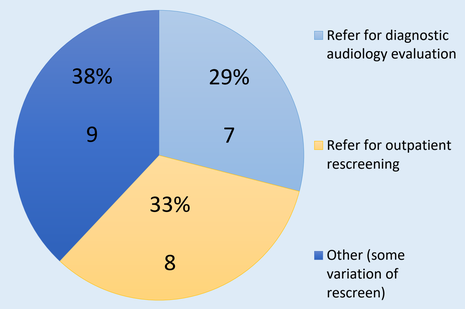
Who Conducts the NICU Screening?



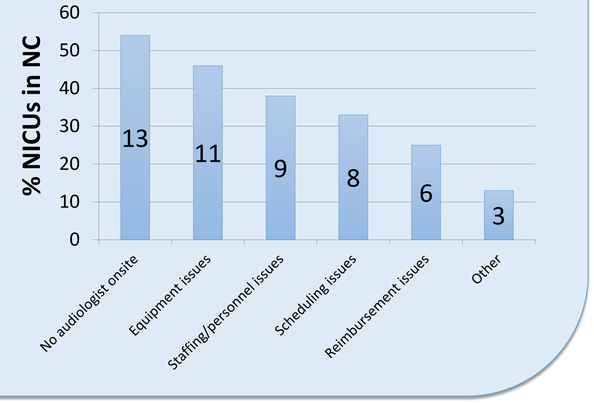
Challenges Associated with Hearing Screening in the NICU



Next Steps After a Failed NICU Screening



Barriers to Providing Diagnostic Hearing Evaluations Prior to Discharge



Key Findings

The 24 Level III & IV NICUs in North Carolina are fully committed to their hearing screening programs; however, a number of key findings were noted:

- Some of our NICUs are not making direct referrals for diagnostic audiology assessment when infants fail their NICU screening.
- Nearly all NICUs are using AABR only but a few are using AABR and OAE; none are using OAE only.
- There is a need for more systematic training and continuing education related to NICU hearing screening.
- Many NICUs report barriers to providing a diagnostic hearing evaluation on site prior to discharge.
- There is lack of standardization in monitoring ototoxic medications.
- Nearly all NICUs are rescreening infants readmitted to the NICU if there is a risk factor associated with the readmission or treatment.
- Three NICUs are outsourcing their hearing screening programs.

Recommendations from our NICUs

- Screen hearing prior to discharge whenever possible.
- Schedule diagnostic evaluations before discharge.
- Improve communication between audiologists and NICU staff.
- Provide more training and orientation related to hearing screening.
- Perform the screening when best for the baby (e.g. when ready for discharge, after a feeding, when environment is quietest).
- Ask NC-EHDI to provide priority tracking for NICU babies who fail their screening.
- Raise awareness of ENT's and Primary Care Providers regarding need for monitoring and follow-up.
- Promote collaboration within the NICU team to optimize communication and flexibility regarding the scheduling of hearing screenings.
- Investigate reimbursement and resources needed to enable onsite diagnostics.
- Improve staff education regarding noise levels and the referral process.
- Provide more audiology oversight for the screening program.

Next Steps

- Share a statewide aggregate summary with each NICU representative.
- Share the individual findings from each NICU with the NC-EHDI Regional Consultant for follow-up as needed.
- Present findings to the NC-EHDI Advisory Committee.
- Make the survey instrument available to EHDI programs in other states.

References

Joint Committee on Infant Hearing. (2019). Year 2019 position statement: Principles and guidelines for Early Hearing Detection and Intervention programs. *Journal of Early Hearing Detection and Intervention*, 4(2), 1-44.

Joint Committee on Infant Hearing. (2007). Year 2007 position statement: Principles and guidelines for Early Hearing Detection and Intervention programs. *Pediatrics*, 120(4), 898–921.

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