Outcomes and Quality Improvement in Hearing Specialty Early Intervention

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HEARING EXPERIENCE LANGUAGE LEARNING OUTCOMES
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The New England Center for Hearing Rehabilitation (NECHEAR)

NECHEAR was established with the mission of assisting children with hearing loss and their families in becoming fully participating members of their community. This goal is achieved through comprehensive audiological testing and fitting children with the most suitable devices as early as possible, enabling access to speech and language. Immediate enrollment into intervention programs facilitates the development of listening and spoken language skills. Our proactive approach to intervention aims to prepare children to join educational settings alongside their peers with normal hearing as early as possible.

Figure 1. Collage of NECHEAR Clinical Service

Collaboration on existing research and community events

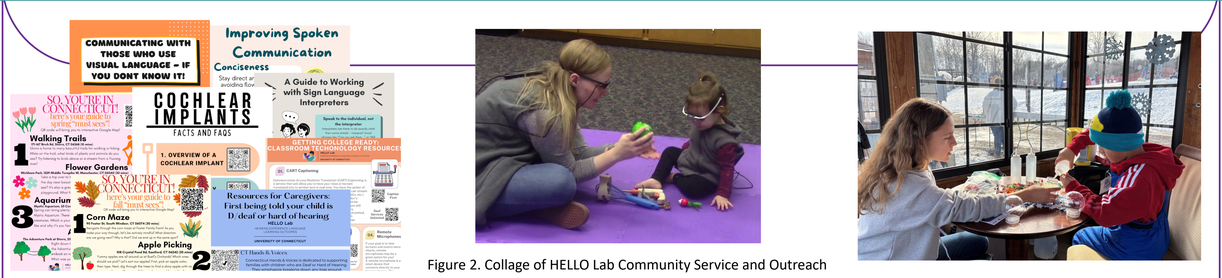

Figure 2. Collage of HELLO Lab Community Service and Outreach

The HELLO Lab is dedicated to exploring one of the most fundamental aspects of life, language. We currently run federally and internally funded grants related to children who are D/deaf and hard of hearing and work to actively engage our community in service, research, and inclusive fun through research collaborations, educational materials development, and events with our community partners.

The Hearing Experience Language Learning Outcomes (HELLO) Lab at UConn

Community Engaged Research

How did we get to this point?

Collaboration through research allows for the transition of research into actionable clinical tools.

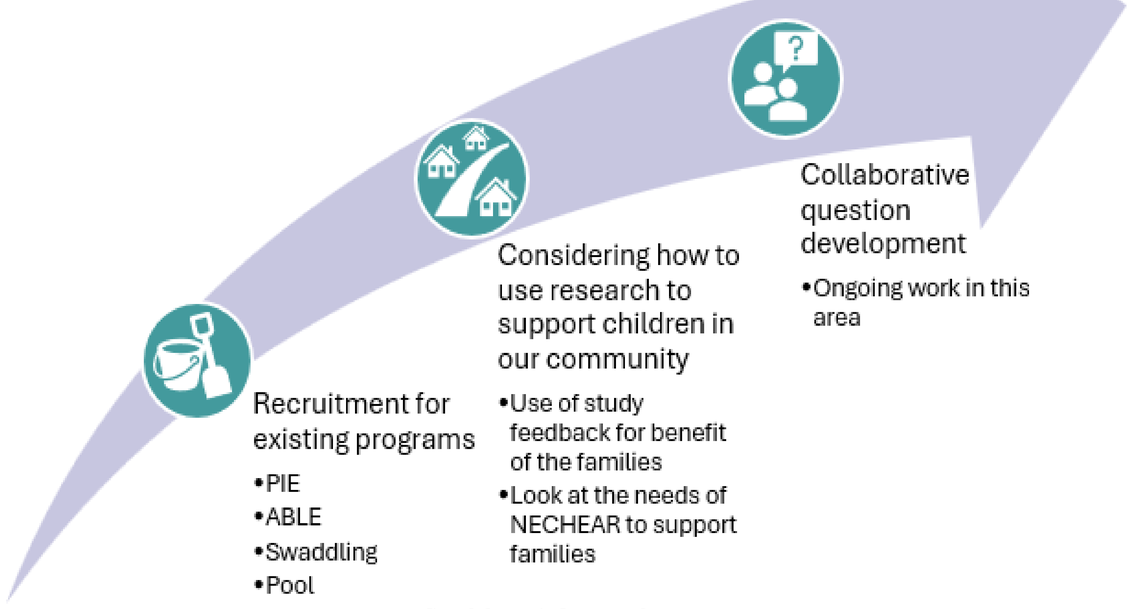

Figure 3. Community Engagement Process

Database Development

Database Planning

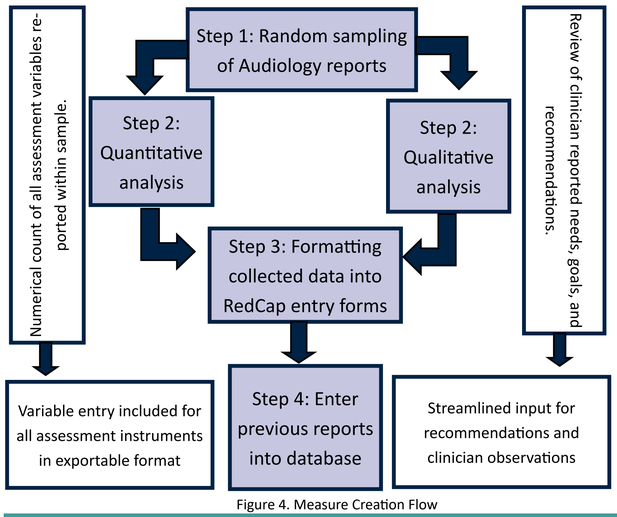

Figure 4. Measure Creation Flow

Structure

We used REDCap to design a clinical database with adaptive data entry fields.

Implementing research within a clinical setting MUST acknowledge the paramount need to make the research process an integrated and seamless part of the clinical service.

IN THE CLINIC

- After a client's visit, the clinician can go into REDCap, select which assessments were performed, and only be prompted to input relevant information.
- Information that is static, like name and date of birth, stay populated across time.
- Fields can autocalculate, like the sum of sub-scores in a clinical assessment.

DATA STORAGE

- REDCap allows secure data storage and a set mode of clinic to university communication.
- The clinic maintains their own medical records.

ASKING QUESTIONS OF THE DATA

- Data can be easily queried based on the question being asked.
- We collaborate as a group across clinical and research professions to develop questions and processes.

Figure 5. Use of RedCAP

Measures used

AB Nonsense Words	AB nonsense words can be used to track the auditory perception of children that are able to repeat back what they hear; the advantage of nonsense words is that there is no linguistic context.
AB Words	This tool is used informally to monitor a child's auditory perception of phonemes.
Aided Audiogram	An aided audiogram continues to be important to understand an individual's detection of soft sounds with devices.
AZBio	AZbio sentence lists offer information regarding a school age child's ability to perceive and recognize words in running speech; comparisons can be drawn when tested in various conditions.
BKBSin	This standardized test is used to determine the difficulty a child has listening in noise compared to their peers; this information can be useful when determining DM recommendations.
CASL-2	Portions of this test are used based on student needs—syntax, semantics, pragmatics, and supralinguistical skills, and each test can be analyzed separately or together.
CELF-P and P3	Provides standard scores related to a child's receptive and expressive language skills, compared to their typical peers; use of this test can offer specific goals and objectives for a child's plan.
CNC	Consonant-nucleus-consonant word lists are used with children that are able to repeat back recorded words to monitor a child's auditory perception, and various conditions can be compared.
Devices	NECHEAR documents what devices a child wears and the warranty information.
Evt3	This monitors the expressive vocabulary, as vocabulary growth, is an integral part of aural habilitation and education.
HINT	The Hearing in Noise test list may be used in place of the AZBio for children that are in between the Pediatric AZBio and AZBio lists, and is it given in various conditions.
Immittance Testing	Immittance testing measures the middle ear status and acoustic reflexes of child; this is some of the information that is objective and used in a battery of tests to determine etiology.
LCT	The Listening Comprehension Test is used in school age students to connect with classroom performance.
LIFE-R	Listening Inventory for Education revised collects information from students and their educators regarding how the student accesses what is being said in the classroom.
OPUS	The Oral Passage of Understanding assesses how a student is comprehending what they hear in a classroom, with added information to analyze what the students focuses on when listening.
OTHER	Individualized testing can be included as needed.
PEACH	The Parent Evaluation of Aural Performance of Children is a parent questionnaire that addresses listening in daily living situations.
Pedi AZ Bio	This is a pediatric version of the AZBio includes information on the processing of sentences in varying listening conditions, use of linguistical information, and perception of running speech.
Phonological Needs of Students	NECHEAR often modifies this test in order to glean information regarding a child's ability to produce a word spontaneously versus imitate a word, with added visual cues when needed.
PLS	Sometimes used during the B23 transition process to give information regarding a toddler's expressive and receptive language.
PPTV-5	The Peabody Picture Vocabulary Test is a standardized receptive vocabulary test that is important to use to track the vocabulary growth.
Recommendations	The recommendations are included for each child to support language development.
REEL	Gives information about receptive and expressive language, and vocabulary growth; this test is used often for children in Birth to Three, as a tool for the therapists and for parents.
RESCA E	Used in school-aged children to assess receptive, expressive, and social language. The addition of the social communication component is an integral tool when developing goals.
SPELT	Assess the spoken language of toddlers and school age children, and gives important information regarding the syntax and grammar skills. of a student.
Spontaneous Language Sample	Allows for assessment of MLU, syntax, morphology, and vocabulary. All are important language components that may not be entirely addressed with standardized tests.
TAPS 3 and 4	Assesses a child's phonological processing, auditory memory, and listening comprehension; analysis is invaluable to give information regarding a student's auditory profile.
TEACH	A skills questionnaire, similar to the PEACH, to document a student's listening behaviors in the classroom.
Test of Auditory Function	The test can be used with two year olds through middle school to assess the auditory skills of children that use hearing devices to look specifically at auditory skill development.
Test of Narrative Language	NECHEAR uses this test as part of a comprehensive Communication Evaluation.
Unaided Audiogram	Provides insight into the child's access to sound without assistive technology.
Unfamiliar multisyllabic words	NECHEAR uses this informal test for older students, to assess their ability to perceive novel words in sentences.
VFS	Students that are mainstreamed may show no delays in language scores, but the VFS can give information about how their hearing loss affects them in school and support accommodations.
WIPI	Assesses a young child's word recognition and discrimination ability. This test is a forced choice picture pointing test, so the child does not need to be speaking.

Table 1. Measured used in Database

Next Steps

The use of this data has been approved at non-Human Subjects Research for program improvement at NECHEAR.

We are currently in the process of inputting the records from NECHEAR into the described database.

Under review with the UConn IRB is a protocol to allow for the HELLO Lab to review the data in the database for more long term questions including:

Clinical tools used in care provision, impact of various demographic variable on outcome measures, the predictive utility of various clinical measures on speech, language, and educational placement outcomes.

Acknowledgements

Our community service, engagement, and research would not be possible without the families that take time to engage with our lab.

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Is your child D/deaf or hard of hearing?

Are you interested in being a part of hearing-related research?

Join the HELLO Lab participant pool for personalized invitations

Primary Investigator: Derek Houston derek.houston@uconn.edu

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