

# Editorial

## Research in Pediatrics: Cincinnati Children's Hospital and Beyond

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Infants and children are perhaps the most challenging population audiologists are called upon to assess and treat. Unlike adults who can provide specific historical information and feedback, the assessment and treatment of infants and children often involves clinical decision making in the absence of input from the patients themselves. The irony is the imperative to be absolutely correct when addressing hearing loss, auditory system dysfunction or vestibular disorders, due to the long-term consequences from incorrect decisions.

An often-stated axiom of pediatric audiology is that children are not little adults. Yet, for far too long we have practiced pediatric audiology with critical gaps in our understanding of the normal responses of infants and children to some of our most basic audiological tests, and even more limited knowledge for newer tests, such as vestibular evoked potentials. A common thread through this group of articles is to better understand the development of normal children, so that clinicians can more easily recognize abnormal responses.

Jeffrey Kuhn, Violette Lavender, and their colleagues studied the ocular vestibular evoked myogenic potential (oVEMP) in children aged three to nine years. They found larger response variability in children, and reported on a modified technique to aid pediatric audiologists in obtaining reliable responses from young children. Similarly, Kay Bachmann and colleagues studied the video head impulse test (vHIT), a new tool to assess the function of all six semicircular canals (SCC) by measuring the gain of the vestibulo-ocular reflex (VOR) in response to rapid head

turns. Their results showed a large amount of variability in the data for the children, which was at least partially attributed to large pupil diameter in the younger subjects. Testing modifications were necessary to obtain adequate data on the pediatric participants. Despite these methodological differences, however, children were found to have adult-like results in both studies.

Assessment of auditory neuropathy in infants has not routinely included assessment with non-invasive electrocochleography (ECoChG), and normative data in infants has not been published. Lisa Hunter and colleagues showed that, in normal infants and those cared for in the NICU, ECoChG responses can be readily obtained in the context of a routine, click-evoked auditory brainstem response. ECoChG provides a measure of neural function that complements otoacoustic emissions and wideband middle ear testing.

We have been fortunate to observe the dedication of pediatric audiologists and their capabilities in assessing, diagnosing, counseling, treating, managing, and supporting children with auditory and vestibular loss. We continue to be impressed with their willingness to engage new ideas, generate relevant questions, and embrace emerging technologies, all in the interests of advancing the care of infants and children. While audiologists hold paramount their dedication to high-quality care, at the same time they are asked to deliver care with greater efficiency. Thus, audiological practice must assess business practices so that the right amount of care is delivered at the right time, with adequate staffing.

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In collaboration with Roanne Karzon at St. Louis Children's Hospital, we surveyed pediatric audiologists regarding use of test assistants. The results show that while more than half of pediatric settings report using test assistants, their duties vary widely and there is no consistent approach to education or training of assistants. It is clear that we must finally embrace and take seriously the need to adequately train and utilize assistants in our practices.

Care for children with complex, multiple disorders is ever increasing in pediatric audiology practices, and the multifaceted needs of these children can be overwhelming for clinicians to manage. Annirudha Deshpande and colleagues studied functional MRI as a biomarker for cochlear implant (CI) recipient outcomes related to auditory and language performance, and found that specific auditory- as well as extra-auditory brain responses- to noise, speech, and silence contrasts correlated with parental reports of their children's performance. Auditory processing disorders (APD) have long been controversial to assess due to complex, inter-related auditory, attention, cognitive, language, and developmental factors in children. This is an area that is urgently in need of a better clinical approach in young children.

Dave Moore and colleagues present one of the largest published data sets from a pediatric audiology service, showing insensitive test performance in the most commonly used tests of APD, while association between these tests with other diagnoses was nearly universal, calling into question the simplistic practice of diagnosing APD on the basis of the typical test battery. Susan Wiley and colleagues explored caregiver stress and the special needs of families of children with dual diagnoses of hearing loss and autism spectrum disorder, finding

that ASD was the primary factor related to reported stress and needs of these families.

Critical to all of these articles is recognition of the need to continually question our current methods in order to meaningfully advance the research that underlies clinical care. In this regard, we have also been fortunate that Cincinnati Children's Hospital Medical Center (CCHMC) encourages and supports basic science, translational, and clinical research across all disciplines, including auditory sciences and audiology. With a greater than \$1.5 billion research endowment (that's 1.5 billion!), CCHMC has purposefully made research a cornerstone of its mission.

In fiscal year 2017, CCHMC received more than \$218 million in sponsored program support for research. As part of this investment into clinically oriented research, CCHMC created the Communication Sciences Research Center (CSRC) in 2012. CSRC brings together translational researchers to focus on auditory, speech-language and reading concerns in infants and children. CSRC serves as a research hub for translational research in auditory and vestibular science at CCHMC.

One of the core tenets of CCHMC is sharing discoveries so that children in Cincinnati and around the world can thrive. We recognize the necessity of research to improve our ability to serve infants and children with auditory and vestibular disorders. It is in this light that we are pleased to provide this issue of *JAAA* with its focus on some of the auditory and vestibular research that is occurring at CCHMC, and beyond.

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