

OBJECTIVE

To provide support for and encourage the use of evidence-based hearing screening tools in Early Intervention (EI) Colorado.

BACKGROUND

Approximately 18,000 children enter early intervention in Colorado each year. Colorado EI guidelines state that children must have received a hearing screening within the last year. Colorado's EI program deems the use of otoacoustic emissions (OAE) as best practice but also states that if OAE screening is unable to be completed, it is permissible to use the H.E.A.R. checklist^{4,5}. During the COVID-19 pandemic, all early intervention agencies provided virtual hearing screenings using the H.E.A.R. checklist, and today, several evaluation entities still solely use the virtual format. Approximately 70 EI evaluators receive training from an audiologist about hearing screenings and use of the OAE equipment (Otodynamics Otocheck LE) purchased by the state of Colorado for these screenings each year, but a number of them have reported that they lack confidence in their skills to perform the OAE screening.

Ensuring that evidence-based screening procedures are in place for EI is vital to increase the likelihood of early identification of children with hearing loss. 2023 estimates report that the incidence of hearing loss increases from 1.86% (congenital hearing loss) to 2.7% at age 4 years³. The increased incidence of hearing loss in young children coupled with the fact that 54.8% of infants in Colorado who did not pass newborn hearing screening (NBHS) were lost to follow-up or lost to documentation in 2022², highlights the importance of accurate and appropriate early hearing screening. In addition, there are other factors that contribute to late identification of children including developmental/medical comorbidities, middle ear disorders, mild hearing loss, and family follow-up issues⁶; children with additional disabilities often are identified with hearing loss later than those without additional disabilities and they face significantly longer delays from referral to EI compared to children without disabilities⁸; NBHS measures do not detect late onset hearing loss and progressive/acquired loss^{1, 6, 7, 10}; and disparities between NBHS protocols of rural and urban birthing hospitals have been shown to impact identification of hearing loss and appropriate referrals to EI services⁹.

To provide additional support to EI Colorado service providers in their efforts to increase the use of OAEs for hearing screening, the audiologist trainer provided feedback she had heard from EI service providers which seemed to fall into themes. Together, it was decided to move forward with a project to create resources for EI Colorado service providers that would address those issues that were reported, be easily accessible, and provide additional support to encourage the use of evidence-based hearing screening methods.

H.E.A.R. CHECKLIST	
Indicators Associated with Hearing Loss	
Children and youth who have any of the following history are of greater concern for potential hearing loss. Bolded items are of greatest concern for potential permanent hearing loss.	
H: Health	<ul style="list-style-type: none"><input type="checkbox"/> Large number of episodes of ear infections, PE tubes, or ear surgeries<input type="checkbox"/> Problems during pregnancy or delivery<input type="checkbox"/> Neonatal Intensive Care (NICU) stay of five or more days<input type="checkbox"/> Prolonged mechanical ventilation (5 days or longer)<input type="checkbox"/> Hyperbilirubinemia requiring exchange transfusion<input type="checkbox"/> Congenital infections known or suspected to be associated with hearing loss (i.e. toxoplasmosis, syphilis, rubella, cytomegalovirus (CMV), and herpes)<input type="checkbox"/> Bacterial meningitis<input type="checkbox"/> Head trauma, especially basal skull/temporal bone fractures<input type="checkbox"/> Diagnosed or suspected neurodegenerative disorders such as Hunter syndrome, Friedreich ataxia, and Charcot-Marie-Tooth syndrome<input type="checkbox"/> Exposure to ototoxic medications (gentamicin, tobramycin, chemotherapy) or loop diuretics (Furosemide/Lasix)<input type="checkbox"/> Family history of permanent childhood or early-onset hearing loss

Image 1. Example of portion of H.E.A.R. checklist; use QR code to access full document

METHODS

The following were identified as issues that arose during/after training on the OAE unit:

- Turning the unit on/off, charging the unit
- Settings: Changing time/date
- How to change the screen/view, move through screens
- Choosing a probe tip, probe parts, putting it on the device
- Performing a listening check
- Troubleshooting: too noisy, poor fit
- Troubleshooting: unable to calibrate
- Troubleshooting: frozen screen
- Tips and tricks/helpful hints during screening

The project team used recording equipment (camera, tripod, microphone), staging equipment (backdrop, sound booth space), and the Otodynamics Otocheck LE to create short (60-90 seconds) videos to address the variety of issues.



Image 2. Equipment used for video creation

- Step-by-step scripts and action items for video recordings were created.
- Videos were recorded videos in multiple sessions
 - One participant read the script while the other completed the actions using the equipment
- Video editing was done using the software iMovie, from Apple
 - Voiceovers of the instructional scripts were added to the videos
 - Visuals were added (such as arrows/circles) to draw attention to equipment parts or screen messages
 - Captioning was added to the videos



Image 3. Photos taken during video filming

CONCLUSIONS/FUTURE DIRECTIONS

The videos are in the process of being shared with EI service providers. In addition, a "Best Practices Guideline" for using OAEs in EI screenings will be created and shared for reference. All resources will be shared in many ways: at EI trainings, online on websites including the University of Colorado Boulder's Department of Speech, Language, and Hearing Sciences, JFK Partners LEND, and EI Colorado. QR codes will be taped to OAE units so that screeners can access resources quickly and easily when they are needed. The project team will create and distribute a survey to screeners to gather updated information regarding their comfort administering screenings as well the need for additional resources and support.

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