

Guidance for Early On® Providers - Utilizing Otoacoustic Emissions (OAE) Hearing Screening Equipment

Importance of Hearing Screening

“When my son was a toddler, there was no regular interval hearing screening system in place after babies left the hospital. So my son’s hearing loss went undiscovered for the first three years of his life. Just think of all that missed learning time! Now that Early On screens hearing, there is a tremendous opportunity to prevent costly and time-consuming interventions and therapies for a lot of children.” - Parent

The brain is the true organ of hearing.

The ears only transmit sounds to the brain. Infants born with hearing loss to parents with typical hearing are not starting from the same point as a child with typical hearing. They have missed out on twenty weeks of typical auditory brain development before birth. Hearing loss in infants has been called a “neurodevelopmental emergency” (Anderson, K.L., 2011). Ninety percent of hard of hearing infants are born to typical hearing parents.

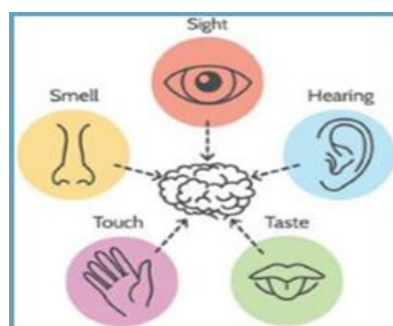


Figure 1: Hearing, like all the senses, occurs in the brain. The ears are the pathways to the brain for sound.

Early identification is important because unidentified hearing loss can lead to speech/language delays, academic difficulties, and social/emotional delays (Quick Statistics About Hearing., (n.d.)).

The Early Hearing Detection and Intervention (EHDI) goals are:

- For all infants to be screened for hearing loss no later than one month of age
- Those who do not pass the hearing screen will have a diagnostic hearing evaluation no later than three months of age
- Infants identified as deaf or hard of hearing will be enrolled in early intervention services no later than six months of age.

Importance of Hearing Screening - Continued

Most physician offices do not have the equipment to screen for hearing, therefore, it is critical for Early On staff to utilize the hearing screen equipment. A physician performing a routine ear examination of a child cannot identify hearing loss.

A baby can pass their hearing screen at birth but have a hearing loss later. OAE screening is one way to identify late onset hearing loss. Infants who pass their newborn screening can develop acquired hearing loss. Causes of late onset hearing loss may include:

- 1) Family history
- 2) Cytomegalovirus (CMV)
- 3) Extracorporeal membrane oxygenation (ECMO) often used in Neonatal units
- 4) Over 400 syndromes
- 5) Significant head trauma
- 6) Postnatal infections such as bacterial and viral meningitis

(Year 2019 Position Statement: Principles and Guidelines for Early Hearing Detection and Intervention Programs., 2019)

Importance of OAEs: Parent Story

“When we called our son to us, sometimes he would come. The times he didn’t we thought he was just being stubborn. He also appeared to hear sounds we made behind his back. So, it seemed to the casual observer that he passed the subjective checklist to ‘screen’ for hearing loss. But he was really just hearing sound in general. He wasn’t hearing and understanding all the sounds of speech. For example, when we say ‘sunshine,’ he may only hear ‘unine’ because he is mostly missing the high frequency speech sounds such as ‘s’ and ‘sh.’” - Parent

Hearing loss is invisible, infants can respond to sounds around them and still have hearing loss. Therefore, it is critical to complete objective measurements to determine the hearing status.

Importance of OAEs - Continued

Subjective screening methods (risk assessment questionnaires) are typically not as effective as objective screenings in identifying hearing loss for very young children. Because the incidence of hearing loss nearly doubles between birth and school age, conducting annual (or more frequent) objective OAE hearing screenings from birth to three years of age, along with prompt follow-up, increases early identification. Studies have shown that only 50 percent of children with hearing loss are identified as deaf or hard of hearing (D/HH) by using risk assessment questionnaires (Bernstein et al. 2013).

Ninety-five percent (76/80) of birth hospitals conduct Automated Auditory Brainstem Response (A-ABR). Therefore, most infants will need A-ABR rescreen if they do not pass the hearing screen prior to discharge. Please send families to rescreen sites that have agreed to follow EHDI best practice guidelines. [For a complete list of rescreen sites visit this link.](#)

OAEs will not identify Auditory Neuropathy/Mild hearing losses but A-ABR will.

How Can the OAE Make a Difference: Parent Story

“By the time our son’s hearing loss was identified properly, he was significantly behind peers in speech and language. In addition, his behavior was horrible, because he did not understand what was going on like his hearing peers did, and he became frustrated very easily. We consulted with sensory, behavioral, and psychological specialists, but the behaviors were all a result of decreased hearing. Imagine being a toddler and trying to learn and comprehend what’s going on in the world as if you are wearing earmuffs and when voices sound like Charlie Brown’s teacher.” - Parent

In a nationwide survey, 97 percent of parents of deaf or hard of hearing (D/HH) children state they preferred to get support and information from another parent of a child who is D/HH (Jackson, C. W., 2008).

To learn more about how OAE can make a difference, click [here](#) for more resources, and to view a short video from physicians and parents about screenings in the “Testimonies and Reflections” section.

Support for families is available: [Michigan Hands & Voices](#) is a parent-led non-profit that can help families when: 1) infants are undergoing hearing tests for their child which may be a confusing and time-consuming period, and 2) a family has confirmed their child’s hearing loss. Email: mihandsandvoices@gmail.com, Phone or Text: 248-845-8762.

Keys to Successful Screening

Proper probe fit is critical to successful screening.

- 1) If the probe is too small, it may allow external noise to interfere with the screening (error message: too noisy) or it may slow down the screening duration.
- 2) If the probe is too large, it may fall out of the ear and it is NOT recommended that the probe is held in place. The microphone in the probe is sensitive and touching the probe causes interference which slows down the screening.
- 3) Minimize movement. Every time the child moves, the probe moves which causes noise and interference.
- 4) Minimize internal noise by finding a distraction technique (quiet toys) that does not require the child to speak. Minimize external noise by locating a quiet room with minimal distractions.
- 5) If children are difficult to test, they may be screened while sleeping, if necessary.
- 6) Screening in groups allows anxious children to watch others be successfully screened.

Calibration

Calibration is the process of adjusting audiometric instrumentation to conform to established specifications (ANSI standards).

Complete annual calibration by contacting one of the manufacturer's listed below:

- Eartek Services: 616-607-2698
- E3 Gordon Stowe: 734-981-3655
- School Health Corporation: 800-235-1305

If you are having technical difficulties with equipment or need some troubleshooting tips contact the manufacturer, Early On consultant, or Jennifer Dakers at DakersJ@michigan.gov.

Please ensure annual budgets include costs for equipment calibration, disposable supplies, and printer paper.

Follow-Up

Not all babies will pass an initial screening, and this is to be expected. The purpose of re-screening is to evaluate the screening conditions and make any necessary adjustments. If screenings are repeated over and over again, without a purpose, the possibility of passing a baby with a hearing loss exists. Remember, the goal of screening is not to pass every baby but to find those babies who need further testing.

Establish an ongoing screening protocol and consider utilizing the [Early Childhood Hearing Outreach \(ECHO\) protocol flowchart](#).

Please send all OAE results to EHD.

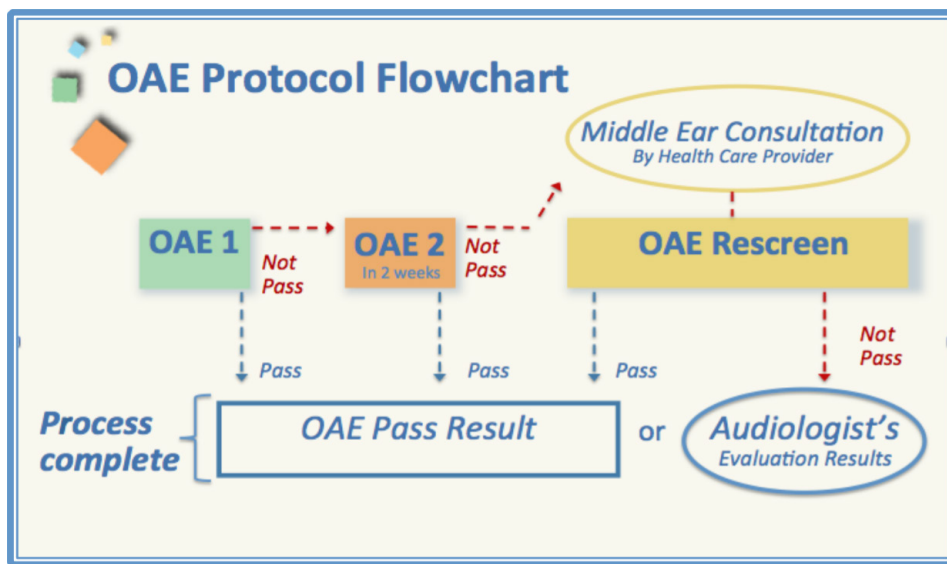


Figure 2: OAE Protocol Flowchart, follow-up process when a baby does not pass the OAE screen.

(Recommended Otoacoustic Emissions (OAE) Screening & Follow-up Protocol (Education Setting). (n.d.))

Training

Hands-on training is a critical portion of learning how to use the OAE. Contact Jennifer Dakers at 517-335-8353 or DakersJ@michigan.gov or connect with a local pediatric/educational audiologist to learn more. [Click for a list of EHD Pediatric Audiology Centers.](#)

Utilize the training modules on the ECHO website, including the tools/resources for training such as the [screeener proficiency check list](#). Please see Resources section for more information.

Resources

[Early Childhood Hearing Outreach \(ECHO\) Screening and Follow-Up Training Modules](#)

[Brain Development and Hearing Loss](#). Karen L. Anderson, PhD. Supporting Success for Children with Hearing Loss. February 17, 2012.

[EHDI Pediatric Audiology Centers](#)

Cytomegalovirus (CMV) is a leading cause of progressive sensorineural hearing loss, vision loss, intellectual disability, impaired motor function and seizures. CMV can have serious consequences in women of childbearing age and expectant women. Public health practitioners and providers are in a direct position to provide basic educational messaging to mitigate these consequences.

- o [National CMV Foundation](#)
- o [MDHHS CMV Overview](#)

For more information on the EHDI program and hearing screen reporting, please visit Michigan's [EHDI website](#) or contact Michelle Garcia, Au.D., CCC-A, Follow-Up Consultant - Early Hearing Detection and Intervention Program at GarciaM@michigan.gov or by phone at 517-335-8878.

References

- Anderson, K. L. (2011). Brain Development & Hearing Loss (Rep.). Minnesota Department of Education.
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