Guidance for *Early On* Providers

Utilizing Otoacoustic Emissions (OAE) Hearing Screening Equipment

Importance of Hearing Screening

Children referred to *Early On* for other conditions may also have undiagnosed hearing loss, which can lead to delays in communication skills and academic achievement. In addition, 90% of Deaf or Hard of Hearing (D/HH) infants are born to parents with typical hearing (Quick Statistics About Hearing., (n.d.)), meaning families may not expect or recognize hearing differences. Given the critical need for early detection, hearing loss in infants is considered a "neurodevelopmental emergency" (Anderson, K.L., 2011). Screening is essential for all children to identify hearing issues early and support their full potential.

> "My daughter didn't pass her newborn hearing screening in the hospital, but we were told that it happens all the time and not to worry about it - so we didn't. One year later, we noticed she wasn't speaking much and scheduled an *Early On* evaluation. Thank goodness they did another hearing screening using special equipment at her evaluation - she had hearing loss that was causing her speech issues! She lost so much learning time in her first year of life. Now we're working with her team to get her caught up."
>
> ***— Parent***

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

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

1 For all infants to be screened for hearing loss before **one month of age**.

3 Those who do not pass the hearing screen will have a diagnostic evaluation before **three months of age**.

6 Infants identified as D/HH will be enrolled in early intervention services before **six months of age**.

Risk Factors for Hearing Loss

A baby can pass their hearing screen at birth but experience a hearing loss later. Otoacoustic emissions (OAE) screening is one way to identify late onset hearing loss. Babies receiving *Early On* services may have one of these risk factors.

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

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.

Importance of OAE's

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.

- Subjective screening methods, such as risk assessment questionnaires, are less effective than objective screenings in identifying hearing loss for very young children. Best practice is to complete objective hearing screening on every child.
- The incidence of hearing loss nearly doubles between birth and school age, making early screening crucial.
- Annual (or more frequent) objective OAE hearing screenings from birth to three years of age, along with prompt follow-up, increases early identification.
- Studies show that only 50% of children with hearing loss are identified as D/HH by using risk assessment questionnaires (Bernstein et al. 2013).
- Most physician offices lack the equipment to screen for hearing loss, making it essential for *Early On* staff to utilize the hearing screen equipment. A routine ear examination by a physician cannot identify hearing loss.

Hospital screenings vs. *Early On* screenings

Ninety-nine percent of Michigan birth hospitals conduct Automated Auditory Brainstem Response (A-ABR). Therefore, most infants will need an 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. Early intervention providers should avoid using OAE screening immediately after a failed A-ABR at birth, but it can be used later to assess late-onset and progressive hearing loss.

Keys to Successful Screening

1. Appropriate training will improve the proficiency of the screener and allow for more successful screening outcomes. Training is available. 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 your educational audiologist to learn more.

2. Utilize the training videos on the **Early Childhood Hearing Outreach (ECHO) website**, including the resources for training such as the **screener proficiency check list**.

3. Proper probe fit is critical to successful screening.
   - 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.
   - If the probe is too small, it can allow external noise to interfere with the screening (resulting in a "too noisy" error) or cause the screening to take longer to complete.

4. Minimize movement. Every time the child moves, the probe moves which causes noise and interference.

5. 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.

6. If children are difficult to test, they may be screened while sleeping, if necessary.

7. Screening in groups allows anxious children to watch others be successfully screened.

Click here to learn more about how OAE can make a difference and to view a short video from physicians and parents about screenings in the "Testimonies and Reflections" section.

Calibration

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

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

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

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

Auditory Instruments: 800-684-4777

Eartek Services: 616-607-2698

E3 Gordon Stowe: 734-981-3655

School Health Corporation: 800-235-1305

OAE Screening is a process, not an event

Approximately 25% of babies will not pass the initial screening in one or both ears, and this is to be expected. A repeat screening should be conducted in two weeks. If the results still indicate a "refer" status, a consultation by a health care provider is recommended to rule out middle ear pathology. After treatment, it is essential to conduct a third OAE to ensure that all sections of the ear are functioning properly. If the baby still does not pass in both ears, the child should be immediately referred to a pediatric audiologist for diagnostic testing. Utilizing this established screening protocol, the ECHO protocol flowchart below, ensures children receive appropriate screenings, referral and treatment. If diagnostic tests are warranted, connect with a pediatric audiologist. Click for a list of EHDI Pediatric Audiology Centers.

Reminder: *The goal of screening is not to pass every baby, but to find those who need further testing. Therefore, screenings should not be performed over and over until a different result is achieved.*

Please send all OAE results to EHDI. Refer to reference section on how to report results.

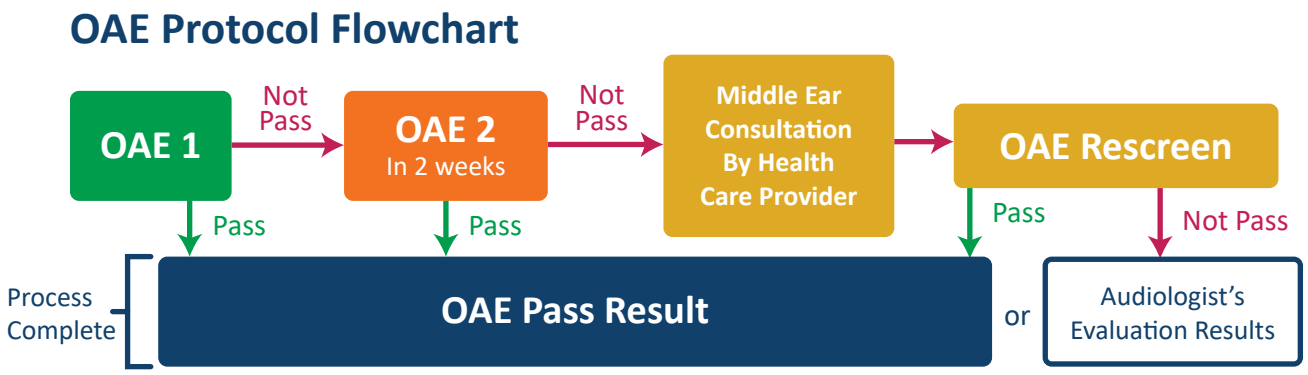

Figure 2: OAE Protocol Flowchart, follow-up process when a baby does not pass the OAE screen. (Recommended Otoacoustic Emissions (OAE) Screening & Follow-up Protocol (Education Setting). (n.d.))

How Early Identification Can Make a Difference: Parent Story

"My son was 18 months old by the time his hearing difference was discovered. By that point in his life, he was delayed in speech, language and social-emotional development. Without full access to sound, he missed so many important moments in development, communication and learning about skills like sharing and turn-taking. If we had known from the beginning, we could have started intervention and prevented some of these delays."

— Parent

Cytomegalovirus (CMV)

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.

- National CMV Foundation
- MDHHS CMV Overview

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

EHDI Program

For more information on the EHDI program and hearing screen reporting, please visit Michigan's EHDI website.

Michigan.gov/EHDI

Follow-Up Consultation

Contact Michelle Garcia, Au.D.
Follow-Up Consultant - Early Hearing Detection and Intervention

Call 517-335-8878 or email GarciaM@Michigan.gov.

Michigan Hands & Voices

Support for families is available. Michigan Hands & Voices is a parent-led non-profit that can help families when infants are undergoing hearing tests for their child which may be a confusing and time-consuming period or a family has confirmed their child's hearing loss.

Call 248-845-8762 or email support@mihandsandvoices.org.

References

- Quick Statistics About Hearing. (n.d.). Retrieved from here.
- Anderson, K. L. (2011). Brain Development & Hearing Loss (Rep.). Minnesota Department of Education.
- (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. DOI: 10.15142/fptk-b748
- Bernstein, H. H., Dhepyasuwan, N., Connors, K., Volkan, K., Serwint, J. R., & CORNET In-vestigators. (2013). Evaluation of a national Bright Futures oral health curriculum for pediatric residents. Academic pediatrics, 13(2), 133-139.
- Screening for Hearing Loss in Early Childhood Programs, William D. Eiserman a,˜, Lenore Shisler a, Terry Foust b, Jan Buhrmann c, Randi Winston d, Karl R. White a a National Center for Hearing Assessment and Management, 2880 Old Main Hill, Utah State University, Logan, Utah 84322, USA b Intermountain Health Care, USA c Illinois College, USA d Ear Foundation of Arizona, USA
- Recommended Otoacoustic Emissions (OAE) Screening & Follow-up Protocol (Education Setting). (n.d.). Retrieved from here.

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