### Importance of Implementing a Hearing and Speech Screening Protocol in Preschools

Jordan Belanger,1,3 and Sandra Abbott Gabbard2,3

1. Audiology LEND Trainee, JFK Partners University of Colorado, Denver
2. LEND Faculty, JFK Partners University of Colorado, Denver
3. Marion Downs Center

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### CONSIDERATIONS FOR PRESCHOOL PROTOCOLS

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Protocol I</strong></td>
<td>- Otoacoustic Emissions (OAE): appropriate for ages 0 to 4 year olds; determines inner ear function; automated screening device which does not require in-depth interpretation by examiner.</td>
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<tr>
<td><strong>Protocol II</strong></td>
<td>- 3 years: Pure Tones: are used starting at 3 years of age. Present tone minimum of 1 and maximum of 4 times at 0dBHL. Tymanometry: To be used in conjunction with Pure Tones on preschool age children. OAEs: Only to be used for children who pure tones are not developmentally appropriate.</td>
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<tr>
<td><strong>Protocol III</strong></td>
<td>- Pure Tones: are used starting at 3 years of age. Test at 1000Hz, 2000Hz, and 4000Hz at 20dBHL. Present tone minimum of 1 and maximum of 4 times. Tymanometry: To be used in conjunction with Pure Tones at any frequency. If conditioning to Pure Tones cannot be completed the protocol for 3 year olds will be used.</td>
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### SCREENINGS & INCIDENCE

- **BACKGROUND**
  - In 1993, the National Institutes of Health (NIH) Consensus Development Program recommended that all newborns receive a hearing screening before leaving the hospital. The current Joint Committee on Infant Hearing (JCIH, 2019) recommends that infants with hearing loss be identified by 3 months of age and receive intervention by 6 months of age. Late-onset hearing loss (LOHL) in children can result from loss to follow-up from newborn hearing screening (CDC, 2023), from limitations of equipment or methods being used that may miss the presence of a hearing loss (American Speech-Language-Hearing Association (ASHA), 2023). Progressive or acquired hearing loss can be associated with several conditions including congenital Cytomegalovirus (CMV), inner ear structural differences, genetics, and head trauma.

A hearing loss that has not been identified or monitored can have significant impacts on a child’s ability to properly acquire speech and language and perform academically. According to ASHA (2023), out of the 50 states, 37 require school hearing screenings, 5 suggest screenings, and 8 do not require screenings. At this time, there is limited information about individual state requirements for screenings.

MDC is a non-profit health clinic that provides audiology, speech, and language services in both a clinic and community setting. The clinic offers hearing services using best practices, as well as educates parents, families, and the surrounding community on the impacts of untreated hearing loss. The MDC’s KidScreen program provides screenings for hearing, speech, vision, and development in school settings, primarily through Head Start and Early Head Start programs which provide services to families that are below the federal poverty line and receive public assistance. Age specific protocols are implemented and results are used to make referrals for further evaluation if needed.

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### PURE TONES

**3 year old vs. 4 year old:**

A retrospective study from 2022, using MDC KidScreen data, looked at the results of pure tone screenings in 3 and 4 year-olds, which is shown in Table 1. Pure tone testing requires the child to demonstrate a behavioral response consistently when a stimulus is presented. The results indicated that approximately 70% of 3 year-olds were unable to condition to pure tones; whereas, only 36% of 4 year-olds were unable to condition to the task. This result indicates that pure tone screenings may not be age appropriate for children under the age of 4 years.

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### SUMMARY & DISCUSSION

It is clear that routine hearing screenings are recommended by JCIH, ASHA, AAA, Head Start, Early Head Start, and CDE for children, but implementation of preschool screenings is not mandated in most states. Maine, New York, Illinois, and Oregon all require screenings starting in preschool.

Screenings should be completed or offered within the first 30 days of enrollment, for children 3 months old to 5 years of age. According to the Colorado Department of Education (CDE), 50 states require school hearing screenings, 5 suggest screenings in 3 and 4 year-olds, whereas, only 36% of 4 year-olds were unable to condition to pure tones; whereas, only 36% of 4 year-olds were unable to condition to the task. This result indicates that pure tone screenings may not be age appropriate for children under the age of 4 years.

There is a notable increase in the incidence of hearing loss as children age when compared to newborn hearing screenings, therefore population-based hearing screenings should be implemented for preschool age children. The protocol used for preschool age children should be age appropriate to be the most sensitive in identifying hearing loss. The suggested MDC protocol in Table 1 indicates that OAEs should be used for 3 year-olds and Pure Tones should be used starting at 4 years of age. Tymanometry is added for referrals to differentiate between a medical or audiologic referral depending on the middle ear status of a child.

In conjunction with hearing screenings, speech screenings are important to identify educational significance speech challenges. Within the MDC KidScreen speech protocol, age-appropriate acquisition of vowels and consonants are evaluated as well as speech intelligibility and articulation. When there is a parental concern for speech and/or hearing, the child should be referred for a diagnostic evaluation completed by an audiologist or speech language pathologist.

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### REFERENCES


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### TYMANOMETRY

**Incidence of Abnormal Middle Ear Status:**

A study from by Amir Minovi and Stefan Dazert (2014), stated that acute otitis media, a middle ear pathology, typically occurs between 3 months and 3 years of age. With approximately 80% of 3 year-olds experiencing otitis media at least once, and 40% of children having 6 bouts of otitis media within the first 7 years. Any abnormality to the middle ear cavity can result in a conductive hearing loss, which is typically temporary. ASHA states that experiencing a prolonged conductive hearing loss during development can have negative impacts on speech and language development.

**Importance of Tymanometry:**

The use of tymanometry can help determine the type of referral that is made following a screening. The MDC KidScreen protocol uses tymanometry to determine if an audiological or medical referral is needed.

- Failed OAE or Pure Tone screening and abnormal tymanometry results require a medical referral.
- Failed OAE or Pure Tone screening and normal tymanometry results require an audiologic referral.