

MICHIGAN DEPARTMENT OF COMMUNITY HEALTH
Division of Family and Community Health

HEARING PROGRAM
Hearing Screening: An Explanation To Physicians

Local health departments in Michigan conduct annual hearing screening for Michigan's children. School age, pre-school, and special education children are screened at regular intervals by local agency hearing technicians.

When the results of the Stage II threshold hearing test indicates the existence of a possible hearing problem, parents are notified and urged to take their child to their physician **or** to a free local health department otology clinic. At the otology clinic, an otologist and audiologist will conduct an examination and provide a diagnosis and recommendations. Following this examination, referrals are then made to community physicians for treatment.

The hearing screening is done in two stages by local agency technicians trained in state approved training programs. The preliminary screening (Stage I) is performed at 1000, 2000 and 4000 Hz at 20, 20, and 25 dBHL, respectively. Children who do not pass the preliminary screening undergo an intermediate sweep, a more extensive screening, approximately 4 weeks later. If they miss *any* of the sounds presented, an audiogram is performed. This includes air conduction and unmasked bone conduction.

The audiogram is completed within four weeks following the preliminary screening to eliminate over referrals due to transient middle ear pathology. False positive referrals are further reduced when children attend the Otology clinics. This means a savings for parents.

Pure tone air conduction threshold testing is done at the frequencies of 250, 500, 1000, 2000, 4000, and 8000 Hz. The frequencies of 500, 1000 and 2000 Hertz are considered the speech frequencies and are used to determine the *pure tone average*, which is then used to indicate the severity of hearing loss for each ear. Using this average for each ear we have:

-10dB to	25dB	Broad range of normal hearing
26dB to	40dB	Mild Loss
41dB to	70dB	Moderate Loss
71dB to	90dB	Severe Loss
Above 91dB		Profound Loss

Most of the hearing losses found in this program are in the mild to moderate range of severity. The physician will often find an external or middle ear problem to explain these losses and offer corrective treatment. Children with moderate losses, or worse, may have a permanent or sensorineural hearing loss even if external or middle ear pathology is identified. These may require extensive otological, audiological and educational evaluation.

The Michigan Hearing Screening Program is unique because it includes bone conduction. The frequencies for bone conduction testing are 250, 500, 1000, 2000, and 4000 Hertz. A referral is made on the basis of the better bone conduction as compared to the air conduction results at the frequencies of 250 Hz, 500 Hz and 1000 Hz. Research has shown that children with bone conduction better than air conduction have clinical symptoms even when air conduction is within normal range.

Local health department hearing technicians utilize the above criterion when making a medical referral following a complete air and bone conduction audiogram. In addition, they have several other criteria to help them make the medical referral decision. They are:

1. The first criterion is based upon air conduction thresholds. The technician refers a child to Stage III if TWO frequencies of the same ear are worse than the following intensity levels:

<u>250 Hz</u>	<u>500 Hz</u>	<u>1000 Hz</u>	<u>2000 Hz</u>	<u>4000 Hz</u>	<u>8000 Hz</u>
30 dBHL	25 dBHL	20 dBHL	15 dBHL	25 dBHL	40 dBHL

2. The second criterion is based upon the significance of bone conduction. The technician refers a child to Stage III when bone conduction thresholds are better than the better ear air conduction thresholds by at least the differences indicated:

<u>250 Hz</u>	<u>500 Hz</u>	<u>1000 Hz</u>
15dB	15dB	10dB

3. The third criterion is based upon a significant difference between air conduction thresholds in each ear. The technician refers a child to Stage III when the *pure tone average* for each ear at 500 Hz, 1000 Hz, and 2000 Hz differ by 10dB or more. The technician considers this method only when the child's thresholds do not meet the first two criteria.

Technicians may occasionally encounter children who fit neither the typical normal pattern, nor meet established medical referral. The technician's concern is often alerted by a minor audiometric variation in combination with other facts such as a history of ear problems, observed ear distress, or teacher reports hearing loss/ear disease. These factors can be used in combination or isolation for a special medical referral collectively designated as "History".

This brief explanation may not fully answer all questions relative to the Michigan Hearing Screening Program. Please contact your local health department if you have specific issues or concerns to discuss.