

# HOME HEARING T • E • S • T



Facts about Hearing Loss  
and Understanding Your Audiogram

# ABOUT THE HOME HEARING TEST

by Robert Margolis, Ph.D.



The **Home Hearing Test** will help determine if you should have your hearing checked by a hearing professional. It is the same kind of test given by hearing professionals, but because it is not performed in a special sound-treated room that reduces background noise, it is not considered a diagnostic test. The Home Hearing Test will not tell you the cause of a hearing loss or what the treatment should be.

For best results you should take the Home Hearing Test in a quiet area at a time when there is no background noise.

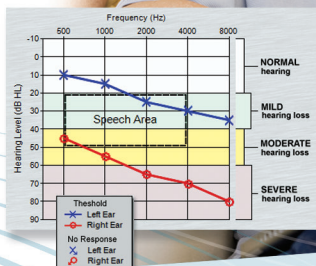
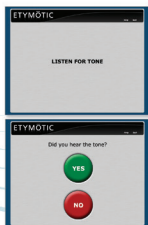
If the results are normal it means that you hear all the soft sounds that are necessary for hearing in everyday situations. A normal result on the Home Hearing Test does not rule out medical conditions that affect the ears. If there are other symptoms of ear disease such as pain, ringing, plugged feeling in the ears, or constant or frequent dizziness, an evaluation by a licensed hearing professional is indicated, even if you have normal hearing.

# Understanding your Audiogram

The Home Hearing Test shows test results on a graph called an *audiogram*.

## The Audiogram

The audiogram is a graph that shows your *thresholds* for sounds at different frequencies (sometimes referred to as pitches). A threshold is the intensity level (loudness) of the softest sound you can hear. Across the top of the audiogram are the frequencies of the sounds [low pitches toward the left and high pitches toward the right]. These frequencies do not represent the full range of human hearing, but are the range of sounds that are most important for hearing in everyday life. Down the left side of the audiogram are the sound intensities (loudness) with soft sounds at the top and loud sounds at the bottom. The lower the mark on the audiogram, the louder the sound has to be for you to hear it. Right Ear thresholds are shown as Os and Left Ear thresholds are shown as Xs.



PROFOUND  
hearing loss > 90 dB

# Test Results on Your Audiogram

The *normal range* is at the top of the audiogram. If all your thresholds are in the normal range, you have normal hearing.

The *Speech Area* within the dashed lines represents the sounds that are produced when we speak in a normal voice. If your thresholds are all above the speech area, you hear all the sounds that are necessary to understand normal speech. If your thresholds are all below the speech area, you don't hear any sounds in speech unless the talker is talking very loud. If your audiogram cuts through the speech area, you can hear some of the sounds when people are talking. When some but not all of the speech sounds can be heard, people usually understand in quiet situations but have trouble in noise.

The degree or severity of hearing loss can be mild, moderate, severe, or profound.

*Mild Hearing Loss* causes difficulty understanding speech especially in difficult listening situations (soft speaker, noisy room, distance from speaker). People with mild hearing loss can usually understand conversation in a quiet room if they are near the speaker. Some people with mild hearing loss are helped by hearing aids. Others get by without hearing aids.

*Moderate Hearing Loss* causes difficulty understanding speech in all normal conversations. Most people with moderate hearing loss get significant benefit from hearing aids.

## Test Results on Your Audiogram *(cont.)*

*Severe Hearing Loss* makes it impossible to hear normal conversation. Most people with severe hearing loss benefit from hearing aids, but many have difficulty understanding even with properly-fitted hearing aids.

*Profound Hearing Loss* makes it impossible to hear speech without hearing aids, and sometimes unable to understand very well even with hearing aids. Hearing aids are helpful for awareness of sounds such as traffic noise, alarms, sirens, and loud speech.

Often a hearing loss is greater in some frequencies than others. High frequency hearing loss is a very common pattern. A person may have normal hearing or a mild loss in the low frequencies, and a severe or profound hearing loss in the high frequencies.

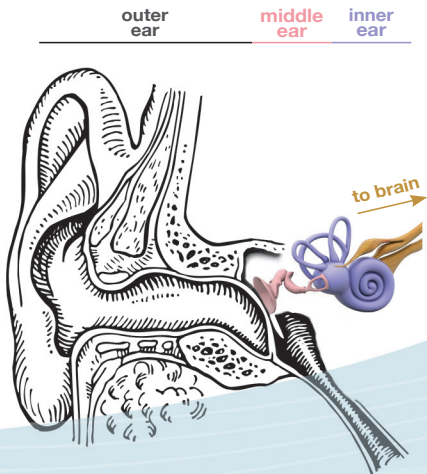


# How the Ear Works

The **Outer Ear** includes the pinna and ear canal. The outer ear is a pathway for sound to reach the inner ear. Besides providing a pathway, the outer ear boosts high-pitched sounds making speech easier to understand.

The Eardrum separates the outer ear from the middle ear. Sound makes the eardrum vibrate.

The **Middle Ear** contains three small bones (ossicles) which are sometimes called the hammer, anvil, and stirrup. When the eardrum vibrates, these three bones are set into motion. The bones are suspended in a closed space and are surrounded by air. The motion of the smallest bone, the stirrup, vibrates the fluid in the Inner Ear. A tube (Eustachian tube) connects the middle ear to the back of the throat. The tube opens to equalize pressure when we swallow.




## How the Ear Works *(cont.)*

The **Inner Ear** contains the sense organ of hearing (the cochlea), the organs of balance, and the auditory nerve. The cochlea contains cells that have tiny hairs projecting from their tops. These hair cells change sound into electricity that stimulates the auditory nerve, which sends information to the brain.

Hearing loss can be caused by a problem in the outer ear, middle ear, or inner ear, or sometimes a combination of one or more of these parts. Hearing loss can be temporary or permanent. Sometimes only one ear is affected (unilateral hearing loss) and sometimes there is hearing loss in both ears (bilateral hearing loss). There are many degrees of hearing loss. The degree of hearing loss may be mild, moderate, severe, or profound.

**Conductive Hearing Loss** occurs when sound cannot reach the inner ear because of a problem in the external or middle ear. Conductive hearing loss can be mild or moderate in degree but not severe or profound. Most conductive hearing losses can be treated with medication or surgery, or resolve on their own.



## Common Causes of Conductive Hearing Loss

*Blocked ear canal.* The most common cause of a blocked ear canal is a buildup of ear wax. Sometimes ear cleaning solutions from the pharmacy can help soften and clear a buildup of ear wax. Other causes of blocked ear canal are swelling due to infection (external otitis), a growth from the ear canal wall, or an object in the ear canal. Often these require a visit to a physician.

*Otitis Media* (middle ear infection) is the most common ear problem in children and occurs occasionally in adults. It can clear up on its own but may need medical treatment.

*Otosclerosis* is caused by a bony growth around the stirrup that prevents it from vibrating, causing a mild or moderate hearing loss. It can often be corrected by surgery.

*Trauma* to the ear can cause hearing loss by damaging the eardrum or disrupting the ossicles.





**Sensorineural Hearing Loss** results from a problem in the inner ear and/or auditory nerve. Sensorineural hearing loss can be mild, moderate, severe, or profound and is almost always permanent. Most sensorineural hearing losses cannot be treated by medications or surgery.

## Common Causes of Sensorineural Hearing Loss

*Noise-induced hearing loss* (NIHL) is caused by frequent overexposure to loud noise. NIHL can occur from a single activity such as an explosion or a loud concert, but it usually occurs gradually over many years from noisy workplaces, recreational noise such as power tools and vehicles (motorcycles, snowmobiles, lawnmowers) and loud music. When hair cells are destroyed by loud noise they do not grow back.

Sometimes hearing loss from loud sounds is temporary and recovers over time; but damage can accumulate from repeated exposures, resulting in permanent hearing loss. Hearing protection devices can prevent long-term damage from loud noise.



*Age-related hearing loss* (often referred to as presbycusis) may occur as a gradual decrease in hearing. Current research is changing our long-held beliefs about the causes and location of changes in the ear as we age. At this time, there is no medical or surgical treatment for age-related hearing loss, but we are closer to identifying the inner ear structures it affects.

*Inner ear infection* can occur by itself or as part of an illness like a cold or the flu. Sometimes sudden hearing loss is the only symptom. In other cases there may be dizziness or ringing in the ears (tinnitus). Inner ear infections are usually treated with medication.

*Meniere's Disease* is an inner-ear condition that causes fluctuating hearing loss, dizziness, and ringing in the ears (tinnitus). Treatments include dietary restrictions (salt, caffeine), medications, and surgery.

*Genetic hearing loss* is caused by certain genes that interfere with development of the ear in young children or produce degeneration of the ear in adults. They can begin any time in the life span and can be any severity. There is usually no medical or surgical treatment.

*Mixed hearing loss* occurs when there is a problem in the inner ear and a problem in the external or middle ear. The two problems may be unrelated (for example, a blocked ear canal and a noise-induced hearing loss) or they may be caused by the same thing (such as infection).

# Treatment for Hearing Loss

Many hearing losses cannot be corrected with medication, medical procedure or surgery. In these cases, the best treatment is hearing aids. When a person cannot hear a significant portion of the speech area, amplification can help. Most people with hearing loss do better with hearing aids in both ears than with just one hearing aid.

## Cochlear Implants

Some people with profound hearing loss benefit from cochlear implants that are surgically implanted in the inner ear to stimulate the auditory nerve. Many people with cochlear implants are able to understand speech even though they cannot understand speech with hearing aids.



## **Assistive Listening Devices**

In addition to hearing aids, Assistive Listening Devices (ALDs) can help people hear in difficult listening conditions. There are devices that help in large areas in which the sound is transmitted to a person who wears a special receiver. Systems can be borrowed in many public places like churches, theaters, and auditoriums. There are also special television listening devices and visual alerting devices that respond to alarms.

Excellent information, a Needs Assessment Survey and tutorials on Assistive Technology can be found at: [www.soundstrategy.com](http://www.soundstrategy.com)




# Hearing Healthcare Professionals

**Audiologists** are professionally trained to evaluate hearing and balance disorders. They provide non-medical treatment for hearing loss, which includes hearing aid fitting and a needs-assessment for assistive technologies. Audiologists are licensed in all 50 states and hold a doctorate or master's degree from an accredited university.

**Otolaryngologists** (ear, nose, and throat doctors) specialize in medical diagnosis and treatment of ear disease. Otolaryngologists usually don't test hearing, but often work with audiologists who perform hearing tests that provide information about hearing that is necessary for a medical diagnosis.

**Primary Care Physicians** are family doctors, pediatricians, and internists who can diagnosis and treat some ear conditions (such as otitis media). In many cases, primary care physicians refer their patients who have ear problems to audiologists and otolaryngologists.

**Hearing Instrument Specialists** are people who fit and sell hearing aids. They may not be required in every state to hold a university degree, and they have varying amounts of training. They can test hearing for the purpose of fitting hearing aids.



## ABOUT ETYMOTIC RESEARCH

Etymotic Research is an engineering-driven research, development and manufacturing company that designs products to assess, protect and enhance hearing. For over 30 years, innovation and education have been central to Etymotic's mission. Etymotic is one of the most respected thought leaders in high-fidelity audio and hearing conservation. Etymotic is located in Elk Grove Village, IL. [www.etymotic.com](http://www.etymotic.com)

# ETYMOTIC®

## ABOUT AUDIOLOGY INCORPORATED

AUDIOLOGY INCORPORATED® was created to develop innovative products for the Audiology profession and for hearing-impaired persons. The guiding principle of AI is that innovative changes in hearing tests are essential to provide the best service to patients. Hearing test products use automation and state-of-the-art technology to increase the accuracy and efficiency of hearing testing, and provide access to hearing services for underserved populations.

The Home Hearing Test was developed by Audiology Incorporated® with support from the U.S. National Institutes of Health and evaluated at several universities and hospitals. [www.audiologyincorporated.com](http://www.audiologyincorporated.com)



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