

Questions?

Your questions are important. Call your doctor or health care provider if you have questions or concerns. UWMC clinic staff are also available to help.

Appointments: Call Otolaryngology – Head and Neck Surgery Center, 206-598-4022.

Established patients with questions about your treatment plan: Weekdays from 8 a.m. to 5 p.m., call the Nurse Voice Mail Line, 206-598-7519.

After hours and on weekends and holidays, call 206-598-6190 and ask for the Otolaryngology resident on call to be paged.

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Otolaryngology/
Head and Neck Surgery Center
Box 356161
1959 N.E. Pacific St. Seattle, WA 98195
206-598-4022

Presbycusis can make it hard to communicate. But, tools such as hearing aids and assistive listening devices can help. Family and friends can help their loved one deal with presbycusis by making sure they talk face to face in areas where there is little or no background noise. They can also help their loved one accept hearing loss as a normal part of aging.

For more information about hearing health services at UWMC, call the Otology Patient Service Specialist at 206-598-4022. Or, you may write to us at:

Otology/Audiology Service
Otolaryngology/Head and Neck
Surgery Center
UWMC
Box 356161
1959 N.E. Pacific St.
Seattle, WA 98195-6127

Research on presbycusis is being done at University of Washington's **Virginia Merrill Bloedel Hearing Research Center**, Box 357923, Seattle, WA 98195-7923. Visit <http://depts.washington.edu/hearing> for more information.



Presbycusis

Age-related hearing loss

Age-related hearing loss is called **presbycusis**. **Presby** means “elder” and **cusis** means “hearing.” Presbycusis is the most common form of hearing loss. Everyone who lives long enough will develop at least some presbycusis. There is no way to tell when it will start, but those who have ear damage from exposure to loud noises will develop it at an earlier age.

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Over 25 million Americans have some hearing loss, and this number is growing as we are living longer. It is normal to lose some of the sharpness and clarity (*acuity*) in our hearing as we age.

Presbycusis rarely causes total deafness, but what starts as a small hearing loss can get worse over time. Many people call this kind of hearing loss “nerve deafness,” which is incorrect. Nerve deafness is very rare and is not the same as presbycusis.

Most people with presbycusis lose the ability to hear higher tones, and that makes it harder to understand speech. Communication can be especially difficult if people do not know you have a hearing problem.

Some common-sense methods will help make communication better. These include looking at the talker, turning off background noise, and using hearing aids if needed.

Some people try to hide their hearing loss instead of accepting it and learning how to live with it. But hiding the problem can cause *isolation*, the feeling of being separate and alone.

Family and friends need to know that it may be hearing loss that is causing misunderstandings, not an attention problem. If everyone works together to improve communication, you can keep the hearing loss from causing relationship problems.

Preventing Presbycusis

We may not be able to completely prevent presbycusis, but we can help maintain good hearing longer by avoiding exposure to loud noises. If you have to be around loud noises, use ear protection such as ear plugs.

Ear plugs that are inserted into the ear canal reduce noise by about 15 to 25 decibels (dB). Wearing ear plugs may allow you to work in noisy areas with less risk of hearing damage.

Remember that hearing loss from loud noises builds up over time. Gun shooting and being around loud music or loud machinery in our early years can cause hearing problems later.

Some drugs can also cause hearing loss. Ototoxic drugs such as *cisplatin* (a chemotherapy drug to treat cancer) and some antibiotics may cause hearing loss very much like presbycusis. We are looking for ways to protect patients from these side effects. For now, it is important to closely monitor any drug treatments so that hearing loss can be detected early.

Risk factors for cardiovascular disease also can affect hearing. *Hypertension* (high blood pressure), *hyperlipidemia* (high fat levels in the blood), and *diabetes* have all been linked to hearing loss.

Preventing hearing loss involves staying as healthy as possible, including eating a balanced diet that is low in fat.

In Review

Presbycusis is a form of hearing loss that many people develop over time. It is caused by a variety of factors, including aging, noise exposure, some diseases, and toxins.

Cochlear Implants

A small number of people have hearing loss that leads to total or near-total deafness. This is called *progressive* hearing loss.

As their hearing loss gets worse, these people often find that hearing aids no longer work. Some can continue to communicate by reading lips and guessing, but others need more help.

Many people whose deafness is recent can be helped by *cochlear implant* surgery. This surgery is done in 1 day, and an overnight hospital stay is not needed.

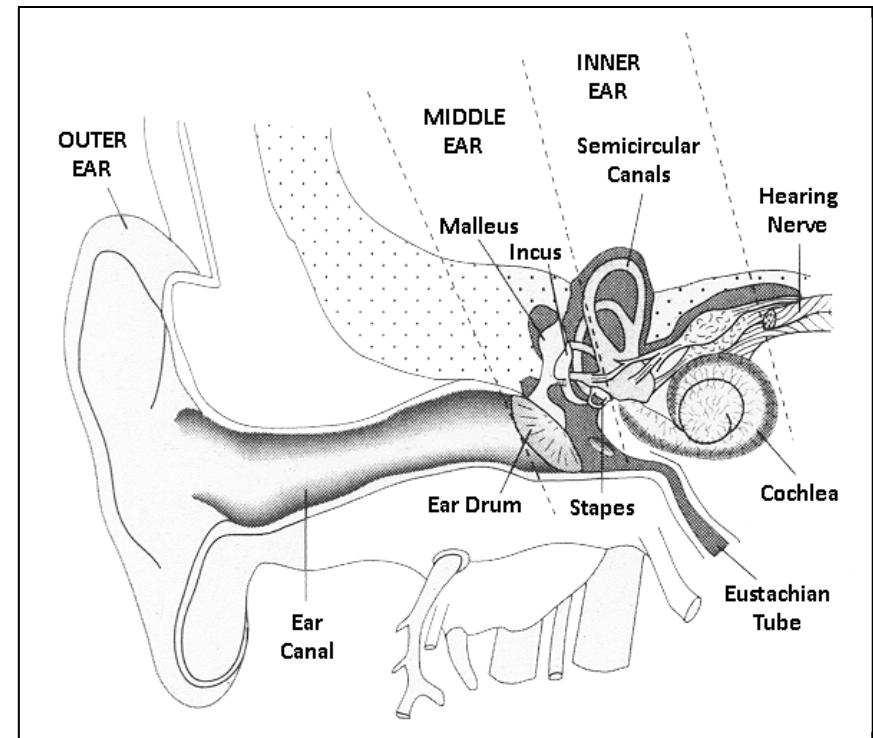
In this surgery, your doctor places the cochlear implant in your inner ear. About 4 to 6 weeks later, a speech processor is hooked up to the implant and programmed by your audiologist.

At first, speech sounds very different than what you were used to. Your audiologist will help you adjust to the new way things sound. After a few weeks or months, your brain will start to make sense out of the sounds it hears. With a cochlear implant, most people are not only able to hear the usual sounds around them, but they can also understand speech well, using a combination of the implant and lip reading. Some are able to talk on the phone.

Medical Treatment

We used to think that there was no medical treatment for inner ear hearing losses of any kind. But some people with inner ear hearing loss are now responding to medical treatment.

Most people with *autoimmune hearing loss* regain most of their hearing with corticosteroids and other anti-immune treatments. Even though there is no medicine to treat presbycusis, we hope our ongoing research on hair cell regeneration will give us new treatment choices in the future.



The structures of the ear

How a Normal Ear Works

The ear has 3 parts:

- The **outer ear**, which collects sound waves.
- The **middle ear**, which increases the sound energy and transmits the sound to the inner ear.
- The **inner ear**, which transforms the sound waves into nerve impulses and sends them to the brain.

Long-term exposure to loud noise is one of the main causes of presbycusis.

As sound waves pass through the ear canal, the eardrum vibrates. This motion affects 3 small bones in the middle ear: the *malleus* (hammer), *incus* (anvil) and *stapes* (stirrup). These bones *amplify* (increase) the sound energy.

When the stapes bone receives sound waves, it pushes on a thin membrane called the *oval window*. The vibration of the stapes against the oval window causes movement in the *cochlea*, a sense organ in the inner ear.

There are tiny hair cells inside the cochlea that convert these vibrations to electrical impulses, or signals. The hearing nerve carries these impulses to the brain. The brain interprets these impulses as sound, and this allows you to hear.

Causes of Presbycusis

Many factors work together to cause presbycusis. The 2 most important are the normal aging process of your hearing system and the damage from exposure to loud noises. Other factors may include age-related diseases, toxic effects of drugs or chemicals, heredity, and diet. Presbycusis tends to run in families, but some family members develop hearing loss earlier and more severely than others.

Our hearing often suffers from the noisy world we live in. The most common causes of noise-induced hearing loss are gun-shooting, loud music, and industrial noise. To prevent this hearing loss, use earplugs or earmuffs to protect your ears as needed, and stay away from loud noises as much as possible.

Assistive Listening Devices

Some people with hearing loss need more than just hearing aids. Age-related hearing loss and the limitations of hearing aids can make it impossible to hear “normally.” This is especially true in public settings, where sounds such as extra voices, background noise, and ventilation sounds are all amplified by the aids. This makes it very hard to hear only 1 person speaking.

Assistive listening devices (ALDs) are systems that amplify sound in difficult listening settings. Often, ALDs use a microphone placed near the sound source (TV, stage, or speaker’s podium) so that the sound is transmitted directly to the listener. The sound may be sent by infrared light, audio loop, FM radio, or direct audio input. ALDs for TV listening at home often use infrared light. These methods improve the *signal-to-noise ratio* – in other words, the desired sounds are made louder while other noises are made softer. This allows the listener to understand what is being said more clearly.

ALDs are becoming more common in churches, theaters, and classrooms. They help hearing-impaired people feel less isolated by helping them participate in public events.

Other ALDs include amplified phones with loud ringers, low-frequency doorbells, and closed-caption TV decoders. Other helpful tools are flashing alarm clocks, alarm bed vibrators, and flashing smoke detectors.

Your audiologist will show you many assistive listening devices you may buy in our clinic.

Finding Out if a Hearing Aid Is Right for You

You will meet with an audiologist to talk about what type of hearing aid will work best for you. The audiologist will consider your hearing needs, lifestyle, adaptability, and price range.

The audiologist will then recommend the type of hearing aids that will best meet your needs, talk with you about how they work, and teach you how to use them. You will also learn about the advantages and limitations of hearing aids.

The state of Washington requires that you have a 30-day trial period when you purchase hearing aids to determine if you want to keep them. This trial period lets you wear the aids in your own home and social settings to see if they will work for you and your lifestyle. You will receive follow-up care with your audiologist, both during the trial period and after you buy the hearing aids.

It takes a while to get used to wearing hearing aids. It may be several months before your brain completely adapts to the new way things sound. The more you wear your hearing aids, the sooner you will adapt to them and receive the most communication benefits. Some people resist wearing hearing aids because they do not want others to know they have hearing loss. But, the difficulty you have communicating without hearing aids is often more obvious to people than the devices themselves. Family support, self-motivation, and being patient will help you adjust to wearing hearing aids.

See our brochure on the UWMC hearing aid program.

People who live in quiet parts of the world have less presbycusis than those who live in big cities. If we reduce our exposure to noise, we will most likely keep our hearing longer.

A Special Note for Women

Presbycusis in women is sometimes linked to *cardiovascular* (heart) disease. Taking steps to prevent cardiovascular disease – staying fit and exercising, reducing weight, lowering high cholesterol, quitting smoking, and modifying the diet – may help delay presbycusis. Science has not yet proven this idea.

Effects of Presbycusis

Presbycusis affects our ability to hear speech both by lowering our ability to hear sounds (*sensitivity*) and by making it harder to understand speech (*word discrimination*). Speech sounds cover a wide range of tones (*sound frequencies*), so both the type and the amount of hearing loss affect speech understanding.

The most common type of presbycusis is *sensory*, caused by the loss of outer hair cells in the inner ear (cochlea). Sensory presbycusis affects the ability to hear the highest tones first, tones that are not used in speech. This may cause *tinnitus* (a ringing sound in the ears) before our ability to understand speech is affected. The ringing usually comes and goes and is often covered by background sounds.

When presbycusis starts to affect lower tones, it is common for the person with hearing loss to say, “I can hear, but I cannot understand the words.” The louder and lower tones in spoken

Aging in the brain can worsen the problems in understanding speech that occurs with presbycusis.

words, such as vowels, are easier to hear, but the high-pitched consonants, such as t, p, k, f, s, and ch, are harder to hear.

Background noise makes it even harder to understand what someone is saying. The person with hearing loss may misinterpret what is being said and ask, “Did you say mash, math, map, or mat?”

With some forms of presbycusis, both high and low pitches are affected. People with this form of hearing loss may not be able to hear what someone is saying in a normal voice, but they can understand if the person talks more loudly.

Aging in the brain can make hearing problems worse, since a person’s ability to process words usually slows with age. An older person with hearing loss usually has a harder time understanding words than a younger person with the same amount of hearing loss. It will often be harder for the older person to hear well in noisy rooms, in rooms with an echo, or when someone is speaking quickly or has an unfamiliar accent.

In general, people with hearing problems in these difficult listening settings need more than just hearing aids to help them communicate. They need to have the speaker talk more slowly and communicate with face-to-face conversation in a quiet room. Often assistive listening devices can be of help (see page 9).

Diagnosis

To diagnose presbycusis, you will first have a physical exam. The doctor will also check your medical history. These will help rule out other common causes of hearing loss, such as fluid or too much wax in the ear.

An *audiologist* (a specialist in hearing disorders) will then give you a hearing evaluation in a sound-treated room. If needed, you may also have lab tests and imaging studies to help rule out other causes of sensory hearing loss.

Treatment

Medical treatment helps fewer than 5% of patients (5 out of 100) with inner ear hearing loss. For most people, hearing aids are the best choice to improve communication and reduce other problems caused by hearing loss.

Hearing Aids

A hearing aid is a tiny, personal loudspeaker that increases sound and sends it into your ear to help overcome your loss of sensitivity to sound. Most people hear best with an aid in each ear.

Hearing aids have improved a lot in recent years, and now there are many different types. You may want one that fits behind your ear, in your ear, partly in your ear canal, or entirely in your ear canal.

Hearing aids also come with different amplification options. You can set them to work differently in different settings, such as when there are loud sounds around you. Some automatically adjust themselves. There are also aids that automatically make soft sounds louder and loud sounds softer. There are also aids that have different “programs” you can choose, depending on whether you are in a quiet place, a noisy place, or talking on the phone.

Medicare and most insurance companies do not provide coverage for hearing aids.