

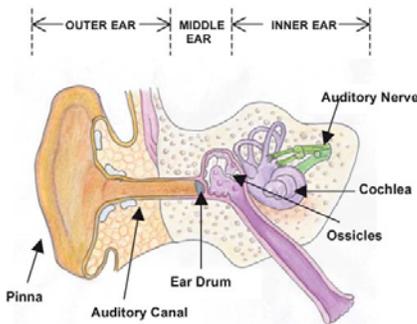
HEARING LOSS

Some chemotherapy drugs, other medications, or radiation needed for treatment of cancer can damage hearing. Hearing loss interferes with daily living. If you received these treatments, it is important to have your hearing checked and to obtain treatment if hearing loss is found.

WHAT ARE THE TYPES OF HEARING LOSS?

Hearing loss that occurs in the outer or middle ear is called a conductive hearing loss. This means that the hearing loss is due to a problem in transmission of sound from the air to the inner ear. An example of this would be changes in hearing because of fluid collection in the middle ear. Sometimes this happens when people have ear infections. The fluid “muffles” the sound when it is traveling through the middle ear.

Hearing loss that results from damage to the inner ear or auditory nerve is called sensorineural hearing loss. An example of this would be damage to the sensory hair cells in the inner ear from chemotherapy. Even though sound waves still move through the inner ear fluid, they can no longer be changed into nerve impulses, so the sound does not reach the brain. Sensory hair cells that process high-pitched sounds are usually damaged first, followed by damage to the sensory hair cells that process lower-pitched sounds. Hearing loss with both conductive and sensorineural components is called mixed hearing loss.



WHAT TYPES OF CANCER THERAPY INCREASE THE RISK OF HEARING LOSS?

The following cancer treatments can potentially cause hearing loss:

- Chemotherapy from the “platinum” group, such as cisplatin or high doses of Carboplatin
- High doses of radiation to the head or brain, especially when the beam is directed at the brainstem or ear
- Surgery involving the brain, ear or auditory (eighth cranial) nerve
- Certain antibiotics (medicines used to treat infections) and diuretics (medicines that help the body get rid of excess water)

WHAT ARE THE EFFECTS OF CANCER TREATMENT ON HEARING?

High doses of radiation to the ear or brain can cause inflammation or ear wax buildup in the outer ear, problems with fluid buildup in the middle ear, or stiffness of the eardrum or middle ear bones. Any of these problems can result in conductive hearing loss. Radiation can also damage the sensory hair cells in the inner ear, causing sensorineural hearing loss.

Damage from radiation may affect one or both ears, depending on the area of radiation treatment. Conductive hearing loss may improve over time, but sensorineural hearing loss is usually permanent. Platinum chemotherapy can cause damage to sensory hair cells in the inner ear, resulting in sensorineural hearing loss. Most often, the effect is similar in both ears and is permanent.

WHAT ARE THE SYMPTOMS OF HEARING LOSS?

Symptoms of hearing loss may include:

- Ringing or tinkling sounds in the ear
- Difficulty hearing in the presence of background noises
- Not paying attention to sounds (such as voices, environmental noises)
- Some people may have no symptoms at all

WHAT MONITORING IS RECOMMENDED?

Testing should be done by an experienced audiologist (a professional trained in hearing disorders).

- Hearing is usually tested by doing an audiogram. During this test, the person wears earphones and listens for sounds of different pitches and different degrees of loudness. Speech audiometry tests the person's ability to hear single words and sentences. Tympanometry tests the status of middle ear and movement of the eardrum in response to a puff of air.
- People who are not able to have an audiogram (such as those who are too young or who cannot understand the test instructions) can have their hearing tested using Brainstem Auditory Evoked Response (BAER). The person having this test is usually given medicine so that they go to sleep, and then their brainwave responses to various sounds are recorded.

HOW OFTEN SHOULD HEARING BE TESTED?

Everyone who had cancer treatment that can affect the ears (such as cisplatin, high doses of carboplatin, high doses of radiation to the brain) should have their hearing tested at least once following completion of treatment. The need for additional testing depends on the type and dosage of cancer treatments that were used. If hearing loss is found, testing should be repeated yearly or as advised by an audiologist. In addition, hearing should be tested anytime a hearing problem is suspected.

WHAT CAN BE DONE IF HEARING LOSS IS DETECTED?

If hearing loss is detected, it is important to have an evaluation by an audiologist or otologist (doctor who specializes in hearing disorders). Hearing loss can cause problems with a person's ability to communicate and carry out daily activities. It is therefore very important for a person with hearing loss to find the services that will best help to make the most of their ability to communicate well. There are many options available, and these can be used in various combinations, depending on the hearing problem.

- Hearing aids make sounds louder. Several types are available, depending on the age and size of the person and the extent of hearing loss. It is very important that the hearing aid batteries are fresh and that the hearing aid is turned to the “on” position when in use.
- Auditory trainers (also known as “FM trainers”) are devices that are particularly useful in the school setting. The person who is speaking (usually the teacher) wears a microphone that transmits sound over FM radio waves. The person with hearing loss wears a receiver that picks up the sound. This device can be worn alone or attached to the hearing aid and allows the person with hearing loss to hear the speaker clearly, even in a noisy environment.
- Other assistive devices are also available for people with hearing loss. These include telephone amplifiers and teletypewriters (TTY’s – sometimes also referred to as Telephone Devices for the Deaf or TDDs). Specialized appliances designed for people with hearing loss include alarm clocks that vibrate and smoke detectors with flashing lights. Closed captioning for television is widely available. The internet is also a helpful communication tool for people with hearing loss, providing options such as email, online discussions, and access to information via websites. Newer communication devices offer text messaging, instant messaging, internet access, and photo transmission.
- Cochlear implants may also be an option for people with profound hearing loss who are unable to benefit from hearing aids. These electronic devices are surgically placed behind the ear and electrodes are threaded into the inner ear. A microphone and speech processor are then used to transmit sound to the electrodes, stimulating the auditory nerve and allowing sound perception by the brain. After the cochlear implant is installed, auditory training is given for a period of time to teach the individual to recognize and interpret sounds.
- Alternate or supplementary communication methods, including speech reading, signed language and cued speech, are available for people with significant hearing loss. Spoken language may also be an option, but usually requires an intensive educational approach with speech therapy. In the United States, healthcare organizations that receive federal funding are required to provide sign language interpreters when requested by a patient.

WHAT CAN I DO TO PROTECT MY HEARING?

If you have experienced hearing loss, or have received therapy that has the potential to damage your hearing, you should discuss this with your healthcare provider. Be sure to obtain prompt evaluation and treatment for ear infections, swimmer’s ear, and earwax impaction. Avoid use of cotton tipped applicators (“Q-tips”) to clean ears, as earwax can be more dry following treatments and use of “Q-tips” or other foreign objects can

potentially pack wax further in the ear canal creating an obstruction and could potentially injure the ear canal resulting in infection. For proper ear hygiene, use drops of hydrogen peroxide or other over the counter ear hygiene solutions. Whenever possible, ask your healthcare provider to consider alternatives to medications that have the potential to cause further hearing loss, including certain antibiotics (aminoglycosides such as gentamicin), certain diuretics (“loop” diuretics, such as furosemide), salicylates (such as aspirin) and medications for high iron levels. You should also take care to protect your ears from loud noises. In fact, loud noises can cause significant damage to your ears.

Works Cited

Adapted from Children's Oncology Group Long-Term Follow-Up Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancers
www.survivorshipguidelines.org