

NIDCD Fact Sheet | **Hearing and Balance****Hearing Protectors****What are hearing protectors?**

The best ways to protect your hearing are to avoid exposure to loud sounds, move away from the noise, or turn down the volume. When these options aren't possible, hearing protectors—earplugs or protective earmuffs—can help. Hearing protectors are wearable devices that can lower the intensity of sound that enters your ears.

Why is it important to protect your hearing?

Loud sounds can damage sensitive structures in your inner ear, causing noise-induced hearing loss (NIHL) and tinnitus (ringing, roaring, or buzzing in the ears). The louder the sound, the faster it can damage your hearing.

NIHL is a significant health problem for U.S. youth and adults. According to the Centers for Disease Control and Prevention (CDC), self-reported hearing tests show that about one in seven U.S. teens and nearly one in four U.S. adults (ages 20 to 69) have features suggestive of NIHL in one or both ears.

Hearing damage can happen instantly. The sound of a gunshot at close range, for example, can cause immediate and permanent damage. Other types of very loud sounds can cause hearing loss in less than 15 minutes. Exposure to repetitive loud noise—from machinery at a worksite, for example—may result in hearing loss over time.

How loud is too loud?

Sound is measured in units called decibels. Sounds at or below 70 A-weighted decibels (dBA) are generally safe. For more information on how sound is measured, visit: <https://www.noisyplanet.nidcd.nih.gov/have-you-heard/how-is-sound-measured>.

A single very loud noise or long or repeated exposure to sounds at or above 85 dBA can cause hearing loss. Here are average decibel ratings for a few familiar sounds:

- ▶ Normal conversation: 60 to 70 dBA
- ▶ Lawnmowers: 80 to 100 dBA
- ▶ Motorcycles and dirt bikes: 80 to 110 dBA
- ▶ Music through headphones at maximum volume, sporting events, and concerts: 94 to 110 dBA
- ▶ Sirens from emergency vehicles: 110 to 129 dBA
- ▶ Fireworks displays: 140 to 160 dBA

The Sound Level Meter app developed for iOS devices by the CDC's National Institute for Occupational Safety and Health (NIOSH) is one example of a free decibel meter app that can help you evaluate sound risks in your environment. For more information on the NIOSH Sound Level Meter app, visit <https://www.cdc.gov/niosh/topics/noise/app.html>.

When should you wear hearing protectors?

If you anticipate being in a loud setting or participating in a noisy activity, wear earplugs or protective earmuffs to safeguard your hearing. Hearing protectors are recommended for these settings and activities:

- ▶ Auto races, sporting events, fireworks displays, and concerts.
- ▶ Motorcycle, dirt bike, and snowmobile riding, and when operating an all-terrain vehicle or tractor.
- ▶ Band or orchestra rehearsals and performances.
- ▶ Industrial, warehouse, farm, landscape, and other loud (or potentially loud) workplace settings.
- ▶ Shooting sports.

Make it a habit to wear hearing protectors when you expect to be in a loud setting, and keep earplugs or protective earmuffs handy for unexpected loud noises. If loud noise happens suddenly or unexpectedly, cover your ears with your hands and move away from the noise, if possible.

What types of hearing protectors are available?

Earplugs and protective earmuffs are available from retail stores or online. Examples include formable foam earplugs, pre-molded earplugs, canal caps, and safety earmuffs. “Musician earplugs” are custom-made earplug molds intended to protect hearing while also allowing as much natural sound as possible to safely enter the ear. Choose a type of hearing protector that is comfortable and easy for you to use, so that you will use it consistently and correctly.



Formable foam earplugs



Pre-molded, high-fidelity earplugs



Canal caps



Protective earmuffs

Hearing protectors don't block all sound. Most hearing protectors have a noise reduction rating (NRR). In general, the higher the NRR, the more sound is blocked (if you are wearing the device correctly). Choose hearing protectors that allow you to communicate well in a noisy environment, so that you don't have to remove them during conversation. Even briefly removing your hearing protectors in a very loud environment puts your hearing at risk.

Consult a hearing health professional if you need help selecting hearing protection, or for information about custom-made earplugs.

Earplugs

Earplugs are inexpensive devices placed directly into your ear canal. Earplugs come in various sizes, but can be hard to find in sizes that fit children. Earplugs may have cords attached to help you keep track of them. Specialty earplugs, including earplugs that are custom-molded to your ears, are also available.

- ▶ **Formable foam earplugs** are made of soft foam. Once inserted, these earplugs expand to fill your ear canal snugly. Formable foam earplugs are meant for one-time use, but they can be reused if they are clean and still fully expand to their “like new” shape.
- ▶ **Pre-molded earplugs** are made from plastic, rubber, or silicone. One type of pre-molded earplug is high-fidelity (hi-fi) earplugs, also called uniform-attenuation earplugs. They have the same effect as turning down the volume on a stereo: the sound intensity is evenly decreased across different pitches. You might find high-fidelity earplugs especially helpful at movies or concerts and at other times when you want to appreciate the audio quality while protecting your hearing.
- ▶ **Canal caps** have a stiff band that provides a gentle force to seal the earplugs, whether formable or pre-molded, into your ear canal. When not in use, the band can be worn around your neck.

How to use formable foam earplugs:

1. Gently roll the earplug between your fingers into a thin tube shape, taking care not to crease the foam, which can create tunnels for sound to enter.
2. Pull the top of your ear up and back with your opposite hand to straighten your ear canal and make it easier to insert the earplug.
3. Continue to roll the earplug and gently slide it into your ear canal. It should fit evenly across the opening of your ear.
4. Gently hold the earplug in place with your finger for 20–30 seconds to give it time to expand.
5. Check the fit to make sure the earplug is comfortable and properly inserted in your ear canal. The earplug should barely be visible when positioned correctly.

6. Repeat steps to insert the earplug into your other ear.
7. Do not cut or tear foam earplugs to make them fit. Cutting the foam reduces its effectiveness. If foam earplugs can't be inserted properly, consider another kind of hearing protector.
8. To remove foam earplugs, slowly twist to break the seal with your ear canal, and then gently take them out of your ear.

How to use pre-molded earplugs:

1. Gently pull the top of your ear up and back with your opposite hand to straighten your ear canal.
2. Use the other hand to firmly grip the stem of the earplug and gently slide the earplug into the ear canal, using a rocking motion until you have sealed the ear canal.
3. To remove pre-molded earplugs, slowly rock them back and forth to break the seal with your ear canal, and then gently pull them out of your ear.

How to use canal caps:

1. Place the band around your head so that the earplugs are accessible to your ears.
2. Insert one earplug at a time.
3. Gently pull the top of your ear up and back with your opposite hand to straighten your ear canal.
4. Insert the tip of the cap into your ear and gently apply pressure until the cap is firmly in place.
5. If the tips are made of foam, use gentle pressure to roll the foam tip between your fingers into a thin tube shape before inserting.
6. Using the same process, insert the second canal cap into your other ear.

Proper fit is important for successful hearing protection. After inserting earplugs, your voice should sound different to you—possibly louder and/or muffled. The earplugs should feel comfortable and secure in your ears. Ask a friend or use a mirror to check positioning. You may need to practice for a comfortable, secure fit. Wearing earplugs shouldn't be painful. Never force earplugs into your ears. If you can't secure a comfortable fit, consider using protective earmuffs instead.

Always make sure your hands and the earplugs are clean before inserting the earplugs into your ears.

Protective earmuffs

Protective earmuffs are easy-to-use, padded plastic and foam cups joined by an adjustable headband. (They aren't the soft earmuffs worn for warmth.) They reduce noise by completely covering both ears. Sizes for adults and children are available. Earmuffs are easier than earplugs to use correctly, especially for young children.

Earmuffs might not work as well for people who wear glasses because the arms of the glasses can create gaps between the earmuff cushion and the skull. If you wear glasses, check to make sure the earmuffs seal properly. Hairstyles, hats, and facial hair can create gaps that make protective earmuffs less effective.

How to use protective earmuffs:

1. Grasp one cup of the earmuffs in each hand and gently pull apart.
2. Place the band over the top of your (or your child's) head and slowly release the cups, making sure they completely cover the ears and fit snugly. Some earmuffs have adjustable headbands to help secure the fit.

What research is being done on hearing protection?

The National Institute on Deafness and Other Communication Disorders (NIDCD), part of the National Institutes of Health (NIH), supports research on the causes, diagnosis, treatment, and prevention of NIHL. The NIDCD also supports research to increase accessible, affordable hearing health care. For more information on NIDCD research, visit <https://www.nidcd.nih.gov/research/improve-hearing-health-care>.



National Institute on
Deafness and Other
Communication Disorders



Where can I find more information on hearing loss and protection?

The NIDCD's national public education campaign, ***It's a Noisy Planet. Protect Their Hearing.***[®], increases awareness among parents of preteens about the causes and prevention of NIHL. Using tips from Noisy Planet, parents, teachers, school nurses, and other adults can help children adopt healthy hearing habits. Visit Noisy Planet at <https://www.noisyplanet.nidcd.nih.gov> for more information.

The NIDCD maintains a directory of organizations that provide information on the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language. Visit the NIDCD website at <https://www.nidcd.nih.gov/directory> to see the directory.

More NIDCD fact sheets on hearing and balance:

- ▶ Noise-Induced Hearing Loss
- ▶ Tinnitus

Visit the NIDCD website at <https://www.nidcd.nih.gov> to read, print, or download fact sheets.

For more information, contact us at:

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The NIDCD supports and conducts research and research training on the normal and disordered processes of hearing, balance, taste, smell, voice, speech, and language and provides health information, based upon scientific discovery, to the public.



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