

# MOHSS

## Montana Occupational Health & Safety Surveillance

October 2023

### *National Protect Your Hearing Month*

As stated by the Centers for Disease Control and Prevention (CDC), October is National Protect Your Hearing Month <sup>(1)</sup>. This letter is intended to provide information about hearing, hearing loss and methods for protecting one's hearing both at work and at home.

### *Mechanisms of Hearing*

In order to adequately protect your hearing, it is helpful to understand how ears work to detect sound. Sound is simply pressure waves in the air that are generated by external forces such as vibrations, collisions etc. Think of a hand slapping the surface of a lake; the impact causes sound waves to travel through the air and into the ear canal. Our ears are sensitive and complex organs consisting of the outer ear, the middle ear, and the inner ear. The primary purpose of the outer ear is to capture and transmit sound waves to the middle ear. The middle ear consists of the eardrum and a series of tiny bones that amplify sound which is then sent to the cochlea in the inner ear <sup>(2)</sup>. Sound waves stimulate tiny hair cells in the cochlea which send signals via the auditory nerve to the brain where the information is processed and translated to action. If we hear a gunshot, we duck. If we hear our name called, we turn and look. These are natural responses to our environment and have been necessary for survival throughout human history. Though loud noise elicits a necessary response, repeated or prolonged exposure to loud noise can have damaging and long-lasting effects.



1. Photo by [cetteup](#) on [Unsplash](#)

Our ears can detect a wide range of sound intensities. These range from the whisper of a soft breeze to a loud thunderclap. Our brains trigger various responses ranging from attraction to a pleasant sound to a fight or flight response in the case of a loud, ominous sound. If the pressure waves from a sound are too intense the sensitive parts of the middle and inner ear can be irreversibly damaged. Importantly, exposure to prolonged mid intensity sound can have the same effect. Think of a factory worker who is around machines that are constantly whirring and banging.

To prevent this damage from occurring, it is necessary to limit the amount of damaging sound that enters the ear canal. This can be achieved by either internal or external hearing protection devices. An example of internal hearing protection is earplugs. Earplugs are typically made of plastic or foam and are inserted directly into the ear canal. They act as a dam that prevents damaging sound waves from overstimulating the middle and inner ear. The second type is the



external or 'over the ear' hearing protection; they serve the same purpose as internal hearing protection. Both types have their advantages and disadvantages. The advantage of earplugs is they are lightweight and far less bulky. They are also inexpensive and can be found in many retail stores and gas stations. The primary disadvantage is earplugs are prone to falling out and getting dirty and/or lost. Also, if not cleaned or replaced regularly, they can promote ear infections. The advantage of external hearing protection is it stays in place and is much more adjustable. It can be worn over hard-hats and is less prone to causing ear infections. Disadvantages are it can be uncomfortable in hot weather and can be heavy/bulky. Both types of hearing protection allow some amount of sound to reach the inner ear which is good for maintaining situational awareness.

Whether using internal or external hearing protection, make sure you keep it clean and replace it if it gets damaged. Make sure you are aware of your surroundings and if you approach a fellow worker who is wearing hearing protection, do your best not to startle them. This can have disastrous consequences and result in serious injury or death in the workplace. If you need to approach a coworker who is wearing hearing protection, give them a wide berth, walk slowly in front of them and signal to them you need to talk.

The workplace can be a source of dangerously high levels of ambient noise. Wear hearing protection when working around loud machinery, and always remember the best way to protect your hearing is to minimize the amount of loud noise you are exposing yourself to.

Be safe and we'll see you next month!

1. <https://www.cdc.gov/nceh/features/protect-your-hearing-month>
2. <https://www.nidcd.nih.gov/health/how-do-we-hear>

