

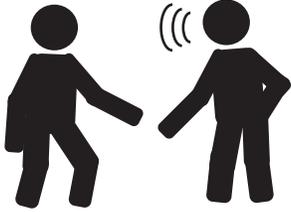
OCCUPATIONAL HEARING LOSS

Hearing loss can be a barrier to communication, decrease quality of life, and affect mental health.

Not being able to hear is a safety issue.

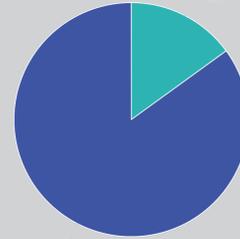
In the workplace, hearing loss can:

- Prevent someone from hearing safety signals
- Reduce productivity through lack of communication



Causes for hearing loss include:

- Exposure to noise
- Exposure to certain chemicals
- Medical disorders and genetics
- Certain medications
- Trauma
- Aging



15%
(37.5 million)
of U.S. adults
experience some
difficulty hearing.¹

It is estimated that 22 million workers are exposed to dangerous noise levels in the workplace.²

Construction and manufacturing are among the industries with the highest prevalence of hearing impairment.³



NOISE-INDUCED HEARING LOSS

Noise is one of the most common causes of hearing loss.

Noise-related hearing loss can be due to one intense sound, like an explosion, or from exposure to loud sound over time.

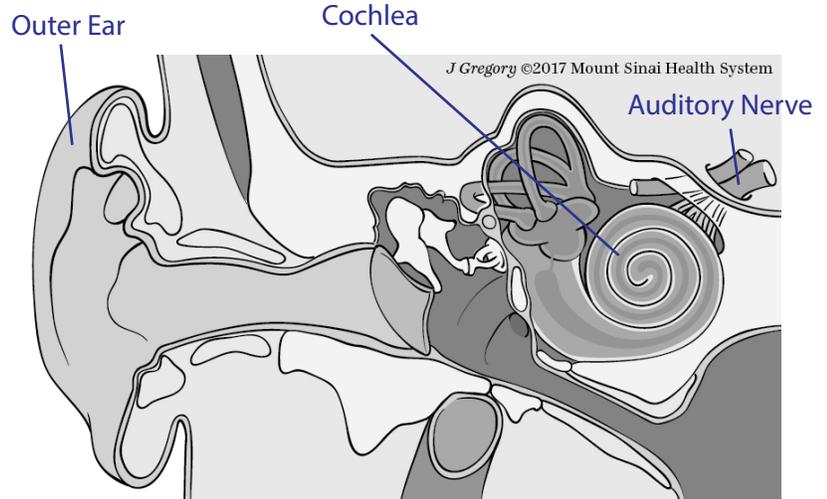
HOW ARE EARS AFFECTED BY NOISE?

1. Noise is processed by the ear as vibrations.
2. The vibrations turn into ripples in the fluid of the cochlea in the inner ear.
3. Hair cells in the ear move along the ripples.
4. As the hair cells move, electrical signals are carried to the brain by the auditory nerve.

Loud, intense, or prolonged noises can damage the hair cells, preventing the brain from picking up the sound signals from the ear.

Unfortunately, once hair cells die they cannot grow back.

Very loud noises can also rupture the eardrum or damage the inner ear bones, causing hearing loss.



Exposures that cause hearing loss may also increase risk for other illnesses and disorders.



Damage in the ear can cause:

- Difficulty in balancing
- Tinnitus, a ringing sound in the ears or head
- Increased risk of high blood pressure and cardiovascular disease due to persistent loud noises⁴

NOISE IN THE WORKPLACE

The current Occupational Safety and Health Administration (OSHA) permissible exposure limit for noise is **90dB averaged over an 8 hour work day**. If you cannot carry on a conversation with people standing next to you without shouting, the noise level is probably at or over the OSHA permissible limit.

If you experience ringing in the ears, or sounds seem muffled after you leave work, it could be a sign of hearing loss. Workers at high risk for noise-related hearing loss include:

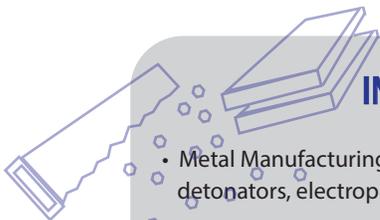
- Aircrew/airline ground maintenance
- Car washers
- Construction workers
- Drivers- Train and subway workers
- Farmers and Agricultural Workers: Workers who use tractors, chain saws, grain dryers and other loud machinery
- Manufacturing workers
- Military workers
- Restaurant workers
- Workers in Entertainment- Musicians, DJ's

OSHA requires that a **Hearing Conservation Program** be implemented when noise exposure levels are at or above 85dB.⁶

CHEMICAL-INDUCED HEARING LOSS

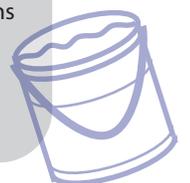
Exposure to certain chemicals, called **ototoxic chemicals**, can cause hearing loss.

Ototoxic chemicals enter the bloodstream and can affect many parts of the hearing system, including the cochlea or the nerves that affect hearing.⁷ Being exposed to both loud noises and ototoxic chemicals can be particularly hazardous for hearing.



INDUSTRIES AND JOB TASKS AT HIGH RISK INCLUDE:

- Metal Manufacturing- soldering, manufacturing of detonators, electroplating
- Construction- work in piping, siding, and window casings
- Farming and landscaping- using pesticides, fungicides, parasite inhibitors
- Industrial cleaning- using dry cleaning agents, cleaners, and spot removers
- Work in confined spaces
- Plastic production- producing synthetic rubber, resins, and insulating materials
- Work with vehicles and proximity to auto emissions
- Artistry- production and use of paints, varnishes, thinners, glue and waxes



COMMON SOUNDS AND THEIR AVERAGE dB RATINGS:⁵

Noise intensity (loudness) is measured on the decibel (dB) scale and adjusted according to human hearing ranges.

Safe dB levels



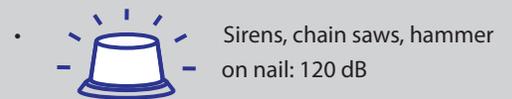
- Quiet office or library: 40 dB
- Refrigerator humming: 45 dB



- Manual machine tools: 80 dB
- Noise from heavy city traffic: 85 dB



- Motorcycle, electric drill: 95 dB
- Factory machinery: 100 dB
- An MP3 player at high volume: 105 dB
- Power saw: 110 dB



- Percussion section of a symphony: 130 dB
- Airplane taking off: 140 dB
- Firecrackers and firearms: 150 dB

Dangerous dB levels

EXAMPLES OF OTOTOXIC CHEMICALS INCLUDE:

- Organic solvents (e.g. carbon disulfide, trichloroethylene, toluene, xylene, styrene)
- Heavy metals (e.g. lead, mercury, tin, manganese, arsenic)
- Asphyxiants (e.g. carbon monoxide)
- Certain medications (e.g. certain antibiotics, anti-cancer drugs)

HOW TO PROTECT YOURSELF FROM HEARING LOSS

Your employer should have administrative and engineering controls in place to limit your exposures at the workplace.

If you believe you are at risk for hearing loss or have experienced hearing loss due to your work, see an [occupational medicine specialist](#), who will look at your work history and work tasks to determine methods to treat and prevent hearing damage. He/she may refer you to an [audiologist](#) to determine extent of hearing loss, or an [industrial hygienist](#) to help determine the source and amount of noise exposure.

To help prevent hearing loss, follow the following safety measures:

- Use appropriate personal protective gear, such as ear plugs or muffs, to protect yourself from loud noises or chemicals you may be exposed to in the workplace. An industrial hygienist can determine what personal protective equipment is right for you, based on your exposures.
- Limit time around loud noises, and request quieter equipment or tools if possible.
- Play sounds (such as music or personal stereos) at lower levels when possible.
- If you know you are exposed to noise or to other risk factors for hearing loss, take regular hearing tests to catch hearing loss as soon as possible. Your employer must provide annual hearing evaluations if you have been exposed to noise levels above the OSHA permissible limit.



This information is intended for general reference purpose only and is not intended to be used as a substitute for professional medical advice.

HEARING CONSERVATION AT MOUNT SINAI

The Selikoff Centers for Occupational Health provides a Hearing Conservation Program.

Services include:

- Noise evaluation at the worksite over the work shift and specific tasks.
- Development of a hearing conservation program that includes policies, training, personal protective equipment, and noise monitoring.
- Hearing protection fit testing for workers based on job tasks and noise exposure.
- Educational programs.
- Audiograms to test hearing ability.



Mount Sinai *Selikoff Centers for Occupational Health*

To learn more, call us at [888-702-0630](tel:888-702-0630)
or visit us at www.mountsinai.org/selikoff



@SinaiOccMed



@WorkerHealth

REFERENCES

¹Blackwell DL, Lucas JW, Clarke TC. 2014. Summary of health statistics for U.S. adults: National Health Interview Survey, 2012. National Center for Health Statistics. Vital Health Stat. 10(260).

²Noise and Hearing Loss Prevention. The National Institute for Occupational Safety and Health.

³Masterson EA, Bushness PT, Themann CL, Morata TC. 2016. Hearing Impairment Among Noise-Exposed Workers- United States, 2003-2012. Centers for Disease Control and Prevention. Morbidity and Mortality Reporrt. 65(15)389-394.

⁴Munzel T, Gori T, Babisch W, Basner M. 2014. Cardiovascular effects of environmental noise exposure. Eur Heart J. 35(13):829-836.

⁵Noise-Induced Hearing Loss. National Institute on Deafness and Other Communication Disorders. 2017.

⁶Hearing Conservation. Occupational Safety and Health Administration.

⁷Campo P, Morata TC, Hong O. 2013. Chamental exposure and hearing loss. Dis Mon. 59(4):119-138.