



## NOISE INDUCED HEARING LOSS (NIHL)

Working Together to  
Prevent Hearing Loss



# NOISE INDUCED HEARING LOSS



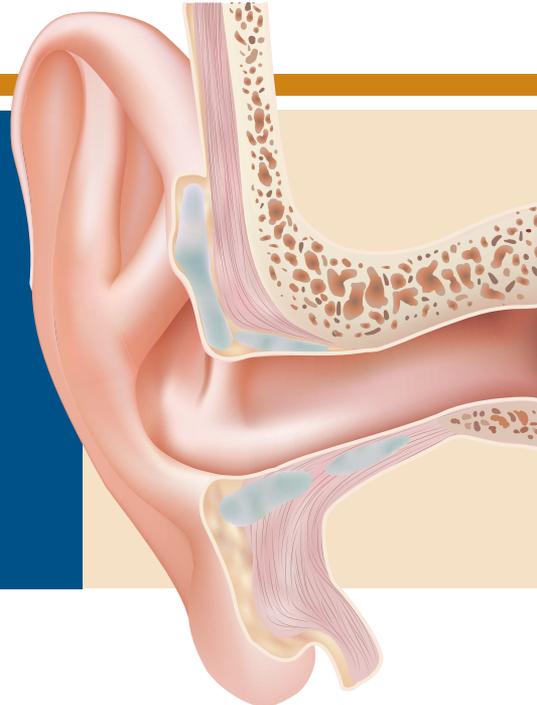
## Noise and its Effects

Noise is a serious and widespread problem in many New Brunswick workplaces. Over time, loud noise from machinery, processes, and equipment can cause permanent hearing loss in employees. Of all occupational diseases in New Brunswick, noise induced hearing loss (NIHL) accounts for the highest number of accepted occupational disease claims to WorkSafeNB. By working together to control noise exposure, employers and employees can prevent occupational hearing loss.

This pamphlet explains NIHL and what you can do to prevent it from happening to you.

## What is NIHL?

*NIHL is the gradual and irreversible loss of the ability to hear sound. Hearing loss usually occurs so gradually that you may not realize it is happening. A one-time exposure to loud "impulse" sounds (train whistle, siren, air horn, jackhammers, etc.) may also cause permanent damage to the ear. There is no cure for NIHL.*

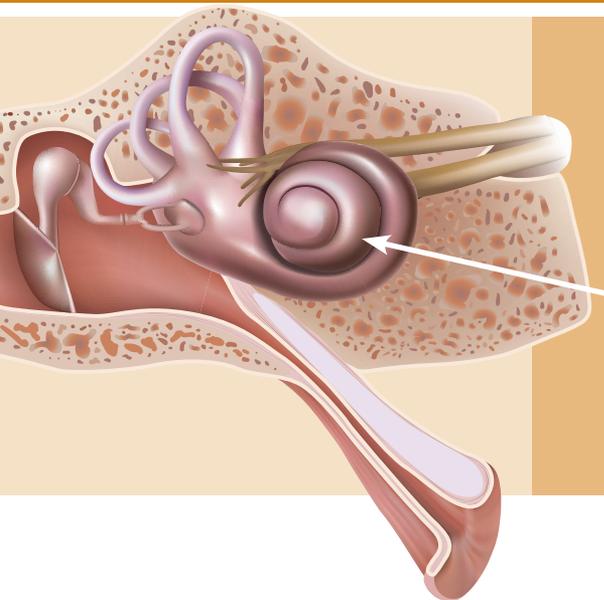


At first, damage to a few hair cells is not noticeable, but as more of the hair cells become damaged the loss will affect the ability to understand speech. Words tend to run into each other, speech cannot be distinguished from background noise, and music becomes muffled. Considerable hearing loss has occurred by the time you become aware of the loss.

Extremely loud noises can cause discomfort and even pain. However, sustained exposure to sounds above 85 dB(A) can produce hearing loss even without noticeable pain or discomfort.

A-weighted decibels [abbreviated dB(A)] is an expression of the relative loudness of sounds in air as perceived by the human ear. In the A-weighted system, the decibel values of sounds at low frequencies are reduced. This correction is made because the human ear is less sensitive at low audio frequencies (below 1000 Hz) than at high audio frequencies.

Exposure to impulse and/or continuous noise may cause short-term hearing loss. This is known as a temporary threshold shift. The temporary threshold shift largely disappears 16 to 48 hours after exposure to loud noise. If a person experiences many temporary threshold shifts, it will lead to permanent NIHL.



*Excessive, continuous and impulse noise over time causes NIHL by damaging the tiny sensory (hair) cells within the inner ear or cochlea.*

## Who is at Risk?

Studies have shown that noise levels in excess of 85 dB(A) over eight hours can cause damage to the ear. The higher the noise level the shorter the exposure time required before damage to the ear can occur.

The American Conference of Governmental Industrial Hygienists (ACGIH) has recommended noise exposure limits known as *Threshold Limit Values-Time Weighted Average (TLV-TWA)* to prevent NIHL. The TLV-TWA® refers to sound pressure levels and durations of exposure that represent conditions it is believed that nearly all workers may be repeatedly exposed to without adverse effect on their ability to hear and understand normal speech. WorkSafeNB has adopted workplace exposure limits for noise-based on the ACGIH TLV-TWA.

ACGIH also states that a hearing conservation program with all its elements, including audiometric testing and training, is necessary when workers are exposed to noise at or above the TLVs® to ensure that the control measures are effective.

One simple way to determine the need for hearing protection is if you need to shout to be heard by someone when they are within two feet. A more accurate way is to conduct noise level tests using equipment designed for this purpose as per CAN/CSA-Z107.56-06 *Procedures for the Measurement of Occupational Noise Exposure*.

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## Legislative Requirements

WorkSafeNB noise legislation covers five key areas:

1. Exposure to noise in excess of the levels described in the table below should not occur without some form of controls.



| NOISE EXPOSURE LIMITS | Sound level (dBA) | Duration per day (Hours) |
|-----------------------|-------------------|--------------------------|
|                       | 80                | 24                       |
|                       | 82                | 16                       |
|                       | 85                | 8                        |
|                       | 88                | 4                        |
|                       | 91                | 2                        |
|                       | 94                | 1                        |
|                       | 97                | ½                        |
|                       | 100               | ¼                        |

2. Employers are to measure noise levels when it is suspected that noise levels exceed 80 dB(A). Employers can use CAN/CSA-Z107.56-06 *Procedures for the Measurement of Occupational Noise Exposure* as a guideline for testing.
3. Employers are to take every reasonable precaution to protect workers from exposure to hazardous sound levels, and shall ensure no employee's eight-hour time-weighted average exposure exceeds 85dB(A).
4. If the prescribed exposure limit is exceeded, the employer is required to put in place measures to reduce a worker's exposure. These measures could include engineering controls, equipment maintenance, administrative controls, or, as a last resort, personal protective equipment (PPE).
5. Employers must post warning signs indicating the range of noise level measured in areas where sound levels regularly exceed 85dB(A).

## How to measure noise levels:



Use a **sound level meter**.



Use a **noise dosimeter** that is attached to a worker while conducting the test.

Sound level meters are normally used to obtain instant noise level readings to establish whether a problem exists. Dosimeters, on the other hand, are used to determine the extent of noise to which workers are exposed in the workplace. Dosimeters can provide an average reading of noise for the duration of a shift or work process.

Guidelines on how best to perform noise tests can be found in the standard CAN/CSA-Z107.56-06 *Procedures for the Measurement of Occupational Noise Exposure*.



## Control Measures



The best way of preventing noise-induced hearing loss is to eliminate noise hazards at the source. This is accomplished through engineering controls such as installing quieter machines and modifying existing equipment. For example: isolating vibrating parts within a machine; using helicoidal gears instead of toothed gears; avoiding elbows or sharp edges in air streams; and, using rubbery materials on all vibrating parts.

The next best control is to prevent noise from reaching the worker along the path.

### Controls along the path include the following:

- Separating workers from the noise source
- Using sound-absorptive materials such as acoustic tiles
- Using mufflers to reduce noise from machines like air compressors
- Erecting enclosures or barriers around workstations and control rooms

The next best option for controlling noise is administrative controls. Examples of administrative controls include conducting noisy operations during non-working hours or job rotation from noisy areas to less noisy areas.

Though far from the best control method, employers often provide PPE to protect workers against noise hazards because unit costs are low and are readily available.

To be effective, hearing protection must:

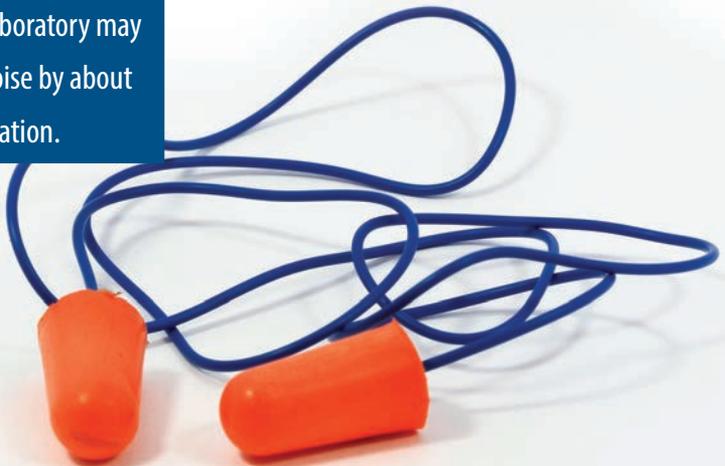
- Be adequate for the specific noise hazard
- Be maintained according to manufacturers' recommendations
- Fit properly and be comfortable
- Not create other health and safety hazards

The Canadian Standards Association (CSA) has produced *Standard Z94.2* on hearing protection. Within the standard, CSA provides guidance on selecting the appropriate hearing protector within a range of noise. Currently New Brunswick legislation quotes the 2014 standard.



The National Institute of Occupational Safety and Health (NIOSH), an American research organization, uses noise reduction rating (NRR) numbers to evaluate hearing protectors. The NRR is determined in a laboratory and may not reflect actual workplace use. To compensate, users should reduce numbers from NRRs by about 25% for muffs, 50% for earplugs and 75% for ear bands.

An earplug rated at an NRR of 29dB in a laboratory may only reduce noise by about 15dB in application.



The following list of suggestions can help employers and employees reduce noise exposures in the workplace:

## Employers

- Make noise control a component of your health and safety program.
- Plan how to control noise on site before a project starts.
- Train workers on the health hazards of noise and how to use controls.
- Purchase or rent quiet equipment and tools, and use noise mufflers.
- Inspect and maintain tools and equipment.
- Prevent surfaces from vibrating excessively.
- Enclose noisy equipment to prevent the noise from reaching workers.
- Isolate employees in sound reduction booths when noise sources cannot be controlled.
- Post signs around noisy areas to prevent entry by unprotected workers.
- Schedule noisy activities for when the fewest number of workers are on site.
- Provide various types of hearing protectors. It's more likely that workers will wear hearing protection if it fits comfortably.
- Enforce the use of hearing protectors, especially for short-duration tasks.
- Provide hearing tests at least every two years (more frequently if required) for workers exposed to noise levels greater than 85 dB(A). Use these results to review controls and ensure protection against further hearing loss.



## Employees

- Notify the employer or supervisor when you encounter hazardous noise and when equipment or tools need maintenance.
- Shut off machinery when it's not in use.
- Use hearing protection properly, even for short duration tasks.
- Select hearing protection that is both comfortable and provides the proper protection.
- Follow the manufacturer's instructions on proper use and care of hearing protectors.
- Look out for your co-workers. Remind them to use hearing protection.
- Participate in the employer's hearing conservation program including periodic hearing tests and training programs on noise hazards.

For more information on noise, visit the Canadian Centre for Occupational Health and Safety (CCOHS) at [cchohs.ca/oshanswers/phys\\_agents/](https://cchohs.ca/oshanswers/phys_agents/)

*Not using or removing a hearing protector even for just three seconds out of a five-minute task can reduce the amount you're protected by **33%**!*



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