

## Occupational hearing loss

WCB may accept a claim for hearing loss when hearing loss has been confirmed on an audiogram and a worker has one of the following types of hearing loss:

- **Occupational traumatic hearing loss:** sudden or acute hearing loss caused by a work accident (e.g., hearing loss due to a fracture at the base of the skull from a fall, an extreme pressure blast, etc.). WCB may accept claims for occupational traumatic hearing loss when the weight of evidence supports that a work accident was a necessary factor for the development of hearing loss.
- **Occupational chemically induced hearing loss:** hearing loss because of exposure to toxins or chemicals in the workplace or medications prescribed for a compensable condition. WCB may accept claims for chemically induced hearing loss when the weight of evidence supports that a work exposure or the use of medications for a compensable condition was a necessary factor for the development of hearing loss.
- **Occupational noise-induced hearing loss (ONIHL):** the gradual loss of hearing due to prolonged exposure to excessive noise in the workplace. In Alberta, the occupational exposure limit (OEL) for noise is 85 dBA averaged over an eight-hour day. The risk of ONIHL is low at exposure levels below this limit but the risk increases significantly as exposures rise above this.

Because the OEL is based on average exposure per day, a worker can be exposed to noise levels higher than 85 dBA for limited periods if the average exposure over eight hours does not exceed 85 dBA.

Continuous noise exposure tends to be more damaging than interrupted exposure to noise, which permits the ear to have a period of rest and recovery. Noise exposure can be reduced using a variety of hearing protection devices such as earplugs and earmuffs.

WCB uses a two-step process to determine if a worker has ONIHL:

1. WCB determines if the evidence supports that a worker has noise-induced hearing loss (NIHL).
2. If so, WCB determines if the NIHL was caused by work.

### Determining if a worker has noise-induced hearing loss (NIHL)

NIHL typically occurs gradually over time due to prolonged exposure to excessive noise levels..

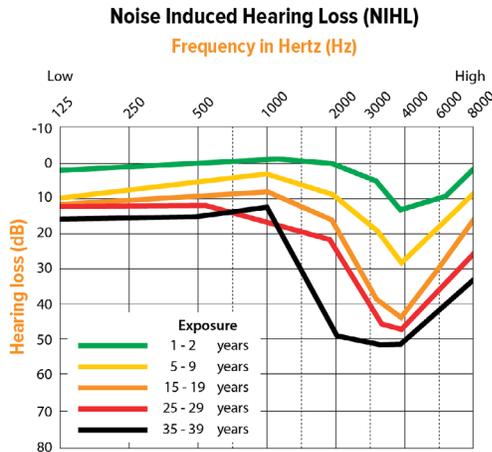
NIHL is permanent in nature because excessive noise damages the hair cells of the cochlea, resulting in sensorineural hearing loss. Noise exposure usually initially develops at 3000, 4000 or 6000 Hz. It does not affect the low frequencies.

To determine if a worker has NIHL, WCB refers to the American College of Occupational and Environmental Medicine's (ACOEM) guidance statement to help determine whether the pattern on an audiogram is consistent with NIHL. On an audiogram, the configuration of the hearing loss reveals a distinctive notch which is typically greatest at 4000 Hz. The hearing is less affected with higher frequencies, with recovery at 8000 Hz. As noise exposure continues, the notch gradually deepens and widens, affecting surrounding frequencies. The effects of aging may reduce the prominence of the notch, which means the effects of noise may be difficult to distinguish from age-related hearing loss (presbycusis) in older individuals, without access to previous audiograms.

NIHL increases most rapidly during the first 10 to 15 years of exposure with the rate of hearing loss declining over time. This contrasts with the rate of presbycusis, which accelerates over time.

NIHL usually affects both ears equally, but it may result in an asymmetrical hearing loss under unique circumstances. For example, an individual with a history of firearm use may have a greater loss in one ear due to the positioning of the head while shooting, which may expose one ear to more noise than the other.

NIHL can be occupational (work-related) or non-occupational. Non-occupational noise exposure can occur at home (e.g., stereos, lawnmowers, farm equipment and power tools) or during recreational activities (e.g., guns, motorcycles, concerts, headphones/earbuds, ATVs and snowmobiles).



**In addition to the above description, the following characteristics are typical of NIHL:**

- The hearing loss is sensorineural.
- In the early stages, the average hearing thresholds in the lower frequencies at 500, 1000 and 2000 Hz is better than the average thresholds at 3000, 4000 and 6000 Hz, and the hearing level at 8000 Hz is better than the deepest part of the notch.
- Hearing loss is not greater than 40 dB at lower frequencies and 75 dB at higher frequencies.
- Word recognition scores are fairly good (greater than 75%).

**The following characteristics are not typical of NIHL:**

- In the low to mid-frequencies.
- Flat across frequencies.
- Profound (greater than 80 dBA).
- Asymmetric (greater in one ear).
- Rapid, late in a working career (ONIHL develops gradually, but most rapidly in the first 10 to 15 years of exposure).
- Progresses significantly despite appropriate hearing protection.
- Occurs during exposure to noise levels below 85 dBA.

**Determining if a worker has ONIHL**

WCB may accept that NIHL was caused by work in specific situations. When a worker has NIHL and reported problems with this to a medical professional (such as an audiologist, physician, etc.):

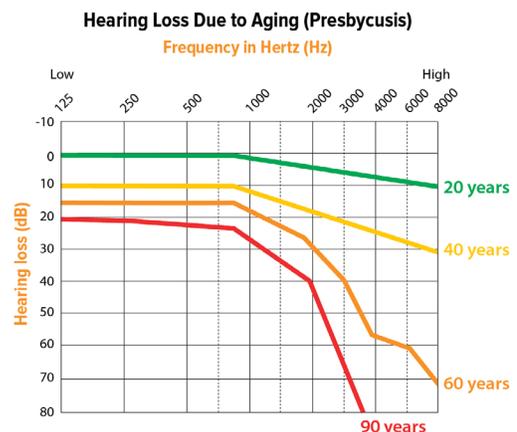
- **Within 12 months** of when they last worked in a job that involved *prolonged exposure to excessive noise*, WCB presumes the NIHL is due to work, unless there is evidence to the contrary.
- **More than 12 months** after they last worked in a job that involved *prolonged exposure to excessive noise*, WCB considers whether the weight of evidence supports that *prolonged exposure to excessive noise* at work was a necessary factor for the development of NIHL.

**Prolonged exposure** means a minimum of two years of work exposure to excessive noise within Alberta or Saskatchewan, or while entitled to WCB-Alberta coverage while working outside of Alberta.

**Excessive noise** means exposure higher than 85 decibels averaged over an eight-hour day, or equivalent (as set out in Alberta's current *Occupational Health and Safety Code*).

WCB may consider other information when determining if the weight of evidence supports that prolonged exposure to excessive noise at work was a necessary factor for the development of NIHL, including but not limited to:

- **Age.** The pattern and progression of presbycusis is different than that of NIHL. Presbycusis is characterized by a gradually sloping pattern. The hearing loss usually begins in the high frequencies, then progresses to the middle and low frequencies, characterized by a gradual sloping pattern, with advancing age. There is no recovery seen at 8000 Hz. The rate of hearing loss begins slowly and accelerates over time, especially after age 60.



- **Test–retest variability.** Slight variations in test results are common. There is high variability in hearing thresholds on screening audiograms; therefore, thresholds may be up to 5 dB worse in the high frequencies and 20 dB worse in the low frequencies. Screening results are typically less accurate than diagnostic audiograms due to the following:

- Less controlled test environments.
- Workers are subject to temporary threshold shifts.
- Workers may be subject to collapsing canals with over-the-ear headphones.

The overall pattern and progression of hearing loss will be considered when multiple audiograms are submitted for review.

- **Other causes of hearing loss.** There are a number of causes of hearing loss besides noise exposure and the aging process. Other causes of hearing loss may include head injuries, viral infections, autoimmune inner ear disease, genetics, hereditary hearing loss that runs in families, Meniere's disease, middle ear disease, ear infections or impacted earwax. Additional factors that have associations with the risk of hearing loss include cardiovascular disease, cerebrovascular disease, smoking, diabetes, kidney disorders and ototoxic medications.
- **Other causes of notching.** The 4000 Hz dip seen on pure tone audiograms is often observed in the early stages of NIHL. However, not all notches are caused by noise exposure. A notch can occur with various diseases (such as viral infections), head injuries, hereditary hearing loss, ototoxicity, acoustic trauma, acoustic neuroma, perilymphatic fistulas and barotrauma. In many cases the cause is unknown.

## Tinnitus

Tinnitus is a condition that sometimes accompanies hearing loss. It happens when sound is perceived even though there's no external source of the sound. It is often described as a ringing, rushing, buzzing or blowing sound in one or both ears. It can be occasional or constant.

WCB may accept tinnitus when all the following apply:

- The worker has an accepted claim for ONIHL, occupational traumatic hearing loss, or occupational chemically induced hearing loss.
- The worker used a hearing aid provided by WCB for a minimum of one year.
- The worker has a documented history of two or more consecutive years of tinnitus.
- Tinnitus has been confirmed by an audiologist or medical specialist with specific training in audiometry/hearing loss.

## When your client has been diagnosed with hearing loss...

If you think your client may have occupational traumatic hearing loss or occupational chemically induced hearing loss, they can complete a [Worker Report of Injury or Occupational Disease](#).

If you think your client may have ONIHL, they can complete the forms in the [hearing loss package](#).

The completed report or forms, along with copies of all audiograms (past and current), should be submitted to WCB.

