

Health & Safety Learning Symposium

The True Cost of Noise-Induced
Hearing Loss

Aaron Jones

Industrial Hygienist

Prevention Services, WorkplaceNL



 www.workplacenl.ca/symposium

WorkplaceNL



Learning Objectives

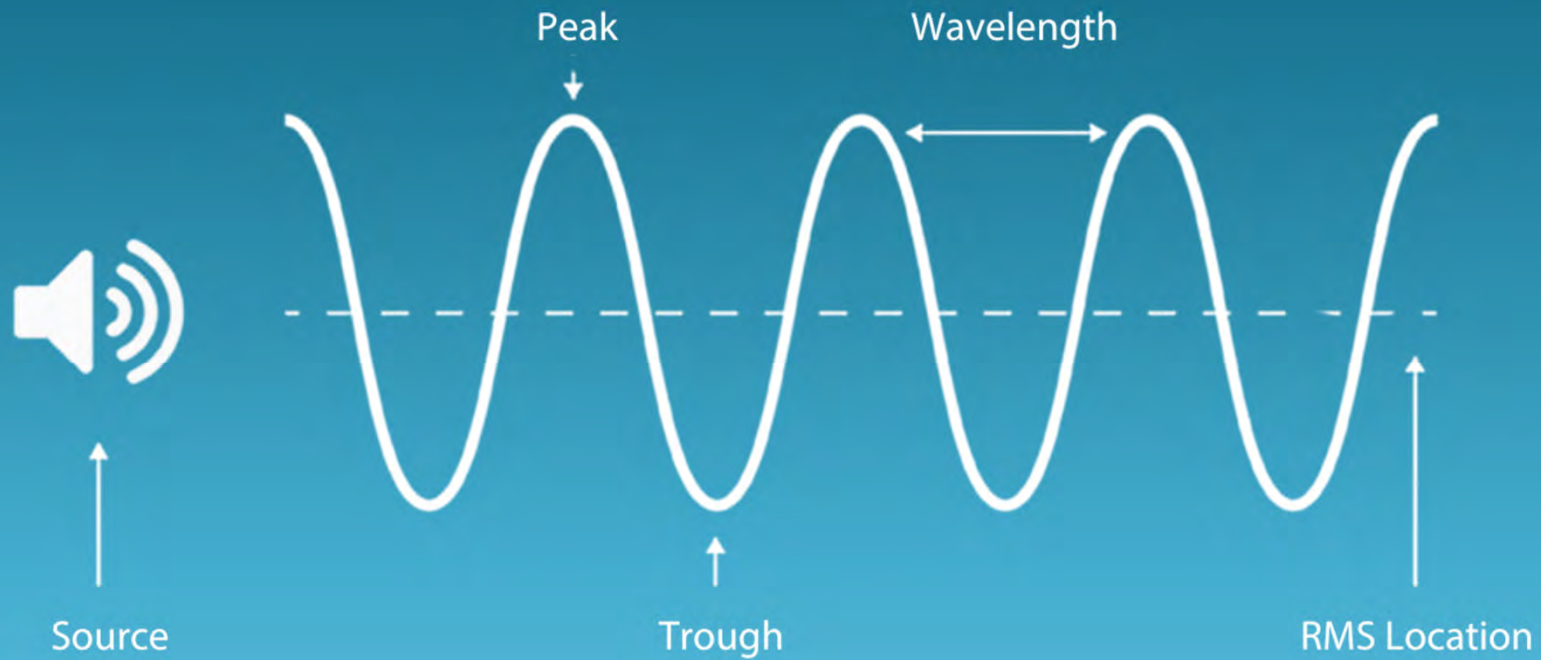
- **Introduction to Noise**
 - What is Sound?
 - How Does Sound Affect the Human Ear?
 - Noise Exposure and Hearing Loss
 - Is There a Safe Level of Noise Exposure?
 - What Does Hearing Loss Sound Like?
- **Impacts of Noise-Induced Hearing Loss (NIHL)**
 - Frequency
 - Cost
 - Personal
- **Prevention Techniques**



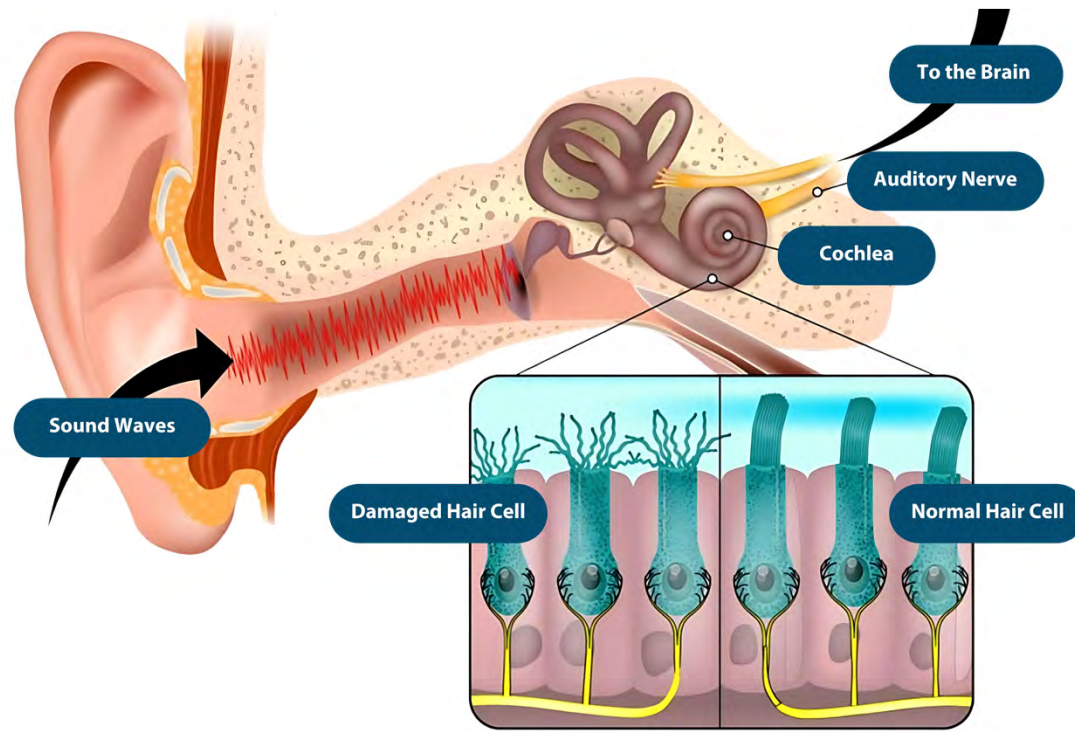


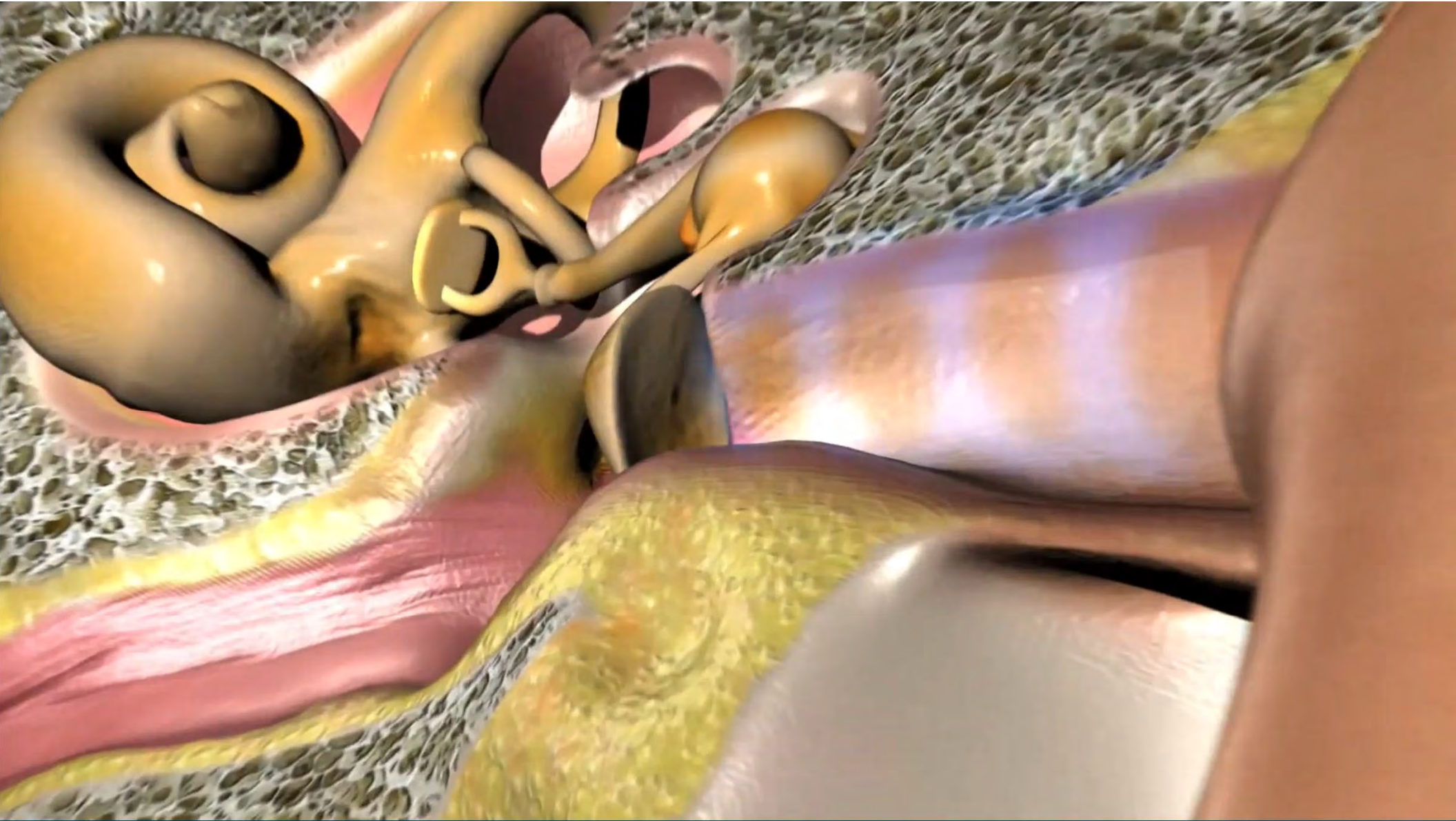
Introduction to Noise

What is Sound?



How Does Sound Affect the Human Ear?





Noise Exposure and Hearing Loss

- Temporary or permanent loss of hearing
- Hearing loss is natural over time (presbycusis)
- Hearing loss can be exacerbated due to environmental or personal factors



Sources of Noise Exposure

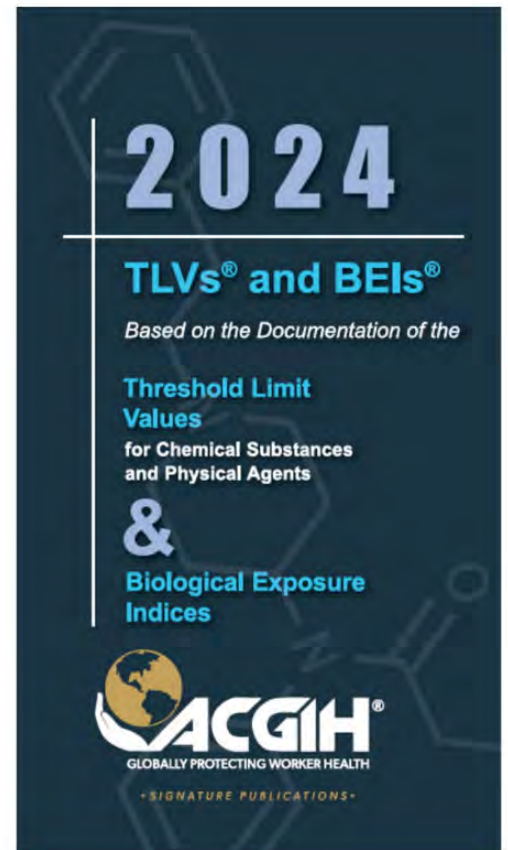
Noise exposure is the result of environmental exposure to excessive noise. Examples include:

- Loud concerts
- Lawnmowers
- Large crowds
- Vehicles/traffic



Is There a Safe Level of Noise Exposure?

Occupational exposure limits in NL are based on the **ACGIH TLVs and BEIs** manual (released annually).



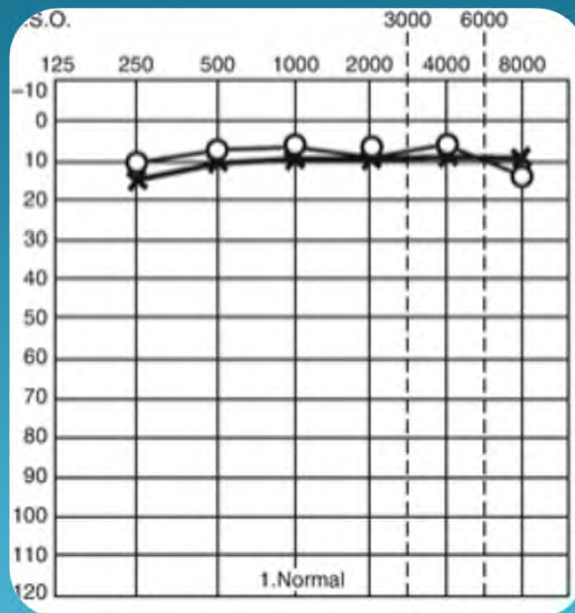
Continuous vs. Impact/Impulsive Noise:

ACGIH Threshold Limit Values

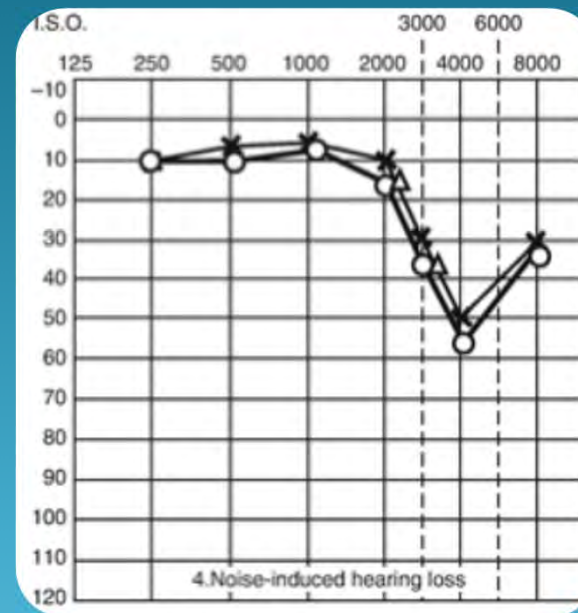
Threshold Limit Value	Noise Level
Time Weighted Average (dBA)	85
Impact or Impulsive Noise Level (dBC)	140

What Does Hearing Loss Sound Like?

Normal Hearing



Noise-Induced Hearing Loss



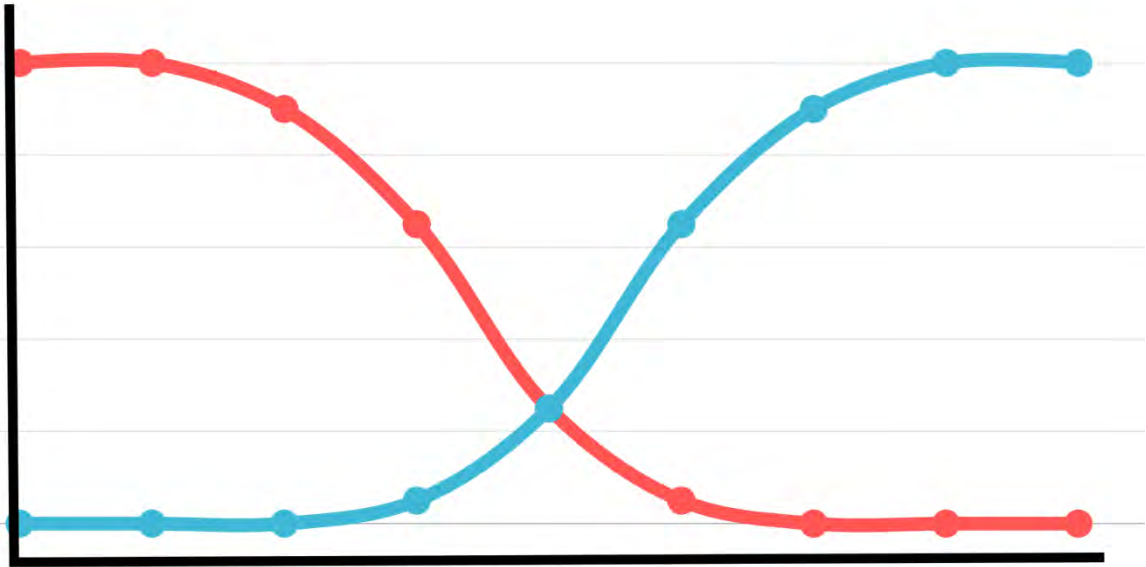
What Does Hearing Loss Sound Like?

<https://www.starkey.com/hearing-loss-simulator>



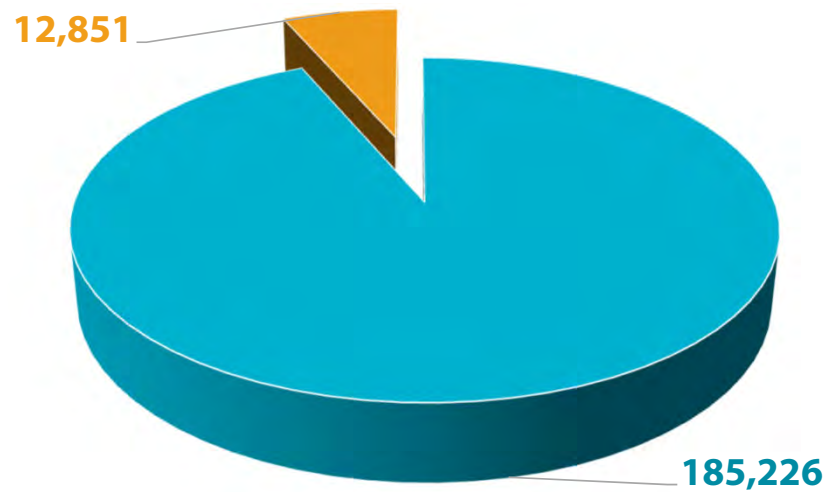
Impacts of Noise-Induced Hearing Loss (NIHL)

Theoretical Occupational Disease Latency Plot



Accident vs. Occupational Disease Claim Frequency

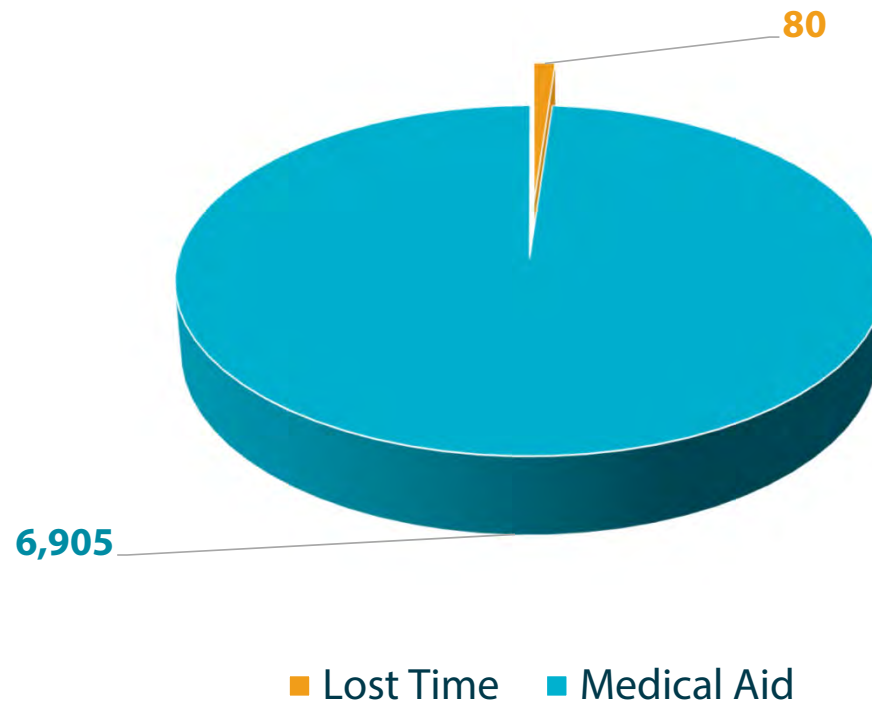
1997 - 2023



■ Accident ■ Occupational Disease

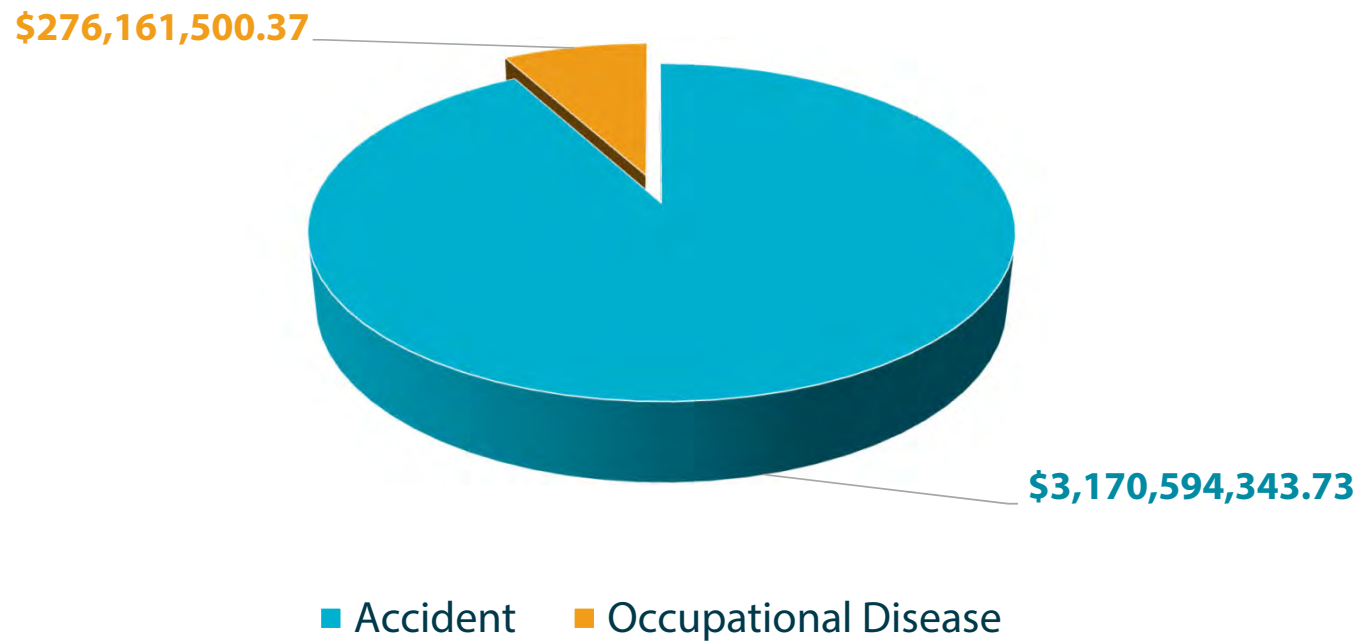
Hearing Loss Claims

1997 - 2023



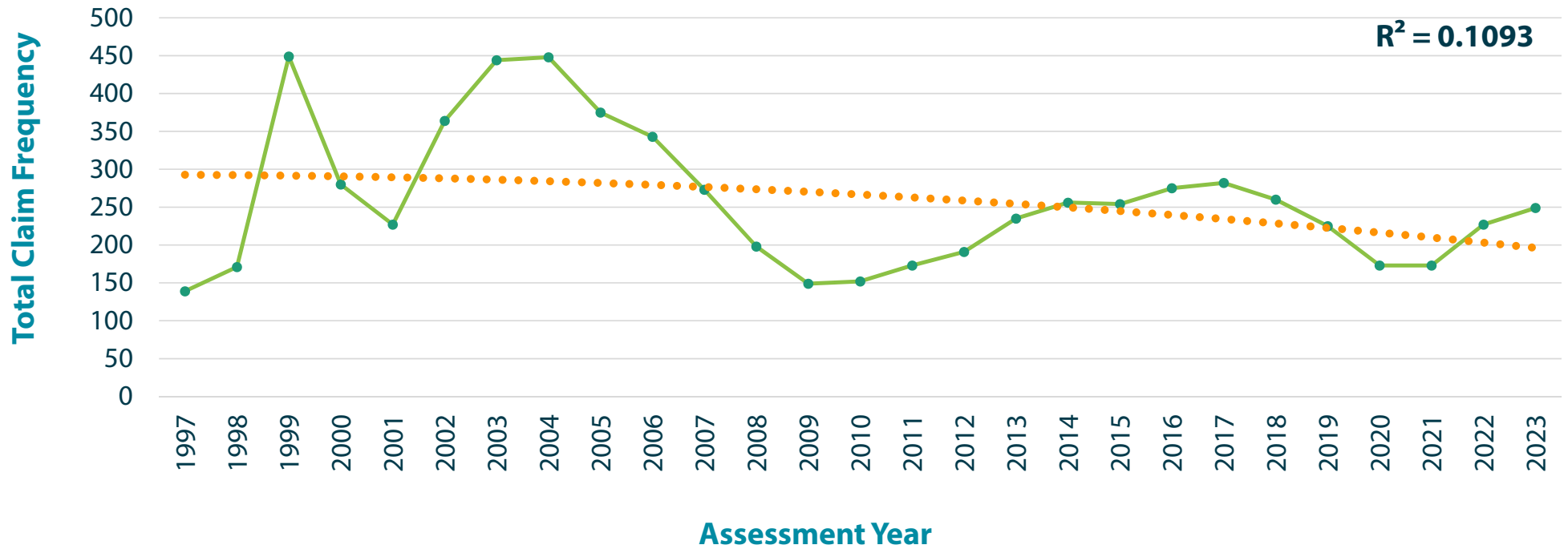
Accident vs. Occupational Disease Claims Cost

1997 - 2023



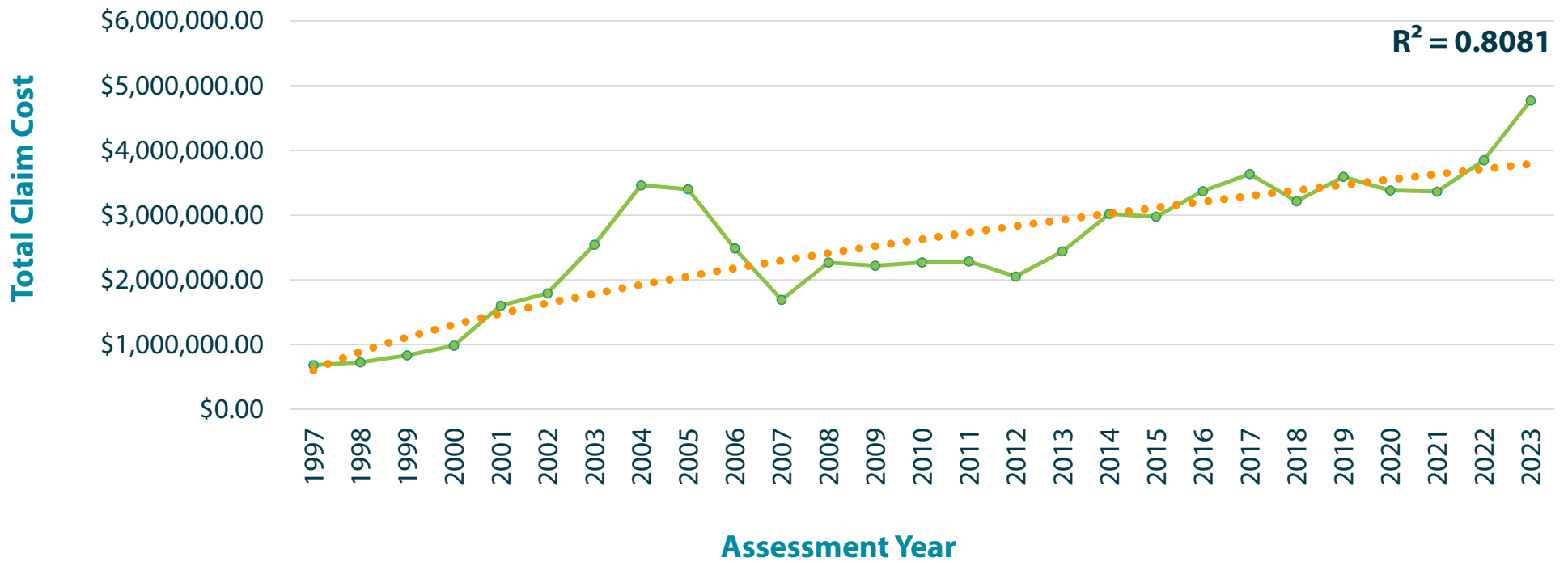
Total Hearing Loss Claim Frequency by Assessment

1997 - 2023



Total Hearing Loss Claim Cost by Assessment Year

1997 - 2023



Did You Know?

Which industry has the highest hearing loss claim frequency?

- a) Carpentry
- b) Logging
- c) Fishing
- d) Mining

Hearing Loss Claim Frequency by Industry

1997 - 2023

Accepted Claims Pay	Lost Time	Medical Aid	All Types of Claims
Not Coded NC	31	2,785	2,816
Fishing (per \$100 of fish purchased) IG031F	1	473	474
Fishery Products and Services Industry IG102	5	410	415
Industrial and Heavy Construction and Site Work IG41	4	338	342
Logging Industry (per cubic metre) IG041W	1	271	272
Pulp and Paper Products IG27	1	244	245
Provincial and Municipal Government Services IG83	3	239	242
Iron Mines IG0617	7	230	237
Building, Developing, and General Contracting IG401	2	194	196
Other Utility Industries IG49	0	170	170
Motor Vehicle and Electric Motor Repair Shops IG635	2	102	104
Other Manufacturing IG39	0	99	99
General Trucking, Warehousing, and Waste Disposal IG456	0	82	82
Hospitals and Ambulance Service IG861	1	77	78
Industrial, Construction, and Automotive Products IG29	0	77	77
Other Mines IG069	1	73	74

Did You Know?

Which industry has the highest hearing loss claim frequency?

- a) Carpentry
- b) Logging
- c) Fishing
- d) Mining

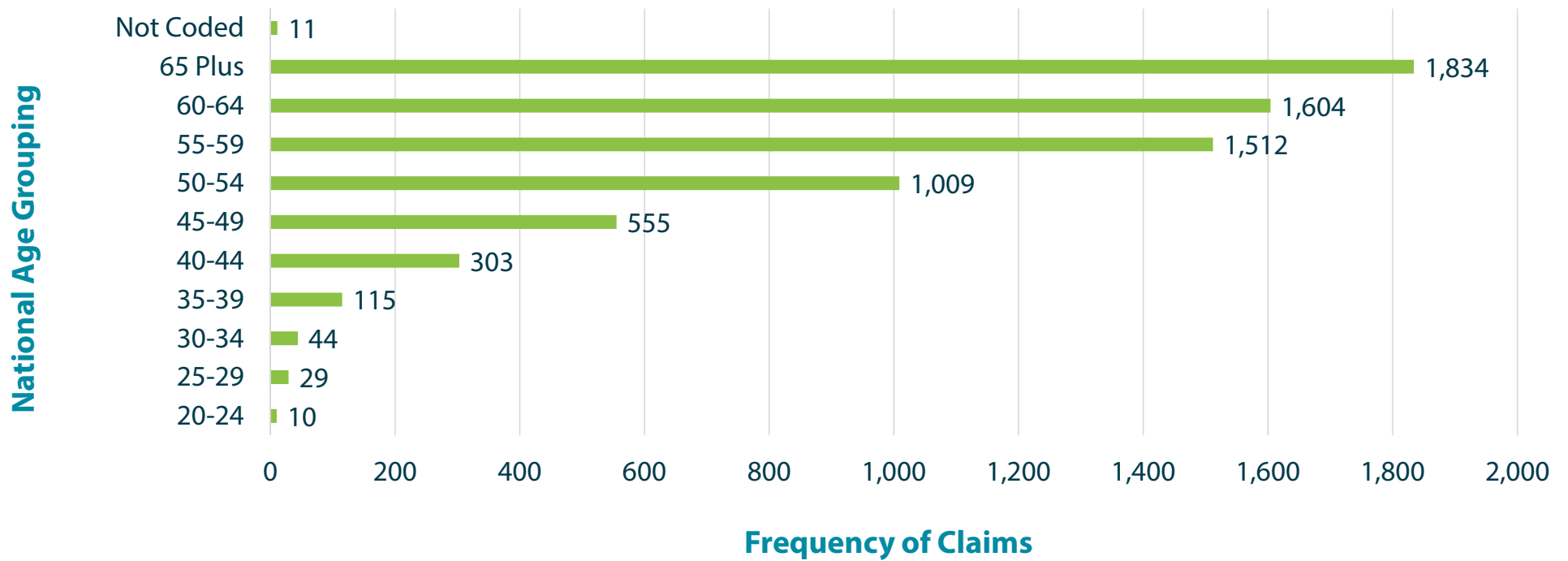
Hearing Loss Claim Frequency by Occupation

1997 - 2023

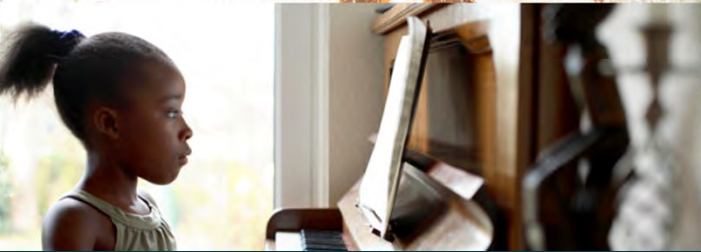
Accepted Claims Pay	Lost Time	Medical Aid	All Types of Claims
Heavy Equipment Operator (Except Crane Operators)	0	430	430
Carpenters	4	363	367
Fishing Vessel Skippers/Fishers	1	354	355
Construction Trades/Helpers/Labourers	4	349	353
Fish Plant Workers	1	282	283
Truck Drivers	3	275	278
Other Transportation Equipment Operators/Related	1	276	277
Other Elemental Service Occupation	3	264	267
Fishing Vessel Deckhands	0	250	250
Welders and Rel. Machine Operators	5	235	240
Auto Services Technician/Truck Mechanic/Rep.	4	202	206
NOT ELSEWHERE CLASSIFIED (NEC)	1	178	179
Heavy-Duty Equipment Mechanics	2	126	128
Deck Crew Water Transport	15	98	113
Chainsaw & Skidder Operators	0	111	111

Hearing Loss Claim Frequency by National Age Group

1997 - 2023

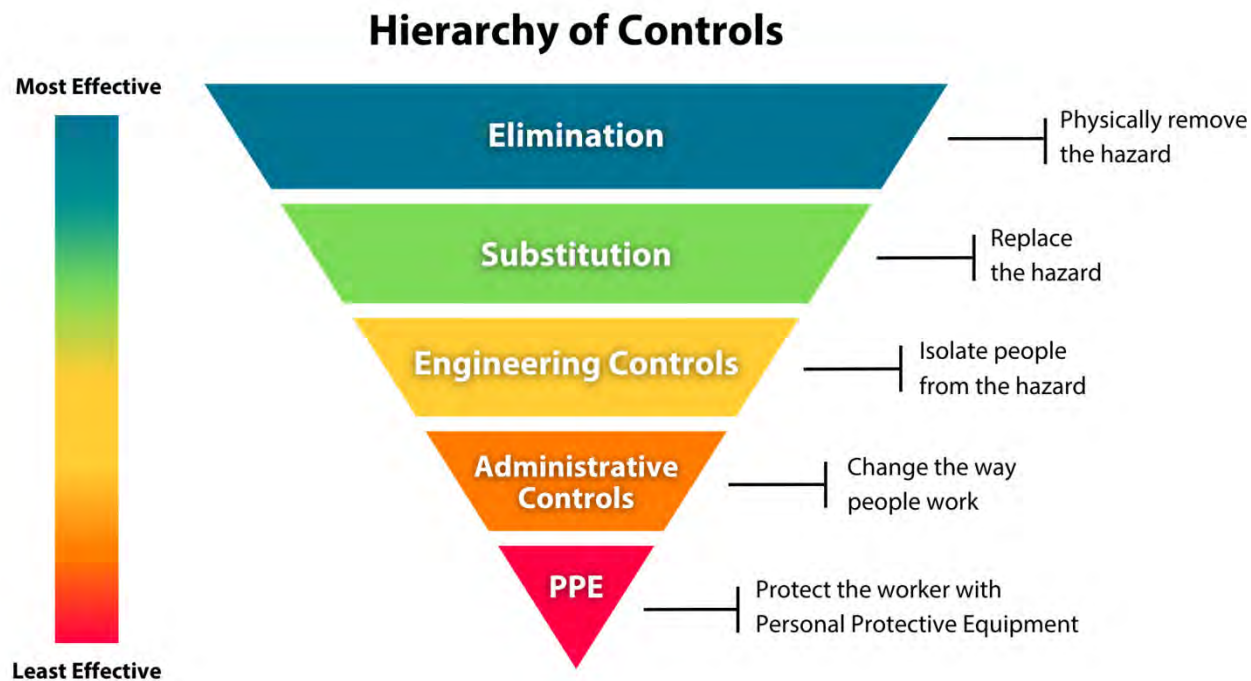






Prevention Techniques

Hearing Conservation Program



Hearing Conversation Program

Where a worker is overexposed to noise, the employer must have a hearing conservation program.

Hearing Conservation Program Guideline – WorkplaceNL

<https://workplacenl.ca/site/uploads/2022/04/Hearing-Conservation-Program-Guideline-20221026-web.pdf>



Hearing Conservation Program

It must be based on a noise assessment and include:

- Roles and Responsibilities
- Risk Assessment
- Control Methods
- Hearing Protection
- Hearing Tests
- Education and Training
- Record Keeping
- Program Review and Evaluation



Training and Education

Training is mandatory for workers who are exposed to noise above the exposure limit.

Training should include:

- Health effects
- Control measures including fitting, maintenance, and care of hearing protection, if applicable
- Hearing tests



Hearing Tests

Hearing tests are required for new workers within the first three months and must be repeated at least annually, thereafter.

Employers must keep records for as long as the worker is employed and provide copies, if requested, on termination.



Signage



Hearing Protection

When engineering and administrative are impractical or insufficient in reducing noise levels below the exposure limit, hearing protection must be used.



CSA Class Rating

Table 4
Selection of HPDs based on class and noise exposure, presuming a desired effective exposure of $L_{ex,8h} = 85$ dBA when the HPDs are worn
(See Clauses 9.6.1, 9.6.4.1, 9.6.4.2, 9.7.1, and 12.2.1 and Table 3.)

$L_{ex,8h}$ (dBA)	Recommended class
≤ 90	C
> 90 up to and including 95	B or BL
> 95 up to and including 105	A or AL
> 105	Dual *

* Dual hearing protection shall be used. A minimum of a Class B earmuff and a Class A earplug shall be used. Also, it is recommended that exposure durations be limited. As required by Clause 9.6.6.2, octave-band analyses shall be conducted for attenuation predictions, and more frequent audiometric testing shall be provided.

Notes:

- 1) As discussed in Clause 9.6.4.1, the values in Table 4 reflect an approximate built-in 10-dB derating.
- 2) When using class to match an HPD to a noise exposure, devices with the L designation should be selected when noises have a substantial low-frequency content and shall be selected when the low-frequency content is sufficient that dBC minus dBA value is ≥ 7 dB (as is the case in about 10% of industrial noises).

CSA Noise Reduction Rating (NRR)

Table 2
Effective rating calculations for the NRR
(See Clauses 9.3.3, 9.6.5.2, and 9.7.1, and A.2.)

Device type	For use with dBA	For use with dBC	Effective rating
Earplugs	$L_{eq} - NRR(0.5) - 3 = XX \text{ dBA}$	$L_{eq} - NRR(0.5) = XX \text{ dBC}$	50%
Earmuffs	$L_{eq} - NRR(0.7) - 3 = XX \text{ dBA}$	$L_{eq} - NRR(0.7) = XX \text{ dBC}$	70%
Dual protection	$L_{eq} - NRR(0.6) - 3 = XX \text{ dBA}$	$L_{eq} - NRR(0.6) = XX \text{ dBC}$	60%

Notes:

- 1) *Use of the deratings shown in this Table might be helpful in estimating average protection levels for groups of users, but the deratings cannot be used to accurately estimate protection levels for individual users.*
- 2) *Predicted values should be rounded to integer values.*

In Summary

- Hearing loss is the most prominent occupational disease within the provinces' workforce
- There are varying impacts associated with hearing loss, most significantly those that affect a workers' quality of life
- Hearing loss is permanent and 100% preventable
- There are an array of prevention techniques available to protect workers from excessive noise exposure:
 - <https://ohsguide.workplacenc.ca/topic/noise/>
 - <https://www.ccohs.ca/topics/hazards/physical/noise>





Thank you!



Questions



Your Feedback is Important!

Please complete the evaluation at the end of the day.