# NOISE INDUCED HEARING LOSS PROGRAM OF CARE

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## Algorithm



## Acknowledgments

The Ontario Association of Speech-Language Pathologists and Audiologists and the Association of Hearing Instrument Practitioners of Ontario made significant contributions to the development of the Noise Induced Hearing Loss Program of Care. The Workplace Safety and Insurance Board (WSIB) acknowledges and appreciates their participation.

### Introduction

The WSIB delivers Programs of Care (POC) to workers in Ontario who have received entitlement to benefits under the Workplace Safety and Insurance Act (WSIA). Programs of Care are evidence-based health care delivery plans that outline approved treatment shown to be effective for specific injuries or illnesses. The Noise Induced Hearing Loss (NIHL) POC pertains to workers who have an occupational noise induced hearing loss. It was developed through a collaborative process that included representatives of associations and the WSIB. It is revised based on ongoing clinical and program outcome measurements, the emergence of new evidence, changes in technology, and changes to practice patterns.

The NIHL POC sets out hearing health services delivered by audiologists and hearing instrument practitioners to treat and reduce the impact of hearing loss through the provision of hearing aids to thereby improve workers' quality of life.

For ease of communication throughout this reference guide, the term hearing health care provider will be used to describe both audiologists and hearing instrument practitioners.

## Evidence

The NIHL POC is based on the principles of Evidence-Based Medicine defined as "the conscientious, explicit and judicious use of current best evidence" (Sackett et al. 1996). For this POC, the literature search, review, discussion of the key findings, and inclusion of the key literature was conducted by the participating health professional associations noted in the acknowledgments section in collaboration with WSIB.

The recommended interventions in this POC are based on peer-reviewed publications and systematic reviews published between 2005 and the fall of 2015 where the quality standards were achieved through evidence-based processes.

Literature review inclusion criteria:

- Studies published in English
- Adult participants (19 years +)
- Using search terms: *hearing aid(s)* in conjunction with each of the following terms: *use, assessment, prescription, outcomes, outcome measurement, benefit, satisfaction, acclimatization, assistive listening devices and aural* and *audiological rehabilitation*

Literature review exclusion criteria:

 Articles containing the following topics: traumatic hearing loss, ear surgery, cochlear implant, middle ear implant, bone conduction or boneanchored hearing aid, CROS-Bi-CROS hearing aid, tinnitus, and interventions comparing hearing aid technologies

## **Program Objectives**

The objectives of the NIHL POC are to:

- Ensure appropriate and comprehensive assessment and hearing health care intervention for workers identified with occupational noise induced hearing loss
- Provide hearing aids and related services and assistive listening devices and additional follow up care in the first year of hearing aid use

- Provide counselling, education, and support to workers and their families or caregivers on: hearing loss and its effects, appropriate expectations for hearing aids, effective communication strategies, and use, care and maintenance of hearing aids and assistive devices
- Promote benefit and satisfaction with hearing aids such that they improve the worker's quality of life
- Facilitate clear and timely communication between the WSIB, workers, employers and providers
- Facilitate safe return to work, where this is applicable

## Worker Population Covered by the Program of Care

The NIHL POC is for workers with an approved WSIB claim for occupational Noise Induced Hearing Loss and who require a new hearing aid. For more information on the WSIB's NIHL Policy (i.e., entitlement to benefits) please visit: Operational Policy Manual: Noise-Induced Hearing Loss.

Treatments specific to the management of tinnitus and traumatic hearing loss are not covered in this POC.

## Components of the Program of Care

#### Assessment

The NIHL POC sets expectations for assessments conducted for WSIB workers. The assessment must consist of:

**Audiometric testing** (if not already conducted in the last 6 months): baseline data collected to determine type, degree, and configuration of hearing loss

**Communication needs evaluation:** summary of the worker's communication barriers as a result of the hearing loss, its impact on quality of life, and goals for improved communication

#### AUDIOMETRIC TESTING

A standard audiometric assessment battery should be completed as per preferred practice guidelines before submission and should include:

- i. Case History
- ii. Otoscopic examination
- iii. Audiometry\*
  - a. Standard pure tone air and bone conduction threshold audiometry using properly calibrated audiometric equipment as per ISO standards, including 3000 Hz for both ears
  - b. Speech recognition threshold
  - c. Speech recognition scores using a 25-word standard list with recorded materials
- iv. Impedance testing
- v. Medical referral as appropriate, if not previously diagnosed, including
  - a. Single-sided hearing loss
  - b. Significant asymmetrical hearing loss
  - c. Conductive component
- \* The name, signature, and qualifications of the individual who performed the audiometric testing must be clearly indicated on the audiogram.

#### EVALUATION OF COMMUNICATION NEEDS

The purpose of the evaluation of communication needs is to determine how the hearing loss is affecting the worker's communication, their overall quality of life by producing activity limitations and participation restrictions, and to determine their goals for improved communication.

The following factors should be considered and documented in order to inform the selection of the most appropriate hearing aids and assistive devices and to determine counselling and rehabilitation needs:

- Lifestyle and environmental considerations
- Activities and participation considerations
- Barriers to successful outcomes with hearing aids including health, social, and cognitive factors that would impact use, care, and maintenance of the hearing aids

- Level of motivation of the worker to accept rehabilitation through the use of hearing aids
- Available/appropriate technologies
- Social supports for the worker (i.e. significant other, family members, caregivers, etc.)

The provision of hearing aids and assistive devices requires a patient-centred approach. Hearing aid intervention must be customized to the specific needs, goals, motivation, and expectations of the worker, ensuring that language, cultural, ethnic, health and social considerations are respected.

The hearing health care provider will collaborate with the worker to establish the worker's goals for improving their hearing and communication. Participation in this process by the worker's social supports is strongly encouraged to provide ongoing support for the rehabilitative process and to maximize the likelihood of a successful outcome with hearing aids.

## PRE-FITTING COUNSELLING AND INFORMATION FOR WORKERS

Information should be provided to the worker at the assessment appointment regarding:

- The benefits of hearing aids to quality of life in order to promote a positive attitude towards the acceptance of hearing aid technology and hearing aid self-efficacy (i.e. confidence)
- Expectations for hearing aid outcome and the likely benefits and limitations of hearing aids in a variety of listening situations

This type of counselling and information promotes hearing aid satisfaction post-fitting.

#### **Prescription and Device Selection**

The audiometric test results and the communication needs evaluation will be taken together to inform the selection of the most appropriate level of hearing aid technology and additional assistive devices (where necessary) to meet the worker's lifestyle, communication, health, social and vocational needs. The worker's cognitive abilities or limitations as well as vision and/or dexterity issues should be considered carefully when selecting the technology in order to ensure that the worker can manage their hearing aids and any of the user controls and/or additional devices (e.g. remote controls). A written prescription must be provided by an audiologist or physician to the worker and be kept by the hearing health care provider in the worker's health record and may be requested by WSIB periodically.

Information to be provided to WSIB:

- Patient name and secondary identifier (e.g. date of birth)
- Date of issue
- Ear(s) to be fitted
- Make, model, type
- Performance specifications, where appropriate (e.g. frequency/gain characteristics and maximum power output or target/fitting formula)
- Audiometric data/or any other appropriate data from the assessment required for dispensing

If not covered by the above, other elements considered necessary must be specified, such as:

- Hearing aid components including but not limited to directional microphone, telecoil, direct audio input, volume control, tamper-proofing, etc.
- Earmold style, material (e.g. hypoallergenic) and specifications for modifications including venting and tubing, where applicable
- Special applications for ear hooks

Ear impressions will be taken for earmolds as required at the time of device prescription.

#### **Dispensing and Fitting**

The process of dispensing and fitting the hearing aids should begin with ensuring that the hearing aids are working according to the manufacturer's specifications by performing:

- i. A listening check to ensure that sound quality is satisfactory and to rule out excessive circuit noise, intermittency, and/or any other negative sound impressions. The listening check may also include operation of the volume control, directional microphones, FM, t-coil, etc.
- ii. Electroacoustic (test box) measures to obtain information about gain, output, and frequency characteristics, distortion level, input noise and attack and release times

#### HEARING AID PROGRAMMING

Initial selection of target gain for average speech input levels should be based on a validated evidence-based prescriptive fitting formula or procedure.

#### PHYSICAL FIT AND SOUND QUALITY

The hearing aids should sit properly and securely in the ear and the worker should find them comfortable and easy to operate. Physical fit should also be assessed to ensure ease of insertion/removal and that audible feedback is not present. Failure to complete these assessments is likely to lead to reduced satisfaction and comfort.

An assessment of the worker's level of comfort with the sound quality of the hearing aids may include:

- Overall loudness
- Naturalness of speech (e.g. harsh, sharp, metallic)
- Own voice (e.g. occlusion effect, loudness, other characteristics)
- Balance between the two ears

Modifications to the physical fit and coupling method (e.g. earmold, domes) will be made as required to ensure comfort and optimal fit of the hearing aids.

Programming adjustments will be made as required in order to meet prescriptive targets and to ensure audibility, clarity, and comfort of sounds. Although very significant advances in hearing aid technology and noise reduction algorithms have taken place over the last decade, much effort is still required by hearing health care professionals to promote optimal sound quality in a variety of listening situations, particularly background noise. The most common reason for hearing aid non-use is the patient's self-report that hearing aids are disturbing in background noise or provide little benefit in that situation.

#### HEARING AID INSTRUCTION

Hearing aid users require a thorough understanding of how to use, care for, and maintain the hearing aids. Such orientation may include but is not limited to:

- Insertion and removal of instruments
- Batteries (size, how to change, disposal)
- Usage patterns/adjustment

- Manipulation of remote controls and/or any special features and accessories
- Access to multiple programs for various listening situations
- Telephone use
- Assistive listening device coupling
- Routine maintenance, safe storage, warranty information

This instruction is significantly more relevant to adults with dexterity issues and/or vision loss who need more time and assistance handling their hearing aids.

#### **Worker Education**

Counselling, education, and provision of information are keys to successful outcome with hearing aids and should be provided during each interaction with the worker.

Two main factors highlight the importance of the need for counselling sessions and information provision. These factors are:

- Hearing aids include a range of features and controls available to the hearing aid user. Remote controls to implement some of the features in the hearing aids and accessories are also commonplace. However, extra features, situationspecific listening programs, and other technologies such as remote controls and streaming devices are only helpful if the hearing aid user has a good understanding of when, where, and how to use them.
- Some hearing aid users may have age-related changes in memory and information processing that limits their capabilities to use their hearing aids to achieve maximum benefit. In addition, individuals with dexterity issues and/or vision loss may require more time and assistance learning how to handle their hearing aids.

Information and education are important to hearing aid users and promote increased use and greater satisfaction. In addition to the instruction on use, care, and maintenance of hearing aids, workers should be counselled regarding:

- The nature of the worker's communication difficulties and how they will be affected by various environments and listening situations
- The use of effective communication strategies in various listening situations

- Appropriate expectations for hearing aids with respect to how they can improve hearing and communication in various listening situations, particularly with respect to hearing/understanding speech in noise
- The notion of acclimatization: that it may take time to become adjusted to the hearing aids and the amplification

#### SOCIAL SUPPORTS

A very significant determinant of successful outcome with hearing aids is the existence of social supports. Family members should be encouraged by the hearing care health provider to participate in the hearing aid fitting and aural rehabilitation follow-up appointments as a means to achieving maximum hearing aid treatment outcomes. From a practical standpoint, family members can add value by remembering and reinforcing some of the information provided to the hearing aid user once they leave the clinic. Family members also gain a better understanding of the hearing impaired individual's experience with hearing loss and hearing aids and this potentially lends to a more supportive and helpful attitude. Decreased rates of depression and anxiety have been documented when family members are included in the aural rehabilitation process.

#### **Outcome Measures**

#### VERIFICATION

An essential component of successful treatment of NIHL is the assurance that the hearing aids produce the prescribed performance characteristics by means of an appropriate verification procedure. Verification provides an objective measurement in decibels of the amount of amplification delivered by the hearing aid into the ear on a frequency specific basis. Real ear probe microphone measurements are the gold standard for verifying and optimizing the electroacoustic characteristics of the hearing aid fitting. Verifying hearing aids is essential to meet the worker and clinician goals, while ensuring output values are within safe and comfortable limits.

Verification using real ear measurements will be completed at the fitting and will be kept by the hearing health care provider in the worker's health record and may be requested by WSIB periodically.

#### VALIDATION

Validation is the assessment of whether or not and how much the hearing aids have reduced the activity limitations and participation restrictions caused by the hearing loss and have improved the quality of life for the worker. Validation will determine the patient's self-perceived benefit and satisfaction; or benefaction with the hearing aids. This assessment is equally important for successful hearing aid outcome as verification. Validation measures under the NIHL POC consist of the NIHL POC Hearing Aid Outcome Questionnaire and hearing aid use data.

#### NIHL POC Hearing Aid Outcome Questionnaire

Although a review of the evidence was conducted to find an appropriate outcome measure to be used in the NIHL POC, it was determined that there were no existing measures that suit the needs of the Ontario worker population. As a result, a new measurement tool called the NIHL POC Hearing Aid Outcome Questionnaire has been developed specifically for the Ontario worker population, which provides important information about the worker's abilities related to their hearing aid.

The self-report NIHL POC Hearing Aid Outcome Questionnaire will be administered at the 90-day follow-up appointment to allow for acclimatization with the hearing aids.

#### Hearing aid use

The amount of time an individual wears their hearing aids is related to their level of satisfaction with the aids and is an important facet of outcome measurement. The hearing aid use data, collected by the hearing aid (datalogging) and uploaded to the hearing aid fitting software will be summarized and documented at the 90-day progress follow-up on the NIHL POC Hearing Aid Outcome Report.

The NIHL POC Hearing Aid Outcome Questionnaire and the manufacturer's invoice (if not already submitted) for the hearing aid(s) must be submitted to the WSIB with the NIHL POC Hearing Aid Outcome Report.

## Duration, Phasing and Description of Hearing Services

The delivery of services provided within the NIHL POC include:

#### Assessment, including:

 audiometric testing (if not already conducted in the last 6 months), evaluation of communication needs, pre-fitting counselling and information, selection of hearing aid technology and prescription (by an audiologist or a physician)

**Dispensing and fitting** - 1-2 weeks after assessment, including:

 listening check and electroacoustic measures, programming, physical fit and sound quality, worker education and instructions, verification using real ear measurement and provision of batteries for the first year of hearing aid use

**Initial follow-up -** 2-4 weeks after hearing aid is dispensed and fitted, including:

 re-programming, physical fit adjustments, cleaning, repairs and remakes and worker education/reinstruction as required

**Progress follow-up** - 90 days after hearing aid is dispensed and fitted, including:

- validation completion of worker's self-report NIHL POC Hearing Aid Outcome Questionnaire and record hearing aid use data
- re-programming, physical fit adjustments, cleaning, repairs and remakes and worker education/reinstruction as required
- completion of NIHL POC Hearing Aid Outcome Report

**Note:** The trial period for the hearing aid can be between 30 days to 90 days following the hearing aid fitting. Any change to the selection of the hearing aid(s) should occur within this timeframe.

**Additional follow-ups** (as required based on the needs of the worker, at the discretion of the hearing health care provider) – up to 365 days after assessment, including:

- programming adjustments or modifications to physical fit and/or sound quality and cleaning, repairs and remakes as required
- additional counselling, education and instruction on use, care, and maintenance of hearing aids, etc.

Refer to the algorithm on page 4 for a summary of the services and phasing.

## Communications with Workers and the WSIB

One of the primary roles of the hearing health care provider is to ensure that communication occurs in an effective and timely manner amongst all stakeholders. Communication includes written reports, telephone conversations and one-on-one discussions.

Communication may include the following parties:

- Audiologist
- Hearing Instrument Practitioner
- Family or General Practitioner
- Otolaryngologist
- Other providers
- Worker
- WSIB Service Delivery Team

The hearing health care provider is responsible for the following communication:

- i. Communication with the worker
  - Communication with the worker should be ongoing throughout the POC.
- ii. Communication with other hearing health care providers
  - Communication with other hearing health care providers during any transfer of care.
- iii. Communication with the WSIB

 Hearing health care providers are required to report the worker's status, progress and outcomes by completing the report as noted below.

Hearing health care providers are required to provide the following to the WSIB:

- i. NIHL POC Hearing Aid Outcome Report
- ii. NIHL POC Hearing Aid Outcome Questionnaire
- iii. An audiogram following the assessment if one has not been completed within the previous six months.
- iv. Manufacturer's invoice for the hearing aid.

Reports should be completed and submitted to the WSIB (by mail or fax) within 5 business days after the services have been delivered.

In addition, call the WSIB when:

- Precautions and other considerations are identified that become a significant barrier to participation in the POC
- There are concerns about the worker's attendance and participation
- Any other issues arise that affect the worker's participation

#### **Confidentiality, Consent and Release of Information**

Information contained within the health record related to the assessment and treatment of a worker should be treated, as with any patient record, as confidential. The issues of consent to treatment and consent to release information are complex, with multiple legislative considerations. An in-depth analysis is beyond the scope of this document but hearing health care providers are reminded that they are accountable to their individual provincial governing regulatory bodies and should comply with all relevant laws relating to confidentiality, consent to treatment and release of patient information.

Information related to the worker's health care may be released to the WSIB by health professionals, hospitals or health facilities without first obtaining the worker's consent. (See S. 37 of the Workplace Safety and Insurance Act.) In the absence of informed consent from the worker, the only personal information about the worker that may be released to the employer is information related to the worker's abilities and limitations.

The health records of workers including the prescription of the hearing aid, outcome measurement and real ear verification are subject to periodic audit by the WSIB as a measure of quality assurance.

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