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NOTE: The first appearance of terms in bold in the body of this document (except titles) are defined terms – please refer to the Definitions section.

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OBJECTIVES

- To identify and assess workplaces in which **workers** may be exposed to **noise** levels exceeding the **occupational exposure limit (OEL)**.
- To implement control measures to prevent occupational **noise-induced hearing loss**.
- To educate workers on the health effects associated with noise levels exceeding the OEL but does not include nuisance noise.
- To provide audiometric testing to those workers who may be exposed to noise levels exceeding the OEL.
- To comply with Alberta's *Occupational Health and Safety Code* (hereafter *OHS Code*) requirements pertaining to noise exposure.

APPLICABILITY

Compliance with this document is required by all Alberta Health Services employees, members of the medical and midwifery staffs, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary).

ELEMENTS**1. Roles and Responsibilities**

- 1.1 All workers with the potential for becoming **noise-exposed** shall:
 - a) understand the Noise Management Program and supporting documents;

- b) participate in the identification and assessment of workplace noise levels;
- c) attend education sessions;
- d) follow established safe work processes;
- e) attend audiometric testing as required;
- f) inform their **supervisor** or **manager** of any changes to work processes or equipment that may affect noise levels;
- g) utilize appropriate personal protective equipment (PPE) while conducting activities with the potential for exceeding the OEL for noise;
- h) ensure visitors/contractors are aware of noise hazards in the work area and follow established processes to minimize exposure to noise; and
- i) inform their supervisor or manager of any incident and report in MySafetyNet (MSN).

1.2 Supervisors and/or managers shall:

- a) ensure that the Noise Management Program is implemented in their department;
- b) ensure that noise levels are assessed in areas within the department where workers may potentially be exposed to excess noise;
- c) provide workers with the results of any noise measurement/monitoring completed within their department;
- d) implement engineering and/or administrative controls to reduce worker noise exposure;
- e) ensure workers are trained in the proper use, care, limitations, and maintenance of any required hearing protective devices;
- f) provide the appropriate PPE for noise-exposed workers;
- g) ensure that noise-exposed workers are wearing the appropriate PPE;
- h) annually reassess worker exposure through the review of job profiles and associated processes, equipment, and tools used and help determine which positions need to be included in the Noise Management Program;
- i) notify Workplace Health and Safety (WHS) of changes in the work environment (work process or equipment) that may affect occupational noise exposures;
- j) supply a list of noise-exposed workers to WHS as they are identified;

- k) ensure that audiometric testing is completed on workers that are identified as noise-exposed;
 - l) allow time for noise-exposed workers to attend audiometric testing (baseline and subsequent);
 - m) ensure that noise-producing equipment is properly labelled;
 - n) ensure warning signs are posted in any work area where the noise level exceeds 85 A-weighted decibels (dBA);
 - o) ensure workers attend the required training; and
 - p) ensure visitors/contractors are aware of any noise hazards and are appropriately protected.
- 1.3 Workplace Health and Safety Business Partnerships (WHSBP) Advisors shall:
- a) assist in the development, implementation, and maintenance of the Noise Management Program;
 - b) conduct noise measurements/monitoring upon request to assist in determining if workers are exposed to noise levels above the OEL and support departments with an initial investigation of noise complaints;
 - c) ensure that noise monitoring equipment is annually calibrated by the manufacturer;
 - d) provide technical services and recommendations regarding noise control measures;
 - e) recommend appropriate hearing protection devices that meet the requirements of the *OHS Code* and provide instruction on their use and maintenance; and
 - f) assist WHS Standards and Governance in their annual review of the Noise Management Program.
- 1.4 Occupational Health Nurses (OHNs) shall:
- a) perform audiometric testing of noise-exposed workers as necessary through baseline and subsequent monitoring and enter results into MySafetyNet (MSN);
 - b) ensure audiometric testing is conducted in an appropriate audiometric test area;
 - c) ensure that any external audiometric service providers are qualified and meet the requirements under the *OHS Code*;

- d) review audiometric results conducted by any external audiometric service provider and enter results into MySafetyNet (MSN); and
- e) maintain records of any audiometric testing results and calibration data of sound booths.

1.5 WHS Standards and Governance shall:

- a) develop and maintain the Noise Management Program and supporting documents;
- b) annually review the Noise Management Program to ensure compliance with all regulatory legislation and organizational practices;
- c) train WHSBP Advisors on the use of **sound level meters** and **noise dosimeters** for conducting noise assessments;
- d) provide assistance and ongoing support for advanced noise assessments and recommendations for appropriate control measures; and
- e) arrange for external consultants to perform noise surveys and dosimetry as needed.

2. Noise Management Process

2.1 The purpose for conducting a noise assessment is to:

- a) identify noise-generating equipment, tools, or tasks and identify workers who may be exposed to noise levels harmful to their hearing and well-being; and
- b) gather information to determine appropriate controls to reduce worker exposure to excessive noise.

2.2 The identification and assessment of workplace noise levels must occur in areas where workers are or may be exposed to levels in excess of 85 dBA L_{ex} . The exposure limit of 85 dBA L_{ex} refers to the total exposure of the worker to noise in dBA averaged over the entire workday and adjusted to an equivalent 8-hour exposure.

- a) Factors that may suggest possible excessive noise exposures include:
 - (i) worker complaints about the level of noise; and/or
 - (ii) difficulty hearing normal conversations without raising voices.
- b) Once a potential noise hazard has been identified, it needs to be assessed. The AHS *Occupational Hygiene Concern Needs Assessment* Form completed by the area supervisor or manager provides background

information on the area of concern. The noise hazard shall be assessed by conducting sound level measurements.

2.3 Occupational Exposure Limits

- a) Workers must not be exposed to noise levels that exceed 85 dBA L_{ex} and the limits set forth in Schedule 3, Table 1 of the *OHS Code*.

2.4 Noise Surveys (Noise Measurements/Monitoring)

- a) Occupational noise surveys shall be conducted by a knowledgeable, trained person and in accordance with the CSA Group Standard Z107.56-06.
- b) There are many ways of measuring occupational noise and a variety of instrumentation. The choice of a particular method or instrument depends on different factors, such as the purpose of the measurement and the environment in which the measurements are being taken.

2.5 Preliminary Noise Surveys

- a) If a potential or actual worker noise exposure is identified, the manager must complete a preliminary *AHS Occupational Hygiene Concern Needs Assessment* Form. This form provides background information on the nature of the noise concern.
- b) A preliminary noise survey assists in determining specific locations, work activities, or equipment/machinery that requires more detailed assessment and attention.
- c) Area noise measurements or spot measurements using a sound level meter, per **manufacturer's specifications**, may be conducted during the preliminary noise survey. The results indicate if there is a concern and assist in determining if further noise exposure measurements are necessary (i.e., noise dosimetry).
- d) Area or spot measurements are not a substitute for personal exposure measurements due to the length of assessment.

2.6 Action Levels

- a) Further action shall depend on the following criteria:
 - (i) Below 82 dBA: a report is generated and provided to the area supervisor/manager to document the noise measurements and to indicate no further noise management practices are required.
 - (ii) 82 to 85 dBA: inform the supervisor/manager of the noise monitoring results and provide assistance to include the

reassessment of noise levels, as necessary. A report is generated.

- (iii) Above 85 dBA: inform the supervisor/manager of the noise monitoring results, the risk of hearing loss, and that a formal noise survey / occupational noise dosimetry is required. A report is generated.

2.7 A formal noise survey / occupational noise dosimetry must be conducted when:

- a) the preliminary survey indicates the noise level to be greater than 85 dBA; and
- b) more detailed information is required to make recommendations for noise exposure reduction methods and/or to select appropriate hearing protection.

It is important to note that the noise dosimetry must be a representative sample of a worker's exposure to noise throughout a regular day. It may not be necessary for the noise measurement to be over the entire worker's shift.

2.8 Instrumentation

- a) The survey(s) must be performed by a competent worker using:
- (i) a Type 2 sound level meter meeting the requirements specified in the American National Standards Institute (ANSI) Standard S1.4-1983 (R2006);
- (ii) a Type 2 noise dosimeter meeting the requirements specified in ANSI Standard S1.25-1991 (R1997) and set at:
- a criterion level of 85 dBA with a 3 dB exchange rate; and
 - a threshold level at or below 80 dBA or 'off' and slow response; or
- (iii) equipment approved by a Director of Occupational Hygiene (as referenced in the *OHS Code*).

2.9 Calibration

- a) To ensure that noise measurements are accurate, sound measuring equipment must be calibrated, maintained, and operated according to the guidelines set out in the CSA Group Standard Z107.56-06 and manufacturer's specifications.
- b) Calibration of the noise measurement instrumentation must occur:

- (i) each time a noise survey is conducted by performing a field calibration pre- and post-assessment; and
 - (ii) annually at the factory or according to manufacturer's specifications.
- c) Workplaces must be reassessed whenever a worker's noise exposures could have changed due to:
- (i) machinery/equipment being installed or removed;
 - (ii) changes to workload or equipment operating conditions resulting in significant changes in noise levels;
 - (iii) a building's structure changes (e.g., a wall is removed or added);
 - (iv) a change in the length of time a worker is exposed to noise; and
 - (v) changes in the worker's audiogram as identified during an audiometric test.

2.10 Noise Survey Records

- a) The results of the preliminary noise survey shall be recorded and the subsequent report shall include the following:
- (i) the work location assessed;
 - (ii) the list of workers and/or occupations assessed;
 - (iii) description of the job activities of the workers and their shift duration(s);
 - (iv) instrument(s) make, model, and serial number;
 - (v) the times of instrument calibration;
 - (vi) measurement/monitoring duration, date, and time;
 - (vii) the sound level readings measured;
 - (viii) locations that require warning signs to be posted;
 - (ix) statement indicating that the noise survey was conducted during typical noise conditions;
 - (x) explanation to account for any unusual or different noise measurement levels, if necessary; and
 - (xi) recommendations.

- b) WHSBP shall gather information on the workplace and document activities/machinery and corresponding sound levels. A report of findings shall be generated.
- c) A copy of the results of the noise survey shall be available at the workplace on request to an affected worker or an OHS Officer and shall be retained in accordance with the AHS *Records Retention Schedule*. Both the site/department and WHSBP shall retain copies of these records.
- d) When a noise survey is conducted, the results of the survey must be communicated. If the noise survey determines that the noise exposure to workers is over the OEL, workers must be informed of the:
 - (i) regulatory requirements;
 - (ii) individual responsibilities for preventing hearing loss;
 - (iii) occupational exposure limits;
 - (iv) health effects of noise exposure;
 - (v) identification of hazardous noise sources at the workplace;
 - (vi) hazard controls for noise exposure;
 - (vii) training in the use of protective equipment (e.g., purpose of hearing protectors, types of protectors available, advantages and disadvantages of the various types of protectors, selection, fitting, use, maintenance, care, and troubleshooting); and
 - (viii) the role of audiometric testing, description of the test procedures, and interpretation and implications of the test results.

2.11 Posting warning signs

- a) Warning signs must be posted at the periphery of any work area(s) where the noise level exceeds 85 dBA. The signs shall include a statement that hearing protection must be worn while in the area. The signs shall present their warning graphically and in words. Hearing protection must be readily accessible to those entering the area. Equipment that generates noise levels above 85 dBA must be labelled as such.

3. Training

- 3.1 Alberta Health Services workers shall understand the nature of the noise hazard they are exposed to and how to protect their hearing. An e-learning course titled Noise and Hearing Protection Training is available via MyLearningLink (MLL).

4. Noise Control Methods

- 4.1 Noise control methods shall be implemented to reduce/eliminate worker exposure. The assessment conducted during the noise survey may assist in identifying appropriate control methods. The hierarchy of control methods used to reduce/eliminate the identified noise hazard are engineering, administrative, and hearing protection devices.
- 4.2 If engineering and administrative controls cannot reduce worker noise exposure sufficiently, or where they are not reasonably practicable, AHS must provide workers with hearing protection that meets the requirements of the *OHS Code*.

5. Selection of Hearing Protectors

- 5.1 The selection of a hearing protector shall reduce the worker's exposure to below 85 dBA but not below 70 dBA. When the exposure is reduced to below 70 dBA, it is referred to as "overprotection" and in some cases can affect the ability of the worker to hear sounds such as speech, machinery noises, and/or warning signals.
- 5.2 When determining the appropriate hearing protection, it shall be based on the worker's 8-hour noise exposure and not a spot measurement of noise.
- 5.3 The *OHS Code* provides direction in determining the appropriate hearing protection device.
- 5.4 The class or grade of hearing protection is based on the sound reduction provided by the protector at certain frequencies in hertz (Hz).
- 5.5 The goal of wearing hearing protection devices is to achieve "acceptable" or "optimal" or "ideal" protection. Once the appropriate hearing protection device is selected, several types from the necessary class should be provided for workers.
- 5.6 When selecting the appropriate hearing protection device (see Schedule 3, Table 2 of the *OHS Code*), the worker must consider:
- a) daily noise exposure of the worker;
 - b) worker hearing ability;
 - c) compatibility with other safety equipment;
 - d) workplace conditions such as temperature, humidity, and pressure;
 - e) ease of use and handling; and
 - f) impact on the wearer's ability to communicate.

6. Audiometric Testing

- 6.1 The purpose of audiometric testing is to monitor the overall effectiveness of the Noise Management Program. Changes in hearing levels may indicate that noise control methods, hearing protection, or education portions of the program may require reassessment and improvement.
- 6.2 All AHS workers exposed to noise levels in excess of the OEL shall participate in audiometric testing. These tests are critical because they identify the beginning of noise-induced hearing loss long before the workers notice it.
- 6.3 A qualified audiometric technician (could include WHSBP OHNs or external providers that have taken approved training) conducts audiometric tests. This individual must pass an audiometric technician course approved by the Director of Medical Services (Government of Alberta) or has been approved by the Director of Medical Services as having the equivalent of an approved audiometric technician course and, in either case, has passed a requalification examination every five (5) years or when requested to do so by the Director of Medical Services.
- 6.4 The audiometric technician shall:
- a) maintain a log book for each audiometer that contains the unit's written calibration records. Calibrations shall be performed according to manufacturer's specifications;
 - b) conduct the tests in a calibrated booth where background noise levels are less than those listed in Schedule 3, Table 3 of the *OHS Code*;
 - c) categorize and classify the test results;
 - d) record the results of the audiometric tests and provide a copy to the worker;
 - e) inform workers on the state of their hearing, comparing it with previous tests when possible;
 - f) advise workers on appropriate hearing devices;
 - g) interpret hearing test statistics to assist in evaluating the effectiveness of the Noise Management Program;
 - h) retain the records of the audiometric tests in accordance with the AHS *Records Retention Schedule*;
 - i) consult with WHSBP Advisors when further evaluations of noise exposure are necessary; and
 - j) consult with other health care professionals as required by the *OHS Code*.

- 6.5 A baseline audiogram is conducted in a noise-free environment when the worker has been away from noise for 14 hours, including noise exposure away from work. For workers who have audiometric testing conducted during their work shift, hearing protection may be used to meet the no-noise requirement.
- a) AHS shall provide an initial baseline test as soon as is practicable, but no later than six (6) months after the worker is employed or within six (6) months after a worker is exposed to excess noise because of a change in the worker's duties or process conditions.
 - b) A repeat (subsequent) audiometric test is conducted not more than 12 months after the initial baseline test and annually thereafter.
 - c) When workers are required to wear dual hearing protection, they shall undergo twice-annual testing.
- 6.6 The subsequent tests should be scheduled at the end of, or well into the worker's shift so that temporary changes in hearing can be noted. If a worker's audiometric test is categorized as an **abnormal audiogram** or an **abnormal shift** audiogram, the audiometric technician shall:
- a) advise the worker of the test results;
 - b) request the worker to provide, and the worker must provide, relevant medical history; and
 - c) forward the results of the abnormal or abnormal shift audiogram, the medical history, and the baseline audiogram to the Zone WHS Medical Director for assessment and recommendations.
- 6.7 Upon receiving the abnormal or abnormal shift audiogram, the medical history, and the baseline audiogram, the Zone WHS Medical Director shall:
- a) review this information;
 - b) confirm if the audiogram is an abnormal or abnormal shift audiogram and inform the worker within 30 days if the audiogram is an abnormal or abnormal shift audiogram;
 - c) provide a copy of the audiometric test results to the worker's Physician (with the worker's permission);
 - d) recommend repeat testing or refer the worker to an appropriate health care professional for follow-up (if required); and
 - e) notify or direct the audiometric technician to notify a Director of Medical Services (OHS) of noise-induced hearing loss.
- 6.8 For subsequent testing, the baseline result is used for comparison until there are significant changes. When an abnormal shift occurs on two (2) consecutive tests,

the baseline is adjusted to the first test that shows an abnormal shift. This test becomes the "new baseline" and subsequent tests are compared to this baseline until another shift occurs in a similar manner.

7. Continuous Improvement

- 7.1 As per the *OHS Code*, the Noise Management Program and supporting documents must be reviewed annually by WHS Standards and Governance to address:
- the effectiveness of the education and training program;
 - the need for further noise measurements/monitoring; and
 - the adequacy of established control measures.
- 7.2 The supervisor/manager of the areas where the noise levels are above the OEL are responsible for reviewing the above elements on an annual basis. WHSBP shall provide assistance when needed during the review process.
- 7.3 WHSBP shall assist WHS Standards and Governance in reviewing the Noise Management Program on an annual basis.
- 7.4 If the review indicates a need for further improvement, a documented action plan shall be developed and implemented.

8. Records Retention

- 8.1 Information pertaining to the Noise Management Program shall be maintained in accordance with the *AHS Records Retention Schedule*.
- 8.2 Supervisors/managers are responsible for the management of all AHS worker training records for those under their supervision.
- 8.3 Results of audiometric testing are entered into MySafetyNet (MSN). Audiometric records are kept in the worker's health file.

DEFINITIONS

Abnormal audiogram means an audiogram that indicates:

- the threshold in either ear is more than 25 dB at 500, 1000, and 2000 Hz;
- the threshold in either ear is more than 60 dB at 3000, 4000, or 6000 Hz; or
- there is one-sided hearing loss with the difference in hearing threshold level between the better and the poorer ear exceeding the average of 30 dB at 3000, 4000, and 6000 Hz.

Abnormal shift means a threshold shift, in either ear, of 15 dB at two consecutive test frequencies from 1000 Hz up to and including 6000 Hz when compared to the baseline test.

L_{ex} means the level of a worker's total exposure to noise in dBA, averaged over the entire workday and adjusted to an equivalent 8-hour exposure (based on a 3 dB exchange rate).

Manager means the individual(s) who has the delegated human resource authority for directly planning, monitoring, and supervising direct reports.

Manufacturer's specifications means the written specifications, instructions or recommendations, if any, of the manufacturer of equipment or supplies, that describes how the equipment or supplies are to be erected, installed, assembled, started, operated, handled, stored, stopped, calibrated, adjusted, maintained, repaired or dismantled, including a manufacturer's instruction, operating or maintenance manual or drawings for the equipment.

Noise means any unwanted sound (sound energy at a worksite). Noise can further be categorized based on the duration of the noise. "Continuous Noise" is continuous noise that remains constant and stable over a given time period. "Intermittent Noise" is a mix of relatively quiet periods and noisy periods. "Impulse or Impact Noise" is a very short burst of loud noise which lasts for less than one second. "Nuisance Noise" may be irritating or annoying to some people but is not loud enough to be hazardous or associated with noise-induced hearing loss.

Noise-exposed means a person exposed to noise at a work site in excess of 85 dBA L_{ex} and the noise exposure limits set out in Schedule 3, Table 1 of the *Occupational Health and Safety Code* (Alberta).

Noise-induced hearing loss (NIHL) means permanent loss of hearing due to repeated exposure to noise. NIHL is very gradual and occurs over a long period of time. NIHL is marked by a decline in high-frequency hearing sensitivity often beginning around 3000-4000 Hz regardless of the noise source, and is usually bilateral (affecting both ears). NIHL is often accompanied by tinnitus (ringing in the ears), but is not typically accompanied by other symptoms such as pain, fullness, or drainage from the ears. Hearing loss that is medically diagnosed as noise-induced is considered a notifiable occupational disease.

Noise dosimeter means a sound level meter used to measure worker exposure. The dosimeter measures and stores sound levels during an exposure period and computes the exposure as a percentage of a criterion level such as an occupational exposure limit.

Occupational exposure limit (OEL) means a worker's maximum permitted daily exposure to noise without hearing protection.

Sound level meter means the basic measuring instrument for noise. It consists of a microphone that converts sound pressure variations into electrical signals, a frequency selective amplifier, a level range control, frequency weighting to shape the frequency response of the instrument and an indicator.

Supervisor means a person, whether unionized or non-unionized, who has charge of a work site or authority over an AHS worker.

Worker means AHS employees, members of the medical and midwifery staffs, students, volunteers, and workers of contracted service providers.

REFERENCES

- Alberta Health Services Governance Documents:
 - *Hazard Identification, Assessment and Control Standard* (#WHS-PCS-01)
 - *Records Retention Schedule* (#1133-01)
 - *Workplace Health and Safety Incident Reporting and Investigation Standard* (#WHS-PCS-06)
 - *Workplace Health and Safety Policy* (#1121)
- Alberta Health Services Forms:
 - *Occupational Hygiene Concern Needs Assessment Form* (#21411)
- Non-Alberta Health Services Documents:
 - *ANSI Standard S1.25 - 1991 (R1997), Specification for Personal Noise Dosimeters*
 - *ANSI Standard S1.4 - 1983 (R2006), Specification for Sound Level Meters*
 - *CSA Group Standard Z107.56-06 Measurement of Noise Exposure*
 - *CSA Group Standard Z94.2-02 Hearing Protection Devices - Performance, Selection, Care and Use*
 - *Measuring Occupational Noise* (WorkSafeBC)
 - *Occupational Health and Safety Code* (Alberta)
 - *Occupational Health and Safety Code 2018, Explanation Guide, Part 16 Noise* (Alberta)
 - *OHS Bulletin – HS005: Audiometric Testing* (Government of Alberta – Labour)
 - *Sound Advice: A Guide to Hearing Conservation Programs* (WorkSafeBC)

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