Hearing Conservation Program
Contents

1.0 INTRODUCTION ........................................................................................................................................... 2
2.0 OBJECTIVES AND METRICS ........................................................................................................................... 2
3.0 SCOPE ............................................................................................................................................................ 2
4.0 ROLES AND RESPONSIBILITIES ..................................................................................................................... 2
5.0 PROCEDURES ................................................................................................................................................ 4
6.0 TRAINING ...................................................................................................................................................... 7
7.0 ASSOCIATED STANDARD OPERATING PROCEDURES (SOPs) ................................................................. 7
8.0 RECORDS AND DOCUMENT CONTROL ...................................................................................................... 8
9.0 DEFINITIONS ................................................................................................................................................ 8
10.0 REFERENCES ............................................................................................................................................... 9
11.0 DOCUMENT HISTORY ................................................................................................................................. 9
1.0 INTRODUCTION

1.1 The Hearing Conservation Program is to provide guidance for protecting Cornell University employees from long-term hearing loss associated with noise levels in the workplace.

2.0 OBJECTIVES AND METRICS

2.1 The Cornell University Hearing Conservation Program establishes the procedures and requirements necessary to be compliant with established standards, rules and regulations for the use of hearing protection devices.

2.1.1 Excessive noise levels will be controlled by implementing engineering and administrative controls whenever possible.

2.1.2 Personal Protective Equipment to be utilized when engineering and administrative controls are not implemented.

2.2 Program evaluation will be conducted on an annual basis of this program.

2.2.1 Metrics showing compliance with annual audiometric testing and training requirements are reviewed as part of the annual program evaluation.

3.0 SCOPE

3.1 The Hearing Conservation Program applies to all Cornell University employees whose noise exposures equal or exceed an 8-hour time weighted average (TWA) of 85 decibels on the A-weighted scale (dBA). Exposures at or above this level for this duration are considered hazardous.

3.1.1 Persons with such exposures will be enrolled in the Hearing Conservation Program (HCP).

3.2 This program applies to all Cornell University facilities with exception of Weill Cornell Medical College.

4.0 ROLES AND RESPONSIBILITIES

4.1 Department of Environmental Health & Safety (EHS)

4.1.1 Develop and maintain this written program.

4.1.2 Conduct appropriate and periodic noise exposure monitoring to identify employees who are required to participate in the Hearing Conservation Program.

a. See section 5.1 for procedure.

4.1.3 Provide required training for employees enrolled in the Hearing Conservation Program.

4.1.4 Complete follow-up procedures with employees identified as having a Standard Threshold Shift (STS) by Cornell Health Occupational Medicine.

4.1.5 Coordinate with Cornell Health Occupational Medicine for an audiometric testing program for employees enrolled in the Hearing Conservation Program. (HS15_SOP_STSFollowUp)

4.1.6 Assist departments with labeling and signage for high noise areas.

4.1.7 Maintain records associated with Quantitative and Qualitative noise exposure assessments.
4.2 Department Managers / Supervisors
   4.2.1 Identifying, with the assistance of EHS, those employees who may need to be enrolled in the HCP.
   4.2.2 Ensuring that employees identified as needing to be enrolled in the HCP receive a baseline audiogram within 6 months of the employee’s first exposure at or above 85dBA.
   4.2.3 Requesting assistance from EHS in evaluating new operations or equipment that may introduce new or additional noise exposures.
   4.2.4 Establishing and maintaining a program which provides employees with access to a variety of appropriate hearing protective devices.
   4.2.5 Enforcing the use of hearing protective devices where and when required
   4.2.6 Ensuring that all employees included in the Hearing Conservation Program attend the required annual audiometric testing.
      a. Provide time during the work-shift for employees to complete audiometric testing requirements.
   4.2.7 Ensuring mandatory employee attendance in the annual hearing conservation training.
   4.2.8 Notifying EHS of Employee, whom are enrolled in the program, changes in job titles or positions.

4.3 Employee
   4.3.1 Utilizing the issued hearing protective devices in accordance with instruction and training. This includes maintaining the hearing protection in a clean and ready-to-use condition at all times.
   4.3.2 Attend initial and annual training
   4.3.3 Attend scheduled annual audiometric testing

4.4 Cornell Health, Occupational Medicine
   4.4.1 Providing the required audiometric testing and recordkeeping
   4.4.2 Meeting the medical requirements of the audiometric testing program as per OSHA 1910.95
   4.4.3 Referring employees to local ear specialists for further consultation when indicated by Program reviewer at Cornell Health Occupational Medicine
   4.4.4 Informing EHS if an employee has experienced a STS.
   4.4.5 Working with remote facilities to establish an Occupational Medicine Provider or approved Otolaryngologist for audiometric testing purposes
5.0 PROCEDURES

5.1 Noise Monitoring

5.1.1 Monitoring surveys will identify and document all equipment, areas, or jobs where there is a hazard of excessive noise, which may result in noise induced hearing loss. EHS will conduct surveys on a periodic basis.

a. In the event of process changes, facility renovations, equipment additions/changes, or upon request, additional noise surveys may be necessary

5.1.2 Initial sound level survey will screen equipment and the areas for the potential of high noise exposures. “Worst Possible Scenario” conditions are assessed to assure that the survey accurately represents the highest possible noise exposure for a particular area or activity.

a. In the event the area, equipment or conditions produce a sound level equal to or greater than 80 dBA under any operating condition, personal monitoring will be performed.

b. Personal exposures are based on eight (8) hour time weighted averages utilizing a personal noise dosimeter

5.1.3 Sound level surveys will be conducted any time new equipment or changes in procedures could result in an increase in the sound level that differs from the initial survey. This will be done utilizing a sound level meter

5.1.4 Sound maps of the sound level survey will be available after a survey.

a. Sound maps consist of simple floor plan drawings, which indicate the maximum sound levels measured in various areas throughout the facility.

b. Sound maps posted in areas where they are accessible to employees.

5.1.5 Results of personal noise monitoring are e-mailed to the person monitored and his or her supervisor in a letter. Individuals may observe any noise measurements taken by EHS.

5.2 Labeling of Areas/Equipment

5.2.1 All areas with noise levels exceeding 85 dBA will be labeled to warn people entering of the requirement for hearing protection:
5.2.2 Stationary sources of high noise, such as table saws, will have the following label affixed:

![Warning Label](image)

5.2.3 Where high noise sources are mobile (i.e. weed trimmers, circular saws), small stickers will be affixed that warn the user to wear hearing protection.

5.2.4 EHS can provide the proper labels, signs and stickers for your department.

5.3 Audiometric Testing Program

5.3.1 Cornell Health, Occupational Medicine shall maintain an audiometric testing portion of this program as required by making audiometric testing available to all employees identified by EHS as having exposures that equal or exceed 85dBA.

a. The cost of the audiometric testing is to be paid for by the employee’s department.

b. Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a Standard Threshold Shift (STS) has occurred.

i. If the annual audiogram shows that an employee has suffered a STS, Cornell Health, Occupational Medicine must obtain a re-test within 30 days and consider the results of the re-test as the annual audiogram.

c. If an STS hearing loss is identified, the employee shall be informed of this fact in writing within 21 days of the determination.

i. The employee may be referred for a clinical audiological evaluation or ontological examination as appropriate, as determined by Cornell Health Occupational Medicine Provider.

ii. The employee will be refitted and trained in the use of hearing protection devices.

5.3.2 Termination audiograms will be conducted:

a. Within 6 months of the job position change outside of noise exposures of enrolled employee

b. 30 days prior to retirement, or at the time management is aware of retirement for enrolled employee

5.4 Noise Control

5.4.1 Methods used to control occupational noise are dictated by conditions present in the work area.

5.4.2 Efforts will be made to evaluate the feasibility of reducing noise levels with engineering and/or administrative controls. Should engineering and/or administrative controls fail to reduce noise levels to acceptable levels or it is determined to be unfeasible, personal protective equipment in the form of personal hearing protection will be utilized.
5.4.3 Engineering Controls
a. Engineering controls are physical changes to a noise source and/or the path of transmission to eliminate or reduce noise. These controls are generally accepted to be the most effective method of noise control. Types of engineering controls include, but are not limited to:
   • Maintenance through the replacement of worn parts and the use of lubrication and cutting oils;
   • Substitution by the use of a more quiet machine or process;
   • Isolation of the operation or equipment;
   • Reduction of vibration by reducing forces and/or rotational speed;
   • Dampening of vibration through increased support materials;
   • Reduce transmission by using flexible mountings and ducts;
   • Reducing reverberation using absorptive materials
   • Setting criteria when purchasing machinery, be aware of the maximum noise levels and set limits on acceptable noise levels

5.4.4 Administrative Controls
a. Administrative controls are changes that occur in the workplace or schedule that are used to reduce employee exposure to noise. These can include task rotation or limiting time spent in noisy areas.

5.4.5 Personal Hearing Protection Equipment
a. Personal hearing protective equipment is the form of hearing protection necessary when engineering or administrative controls are not feasible or adequate. Hearing protection must be carefully selected to ensure they provide the correct noise attenuation to adequately protect employees. When hearing protection is necessary EHS will work with impacted departments on the selection and proper use.
b. Hearing protection is required for:
   • Employees exposed to eight-hour TWA noise exposures in excess of 85 dBA.
   • Areas where posted warning signs require the use of hearing protection.

5.5 Hearing Protection Devices
5.5.1 Hearing protectors act as barriers to reduce sound entering the ear. Use of hearing protection is mandatory for anyone exposed at or above a TWA of 85 dBA
a. Types of hearing protectors available
   • Disposable or reusable plugs
   • Headband plugs
   • Earmuffs.
b. Reusable hearing protectors will be cleaned often and replaced when the plugs or muff cushions become damaged, hardened or discolored.
c. Ensuring proper fit
   • Plugs are seated properly in the ear
   • Muffs form an adequate seal around the ear and the headband is not bent.

d. All of these conditions will improve the noise attenuation (reduction) achieved by the hearing protection.

5.5.2 A Noise Reduction Rating (NRR), stamped on the hearing protector device or its packaging, indicates how much noise the particular hearing protector attenuates, usually between 20-33dBA. EHS will evaluate what type of hearing protector offers adequate attenuation for the work area based on the noise surveys.

6.0 TRAINING

6.1 Requirements

6.1.1 All employees who are required to wear hearing protection devices will attend initial hearing conservation training and annually thereafter. EHS will provide in-person and online training options to meet this requirement. Education and training of employees in the use of hearing protection devices will include:
   a. A description of the different types of noise hazards
   b. A description of the different types of hearing protection devices
   c. Hearing protection
      • Selection
      • Limitations
      • Inspection procedures
      • Donning and doffing procedures
      • Cleaning and storage
   d. A review of the OSHA Hearing Conservation Standard requirements

6.2 Class Names and Course Numbers

6.2.1 Web based training is available on Cornell University’s Learning Management System

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Users</th>
<th>Availability</th>
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<tbody>
<tr>
<td>2407</td>
<td>Hearing Conservation</td>
<td>Voluntary Use</td>
<td>Web-base and Classroom</td>
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<tr>
<td>2407C</td>
<td>Hearing Conservation Program with Audiogram</td>
<td>Required – Enrolled personnel</td>
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7.0 ASSOCIATED STANDARD OPERATING PROCEDURES (SOPs)

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<th>SOP Name</th>
<th>Description</th>
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<td>STS Follow Up</td>
<td>Procedure for STS follow up with employee</td>
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<tr>
<td>HS11_SOP_NoiseSampling</td>
<td>Noise Sampling Procedures</td>
<td>Utilizing various noise sampling equipment and forms</td>
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8.0 RECORDS AND DOCUMENT CONTROL

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<td>HS11F_003_AreaSoundMappingFieldWrkSht</td>
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<td>HS15_Rec_PersonalNoiseResults</td>
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<td>HS15_Rec_AreaNoiseResults</td>
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9.0 DEFINITIONS

9.1 **Action level** - 85 dBA measured as an eight-hour time-weighted average (TWA). When exposures are equal to or exceed the action level, a hearing conservation program is required.

9.2 **Attenuation** - Reduction of noise level.

9.3 **Audiogram** - A chart, graph or table resulting from an audiometric test showing an individual’s hearing threshold.

9.4 **Audiologist** - A professional specializing in the study and rehabilitation of hearing and is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

9.5 **Baseline audiogram** - The audiogram against which future audiograms are compared.

9.6 **dBA decibel** - Unit of measure for sound levels. Based on a logarithmic scale.

9.7 **Dosimeter** - An instrument worn or used by an individual to measure the accumulation of their noise exposure over a work period. Dosimeters monitor all kinds of noise sources and are used when time and mobility are issues. Dosimeters generally sample 16 times per second.

9.8 **Frequency** - Pitch or the number of cycles that a sound wave completes per second. Measured in Hertz or cycles per second (CPS).

9.9 **Hertz** - Unit of measurement of frequency, numerically equal to cycles per second.

9.10 **Noise cancellation** - Noise cancellation equipment uses a microphone to pick up sound waves from a noise source. The microphones output is fed to a computerized signal processor, which generates a waveform identical to the original but 180 degrees out-of-phase. This out-of-phase signal is amplified and directed back toward the noise source via a speaker system. When the two sound waves combine, they cancel each other out, reducing the noise.

9.11 **Noise reduction rating (NRR)** - Measure of the estimated attenuation capacity of a hearing protector.


9.13 **Personal dosimeter** - a specialized sound level meter intended specifically to measure the noise exposure of a person integrated over a period of time.

9.14 **Sound level meter** - a handheld, direct-reading instrument with a microphone.

9.15 **Standard Threshold Shift (STS)** - a change in hearing threshold, relative to the baseline audiogram for that employee, of an average of 10 decibels (dB) or more at 2000, 3000, and 4000 hertz (Hz) in one or both ears.

9.16 **TWA (time weighted average)** - The average of the sampled sound over an eight-hour period.
10.0 REFERENCES

Occupational Noise Exposure Revised Criteria 1998 specified by the National Institute for Occupational Safety and Health
https://www.cdc.gov/niosh/docs/98-126/default.html

Occupational Health and Safety Administration 29 CFR 1910.95

11.0 DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision Number</th>
<th>Purpose of Revision</th>
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<td>Complete revision</td>
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