Northwestern | DEPARTMENT OF SAFETY & SECURITY ENVIRONMENTAL HEALTH & SAFETY

Hearing Conservation

Table of Contents

I. Purpose 2
II. Scope 2
III. Responsibilities 2
IV. Noise Monitoring 3
V. Audiometric Testing 3
VI. Hearing Protection 4
VII. Training 5
VIII. Recordkeeping 5
IX. Regulatory Authority and Related Information 5
X. Contact 6
Appendix 1 – Audiometric Testing Requirements 7

I. Purpose

This program establishes the framework to prevent occupational hearing loss by identifying, evaluating, and controlling noise exposures. It defines requirements for noise monitoring, audiometric testing, implementation of engineering and administrative controls, and the use of hearing protection when other controls are not feasible or do not adequately reduce exposure. Refer to the Northwestern Noise and Hearing Conservation Information Sheet for more information.

II. Scope

This program applies to all Northwestern employees who are exposed to noise levels at or above the Occupational Safety and Health Administration (OSHA) action level of a time-weighted average (TWA) of 85 dBA.

Students, faculty, staff, contractors, vendors, suppliers, and visitors with occasional or infrequent potential exposure to hazardous noise levels in University areas are expected to wear hearing protection, as required. However, these populations will not be included in the hearing conservation program.

III. Responsibilities

A. **Environmental Health and Safety (EHS)**
   i. Adhere to the requirements of this program.
   ii. Review and revise this program, as necessary.
   iii. Collaborate with schools and units to conduct noise exposure monitoring (**Section IV**) and provide results to affected schools, units, and employees.
   iv. Maintain and calibrate noise monitoring equipment according to industry and OSHA standards.
   v. Coordinate and/or provide training (see **Section VII – Training**).
   vi. Coordinate audiometric testing in **Section V** with Northwestern University Center for Audiology, Speech, Language, and Learning (NUCASLL), Northwestern Medicine Corporate Health, and other audiometric testing centers.
   vii. Provide consultation and guidance, as necessary and upon request, to identify, evaluate, and control potential exposure to hazardous levels of noise.

B. **Audiometric Testing Providers**
   i. Adhere to the requirements of this program.
   ii. Conduct audiometric tests in **Section V** and determine if employees experience a standard threshold shift (STS).
   iii. Provide EHS with a list of employees who have experienced an STS.
   iv. Maintain and calibrate all audiometric testing equipment according to industry and OSHA standards.
   v. Conduct in-person employee training, if applicable.

C. **Schools and Units**
   i. Adhere to the requirements of this program.
   ii. Collaborate with EHS to identify and assess areas of potential noise exposures.
   iii. Consult EHS regarding potential noise exposures, including changes in the work environment and equipment that could increase noise exposure, and for noise monitoring requests or concerns.

iv. Ensure employees, including new, existing, temporary, and seasonal employees, exposed at or above a TWA of 85 dBA, complete the required training in **Section VII** and are provided with annual audiometric tests in **Section V**.
v. Provide funding for audiometric tests, training, and hearing protection, as necessary.
vi. Promptly notify EHS of new, transferred, and temporary employees who may be subject to this program.
vii. Ensure employees are not exposed to occupational noise or properly wear hearing protectors for 14 hours prior to audiometric testing.
viii. Ensure a variety of hearing protection is provided, including earplugs and earmuffs, at no cost to employees.
ix. Ensure employees and others wear hearing protection when required.
x. Ensure signage requiring hearing protection is posted, where applicable.
xi. When replacing equipment, ensure new equipment has a lower noise exposure level, if feasible.

D. **Employees**
i. Adhere to the requirements of this program.
ii. Participate in noise monitoring activities, as necessary.
iii. Complete the required training in **Section VII.**
iv. Encouraged to participate in annual audiometric tests.
v. Wear hearing protection as required.
vi. Ensure hearing protection is maintained in good condition.
vii. Notify supervisors of changes in the workplace that could change noise exposures or when hearing protection needs to be replaced.

IV. Noise Monitoring

When employee exposure to noise is suspected or known to equal or exceed a TWA of 85 dBA, noise monitoring will be performed or coordinated by EHS. All personal exposure measurements of continuous, intermittent, and impulsive sources of noise must include all noise within the 80 to 130 dBA range; exposure to impact or impulsive noise must never exceed 140 dBA.

A. Noise exposure monitoring will be conducted with area sound level measurements, personal dosimetry, or a combination of these techniques.
B. Measurements will be made with calibrated equipment operated by EHS or a designee.
C. Monitoring will be repeated whenever there is a change in production, process, equipment, or controls that results in increased noise exposure, and periodically, as necessary.
D. Affected employees will have the opportunity to observe any noise measurements during collection and will have access to monitoring results.

V. Audiometric Testing

A. All employees with known or suspected noise exposure at or above the action level (TWA of 85 dBA) must be provided with audiometric testing. This exceedance can occur as infrequently as one day per year.
i. A baseline test will be provided within 6 months of the employee's first exposure at or above the action level of a TWA of 85 dBA.
ii. Supervisors must ensure employees are not exposed to occupational noise, or properly wear hearing protectors, for 14 hours prior to testing.

iii. Audiometric testing will be provided annually.
iv. All employees will receive the results of audiometric testing in writing. If an STS has occurred (i.e., a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear), employees will receive written notification within 21 days.
v. If the results of annual audiometric testing indicate an STS, the employee has the option to receive a re-test within 30 days. The results of the re-test will be considered as the annual audiogram.
vi. When tests indicate an STS, the following must occur:
    a. Employees not wearing hearing protection will be provided hearing protectors, trained in their use and care, and required to wear them.
    b. Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
    c. Hearing protection must reduce employee exposure to a TWA below 85 dBA. Refer to the Northwestern Hearing Protection Sheet for more information.
    d. An audiologist will review test results and determine if further evaluation or retraining is needed.
vii. An annual audiogram may be substituted for the baseline audiogram (i.e., revised baseline) when, in the judgment of the audiologist, otolaryngologist, or physician who is evaluating the audiogram, determines that:
    a. The STS revealed by the audiogram is persistent, or
    b. The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

B. An employee subject to this program whose duties change, where they are no longer exposed to a TWA of 85 dBA, will be provided at least one additional annual audiogram, as regularly scheduled.
C. Approved audiometric testing locations:
    i. Northwestern University Center for Audiology, Speech, Language, and Learning (NUCASLL)
    2315 Campus Drive, Evanston, Illinois 60208
    Phone: (847) 491-3165, Fax: (847) 467-7141, Email: nucasll@northwestern.edu
    ii. Northwestern Medicine Occupational Health Services
    676 N. St. Clair Street, Suite 900, Chicago, Illinois 60611
    Phone: (833) 622-6333, Fax: (312) 926-1787
D. Audiometric testing must be performed in accordance with **Appendix 1 – Audiometric Testing Requirements**.
E. Audiometric testing will be provided at no cost to employees if required by this program.

VI. Hearing Protection

A. Engineering and administrative controls (e.g., equipment substitution, enclosure, exposure duration limits) will be evaluated and implemented, when feasible, to reduce employee exposure to below 85 dBA. If these controls are not sufficient to reduce employee exposure to below 85 dBA, hearing protection will be used.

B. A variety of hearing protection will be made available, at no cost, to all employees exposed to or likely to be exposed to noise levels at or above the OSHA action level of a TWA of 85 dBA.
C. Employees must wear hearing protection if exposed to a TWA of 85 dBA or more.
D. Hearing protection guidelines are as follows:
    i. Training will be provided on the use and care of the provided hearing protection. Refer to **Section VII**.
    ii. Hearing protection will be replaced as necessary.
    iii. Hearing protection must provide a noise reduction rating (NRR) sufficient to attenuate the noise below the 85 dBA action level.
E. Refer to the Northwestern Hearing Protection Sheet for more information.

VII. Training

A. Employees with known or suspected exposure to noise at or above a TWA of 85 dBA must complete biennial online Hearing Conservation training and annual Hearing Conservation Program training provided by EHS or NUCASLL, beginning upon hire.
B. Training must include:
    i. The effects of noise on hearing.
    ii. The purpose, advantages, and disadvantages of properly fitting hearing protectors for attenuating noise levels.
    iii. Instructions on selection, fitting, use, and care of hearing protection.
    iv. The purpose of audiometric testing and an explanation of test procedures.
    v. A description of sources of hazardous noise in the workplace.
    vi. The requirements of the OSHA standard for hazardous noise, including employee rights, employer responsibilities, and occupational exposure limits for noise.

VIII. Recordkeeping

A. Northwestern Environmental Health and Safety (EHS) will maintain:
    i. Noise exposure monitoring data for at least 30 years.
    ii. STS records when an employee has a work-related STS in hearing in one or both ears, and the employee's total hearing level is 25 dB or more above audiometric zero (averaged at 2000, 3000, and 4000 Hz) in the same ear(s) as the STS, for at least 5 years.
    iii. Training records in myHR Learn for the duration of employment, plus 1 year.
B. Audiometric testing providers will maintain audiometric test records for the duration of affected employees' employment, plus 30 years, and must include:
    i. Name and job classification of the employees
    ii. Dates of the audiogram
    iii. Examiner's name
    iv. Date of latest audiometer calibration

IX. Regulatory Authority and Related Information

Northwestern, audiometric testing providers, and contractors will comply with the Occupational Safety and Health Administration's (OSHA) standards and any other applicable codes and standards, including:

Northwestern Employee Exposure and Medical Records
Northwestern Hearing Protection Information Sheet
Northwestern Noise and Hearing Conservation Information Sheet
Northwestern Personal Protective Equipment Program
OSHA 29 CFR 1904.10 – Recording Criteria for Cases Involving Occupational Hearing Loss
OSHA 29 CFR 1910.95 – Occupational Noise Exposure
OSHA 29 CFR 1910.1020 – Access to Employee Exposure and Medical Records

X. Contact

For questions contact Environmental Health and Safety at ehs@northwestern.edu or (847) 467-6342.

Appendix 1 – Audiometric Testing Requirements

A. Audiometric tests will be performed by:
   i. A licensed or certified audiologist, otolaryngologist, or other physician, or
   ii. A technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining, and checking calibration and proper functioning of the audiometers being used. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist, or physician.

B. Audiometric tests will be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency will be taken separately for each ear.

C. Rooms used for audiometric testing will not have background sound pressure levels exceeding those in Table 1.

Table 1: Maximum Allowable Octave-Band Sound Pressure Levels for Audiometric Test Rooms

Octave-band center frequency (Hz)	500	1000	2000	4000	8000
Sound pressure level (dB)	40	40	47	57	62

D. Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.

E. Functional Operation:
   i. The functional operation of the audiometer must be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds.
   ii. Deviations of 10 decibels or greater require acoustic calibration.

F. Acoustic Calibration:
   i. Audiometer calibration will be checked acoustically at least annually.
   ii. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check.
   iii. Deviations of 15 decibels or greater require an exhaustive calibration.

G. Exhaustive Calibration:
   i. An exhaustive calibration will be performed at least every two years.
   ii. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

H. Revised baseline:
   An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist, or physician who is evaluating the audiogram:
   i. The standard threshold shift revealed by the audiogram is persistent, or
   ii. The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.