COUNSELING FOR HEARING THRESHOLD CHANGES

Background

PLACEMENT OF WORKERS IN MEDICAL SURVEILLANCE PROGRAMS

Workers with potential exposure to hazards are usually placed in medical surveillance programs based on industrial hygiene (IH) and/or safety surveys that quantify exposures in the workplace. This has been called "hazard based" medical surveillance. Workplace hazard assessment takes into account exposure levels (frequency and duration), and routes of exposure (inhalation, skin absorption or ingestion), **and similarly exposed groups**. The decision to include a worker in a program is normally based on the possibility of exposure at or above the action level set by U.S. Navy standards that must comply with Occupational Safety and Health Administration (OSHA) standards. If insufficient data or no data are available, medical personnel may place workers in medical surveillance based on "presumed" exposures and job title. When this happens, workers medical surveillance needs must be reassessed as IH data are obtained. Workers whose jobs are associated with exposures to hazards at or above the medical surveillance action level for more than 30 days per year or 15 days per quarter are placed into medical surveillance programs. When there is no legal standard for medical examinations for specific agents, or when there are insufficient data to demonstrate compliance with a high degree of confidence, half of a recommended exposure limit, (i.e., Threshold Limit Value), may be used as the action level. Some programs have specific guidance for placement; asbestos, organophosphate pesticide workers, hearing conservation, sight conservation, and radiation workers.

Noise Exposure Assessment. The specialized equipment to be used by an industrial hygienist or occupational audiologist may include octave band analyzers, recorders and personal noise dosimeters.

(1) The Navy Occupational Exposure Limits (NOEL) shall be used to determine the degree of compliance with applicable standards.

(2) A noise hazardous area is defined as:

(a) Any work area where the A-weighted sound level (continuous or intermittent) is routinely greater than 84 dB(A).

(b) Any work area where the peak sound pressure level (impulse or impact noise) routinely exceeds 140 dB.

NOTE:
Routinely is defined, as those areas/equipment where the noise is of sufficient intensity and duration that it can reasonably be expected exposure will result in a loss of hearing sensitivity.

(3) Noise hazardous equipment is that which produces sound levels greater than 84 dB(A) or 140 dB peak sound pressure level.

(4) An 8-hour time-weighted average (TWA) noise levels shall be determined for all personnel working in noise hazardous areas at least once during assignment and within 30 days of any change in operations affecting noise levels.

The record of noise measurements shall be kept by the measuring activity for a period of 50 years. If measurements are made by a ship's Industrial Hygiene Officer, the records shall be turned over to a supporting shore medical activity for retention. The shore activity will establish a file for each ship. Records shall include, as a minimum the number, type, and location of the noise sources; number and identification of personnel in the work area and their daily noise exposure and duration; type, model, serial number of test equipment, and calibration data; location, date, and time of noise measurements; noise levels measured and hazard radius; and the name and signature of the person(s) who made the survey.

Hearing Testing and Medical Evaluation

Hearing Test. Audiometers used in the performance of hearing tests shall conform to the standards defined in the most current edition of the American National Standard Specification for Audiometers, S3.6-1989, American National Standards Institute. Hearing tests shall be pure tone, air conduction hearing threshold examinations to include, as a minimum, test frequencies of 500, 1,000, 2,000, 3,000, 4,000 and 6,000 Hz and shall be taken separately for each ear. Tests shall be performed by an audiologist, otolaryngologist, qualified physician or by a person certified by the NAVENVIRHLTHCEN Norfolk or the equivalent organization of another U.S. military service. Hearing tests shall be conducted in an audiometric chamber with internal ambient sound levels not exceeding those prescribed in the DODINST 6055.12 of 22 April 1996, “DOD Hearing Conservation Program (HCP)”.

(1) Audiometric booths must be certified annually by an industrial hygienist, audiologist or other qualified personnel under their direct supervision.

(2) The use of noise excluding audiometric earphones is not permitted to augment the performance of a deficient (e.g., non-certifiable) audiometric test room. Their use for minimizing ambient noise masking effects during testing is allowed within a certified room.

Hearing Testing and Medical Evaluation

Activities shall enter all Navy personnel, military and civilian, except those specifically excluded who are required to work in designated hazardous noise areas or with equipment which produces or is reasonably expected to produce exposure levels at or above an 8-hour TWA of greater than 84 dB(A) or with impulse exposures exceeding 140 dB peak sound pressure levels, into a hearing conservation program. Hearing conservation measures and medical evaluations of hearing tests shall be per the detailed procedures set forth in NEHC Technical Manual TM 6260.51.99-1 of May 99, Navy Medical Department Hearing Conservation Program Procedures

Types of Audiometric Tests.

(1) **Reference Hearing Tests**. The reference hearing test will not be obtained unless the individual has been free from exposure to ANY noise above 80 dB(A) for at least 14 hours.

THIS REQUIREMENT MAY NOT BE MET BY WEARING HEARING PROTECTIVE DEVICES AND IT INCLUDES EXPOSURE TO NOISE FROM NON-OCCUPATIONAL SOURCES.

The results of any reference hearing test are recorded on DD 2215. The original reference audiogram form, as well as all subsequent audiograms, will be retained permanently in the individual's health record. Three types of reference audiograms are used in the HCP:

(a) **An original reference (Baseline)** audiogram is performed prior to hazardous noise exposure while in Federal employment.

(b) **A Reference audiogram** is performed after exposure to hazardous noise when the original reference audiogram was lost or was never accomplished.

(c) **A Re-established Reference audiogram** is performed as the result of a follow-up program.

(2) **Monitoring Hearing Tests**. Monitoring hearing tests are used to detect incremental changes in hearing and identify potential problems before the individual experiences hearing loss that interferes with verbal communications. Detection is made by comparing the current monitoring audiogram with the reference audiogram to determine significant changes in hearing. The annual monitoring hearing test may be conducted at any time during the work shift. The results are recorded on DD 2216 and retained permanently in the individual's health record. When
a retest is required due to a significant change in hearing, it is important that the individual be evaluated in a timely manner. The DD 2216 monitoring sequence should be completed within two weeks, and cannot exceed 30 days to be considered valid. If follow-up testing is not obtained within 30 days, the sequence must start over.

NOTE: Personnel to be monitored should be instructed to bring their personal hearing protectors to the test site in order to verify fit and effectiveness.

Termination Hearing Tests.

All military personnel will receive a hearing test upon termination of Navy service regardless of assignment or exposure to hazardous noise. Civilian personnel who have been routinely exposed to hazardous noise and were enrolled in the HCP will receive a hearing test upon termination of employment. Additionally, all civilian personnel who no longer require inclusion in the HCP due to removal from hazardous noise duties will have a hearing test to document auditory status at the time of reassignment. Results of termination/removal hearing tests are recorded on DD 2216 forms.

Significant Threshold Shifts (STS).

An STS is defined as a change in hearing threshold relative to the current reference audiogram of 15 dB or greater in either ear at any test frequency from 1000 to 4000 Hz. In addition, a change in hearing threshold averaging 10 dB or more at 2000, 3000, and 4000 Hz, in either ear, will be considered an STS. The STS may be either positive (poorer hearing) or negative (better hearing). Action should be taken as follows:

(1) If the STS is negative, that is, the hearing levels of the monitoring audiogram are better than the reference audiogram, then either the reference audiogram or the monitoring audiogram may be in error. In order to determine which is the case, a retest should be conducted on the same day, if possible. Based upon the results of this retest, the following action will be taken:

(a) If the results of the retest are not significantly different from the reference audiogram, it is assumed that the annual monitoring audiogram was in error. No additional action is necessary.

(b) If the results of the retest remain significantly improved from the reference audiogram, it is assumed that the reference audiogram is in error. Establish the retest as the Reestablished Reference audiogram, category 3 on DD 2215. No consult is needed.

(2) If the STS is positive, that is, the hearing levels of the monitoring audiogram are poorer than the reference audiogram, a 14-hour noise-free follow-up test must be administered on a subsequent day to determine if the decrease in hearing is permanent. The supervisor should be notified of the date, time, and reason for the follow-up test(s).

(a) If the results of this first follow-up test do not indicate an STS, no additional follow-up testing is required and the individual may be counseled and returned to annual monitoring.

(b) If positive STS persists on the first follow-up, then it is efficient and necessary to rule out an obvious conductive (mechanical) or medically significant basis for the shift before proceeding to the second follow-up. The preferred method to rule out conductive hearing loss is through technician-administered tympanometry. A normal tympanogram, in conjunction with normal otoscopy, is a quick and accurate indication that the threshold shift was not caused by an acute medical problem which would invalidate subsequent hearing test results. A health record SF600 entry should be made to document the tympanometric and otoscopic findings. A copy of the tympanogram print-out (if provided) should be attached to the SF600. If the tympanogram is abnormal or the necessary instrumentation is unavailable, then evaluation by a health care provider (medical officer, nurse practitioner, physician's assistant, or independent duty corpsman) must be obtained and documented and the individual followed until cleared medically.

NOTE: The tympanogram or the medical evaluation may be obtained immediately following the determination of STS on the annual testing test, as long as follow-up audiometry is not done on the same day as the annual audiogram.

(c) Perform a second follow-up audiogram if tympanometry/otoscopy and/or medical evaluation are within normal limits. This follow-up test may be administered on the same day as the first follow-up. If the STS persists on the second follow-up, the results are forwarded to an audiologist or qualified physician for review and disposition. The audiologist or qualified physician may elect to provide a specific written referral protocol for disposition of individuals who do not require additional follow-up. The results of the second follow-up test are typically used to create a re-established reference audiogram. If the second follow-up differs significantly from the first follow-up, ie. is unbelievable, then the consulting audiologist or appropriate physician will provide direction.

(3) Individuals who exhibit a positive STS will be informed of this fact, in writing, within 21 days of when an audiologist or qualified health care provider confirms the positive STS is permanent.

Permanent Threshold Shift (PTS).

A PTS toward poorer hearing is a recordable illness or injury and is reported to the OSH office for entry on OPNAV 5102/7 (Log of Navy Injuries and Occupational Illnesses), or equivalent. In addition, all monitoring results should be reviewed for evidence of an "OSHA-Recordable" STS. This is defined as a 25 dB average shift at the frequencies 2000, 3000, and 4000 Hz in either ear, when compared to the earliest Baseline/Reference audiogram on file. Both these circumstances require written notification to the worker within 21 days.
Within 60 days of notifying the OSH office/commanding officer that a PTS has occurred, Occupational Health or the appropriate medical provider (such as the Medical Officer or the Medical Department Representative aboard ship) will determine if actions have been taken to prevent future hearing loss. These actions may include evaluation of the work-site, determining adequacy of hearing protectors, and ensuring that hearing protectors are being used properly.

Additional Referral Criteria.

(1) Individuals who exhibit the following will be seen by a medical officer who may refer them to an audiologist or otolaryngologist (cross-reference SF 513 Consultation Sheet to hearing test data) when:

(a) Hearing threshold levels average greater than 25 dB at 500, 1000, 2000, and 3000 Hz or 45 dB at 4000 and 6000 Hz, in either ear, and have not been previously evaluated.

(b) Unilateral hearing loss (i.e., greater than 20 dB at 500, 1000, or 2000 Hz, or 40dB at 3000, 4000, or 6000 Hz) that has not been previously evaluated.

(2) Individuals whose hearing thresholds at any test frequency differ by 40 dB or more between ears cannot be tested at the technician level, and must be referred to an audiologist.

(3) Otolaryngology referral is indicated for individuals not responding to treatment of ear canal occlusion, persistent ear pain, or drainage from the ear canal. Significant aural pathology, dizziness, severe and persistent or unilateral tinnitus, or sudden onset of hearing loss warrants immediate otolaryngology consultation.

Exclusion From Future Noise Exposure.

Individuals who exhibit a progressive series of PTSs must be considered to be at high risk for developing further hearing loss. Accordingly, such personnel must be given special consideration under the HCP.

(1) Individuals monitored under the HCP who have their reference audiogram reestablished due to deteriorated hearing on three separate occasions must obtain clearance from an audiologist, otolaryngologist, or occupational and environmental medicine physician before returning to duties involving hazardous noise.

(2) Any individual who has hearing loss in both ears in which the sum of thresholds at the frequencies of 3000, 4000, and 6000 Hz exceeds a sum total of 270 dB will not be assigned to duties involving exposure to hazardous noise without clearance as described above.

(3) If such clearance is inappropriate, the audiologist or physician evaluating the individual will make specific recommendations to the individual's command. These may include the advisability of restriction from noise hazardous work, appropriate placement of the worker, or the need for stricter enforcement of hearing protection policies.

Types of Hearing Loss

There are three types of hearing loss: **conductive**, **sensory-neural**, and **mixed**.

Conductive Hearing Loss

Conductive hearing loss may affect one or both ears and is targeted around the outer ear and middle ear. With this type of loss the sound waves do not reach the inner ear due to any of several causes. Typical causes range from earwax build-up, debris, or infection in the outer canal and infection or fusion of the bones in the middle ear. Medications or surgery provide effective results and can correct the problem.

Sensory-Neural Hearing Loss

A sensory loss is due to damage in the cochlea. A neural loss is due to damage in the nerves beyond the inner ear carrying stimulus to the brain. These two types of losses are commonly grouped together and are not usually medically or surgically treatable. Sensory and neural hearing loss happens for many reasons, but some of the more common causes are the damaging effects of age, drug reactions, and exposure to damaging noise.

Mixed Hearing Loss

Mixed hearing loss is comprised of both conductive loss and sensory-neural loss components. A complete hearing evaluation should test for and distinguish both types of loss. This is critically important as combined treatment approaches may provide a more effective solution for many hearing loss sufferers.

Tinnitus is a ringing or buzzing in the ears that can be caused by anything from exposure to loud noises and wax on the eardrum to ear infections and tumors on the hearing nerve.

How is it diagnosed?

If you experience tinnitus, you should see a hearing specialist to determine the underlying cause. The tinnitus will be evaluated for pitch, loudness, and the underlying cause. If you think you might have tinnitus, but aren't sure, you can take a quick quiz to help you find out if a doctor's visit in order.

How is it treated?

- There is no cure for tinnitus, and the primary treatment involves covering up the ringing or buzzing sound with an outside sound. This can be done in several ways, including using a hearing aid to amplify low-pitched sounds that cover up the tinnitus.
- Tinnitus is sometimes associated with stress, so you may be encouraged to improve your stress management.
- Wear protective earmuffs or earplugs when you will be exposed to loud noises, which can make tinnitus worse.
- Avoid alcohol and caffeine, which may also make tinnitus worse
- Certain medications may cause tinnitus or increase the symptoms. Check with an ear specialist, immediately, if you suspect a medication you are taking is either causing or worsening your symptoms.