



United States Navy Occupational Audiology

Tri-Service Hearing Technician Certification Course

Student Manual





For any DOEHS-HC input or DOEHS related issues or questions contact your regional audiologist or senior audio technician, if they cannot help contact Theodore Mason or Thomas Dewitt at 757-953-0772 or 0776

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Hearing Conservation Overview

Learning Objectives

- 1.1.1 Describe the effects of exposure to hazardous noise
- 1.1.2 Describe the purposes of the Hearing Conservation Program (HCP)
- 1.1.3 Describe the elements of the Hearing Conservation Program (HCP)
- 1.1.4 Identify the team members of the Hearing Conservation Program (HCP)

Impact of Hearing Loss

- Noise Induced Hearing Loss (NIHL)
- #1 occupational health hazard in the military

Good hearing equates to: Less safety mishaps, injuries and deaths; more lethal/effective service members; increased mission readiness. Noise in the military: Largest occupational health hazard; Noise-induced hearing injuries/illness; Sources of noise on/off duty; Noise in the civilian workforce

Noise-Induced Hearing Loss is the #1 occupational health hazard in the military (Veterans Administration Benefits Report 2010 through 2016). Sudden HL due to “sudden” explosions. Gradual progressive HL due to continuous exposure to noise over time

NIHL negatively affects combat and mission readiness; Fitness for Duty; retention for job specialty (job qualifications); quality of life

Loss of communication ability, difficulty understanding conversations. Combination effects of noise and aging; hearing aids may help, but don't cure; ringing in the ears/tinnitus

Noise in the Military

- Exposure to hazardous noise, without hearing protection (unprotected) can cause:
 - Temporary and/or permanent hearing loss; temporary and/or permanent tinnitus
- Noise-induced ailment (hearing loss/tinnitus)
 - Occur gradually over time from repeated exposures
- Noise-induced injury (hearing loss/tinnitus)
 - Occur from one significant exposure/event

Noise Sources

- Occupational (DoD)
 - Machinery, weapons, vehicles, tools, equipment
- Occupational (Civilian)
 - Industrial machinery, constructive equipment, explosives, farming equipment, musical instruments, railroads; Manufacturing - 14% of the workforce but has 80% of the incidence of the noise induced hearing loss
- Non-occupational
 - Lawn care, power tools/equipment, firearms, music, motorcycle, air pods/ear buds

Sources of noise can be related to military/DoD work, as well as recreational off-duty exposures. Other common sources of occupational noise outside of DoD including agriculture, mining and railroad industries, as well as manufacturing.

Auditory Effects of Noise Exposure

- Loss of hearing sensitivity
- Tinnitus or “ringing”
- Missing parts of conversation
- Slower/Inaccurate localization
- Increased errors, safety mishaps

Auditory Effects of Hazardous Noise Exposure: Loss or impairment of hearing sensitivity/communication ability/localization; tinnitus; increased errors/safety mishaps; auditory situational awareness. Hearing loss affects our ability to understand speech; affects our social communication and possibly a person’s comfort in social situations. Tinnitus or “ringing” is generally associated with hearing loss and will likely be constant and permanent. Hearing loss causes a person to miss parts of a conversation – this can lead to multiple requests for the speaker to repeat, or responding inappropriately because the person guessed incorrectly. Hearing loss will affect how quickly and accurately you are able to localize where sounds originate. Hearing loss increases the chance of errors and safety mishaps

Non-Auditory Effects of Noise Exposure

- Health risks - exposure to hazardous noise may:
 - Raise blood pressure; raise heart rate; increase stress hormone levels; disrupt healthy sleep patterns; possible reassignment to different MOS/AFSC/NEC/SDOC (job); embarrassment, frustration, withdrawal

The Four P’s of a Noise-Induced Hearing Loss (NIHL)

- Painless; Progressive; Permanent; Preventable

Purpose of the Hearing Conservation Program (HCP)

- Prevent occupationally related NIHL
- Maintain combat readiness
- Maintain fitness for duty
- Retain job or work specialty
- Reduce cost of hearing loss
- Promote healthy hearing & quality of life

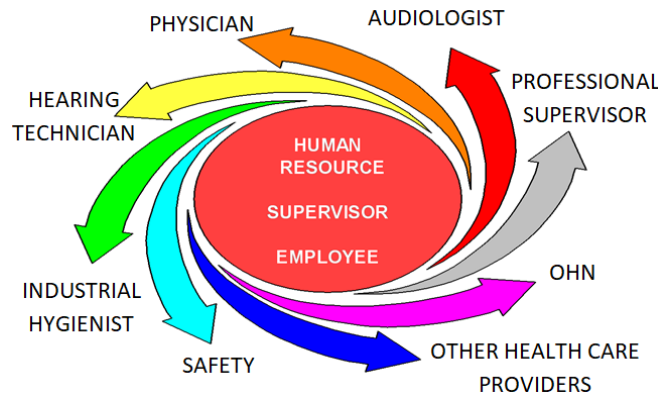
HCP Major Elements (Overview)

- Noise Hazard Assessment
- Noise Controls
- Audiometric Monitoring
- Hearing Protection Devices (HPDs)
- Hearing Conservation Education
- Recordkeeping
- Program Evaluation

HCP Team Members

OHC Team involves personnel at all levels of command; all team members are essential. To carry out OSHA/DOD/Service-level instructions for the HCP. To maintain Readiness. To ensure Quality of Life

Team members may include: Noise Professionals: Industrial Hygienist, Bio-environmental Engineers; Audiologist; Occupational Health Nurse; Occupational Medicine Physician/Flight Medicine Physician; Public Health; Safety Officer; Occupational Hearing Conservationist; Other personnel (Commanders, Workers, Supervisors, etc.)



Occupational Hearing Conservationist (Hearing Technician)

- Critical role in achieving goals/purpose of the HCP
 - Test all personnel; Fit HPDs; Educate/Motivate; Answer questions; Process referrals to the correct echelon of care

Role of CAOHC

- Provide consistent training for Occupational Hearing Conservationist (OHC), Course Directors (CD), and Professional Supervisors (PS)
- Promote the establishment of best practices in HCP
- Provide certification of OHCs and PSs

Summary

- Hazardous noise
 - Impact of hearing loss; Noise in the military; Auditory and non-auditory effects of noise; Noise-induced hearing loss characteristics
- Hearing conservation program purpose
- Hearing conservation program elements
- Hearing conservation program team members
- 4 P's of a noise induced hearing loss

DOEHRS-HC User Creation Practicum

Learning Objectives

- 1.2.1 Create a DOEHRS-HC user identity
- 1.2.2 Understand the different user privileges/restrictions
- 1.2.3 Select correct user privilege
- 1.2.4 Understand vital examiner fields
- 1.2.5 Enter examiner information correctly
- 1.2.6 Understand how to unlock accounts
- 1.2.7 Understand how to clear passwords

DOEHRS-HC Application Access

- DOEHRS-HC is integrated with the audiometer testing software application
- DOEHRS-HC ICON
 - Acknowledge DOD notice and consent banner; Resolve any audiometer error messages prior to continuing
- An HCPM user needs to log in to add additional users into the database

Initializing audiometer hardware window, several pop-up prompts and/or error messages may appear when the application opens, read/become familiar with them and resolve them prior to continuing. Most common error message, hardware connections, power is off or interface cable is disconnected. Ensure to always turn off power prior to connecting/disconnecting audiometer from the computer or each other. Only authorized certified technicians can perform audio testing and are required to test under their user identity. Add user identity into each DOEHRS-HC work station where audio testing/DOEHRS data entry will be performed

- There are 3 HCPM users in the local DOEHRS-HC
 - SMITHA; SMITHAF; SMITHN**
- Log in using User ID _____
- Do not enter a password
- Press OK
- New/Verify password = **Qwerty1234567890_**

Log in using a specific user ID, do not type in a password; enter/verify **Qwerty1234567890_** in change password window

DOEHRS-HC User/Examiner Sub-Fields

- An HCPM user has to be logged into the DOEHRS-HC work station in order to add yourself as a DOEHRS-HC user
- User identity needs to be created on each DOEHRS-HC work station
- Always log in under your own user identity
- 3 users in current work station

Sub-fields affect multiple records and have to be filled out correctly, if the examiners information is filed out incorrectly it will affect all records that the user creates. Go to File>Users, all training databases should have 3 HCPM users in it, more or less than 3 then the incorrect "initial student database" is present, replace it with the correct database.

Note: additional functions under users: lock/unlock account, clear password, delete user - just makes user inactive, once created, examiner information will never be fully deleted

Create DOEHRS-HC User/Examiner Complete Sub-Fields

- User name = last name
- Select HCPM privilege
- Enter correct examiner data
 - ID# = SSN linked with certification number; DoD Comp filters testing facility selections

This is a sub-field, any mistakes will be multiplied by the number of audiograms done by this user. Bottom line: make sure these fields are filled out correctly. To add user, ensure New User is selected; type in last name as the user name, select HCPM as the privilege.

Note: Throughout DOEHRS-HC previously selected drop down windows limit future drop down window selections; always use the tab to advance to the next field, do not skip fields

Enter examiner data, office symbol = work location; select 68546A as the test site.

Review for future use, testing facility is as follows: USA examiners uses zip code of the audio booth; USAF uses examiners PAS code as testing facility; USN/USMC uses UIC of the test booth location. Use 1989 as the course number, followed by 2-3 digits depending on service providing audio course with the sponsoring service letter at the end of the certification number: A = Army; F = Air Force; N = Navy

Save DOEHRS-HC User/Examiner

- Ensure data is correct prior to saving user/examiner
- Once saved ensure 4 examiners are present in the user drop down window

Examiner Privilege Restrictions

- Fields unavailable under examiners privileges

Examiner role is restrictive, following areas are inaccessible: users, exclude password, 2217 delete, audiogram edit, audit train report. Most important: users with examiner privileges can't add, edit, unlock, clear user's password or edit any audiogram

Change Login/User

- Enter User ID
- PW = **Qwerty1234567890_**
- Log in only one time

Have the students log in, use password **Qwerty1234567890_** one time only. (Demonstrate login failure) Password is case sensitive, ensure cap lock is not engaged

Access DOEHRS-HC Application

- 3 DOEHRS-HC access attempts with an invalid password will lock your account
- Passwords expire every 60 days
- Cleared passwords never expire

All students should try this only once, show the Invalid user name/password prompt. You can only try to access DOEHRS-HC and the DR but on the third invalid try, the application will lock user's accounts; for DOEHRS-HC another HCPM user can unlock/clear the password of the user or the user can contact the DHA help desk for a temporary password. Password expires every 60 days; previous 10 passwords cannot be used. Clear password if you will not be using the DOEHRS-HC system for an extended period of time

- Enter User ID/no password press OK
- PW = Qwerty1234567890_
- Functions>Run Test/CCA-200
- Resolve any audiometer error messages prior to continuing

Always log in under your own user identity, use above password; remind again password is case sensitive. Use menu to bring up the Run Test and CCA-200 windows.

Unlock Account/Clear Password

- Any HCPM on the local database can unlock and clear passwords

Defense Occupational Environmental Health Readiness System – Hearing Conservation (DOEHRS-HC)

- DOEHRS-HC is the system of record for monitoring audiometry within the Department of Defense
- DOEHRS-HC consists of:
 - Database Software = DOEHRS-HC; Run Test window; Microprocessor Audiometer Software = Benson Medical CCA-200
- All monitoring audiometry for DoD personnel will be entered into DOEHRS-HC

DOEHRS-HC consists of sub-fields (examiner information, UIC/WICs, audiometers, listeners) that are associated with multiple records and are required to be filled out correctly; current fields are individually associated with a patient record(s); Current user/examiner required to be logged into software

Summary

- DOEHRS-HC user creation
- Examiner versus HCPM privileges
- Vital examiner fields
- Examiner data entry
- Unlock user accounts and clear user passwords

Properties of Sound

Learning Objectives

- 1.3.1 Explain the physical properties of sound
- 1.3.2 Explain the requirements for a sound, sound transmissions
- 1.3.3 Explain the characteristics of sound

Definitions

- Sound
 - Any pressure change in air, water or other medium; physical definition - pressure change or vibration that is propagated in a medium; human definition - perception resulting from stimulation of the auditory mechanism.
- Noise
 - Unwanted sound that is irritating or interferes with an activity.

Requirements for Sound

- Sender (Source)
- Vibrating body
- Medium
- Receiver

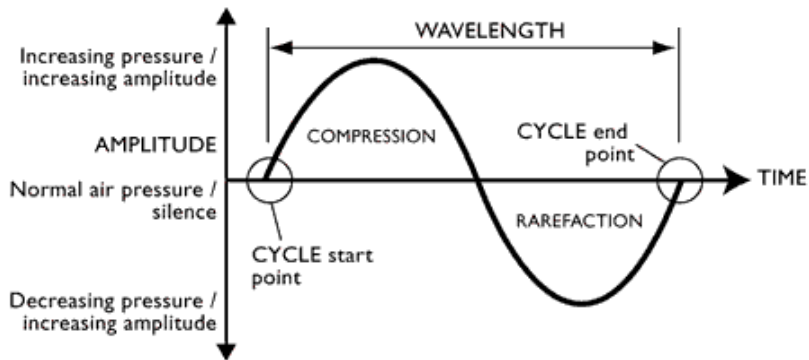
Requirements for sound propagation: Sender – the source of vibration or energy; vibrating body; Medium – what carries the vibration (the sound wave pathway); Receiver – the auditory mechanism

Transmission of Sound

- Vibration: alternating pressure changes in air molecules
 - Compression; Rarefaction
- Sound wave = compression + rarefaction
 - One complete cycle is one set of compression and rarefaction

Vibration: a sound source (sender) causes alternating pressure changes in the air molecules (medium). Compression: molecules are forced together causing areas of high (positive) pressure; the medium becomes compressed. Rarefaction: molecules separate from each other causing areas of low (negative) pressure; the medium becomes more spread out. Sound wave: a series of pressure changes in compression and rarefaction cycles that transfer energy.

- Sine Waves - simplest sounds
 - Pure Tone (simplest form of sound)



Sine Wave – Graphic representation of the simplest sound wave, which is a single frequency, or a pure tone, of constant intensity. Complex Sounds - A complex sound wave consists of many frequencies of varying intensities; most of the sounds in our environment are complex sounds.

Horizontal Axis – represents time in seconds; Vertical Axis – Represents molecule vibrations;
 Compression – Upward movement indicating a rise in pressure; Rarefaction - downward movement indicating a drop in pressure; Cycle – 1 complete compression + 1 complete rarefaction

- Complex Sounds

Transmission of Sound

- Gas
 - Air = 1,100 ft/sec
- Liquid
 - Water = 4,500 ft/sec
- Solid
 - Steel = 15,000 ft/sec

Speed of sound waves; the velocity (speed) at which a sound wave travels depends on the medium; the denser the medium the faster the sound waves travel.

Characteristics of Sound

- The 2 parameters of sound that make noise hazardous are intensity and duration

| <u>Physical</u> | <u>Psychological/Perceptual</u> | <u>Measurement</u> |
|------------------|---------------------------------|--------------------------------------|
| Frequency | Pitch | Hertz (Hz) |
| Intensity | Loudness | Decibels (dB) |
| Time | Duration | Milliseconds, seconds, minutes, etc. |

Frequency (Pitch)

- Measured in Hertz (Hz)
 - The number of cycles per second; The more cycles per second, the higher the frequency
- Audio Testing Frequencies
 - 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz, 4000 HZ, 6000 Hz; 8000 Hz (optional)

Frequency - the number of cycles per second, expressed in Hertz (Hz) as the unit of measurement. Pitch is the psychological perception of frequency. The more cycles per second, the higher in pitch the sound.

- Total range of human hearing at birth
 - 20-20,000 Hz
- Speech range
 - 250-4000 Hz; Consonants - higher frequency; Vowels - lower frequency
- Noise damage
 - 3000-6000 Hz
- Most sensitive area of sound detection in humans
 - 1000-4000 Hz

Human hearing is less sensitive in the low frequencies. DOEHRs-HC testing range: 500, 1000, 2000, 3000, 4000, 6000 Hz; 8000 Hz is optional, but recommended

Intensity (Loudness)

- The amplitude of a sound wave
- Measured in decibels (dB)
- Decibels are used instead of pressure units to keep the numbers in a manageable range
- Decibels are logarithmic, not arithmetic

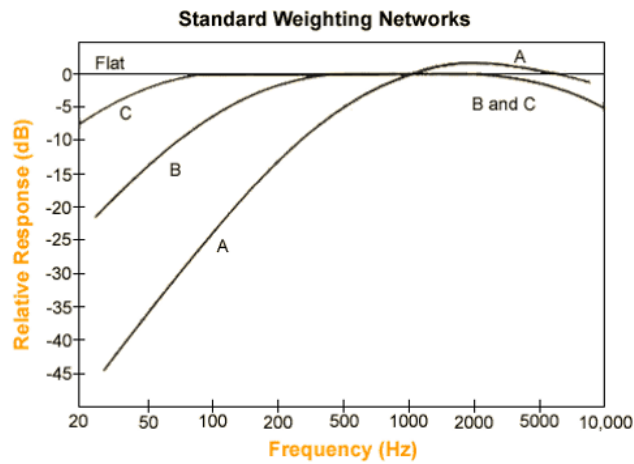
Intensity: the loudness of a sound results from the amount of pressure or energy exerted on materials or surfaces they encounter; unit of measurement is decibels (dB). Description of everyday sounds in decibels, noise levels are approximate and should only be used as a guide.

Decibels are a logarithmic representation of the intensity of a sound. Dynamic range of intensity in human: 0.00002 pascals (threshold of normal hearing) – 20 Pascals (threshold of pain)

| Approximate sound levels and intensities within human hearing range | | | |
|---|----------------------|--------------------------|--------------|
| Source of sound | Intensity level (dB) | Intensity ($W m^{-2}$) | Perception |
| jet plane at 30 m | 140 | 100 | extreme pain |
| threshold of pain | 125 | 3 | pain |
| pneumatic drill | 110 | 10^{-1} | very loud |
| siren at 30 m | 100 | 10^{-2} | |
| loud car horn | 90 | 10^{-3} | loud |
| door slamming | 80 | 10^{-4} | |
| busy street traffic | 70 | 10^{-5} | noisy |
| normal conversation | 60 | 10^{-6} | moderate |
| quiet radio | 40 | 10^{-8} | quiet |
| quiet room | 20 | 10^{-10} | very quiet |
| rustle of leaves | 10 | 10^{-11} | |
| threshold of hearing | 0 | 10^{-12} | |

Types of Decibels

- dB SPL – Sound Pressure Level
- Weighting scales



- dB A - continuous noise
 - mimics the response of the human ear in sensitivity and potential damage from noise hazards
- dB C - continuous or impulse noise (includes low frequency energy)
 - Used to determine HPD Noise Reduction Rating (NRR)
- dB P - continuous, impulse, or impact noise
 - Sound duration less than 1 second

dB SPL – Sound Pressure Level. The amount of sound energy in the atmosphere around us. DB SPL is also considered dB F (flat), without weighting. Common weighting-scales used in hearing conservation: dB A – Used by IH professional when measuring shop noise; attempts to mimic the response of the human ear in sensitivity and potential damage from noise hazards; dB A weighting closely correlates with risk of noise-induced hearing loss. dB C – Used by IH professional when measuring shop noise with sufficient low frequency energy and used to measure the noise reduction rating (NRR) of hearing protectors, depending on the measurements used. dB P – Used by IH professional when measuring.

How to know if you are in potentially loud hazardous noise? Three Foot Rule: If you need to raise your voice or shout to be understood from three feet away from someone, you are probably in a hazardous noise environment. Rule of thumb to use with workers/patients to judge the noise hazard in their environment.

Duration

- The length of time that sound is present
- Types
 - Continuous (Intermittent; Varying); Impulse; Impact

Duration length of time that sound is present. Continuous or steady-state noise – lasts more than 2 seconds. Intermittent noise – large differences in sound levels occurring with periodic interruptions of relative quiet between noise episodes. Varying – when the noise level varies but there are no significant quiet periods. Impulse noise – very short bursts of noise lasting less than one second in duration (e.g., gunshot); Impact noise – slightly longer than impulse (e.g., metal stamping)

Inverse Square Law

- Attenuation by distance
- Double distance = intensity decrease by 6 dB

Dynamics of Sound Transfer: Double the distance from a noise source, decrease the amount of intensity by 6 dB

Combining Sound Sources

- Double the noise source = increase noise level by 3 dB

Dynamics of Sound Transfer: Combining sound sources that are the same: For each doubling of the noise source, the intensity will increase by 3 dB

Summary

- Definitions
- Requirements for sound
- Transmission of sound
- Characteristics of sound
 - Frequency/pitch (Hz); Intensity/loudness (dB)

Noise Measurement and Control

Learning Objectives

- 1.4.1 Explain the purpose and processes for noise assessment
- 1.4.2 Explain the role of noise controls
- 1.4.3 Explain how hearing protection attenuation is estimated
- 1.4.4 Identify personnel who are required to be in the hearing conservation program
- 1.4.5 Understand the differences between the weighting scales
- 1.4.6 Understand terminology specific to noise measurement and control

Noise Assessment

- Noise surveys
 - Quantify exposure and determine health risks
- Noise control studies
 - Characterize the noise hazard for implementing controls
- Who measures noise
 - Industrial Hygienist (IH), acoustical engineer or other qualified professional
- When is noise measured
 - Annually; New or changed equipment or processes, hearing trends

Area Noise Surveys

- Determine the noise level of particular piece of equipment or area
- Sound-level meters (SLM)
 - Used for a particular area or equipment; Type 1 (precision), Type II (general); Octave-band analysis (Type 1 SLM); Mostly done with type II general purpose meters (accuracy within 2 dB)
- Sound booth background noise certification (required annually)

Area noise surveys: mapping of hazardous-noise areas for posting notices, to determine the appropriate hearing protection for that equipment, and/or to determine personnel at risk or not at risk in an environment (who needs to be on a hearing conservation program). Can also be completed in order to observe the work process of the worker.

Sound level meters (SLM): an instrument used to measure ambient sound in an environment; Type I SLM (precision) vs type II SLM (general) devices; Octave band analysis (Type I SLM); provides more specific information on the noise energy by frequency through the measurement of the octave band levels, and can determine risk to human hearing more accurately; can be used in order to accurately recommend hearing protection devices (especially in the low frequencies)

Audiometric sound booth certification: Completed for assessment of background noise levels inside of audiometric sound booths using octave band analysis. DoD 6055.12 provides specific background noise limits to ensure ambient noise does not interfere with hearing test results. Required annually

Noise Hazard Assessment

- Identify potentially hazardous noise sources
- Determine individuals employed in hazardous noise areas
- Identify personnel who should be enrolled in hearing conservation program to Safety (see service-specific guidelines)
- Label noise hazardous areas and equipment with appropriate labels

Identification of noise hazardous work environments and equipment; Determine individuals and/or work space areas exposed to hazardous noise using measurements obtained with dosimeters or sound level meters; Noise levels \geq 85 dBA SPL steady state/continuous noise (8 hour TWA measurement) and/or 140 dBP SPL impulse/impact noise; All Army/USMC service members are enrolled in the HCP regardless of noise exposure; Primarily responsibility of Industrial Hygienist

Noise Study - Dosimetry

- Captures individual exposures over a work shift (TWA)
- Measures the average dBA level

The goal of Dosimetry is to capture the individual's noise exposure over a work shift; measures the noise dose from all the exposures over a work shift. Dosimeters are smaller SLM worn near ear-level, often clipped to the shoulder; some dosimeters can be in-ear models. Dosimeters measure, store and analyze noise data, using in dBA and/or dBC or dB SPL scales; they also can measure in different exchanges rates. Some dosimeters provide a time history that can be downloaded and analyzed. Conduct dosimetry over several days with several employees for a good sample of the work environment

Weighting Scales

- Changes a measurement to lessen the contributions of low frequencies
- The "A" scale mimics how the human ear hears sound
- The "C" scale is used to recommend the hearing protector device to use in the noise hazard area

dB A – Used by IH professional when measuring shop noise; attempts to mimic the response of the human ear in sensitivity and potential damage from noise hazards; dB A weighting closely correlates with risk of noise-induced hearing loss; dB C – Used by IH professional when measuring shop noise with sufficient low frequency energy and used to measure the noise reduction rating (NRR) of hearing protectors, depending on the measurements used

Averaging Decibel Levels

- Average is Time Weighted (TWA), not arithmetic
 - Depends on the time/intensity relationship (exchange rate); Cumulative exposure over day and lifetime
- Exchange rate for time/intensity tradeoff depends:
 - 3 dB per doubling of level (DoD, ACGIH, NIOSH and most other countries) – Recommended Practice; 5 dB per doubling of level (OSHA)
- Permissible Exposure Limit (PEL) (also called criterion level)
 - 85 dBA TWA over 8-hours (DoD, ACGIH, NIOSH); 90 dBA TWA over 8-hours (OSHA, MSHA)

Time Weighted Average: The amount of time a worker is exposed to hazardous noise over the work day

Dose: Percent of allowable noise exposure by the end of a shift; also called the Permissible Exposure Limit (PEL). DOD standard is 85 dB A for an 8 hour day is acceptable without hearing protection for 100% dose or PEL.

Exchange Rate: 3 dB – The relationship between exposure time and noise intensity. Every increase in intensity by 3 dB will cut the safe exposure time in half. Always start with 85 dBA for 8 hour period. (ex. 88 dB A for 4 hours). OSHA, MSHA uses a 5dB exchange rate.

Other Noise Exposure Characterizations

- Action Level
 - 85 dBA TWA over 8-hours in most agencies; Point at which a hearing conservation program is required - Monitoring audiometry; Hearing protection availability (required use in DoD); Annual hearing health education
- Dose
 - Is a percentage of PEL, i.e., 100% dose = PEL; Based on a 24 hr. exposure time; Behaves arithmetically, unlike decibels - 93 dBA + 93 dBA = 96 dBA; 50% dose + 50% dose = 100% dose

The 85 dBA action level triggers only some aspects of the hearing program; $TWA = 85 + 10 \log (\text{dose}/100)$ (DoD)

NIOSH and OSHA Standards

| NIOSH Standard | | OSHA Standard | |
|-------------------|------------------------------------|-------------------|------------------------------------|
| Sound level (dBA) | Duration (Hours: Minutes: Seconds) | Sound level (dBA) | Duration (Hours: Minutes: Seconds) |
| 82 | 16:00:00 | 85 | 16:00:00 |
| 85 | 8:00:00 | 90 | 8:00:00 |
| 88 | 4:00:00 | 95 | 4:00:00 |
| 91 | 2:00:00 | 100 | 2:00:00 |
| 94 | 1:00:00 | 105 | 1:00:00 |
| 97 | 0:30:00 | 110 | 0:30:00 |
| 100 | 0:15:00 | 115 | 0:15:00 |
| 103 | 0:07:30 | 120 | 0:07:30 |
| 106 | 0:03:45 | 125 | 0:03:45 |
| 109 | 0:01:53 | 130 | 0:01:53 |
| 112 | 0:00:56 | 135 | 0:00:56 |
| 115 | 0:00:28 | 140 | 0:00:28 |
| 118 | 0:00:14 | 145 | 0:00:14 |
| 121 | 0:00:07 | 150 | 0:00:07 |
| 124 | 0:00:03 | 155 | 0:00:03 |
| 127 | 0:00:01 | 160 | 0:00:01 |

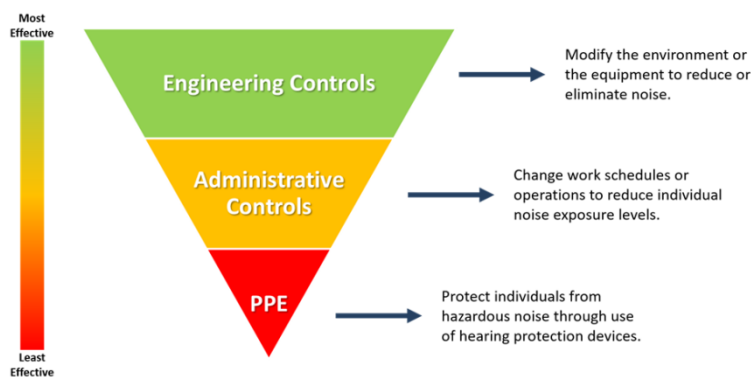
National Institute for Occupational Safety and Health 1998; Occupational Safety and Health Administration 2009. According to each governing body, a person can safely be exposed to each decibel level for its corresponding time without risk of NIHL. For example, according to the OSHA standard, a person can withstand an environment with sound levels at 95dBA for four hours. After four hours they are at risk for NIHL. NIOSH maintains that a person is safe in a 95dBA environment for less than one hour.

Noise Controls

- Engineering controls - primary means to reduce or control noise: dampen, enclose and/or isolate noise
 - Dampen, enclose and/or isolate noise; Erecting barriers between noise source/workers; Providing lower output tools/machinery; Use HPDs only after engineering controls prove unfeasible or cost prohibitive; Exceptions: high performance ships, aircraft, tactical vehicles or weaponry

Reduce or eliminate noise level at source; baffles/sound absorbing material; preventive maintenance; purchase new, quieter; isolation; consultation by Industrial Hygienist or Audiologist

Hierarchy of Noise Controls



Controlling exposure to noise is the most important method of protecting workers. A hierarchy of controls is used as a means of determining how to implement feasible and effective control solutions.

Engineering controls: reduce the noise at the source

Administrative controls: worker rotation or isolation to reduce burden of exposure

Personal protective equipment (PPE): worker use of hearing protection. The effectiveness of the noise control methods decrease across the hierarchy, with Engineering Controls as the most effective to PPE as the least effective. PPE is the least effective, as it relies on daily worker behavior to protect from the hazard.

Engineering Controls – Source/Path

The most effective way to control noise, if substitution and elimination of the noise source are not feasible is engineering controls. Examples: replace/isolate machine, reduce the speed of a machine, reduce compressed air pressure, apply damping material, and replace worn bearings or other vibrating parts

Path: can be direct, indirect or reflected, with different control methods for each type. Reduce noise via carefully designed enclosures around the machine, or treatments to impede the transmission of noise. Examples: sound-absorbing materials – barriers or curtains on walls or ceilings; to reduce sound wave reflections

Engineering Controls - Receiver

Reducing noise in the receiver's immediate environment, such as a booth or control room around the worker

Administrative Controls

- Personnel rotation
- Shift work

Rotating of worker out of noisy areas to prevent exceeding the PEL, restricting access to hazardous noise areas

Personal Protective Equipment (PPE)

- Hearing protection devices (earpro)
- Last choice, least effective to control noise

Personal protective equipment (hearing protection) is last option because of the variability in attenuation received by the user and the likelihood of consistent use is not predictable

Terminology

- Damage risk criteria
 - Risk of acquiring a hearing loss as a result of a specified noise exposure provides a method for determining the acceptable limits of noise exposure, or the maximum safe or allowable noise levels for various frequencies
- Permissible exposure limit (PEL) or criterion level
 - Agency defined allowable exposure limit (100% dose); DoD ≥ 85 dBA TWA for 8-hours, or ≥ 140 dBP impulse noise or ultrasonic exposure level as outlined in DoDI 6055.12; OSHA ≥ 90 dBA for 8-hours or 140 dBP impulse noise
- Time-weighted average
 - Average sound level or exposure for an 8-hour workday and 40-hour work week
- Action level/criterion level
 - Trigger point at which personnel are enrolled in the HCP and certain elements must be administered, i.e. education, monitoring audiometry, hearing protection availability; DoD ≥ 85 dBA TWA for 8 hours, or ≥ 140 dBP impulse noise; OSHA ≥ 85 dBA
- Weighting Scales
 - Filter setting on a sound level meter that electronically screens the sound as measured in the ambient environment; common scales are dBA and dBC
- Dose
 - Percentage of PEL
- Dosimetry
 - Use of dosimeters for assessing noise exposure
- Exchange Rate (time/intensity tradeoff)
 - Time-weighting factor used in average varying levels of noise in an exposure
- Noise survey
 - Mapping of noise levels to determine need for more detailed assessment

- Noise Study
 - Established exposures and identifies problem noise sources
- Octave band analysis
 - Breakdown of a sound into frequency bands

Summary

- Noise assessment
 - Goals; Equipment; Types of surveys
- Weighting scales
- Noise control
 - Hierarchy of controls
- HPD's
 - Last resort
- Terminology

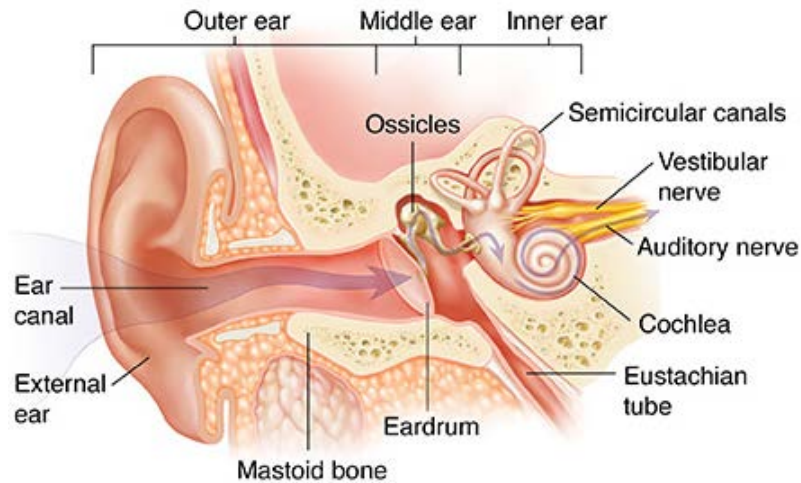
Anatomy and Physiology of the Ear

Learning Objectives

- 1.5.1 Describe and identify the basic anatomical divisions, structures and functions of the ear
 - Outer ear
 - Middle ear
 - Inner ear
 - Central auditory system
- 1.5.2 Describe their role in sound transmission

Main Components of the Hearing Mechanism

- Outer ear
- Middle ear
- Inner ear
- Central auditory system



Structure of the Outer Ear - Pinna (Auricle)

- Made of cartilage
- Collects sound (acoustic energy)
- Helps in sound localization
- Most efficient in directing high frequency sounds to the eardrum

Collects/directs sounds, localizes sound

Outer Ear - External Auditory Canal

- Approximately 1 inch in length
- S-shaped
- Lined with cerumen glands
- Outer 1/3 surrounded by cartilage; inner 2/3 surrounded by bone
- Amplifies sound approximately 5-6 dB

Funnels sound to the eardrum; Cerumen is normal/assists in cleanliness of the ear canal (anti-fungal/anti-bacterial), protects from infection, foreign invaders (insects/bugs), produced by glands in the cartilaginous portion of the ear canal, color/consistency vary - light yellow/brown (ethnicity/age), color becomes darker and dryer the longer it is in the ear, Natural removal/migration of wax with skin toward exterior of canal. OHC concern: Excessive cerumen - prevents sound from reaching eardrum effecting hearing test and interferes with correct fitting and use of earplugs

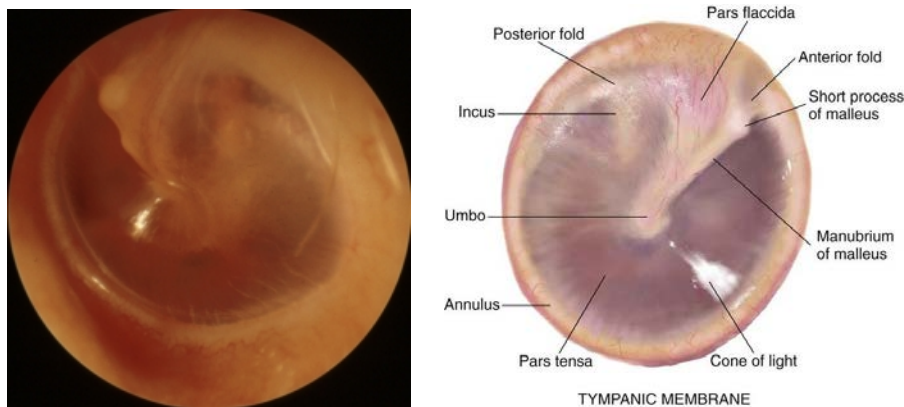
Middle Ear

- Air filled space in the skull
- Lined with mucous membrane
- Mechanically amplifies sound

Also known as the tympanic cavity

Middle Ear – Normal Tympanic Membrane

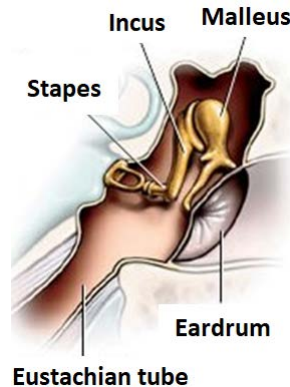
- Thin membrane forming boundary between outer and middle ear
- Vibrates in response to sound
- Changes acoustical energy to amplified mechanical energy



First middle ear structure - ear drum or tympanic membrane (TM); contains three different layers; ruptured eardrum can result in hearing loss; generally perforations can naturally heal without treatment, however, sometimes intervention is required through surgical repair to heal; OHC concern: If it doesn't look normal, refer

Structures of the Middle Ear - Auditory Ossicles

- Malleus “Hammer”
- Incus “Anvil”
- Stapes “Stirrup”
 - Footplate of stapes enters oval window of the cochlea
- Ossicles are smallest bones in the body
- Act as a lever system
- Eustachian Tube
 - Ventilates the middle ear space; not part of the hearing process



Transfers sound from the eardrum to the cochlea; middle ear system problems can cause up to 40-60 dB of conductive hearing loss; mechanically amplifies sound; optimal performance is in air-filled cavity which is refreshed by the Eustachian tube (Ossicles Chain)

The Ossicular Chain - Why is the middle ear needed?

- Transfers sound from the eardrum across the middle ear to the cochlea
- Without the middle ear system, there would be a loss of 40-60 dB of hearing sensitivity due to conductive loss

Structures of the Middle Ear - Eustachian Tube

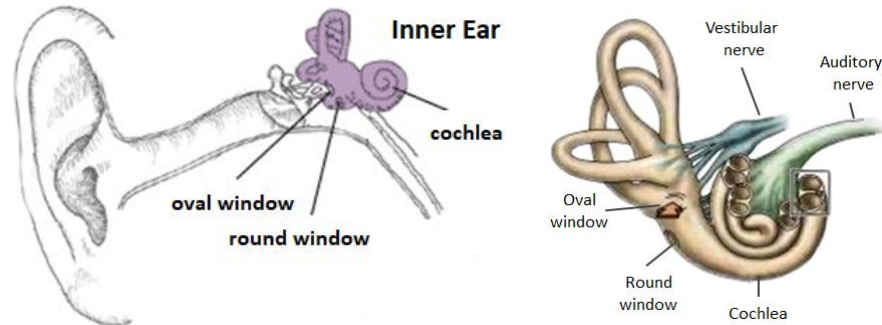
- Connect middle ear to nasopharynx
- Equalizes air pressure in middle ear cavity
- Lined with mucous membrane

Equalizes air pressure; middle ear is an enclosed air filled space, when the atmospheric pressure changes, the Eustachian tube opens to equalize the pressure; if not, the ear drum could burst; membranous tube that connects back of nose and upper throat (pharynx) to middle ear space; muscles relax when we swallow or yawn; Eustachian tube functions when you fly in an airplane or driving up a mountain; when you yawn, drink (swallow) or chew gum or perform Valsalva, you are opening the Eustachian tube to equalize the pressure

Optional: Infant head smaller, E-tube shorter, more horizontal than adult; easier for nasal secretions, fluids in mouth travel to middle ear; ear infection is a “childhood disease”, number one reason for pediatrician sick visits; Don’t put baby to bed with bottle, fluid may enter middle ear when baby swallows

Inner Ear

- Located within temporal bone
- Fluid Filled
- Hearing and balance functions



Fluid filled structure located inside the temporal bone, contains the organs for hearing and balance; responsible for hydraulic/electric energy

Structures of the Inner Ear – Cochlea

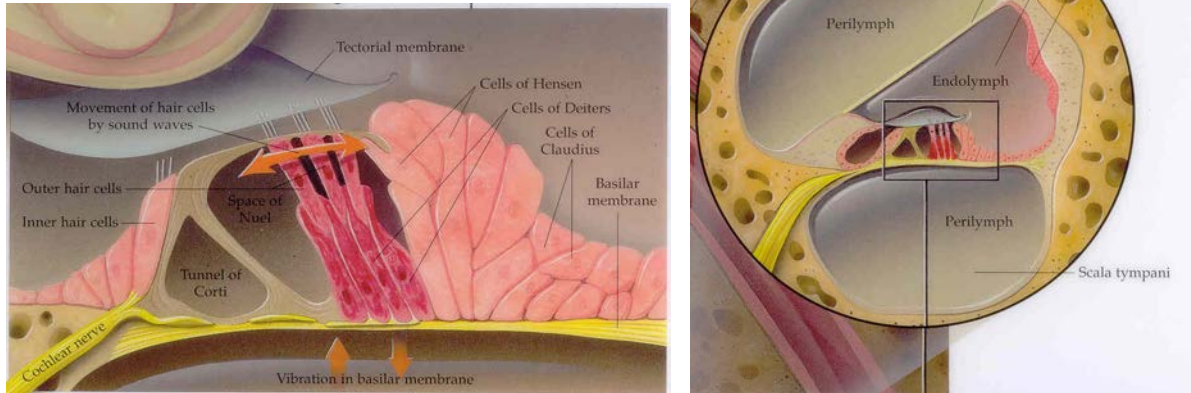
- Snail shaped organ with a series of fluid-filled tunnels
- Converts mechanical energy to electrical energy

Cochlea - snail looking structure; responsible for hearing, contains sensory cells that respond to sound energy (now fluid or hydraulic energy); has membranous tunnels filled with different fluids - endolymph and perilymph

- Oval Window - located at the footplate of the stapes; when the footplate vibrates, the cochlear fluid is set into motion; separates the middle and inner ear
- Round Window - functions as the pressure relief port for the fluid set into motion initially by the movement of the stapes at the oval window

Organ of Corti

- The end organ of hearing; contains stereocilia and hair cells



Organ of Corti - three rows of outer hair cells and one row of inner hair cells, organized tonotopically; the shearing effect of the tectorial membrane along the hair cells from the hydraulic action of a traveling wave along the basilar membrane causes a deflection of the stereocilia; a chemical reaction within the hair cells then activates a nerve impulse that is sent up the nerve to the brain

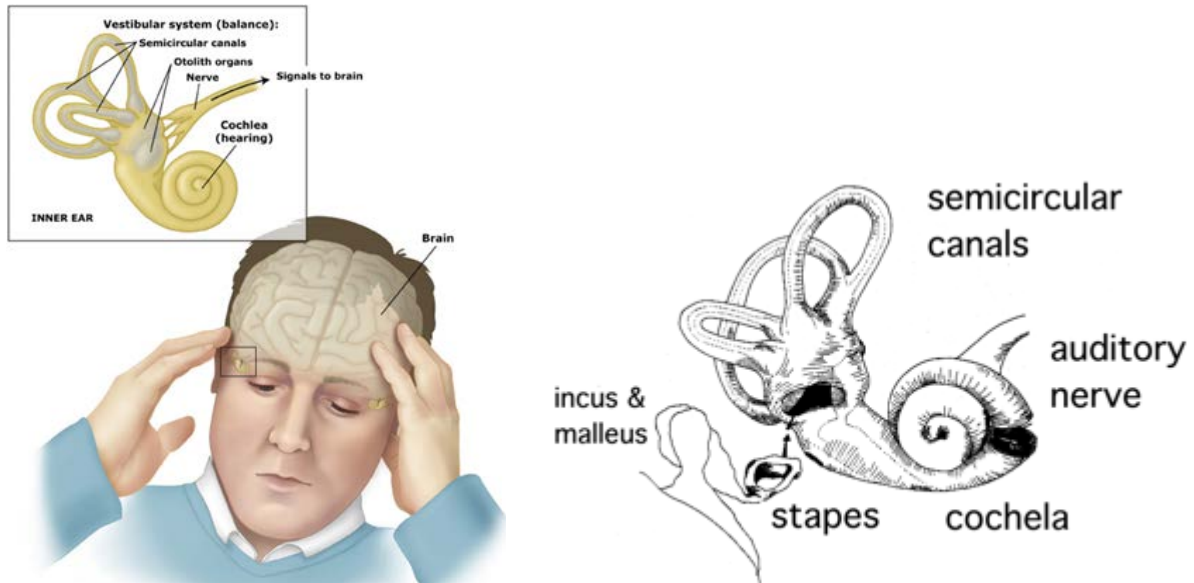
Hair Cells

- Frequency-specific
- High pitch sounds = base of cochlea
- Low pitch sounds = apex of cochlea
- When the basilar membrane moves, a shearing action between the tectorial membrane and the organ of Corti causes hair cells to bend

Cochlea is tonotopically organized with each hair cell assigned to a particular frequency, example: piano keys

Vestibular System

- Consists of three semi-circular canals & Otolith system
- Shares fluid with cochlea
- Controls balance and sense of orientation in space



Non-hearing part of the inner ear; three semicircular canals, responding to dynamic equilibrium, and angular acceleration; Angle of the canals, one in each spatial plane; Examples: examples of the semicircular canals at work are a Ferris wheel, turning a sharp corner in a car, and gravity accelerating carnival rides like Tea Cups or Tilt-a Whirl. Otolith organs are located in the bulb or big bump part of the inner ear labyrinth; senses linear movements or accelerations of the head; Examples: direct right, left, up or down movement of head; accelerating in a car, standing up or sitting down, bungee jumping. Vestibular system has a small connecting duct with cochlea so some sharing of fluid system; problem with balance can result in hearing loss; problem in cochlea can affect balance. The vestibular system communicates with the cerebellum 1 million times per second while at rest

Central Auditory System

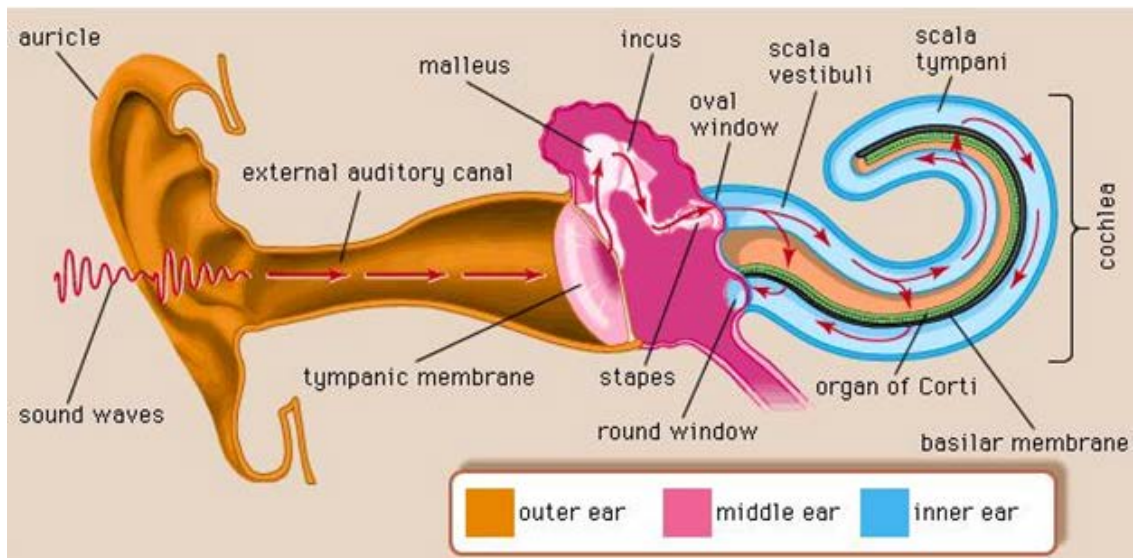
- 8th Cranial Nerve or “Auditory Vestibular Nerve” carries signals from inner ear to brain
- Auditory Cortex - temporal lobe of brain
 - Sound is perceived and analyzed
- Cerebellum - balance and equilibrium
- Depth of the central auditory system
- Many things can impede hearing at the outer, middle, and inner ear, this is also true for the central auditory system

Last major division is the Central Auditory System; involves all auditory nerves that leave inner ear and travel through brainstem to auditory centers in brain or cortex; hearing impulses travel to the temporal lobe of the brain (auditory cortex) where sound is perceived and analyzed. TBI – Difficulty understanding speech

How Sound Travels Through the Auditory System

- **Pinna** - channels sound into the ear canal
- **Ear Canal** - carries sound to eardrum (tympanic membrane)
- **TM** - vibrates from acoustic energy
- **Ossicles** - mechanically amplify sound to the cochlea
- **Cochlea/Organ of Corti** - converts acoustic energy into electro-chemical signals
- **Auditory Nerve** - transmits e-chemical signals to brain

Visual path sound wave takes through the different sections of the auditory system



Summary

- Divisions, structures and functions of the ear
 - Outer ear; Middle ear; Inner ear; Central auditory system
- Energy transmission

Ear Disorders and Hearing Loss

Learning Objectives

- 1.6.1 Define the five types of hearing loss
- 1.6.2 Describe medical symptoms and communication impairments that are characteristic of each type of hearing loss
- 1.6.3 List common causes of and basic treatment of each type of hearing loss
- 1.6.4 Explain how continuous and impact noise exposure affect ear structures and functions

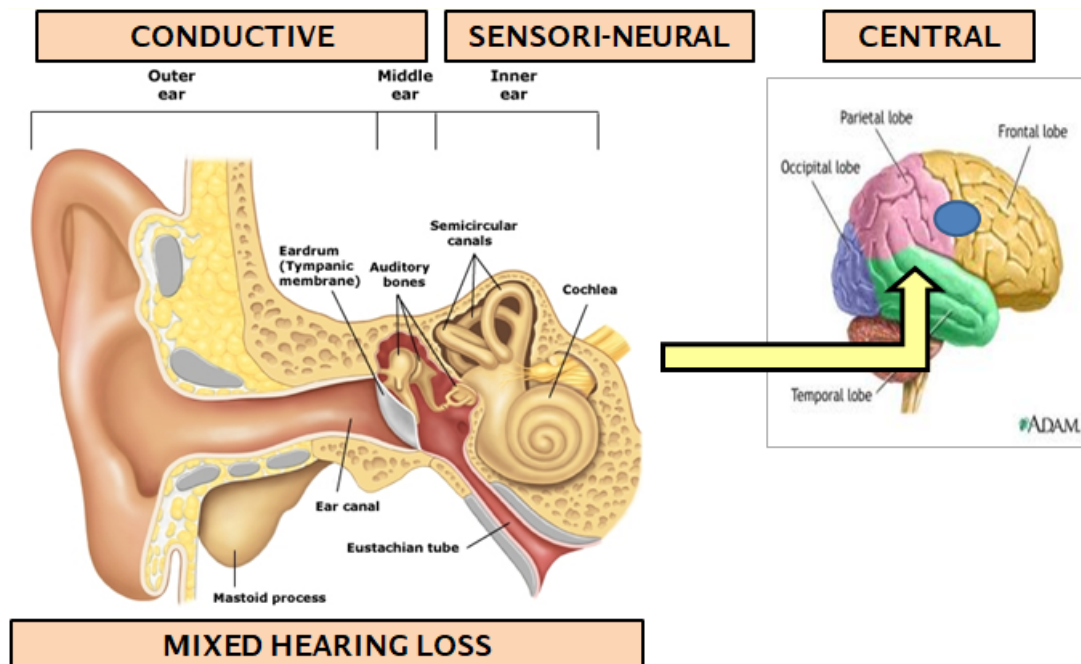
OHC Technician Responsibilities

- Acceptable - General knowledge of hearing loss/ear disorders; Recognize normal/abnormal; Process referrals to medical officers and audiologist
- Unacceptable - Diagnosis type of hearing loss or ear disease; Recommend treatments

5 Types of Hearing Loss

- Conductive hearing loss - outer and middle ear
- Sensorineural hearing loss - inner ear
- Mixed hearing loss - outer/middle ear and inner ear involved
- Central hearing loss - auditory nerve/pathways or auditory centers of brain
- Nonorganic/Functional hearing loss - no biologic or organic cause can be found

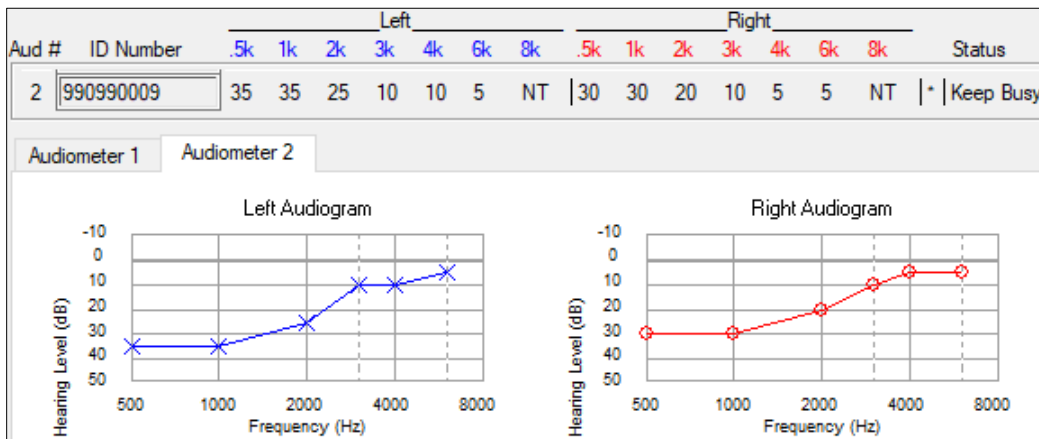
Hearing loss is named according to type of dysfunction



4 hearing losses displayed; **Conductive hearing loss:** outer ear, middle ear, both divisions; **Sensorineural hearing loss:** inner ear; **Mixed hearing loss:** two or more divisions of the ear at the same time; common situation/permanent sensorineural hearing loss from noise exposure, suddenly noticed with onset of a conductive, middle ear problem; **Central hearing loss:** auditory nerve, brainstem auditory centers, brain auditory centers

Conductive Hearing Loss Symptoms

- Indicates a problem in the outer and middle ear (earwax impaction, congestion, cold, ear infection, etc.)
- May have abnormal otoscopic and/or tympanometry results
- Patient may speak softly or feel as if talking in a barrel
- Ability to understand speech is good with increased volume
- May experience low-pitched ringing
- Audiogram generally shows a **rising configuration** with greater loss in the low frequency range and better hearing in the high frequencies
- Usually treatable with medical or surgical intervention



Normal Ear Canal and Tympanic Membrane



Know what a normal eardrum looks like so you can recognize something abnormal. Color differences among these examples may be influenced by photo settings. Gain experience viewing normal ear canals & eardrums. Wide range of normal: Some cerumen is normal in ear canal, eardrum needs to be visible. Normal eardrum characteristics: Pearly/ translucent appearance, reflects light from otoscope, Cone of Light is triangular bright reflection (center to lower side edge), might see shadows of Ossicles, and color differences among races and health condition/history.

Outer Ear Diseases/Disorders

Conductive hearing loss

Possible causes: over production of cerumen natural progression out of ear canal impeded by: excessive hair, narrow canal, sharp bend in canal, daily use of Q-tips, ear plugs, ear molds; Specific symptoms: plugged up feeling, sounds slightly softer/muffled, low frequency tinnitus; Amount of hearing loss: mild – 35 dB HL or less, must be fully occluded for hearing loss to occur.

Referral: medical officer or trained corpsman for removal, over the counter methods may soften up hard plugs for removal but should be medically removed

External Otitis or Infection

Conductive hearing loss: Bacterial or viral infection; may involve pinna, mastoid area, ear canal; commonly called swimmer's ear; Possible causes: abrasion or cut in skin in ear canal (scrubbing with objects) or on pinna; swimming – bathing; bacterial/viral organism in water; water doesn't clear the canal; Specific symptoms: pain – sometimes extreme; redness, swelling (ear canal can swell completely shut); fever or at least heat around ear; "gunk" in ear canal – pus, dead cells, tissue debris and fluid, cerumen.

Referral: immediate medical treatment; may involve oral and topical medications

Exostoses – bony growths or protrusions

Conductive hearing loss: bony growths protrude up under the skin into the ear canal; no serious concern unless the growths begin to close off the ear canal; caution when fitting earplugs or making custom mold impressions; Possible causes: seen in people who are in cold water a lot, i.e. divers, swimmers, surfers; Referral: medical referral for documentation; impacted cerumen may be chronic problem; typically no treatment

Foreign Objects

Conductive hearing loss; the small diameter and curved shape of the ear canal protects the eardrum from foreign objects and invaders.

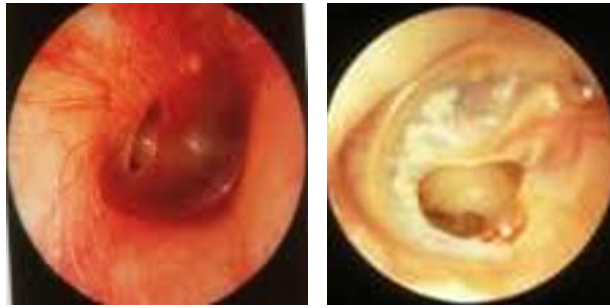
Referral: yes, if full blockage or damage to eardrum; Medical professional should extract the foreign object

Congenital Atresia and Stenotic Canal

Conductive hearing loss; Atresia means no opening.

Referral: Depending on radiology test results, surgery may be able to create an opening; Bone conduction hearing aids can provide "normal" hearing to the individual if there is no inner ear involvement

Tympanic Membrane Perforation



Conductive hearing loss: hole in eardrum from external or internal forces; surgical perforation for Pressure Equalization (PE) tubes.

Referral: medical officer; small holes heal naturally; large perforations need surgical repair; however any hole of any size can lead to further disease (cholesteatoma); swim plug protection needed while swimming or bathing to keep water out of middle ear space

Otosclerosis

Conductive hearing loss - Stiffening of the stapes at the oval window due to ossification or abnormal bone growth around the footplate of the stapes. More common in females by a 2:1 ratio and often accelerates during pregnancy, usually occurs between 30-40 years of age

Surgery is performed by an otologist (ENT) who will replace the stapes with a prosthetic one, often restoring some/most of the person's hearing loss.

Eustachian Tube Dysfunction

Conductive hearing loss: Normally opens when we swallow to replenish air in middle ear; maintains equal air pressure on each side of eardrum; Eustachian tube muscles do not open due to inflammation or spasm; vacuum in middle ear space. Can quickly progress to otitis media - middle ear fluid and infection.

Referral - depends on patient history.

Middle Ear Effusion Serous Otitis Media

Conductive hearing loss: fluid has been pulled out of middle ear tissues due to Eustachian tube dysfunction - vacuum environment; fluid is NOT infected – clear.

Referral: medical officer; decongestants, myringotomy (lancing TM to drain fluid).

Otitis Media

Conductive hearing loss: middle Ear space becomes inflamed; bacteria or viruses proliferate; most common conductive ear disease, particularly in children.

Referral: medical officer; medications - antibiotics, decongestants, pain/fever relief; surgery - myringotomy (lancing eardrum) to drain fluid or control potential perforation

Cholesteatoma

Conductive hearing loss: “marshmallow” like sac of skin cells and debris that can grow in the middle ear space.

Referral: refer to medical officer; surgery must remove all of the cholesteatoma cells in order to cure and/or prevent its reoccurrence

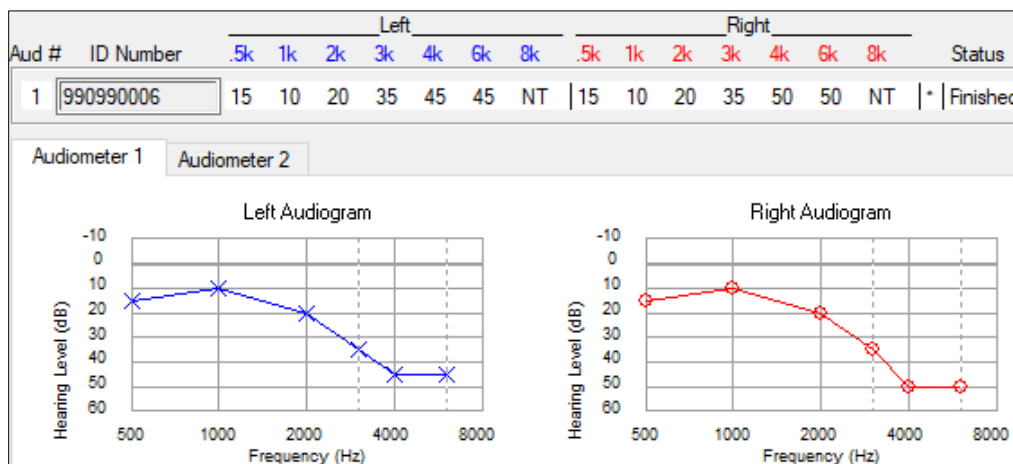
Conductive Hearing Loss Treatment

- Conductive hearing loss - outer and middle ear
 - Medication; Surgery
- If conductive hearing loss cannot be cured or repaired
 - Hearing aids

Most conductive hearing losses are temporary; most conductive hearing disorders respond to medical treatment. Key problem for conductive hearing disorders is a loudness problem; sound is being blocked; good understanding if sound is intense enough to reach inner ear.

Sensorineural Hearing Loss

- Occurs in the inner ear/auditory nerve (8th Cranial Nerve)
- Difficulty understanding speech, worse in background noise
- Loud speaking voice
- Tinnitus
- Balance difficulties
- Normal otoscopic exam/tympanogram
- Typically high frequency hearing loss



- Organ of Corti and Hair Cells
 - Damaged; Destroyed
- As a result
 - certain sounds can't be detected and/or transmitted; creating distorted speech sounds – usually consonant sounds

Basic problem of a sensorineural hearing loss is that the Organ of Corti and hair cells are damaged, destroyed or undergoing pressure, therefore, they cannot respond normally to components of speech (frequency, intensity, and timing). The result is complete sound information can't be detected and it cannot be transmitted accurately, if at all, resulting in distorted speech and misunderstanding/possibly negative feelings and consequences

Sensorineural Hearing Loss Causes of Inner Ear Damage

- Ototoxins - drugs or chemicals
 - Destroys delicate sensory hair cells and other structures inside cochlea; Toxicity determined by amount/dosage, exposure time, and synergistic effects with noise or other toxins; affects both ears equally
- Drugs
 - Antibiotics with “mycin” suffix (streptomycin, gentamycin, erythromycin, neomycin); Diuretics combined with aminoglycosides (-mycin) – lasix (furosemide), bumex (bumetanide); Quinine derivatives; Chemotherapy – cisplatin
- Chemicals - more damage in combination with noise exposure
- Heavy Metals – lead, mercury
- Solvents - toluene , ethyl Ac, ethanol, styrene; accidental poisoning or intentional inhalation

Difficult to show pictures of sensorineural disorders because structures hidden and microscopic in size; amount of hearing loss can vary from minimal to profound deafness; majority of sensorineural hearing losses are permanent. Both active military and civilian personnel are often exposed to toxic chemicals in their work and combat situations; safety precautions should be strictly followed.

- Head trauma
- Aging (presbycusis)
- Autoimmune disease (ex. Multiple Sclerosis)
- Diseases - bacterial/viral
- Congenital or genetic
- Sudden hearing loss - medical emergency (sudden onset/within 12-24 hours; needs immediate medical attention - Emergency, often results in total deafness – some recovery especially with immediate drug treatment, usually unknown cause, but can be caused by high doses of drugs)
- Hazardous noise exposure - most relevant area for the OHC professional

Noise Induced Hearing Loss

- Permanent and irreversible
- Body does not regenerate these damaged/destroyed sensory cells and nerve fibers

Noise Induced Hearing Loss or NIHL is our greatest concern; purpose of HCP is to prevent NIHL as much as possible; NIHL is acoustic trauma or injury - hearing loss is an injury to the body.

Single exposure to impact noise at or more than 140 dB HL; explosion, weapon fire, IED; sound pressure wave severely damage/destroy Organ of Corti and sensory hair cells - looks like “hurricane” went through the ear.

Long-term exposure to hazardous noise levels - prolonged (years) of noise ≥ 85 dB HL; most typical NIHL - gradual damage and destruction from chronic ongoing exposure to hazardous levels of noise; work environments and recreational/at home activities; amount of loss and length of noise exposure varies from person to person; some more susceptible to NIHL; typical hearing loss is high frequency, particularly between 3000 Hz and 6000 Hz – “noise notch”.

Variables of Noise Induced Hearing Loss

- Intensity level of hazardous noise
- Type of noise - impact, impulse, steady, frequency characteristics
- Time of specific exposure
- Long-term time of overall exposure
- Appropriate use of hearing protection devices
- Individual personal factors/characteristics

Sensorineural hearing losses are permanent and irreversible; key problem is understanding sounds and speech.

Sensorineural Hearing Loss Treatment

- Medication/Surgery – limited
 - critical timing factor to “reverse” sensory damage
- Hearing aids
 - can improve understanding of speech significantly; are “aids”, not cures and not hearing replacement
- Adaptive skills
 - relearn listening and attention skills
- As a reminder the four P’s of Hearing Loss - Painless, Progressive, Permanent, Preventable

Medication and surgery very limited to certain conditions; hearing aids have advanced technologically; adaptive skills must be learned - using hearing aids to best advantage in variety of listening environments.

Mixed Hearing Loss

- Combination of conductive and sensorineural hearing loss
- Any combination of symptoms, hearing test results, types of disease/disorders, treatments previously discussed
- Frequently - permanent sensorineural HL with outer/middle ear disorder or impacted cerumen, temporary conductive HL
- Conductive portion of a mixed hearing loss is typically temporary and treatable

If further audio testing is required, always resolve conductive issues prior to bringing the patient back for follow-up testing.

Central Hearing Loss

- When the damage or malfunction is beyond the cochlea up to the brain, specifically this includes
 - The auditory nerve - auditory nerve fibers traveling through brainstem auditory centers of the brain

- It can be difficult to identify central hearing loss because many other health and behavior problems have the same symptoms, complexity and redundancy in the central nervous system which makes exact problem difficult to isolate

Central hearing disorders affects understanding of sounds and speech.

Central Hearing Loss Symptoms/Findings

Central Hearing Loss is when the damage or malfunction is beyond the cochlea up to the brain; specifically this includes the auditory nerve, auditory nerve fibers traveling through brainstem auditory centers of the brain

- Tinnitus - typically constant
- Atypical difficulty understanding speech in background noise
- Balance difficulties
- Head trauma
- May have normal pure tone thresholds/audiogram
- May be accompanied by other neurological disorders
- May be accompanied by learning/cognitive deficits
- May be confused with behavioral problems

Tinnitus - constant (typically), often the patient can report exactly when the ringing or perceived sound began; difficulty understanding speech in noise although hearing may be normal in quiet - very big definite difference; balance difficulties; head trauma.

Most Important Central Hearing Loss Symptom for OHC Technicians

- Asymmetrical hearing loss
- Hearing test results show difference of 20dB or more between ears at 2 consecutive frequencies
 - refer to audiologist
- Hearing loss does not have to be asymmetrical but it is an important symptom for referral

Central Hearing Loss Treatment

- Surgery – tumors/growths
- Educational therapy
- Adaptive skills
- Hearing aids

If the problem is a tumor on Auditory Nerve or elsewhere in central auditory system, surgery techniques conserve as much hearing as possible; early diagnosis is critical to conserve hearing; If the problem is a processing and integrating problem of auditory signals/sounds, then treatment involves educational therapy and training in adaptive techniques.

Examples: controlling listening environment; use of assistive listening devices; learning how to use other sensory and language skills to figure out the auditory message

Training and adaptive techniques can minimize effects/problems in individuals

Nonorganic Hearing Loss, Malingering

- History - enlistment, deployment, disciplinary actions, work avoidance, retirement, attention, monetary compensation/disability
- Inconsistent behavior
- Testing behavior
- Audiometric test results inconsistent with previous tests, behavior, function of the ear

Identification Number (SSN): 990990013 To edit a test, select the appropriate test date in the grid below and then click the 'Edit' button.

HL Data

| | Date/Time | Type | Ref. Established | L5 | L1I | L2I | L3K | L4I | L6I | L8I | R5 | R7 | R2I | R3 | R4 | R6 | R8 |
|---|-------------------|----------------------------|------------------------|----|-----|-----|-----|-----|-----|-----|----|----|-----|----|----|-----|----|
| ▶ | 12/3/2019 7:23 AM | Follow-Up 2 | | 5 | 5 | 5 | 5 | 0 | 0 | NT | 95 | 70 | NR | 80 | 70 | 70 | NT |
| | 12/3/2019 7:15 AM | Follow-Up 1 | | 60 | 95 | 70 | 75 | 60 | NR | NT | 5 | 5 | 10 | 10 | 0 | -5 | NT |
| | 12/2/2019 2:26 PM | Pre-Deployment | | 75 | 85 | 80 | 85 | 90 | 85 | NT | 0 | 5 | 0 | 5 | -5 | -10 | NT |
| | 12/7/2018 2:16 PM | Reference | Prior to Initial Du... | 0 | 5 | 0 | -5 | 5 | 0 | NT | 0 | 0 | -5 | 0 | 5 | 5 | NT |
| | 12/7/2018 | Manually Entered Reference | | 0M | 5M | 0M | -5M | 5M | 0M | M | 0M | 0M | -5M | 0M | 5M | 5M | M |

Examiner started Follow-up 2 test on the right ear versus the left ear as previous tests

Patient history/audiogram test purpose: enlistment issues - recruit wants to go home; deployment/discipline - excuse/avoidance; avoid work assignments; approaching retirement; needs attention (particularly in children); monetary compensation

Inconsistent behavior: understands speech but suddenly remembers that s/he can't hear or makes unreasonable guesses; responds to soft speech and "automatic statements" (Sit at station 2) or when speaker is facing away speaks in excessively loud voice - may be inconsistent in keeping up volume; exaggerated gestures - cups hand behind ear, leans forward and intensely stares at speaker; observed in conversation with another person in normal manner; details of hearing loss story are vague, inconsistent, doesn't make sense re: physical laws

Testing behavior: asks lots of detailed questions about how to take test and/or exactly how to respond to tones; presses earphone to ear; multiple responses to tone presentation or frequency; threshold pattern is inconsistent across frequencies - wide "zigzag" pattern; hearing test results inconsistent with hearing behaviors; thresholds are greater/worse than person's earlier response to sound or conversation; average speech is between 50-60 dB HL; previous tests - big change in thresholds without supporting medical or exposure history; how ear functions: responds with one ear normal and one ear severe/profound loss; tone will crossover to good ear through skull after 40-50 dB difference

Nonorganic Hearing Loss, Psychological Trauma, Conversion Disorder

- History – traumatic event (TBI)
- No organic cause of hearing loss
- Not attempting to avoid work or obtain monetary compensation
- Inconsistent audiometric test results
- Belief there is an organic hearing loss
- Rare condition

Patient presents with neurological symptoms, such as numbness, blindness, paralysis, seizures or hearing loss; however, there is no physical evidence of a neurological cause for the symptom; patient “converts” their trauma or anxieties into physical symptoms; considered a psychiatric disorder. Patient has history of a traumatic event - IED, war trauma, rape, assault, etc. Patient’s behavior and report indicate they are not trying to avoid work or obtain monetary compensation. Hearing test results are inconsistent or follow a strange pattern; results may be consistent within the test but inconsistent with patient’s communication behavior, Patient has a flat affect (lack of physical animation and energy) and/or an emotionless face; Patient truly believes he or she cannot hear normally

Nonorganic Hearing Loss, OHC Technician Responsibility

- Follow established protocols
 - Obtain best air conduction pure tone responses from the patient; Reinstruct patient; Retest another day using another booth station; Never accuse, label, or argue with person taking the test
- Observe irregular behaviors
- Refer to audiologist
 - Special testing/techniques; Counseling

If malingering suspected, do not re-establish reference; Audiologist referral: audiologist’s responsibility to determine reliable and valid hearing thresholds; special test techniques and test procedures available to validate if person is exaggerating hearing loss; can usually obtain person’s true hearing thresholds or very close; responsible to counsel patient and report outcome

Summary

- Five types of hearing loss
- Medical symptoms and communication impairments that are characteristic of each type of hearing loss
- Common causes of and basic treatment of each type of hearing loss
- Ear structures and functions affected by continuous and impact noise exposure

Audiometer and Test Environment

Learning Objectives

- 1.7.1 Identify the primary types of audiometers used in hearing conservation program
- 1.7.2 Describe the testing environment conditions for completing audiometric tests
- 1.7.3 Perform daily checks/tests required prior to testing
- 1.7.4 Add bio-acoustic simulator (BAS) listener/audiometer into DOEHS-HC
- 1.7.5 Establish daily calibration baselines
- 1.7.6 Identify and troubleshoot audiometric equipment

Types of Audiometers

- **Microprocessor**
 - Test is computer controlled or automated; System may have a manual override feature allow user to switch between automated and manual mode; Manual audiometry competence is required even if a microprocessor audiometer is used
- **Manual**
 - Tester is in control; Not automated; Can be used for hard-to-test patients

Microprocessor: stimuli presentation are created/presented by patient previous responses; manual: stimuli presentation are created/presented by examiners discretion

Audiometer Specifications

- Must meet ANSI S3.6 – current edition
 - Specifies range of HL output for each audiometric test frequency
- Earphones and cushions must also comply
- Earphones are not interchangeable between audiometers
 - Calibrated/repared as a unit (audiometer/headset); never separate earphones from their audiometer to test patients

Audiometer, Acoustical Calibration Check

- OSHA requires annually or if equipment fails daily biological calibration
- Audiometer output is not adjusted
- Performed by trained personnel with appropriate sound level equipment
- Audiometer and headphones are calibrated together as a unit
- DoD completes exhaustive calibration annually vs. acoustic calibration check

Audiometer, Exhaustive Calibration

- Electro-acoustic calibration
 - DOD has an annual requirement; OSHA requirement is every 2 years
- Audiometer calibrated to ANSI S3.6 current edition
- Audiometer calibrated to specific earphones
- Audiometer and earphones must have the same serial number
- Never test patients with mismatched audiometer headphones
- Performed by trained personnel with appropriate equipment

NMCPHC does all DOD CCA-200m audiometer calibrations at no charge

Audiometer Daily Calibration and Functional Check

- Calibration and functional check required daily prior to any audiometric testing occurring
- Audiometer and headphones are calibrated together as a unit
- If audiometer does not pass daily calibration or functional check, the audiometer cannot be used and must be turned in for repair

Microprocessor Audiometer, Advantages/Disadvantages

- Advantages
 - Built-in calibration and functional check procedures; Can perform multiple hearing tests at the same time; Reduces human error
- Disadvantages
 - More expensive than manual audiometers; Difficult for some employees

Manual Audiometer, Advantages/Disadvantages

- Advantages
 - Greater examiner control; Allows retest of one or more frequencies; Accommodates subjects with tinnitus; Least expensive; One-on-one testing; Best method for hard-to-test employees
- Disadvantages
 - Can only test one at a time; Examiner fatigue/error

When Manual Audiometry is Appropriate

- Use to retest questionable thresholds or when threshold determination is unsuccessful in automatic mode
- Subject has difficulty understanding instructions
- Motor skill challenges (hand switch)
- Distraction, lack of focus, sleepiness
- Fear, nervousness
- Tinnitus

Audiometer Test Environment

- Must meet standards outlined in DoDI 6055.12
- If standards are not met, valid audiometric test results are not achieved

Ambient Noise Level Limits

- Audiometric test environment must not exceed MPANL
- For surveillance/monitoring audiometry, ambient noise level limits are specified for five octave bands

| Maximum Permissible Ambient Noise Levels (Octave Band SPL, in dB) | | | | | | | |
|---|-----|-----|-----|------|------|------|------|
| Frequency | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| OSHA Table D-2 | | | 40 | 40 | 47 | 57 | 62 |
| DoDI 6055.12 | | | 27 | 29 | 34 | 39 | 41 |
| ANSI S3.1-1999* | 49 | 35 | 21 | 26 | 34 | 37 | 37 |

Sound level survey must be done annually, booth must meet standards; any booth movement (stationary or mobile – MOHCAV) requires another survey be accomplished prior to testing; ships require 2 surveys, one pier side, one underway, both of which may have restrictions with testing

Controlling Ambient Noise

- Excessive ambient noise may increase hearing thresholds, especially at 500 Hz
 - Calibrations fail at 500 Hz because lower frequencies are more difficult to attenuate
- Change testing schedule
- An audiometric booth is not a regulatory requirement, but it will help meet the ambient noise limit requirements
- Testing in a quiet room is acceptable if the ambient noise level requirements are met

Rooms used in place of audiometric booths must meet a sound survey at all frequency threshold levels in order to conduct accurate HCP audio testing.

Booth Ambient Noise Causes and Resolutions

- Door seal deterioration/replace seals
- Jack panel leaks/add insulation behind panel
- Excessive ventilation noise/replace fan
- External noise around booth/relocate booth

Noticeable by patient elevated thresholds at 500 Hz; booth relocation will require another sound survey/booth certification

Audiometric Test Booths, Single wall versus Double Wall

- Booth placement and background noise in the testing area will determine the need for a single or double wall booth
- A single wall booth is usually acceptable in a quiet, low traffic location
- A double wall booth will likely be required for a location where other background noise is vibrant (excessive/continuous ambient noise)
- A double wall booth is a booth within a booth

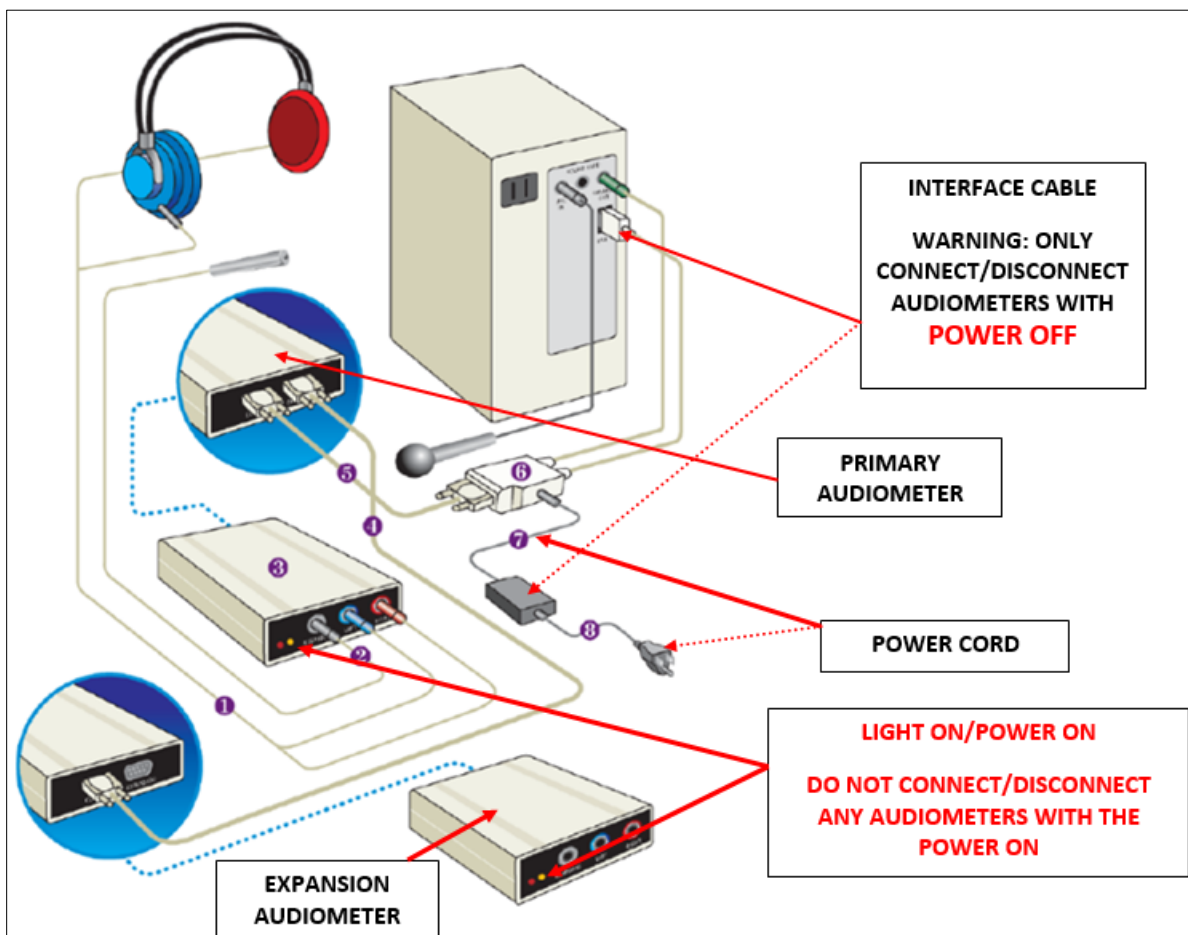
Determine background noise levels; structural considerations - floor handle the weight of the booth, electrical outlets, heating/cooling, do not mount directly on the deck of a ship; is the room large enough for the booth, vents, examiner station and door opening; any noise related items happening near the building where testing is going on – runways, motor pool, etc.

Defense Occupational Environmental Health Readiness System – Hearing Conservation (DOEHRS-HC)

- DOEHRS-HC is the Military Services system of record for conducting monitoring audiometry
- DOEHRS-HC consists of:
 - Desktop database software; Microprocessor Audiometer hardware and software (Benson Medical Instruments CCA-200); Web-based data repository
- All monitoring audiometry for the Military Services personnel will be recorded in DOEHRS-HC

Never connect or disconnect audiometers from the computer or another audiometer without ensuring the audiometer power is turned off

Confirm the headset serial number and audiometer serial number match; review the serial number for the BAS when establishing calibration baselines. Never separate audiometer headset from the audiometer it was calibrated to.



DOEHRS-HC consists of sub-fields (examiner information, UIC/WICs, audiometers, listeners) that are associated with multiple records and are required to be filled out correctly; current fields are individually associated with a patient record(s); Correct user/examiner required to be logged into software

Audiometer Checks

- Resolve audiometer error messages (common one is power disruption)
- Visual Check
 - Ensure equipment is clean; ensure headset wiring and response switch are untangled; ensure equipment is properly connected

Done daily, required prior to any audio testing

Set software up to do a functional check; go to each audiometer to start the functional check, placing the headphones on and pressing hand switch inside booth to listen to the frequency/intensity sweep/functional check. Do not start the functional check from the computer screen.

Resolve any problems with the functional listening check prior to starting the daily biological calibration test, if it cannot pass, do not calibrate, audiometer cannot be used. Address equipment issues immediately with the hearing program manager or professional supervisor.

Audiometer Functional Listening Check

- Listening Check
 - Frequency sweep – left ear; Intensity sweep – right ear; Steady 60 dB tone [Static/Breaks (check both ears); Cross-talk (check both ears)]
- Ensure you go inside the booth, place the headphones on and start the functional test by pressing the response switch

Technician conducting the Functional Listening Check is required to have normal hearing

- Auto switches to a steady 60 dB tone in left ear
 - Check for static; Check for breaks; Check for cross-talk
- Press the response switch once to change the tone to the right ear
- Conduct the same checks for the right ear
- Have all students perform the function check, identify any problems

Daily Biological Calibration Check

- Use the BAS-200 (artificial ear) to establish a primary and secondary baseline (different listener) after annual electro-acoustic calibration
- Secondary baseline is used if the primarily listener becomes inoperative
- The baseline is recorded on DD Form 2217
- Ensure BAS-200 is activated and properly connected to audiometer
- Daily calibration thresholds are compared to the calibration baseline on the DD Form 2217

Done daily, required prior to any audio testing

Daily Biological Calibration Check, Hardware Setup

- Ensure headset are properly placed on the BAS
 - Headband parallel to the face of the BAS-200; Headband yolk completely compressed
- Remove response switch from BAS-200 to activate the BAS for the calibration test
- Completely close the audio booth door prior to starting any tests

Daily Biological Calibration Check, Software Setup

- Booth numbers are italic (calibration not done)
- Audiometer > Daily Calibration > Set
- Set daily calibration test for all audiometers
- Press all enabled audiometers
- Daily calibration test will be set for all audiometers

Establishing Calibration Baselines

- Run calibrations (first time)
- Write down or do a screen shot of the calibration results (CCA-200 window)

| | | | | | | | | | | | |
|-----|------|------|------|------|------|-----|------|------|------|------|------|
| 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 |
|-----|------|------|------|------|------|-----|------|------|------|------|------|

- Change the testing parameters
 - Remove/Replace the headset on the BAS; Unplug and re-insert left and right headset plugs in BAS; Unplug and re-insert patch cord from BAS and audiometer
- Do not retrieve results in the listener window
- Cancel and re-run calibration test
- Compare subsequent results with those received from the original calibration
 - Look for consistency in threshold results; Results plus or minus 5 dB for 500 Hz thru 4000 Hz; Results plus or minus 10 dB for 6000 Hz
- If the thresholds are the same or mimicking above passing criteria of the initial calibration results, retrieve results as baseline

Adding Listener

- Calibrations may not be completed in sequential order, check the station number prior to entering the BAS serial number
- Enter listener as BAS-200 and add BAS serial number

Adding Audiometer

- Application will auto fill audiometer information from the Benson Medical window and sub-fields previously filled out
 - Audiometer serial number, make and model; Electro-acoustic calibration date; Facility/Location; Audiometer type; **Ensure you tab through the fields prior to saving**

Failure to tab through fields will leave facility/location blank on the DD Form 2217 and with the saved audiometer.

- Manual/Microprocessor selection

Daily Calibration Listeners

- Once listeners and audiometers are added a calibration baseline is created on DD Form 2217
- Select the correct listener from the drop down window for daily comparison with the baseline

The functional check and daily calibration must be completed successfully and retrieved into the DOEHRs-HC software in order to complete any hearing tests

Successful Equipment Tips

- Resolve any problems with the functional listening check prior to starting the daily calibration test
- Follow the same calibration procedures every time the procedure is completed
- Have an alternate listener baseline already conducted in case the primary listener becomes inoperative
- Address equipment issues immediately with the hearing program manager or professional supervisor

Failed Calibration/DD Form 2217

- Find out where and why the audiometer failed calibrations
 - Main failures, ambient noise, headphone placement

BAS-200 Common Problems

- Headphone placement
 - Place headband on BAS parallel to wall; Completely tighten headband yolk; Loosen headband to remove from BAS
- Review DD Form 2217 for unsuccessful daily calibrations
- Invalid baseline established
- If daily calibration is not completed or is not successful, audiometer cannot be used

Invalid Calibration Baseline Established/DD Form 2217

DD Form 2217

- Stored in DOEHRs-HC
- Print or export/save DD Form 2217 monthly
- Maintain copy of each DD Form 2217 for 5 years

Summary

- Audiometer types
 - Microprocessor/Manual audiometers; Advantages/Disadvantages
- Audio booth/certification
- Equipment set up/connections
- Function Check
- Establishing calibration baselines
 - Adding BAS listener/audiometer; Unsuccessful checks
- Audiometer calibrations annual/daily
- Common BAS and audiometer issues, troubleshooting
- DD Form 2217

Unit Identification Code Practicum

Learning Objectives

- 2.1.1 Understand the service format for UIC/WICs
- 2.1.2 Understand how to use the UIC Locator
- 2.1.3 Find Unit Identification Codes (UICs)
- 2.1.4 Add, edit and delete UICs from DOEHRs-HC
- 2.1.5 Test personnel under the correct service UIC/WIC

Service Unit Identification Code (UIC) Format

- Army starts with a “W” followed by five alpha and/or numeric characters (Wxxxxx)
 - All Army (USA) are tested under their service UIC
- Coast Guard consists of 7 numbers (#####)
 - All Coast Guard (USCG) are tested under their service UIC
- Marine Corps consists of 8 alpha and/or numeric characters (#####x#x)
 - Marine Corps (USMC) can be tested under USMC or USN UICs
- Navy consist of five alpha and/or numeric characters (xxxxx)
 - Navy (USN) can be tested under USN or USMC UICs

Service Workplace Identification Code (WIC) Format

- Air Force has four numbers – four letters – 3 numbers followed by a letter (####-XXXX-###X).
- This is a WIC
- It is issued to USAF personnel on USAF bases in the HCP by a USAF Bio-Environmental Engineers (BEE)
- USAF patients stationed at USMC/USN bases, the test site will use: 1234-NAVY-123N and type their unit in the demographic data section on the run test window in the location field

Query UIC Locator

- Enter a small amount of information in the query
 - Use filter to pull up the answer; Re-query when you see how the data/records retrieved are recorded
- Data queried needs to be typed exactly as it is in the database (space, dash or slash)
 - If the query has too much information or is not typed exactly the way it is in the database the answer pool will not find data (use contains versus equals)
- Use single or multiple filters, Service, City, State or partial Unit name

UIC LOCATOR PRACTICUM

Find the DOD Component, UIC, City, State, Zip Code and Major Command for the following units. You may have to adjust the wording/spelling to get the correct data. These UICs will be used in following exercises. If there is APO or FPO followed by 2 letters then the APO or FPO will be the city and the following 2 letters will be the state followed by the zip code.

K Co 3/8 2D MARDIV, Camp Lejeune NC

Service: USMC UIC: _____ City: _____

State: _____ Zip Code: _____ MACOM: _____

USS GUNSTON HALL LSD 44

Service: USN UIC: _____ City: _____

State: _____ Zip Code: _____ MACOM: _____

3RD ENCO E ANTI ARMOR Fort Hood TX

Service: USA UIC: _____ City: _____

State: _____ Zip Code: _____

106th Wing Aerospace

Service: USAF WIC: 0006-FAAG-100A City: Andrews AFB

State: MD Zip Code: 20762

UICs are important

- Patients require their UIC to be entered and/or selected for their audiogram
- Most HCP reports are created via the patient UIC
- Contact your HCPM for any UIC questions you may have
- Enter UIC in the location you are entering patient data otherwise you will need to refresh the screen

Unit Identification Code

- Established “core” UICs
- Core UICs are UICs that belong to the units that repetitiously test at the testing site
- Unit Safety personnel work in conjunction with the HCPM to identify personnel and units exposed to hazardous noise
- A DR Inquiry may bring down associated sub-table UICs for non-Air Force military personnel if the UIC is not in the local database
- Always create UICs in the field you are currently in
- USN, USMC and USCG add the Major Command with the UIC

Summary

- Service format of UIC/WICs
- UIC Locator
- Unit Identification Codes
- Add, edit and delete UICs from DOEHRS-HC
- Test personnel under the correct service UIC/WIC

Demographic Data Practicum

Learning Objectives

- 2.2.1 Enter demographic data correctly
- 2.2.2 Understand that previous drop down selections limit future drop down choices
- 2.2.3 Practice entering demographic data
- 2.2.4 Right click to assist with drop down window choices
- 2.2.5 Patients not tested within DOEHRS-HC

Demographic Data Form

Form to be filled out by patients prior to coming to the booth for testing; ensure patient Demographic Data Form is filled out with enough information to verify/input patient in DOEHRS-HC; annotate station number within booth to ensure patient data matches the patient you are testing; SSN is the primary key and is required to be correct

DOEHRS-HC Run Test Window/Input Demographic Data Window

For training purposes we are going to enter Demographic Data only without testing patients. The Input Demographic Data window mimics the same fields in the Run Test Demographic Data section. Unlike the Run Test screen, data can be either edited or saved in the Input Demographic Data screen without test retrieval. This is just to get you used to entering patient data that can be saved without testing patients.

DOEHRS-HC, Demographic Data Entry

- Enter Patient SSN
- Use tab to move forward to next field
- Enter date for DOB M/D/YY, tab
- Use hot keys
- Location - only free text area available for local use

Patient SSN is required to activate the DR inquire and/or demographic data portion of the run test window; go to Functions>Demographic Input

Enter your own data in the demographic input window, adding your UIC in the same window by right clicking in the UIC field. Save data.

Enter and save demographic data for Krista Capps and Blake Owens.

| DOEHRS-HC Demographic Data Form | | Booth # _____ |
|---|---|---------------------------------|
| IDN (SSN and DODIDN): 990990005 | | |
| Last Name: Capps | First Name: Krista | MI: |
| Gender: Male <input type="checkbox"/> Female <input checked="" type="checkbox"/> | Date of Birth (mm/dd/yr): 7/10/83 | |
| Component (select one): DOD USCG USA <input checked="" type="checkbox"/> USAF USMC USN Other (explain): | | |
| Service Component (select one): Contractor Federal Employee Foreign National <input checked="" type="checkbox"/> Regular Reserve NG | | |
| Rank/Grade: E6 | AFSC/MOS/NOBC/Rate & NEC/SDOC: Network Intelligence Analyst | Unit: 106 th Wing AS |
| UIC/WIC/WPID: 0006-FAAG-100A | Branch/Career Field/Activity: | Major Command: |
| Work Location or Code: Andrews | Phone Number (include area code): 501-555-5555 | |

| DOEHRS-HC Demographic Data Form | | Booth # _____ |
|---|---|-------------------------|
| IDN (SSN and DODIDN): 990990027 | | |
| Last Name: Owens | First Name: Blake | MI: M |
| Gender: Male <input checked="" type="checkbox"/> Female <input type="checkbox"/> | Date of Birth (mm/dd/yr): 8/5/85 | |
| Component (select one): DOD USCG USA USAF <input checked="" type="checkbox"/> USMC USN Other (explain): | | |
| Service Component (select one): Contractor Federal Employee Foreign National <input checked="" type="checkbox"/> Regular Reserve NG | | |
| Rank/Grade: O3 | AFSC/MOS/NOBC/Rate & NEC/SDOC: Infantry officer | Unit: 3/8 |
| UIC/WIC/WPID: | Branch/Career Field/Activity: | Major Command: 2 MARDIV |
| Work Location or Code: K Co | Phone Number (include area code): 910555-5555 | |

Go to Edit>Demographic Data window to check and/or correct data.

DOEHRS-HC Edit Demographic Data

- Edit>Demographic Data
- Check self
- 990990005
- 990990027

Patient Data Entry

- Have the patient fill out a demographic form
- This form assists inputting patient data correctly
- Ensure the form has enough information so that patient data entry can be completed in DOEHRS-HC
- If more information is required, question the patient prior to placing them in the booth
- Write the station number on the patients demographic sheet on multi-stationed booths
- Enter patient demographic data in the Run Test screen when a patient is present for testing
- This data in conjunction with the threshold levels retrieved from the CCA-200 window will save as an audiogram (record)
- Enter demographic data correctly and completely
- Incomplete data entry will restrict test data from being retrieved from the CCA-200 window

Patient Data Entry

- Enter patient demographic data in the Run Test screen when a patient is present for testing
- This data in conjunction with the threshold levels retrieved from the CCA-200 window will save as an audiogram (record)
- Enter demographic data correctly and completely
- Incomplete data entry will restrict test data from being retrieved from the CCA-200 window

General Information

- Patient SSN is a primary key, it has to be entered correctly
- Never use "Other" as a DoD comp without an audiologist prior approval
- Dependents, non-DoD employees and children age 16 or younger will not be entered into DOEHRS-HC

Summary

- Enter demographic data
- Previous drop down selections limit future drop down choices
- Right click drop down window assistance
- Patients that will not be tested within DOEHRS-HC

Fill out the below form with your personal information, all personnel are in the hearing conservation program; enter the HPDs you would wear if you are exposed to hazardous noise.

DOEHRS-HC Demographic Data Form

Booth # _____

| | | | | | | | | | | |
|---|---|--------------------------|----------------------------------|--|--|-----------------------|------------------|---|---|--|
| IDN (SSN and DODIDN): | | | | | | | | | | |
| Last Name: | | | First Name: | | | | MI: | | | |
| Gender: | Male | Female | Date of Birth (mm/dd/yr): | | | | | | | |
| Component (select one): | DOD | USCG | USA | USAF | USMC | USN | Other (explain): | | | |
| Service Component (select one): | Contractor | Federal Employee | Foreign National | Regular | Reserve | NG | | | | |
| Rank/Grade: | AFSC/MOS/NOBC/Rate & NEC/SDOC: | | | | | Unit: | | | | |
| UIC/WIC/WPID: | Branch/Career Field/Activity: | | | | | Major Command: | | | | |
| Work Location or Code: | | | | | Phone Number (include area code): | | | | | |
| Are you routinely exposed to hazardous noise or in the hearing conservation program? | | | | | | | | Y | N | |
| Purpose of visit (circle one): | Annual | Follow-up | Pre-deployment | Post-deployment | | | | | | |
| | Termination | Retirement/Separation | Reference/Baseline | Accession/Commissioning | | | | | | |
| | Pre-employment | Non-hearing Conservation | Other (explain): | | | | | | | |
| Do you have any Ear, Nose or Throat problems today that affect your hearing? | | | | | | | | Y | N | |
| How many hours have you been away from noise prior to this test? | | | | | | | | | | |
| What specific type of Hearing Protection Devices (earpro) do you wear? | | | | | | | | | | |
| Do you wear double hearing protection? | | | | | | | | Y | N | |
| If so, what additional Hearing Protection Devices (HPD)s do you wear? | | | | | | | | | | |
| Do you wear glasses or goggles while wearing HPDs? | | | | Always | Seldom | N/A | | | | |
| During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) | | | | | | | | | | |
| | | | Not bothered at all | Bothered a little | Bothered a lot | | | | | |
| Were you fit with HPDs today? | | Y | N | Were you previously fitted with HPDs? | | | Y | N | | |
| Do you currently have your HPDs with you? | | | | Y | N | | | | | |
| Was hearing health education provided today? | | | | Y | N | | | | | |

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

DISCLOSURE: Disclosure of the SSN is voluntary; however, failure to provide the requested information may result in inaccurate documentation

For Official Use Only

Audiometric Techniques and Considerations

Learning Objectives

- 2.3.1 Complete a comprehensive aural history
- 2.3.2 Understand the benefit of an otoscopic examination and when to do one
- 2.3.3 Explain the considerations for patient testing and preparation for testing
- 2.3.4 Explain the standard process of air conduction threshold testing, for automatic and manual methods
- 2.3.5 Understand factors affecting test validity

Who May Perform Audiometry

- OSHA
 - Licensed audiologist, otolaryngologist or other physician; OHCs certified by CAOHC or who have “demonstrated competence”; Technician who demonstrates competence operating a microprocessor (does not need to be certified)
- NIOSH does not recommend demonstrated competence option
- DoD does not recognize the demonstrated competence option
- DoD requires Military hearing technician certification training or CAOHC certification
- This applies to contract and sub-contract technicians
- Individual states may also require certification

Audiometric Procedures

- Equipment Pre-checks
 - Daily functional listening check; Daily calibration
- Obtain aural (hearing) history
 - Demographic data form
- Perform otoscopic examination
- Place subject in audiometric booth
- Provide clear, understandable instructions
- Place earphones on subject
- Complete test IAW ANSI
- Accurately enter patient demographic data
- Select correct test type
- Retrieve/record audiometric results
- Review audiogram for potential problems
- Counsel employee, educate, and arrange follow-up tests if needed
- Refer as needed

Prepare for Testing

- Ensure ambient noise levels in the test environment are below standards outlined in applicable regulations
- Log into the audiometric software application (DOEHRS-HC)

- Ensure equipment works properly; Annual electro-acoustical calibration is valid; Daily functional check is successful; Daily biological calibration test is successful
- Clean equipment IAW clinic infection control policies

Infection Control

- Follow local infection control guidelines
- Include hand hygiene and equipment cleaning
- Include plan for cleaning blood and/or other body fluids
- Disposable earphone covers recommended
- Non-alcohol based disinfection wipes - preferred method
- Earphone cleaning
 - Do not use alcohol or harsh chemicals; Keep moisture away from earphone diaphragm; Ensure earphones are dry before patient use
- Hand switch
 - Cleaned in the same manner as earphones

Aural History

- Current auditory complaints
- Changes in health, medications
- Occupational and non-occupational noise exposure
- Hearing protection use
- Tinnitus
- GINA – Genetic Information Nondiscrimination Act
 - Do not ask family history questions

Otoscopic Examination Lighted Ear Inspection

Always do an otoscopic examination if conductive issues are suspected or if you are going to insert hearing protection into the ear canal.

Volume Control - Adjust instructions volume prior to patient testing

Patient Processing/Instructions

- Collect demographic forms, annotate station and ensure patient is in the correct station
- Verbal instructions:
 - Remove any foreign items in their mouth (gum, etc.); Remove eye glasses, hearing aids, large earrings, etc.; Turn off all electronic devices; Move hair away from ears; Response switch in hand; Test instructions will begin when the door shuts; Place headphones on properly, red/right, blue/left

Instructions can be modified to listener's primary language within the CCA-200 software.

CCA-200 Start Test Voice Instructions

This is a hearing check. You will be listening for some tones. When you hear a tone, press the button once and quickly release the button. No matter how faint the tone, press the button when you hear a tone and quickly release the button. Upon completion of your hearing check, please remain seated and quiet until the operator releases you.

Close audio booth door, start test booth; if auto voice instructions are not played, verbal instructions similar to above will need to be review with patients. Have students listen to instructions, adjust volume to an appropriate level for patients with/without normal hearing.

Audiometer Test Configuration

- Pulsed stimuli is selected/used
 - Helpful for patients with tinnitus
- CCA-200 always begins with the left ear; changing to begin on the right ear is available (prior to test start)
 - Test better ear first; Testing better ear first allows patient to learn what to expect; May be longer periods of silence during testing of poorer ear
- Start/Error voice instructions are presented

Hearing Threshold Level (HTL) Automated or Manual Testing

- Hearing threshold at a frequency is defined as the lowest level at which a response occurs in at least half (50%) of the ascending stimuli
- HTL is a statistical measure...not an absolute number
- Variations of +/- 5 dB are not statistically significant
- A hearing level to which the subject responds to 100% of the time would likely be at least 5 dB above the HTL

Manual Testing Modes

- Pulsed method presents 1-2 second tones
- To determine a threshold present a 30 dB tone for the ear and frequency; if no response is recorded, increase stimulus level initially by 20dB then 10 dB until a response is obtained
 - After the initial response is confirmed, follow the threshold bracketing procedure: Response - stimuli presentation decrease by 10 dB; No response - stimuli presentation increased by 5 dB; A threshold is determined when the patient responds twice in an ascending mode at the same intensity
- CCA-200 semi-automatic manual mode will do the bracketing method automatically

Initial Response Confirmation may be selected: stimulus to which the subject first responds in an ascending trial of a threshold determination is repeated. If the subject responds to the repeated stimulus, the test continues normally; otherwise, the stimulus intensity increases by 5 dB until the subject responds again. That response is again confirmed.

Audiometer Test Sequence Automated/Manual

- Initial stimuli presented at 30 dB, (per frequency)
- Repeat 1000 Hz (initial ear)
 - Retest within +/- 5 dB, records the lower threshold; If repeat varies by 10 dB or more, receives error message (RN) “retest not valid” reinstructs and continues testing (semi-automatic manual mode)
- Continue with additional frequencies

| General | | Test Sequence | | | | | Ls | |
|----------|-------|---------------|------|------|-----------|-------|----|--|
| Ear: | Freq: | Start: | Low: | HSL: | Ear: | Freq: | | |
| 1. Left | 1000 | 30 | -10 | | 10. Right | 1000 | | |
| 2. Left | 500 | VSL | -10 | | 11. Right | 2000 | | |
| 3. Left | 1000 | VSL | -10 | | 12. Right | 3000 | | |
| 4. Left | 2000 | VSL | -10 | | 13. Right | 4000 | | |
| 5. Left | 3000 | VSL | -10 | | 14. Right | 6000 | | |
| 6. Left | 4000 | VSL | -10 | | | | | |
| 7. Left | 6000 | VSL | -10 | | | | | |
| 8. Right | 1000 | 30 | -10 | | 17. | | | |
| 9. Right | 500 | VSL | -10 | | 18. | | | |

If conducting a complete “manually tested” audiogram, conduct test sequence for manual testing in the same frequency order as identified above, confirmation test only needs to be done at the 1000 Hz on the initial ear, retest needs to be within 5 dB of initial threshold received.

Manual Testing

- Consider manually testing if:
 - Patient is having problems testing (error codes); Results differ greatly from the last test (STS, EWS); Questionable results
- Evaluation legend

| | Right | Left |
|-----------------------|-------|------|
| <u>Air Conduction</u> | | |
| Unmasked | ○ | × |
| Masked | △ | □ |

When using the semi-automatic manual testing mode, do not adjust the frequency or decibel levels once a patient responds, application will keep track of the responses/stimuli presented and lock in thresholds once the patient responds twice in an accenting manner.

Switching to Manual Mode in CCA-200

Defaults to left ear, 1000 Hz, 30 dB; select ear/frequency; set NT if thresholds are already present; present stimulus; increase by 20 dB then by 10 dB until patient responds, do not adjust dials once the patient responds when using the semi-automatic manual testing mode. Bracketing method will initiate, application will keep track of the patient responses, once the patient responds twice in an ascending manner, threshold will lock; “M” identifier will be present only in the CCA-200 portion of the application.

Select ear/frequency; set NT if thresholds are present. Present stimulus at 30 dB; increase by 20 dB then by 10 dB until patient responds, do not adjust dials once the patient responds. Bracketing method will initiate, application will keep track of the patient responses, once the patient responds twice in an ascending manner, lock threshold.

Have student manually test the right ear 4000 Hz; Select ear/frequency; set NT if thresholds are present

Present stimulus at 30 dB; increase by 20 dB then by 10 dB until patient responds, if using the semi-automatic manual testing mode do not adjust dials once the patient responds

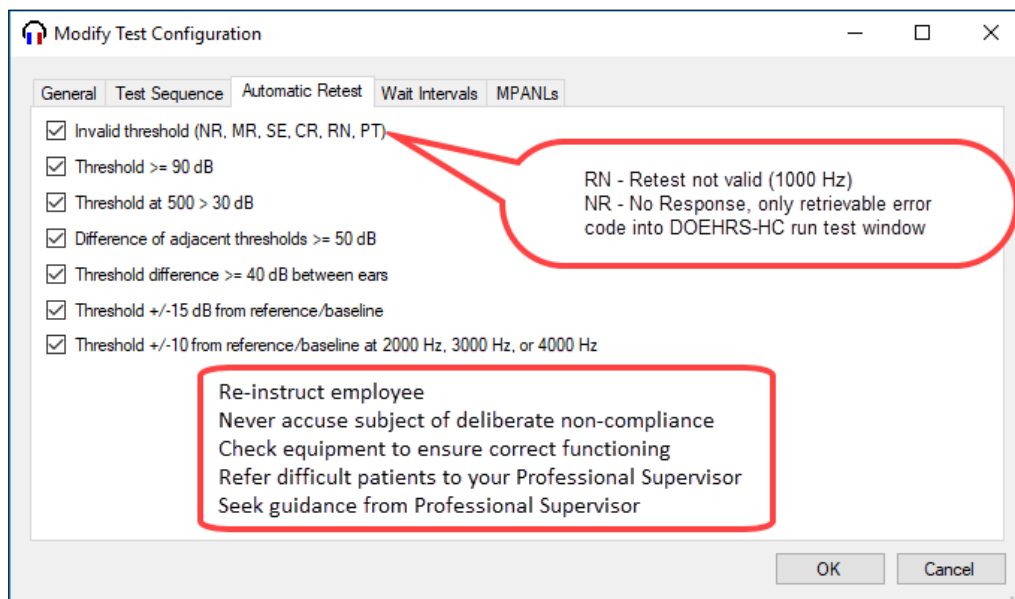
Bracketing method will initiate, application will keep track of the patient responses, once the patient responds twice in an ascending manner, and threshold will lock

“M” identifier will be present ONLY in the CCA-200 portion of the application

- Select ear, frequency, set NT, present initial stimuli at 30 dB (default)
 - Do not give visual cues, press present stimulus
 - Initial increase by 20 dB then 10 dB increments until patient responds
 - Once patient responds, use the bracketing method (do not adjust dials after initial response if using the semi-automatic manual testing mode)
 - Vary time interval between stimuli to avoid a rhythmic tone presentation
 - Lock thresholds when patient responds twice in an ascending manner (automatically done if using the semi-automatic manual testing mode)

Do not adjust the frequency or decibel levels once a patient responds if using the semi-automatic manual testing mode, application will keep track of the responses/stimuli presented and lock in thresholds once the patient responds twice in an ascending manner.

Threshold Retest (CCA-200)



Manual Testing (common issues)

- Facial or visual cues
- Rhythmic pattern of presenting stimuli
- Earphones placement
- Poor (sloppy, rushed, non-standard) instruction
- Forgetting 1000 Hz retest (whole ear test)
- Recording data incorrectly in DOEHRs-HC (wrong ear or thresholds)

Factors Affecting Test Validity

- Poor test environment
- Cross-over hearing
- Uncooperative patients
- Fatigue, sleepiness
- Tinnitus
- Manual coordination problems
- Wax impaction, collapsing ear canals
- Lack of understanding of the instructions
- Anxiety and claustrophobia

Summary

- Aural history
- Patient test considerations
- Testing preparation
- Automated process for pure tone air conduction testing
- Manual testing methods
- Factors affecting test validity
- When to do an otoscopic examination
- Normal/Abnormal tympanic membrane

Hearing Protection Devices

Learning Objectives

- 2.4.1 Explain the relevance and importance of HPD fittings
- 2.4.2 Distinguish the types of hearing protective devices according to their characteristics, advantages and disadvantages
- 2.4.3 Outline the steps for fitting a patient with hearing protective devices
- 2.4.4 Explain the significance of the NRR in determining the effectiveness of hearing protectors

Hearing Protection Selection Criteria

- Tactical requirements
- Degree of noise attenuation required to prevent any change of hearing thresholds
- The work environment
- Advantages and disadvantages
- The best hearing protection device is one that will be used and worn correctly by the noise exposed individual

Hearing Protective Device, Single Protection

- Required in the following noise conditions, regardless of duration
 - Steady State Noise: ≥ 85 dBA TWA; Impulse noise: ≥ 140 dB
- OSHA HPD use is required at an 85 dBA TWA if the employee has not received a baseline audiogram or if an STS has been identified

Hearing Protective Device, Double Protection - Service Specific

- USA
 - Steady state noise > 103 to 108 dBA (TWA); Impulse noise > 165 dB
- USN/USMC/USCG
 - Steady state noise ≥ 104 dBA (TWA); Impulse noise ≥ 160 dB
- USAF - when noise exposure is still hazardous with single HPD attenuation or on the flight line
- In all cases while wearing double HPDs and noise hazard exposure is still exceeded; administrative time limit controls may be implemented

Administrative controls; time limits on noise hazard exposure; OSHA does not have double hearing protection requirements

Noise Reduction Rating (NRR)

- HPD are labeled with their noise reduction rating referred to as the NRR
- The NRR is an attenuation value
 - Determined under laboratory conditions; Not accurate in a field environment (Affected by fit; Insertion technique; Noise level in the work environment)
- OSHA/NIOSH have developed formulas to de-rate the NRR as a better estimate of real world protection

Actual attenuation in a field environment is about half the NRR. Those who are fit appropriately and use the devices correctly will likely achieve attenuation values close to the published NRR

Estimating HPD attenuation

- Noise Reduction Rating (NRR) measured in dBC
- Spectral adjustment (subtract 7dB for use with dBA)
- Derating (OSHA recommendation)
 - Service-specific de-rating; Other organization recommendations
- Personal Attenuation Rating (PAR)

Noise Reduction Rating (NRR) is required by the Environmental Protection Agency; because the NRR is measured in dBC, and dosimetry is typically measured in dBA, some spectral adjustments due to weighting scales differences is necessary (NRR-7dB subtraction)

Estimating HPD attenuation: Derating - The adjustment of the NRR to estimate actual field attenuation as opposed to attenuation measured in a laboratory; Derating is an OSHA recommendation, but not a requirement; Derating is only necessary on the required EPA-labeled NRR using the ANSI S3.19 (1974) standard; not necessary if using the most current ANSI S12.6 or S12.42

Air Force derating: per AFI 48-127: 50% earplugs, 25% earmuffs

Army derating: is not specified for the Army

Navy derating: Subtract 7 dB from HPD NRR; follows USMC derating if an STS is present

Marines derating: Subtract 7 dB from HPD NRR and divide by 2

NIOSH derating: 70% for pre-molded earplugs, 50% for formable earplugs and 25% for earmuffs (derating percentages reflect ease of fit)

OSHA derating: recommends derating the NRR by 50% when hearing protection is used in lieu of engineering and administrative controls

Personal Attenuation Rating: A measurement of the actual attenuation received by a user for a given fit. The most accurate method of determining appropriateness of a hearing protector (no derating necessary) Results reflect a specific fit

OSHA HPD attenuation derating

| | |
|----------------------------|--|
| 8 hour TWA noise exposure: | 93 dBA |
| NRR of Hearing Protection: | 29 dB |
| Subtract 7 dB from NRR: | $29 \text{ dB} - 7 \text{ dB} = 22 \text{ dB}$ |
| Divide by 2: | $22/2 = 11 \text{ dB}$ |
| Subtract 11 from the TWA: | $93 \text{ dBA} - 11 \text{ dB} = 82 \text{ dB}$ |

Decide if 82 dB (known as the “Protected Exposure”) is below the PEL for noise

Noise Reduction Rating (NRR) Double Hearing Protection

- Double hearing protection (earplug and earmuff or helmet) the wearer does not double the NRR
 - An earplug with a NRR of 25 dB worn with an earmuff protector that has a NRR of 25 dB does not give you 50 dB of noise reduction

- Double protection provides only an additional 4-5 dB attenuation

Hearing Protection Device Types

- Earplugs
 - Preformed (fit by medical - per ear); Hand formed
- Noise muffs
- Ear canal caps
- Helmets
 - Service specific
- Other
 - Tactical Communication and Protective Systems (TCAPS)

Helmets are service specific in DOEHRS as a selection IAW patient DOD component; Carry HPDs in an earplug case, case may be used to assist in inserting HPD into ear; Primary HPD selection will limit double hearing protection drop down choices.

Hearing Protection Device (HPD) Users

- Protection required in hazardous noise
- Speech becomes recognizable with time and practice
- Machine noise and its operational characteristics become recognizable
- HPDs may work loose (depending on type) and must be reinserted periodically for maximum effectiveness
- Reduce work day exposure below 85 dBA/140 dBP using hearing protection or combination of hearing protection and administrative controls
- Protected hearing is better than permanent hearing loss

Earplug Fit

- Fully insert HPD correctly
- Occlusion effect - user's voice should sound "deeper" to themselves
- Voice should sound muffled
- Fit each ear individually
- Air-tight seal achieved
- Resistance when you tug or try to remove the hearing protection device

Otoscopic Examination Lighted Ear Inspection

- Ensure ear canals are free of any obvious problems
 - Can the TM be viewed; Are there any obstructions/abnormalities; What size HPD may be appropriate
- Necessary step in fitting hearing protection
- If something unusual or abnormal is discovered, seek further evaluation by a medical professional

Triple Flange Earplug

- 3 color coded sizes
 - Small (green); Medium (orange); Large (blue)
- Use the earplug case to insert the triple flange earplug

Visualize a Good HPD Fit

Quad-Flange Earplug

- Size may vary, depending on manufacturer

Level Dependent Earplugs

- Specialized filter contained within the ear plug
- Used differently depending on type of noise
- Closed filter - maximum protection for both continuous noise (vehicles/machinery) and impulse noise (weapons fire)
- Open Filter - little or no protection for continuous noise but will protect from impulse noise; level of protection will increase with the level of the impulse noise

Open setting, level dependent earplugs will allow you to hear soft sounds, like speech, better but will not provide protection from continuous noise

Level Dependent Earplugs Combat Arms/Battle Plugs

- Sized
 - medically fitted; comes attached, same size as a set
- Toggle switch selector
 - Maximum protection from hazardous noise cap closed; Open cap for increased situational awareness during weapons fire (Provides greater ability to hear speech and environmental sounds while providing protection from impulse noise)

Combat arms: small=green, regular=tan, large=brown

Level Dependent Earplugs Sonic Defenders - Surefire

- Specific to ear – right/left
 - Right ear = red vent; Left ear = clear vent
- Cap open for weapons fire
- Cap closed for continuous noise
- Medically fitted

Preformed Ear Plugs; Care, Maintenance and Replacement

- Clean after each use with warm, soapy water
- Rinse and dry thoroughly
- Level-dependent earplugs
 - Do not get the filter wet; Remove the filter before cleaning the earplug with soap and water
- Do not insert with soiled hands
- Check plugs for correct size and any signs of deterioration
- If unserviceable, get refitted with another pair

Preformed Ear Plugs Advantages

- Effective protection with proper insertion depth; Durable, washable, reusable; Easily carried; Less expensive than ear muffs; Comfortable

Preformed Ear Plugs Disadvantages

- Medical fitting required; Frequent insertion may cause irritation; May work loose with jaw movement; Improper fit reduces effectiveness

Hand Formed Earplugs

- Sized, manufacture dependent
- Plug will return to its original shape after being removed
- Insert hand formed earplugs with clean hands

Clean hands = free of debris or chemicals; any dirt, abrasive substances, or chemicals can irritate the ear canal

Hand Formed Earplugs Fitting Techniques

- Ensure a crease-free roll (thumb/index finger)
- Insert 2/3 of plug into canal
- Hold plug in place with finger until fully expanded

When you have a good fit and seal, only the green color will be visible and the orange portion of the earplug will be completely in the ear canal

Hand Formed Earplugs: Care, Maintenance and Replacement

- Hand formed earplugs are made from memory foam (polyurethane, etc.)
- Washing hand formed earplugs will destroy the acoustic properties and render the earplug less effective
- Designed to be one-time use
- Recommend dispose of earplug after a single use
- Do not alter in any way (cut in half, trim tips for comfort, etc.)

Hand Formed Ear Plugs Advantages

- Effective protection when properly inserted; Comfortable; Universal fit; Least expensive; Hand Formed

Hand Formed Ear Plugs Disadvantages

- Required practice to get a smooth cylinder shape with no creases or folds; Easily soiled; Cannot be used around corrosives or dangerous chemicals; One time use

Noise Muffs

- Universal fit
- Fitting techniques:
 - Ear-cups must totally seal and enclose each ear; Adjust headband for firm, comfortable fit; Headband placement options vary
- Can be incorporated into hard hat or helmet with high performance ear muffs
- Verify seal with or without glasses or goggles

Hard Hat with Noise Muffs

- Verify seal

Noise Muffs Care, Maintenance and Replacement

- Wipe ear-cup seals with moist cloth
- Check seals frequently; replace if damaged
- Replace cushion inserts (inside ear-cups) when foam deteriorates
- Check for cracks or holes in ear-cups
- Ensure adequate headband tension; replace if necessary
- Modifications are prohibited

Noise Muffs Advantages

- Universal fit; Good attenuation; Can be worn with earplugs; Medical fit not required; Easily cleaned; Add communications equipment and/or Active Noise Reduction (ANR) features

Noise Muffs Disadvantages

- Expensive; Bulky and heavy; Uncomfortable in heat and humidity; Hair, glasses, earring decrease effectiveness; Not easily carried

Ear Canal Caps

- Use only for short-term or intermittent exposures
- Provide adequate hearing protection when hazardous noise levels are 95 dBA or less
- Tips or end caps are placed at the opening of the ear canal and pushed into the ear canal until a snug seal is obtained
- Can be worn over the head, under the chin or behind the neck

Ear Canal Caps Advantages

- Universal fit; Quickly inserted; Lightweight; Easily carried around the neck

Ear Canal Caps Disadvantages

- More expensive than ear plugs; Uncomfortable after extended use; Limited attenuation; Poor headband tension greatly reduces effective protection

Combat Vehicle Crewman (CVC) Helmet

- CVC Helmets normally stay with the vehicle
- Contains a helmet liner
 - Vehicle Intercommunication System (VIS); Uses active noise reduction
- Care and Maintenance
 - Check ear-cup seals semi-annually; Replace when cracked or broken
- Eye protection may interfere with seal

All helmets are issued by the unit

Aviators Helmet

- Aviator helmets normally stay with the person it is issued to
- Aircrew retains night vision goggle (NVG) capability
- Dismounted aircrew can communicate with aircraft
 - Hearing enhancement while dismounted
- Protection from high-level impulse noise
- Improved situational awareness
- Improved face-to-face communication
- Usually worn with the Communication Earplug (CEP)

Tactical Communication and Protection System (TCAPS)

- Integrates hearing protection, communication equipment and amplification of environmental sounds
- Advantages: Allows for amplification of soft sounds such as speech while providing hearing protection for loud sounds such as weapon fire; HPD that can be used easily in tactical environments; Availability in different types to suit unit/operator needs
- Disadvantage: Decreased localization and distance determination

In addition to protection from hazardous noise, it also amplifies low level sounds, like a hearing aid to increase the wearer's situational awareness for low level sounds; ANR is activated at 85 dBA, max output is 90 dBA, it is safe to wear for up to 8 hours in 115 dBA (equivalent to the sound of a jet taking off) and it is safe for impulse noises up to 165 dB peak sound pressure level; a digital compression circuit like those used in a hearing aid ensures that hazardous noise is not attenuated any more than necessary

Musician Earplugs Custom Molded or Preformed

- Custom Molded
 - Molded to individual ear; Various filters available; Ear mold impression/special order required
- Preformed
 - Available in standard and large sizes; Medical fit required; NRR 20 dB

Designed for musicians and sound engineers, incorporate filters which yield relatively flat attenuation across frequencies; sound is not distorted in the same way conventional hearing protectors do; must be medically fit, custom molded earplugs and ear mold impressions with deep canal portion are needed; amount of attenuation depends on what instrument the musician plays and location in the band normally between 15-25 dB

Summary

- Selecting hearing protection
 - Single protection; Double protection
- Noise reduction rating – HPD attenuation
- HPD Types
- HPD fit
- Otoscopic examination
- HPDs care and maintenance
- HPDs advantages and disadvantages

Audiometric Testing and Follow-up

Learning Objectives

- 2.5.1 Understand audiogram basics
 - Test types and format
 - Degrees of hearing
 - Common audiometric configurations
 - Significant/Standard Threshold Shift (STS)
 - Temporary Threshold Shift (TTS)
 - Permanent Threshold Shift (PTS)
- 2.5.2 Identify problem audiograms requiring review by the Professional Supervisor
- 2.5.3 Baseline re-establishment

Pure Tone Air Conduction Threshold Testing

Definitions

- Threshold of hearing
 - The lowest level of sound a person can hear in a series of ascending, pure tone presentation trials at least 50% of the time
- Audiometric Zero (0 dB HL)
 - The sound pressure level at which the threshold of audibility occurs for average normal listeners
- Audiogram
 - A record of an individual's hearing sensitivity; For occupational testing, a record of the pure-tone air-conducting hearing threshold levels
- Significant/Standard Threshold Shift (STS)
 - An average change of plus or minus 10 dB at 2000, 3000, and 4000 Hz, relative to the reference audiogram, in either ear, without age corrections. (DoDI 6055.12)
- Temporary Threshold Shift (TTS)
 - An STS that resolves on follow-up test after auditory rest (≥ 14 hours)
- Permanent Threshold Shift (PTS)
 - An STS that doesn't resolve on follow-up testing after auditory rest (≥ 14 hours); Confirmed by an audiologist or physician (Professional Supervisor)
- Early Warning Shift (EWS)
 - A difference of plus 15 dB at 1000, 2000, 3000, and 4000 Hz, relative to the reference audiogram, in either ear, without an STS; If an STS is present in the same ear, the STS takes precedence

Audiometry Testing

- Comply with Federal, DoD and Service specific regulations
- Monitor the effectiveness of the local hearing program
- Identify significant threshold shift(s) in hearing level
- Process medical referrals for proper diagnoses
- Establish individual's fitness for duty

Audiometric Monitoring

- Purpose: conduct routine hearing tests to identify changes in hearing related to noise exposure
- Creation of initial baseline hearing thresholds
 - DD Form 2215 required for all military and all DoD civilians exposed to hazardous noise (HCP Stressors)
- Determine disposition, referral needs, and fitness for duty
- Baseline re-establishment
- Termination - removal from the HCP

Reference audiogram - required of all military, and civilian personnel in the HCP; obtained during first 30 days of employment.

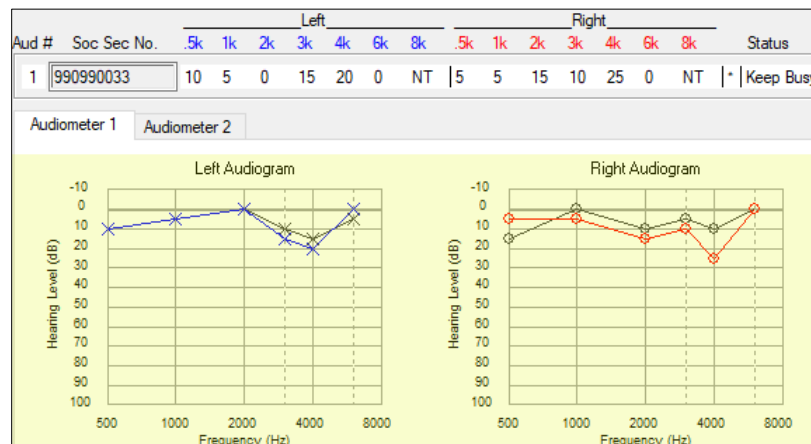
DD 2216 – Annual, Required of all military and civilian personnel routinely exposed to noise, and all Army/USMC military; enrollment in HCP. DD 2216 current test compared to reference audiogram to determine if a change (STS) has occurred.

Audiogram Testing

- Service members are at a much greater risk for noise-induced hearing loss compared to the general population
- Noise induced hearing loss is a bloodless/painless injury
- Hearing tests are a reliable way to identify a noise induced injury
- Early identification is the goal
 - Identified earlier, the injury is easier to halt hearing loss progression; Enables access to preventive/rehabilitative services
- Limits permanent impact on career/job performance

Types of Audiogram Recordings, Graphic (highlighted portion)

- Graphic representation of hearing thresholds; Frequency and intensity
- Symbols to represent right ear, left ear, bone conduction and masked thresholds (legend)
- Frequently used in a clinical/diagnostic setting
- Thresholds are measured and recorded in 5 dB increments
- Bring up the annual test in the local database, 990990033, dated December 2019, press print to review 2216



DD Form 2215, Serial/Numeric Audiogram

| REFERENCE AUDIOGRAM | | | | | | | | | | 1. ZIP CODE/APO/FPO/PAS | | | | | |
|--|--|---|---|--|--------------------------------------|--|---|--|------|---|------|-------------------------------------|------|--|--|
| <i>(This form is subject to the Privacy Act of 1974 - use Blanket PAS - DD Form 2005)</i> | | | | | | | | | | | | | | | |
| 2. DOD COMPONENT | | | | | 3. SERVICE COMPONENT | | | | | | | | | | |
| <input type="checkbox"/> A - ARMY | | <input type="checkbox"/> F - AIR FORCE | | <input type="checkbox"/> C - COASTGUARD | <input type="checkbox"/> R - REGULAR | | <input type="checkbox"/> G - NATIONAL GUARD | | | | | | | | |
| <input type="checkbox"/> N - NAVY | | <input type="checkbox"/> M - MARINE CORPS | | <input type="checkbox"/> 1 - OTHER | <input type="checkbox"/> V - RESERVE | | <input type="checkbox"/> 1 - OTHER | | | | | | | | |
| 4. SOCIAL SECURITY NUMBER | | | 5. NAME <i>(Last, First, Middle Initial)</i> | | | | | 6. DATE OF BIRTH | | 7. SEX | | | | | |
| <input type="checkbox"/> M - MALE | | | <input type="checkbox"/> F - FEMALE | | | | | | | | | | | | |
| 8. PAY GRADE UNIFORMED SERVICES | | 9. PAY GRADE CIVILIAN | | 10. SERVICE DUTY OCCUPATION CODE | | 11. MAILING ADDRESS OF ASSIGNMENT | | | | | | | | | |
| 12. LOCATION - PLACE OF WORK | | | | | 13. MAJOR COMMAND | | | 14. DUTY TELEPHONE <i>(Include area code)</i> | | | | | | | |
| AUDIOMETRY | | | | | | | | | | | | | | | |
| 15. REASON FOR CONDUCTING AUDIOGRAM | | | | | | | | | | | | | | | |
| <input type="checkbox"/> 1 - REFERENCE ESTABLISHED PRIOR TO INITIAL DUTY IN HAZARDOUS NOISE AREAS | | | | <input type="checkbox"/> 2 - REFERENCE ESTABLISHED FOLLOWING EXPOSURE IN NOISE DUTIES | | | | <input type="checkbox"/> 3 - REFERENCE RE-ESTABLISHED AFTER FOLLOW-UP PROGRAM | | | | | | | |
| 16. AUDIOMETRIC DATA RE: ANSI S3.6 | | LEFT | | | | | | RIGHT | | | | | | | |
| | | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | | |
| 17. DATE OF AUDIOGRAM | | | | | | | | | | | | | | | |
| 18. MEETS REFERRAL CRITERIA | | | 19. MILITARY TIME OF DAY <i>(Optional)</i> | | | 20. HOURS SINCE LAST NOISE EXPOSURE | | 21. EAR, NOSE, AND THROAT PROBLEM AT TIME OF TEST | | | | | | | |
| <input type="checkbox"/> 1 - NO <input type="checkbox"/> 2 - YES | | | | | | | | <input type="checkbox"/> 1 - NO <input type="checkbox"/> 2 - YES <input type="checkbox"/> 3 - UNKNOWN | | | | | | | |
| 22. EXAMINER | | | | | | | | | | | | | | | |
| a. NAME <i>(Last, First, Middle Initial)</i> | | | | | b. TRAINING CERTIFICATION NUMBER | | | c. SERVICE DUTY OCCUPATION CODE | | d. OFFICE SYMBOL | | | | | |
| 23. AUDIOMETER | | | | | | | | | | | | | | | |
| a. TYPE | | b. MODEL | | | c. MANUFACTURER | | | d. SERIAL NUMBER | | e. LAST ELECTROACOUSTIC CALIBRATION DATE | | | | | |
| <input type="checkbox"/> 1 - MANUAL <input type="checkbox"/> 2 - SELF-RECORDING <i>(Automatic)</i> <input type="checkbox"/> 3 - MICROPROCESSOR | | | | | | | | | | | | | | | |
| 24. PERSONAL HEARING PROTECTION | | | | | | | | | | | | | | | |
| a. TYPE ISSUED | | | | b. SIZE EARPLUGS | | | | c. DOUBLE PROTECTION USED | | d. GLASSES WORN | | e. FREQUENCY GLASSES WORN | | | |
| <input type="checkbox"/> 1 - SINGLE FLANGE (V51R) | | <input type="checkbox"/> 5 - NOISE MUFFS | | <input type="checkbox"/> L | <input type="checkbox"/> R | <input type="checkbox"/> 1 - X8 | <input type="checkbox"/> 4 - L | <input type="checkbox"/> 1 - NO | | <input type="checkbox"/> 1 - NO | | <input type="checkbox"/> 1 - ALWAYS | | | |
| <input type="checkbox"/> 2 - TRIPLE FLANGE | | <input type="checkbox"/> 6 - OTHER | | <input type="checkbox"/> 2 - S | <input type="checkbox"/> 5 - XL | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 2 - SELDOM | | | |
| <input type="checkbox"/> 3 - HANDFORMED EARPLUG | | <input type="checkbox"/> 7 - NONE | | <input type="checkbox"/> 3 - M | | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 2 - YES | | <input type="checkbox"/> 3 - N/A | | | |
| <input type="checkbox"/> 4 - EAR CANAL CAPS | | | | | | | | | | | | | | | |
| 25. REMARKS <i>(Include Exposure Data)</i> | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

DD Form 2216, Serial/Numeric Audiogram

| HEARING CONSERVATION DATA | | | | | | | | | | | 1. ZIP CODE/APO/FPO/RA | | | | | |
|---|--|--|------|---------------------------------------|-----------------------------------|-----------------------------------|------------------------------|---|--|--------------------|----------------------------|----------------------------------|------|---------------------------------|--|--|
| <i>(This form is subject to the Privacy Act of 1974 - use Blanket PAS - DD Form 2005)</i> | | | | | | | | | | | | | | | | |
| 2. DOD COMPONENT | | A - ARMY N - NAVY | | | F - AIR FORCE M - MARINE CORPS | | C - COAST GUARD 1 - OTHER | | 3. SERVICE COMPONENT | | R - REGULAR V - RESERVE | | | G - NATIONAL GUARD 1 - OTHER | | |
| 4. SOCIAL SECURITY NUMBER | | | | 5. NAME (Last, First, Middle Initial) | | | | | 6. DATE OF BIRTH | | | 7. SEX M - MALE F - FEMALE | | | | |
| 8. PAY GRADE UNIFORMED SERVICES | | 9. PAY GRADE CIVILIAN | | 10. SERVICE DUTY OCCUPATION CODE | | 11. MAILING ADDRESS OF ASSIGNMENT | | | | | | | | | | |
| 12. LOCATION - PLACE OF WORK | | | | | | 13. MAJOR COMMAND | | | 14. DUTY TELEPHONE (Include area code) | | | | | | | |
| 15. AUDIOMETRY | | a. PURPOSE | | 1 - 90 DAY | | | 2 - ANNUAL | | 3 - TERMINATION | | 4 - OTHER | | | | | |
| AUDIOMETRIC DATA RE: ANSI S3.6 | | LEFT | | | | | | RIGHT | | | | | | | | |
| | | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | | | |
| b. CURRENT AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| c. REFERENCE AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| d. SIGNIFICANT THRESHOLD SHIFT (STS) | | e. THRESHOLD SHIFT | | | | | | | | | | | | | | |
| 1 - NO | | -----> | | | | | | | | | | | | | | |
| 2 - YES | | | | | | | | | | | | | | | | |
| f. REMARKS (Include Exposure Data) | | | | | | | | g. TYPE OF PERSONAL HEARING PROTECTION USED | | | | | | | | |
| | | | | | | | | 1 - SINGLE FLANGE (V51R) | | 4 - EAR CANAL CAPS | | | | | | |
| | | | | | | | | 2 - TRIPLE FLANGE | | 5 - NOISE MUFFS | | | | | | |
| | | | | | | | | 3 - HAND FORMED EARPLUG | | 6 - OTHER | | | | | | |
| | | | | | | | | | | 7 - NONE | | | | | | |
| h. EXAMINER NAME (Last, First, Middle Initial) | | | | | | i. TRAINING CERTIFICATE NO. | | j. SERVICE DUTY OCCUPATION CODE | | k. OFFICE SYMBOL | | | | | | |
| l. AUDIOMETER TYPE | | m. MODEL | | n. MANUFACTURER | | o. SERIAL NUMBER | | p. LAST ELECTROACOUSTIC CALIBRATION DATE | | | | | | | | |
| 1 - MANUAL | | (Automatic) | | | | | | | | | | | | | | |
| 2 - SELF-RECORDING | | | | | | | | | | | | | | | | |
| 3 - MICROPROCESSOR | | | | | | | | | | | | | | | | |
| 16. FOLLOW-UP NO. 1 | | a. MINIMUM 14 HOURS NOISE FREE SINCE CURRENT AUDIOGRAM (See Item 15.B) | | | | | | | | | | | | | | |
| AUDIOMETRIC DATA RE: ANSI S3.6 | | LEFT | | | | | | RIGHT | | | | | | | | |
| | | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | | | |
| b. CURRENT AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| c. REFERENCE AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| d. SIGNIFICANT THRESHOLD SHIFT (STS) | | e. THRESHOLD SHIFT | | | | | | | | | | | | | | |
| 1 - NO | | -----> | | | | | | | | | | | | | | |
| 2 - YES | | | | | | | | | | | | | | | | |
| f. EXAMINER NAME (Last, First, Middle Initial) | | | | | | g. TRAINING CERTIFICATE NO. | | h. SERVICE DUTY OCCUPATION CODE | | i. OFFICE SYMBOL | | | | | | |
| j. AUDIOMETER TYPE | | k. MODEL | | l. MANUFACTURER | | m. SERIAL NUMBER | | n. LAST ELECTROACOUSTIC CALIBRATION DATE | | | | | | | | |
| 1 - MANUAL | | | | | | | | | | | | | | | | |
| 2 - SELF-RECORDING | | | | | | | | | | | | | | | | |
| 3 - MICROPROCESSOR | | | | | | | | | | | | | | | | |
| 17. FOLLOW-UP NO. 2 | | a. MINIMUM 14 HOURS NOISE FREE SINCE CURRENT AUDIOGRAM (See Item 15.B) | | | | | | | | | | | | | | |
| AUDIOMETRIC DATA RE: ANSI S3.6 | | LEFT | | | | | | RIGHT | | | | | | | | |
| | | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | | | |
| b. CURRENT AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| c. REFERENCE AUDIOGRAM DATE | | | | | | | | | | | | | | | | |
| d. SIGNIFICANT THRESHOLD SHIFT (STS) | | e. THRESHOLD SHIFT | | | | | | | | | | | | | | |
| 1 - NO | | -----> | | | | | | | | | | | | | | |
| 2 - YES | | | | | | | | | | | | | | | | |
| f. EXAMINER NAME (Last, First, Middle Initial) | | | | | | g. TRAINING CERTIFICATE NO. | | h. SERVICE DUTY OCCUPATION CODE | | i. OFFICE SYMBOL | | | | | | |
| j. AUDIOMETER TYPE | | k. MODEL | | l. MANUFACTURER | | m. SERIAL NUMBER | | n. LAST ELECTROACOUSTIC CALIBRATION DATE | | | | | | | | |
| 1 - MANUAL | | | | | | | | | | | | | | | | |
| 2 - SELF-RECORDING | | | | | | | | | | | | | | | | |
| 3 - MICROPROCESSOR | | | | | | | | | | | | | | | | |

DD FORM 2216E, MAY 96

Approved for Electronic Generation by WHS-DIUR.
PREVIOUS EDITIONS ARE OBSOLETE

For Official Use Only

Non-Hearing Conservation Hearing Audiogram, Serial/Numeric Audiogram

| | | | | | | | | | | | | | | |
|---|--|-----------------------|------------------|---|-------------------|---------------------------------------|------|-------|--------------|------------------------------|------|----------------------------|------|--|
| NON-HEARING CONSERVATION HEARING TEST | | | | | | | | | | ZIP CODE/APO/FPO/PAS | | | | |
| (This report contains data subject to the Privacy Act of 1974.) | | | | | | | | | | | | | | |
| DOD COMPONENT | | | | | SERVICE COMPONENT | | | | | | | | | |
| A - ARMY | | | F - AIR FORCE | | | C - COAST GUARD | | | R - REGULAR | | | G - GUARD | | |
| N - NAVY | | | M - MARINE CORPS | | | 1 - OTHER | | | V - RESERVE | | | 1 - OTHER | | |
| SOCIAL SECURITY NUMBER | | | | NAME <i>(Last, First, Middle Initial)</i> | | | | | | DATE OF BIRTH | | SEX | | |
| PAY GRADE UNIFORMED SERVICES | | PAY GRADE CIVILIAN | | SERVICE DUTY OCCUPATION CODE | | MAJOR COMMAND <i>(Optional)</i> | | | | | | ENT PROBLEMAT TIME OF TEST | | |
| | | | | | | | | | | | | 1 - NO | | |
| | | | | | | | | | | | | 2 - YES | | |
| | | | | | | | | | | | | 3 - UNKNOWN | | |
| HEARING TEST (Audiometric Data RE: ANSI S3.6 - 1989) | | | | | | | | | | | | | | |
| AUDIOGRAM DATE | | LEFT | | | | | | RIGHT | | | | | | |
| | | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | 500 | 1000 | 2000 | 3000 | 4000 | 6000 | |
| | | | | | | | | | | | | | | |
| EXAMINER | | | | | | | | | | | | | | |
| NAME <i>(Last, First, Middle Initial)</i> | | | | | | TRAINING CERTIFICATE NO. | | | | SERVICE DUTY OCCUPATION CODE | | | | |
| | | | | | | | | | | | | | | |
| AUDIOMETER | | | | | | | | | | | | | | |
| TYPE | | | | MODEL | | | | | MANUFACTURER | | | | | |
| | | | | | | | | | | | | | | |
| SERIAL NUMBER | | | | | | LAST ELECTROACOUSTIC CALIBRATION DATE | | | | | | | | |
| | | | | | | | | | | | | | | |

For Official Use Only

Types of Audiogram Recordings, Serial/Numeric (highlighted portion)

- Used on DD 2215, DD 2216 and Non-Hearing Conservation tests
- Bring up the annual test in the local database, 990990033, dated December 2019, press print to review 2216

| Aud # | Soc Sec No. | Left | | | | | | | | Right | | | | | | | | Status |
|-------|-------------|------|----|----|----|----|----|----|-----|-------|----|----|----|----|----|---------------|--|--------|
| | | .5k | 1k | 2k | 3k | 4k | 6k | 8k | .5k | 1k | 2k | 3k | 4k | 6k | 8k | | | |
| 1 | 990990033 | 10 | 5 | 0 | 15 | 20 | 0 | NT | 5 | 5 | 15 | 10 | 25 | 0 | NT | * Keep Busy | | |

Required Field/Sub-Field Information (DOEHRS-HC Audiogram)

- Examiner information
 - Comes from user logged into DOEHRS-HC; Name, certification number, SDOC, office symbol
- Date/Time of test
 - Auto entered from date/time on computer
- Audiometer
 - Auto created from calibration baseline/saved audiometer; Make, model, serial number, calibration date, facility; Type - microprocessor or manual (selected by technician)

Audiogram DOEHRS-HC Sub Fields

- Audiometer (saved/created with calibrations)
- Examiner key fields (logged in user)

Audiogram Test Selection

- Very important that the technician select the correct test type
 - Correct test type selection will ensure correct patient counseling/training
- Test type changes once records has been exported to the DR cannot be locally accomplished

DD Form 2215, Reference (Baseline) Audiogram

- Required for all military and noise exposed civilians
 - Patient must be 14 hours noise free; Should be obtained prior to noise exposure, but at least within 30 days of employment; No ENT (Ear, Nose and Throat) problems the day of the test
- OSHA allows 6 months and up to 1 year, if using a mobile testing service
- Reference required (comparison) for all periodic exams (DD Form 2216 tests)
- Referral may be generated depending on the threshold results and reference reason

OSHA requires use of hearing protection at 85 dBA TWA until a baseline is obtained; once baseline is obtained, exposure level for required HPD use increases to 90 dBA TWA. If a referral is generated by test selection you may not want to create the 2215, example - masking requirement is present (possible invalid thresholds)

DD Form 2215, Reference Audiogram Reasons

- Prior to initial duties in noise hazardous areas
 - Type 1 (< 30 days hazardous noise exposure)
- Following exposure in noise duties
 - Type 2 (\geq 30 days hazardous noise exposure)
- Re-established after follow-up program
 - Type 3 (over rides previous references - ear specific)
- Change in service component (break in service)
 - Type 4 (over rides previous references)
- Type 0 (non-2215) is inputted if DOEHRS-HC DR is down or at a non-internet connected testing site
- Very important that the technician selects the correct reason when a 2215 test type is conducted
- All future 2216 tests will compare to the earliest electronic reference audiogram within DOEHRS-HC
 - Only type 3 or 4 reference audiograms can over-ride this application policy
- Reason type 1 or 2 tests are completed as the initial reference for all military personnel or civilians in the HCP
- Reason type 3 are only used if the patient has an STS on the previous test series
 - Only reference reason that could be single ear; May require an electronic remark for re-establishment authorization (SOP, audiologist) or who is entering the data (manual entry)
- Reason type 4 is only used if a previous reference is present in DOEHRS-HC and the patient has had a career change (military/civilian) or break in service
 - Takes the place of a type 1 or 2 so future 2216 tests can be compared to this 2215
- Technician is required to make a decision on the test type and/or reason
- Has to be knowledgeable on selection to negate future testing data errors
- Data may be transferred to medical readiness applications

If the wrong reference test reason is selected, future 2216 tests may not be compared to the correct 2215

DD Form 2216, Monitoring Audiograms Types

- Requires a reference audiogram for comparison
- Annual
- Pre and Post-Deployment
- Termination
- 90 Day
- Other
- Follow-up 1 and 2

Follow-up 1 or 2 are the only 2216 tests that can be single ear; requires STS on previous test within follow-up time frame

DD Form 2216 Selection

- Technician has to be knowledgeable on test selection to negate future testing data errors
- Identifies STS/EWS and referral criteria
- STS/EWS require patient signature on the 2216
- Selection of a 2216 test type requires a reference audiogram
- If a reference audiogram is not in the local database, a type 0 reference is required to be entered in the run test window
 - ❑ Type 0 references come from a DD Form 2215 only; Date and thresholds are entered for DD Form 2216 comparison; Never enter a type 0 reference from a physical, NHC or a MEPS audiogram
- If connected to the internet and DOEHRs DR is accessible, ensure patient SSN is correct

Reference Audiogram Type 0

The screenshot shows the 'Run Test' application window. The 'Reference Audiogram' section is highlighted with a red box. A red callout bubble at the top says: "2216 selection will activate reference window for entry if a reference is not present in the local database". Another red callout bubble at the bottom says: "Enter SSN, select Annual, press enter and input date of reference only use tab to scroll through fields, review data, press save if correct". The interface includes fields for IDN (SSN), Date, Reason, and Test Type (set to Annual). There are also frequency response buttons for Left and Right ears.

- If students have a DD Form 2215, enter their own SSN, select test type of annual and enter their own reference audiograms

Ensure when entering type 0 reference data, do not use the calendar function, it will enter a time stamp from the local computer; Use the tab to go from one date field to the other or the date may change between ears; Verify all information prior to saving type 0 reference

DD Form 2216 - Follow-up Testing

- Follow-up test selection can only occur if a patient has an +/- STS on the initial 2216 or for a follow-up 2 test a +STS on follow-up 1 and the follow-up testing window has not expired
- Only the most recent test results will be reflected in the DD Form 2216 remarks section
- Negative STSs do not have a noise free requirement
- Positive STSs have a 14 noise free requirement
- If a positive and a negative STS exists, check headphone placement/auditory history

DD Form 2216 - Follow-up Testing, Negative STS

- Thresholds are better than the reference
 - Normally occurs early in the audiometric history
- Review the audiometric summary
 - Was the baseline recent or re-established by an audiologist; Is there a masking requirement
- If the reference is probably invalid immediately re-test the ear that had the negative STS
 - If the negative STS is confirmed on follow-up 1, software will re-establish the baseline (ear specific)
- Clear Run Test station after initial 2216 test, input SSN and Follow-up 1 test will be auto-selected

Student can look at data in their own database, viewing 990990001, annual/follow-up 1/reference dated December 2019 in the edit audiogram window to observe/review

DD Form 2216 - Follow-up Testing, Negative STS Confirmed, Auto Re-established Baseline

- If the negative STS is confirmed on the Follow-up 1 retrieval DOEHS-HC will auto re-established the baseline
- Very important to review patient history prior to conducting any follow-up testing for a negative STS

Run Test Retrieval on Follow-up 1

- If the negative STS is confirmed on the Follow-up 1 retrieval DOEHS-HC will auto re-established the baseline
- Review patient history prior to conducting any follow-up testing for a negative STS

DD Form 2216 - Follow-up Testing; Negative STS - Follow up 1 Resolved

Student can look at data in their own database, viewing the 990990017 annual/follow-up 1 dated December 2019 in the edit audiogram window to observe/review

DD Form 2216 - Follow-up Testing, Positive STS

- Thresholds are worse than the reference
- Requires 14 noise free hours
- Cannot be done the same day as the initial 2216 test
- Follow-up 1 and Follow-up 2 can be accomplished on the same day (ear specific)
- If conductive issues (ENT) are suspected, consider referring to a medical provider prior to conducting further testing

Follow up Testing Scheduling

- Time frames for follow-up testing
- From initial audiogram on the 2216
 - 30 days – all civilians and USAF Regular; 60 days – USAF Reserves and National Guard; 90 – All USA, USN, USMC military
- Do not mention time frame for return to patients
- Question them on the earliest they can return noise free

DD Form 2216 - Follow-up Testing, Positive STS (TTS)

- If the STS resolves on the Follow-up 1 (TTS after auditory rest) Follow-up 2 cannot be accomplished
 - Counsel/Educate; Refit HPDs (patient may not be wearing them properly or they are the wrong size); Return in a year
- If the STS is still present on the Follow-up 1, complete a Follow-up 2 test
- If the STS resolved on Follow-up 2
 - Follow instructions as above

DD Form 2216 - Follow-up Testing, Positive STS - Follow up 1 Resolved Early Warning Shift (EWS)

Student can look at data in their own database, viewing the 990990018 DD Form 2216 annual and follow-up dated December 2019 in the edit audiogram window to observe/review; if an STS and a EWS are both present the STS takes precedence

DD Form 2216 - Follow-up Testing, Positive STS - Follow up 1 Confirmed

Student can look at data in their own database, viewing the 990990015 DD Form 2216 annual and follow-up dated December in the edit audiogram window to observe/review

DD Form 2216 - Follow-up Testing, Positive STS - Follow up 2 Resolved

Student can look at data in their own database, viewing the 990990015 DD Form 2216 annual and follow-up tests dated December 2019 in the edit audiogram window to observe/review

DD Form 2216 - Follow-up Testing, Positive STS - Follow up 1 Confirmed

Student can look at data in their own database, viewing the 990990016 DD Form 2216 annual and follow-up tests dated December 2019 in the edit audiogram window to observe/review

DD Form 2216 - Follow-up Testing, Positive STS - Follow up 2 Confirmed

Student can look at data in their own database, viewing the 990990016 DD Form 2216 annual and follow-up tests dated December 2019 in the edit audiogram window to observe/review

- Application will ask if re-establishment using previous test results is requested
- Always select “No” unless you have been authorized to re-establish baselines

DD Form 2216 - Follow-up Testing, Positive STS (PTS)

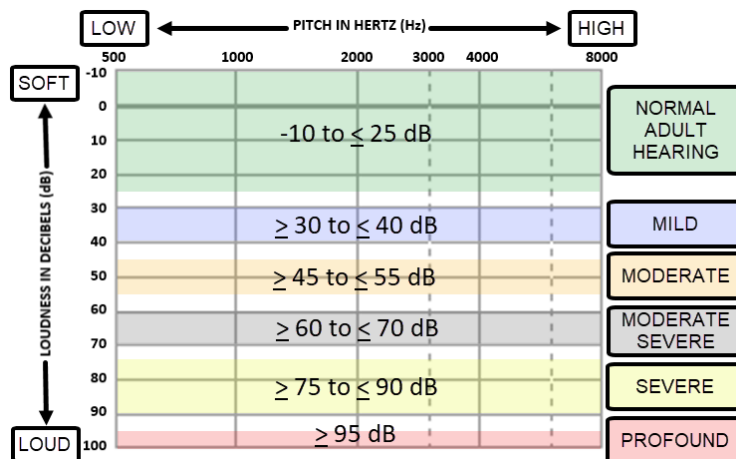
- If the STS is still present on the Follow-up 2
- Refer to the proper echelon of care (PS - Professional Supervisor) for evaluation or administrative processing
- Only re-establish baselines that you are authorized to
 - With the approval of the PS, follow-up test or audiological evaluation results may be used to create a (type 3) re-established reference. Add an electronic remark on the 2215 with who (PS) or what (SOP) authorized the baseline re-establishment.

Non-Hearing Conservation Test

- Performed on individuals who are not enrolled in the Hearing Program
 - Physical, Pre-commissioning, Separation History and Physical Examination (SHPE), Non-DoD employees, Etc.
- Performed on individuals requesting a hearing test before their periodic evaluation who are concerned about changes in hearing due to possible illness, medical condition, etc.
 - Consult with Professional Supervisor to determine how these encounters should be handled

Student can look at data in their own database, viewing the 990990005 NHC dated December 2019 in the edit audiogram window to observe/review, SHPE, Separation History and Physical Examination

Degree of Hearing Loss



Post-Audiometric Testing Review

- Technician is required to counsel patient on results
 - Early warning shift (EWS); Change in hearing, Significant/Standard Threshold Shift (STS) return for follow-up testing; Temporary Threshold Shift (TTS); Permanent Threshold Shift (PTS)
- Process automated referrals
- Create referrals for conductive or other issues: Physician, Audiologist

Audiometric Configurations, Sloping High Frequency Hearing Loss

Most common audiometric configuration; Associated with aging (Presbycusis), ototoxicity, diseases (meningitis, measles), and can be congenital

Student can look at data in their own database, viewing the 990990006 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review.

High Frequency Hearing Loss, Notched - Noise Induced Hearing Loss

Noise Notch often first observed at 4000 Hz, but could begin at 3000 Hz or 6000 Hz; Hearing loss spreads to adjacent frequencies as noise exposure continues

Student can look at data in their own database, viewing the 990990007 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review.

Low Frequency Hearing Loss, Rising Audiometric Configuration

Can be caused by ear disease or middle ear dysfunction (Conductive issues - Otoscopic Exam); Technician should never establish or re-establish baseline until conductive issues are resolved

Student can look at data in their own database, viewing the 990990009 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review.

Low Frequency Hearing Loss, Rising Audiometric Configuration

Can occur as a result of background noise; 500 Hz threshold will often be elevated in these instances. Student can look at data in their own database, viewing the 990990008 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review.

Audiogram Considerations, Problem Audiograms - Cross Over

- Can occur when a ≥ 40 dB difference in thresholds exists between ears at a given frequency
- Sound energy from the test ear stimulates the non-test ear causing non-test ear to respond to the stimulus
- DOEHRs-HC performs an automatic re-check when threshold difference is ≥ 40 dB between ears at a given frequency
- If difference confirmed, DOEHRs-HC will generate a referral

Technician should never establish or re-establish baseline at their level

Audiogram Considerations, Problem Audiograms - Masking

- Performed during diagnostic hearing evaluation when cross-over is suspected
- Masking noise presented in the non-test ear while thresholds are being recorded for test ear
- Prevents the non-test ear from detecting the sound presented to the test ear
- DOEHRs-HC will generate a referral if masking is required
- Follow PS guidance on automated referrals for masking

Audiometric Configurations, Unilateral Hearing Loss

Hearing loss in one ear; other ear is normal; May be associated with unilateral noise exposure, sudden SNHL, or acoustic neuroma/vestibular schwannoma; Always considered a problem audiogram; audiogram should always be reviewed by Professional Supervisor; Technician should never establish or re-establish baseline with a masking requirement without approval of an audiologist.

Student can look at data in their own database, viewing the 990990010 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review. Created an Asymmetric Hearing Loss and Masking Required Referral.

Audiometric Configurations, Asymmetrical Hearing Loss

Hearing loss in both ears, thresholds in one ear are better than thresholds in the opposite ear; May be associated with unilateral noise exposure, sudden SNHL, or acoustic neuroma/vestibular schwannoma; Always considered a problem audiogram; Audiogram should always be reviewed by Professional Supervisor; Technician should never establish or re-establish baseline with a masking requirement without approval of an audiologist.

Student can look at data in their own database, viewing the 990990011 2215/2216 dated December 2019 (same date to show any referral criteria differences between test types) in the edit audiogram window to observe/review. 2215 - Created an Asymmetric Hearing Loss and High Frequency Hearing Loss Referral; 2216 - Created an Asymmetric Hearing Loss Referral

Audiogram Considerations, Problem Audiograms, Functional and/or Non-Organic HL

- Lack of crossover
- Flat audiogram
- Inconsistent responses
- Behavior
- Known motivation
- 50 dB or above

Crossover occurs around 40-45 dB; lack of cross over patient may have a much higher variance between ears

Audiometric Configurations, Flat Hearing Loss

Thresholds are approximately the same across the test frequencies – Mixed hearing loss; Common audiometric configuration of non-organic hearing loss/malingering; Have it reviewed by PS

Student can look at data in their own database, viewing the 990990019 2216/2215 dated December 2019 in the edit audiogram window to observe/review.

Audiometric Configurations, Asymmetric Flat Hearing Loss

Thresholds are approximately the same across the test frequencies – one ear (lack of crossover); Common audiometric configuration of non-organic hearing loss/malingering; Have it reviewed by PS; Technician should never establish or re-establish baseline at their level

Student can look at data in their own database, viewing the 990990013 2216s dated December 2019 in the edit audiogram window to observe/review. 2215 (Created High Frequency Hearing Loss, Low Frequency Hearing Loss, Asymmetric Loss, Masking Required Referral) and 2216 (Created an Asymmetric Loss, Masking Required Referral)

Sudden Hearing Loss, Always a Medical Emergency

- Get patient evaluated the same day
- If sensorineural, time to treatment is critical

Student can look at data in their own database, viewing the 990990026 2216 dated December 2019 in the edit audiogram window to observe/review.

Audiogram Referrals

- DOEHRs-HC referral flags - some are listed below
 - Positive STS - conduct Follow-up testing; Asymmetrical hearing loss; Low and/or high frequency hearing loss; Masking; Tinnitus; Fitness and Risk Evaluation
- Review the audiometric history to determine what happened and what needs to occur
- DOEHRs-HC may not create a referral but further examinations/care may need to occur
- Conductive issues suspected - do an otoscopic examination and/or refer for evaluation/care
 - If Follow-up testing is required, delay until issue resolves

Profile Change

- Pertains to military personnel only
- Profile change does not auto generate a referral
 - Service Specific
- Review the audiometric history
 - Determine if patient was previously evaluated; Refer to an audiologist if needed

Physical Profile Serial System, PULHES

- P = Physical capacity/stamina
- U = Upper body
- L = Lower body
- H = Hearing and ears
 - Focused on hearing and any diseases of the ear
- E = Eyes
- S = Stability/Psychiatric

PULHES Numerical Grade System

- 1 = a high level of medical fitness; fully qualified
- 2 = possesses some medical condition or physical defect that may require some activity limitations
- 3 = one or more medical conditions or physical defects that may require significant limitations; may still be able to stay in the military with limited duties
- 4 = one or more medical conditions or physical defects of such severity that the performance of military duty must be drastically limited; disqualifier for continued military service

PULHES “H”

- DOEHRS-HC test is not a diagnostic hearing test, a profile should not be created from this test alone
- DOEHRS-HC tests indicate projected profiles
- If a DOEHRS-HC test projects a profile of $\geq H2$, a referral for a diagnostic hearing evaluation is necessary (check audiometric history)
- Hearing profiles will be documented IAW Service specific guidelines

Summary

- Graphic/Serial audiogram
- Patient demographic
- Audiograms types
 - DD Form 2215, DD Form 2216 (Follow-up testing), Non-Hearing Conservation test
- Audiometric configurations
- Problem Audiograms
- Baseline re-establishment

Counseling Strategies

Learning Objectives

- 3.1.1 Describe the importance of counseling
- 3.1.2 Counsel a patient on their audiogram using common terms
- 3.1.3 Describe the required follow-up steps for an initial STS identification and/or referrals
- 3.1.4 Outline techniques that will allow for group explanation of test results that will not violate HIPAA requirements
- 3.1.5 Demonstration

Health Insurance Portability and Accountability Act (HIPAA)

- Impacts all patient care
- Protects individual's rights to privacy and confidentiality
- Assures the security of electronic transfer of personal information
- Applies in hearing conservation
 - Employers, i.e. DoD, who paid for the exam and are conducting the exam to be compliant with Federal regulations may have access to the record without consent of the employee; Information reported must be limited to information that is required by the agency

Ensure discussions regarding individual PHI are not overheard; do not conduct discussions in open areas: elevators, cafeterias, etc.; Protect computer screen from outsider's view, logout when departing work station

HIPAA Review

- Develop group counseling strategies that conform to HIPAA
 - Counseling sessions in a multi-test station clinic; High volume clinics necessitate explanation of test results in groups; Group counseling sessions create a potential for HIPAA violations
- Consults
- STS notifications to patient's chain of command

HIPAA creates ramifications for multiple clinic actions

Counseling

- Effective counseling and education is one of the most effective ways to get noise exposed personnel into becoming more involved in their role as a member of the HCP team
- Give patient their audiogram
 - Is there a change in hearing? Yes/No; what changes occurred? Positive/Negative; is hearing loss present? Yes/No
- Discuss the dangers of hazardous noise and that noise induced hearing loss is preventable
- Review the importance of periodic audiograms and/or schedule follow-up testing/evaluation

Audiogram

- Simplify terms for patients - avoid jargon
 - Use pitch in place of frequency (Women/Children voice - high frequency; Men voice - low frequency); Use loudness in place of intensity
- Describe test results, rather than thresholds
 - Explain frequencies (i.e., pitches) in terms of piano keys; Compare thresholds (i.e., test results) the lower the number, the better you can hear
- Employ similes and/or metaphors

Review major components: left/right ear, frequency, intensity; Use common language as patients do not have context for the audiogram; Compare common knowledge to help the patient understand the number values

Audiogram

- Acceptable hearing level thresholds
- Normal hearing test results range from 10 to 25 dB
- Normal (expected) test-retest variability 5-10 dB
- Comparison to reference/baseline
 - Change in hearing?; Definition of a significant or standard threshold shift; Is there a change in hearing (STS); Definition of an early warning shift; Is there an early warning shift (EWS)
- Follow-up testing/evaluation is required to determine if the change is permanent

Group Counseling Strategy

- Have visual aids to help explain results
- Review and prepare audiograms
- Print and review test results prior to assembling patients for counseling
- Identify individuals with problem audiograms that will require follow-up or referral
 - You will need to meet individually with them later; Be careful not to “call them out” in front of peers or other patients
- Provide verbal guidance that results are confidential, patients must view only their results

Be effective and efficient; group patients so all can see/hear the examiner; Ask those that have questions to remain, review audiogram/question individually; let those that do not have issues go, letting them know they need to return in a year for their next audiogram.

- Audiograms should be highlighted in advance for those requiring additional individualized counseling.
- Distribute tests
 - Caution patients to respect others’ privacy; Protect medical information; Provide verbal guidance that results are confidential, patients must view only their results
- Verify demographic information (visual aid)
 - Ask patients to review blocks 2-14 for accuracy
- Mark top of any audiograms that requires data to be edited or fixed

Group Counseling Strategy, Serial Audiogram Orientation

- Frequencies tested for left/right ears
- Current test results location
- Intensity explanation
 - Lower numbers = better hearing; Normal hearing parameters
- Baseline results explanation
- Normal test-retest differences
 - Definition of a significant threshold shift; Is there a change in hearing (STS); Is there an early warning shift (EWS)
- Retain:
 - Those who have questions; Those requiring further evaluation (highlighted forms)
- Individually review abnormal results with patient
 - Maintain privacy; Provide instructions for follow-up procedures; Obtain patient signature for test results (as applicable)
- Provide referral information (as applicable)

Ask those that have questions to remain, review audiogram/question individually; let those that do not have issues go, letting them know they need to return in a year for their next audiogram. Audiograms should be highlighted in advance for those requiring additional individualized counseling.

Retest and/or Referrals

- DD 2215/2216 or NHC
 - Follow Professional Supervisor guidance on referrals to audiologist or physician for further evaluation; Instruct patient to be 14 hours noise free prior to any diagnostic testing

Ensure patient understands where to report for f/u test or evaluation - audiologist, hearing technician or medical physician.

- DD 2216 positive STS
 - Follow Professional Supervisor guidance on retesting and referrals for additional evaluation; Potential conductive issues, i.e. cerumen impaction, should be addressed and resolved prior to retest; Complete follow-up testing as soon as possible; All positive STS follow-up tests require the patient to be at least 14 hours noise free
- DD 2216 negative STS
 - Review audiometric history; Retest immediately if needed

Positive STS follow-up time frames: all civilians and USAF regular = 30 days; USAF reserve/NG = 60 days; USA, USN, USMC, USCG military 90 days. This is a brief overview of what the technician needs to tell the patient about follow-up requirements: Ensure patient understands where to report for f/u test or evaluation - audiologist, hearing technician or medical physician. Negative STS normally occur the first audiogram after an invalid reference audiogram was established, do not retest if previous reference was established by an audiologist and/or pay attention to headphone placement, positive STS on one ear, negative STS on the other.

Group Counseling Demonstration

- Group counseling 8 patients
 - 6 patients do not have an STS or audiometric changes; 1 patient has a negative STS; 1 patient has a positive STS
- Conduct an efficient and effective group counseling session
 - All patients have a basic understanding of test results; HIPAA is maintained; Patients with STS receive correct follow-up testing and/or additional guidance

Have all patients review demographic data, blocks 2 through 14; Then review block 15, the lower the numbers the better the hearing: Yellow = current audiogram; Blue = reference audiogram; Dark Green = differences between current and reference audiogram (STS); Light Green = differences between current and reference audiogram (EWS); Purple = remarks; Remarks on the 2216 are specific to the latest test on the 2216; Release all those with no issues, state their need to return in 1 year and continue to wear HPDs when exposed to hazardous noise; Technicians need to pay attention to conductive, sensorineural, mixed hearing loss and patients that are not being cooperative.

Note: any changes required need to occur in the edit audiogram window

Group Counseling Demonstration Role Play

Negative STS - Airman initial annual test after reference was established; results meant to provide an example of a patient who requires individual counseling for follow-up requirements of a negative STS; good policy to review audiometric history

Student can look at data in their own database, viewing the 990990001 annual, follow up 1 and re-established baseline dated December 2019 in the print window to observe/review

Patient history - enjoys going to the range to fire weapons, left handed shooter; results meant to provide an example of a patient who requires individual counseling for follow-up requirements of a positive STS; ensure patient signs 2216

Student can look at data in their own database, viewing the 990990021 annual test dated December 2019 in the print window to observe/review

Group Counseling Overview

- Have patients review personal data for errors
- Release those with no issues
 - Return for testing in 1 year; Fit, counsel, continue wearing HPDs in hazardous noise
- Retain those requiring further testing/evaluation or have questions
 - Individually review abnormal results with patient; Retest those requiring further technician audio testing; Maintain privacy; provide instructions for follow-up procedures/obtain patient signature (as applicable)

Role Play

Patient history: USAF civilian, Sheet Metal Mechanic

Provide normal parameters of hearing; explanation of an STS and other data that may be included in remarks section; Remarks on the 2216 are specific to the latest test on the 2216; Student can look at data in their own database, viewing the 990990020 DD Form 2216 test dated December 2019 in the print window to observe/review

Student can look at data in their own database, viewing the 990990022 annual test dated December 2019 in the print window to observe/review

Student can look at data in their own database, viewing the 990990023 annual test dated December 2019 in the print window to observe/review

Counseling Tips

- If validity of test results is in question and re-instructing patient is not successful, refer patient to Professional Supervisor
- Ensure patient privacy
- Fit and counsel patients on the use of hearing protection whether or not hearing has changed
- Counseling session equals patient education
- Do not diagnose hearing loss
 - Pure tone air conduction is not a diagnostic hearing evaluation; Test cannot identify the type of hearing loss or the possible presence of a medical pathology
- Results of the diagnostic hearing evaluation will determine type of hearing loss and whether a referral to a medical doctor is necessary

Summary

- Counseling
- Audiogram forms/fields
- Counsel a patient on their audiogram
- Describe the required follow-up steps for a STS and/or referrals
- Group explanation of test results
- Demonstration and role-play

Recordkeeping

Learning Objectives

- 3.2.1 Describe characteristics of good records
- 3.2.2 List types of hearing conservation records used in the hearing conservation program
- 3.2.3 Understand record regulatory requirements and how long to retain them
- 3.2.4 Understand how the hearing conservation program is evaluated

Characteristics of Good Records

- Accurate
- Thorough
- Organized
- Legible
- Consistent with OSHA and DoD policies

Hearing-related DOD forms are considered medical-legal documents; Invalid data entry may result in the unjust awarding of compensation claims

HIPAA

- Protect hearing conservation records IAW with HIPAA requirements and local procedures
- Many hearing conservation records contain personal identifiable information (PII) and protected health information (PHI)
 - DOEHRS-HC and DOEHRS-HC DR; DD 2215, DD 2216 and NHC audiograms; Patient demographic sheets

Health information is frequently used by multiple agents in a single episode - includes hearing loss

Types of Hearing Conservation Records

- Audiometric records
- Technician certification/competency
- Rosters of noise exposed personnel
- Medical records
- OSHA recordable hearing loss
- Services accident reporting systems
- Training and education
- Program evaluation

Noise Survey Data

- DD Form 2214 - completed by IH or BEE
- Sound level surveys are electronically maintained in DOEHRS-IH
- Noise survey data is kept for the duration of an individual's employment, plus 30 years
 - OSHA requirement 2 years
- Audio testing booth surveys
 - Records maintained locally - 5 years

- Other Service specific requirements may vary

Ensure booth surveys are retained by HCP for 5 years; Shipboard audio booths require 2 sound surveys, underway and pier side; Mobile vehicle audio test booths require a sound survey at each site location when moved prior to any patient testing

BEE = Bio-Environmental Engineer

Calibration Data

- Electroacoustic calibrations - required annually
- Exhaustive calibration
 - OSHA - required every 2 years; DoD/NIOSH - required annually; Records maintained locally - 5 years
- Daily biologic calibration check- DD Form 2217
 - Records maintained locally - 5 years; Export as a PDF at the beginning of each month for the preceding month
- Document periods of non-use and failure actions

DOD exhaustive calibrations are maintained electronically for the life of the audiometer; Records may be maintained either as paper or electronic files; Daily calibrations are maintained for all audiometers: manual and microprocessors

Audiograms

- Maintained in the medical record
- Upload/Attach in patient electronic health record (EHR)
 - DD Form 2215; DD Form 2216; Non-hearing conservation test; Diagnostic Evaluations
- DOEHRs records can be exported as a PDF

DD Form 2215 - Reference

- DD Form 2215
 - Require 14 hours noise free; No ENT problems; Identifies any referral criteria; Types (*overrides preceding references) (Prior to initial duty in hazardous noise areas; Following exposure in noise duties; *Re-established after follow-up program; *Change in service component)

Prior to initial duty - identifies pre-existing hearing loss. Following exposure in noise duties - lost medical records, no reference in the DR. Re-established after follow-up program - listener had an STS confirmed with follow-up testing. Change in service component - listener change in DOD service or service component or break in service or from the HCP. ENT – No pain, pressure or fullness, sinus problems, ear infections... (Conductive issues)

DD Form 2216

- Require a reference audiogram for comparison
- Identifies STS/referral criteria
- DD 2216 type in HCP(*STS needs to be present on preceding test to complete, +STS requires 14 hours noise free)

- Annual, 90 Day, Other, Pre/Post-Deployment, Termination, *Follow-Up 1 (2nd test on the 2216), *Follow-Up 2 (3rd Test on the 2216)
- DD 2216 not in the HCP
 - Pre/Post-Deployment, Termination

All test compared to the reference; identifies STS and other referral criteria; Initial audiogram on 2216 test does not have a noise free requirement. Follow-up testing: Positive STS requires 14 hour noise-free; Negative STS retest immediately; Positive STS/Early Warning Indicators require patient signature. 2nd and 3rd test are only done on the DD Form 2216 if there is a positive or negative shift on the preceding test within the series; only positive STS requires 14 noise free hours

Non-Hearing Conservation

- Military personnel not in the HCP
- DoD employees not in the HCP
- Pre-employment physicals
- Non-DoD employees or not associated with DoD

Technician Competency

- Technicians must attend a CAOHC approved training or military equivalent training every 5 years
 - Training inputted into technicians electronic training record; Records maintained locally - 5 years
- DoD technicians receive a DoD-specific certification number in order to create a DOEHRs-HC account
- Only appropriately certified technicians can perform OHC duties
- Services may require evaluations of OHC technicians skills/knowledge to maintain certification

USN requires annual OHC evaluations to maintain audio certification; certification posted at test location

SF 600 Chronological Record of Medical Care

- Capture hearing conservation encounter in full
- Customized SOAP note
- Documentation in electronic health record IAW DoD 6055.12
- Standardized MHS procedure and diagnosis codes

Data Entry (Site Specific)

- Utilize MEPRS code FBNx to capture HCP workload
- Diagnosis Codes Examples: DOD0214 (Reference), DOD0215 (Annual), DOD0216 (Termination), Z56.82 (Pre/Post Deployment), Z001.10 (Normal) or Z01.118 (Abnormal)
- Procedure Code - 0208T use Supervising Provider and include statement referring to audiometric test results and SF 600
- Disposition - E&M Code 99499 Unlisted E&M
 - Technicians = non-count; Providers = count

OSHA Recordable Hearing Loss

- Permanent STS (PTS) shall be recorded as an illness/injury if the hearing thresholds meet these criteria:
 - An STS occurs (an average 10 dB or greater threshold decrease at 2, 3, 4 kHz) in either ear from the applicable reference; Hearing thresholds for the current hearing test average 25 dB or greater at 2, 3, 4 kHz from audiometric zero for the shifted ear; Determined work-related by the Professional Supervisor (audiologist/physician)

IAW DODI 6055.07, DODI 6055.12 and Service-level instructions; Title 29 CFR Part 1904.10; No age corrections allowed per DoDI 6055.12; Age correction allowed by OSHA; Normally the professional supervisors responsibility

Service Level Reporting of OSHA Illness or Injury (Site Specific)

- Air Force Safety Automated System (AFSAS)
- Navy/USMC - Web-Enabled Safety System (WESS)
- Army - report it
- OSHA recordkeeping forms
 - OSHA Form 300 - log of work related injuries and illnesses; OSHA Form 300A - summary of work related injuries and illnesses (required annually); OSHA Form 301 - injury and illness incident report (individual report)

USMC falls under USN; Normally the professional supervisor's responsibility

Management of OSHA Recordable Loss

- Notify worker within 21 days, supervisor within 10 additional days
 - Both permanent STS and OSHA recordable cases
- Must be reported officially in the Service-level safety within 7 calendar days of disposition as OSHA recordable
- Completed at first occurrence and every subsequent occurrence
- Service specific forms and process may vary for completing within the OSHA required timeline

Patient signature required for STS/EWS notification on the DD Form 2216

Rosters of Noise-Exposed Personnel

- Noise-exposed personnel must be identified by name
- Rosters will be maintained by IH, the professional supervisor, and workplace supervisor
- Will be updated at a minimum every 6 months
- Maintained in DOEHS-IH and/or other Service-level databases
 - Air Force: Aeromedical Services Information Management System (ASIMS); Army: MEDPROs; USN/USMC: MRRS, ESAMs

Hearing Protection

- DOEHS HC (captured in the electronic record)
 - DD Form 2215; DD Form 2216
- SF 600

Training and Education

- DOEHRS-HC (captured electronically)
 - DD Form 2215; DD Form 2216; Reports/Lists
- SF 600
- AF Form 55, Record of Training or equivalent

Additional Forms Software Applications

- Fitness for Duty, Fitness and Risk Evaluations
- Medical Readiness
 - USA – MEDPROS; USAF – ASIMS; USN/USMC - ESAMS/MRRS
- Air Force HCP Forms
 - 1753 (Hearing Conservation Examination); 1754 (Job Capability and Safety Analysis); HCDC (Hearing Conservation Diagnostic Center) Referral and Disposition Form

AF 1753: completed by the PS for new workers and on confirmed STS cases; AF 1754: completed by the PS and OHC team for Fitness and Risk Evaluations; AF HCDC: completed by public health and sent to audiologist for disposition of in-person patient care or case review

Program Evaluation

- Specific to location/unit
- Statistics determine hearing conservation program effectiveness
 - High compliance - everyone in the hearing conservation program is tested annually; Low rate of significant or standard threshold shifts (STS)

Recordkeeping

- Booth certification
- Audiometer electro-acoustic calibration certificate
- Technician certification
- DD Form 2217
- DD Form 2215
- DD Form 2216
- Non-hearing conservation test

Summary

- Characteristics of good records
- Types of hearing conservation records
 - Noise exposure measurements; Audiometric records; Technician competency; Medical records; OSHA records; Rosters; Hearing protection
- Program Evaluation
 - Training and education; DoD and Service-specific requirements

Regulations

Learning Objectives

3.3.1 Recognize the importance and application of hearing conservation program regulatory requirements

- Federal – OSHA/NIOSH
- State
- Department of Defense
- Service Specific
- Local level - including SOPs

Standards, Regulations, and Law

- Standard - usually a codified set of rules or guidelines developed by a consensus group like ANSI, ISO, or other government agencies
- Regulation - a rule order prescribed by an authority (the government, for example)
 - usually a rule or set of rules that is somewhat more formal than a standard
- Law - Prescribed by authorities and are enacted by elected representatives, i.e., congress

Purpose of Regulations

- Regulations are key to obtaining resources
 - Personnel; Equipment; Supplies

History of Hearing Conservation Regulations

- 1970 - Congress enacts the Occupational Safety and Health Act
 - Established Occupational Safety and Health Administration (OSHA - regulatory agency);
Established the National Institute for Occupational Safety and Health (NIOSH - best practices, education and research)

The Air Force published the first governmental noise standard AFR 160-3 in 1948 but did not issue specified maximum noise levels until 1955.

The first civilian noise standard was issued by the U.S. Department of Labor in 1969 under the 1936 authority of the Walsh-Healey Act. By passing the Walsh-Healy Noise Standard Act, Congress gave the Department of Labor authority to regulate companies with contracts with the Federal Government. In 1970, Congress enacted the Occupational Safety and Health Act. The act created OSHA in the Department of Labor as well as the National Institute for Occupational Safety and Health (NIOSH) in the U.S. Department of Health, Education, and Welfare; currently located at the Department of Health and Human Services. NIOSH currently resides within the Department of Health and Human Services. When it comes to federal regulations, OSHA is generally cited as the basis for all, but federal agencies such as the Mine Safety and Health Administration, the U.S. Department of Defense, and the Federal Railroad Administration also have governing mandates.

- 1980 - Executive Order 12196
 - Requires each Executive Agency furnish to employees places/conditions of employment that are free from recognized hazards that are causing or likely to cause death/serious physical harm, establish and operate a formal occupational safety and health program; designate an agency official to manage that program; comply with OSHA standards except where an alternative agency standard may be approved by the Secretary of Labor; Applies to all executive agencies except military personnel and unique military equipment

Executive Order 12196 signed in 1980 which required all executive agencies to comply with OSHA standards

- 1981 - Title 29 CFR 1910.95 occupational noise exposure and hearing conservation amendment becomes law
 - Requires Hearing Conservation Programs to be initiated at 85 dBA TWA (50% dose/action level); Prescribes a permissible exposure limit (PEL) of 90 dBA TWA; Prescribes a 5 dB exchange rate; Outlines elements of a hearing conservation program; Enforcement started in 1983

Agencies that Regulate Occupational Noise Exposure

- Occupational Safety and Health Administration (OSHA)
 - Regulates most US industry; Not science based
- Noise exposure standard (29 CFR 1910.95) does not apply to workers in the mining, construction, transportation, or entertainment sectors
 - Mine Safety and Health Administration (MSHA); Federal Railroad Administration (FRA); Department of Defense (DoD)

Mining, construction, transportation, or entertainment sectors have their own noise exposure standards; Mining is separate from other industries

National Institute for Occupational Safety and Health (NIOSH)

- Created by the OSHA Act of 1970
- Government agency, part of HHS Centers for Disease Control and Prevention (CDC)
- Responsible for conducting research and making recommendations for the prevention of work-related illnesses and injuries (best practices)
- Produces and distributes free documents, products, and services related to hearing conservation
- Evidence/Science based

Federal Regulations

- The Code of Federal Regulations (CFR) is an annual codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government
- Provide minimum standards
- May not reflect best practice, but an agreed upon standard across multiple agencies and special interest groups

State, Local, Service Specific Regulations

- Must at least meet the requirements of applicable federal standards
- May be more conservative/restrictive than federal standards
- Technicians must follow the most stringent standards

Department of Defense Regulations

- DODI 6055.12 - Applies to all military and military unique equipment
- Provides minimal requirements for all DoD organizations
- Allows Services to develop Service specific regulations

Service Specific Regulations

- AFI 48-127 - Occupational Noise and Hearing Conservation Program
- DA PAM 40-501 - Army Hearing Program
- MCO 6260.3 Series - Marine Corps Hearing Conservation Program
- OPNAVINST 5100.19 Series - Hearing Conservation (Afloat)
- OPNAVINST 5100.23 Series - Hearing Conservation (Shore)

Regulation/Best Practice

| Issue | 29 CFR 1910.95 OSHA | DoDI 6055.12 | NIOSH |
|----------------------------------|---|---|--|
| Action Level | 85 dBA TWA | 85 dBA TWA | Recommended exposure Limit (REL) = 85 dBA TWA |
| Permissible Exposure Limit | 90 dBA TWA | 85 dBA TWA | Recommended exposure Limit (REL) = 85 dBA TWA |
| Exchange Rate | 5 dB | 3 dB | 3 dB |
| Noise Control | Reduce to <90 dB(A) | Reduce to <85 dB(A) | Reduce to <85 dBA |
| Hearing Protective Devices (HPD) | Optional for ≥ 85 dB(A) required for ≥ 90 dB(A) | Required for ≥ 85 dB(A) and ≥ 140 dB(P). Must protect to 85 dB(A). | Required for ≥ 85 dB(A). Must protect to 85 dB(A). Dual protection recommended ≥ 100 dB(A) TWA |
| Audiometry Baseline | Required within 6 months (12 months if using mobile test service) | Complete as soon as possible after entering active duty, but prior to noise exposure. | Complete within 30 days of exposure |
| Damage Risk | 21 - 29% | 10 - 15% | 10 - 15% |

Display are some of the differences between OSHA, DOD, and what NIOSH recommends; although not all inclusive, some key differences are shown; Very important if taking the CAOHC exam

Action Level/Permissible Exposure Limit

- Action Level - NIOSH deems 85 dB(A) TWA to be the recommended exposure limit and does not recommend any permissible exposure above this level
- Permissible Exposure Limit - DoD does not refer to 85 dB(A) as the recommended exposure limit, but treats it as both the action level and permissible exposure limit

AL and PEL are very important for CAOHC exam

Exchange Rate/Noise Controls

- Exchange rate - OSHA is 5 dB, NIOSH and DoD is 3 dB
- Noise controls under OSHA must reduce sound levels to below 90 dBA; NIOSH and DoD both require noise controls to reduce exposure to below 85 dB(A)

5 dB exchange rate is made up, not created from scientific testing; Exchange rate very important for CAOHC exam

Hearing Protection Devices (HPDs)

- HPDs under OSHA must be available to employees who have exposures \geq 85 dB(A), use is not required until \geq 90 dB(A) unless pending a reference
- NIOSH and DoD require the use of HPDs for exposures \geq 85 dB(A)
- DoD requires HPDs when peak sound pressure levels \geq 140 dB(P)
- Engineering/Administrative controls
- NIOSH recommends double hearing protection when exposures \geq 100 dB(A)
- DoDI does not address double hearing protection and OSHA simply states that double hearing protection should be used in high noise environments
- Army, Navy, Air Force, and Marine Service Specific regulations do address more specific hearing protection requirements

Audiometry Baseline

- OSHA is required to be obtained within 6 months of exposure
 - Unless a mobile testing service is used, then the baseline needs to be obtained within one year of exposure
- OSHA HPD use is required at an 85 dB(A) TWA if the employee has not received a baseline audiogram
- NIOSH recommends completing the baseline within 30 days of exposure
- DoD requires the baseline to be obtained as soon as possible after entering active duty
 - Prior to any noise exposure; At the service members first duty assignment (accession points)
- DoD civilians require an audiometric baseline prior to exposure to hazardous noise

Damage Risk

- Level of acceptable risk or the proportion of the exposed population that could be allowed to become materially impaired
- Regulatory requirements are not 100% protective and that an estimated percent of the workforce will be materially impaired by following the applied regulation
- Note above % is very high, should be less than 5% if compliant

Regulations in Support of the Hearing Conservation Program

- Occupational Health - record keeping/reporting
- Safety - personal protective devices/exposure/site specific
- Environmental Health and/or Preventive Medicine - site specific environmental issues
- Industrial Hygiene - noise measurement

Multiple regulations may impact the hearing conservation program

OHC Responsibility

- Understand the regulations that apply to you, your patients and the hearing conservation program
- Always adhere to the most stringent standard
- Work closely with professionals
- Know where to access all applicable regulations
- Military OHCs should have a general working knowledge of all Service Specific hearing conservation program regulations

Summary

- Federal Regulations
 - OSHA; NIOSH
- State Regulations
- Department of Defense Regulations
- Service Specific
 - Regulations; Instructions/Technical manuals; Local level policies/SOPs

Hearing Program Team Roles

Learning Objectives

- 3.4.1 Identify and explain the roles of the key members of the Occupational Hearing Conservation (OHC) team

Team Members

- Noise professionals
 - Industrial Hygienist (IH); Bio-Environmental Engineers (BEE)
- Audiologist
- Occupational medicine physician
- Flight medicine physician
- Occupational health nurse
- Occupational hearing conservationist also known as hearing technician
- Leadership/Commanders
- Safety officer
- Workplace supervisor
- Employee
- Other personnel
 - Public Health; Professional Supervisor

Team members may include the following, depending on the installation and the Service; team work together to address different aspects of the HCP, in their individual roles and scope of practice

Industrial Hygienist

- Conduct noise surveys
 - Determine what type of work is performed by whom; Take sound level measurements of area & equipment; Take personal dosimetry when SLM measurements \geq 85 dBA
- Analyze all noise data
- Provide report to supervisor, Installation Safety Manager & Occupational Health
 - Sample results; Recommendations to the workplace supervisor regarding engineering and/or administrative controls; Noise hazard maps; Recommendations on hearing protection
- Provide by-name roster of noise exposed personnel to Hearing Program Manager and/or Public Health
 - provide copy to Installation Safety Manager and workplace supervisor
- Maintain information in DOEHS-IH by Similar Exposure Groups (SEG)

Audiologist

- Serve as the Professional Supervisor
- Ensure hearing protection is fitted to all noise-exposed personnel
- Ensure annual hearing health education is provided
- Ensure monitoring audiometry (including follow-ups) are performed
- Conduct diagnostic and fitness for duty evaluations
- Ensure personnel performing audiograms are certified and maintain related skills
- Report quality assurance and program effectiveness measures through command channels
- Report STS and OSHA recordable hearing loss data
- Conduct worksite/shop visits to ensure hearing readiness compliance

Occupational/Flight Medicine Physician

- Determine if workers possess the minimum physical abilities required to perform essential duties
- Conduct evaluations to detect signs and symptoms of noise-induced hearing loss at an early stage
- Initiate fitness and risk evaluations and make medical recommendations
- Determine if hearing shift is related to an ear, nose, throat condition
- Determine appropriate additional referral criteria

Occupational Health Nurse

- Client history/perform audiometric monitoring
- Collaborate with industrial hygiene and safety
- Enroll identified employees into the HCP
- Provide health education - individual/group
- Service/Site specific
 - Maintain log of OSHA recordable hearing loss; Develop and maintain OH SOP for the hearing conservation program; Conduct worksite/shop visits to ensure compliance

Occupational Hearing Conservationist (OHC)

- Maintain current DoD hearing technician certification
- Document/Coding in the electronic health record (EHR)
- Recordkeeping
- Equipment preparation
- Equipment maintenance
- Stocking and fitting of hearing protective devices

OHC is the backbone of the HCP - you test 100% of the patient pool, educate/motivate; Recordkeeping - shop rosters, OSHA recordable, fitness & risk, STS/PTS, electroacoustic and daily calibrations, booth certifications; Equipment preparation - daily functional, biologic checks; Equipment maintenance - annual calibration, test booth maintenance

- Schedule hearing services (initial/follow-up)
- Patient histories
- Conduct audiometry
 - DOEHS data entry; Audiogram test selection
- Explanation of test results, counseling
- Process referrals
- Provide individual and group hearing health education

Schedule hearing services - initial, follow-up testing, appointments; Patient histories - new/updates; Conduct audiometry - DD Form 2215/2216 and NHC (audiogram for personnel not in the HCP or pre-hires)

Commanders/Leadership

- Ensure a comprehensive HCP is in place and resourced
- Ensure workplaces and workplace supervisors comply with all HCP, DoD, and/or OSHA requirements
- Ensure HCP personnel meet training requirements
- Participate in the review of workplace hazards

Safety Officer

- Ensure areas are posted with noise hazardous signs and equipment is posted with decals
- Conducts spot inspections for HPDs availability and utilization
- Chairs installation safety meetings
 - Accompanies HCP personnel on shop visits, contributes to fitness & risk evaluations
- Maintain appropriate records
 - OSHA recordable hearing losses; Maintain rosters

Workplace Supervisor

- Ensure personnel comply with all Service-level HCP, DoD, and/or OSHA requirements
- Use recommendations for noise controls as the primary means of eliminating exposure
- Mark hazardous noise areas and equipment
 - Maintain a supply of HPDs; Ensure personnel carry HPDs and wear them properly in hazardous noise areas
- Update and maintain current rosters of personnel exposed to hazardous noise or in the HCP
- Notify IH/BEE/PH personnel if workplace equipment, practices or procedures involving change to potentially hazardous noise
- Ensure workers complete audiograms
- Conduct/Document initial and annual workplace specific HC training
- Notify each employee exposed at or above 8-hour TWA of 85 dBA

IH = Industrial Hygiene; BEE = Bio-Environmental Engineer; PH = Public Health

Employee/Patient

- Comply with all hazardous noise control measures
- Maintain hearing protection devices (HPDs)
- Always carry HPDs when working
- Wear HPDs upon entering hazardous noise areas
- Bring HPDs to the audiometric testing appointment
- Attend all required audiometric evaluations
- Report to supervisor any new or changes in operating procedures that affect workplace noise

Hazardous noise control both at work and/or off-duty (non-occupational); Personnel due to environment hazards or ototoxic drugs may be in the HCP and not exposed to hazardous noise

Professional Supervisor

- Defined as an audiologist or an appropriately trained physician
- Establishment and supervision of an audiometric monitoring program
- Management of an audiometric database
 - Review of problem audiograms; Determination of work-relatedness for hearing shifts and/or OSHA recordable hearing loss
- Follow up of work-related auditory disorders
- Perform program evaluation to monitor effectiveness

Summary

- Noise professionals
- Audiologist
- Occupational and flight medicine physician
- Occupational health nurse, occupational hearing conservationist
- Leadership/commanders, safety officer, workplace supervisor, employee
- Other personnel

Audiometric Testing Practicum 1

Learning Objectives

- 3.5.1 Perform a successful functional check and a successful calibration, troubleshoot appropriately
- 3.5.2 Input patient data correctly while testing patient
- 3.5.3 Select correct test type/reason
- 3.5.4 Transfer/Retrieve audiograms
- 3.5.5 Counsel/Educate patients properly
- 3.5.6 Know when to perform otoscopic examination and fit HPD
- 3.5.7 Retest or process referrals correctly

Pretest Processes

- Perform a successful functional check
- Perform a successful calibration
- When done, bring up the DD Form 2217 for the week

Manual Testing

Set NT (not tested) for the correct ear/frequencies that need to be manually tested; once the patient responds do not adjust decibels level, vary stimuli presentations, once the patient responds twice in an ascending mode thresholds will lock in, press OK, "M" identifier will be present in the CCA-200 window.

Patient #1, Testing Self

- Using the BAS to simulate a patient
 - Start test
- Inputting your data as a patient (Run Test Window)
 - All personnel are in the Hearing Conservation Program; Select the correct test type/reason based on your own audiograms
- Transfer data from the run test window to the CCA-200
- Manually test 4000 Hz and 6000 Hz for the right ear

Headphones on the BAS, response switch removed to activate the BAS

- Ensure "M" identifier is in the CCA-200 window for 4000 Hz and 6000 Hz, right ear
- Retrieve audiogram from the CAA-200 window to the Run Test window
 - Pay attention to any pop-up windows that occur
- Print audiogram (Patient signature if an STS and/or an EWS is present)
- Counsel, educate appropriately
 - Otosopic exam/fit HPDs as needed
- Return for follow-up testing or refer appropriately

Note the manual tested thresholds in the CCA-200 software does not transfer over to the Run Test window. Test selections should have been either a 2215 or a 2216

Patient #2, Testing Jamal Deloach

- Using the BAS to simulate a patient
 - Start test
- Input Jamal Deloach (Run Test Window)
 - Ensure all demographic data is correct; Select the correct test type/reason based on audiometric history, demographic data form
- Transfer data from the run test window to the CCA-200

Headphones on the BAS, response switch removed to activate the BAS

Demographic Data Form is on the next page

- Retrieve audiogram from the CAA-200 window to the Run Test window
 - Pay attention to any pop-up windows that occur
- Print audiogram (Patient signature if an STS and/or an EWS is present)
- Counsel, educate appropriately
 - Otoscopic exam/fit HPDs as needed
- Return for follow-up testing or refer appropriately
- SSN not on the demographic sheet
- UIC not present in local database
- Added UIC W1S907 from the Run Test window

Review Blocks 2-14 demographic data; STS on both ears; Normal hearing is -10 – 25 dB, the lower the numbers the better, you have a change in hearing, need to return for follow-up testing, 14 hours noise free, when can they return...

DOEHRS-HC Demographic Data Form

Booth # _____

| | | | |
|--|--|---|--|
| IDN (SSN and DODIDN): | | | |
| Last Name: Deloach | | First Name: JAMAL | |
| Gender: <input checked="" type="radio"/> Male <input type="radio"/> Female | | MI: W | |
| Date of Birth (mm/dd/yr): 11/26/75 | | | |
| Component (select one): DOD <input type="radio"/> USCG <input type="radio"/> <input checked="" type="radio"/> USA <input type="radio"/> USAF <input type="radio"/> USMC <input type="radio"/> USN <input type="radio"/> Other (explain): | | | |
| Service Component (select one): Contractor <input type="radio"/> Federal Employee <input type="radio"/> Foreign National <input type="radio"/> <input checked="" type="radio"/> Regular <input type="radio"/> Reserve <input type="radio"/> NG | | | |
| Rank/Grade: E7 | | AFSC/MOS/NOBC/Rate & NEC/SDOC: 11H | |
| UIC/WIC/WPID: | | Unit: 1ST BN 393 REGT | |
| | | Major Command: FORSCOM | |
| Work Location or Code: Fort Hood TX | | Phone Number (include area code): 254-555-5555 | |
| Are you routinely exposed to hazardous noise or in the hearing conservation program? <input type="radio"/> Y <input checked="" type="radio"/> N | | | |
| Purpose of visit (circle one): Annual <input type="radio"/> Termination <input type="radio"/> Pre-employment <input type="radio"/> <input checked="" type="radio"/> Follow-up Retirement/Separation <input type="radio"/> Non-hearing Conservation <input type="radio"/> Pre-deployment Reference/Baseline <input type="radio"/> Other (explain): <input type="radio"/> Post-deployment Accession/Commissioning <input type="radio"/> | | | |
| Do you have any Ear, Nose or Throat problems today that affect your hearing? <input type="radio"/> Y <input checked="" type="radio"/> N | | | |
| How many hours have you been away from noise prior to this test? 6 | | | |
| What specific type of Hearing Protection Devices (earpro) do you wear? Foamies | | | |
| Do you wear double hearing protection? <input type="radio"/> Y <input checked="" type="radio"/> N | | | |
| If so, what additional Hearing Protection Devices (HPD)s do you wear? | | | |
| Do you wear glasses or goggles while wearing HPDs? Always <input type="radio"/> Seldom <input type="radio"/> <input checked="" type="radio"/> N/A | | | |
| During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) <input checked="" type="radio"/> Not bothered at all <input type="radio"/> Bothered a little <input type="radio"/> Bothered a lot | | | |
| Were you fit with HPDs today? <input type="radio"/> Y <input checked="" type="radio"/> N | | Were you previously fitted with HPDs? <input checked="" type="radio"/> Y <input type="radio"/> N | |
| Do you currently have your HPDs with you? <input checked="" type="radio"/> Y <input type="radio"/> N | | | |
| Was hearing health education provided today? <input type="radio"/> Y <input checked="" type="radio"/> N | | | |

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

DISCLOSURE: Disclosure of the SSN is voluntary; however, failure to provide the requested information may result in inaccurate documentation

For Official Use Only

Patient #3, Testing Krista Larsen

- Using the BAS to simulate a patient
 - Start test
- Input 990990005, Krista Larsen (Run Test Window)
 - Ensure all demographic data is correct; Select the correct test type/reason based on audiometric history, demographic data form; Manually test 3000 Hz and 4000 Hz for the left ear
- Transfer data from the run test window to the CCA-200

Headphones on the BAS, response switch removed to activate the BAS

Demographic Data Form is on the next page

- Ensure "M" identifier is in the CCA-200 window for 3000 Hz and 4000 Hz, left ear
- Retrieve audiogram from the CAA-200 window to the Run Test window
 - Pay attention to any pop-up windows that occur
- Print audiogram
- Counsel, educate appropriately
 - Otoscopic exam/fit HPDs
- Return or refer appropriately

DOEHRS-HC Demographic Data Form

Booth # _____

IDN (SSN and DODIDN): 990990005

Last Name: Larsen First Name: Krista MI:

Gender: Male Female Date of Birth (mm/dd/yr): 7/10/83

Component (select one): DOD USCG USA USAF USMC USN Other (explain):

Service Component (select one): Contractor Federal Employee Foreign National Regular Reserve NG

Rank/Grade: E6 AFSC/MOS/NOBC/Rate & NEC/SDOC: IN4X1 Unit: 106th Wing A5

UIC/WIC/WPID: D006-FAAG-100A Branch/Career Field/Activity: Major Command: AETC

Work Location or Code: Andrews Phone Number (include area code): 501-555-5555

Are you routinely exposed to hazardous noise or in the hearing conservation program? Y N

Purpose of visit (circle one): Annual Termination Pre-employment Follow-up Retirement/Separation Non-hearing Conservation Pre-deployment Reference/Baseline Other (explain): Post-deployment Accession/Commissioning

Do you have any Ear, Nose or Throat problems today that affect your hearing? Y N

How many hours have you been away from noise prior to this test? 2 days

What specific type of Hearing Protection Devices (earpro) do you wear? foamies

Do you wear double hearing protection? Y N

If so, what additional Hearing Protection Devices (HPD)s do you wear?

Do you wear glasses or goggles while wearing HPDs? Always Seldom N/A

During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) Not bothered at all Bothered a little Bothered a lot

Were you fit with HPDs today? Y N Were you previously fitted with HPDs? Y N

Do you currently have your HPDs with you? Y N

Was hearing health education provided today? Y N

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

DISCLOSURE: Disclosure of the SSN is voluntary; however, failure to provide the requested information may result in inaccurate documentation

For Official Use Only

Summary

- Successful pre-checks/tests
- Patient demographic input
- Audiograms types/reasons
- Transfer/Retrieve audiograms
- Counsel/Educate patients properly
- Know when to perform otoscopic examination and fit HPD
- Retest or process referrals correctly

DOEHRS-HC Additional Functions 1

Learning Objectives

- 3.6.1 Understand how to apply for a DOEHRS-HC DR user account
- 3.6.2 Understand when and how to perform a lookup table update
- 3.6.3 Understand how to compact and repair the DOEHRS-HC database
- 3.6.4 Understand where and how to back-up the DOEHRS-HC database
- 3.6.5 Understand how to do a DOEHRS-HC DR export and review the status of those uploads
- 3.6.6 Understand how to do a DR inquire, multiple SSNs or individually

DOEHRS-HC User Account Request

https://doehrswww.apgea.army.mil/doehrsdr/pub/AccountRequest_input.action

Ensure your CAC is in the work station; request the correct type of account and specific branch of service

DOEHRS DR User name will be issued from your name, normally last name, first initial, middle initial, then a number if that user name is already in use. Name, SSN and Mothers maiden name are confirmed when you change your password or lock your DR user account. Request a DR user account prior to performing any audio testing.

Account Information

* Indicates a required field.

Select Hearing Conservation For help with this form, please contact the [DHA Global Service Center](#)

FUNCTIONAL GROUP * SERVICE BRANCH *

● Service Branch is required.

To see available installations, please select a Service Branch.

User Identification

Ensure you spell your name right and put it in the correct fields

FIRST NAME * MI LAST NAME * SUFFIX

● First Name is required. ● Last Name is required.

SOCIAL SECURITY NUMBER (NO DASHES) * MOTHER'S MAIDEN NAME *

Mothers Maiden Name and SSN are cryptographically hashed and not saved. The hashes are used solely for user verification in case of a forgotten password.

| Personnel Information | |
|--|--|
| WORK ADDRESS * Line 1 <input type="text"/> Booth Location Physical Address | |
| <ul style="list-style-type: none"> Address is required. | |
| Line 2 <input type="text"/> | |
| CITY * <input type="text"/> | STATE OR APO * <input type="text"/> |
| <ul style="list-style-type: none"> City is required. | <ul style="list-style-type: none"> You must select a State or APO. |
| ZIP CODE * <input type="text"/> | IP ADDRESS 205.74.162.114 |
| <ul style="list-style-type: none"> Zip is required. | Your .mil email address |
| COUNTRY * <input type="text"/> | WORK EMAIL ADDRESS * <input type="text"/> |
| <ul style="list-style-type: none"> You must select a Country. | <ul style="list-style-type: none"> Email is required. |
| COMMERCIAL PHONE NUMBER * <input type="text"/> | EXTENSION <input type="text"/> |
| <ul style="list-style-type: none"> Phone is required. | |
| COMMERCIAL FAX NUMBER <input type="text"/> | DSN (OCONUS: USE 10-DIGIT DSN) <input type="text"/> |
| ORGANIZATION * (Ex. 1578th IPR) <input type="text"/> | OFFICE SYMBOL/DEPARTMENT * (Ex. /SGM/SGMIR) <input type="text"/> |
| <ul style="list-style-type: none"> Organization is required. | <ul style="list-style-type: none"> Office Symbol or Department is required. |
| JOB TITLE/FUNCTION * <input type="text"/> | SECURITY CLEARANCE * <input type="text"/> |
| <ul style="list-style-type: none"> Job Title is required. | <ul style="list-style-type: none"> You must select a Security Clearance. |
| DOD CERTIFICATION NUMBER * If None, indicate None <input type="text"/> | HC VERSION * <input type="text"/> |
| <ul style="list-style-type: none"> Certification Number is required. | <ul style="list-style-type: none"> HC Version is required. |
| The Audio Course Certification Number you were issued in class | |
| ISSO FULL NAME * <input type="text"/> | ISSO EMAIL ADDRESS * <input type="text"/> |
| <ul style="list-style-type: none"> ISSO name is required. | <ul style="list-style-type: none"> ISSO email is required. |
| ISSO PHONE * <input type="text"/> | EXT <input type="text"/> |
| <ul style="list-style-type: none"> ISSO phone is required. | IT Person |
| Your Profession Supervisor (HCPM) | |
| SUPERVISOR FULL NAME * <input type="text"/> | SUPERVISOR EMAIL ADDRESS * <input type="text"/> |
| <ul style="list-style-type: none"> Supervisor Name is required. | <ul style="list-style-type: none"> Supervisor Email is required. |
| SUPERVISOR PHONE * <input type="text"/> | EXT <input type="text"/> |
| <ul style="list-style-type: none"> Supervisor Phone is required. | |

Access Information

JUSTIFICATION FOR ACCESS *

Select the first justification in the drop down window

Applicant's responsibilities include forwarding data to and downloading data from the DOEHRS DR

Applicant has administrative responsibilities for the DOEHRS-HC at the Installation level

Applicant has administrative responsibilities for the DOEHRS-HC at multiple installations

Applicant has administrative responsibilities for the DOEHRS-HC at the Region level

Applicant has administrative responsibilities for the DOEHRS-HC at the Major Command level

Applicant has administrative responsibilities for the DOEHRS-HC at the DoD level

Other

WHAT TYPE OF ACCESS DO YOU NEED? If you require DR access beyond sending and receiving DOEHRS-HC data, please select the appropriate access.

Press Submit one time only

Submit Reset

Thank You!

The DOEHRS DR received your account request. Your application will be processed by your Functional Representative(s). After your application has been reviewed, you will receive an email with your login information and instructions on how to access the DOEHRS Data Repository.

Once submitted a window will appear that states the DOEHRS DR received your account request and it will be processed by your Functional Representatives. You will receive an email with your DR user name and a temporary password, immediately access your DR user account to lock your CAC with your DR user account.

DOEHRS HC Lookup Table Update

- Every drop down window or addition pop-up window has tables associated with it
- These tables are updated at the Data Repository (DR) and are available the first workday of the every month (Eastern Standard Time)
- They can be processed either via an internet connected DOEHRS-HC work station or downloaded from the Data Repository from an internet connected computer and transferred to a disc for a local update

About DOEHRS HC Version/Lookup Table Update

Lookup Table Update for an internet connected DOEHRS-HC work station

Compact/Repair Database

- Compact and repair database once completed performs a backup of the database that is placed in the back-up folder on the C Drive
 - Copy and/or move the backup to a shared drive or external device to prevent data loss in case of a computer crash.
- Time for the compact and repair depends on the size of the local database, the smaller it is, the faster it repairs and compresses

DOEHRS-HC Database Back-up

- DOEHRS-HC backup contains
 - Users, examiners, audiometers, calibration listeners; Administrative documents (DD Form 2217); Patient records (DD Form 2215/2216 and NHC tests, Referrals)
- Lookup table at the time of the back-up
- Current only to the date it was created
- Always place backup on a shared drive

DOEHRS-HC DR Export

- A DR export includes all newly created records and any previous records that were edited/saved
- The application will securely connect with the data repository while it compacts and creates a zip file to export to the DR
- If at any time this secure connections is disrupted, even for a millisecond the records may not be transmitted
- Always verify the file made it to the data repository and was successfully processed

DOEHRS-HC DR Export Upload History

- Verify export file was received
- Ensure it was successfully processed
- Manually re-export if the file was not received

Other than successful processing status requires the export be brought to the HCPM attention for assistance

DOEHRS-HC DR Inquire, Multiple SSNs

- Up to 10 SSNs can be inquired at a time
- Enter required SSNs
 - Press Add New; Once all SSNs are entered, press Submit
- Query will return records for those SSNs

Summary

- Lookup table update
- Compact and repair DOEHRS-HC database
- Backup the DOEHRS-HC database
 - When; Where
- DOEHRS-HC DR export/export status
- DR inquire
 - Multiple; Individually

Audiogram Entry Practicum

Learning Objectives

- 4.1.1 Manually enter audiograms from an audiological evaluation
- 4.1.2 Understand how the sub-table/fields data entry affects patient audiograms
- 4.1.3 Add examiner information correctly
- 4.1.4 Add audiometer correctly
- 4.1.5 Correctly enter audiograms test site, date/time and thresholds

Audiogram Entry, Background Information

- Entering data from scratch may require inputting sub-fields, right click from current window
 - Patient UIC, Examiner identity with test site installation, Audiometer
- Enter date and time audiogram was completed
 - If more than 1 audiogram is being entered from the same evaluation, enter audiogram series correctly, enter time of sequential tests in 1 minute increments
- Selection of audiogram test type and/or reason
- Thresholds correctly entered
- Frequencies entered on a 2215/2216 or a NHC are?
- Thresholds on this evaluation go from _____ Hz to _____ Hz
- Patient has an asymmetrical hearing loss/masking required
- Instructions from the audiologist:
- Left ear STS, enter 2216 both ears, re-establish baseline left ear
- Test selection - 2216
- Demographic sheet provided (following pages)
- Referral provided (following pages)
- Evaluation provided (following pages)
- Most information is provided
- There is at least 1 or more pieces of information you will have to get from the facilitators

All manually entered audiograms require an electronic remark

- Audiogram entered by (name); Always add remarks by pressing the add remarks button, do not enter directly into the remarks box
- Data integrity is very important

Complete Practicum

- Write down the thresholds that need to be entered on the audiogram
- Raise your hands to request the missing information
- Raise your hands once the 2216 has been saved (do not continue with 2215 until checked)
 - Go to the edit audiogram window to review with facilitator
- Continue entry of the 2215 (easier if edit audiogram window is open to the 2216 test)
- Raise your hands once the 2215 has been saved
 - Go to the edit audiogram window to review with facilitator

DOEHRS-HC Demographic Data Form

Booth # _____

| | | | |
|--|----------------|---|--------------------|
| IDN (SSN and DODIDN): | | 990990024 | |
| Last Name: | Weatherby | First Name: | Brent |
| Gender: | Male | Date of Birth (mm/dd/yr): | 12/14/84 |
| Component (select one): | DOD | USCG | USA |
| Service Component (select one): | Contractor | Federal Employee | Foreign National |
| Rank/Grade: | E7 | AFSC/MOS/NOBC/Rate & NEC/SDOC: | 4302 |
| UIC/WIC/WPID: | | Branch/Career Field/Activity: | EN |
| Work Location or Code: | Engine Room | Phone Number (include area code): | 325-555-5555 |
| Are you routinely exposed to hazardous noise or in the hearing conservation program? | | <input checked="" type="radio"/> Y <input type="radio"/> N | |
| Purpose of visit (circle one): | Annual | Follow-up | Pre-deployment |
| | Termination | Retirement/Separation | Reference/Baseline |
| | Pre-employment | Non-hearing Conservation | Other (explain): |
| Do you have any Ear, Nose or Throat problems today that affect your hearing? | | Y <input checked="" type="radio"/> N | |
| How many hours have you been away from noise prior to this test? | | 16 | |
| What specific type of Hearing Protection Devices (earpro) do you wear? | | Qued Flange | |
| Do you wear double hearing protection? | | <input checked="" type="radio"/> Y <input type="radio"/> N | |
| If so, what additional Hearing Protection Devices (HPD)s do you wear? | | hard hat w/ EARMUFFS | |
| Do you wear glasses or goggles while wearing HPDs? | | <input checked="" type="radio"/> Always <input type="radio"/> Seldom <input type="radio"/> N/A | |
| During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) | | Not bothered at all <input checked="" type="radio"/> Bothered a little <input type="radio"/> Bothered a lot | |
| Were you fit with HPDs today? | | Y <input type="radio"/> N <input checked="" type="radio"/> Were you previously fitted with HPDs? <input checked="" type="radio"/> Y <input type="radio"/> N | |
| Do you currently have your HPDs with you? | | Y <input type="radio"/> N <input checked="" type="radio"/> | |
| Was hearing health education provided today? | | Y <input type="radio"/> N <input type="radio"/> | |

Privacy Act of 1974
AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.
PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.
ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.
DISCLOSURE: Disclosure of the SSN is voluntary; however, failure to provide the requested information may result in inaccurate documentation

For Official Use Only

| HEALTH RECORD | CHRONOLOGICAL RECORD OF MEDICAL CARE | | |
|---|---|--|--|
| DATE | SYMPTOMS, DIAGNOSIS, TREATMENT | | TREATING ORGANIZATION <i>(Sign each entry)</i> |
| 1/3/2020 | HEARING CONSERVATION DISPOSITION | | |
| | Name : | WEATHERSBY, BRENT K | SSN : 990990024 |
| | Referral Date : | 12/2/2019 | Test Date : 12/2/2019 |
| | Rank/Grade : | E07 | Service Duty Occupation Code : EN4302 |
| | Work Address : | V JACKSONVILLE FL 32228 | Phone : (325) 555-5555 |
| | Reason for Referral : | | |
| | <input type="checkbox"/> Positive STS | <input checked="" type="checkbox"/> Masking Required | |
| | <input checked="" type="checkbox"/> Asymmetrical Hearing Loss | <input type="checkbox"/> Medical Referral | |
| | <input type="checkbox"/> Invalid Test | <input type="checkbox"/> Fitness and Risk Evaluation | |
| | <input type="checkbox"/> DD 2215 - Low-Frequency Loss | <input type="checkbox"/> HPD Difficulty | |
| | <input type="checkbox"/> DD 2215 - High-Frequency Loss | <input type="checkbox"/> Other: | |
| | Results (Assigned by Audiologist, ENT or Physician) : | | |
| | <input checked="" type="checkbox"/> Tinnitus | Provisional Diagnosis: | |
| | <input type="checkbox"/> Pending Further Evaluation | <input checked="" type="checkbox"/> Noise - Induced Sensorineural Hearing Loss | |
| | <input checked="" type="checkbox"/> Other: | <input type="checkbox"/> Conductive Hearing Loss - Chronic | |
| | See Below in Remarks | <input type="checkbox"/> Conductive Hearing Loss - Resolved | |
| | | <input type="checkbox"/> Mixed Hearing Loss | |
| | | <input type="checkbox"/> Sensorineural Hearing Loss | |
| | | <input type="checkbox"/> Retrocochlear Hearing Loss | |
| | Recommendations (Assigned by Audiologist, ENT or Physician) : | | |
| | <input checked="" type="checkbox"/> Return to Duty, No Restrictions | F & R Results: | |
| | <input type="checkbox"/> Return to Duty, Restrictions as Indicated | <input type="checkbox"/> Retain | |
| | <input type="checkbox"/> Remove From Hazardous Noise - Permanent | <input type="checkbox"/> Accomodate | |
| | <input type="checkbox"/> Remove from Hazardous Noise - Temporary | <input type="checkbox"/> Remove | |
| | <input checked="" type="checkbox"/> Re-establish Reference Audiogram | | |
| | <input type="checkbox"/> Re-fit and Counselor: HPD | | |
| | <input type="checkbox"/> Further Follow-up Recommended | | |
| | <input type="checkbox"/> Perform Fitness and Risk (F&R) Assessment | | |
| | <input checked="" type="checkbox"/> Other: AS STS, enter 2216 AU, re-establish baseline AS | | |
| | Remarks : | | |
| | Left Ear STS, enter 2216 both ears; then re-establish baseline left ear (1 minute time delay), refit HPDs, provided education. | | |
| | Examiner Information: Kristine Mitchell, Federal Employee, GS-12, Speech Pathology & Audiology, 0665 DOEHRs-HC Certification number 189092N | | |
| | *****Training Evaluation***** | | |
| | Return To : | | |
| PATIENT'S IDENTIFICATION <small>(Use this space for Mechanical Imprint)</small> | RECORDS MAINTAINED AT: | | |
| | PATIENT'S NAME <small>(Last, First, Middle Initial)</small> | | SEX |
| | WEATHERSBY, BRENT K | | M |
| | RELATIONSHIP TO SPONSOR | STATUS | RANK GRADE |
| | SAME | REGULAR | E07 |
| | SPONSOR'S NAME | | ORGANIZATION |
| | WEATHERSBY, BRENT K | | 4002A |
| DEPART. SERVICE | SSN IDENTIFICATION NO. | DATE OF BIRTH | |
| NAVY | 990990024 | 12/14/1984 | |
| CHRONOLOGICAL RECORD OF MEDICAL CARE | | STANDARD FORM 600E | |
| For Official Use Only | | | |



FREQUENCY IN HERTZ (Hz)

HEARING LEVEL IN dB (ANSI 2010)

Examiner/Assistant:
Kristine Mitchell, Au.D.

Audiometer:
GSI 61 GS0047999

Transducer:
ER-3A Inserts

Method: Conventional

Reliability: Good

| Stim | Meas | Acoustic Reflexes | | | | Reflex Decay | |
|-------|--------|-------------------|------|------|------|--------------|------|
| | | 500 | 1000 | 2000 | 4000 | 500 | 1000 |
| Right | Contra | 95 | 90 | 80 | | Nml | |
| | Ipsi | 95 | 90 | 85 | | | |
| Left | Contra | 95 | 95 | 85 | | Nml | |
| | Ipsi | 90 | 90 | 80 | | | |

Abs- Absent CNT- Could Not Test UdB- Undefined decibel level

| Test Ear | Effective Masking Levels To Non-Test Ear | | | | | | | | | | |
|----------|--|-----|-----|-----|------|------|------|------|------|------|------|
| | 125 | 250 | 500 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 6000 | 8000 |
| AC L | | | | | | | | | 35 | 45 | |
| AC R | | | | | | | | | | | |
| BC L | | | | | | | | 55 | 65 | | |
| BC R | | | | | | | | | | | |

Pure Tone Average (PTA)

| RIGHT | | Monaural | LEFT | |
|---------|--------------|------------|-------|--------------|
| Air | 15 dBHL [3a] | | Air | 17 dBHL [3a] |
| Bone | 18 dBHL [3a] | | | |
| UNAIDED | | Soundfield | AIDED | |

Tympanometry

| | Right | Left |
|----------------------|-------|------|
| Probe Tone (Hz) | 226 | 226 |
| Ear Canal Volume | 1.10 | 1.20 |
| Peak Admittance (mL) | 0.70 | 0.80 |
| Peak pressure (daPa) | 10 | 20 |
| Curve Type | A | A |

Thick (red) - right, Thin (blue) - left

Speech Reception/Awareness Threshold (dBHL)

| RIGHT | | LEFT | |
|-------|-------------|------|-------------|
| Air | 15 dB [SRT] | Air | 20 dB [SRT] |

Word Recognition (dBHL)

| RIGHT | | LEFT | |
|-------|--------------|------|--------------|
| | 92% at 45 dB | | 96% at 50 dB |

Evaluation: 1/3/2020, 9:00 A.M.
Audiometer: GSI-61, GSI, GS0047999
Calibrated 9/24/2019

32532 - Naval Branch Health Clinic
Norfolk Shipyard
 ***** Training Evaluation *****

EXAMINER SIGNATURE *Kristine Mitchell*

Date 03/22/2019

Patient Identifier 990990024

NAME Weathersby, Brent

D.O.B. 12/14/1984

NBHC NSY NORFOLK - 0380

FOR OFFICIAL USE ONLY - FORM

Summary

- Manually enter audiograms from an audiological evaluation
- Sub-table/fields data entry and how it affects patient audiograms
- Examiner entry
- Audiometer entry
- Audiogram test site, date/time and thresholds entry

Re-establish Baseline from a Previous Audiogram Practicum

Learning Objectives

- 4.2.1 Manually re-establish a baseline from a previous audiogram
- 4.2.2 Enter an electronic remark to cover the authority for the re-established baseline

Audiometry Summary

- Do a DR inquire on the patient to bring back any records from the DR that are not in your local database
- Review the audiograms covered by the referral
 - STS present
- Review audiologist instructions
- Re-establish baseline
 - Technician was/is the examiner on the audiogram; Electronic remark to cover the authority for the re-established baseline

Complete Practicum

- Briefly review patient history in local database (print 2216 if needed)
- Referral provided (following pages) review – follow directive
- Do not edit a test to change the test type
- Functions>Input Audiogram>DD 2215>...
- Input patient SSN
- Read prompts that appear
- Follow referral instructions (test selection)
- Input electronic remark

Summary

- Manually re-establish a baseline from a previous audiogram
- Enter an electronic remark to cover the authority for the re-established baseline

Audiometric Testing Practicum 2

Learning Objectives

- 4.3.1 Perform a successful functional check and a successful calibration, troubleshoot appropriately
- 4.3.2 Input patient data correctly while testing patient
- 4.3.3 Select correct test type/reason
- 4.3.4 Transfer/Retrieve audiograms
- 4.3.5 Counsel/Educate patients properly
- 4.3.6 Perform otoscopic examination/fit HPDs appropriately
- 4.3.7 Retest or process referrals correctly

Pretest Processes

- Perform a successful functional check
- Perform a successful calibration

Patient #4, Testing Blake Owens

- Demographic Data Form is on the next page
- Using the BAS to simulate a patient
 - Start test
- Input 990990027, Blake Owens (Run Test Window)
- Ensure all demographic data is correct
 - Select the correct test type/reason based on audiometric history, demographic data form
- Transfer/Retrieve data from the run test window to the CCA-200
 - Pay attention to any pop-up windows that occur
- Print, counsel, have patient return for follow-up testing or refer appropriately

Headphones on the BAS, response switch removed to activate the BAS

Counseling:

Review Blocks 2-14 demographic data; EWS Left Ear/STS right ear or STS on both ears? Normal hearing is -10 – 25 dB, the lower the numbers the better, you have a change in hearing, need to return for follow-up testing, 14 hours noise free, when can they return? Sign 2216

DOEHRS-HC Demographic Data Form

Booth # _____

IDN (SSN and DODIDN): 990990027

Last Name: Owens First Name: Blake MI: M

Gender: Male Female Date of Birth (mm/dd/yr): 8 MAY 95

Component (select one): DOD USCG USA USAF USMC USN Other (explain):

Service Component (select one): Contractor Federal Employee Foreign National Regular Reserve NG

Rank/Grade: 03 AFSC/MOS/NOBC/Rate & NEC/SDOC: 0302 Unit: 310

UIC/WIC/WPID: Branch/Career Field/Activity: Major Command: 2D MARDIU

Work Location or Code: KCo Phone Number (include area code): 910-555-5555

Are you routinely exposed to hazardous noise or in the hearing conservation program? Y N

Purpose of visit (circle one): Annual Termination Pre-employment Follow-up Retirement/Separation Non-hearing Conservation Pre-deployment Reference/baseline Other (explain): Post-deployment Accession/Commissioning

Do you have any Ear, Nose or Throat problems today that affect your hearing? Y N

How many hours have you been away from noise prior to this test? 2

What specific type of Hearing Protection Devices (earpro) do you wear? Combat Arms

Do you wear double hearing protection? Y N

If so, what additional Hearing Protection Devices (HPD)s do you wear?

Do you wear glasses or goggles while wearing HPDs? Always Seldom N/A

During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) Not bothered at all Bothered a little Bothered a lot

Were you fit with HPDs today? Y N Were you previously fitted with HPDs? Y N

Do you currently have your HPDs with you? Y N

Was hearing health education provided today? Y N

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

DISCLOSURE: Disclosure of the SSN is voluntary; however, failure to provide the requested information may result in inaccurate documentation

For Official Use Only

Patient #5, Testing Jamal Deloach

- Demographic Data Form is on the next page
- Using the BAS to simulate a patient
 - Start test
- Input 990990028, Jamal Deloach (Run Test Window)
 - Ensure all demographic data is correct
 - Select the correct test type/reason based on previous audiograms, demographic data form
- Transfer/Retrieve data from the run test window to the CCA-200
 - Pay attention to any pop-up windows that occur
- Print, counsel, have patient return for follow-up testing or refer appropriately

Review Blocks 2-14 demographic data; Counseling thoughts: STS both ears, Normal hearing is -10 – 25 dB, the lower the numbers the better, you have a change in hearing, there is a change in hearing, when can they return to see the audiologist, 14 hours noise free? Sign 2216

DOEHRS-HC Demographic Data Form

Booth # _____

| | |
|---|---|
| IDN (SSN and DODIDN): <u>990990028</u> | |
| Last Name: <u>DeLoach</u> | First Name: <u>JAMAL</u> MI: <u>W</u> |
| Gender: <input checked="" type="radio"/> Male <input type="radio"/> Female | Date of Birth (mm/dd/yr): <u>11/26/75</u> |
| Component (select one): DOD USCG <input checked="" type="radio"/> USA <input type="radio"/> USAF <input type="radio"/> USMC <input type="radio"/> USN Other (explain): | |
| Service Component (select one): Contractor Federal Employee Foreign National <input checked="" type="radio"/> Regular <input type="radio"/> Reserve <input type="radio"/> NG | |
| Rank/Grade: <u>E7</u> | AFSC/MOS/NOBC/Rate & NEC/SDOC: <u>11H</u> Unit: <u>1ST BN 393 REGT</u> |
| UIC/WIC/WPID: | Branch/Career Field/Activity: Major Command: <u>FORSOM</u> |
| Work Location or Code: <u>Fort Hood TX</u> | Phone Number (include area code): <u>254-555-5555</u> |
| Are you routinely exposed to hazardous noise or in the hearing conservation program? Y <input type="radio"/> N <input checked="" type="radio"/> | |
| Purpose of visit (circle one): | Annual Termination Pre-employment Follow-up Retirement/Separation Non-hearing Conservation Pre-deployment Reference/Baseline Other (explain): Post-deployment Accession/Commissioning |
| Do you have any Ear, Nose or Throat problems today that affect your hearing? Y <input type="radio"/> N <input checked="" type="radio"/> | |
| How many hours have you been away from noise prior to this test? <u>16</u> | |
| What specific type of Hearing Protection Devices (earpro) do you wear? <u>Formies</u> | |
| Do you wear double hearing protection? Y <input type="radio"/> N <input checked="" type="radio"/> | |
| If so, what additional Hearing Protection Devices (HPD)s do you wear? | |
| Do you wear glasses or goggles while wearing HPDs? Always Seldom <input checked="" type="radio"/> N/A | |
| During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) | |
| <input checked="" type="radio"/> Not bothered at all <input type="radio"/> Bothered a little <input type="radio"/> Bothered a lot | |
| Were you fit with HPDs today? Y <input type="radio"/> N <input checked="" type="radio"/> Were you previously fitted with HPDs? Y <input checked="" type="radio"/> N <input type="radio"/> | |
| Do you currently have your HPDs with you? Y <input checked="" type="radio"/> N <input type="radio"/> | |
| Was hearing health education provided today? Y <input type="radio"/> N <input type="radio"/> | |

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

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Testing Processing Flow

You will be doing initially only what is on this page

Prior to conducting any DOEHRs-HC testing apply for a DR user account

Log into DOEHRs-HC application

Conduct a function check and daily calibration

- Resolve any issues

Receive patients for testing

- Review medical record and/or demographic data form
- Question the patient if you need additional information
- Perform an otoscopic examination if needed

Write booth number on demographic form, place patient in booth (correct location)

Give patients pre-test instructions

- Remove any foreign items in their mouth (gum, etc.)
- Remove eye glasses, hearing aids, large earrings, etc.
- Turn off all electronic devices
- Move hair away from ears
- Response switch in hand
- Test instructions will begin when the door shuts
- Place headphones on properly, red/right, blue/left

Ensure patient have the headphones on properly and the response switch in hand

Close booth door

Start patients test

Input patient SSN, DR Inquire

- Verify and update demographic data
- Select test type
- Monitor testing occurring in the CCA-200 window

Transfer patient data from the Run Test window to the CCA-200 window

- Manually test patient if needed

Review patient thresholds in the CCA-200 window and prepare counseling thoughts

This will be done individually per work station where the student who did the testing will act as the examiner; retrieve, counsel, and refer appropriately the patient on the test results retrieved. Speak loud enough for all student to hear.

Retrieve data from the CCA-200 window into the Run Test window, paying attention any reading any pop-up messages that appear

Answer applicable pop-up window questions

Print test(s) and counsel/educate patient(s)

- Have patients review demographic data in blocks 2-14 for accuracy

Where in the test series does this test fall? (Initial 2216, follow-up 1 or follow-up 2)

Is there a change in hearing? Yes/No

What changes occurred? Positive/Negative

Is hearing loss present? Yes/No normal hearing (-10 dB to 25 dB)

- Discuss noise is dangerous (on and off duty) and NIHL is preventable
- Review the importance of periodic audiograms
- Review the 4 P's (Permanent, Painless, Progressive, Preventable)
- Effects of noise on hearing
- Perform an otoscopic examination if conductive issues are suspected from the audiogram thresholds (low frequencies) or fitting for HPDs
- Fit and counsel patients on the use of hearing protection devices
- Individually review abnormal results with patient
- Provide instructions for follow-up procedures; schedule follow-up testing/evaluation
- Obtain patient signature (as applicable)

Provide follow-up testing

- Conductive issues resolved prior to returning for follow-up testing
- Noise free requirement met
- Returned within follow up timeframe or start testing series over

Process referrals appropriately

- Conductive issues to primary care giver/physician
- Sensorineural issues to audiologist
- Mixed issues - get conductive issues resolved prior to sending to the audiologist

If there are any questions or doubts about what to do, always ask your HCPM and/or class instructors, they will continue to assist you through the audiometric portion of your job.

Patient #6, Testing Each Other (Filled Demographic Data Form on page 49)

- Insert hand switch into BAS
- Ensure wiring is untangled
- Class broken down into groups of two
- Receive audiograms and demographic form (all students are in the HCP)
 - Review forms; Ask any questions; Instruct patient (each other prior to classroom testing); Ensure the patient's back is to the examiner; Patient has headphones on, response switch in hand
- Start automated test
- Input demographic data into the run test window
- Select test type
- Transfer data from the run test window to the CCA-200
 - Manually test the patient's right ear, 3000 Hz, 4000 Hz and 6000 Hz
- Retrieve audiogram from the CAA-200 window to the Run Test window (pay attention to any pop-up windows that occur)
- Print audiogram
- Counsel, educate appropriately, otoscopic exam, fit or refit HPDs
- Return for further testing or refer appropriately

Switch roles when complete

Summary

- Successful pre-checks/tests
- Patient demographic input
- Audiograms types/reasons
- Transfer/Retrieve audiograms
- Counsel/Educate patients properly
- Perform otoscopic examination/fit HPDs appropriately
- Retest or process referrals correctly

Additional demographic sheet if there are an odd number of students; a facilitator can fill in as a patient.

DOEHRS-HC Demographic Data Form

Booth # _____

IDN (SSN and DODIDN): 990990009

Last Name: Smith First Name: Reggie MI: P

Gender: Male Female Date of Birth (mm/dd/yr): 11/11/96

Component (select one): DOD USCG USA USAF USMC USN Other (explain):

Service Component (select one): Contractor Federal Employee Foreign National Regular Reserve NG

Rank/Grade: E4 AFSC/MOS/NOBC/Rate & NEC/SDOC: 0819 Deployment Processing Unit: RSU EAST

UIC/WIC/WPID: Branch/Career Field/Activity: Major Command:

Work Location or Code: CP Lejeune NC Phone Number (include area code): 910-555-5555

Are you routinely exposed to hazardous noise or in the hearing conservation program? Y N

Purpose of visit (circle one): Annual Follow-up Pre-deployment Post-deployment
Termination Retirement/Separation Reference/Baseline Accession/Commissioning
Pre-employment Non-hearing Conservation Other (explain):

Do you have any Ear, Nose or Throat problems today that affect your hearing? Y N

How many hours have you been away from noise prior to this test? 6

What specific type of Hearing Protection Devices (earpro) do you wear? Foamies

Do you wear double hearing protection? Y N

If so, what additional Hearing Protection Devices (HPD)s do you wear?

Do you wear glasses or goggles while wearing HPDs? Always Seldom N/A

During the past month, how much have you been bothered by noises in your head or ears, such as ringing, buzzing, crickets, humming, tone(s), etc? (circle one) Not bothered at all Bothered a little Bothered a lot

Were you fit with HPDs today? Y N Were you previously fitted with HPDs? Y N

Do you currently have your HPDs with you? Y N

Was hearing health education provided today? Y N

Privacy Act of 1974

AUTHORITY: 5 U.S.C., Section 301; 10 U.S.C., Section 1071-1085; 50 U.S.C., Supplement IV, Appendix 454, as amended.

PRINCIPLE PURPOSE: SSN will be used for identification purposes to ensure proper documentation of medical records.

ROUTINE USE: Information may be disclosed to Veterans Administration to adjudicate veterans claims and provide medical care to service members; National Research Council, National Academy of Sciences, National Institute of Health and similar institutions for authorized health research in the interest of the Federal Government and the public; local and state government and agencies for compliance with local laws regulations governing control of communicable diseases, preventive medicine and safety, child abuse, and other public health and welfare programs.

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DOEHRS-HC Additional Functions 2

Learning Objectives

- 4.4.1 Compact and repair the DOEHRs-HC database
- 4.4.2 Understand how to import data locally
- 4.4.3 Perform a local import of data

Compact/Repair Database

Import from Local Database

Simulates a DR inquire, time for the secure connect, once secure, transfer of data occurs in seconds. This is also good for test sites that are not connected to the internet (ships, etc.) to retrieve data that was done at other test sites

Summary

- Compact and repair DOEHRs-HC database
- Import data locally

Health Education and Training

Learning Objectives

- 4.5.1 Become familiar with various training techniques for noise-exposed personnel
- 4.5.2 Describe critical considerations and regulatory requirements for crafting an effective health education message
 - Rate of recurrence
- 4.5.3 List specific mandated and optional topics that should be briefed:
 - Effects of noise (occupational/non-occupational); HPDs; Audiometric monitoring

Introduction

- Noise induced hearing loss (NIHL) and tinnitus are most common injuries in the military
 - Both are largely under-recognized
- Understand the threat = mitigate the threat
- Effective education provides the knowledge and tools to prevent the “invisible” injury

Testimonial

- Education protects the individual and unit health
- Preserves communication capabilities for job performance
- Impacts mission accomplishment
- Promotes safety

Mandated Training Topics

- The effects of noise on hearing (on/off duty) and military operations
- Hearing protection devices (HPDs)
- Purpose, advantages, disadvantages and attenuation characteristics of various types; Instructions for proper fit, care and use; Wear when exposed to hazardous noise both on/off duty
- Audiometric testing
 - Purpose, explanation of test procedures; Interpretation of results
- Impact hearing loss may have on career

Mandated Initial and Annual Training Topics

- Elements and rationale of the HCP
- Effects of noise on hearing
- Purpose, styles and proper use of various HPDs
- Command and employee responsibilities for HC
- Impact hearing loss may have on career, safety and mission
- Off-duty hearing health practices (non-occupational noise)
- Purpose of hearing tests and procedures
- Service-specific requirements

Recommended Briefing Topics

- Overview of HCP services available
- Importance of hearing for mission accomplishment
- Anatomy, physiology and mechanism of hearing loss
- Impact of hearing loss on communication during training, operational exercises, combat missions and work
- Hearing loss prevention tactics and alternative HPD strategies
- Noise surveillance and abatement strategies
- Noise exposure - signs and symptoms
 - Ringing or buzzing ears (tinnitus); Ear pain; Difficulty understanding conversational speech; Need radio or television louder; Complaining people mumble, muffled hearing
- Four P's of noise-induced hearing loss
 - Permanent, Painless, Progressive, Preventable

Service Specific Training Requirements

- Air Force - annual requirement for
 - All noise exposed personnel – Further documented on the worker's AF Form 55, Record of Training or equivalent; All workplace supervisors (trained by Public Health)
- Army - required annually by all Active Duty and Operational (TOE) USAR and USANG personnel
 - Training required regardless of MOS; Mandated topics match 29 CFR 1910.95 Navy - annual refresher training for all HCP enrolled personnel, military and civilian
- Navy - annual refresher training for all HCP enrolled personnel, military and civilian
- Marines - annual refresher training for all Marines

Instructors

- Personnel well-versed in all components of the hearing conservation program (HCP)
- Audiologists/Hearing Conservation Program Managers (HCPMs)
- Preventive medicine professionals
- Occupational health
- Safety officers
- DoD certified hearing technicians/Occupational Hearing Conservationists (OHCs)

Tailor Training Material to Audience

- One brief does not suffice for all, vary brief with unit composition
- Update and/or alter briefs year-to-year
- Research unit before preparing brief
 - Review unit hearing loss trends and occupations

Tailor Training Material to Noise Environment

- Provide noise levels for equipment commonly used by unit
- Include interesting facts
 - Exposure levels are dependent on speed of tactical vehicle; Location in aircraft will vary noise intensity levels, consider pilot, crew, passengers

Training Participants

- Service members and DoD civilians - noise exposed
- Army/Marine Military are all noise-exposed
- Navy & Air Force
 - Defined as at risk for routine exposure to 85 dBA TWA or 140 dBp; Deploying personnel may be deemed at risk, test requirements will appear on reporting instructions; Civilians - documented by industrial hygiene that exposure levels meet or exceed 85 dBA TWA for at least 1 day annually

Emphasis of the Brief

- Effects of noise on hearing - on and off duty
- Hearing protection
 - Purpose and use; Advantages, disadvantages, attenuation and characteristics; Selection, fitting, use and care; Interaction with others forms of PPE (eyewear)
- Audiometric testing - purpose and interpretation of results

Hearing loss and how it may lead to disqualification from current duties if hearing is critical to job performance; mandatory requirement of assigned protective equipment, administrative actions that may follow for failure to wear; Additional notes for Air Force personnel: Document all training on the worker's AF Form 55, Record of Training, or equivalent

Training Techniques and Tips

- Keep training
 - Simple; Short; Meaningful - tailored to audience
- Motivate - give attendees a specific reason to listen
- Formal Training Time limits
 - Recommend maximum of 15-30 minutes; Review key items first

Keys to successful hearing loss prevention training; Training attendees remember 70% of what is heard the first 20 minutes of training

Briefing Formats

- Informal - counseling current audiograms and/or earplug fittings
- Formal - Small group (10 or less)
 - Best scenario - small groups, short time; Annual group hearing tests using training supplements; Command groups
- Formal - Large group (11 or more)
 - Annual briefing conducted for group of personnel; Tracked on large-scale metric for mandatory training

Training Documentation

- All Services - DOEHRS-HC Reports/Lists
- USA
 - Sign-in rosters maintained by unit; DTMS - Defense Training Management System entry
- USN/USMC
 - Sign-in rosters maintained by units and medical record
- USAF
 - AF Form 55, Record of Training, filed with workplace supervisor; SF 600 and/or documented in the electronic health record

Summary

- Training techniques/tips
- Training content
 - Rate of recurrence
- List specific mandated/optional topics that should be briefed:
 - Effects of noise (occupational/non-occupational); HPDs; Audiometric monitoring

CCA-200 Error Code Descriptions

| Error | Common Name | Description |
|-------|----------------------|--|
| NR | No Response | The subject did not respond to two stimulus presentations at the maximum intensity |
| MR | Multiple Response | The subject responded more than once to a single stimulus presentation |
| SE | Subject Error | A threshold was not determined within twenty stimulus presentations |
| CR | Continuous Response | The response switch was not released since the start of the previous stimulus presentation |
| RN | Retest Not Valid | The threshold of a programmed retest varies by more than 5 dB |
| PT | Presentation Timeout | More than sixty seconds have elapsed from the start of a threshold determination without a threshold being established |

Full Manual Mode

Select ear, frequency that you want to test. Set “NT” (not tested) if thresholds are present. Present a 30 dB pulsed tone (3 tones), if no response is recorded, initially increase stimuli by 20dB and then by 10 dB until a response is obtained.

After the response is confirmed, follow the bracketing procedure; vary stimulus interval to counter patient guessing.

Response - decrease stimuli presentation by 10 dB

No response - increase stimuli presentation by 5 dB

A threshold is determined when the patient responds twice in an ascending mode (responds 50% of the time) - lock threshold level

If doing a complete both ear full manual test mode, frequency presentation should be left ear or better ear: 1000 Hz, 500 Hz, 1000 Hz (confirmation test needs to be within 5 dB of initial threshold received), 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz; then the opposite ear: 1000 Hz, 500 Hz, 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz

Ensure to press OK to bring threshold to CCA-200 window. “M” identifier will be in the cca-200 window only, once retrieved into the run test window the “M” identifier is not present.

Semi-Automated Manual Mode

Select ear, frequency that you want to test. Set “NT” (not tested) if thresholds are present. Present a 30 dB pulsed tone (3 tones), if no response is recorded, initially increase stimuli by 20dB and then by 10 dB until a response is obtained; vary stimulus interval to counter patient guessing.

Application semi-automatic manual mode will do the bracketing method automatically; dB level will increase by 5dB (no patient response) decrease by 10dB (patient responds) and will lock in thresholds once a patient responds twice in an ascending mode.

If doing a complete both ear semi-automated manual test mode, frequency presentation should be left ear or better ear: 1000 Hz, 500 Hz, 1000 Hz (confirmation test needs to be within 5 dB of initial threshold received), 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz; then the opposite ear: 1000 Hz, 500 Hz, 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz

Ensure to press OK to bring threshold to CCA-200 window. “M” identifier will be in the cca-200 window only, once retrieved into the run test window the “M” identifier is not present.

Unfair Hearing Test

| | Column A | Column B | Column C |
|----|----------|----------|----------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |