



Hearing Conservation Compendium Report CY2015

Navy and Marine Corps Public Health Center
Occupational Audiology and Hearing Conservation Division

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Executive Summary

- The Navy and Marine Corps Public Health Center (NMCPHC) Occupational Audiology and Hearing Conservation (OA/HC) Division develops an annual compendium report that summarizes enterprise hearing conservation program Measures of Effectiveness (MOEs).
- Starting in 2016, NMCPHC engaged the Defense Health Agency’s EpiData Center to provide epidemiological support and analysis.
 - Hearing injury rates have declined from 17.4 STSs per 100 Department of the Navy (DON) personnel in CY 2006 to 12.9 per 100 DON personnel in CY 2015.
 - Navy compliance for CY15 was 87.5%, up from 85.2% in CY14. For CY15, USMC compliance was at 81.3%. While this is below the target threshold of 85% this represents a continued uptick from the CY14 compliance of 80.8% and a significant improvement from CY 13 compliance of 63.2%.
 - The percentage of DON personnel with normal hearing has increased from 76.8% in 2006 to 79.9% in 2015.
 - Data indicates that 89.2% of new accessions have normal hearing in 2015 compared to 87.5% in 2006.
 - Based on thresholds obtained on termination audiograms, the percentage of those potentially eligible for Veteran’s Benefits Administration (VBA) compensation has remained relatively unchanged at around 4% over the past 10 years.
- The MOEs have been incorporated as the minimal reporting requirement in the draft DODI 6055.12 Hearing Conservation and Readiness instruction currently under review.

ACKNOWLEDGEMENTS

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LCDR Nicholas Schnauffer, United States Marine Corps-Health Services
Ms. Alina Rossini, Epidemiologist, EpiData Center



Background

The goal of the Department of Navy's (DON) Hearing Conservation and Noise Abatement initiative is to proactively prevent noise-induced hearing loss and ensure optimal auditory readiness. Per Navy Bureau of Medicine and Surgery (BUMED) guidance, the Navy and Marine Corps Public Health Center (NMCPHC) Occupational Audiology and Hearing Conservation (OA/HC) Division is responsible for the overall management of the Navy and Marine Corps Hearing Conservation Program (HCP). The OA/HC Division Head is considered the subject matter expert pertaining to program oversight, data analysis and report development. This annual compendium report summarizes the HCP measures of effectiveness (MOEs) and considers the impact on the Navy and USMC population. This report should be utilized to focus BUMED consultation, guidance and direction, augment the Naval Safety Center and the Marine Corps Safety Division, meet the Hearing Conservation and Noise Abatement Flag Level Steering Board (FLSB) Plan of Action and Milestones (POA&M) objectives and provide enterprise-wide comparison data for local commands and deck-plate inspection processes to monitor performance.

One key component of the HCP is program evaluation. Department of Defense (DoD) policy has traditionally used Significant Threshold Shift (STS) rate (change in hearing) and audiogram completion rate as the two metrics to evaluate the effectiveness of HCPs. Per the Navy Executive Safety Board (NESB), additional MOEs include percentages of hearing impaired, new accessions with hearing impairment, and those eligible for compensation on termination audiogram. These expanded MOEs serve as a standardized operational demand signal that is actionable from the unit commander through the chain of command. These MOEs serve as an enterprise tool to assess efforts made to minimize preventable hearing loss across the DON.

Requirement for Medical Surveillance

Service members are required to be under medical surveillance if exposed to noise equal to or greater than 85 A-weighted (dBA) as an 8 hour time-weighted average (TWA) and/or impulse noise equal to or greater than 140 peak decibel (dBp)

Required exams include: baseline audiogram within 1 month of first exposure, annual audiogram and subsequent follow-up, and termination audiogram when removed from exposure



Methods

Audiogram data were extracted **on 02 July 2016** from The Defense Occupational and Environmental Health Readiness System-Hearing Conservation (DOEHRS-HC) with an audiogram date of 01 January 2006 to 31 December 2015 for all DON personnel enrolled in the HCP. Enrollment was determined using audiogram type; records were maintained for analysis if the following audiogram types were indicated: Reference Audiogram, Annual Audiogram, Termination Audiogram, Follow-up 1 Audiogram, Follow-up 2 Audiogram, Pre-Deployment Audiogram, or Post-Deployment Audiogram.

For MOE 1, only periodic, or annual, audiograms were analyzed. Injury Rates were calculated by dividing the number of unique STSs by number of unique DON personnel that had a periodic audiogram for each calendar year. Personnel were flagged as having a STS if the record indicated a 'Positive Shift.' Personnel were flagged as having a permanent threshold shift (PTS) if they had a reference audiogram along with an audiogram purpose indicating a re-establishment of the reference (See Appendix A). All injury rates are reported per 100 individuals.

For MOE 3, the following types of audiograms were maintained for analysis: Reference Audiogram, Annual Audiogram, Termination Audiogram, Follow-up 1 Audiogram, Follow-up 2 Audiogram, Pre-Deployment Audiogram, and Post-Deployment Audiogram. Records were analyzed for personnel whose records indicated 'No Shift.' Hearing impairment was defined as having any hearing threshold (500 Hz, 1,000 Hz, 2,000 Hz, 3,000 Hz, 4,000 Hz, or 6,000 Hz) that tested greater than 25 dB HL in either ear. The proportion of those who were hearing impaired was calculated by dividing the number of individuals who were flagged as hearing impaired by the number of unique individuals tested in each year.

For MOE 4, only reference audiograms that indicated that the audiogram test was prior to initial duty in noise were analyzed. The proportion of those who were hearing impaired was reported for this MOE.

For MOE 5, only termination audiograms were analyzed. Records were flagged as meeting or exceeding Veterans Affairs (VA) standards for compensation if any threshold from 500 Hz to 6,000 Hz tested greater than 40 dB HL or having an average of any three thresholds greater or equal to 26 dB HL. The proportion of those who were hearing impaired at a termination audiogram was reported and those figures are located in Appendix D.



Definitions

Significant Threshold Shift (STS): Hearing thresholds changed, relative to the most recent baseline, an average of 10dB or more at 2000, 3000, or 4000 Hertz in either ear.

Permanent Threshold Shift (PTS): An STS that fails to resolve on follow-up testing and is determined to be a permanent change in hearing performance.

Normal hearing: No tested frequency exceeding 25 dBHL in either ear as directed by the American Speech Language and Hearing Association.

Hearing Impaired (HI): At least one frequency exceeding 25 dBHL in either ear.

Data

Data for MOEs 1, 3, 4, and 5 were analyzed using SAS Statistical Analysis Software 9.4 in September 2016.

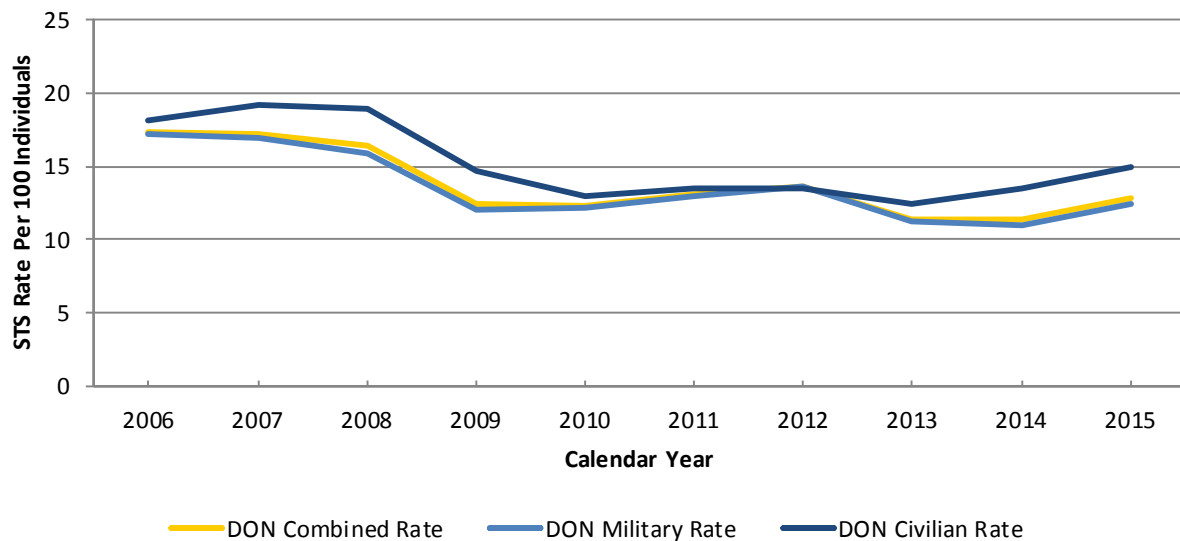
MOE 2 Navy data is generated through the Medical Surveillance Command Report submitted by the Naval Safety Center and reflects self-reported data from Echelon II commands. MOE 2 USMC data was generated on 30 December 2015 through Medical Readiness Reporting System (MRRS) Command Summary Hearing Conservation Report and reflects performance based on the prior 365 days.

Appendices A-D provides further breakout data for each MOE.



MOE 1: DON Injury Rates on Periodic Hearing Screening

Figure 1. Significant Threshold Shift Rate (STS) among Department of the Navy (DON) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Interpretation: Among DON Personnel enrolled in the HCP, Injury rates have declined from 17.4 STSs per 100 DON personnel in CY 2006 to 12.9 per 100 DON personnel in CY 2015.

Goal: Reduction in injury rates indicates compliance with HCP requirements, proper engineering controls, and PPE use both at work and at home.

Discussion: Considering the “real-time” (within CY), percentage of hearing injury is more indicative of hearing loss prevalence in current personnel.

MOE 2: Compliance with Periodic Screening

Navy:

- CY15: 87.5%
- CY14: 85.2%
- CY13: 83.8%
- CY12: 85.8%

USMC:

- CY15: 81.3%
- CY14: 80.8%
- CY 13: 63.2%
- CY12: 71.4%

Data Source:

Navy: Medical Surveillance Exam Completion Report submitted by the Naval Safety Center.

USMC: Medical Readiness Reporting System (MRRS) Command Summary Hearing Conservation.

Interpretation: Data reflects the number of periodic annual screenings (numerator) administered over the self-reported program enrollment (denominator) reported by the echelon II commands. While USMC compliance (81.3%) is below the 85% target, significant improvement continues to be made since the release of MARADMIN 010-12 which placed 100% of the USMC on the HCP.

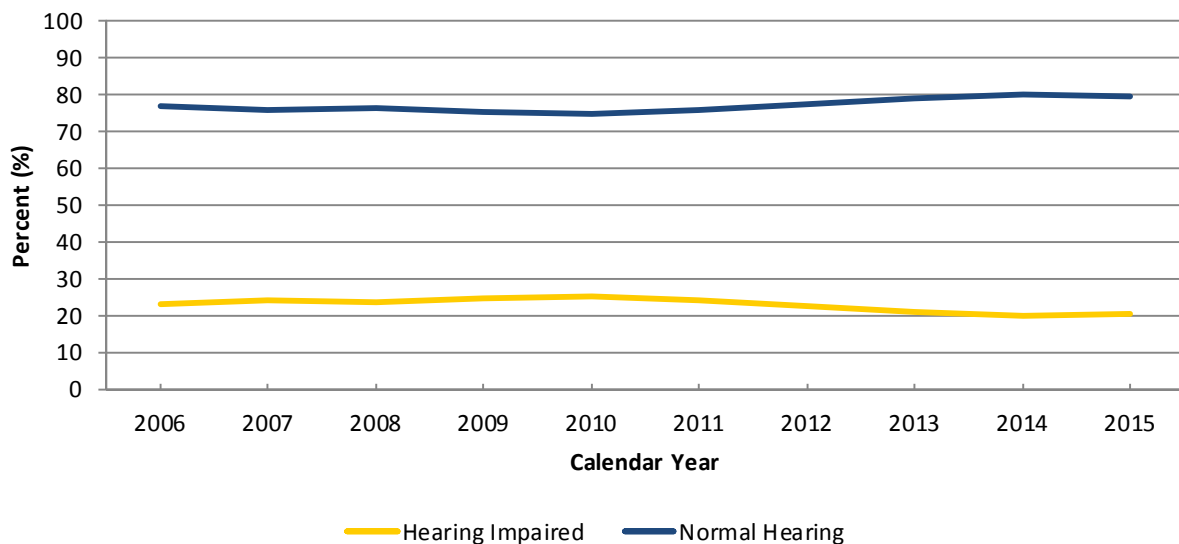
Goal: 85% target compliance threshold.

Discussion: A key element in a successful hearing conservation program is to ensure all personnel exposed to hazardous noise in the workplace are enrolled in the command's HCP and receive annual audiometric evaluations. While Navy Medicine is responsible for the overall management of the program, ultimately it is the command's responsibility to ensure its personnel receive annual audiograms. This compliance is on the rise when compared to previous years.



MOE 3: DON Percentage of Normal Hearing and Hearing Impaired

Figure 2. Proportion of Hearing Impaired^a Department of the Navy (DON) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

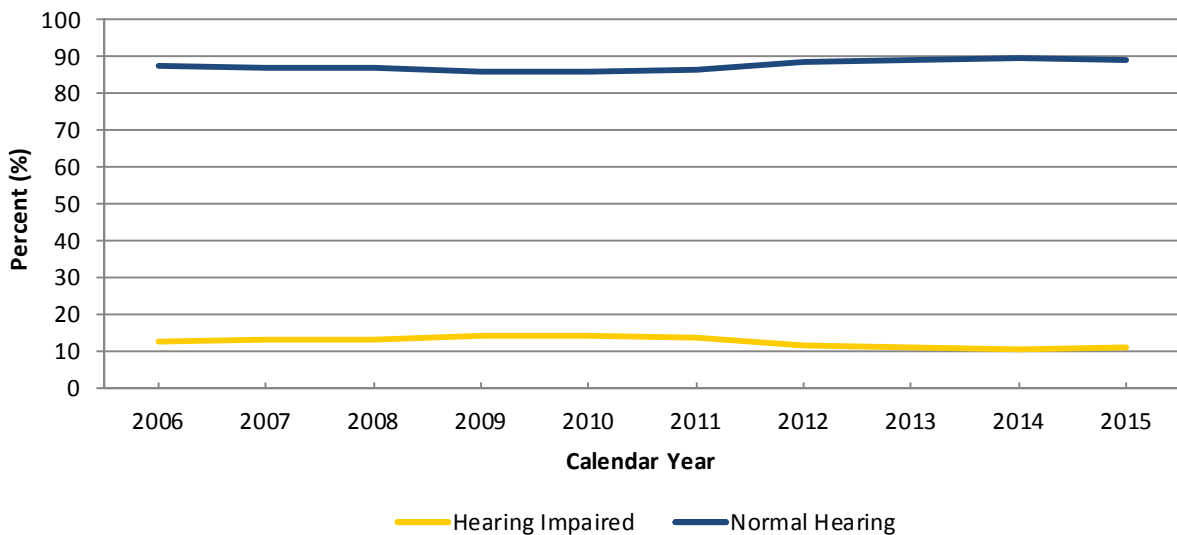
Interpretation: Figure 2 provides a corporate view of hearing impaired and normal hearing populations. The data indicates a reduction in the percentage of hearing impaired personnel from CY06 to CY15.

Goal: To increase percentage of normal hearing personnel and decrease the percentage of hearing impaired personnel.

Discussion: The data indicates an increase in the proportion of DON personnel who have normal hearing. In CY 2006, 76.8% of DON personnel enrolled in HCP were flagged as having normal hearing, increasing to 79.9% in CY 2015.

MOE 4: DON Percentage of New Accessions with Normal Hearing and Hearing Impairment

Figure 3. Proportion of Hearing Impaired^a Department of the Navy (DON) Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

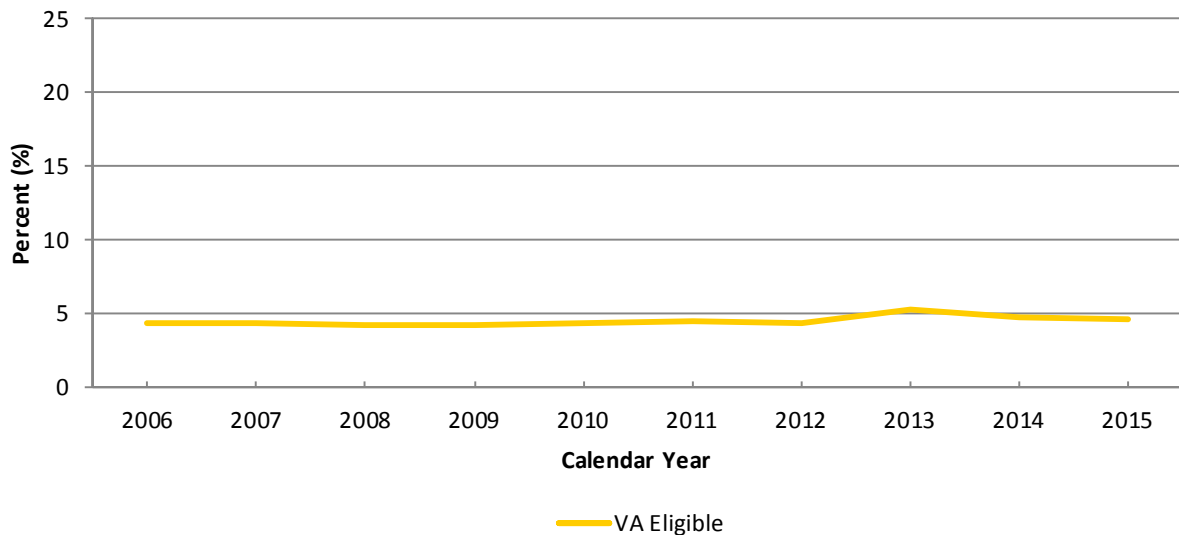
Interpretation: Figure 3 provides a corporate view on the effectiveness of accession policy and enforcement. Figure 3 indicates that 87.5% of accessions had normal hearing in CY 2006, and 89.2% had normal hearing in CY 2015.

Goal: To increase percentage of normal hearing personnel entering into military or civil service.

Discussion: According to the Accession Medical Standards Analysis and Research Activity (AMSARA), retention is negatively affected by recruits entering military service with a medical waiver for hearing loss; more so than recruits with any other type of medical waiver.

MOE 5: Percentage of Sailors and Marines who meet minimum VA Threshold Compensation Requirements

Figure 4. Proportion of Screenings that Met or Exceeded the Veterans Affairs (VA) Standards for Compensation^a among DON (Department of the Navy) Terminating Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aVA standards for compensation consideration are defined as any tested threshold greater than 40 dB HL or an average of any three tested thresholds that is greater or equal to 26 dB HL.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Interpretation: From CY 2006 to CY 2015, about 7% of DON personnel enrolled in the Hearing Conservation Program met or exceeded the VA Standards for compensation for hearing loss.

Goal: Reduce the percentage of VA eligible cases, based on thresholds obtained on termination hearing screenings.

Discussion: The goal to reduce the percentage of VA eligible cases is a different and more reflective outcome to consider program effectiveness than the overall hard count of Veterans Benefits Administration (VBA) prevalence and disability payout.

Summary and Conclusions

The goal of the Department of Navy’s Hearing Conservation and Noise Abatement program is to prevent noise-induced hearing loss, ensure auditory readiness, and drive mission success. While Navy Medicine is responsible for the overall management of the HCP, success depends on command execution. Compiling injury and compliance program metrics at a local level is critical to determining and communicating program effectiveness. However, there is an important place for population metrics when considering the enterprise level management of the HCP. The expanded metrics and this annual compendium report allow for a standardized approach to consider “real-time” (within the calendar year) population metrics that span the entire career lifecycle from accession to separation (termination).

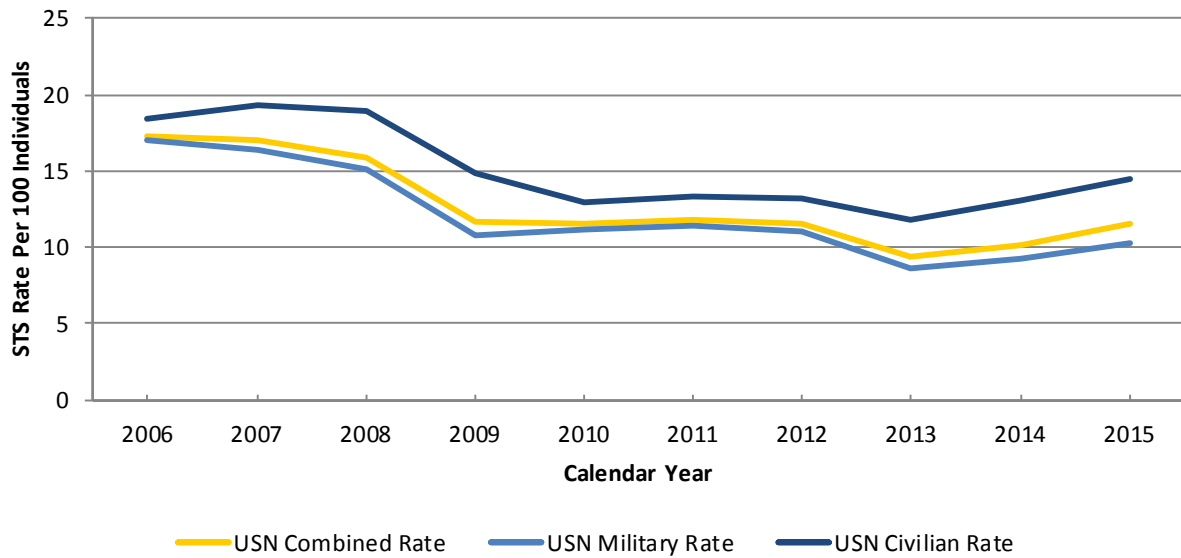
The way ahead:

- The Navy Hearing Conservation community will continue to aggressively incorporate prevention models to reduce occupational hearing loss.
- Establish noise control baselines for engineering and acquisition communities.
- Explore opportunities to improve trends among the civilian workforce.
- Annually report population metrics for the expanded MOEs.
- Champion standardizing the MOEs across the services.



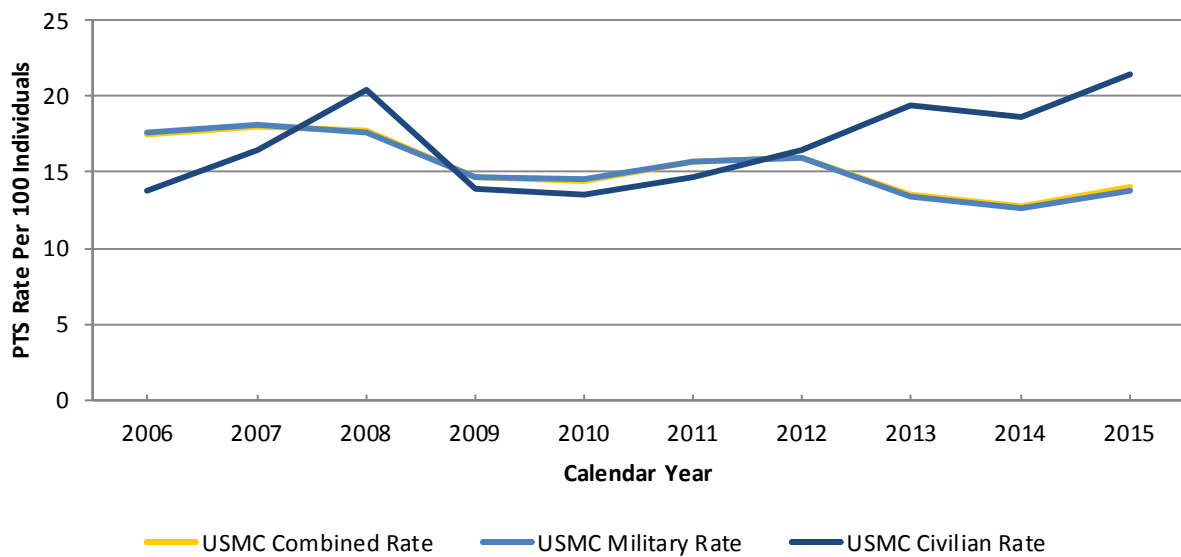
Appendix A: Additional MOE 1 Figures

Figure 1A. Significant Threshold Shift Rate (STS) among the United States Navy (USN) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Figure 2A. Significant Threshold Shift Rate (STS) among the United States Marine Corps (USMC) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015

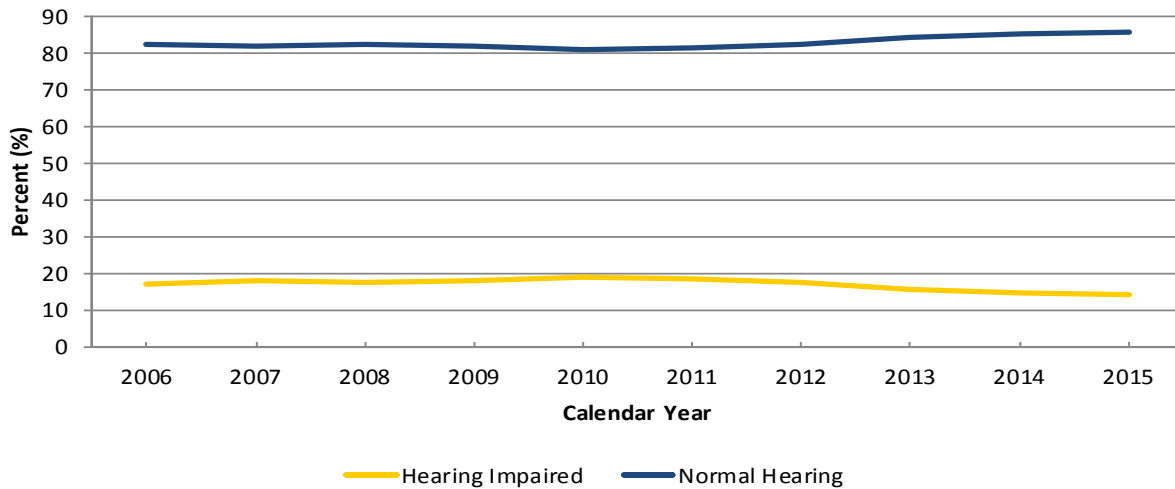


Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016



Appendix B: Additional MOE 3 Figures

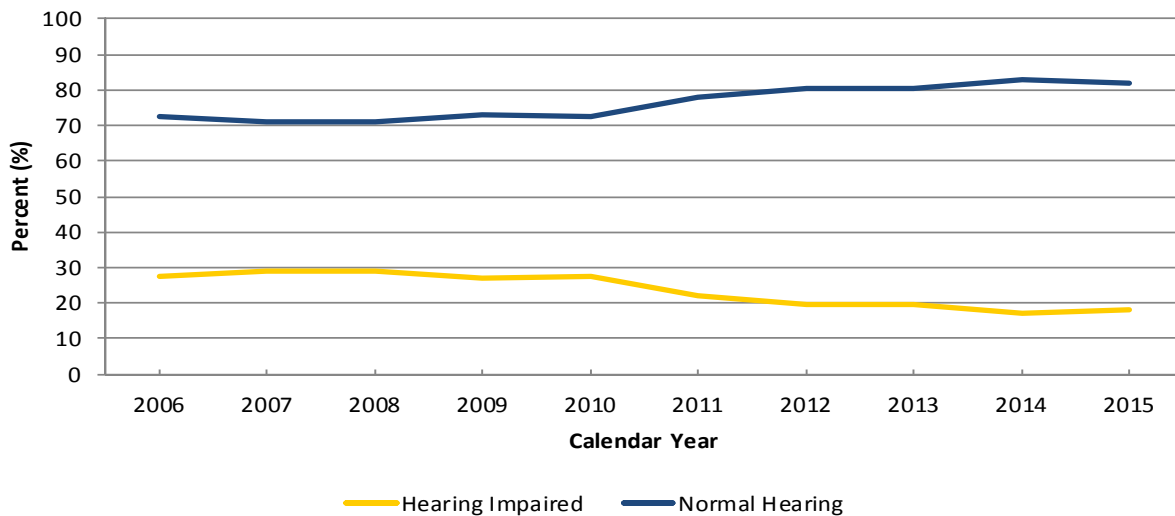
Figure 1B. Proportion of Hearing Impaired^a United States Navy (USN) Active Duty (AD) Service Members Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

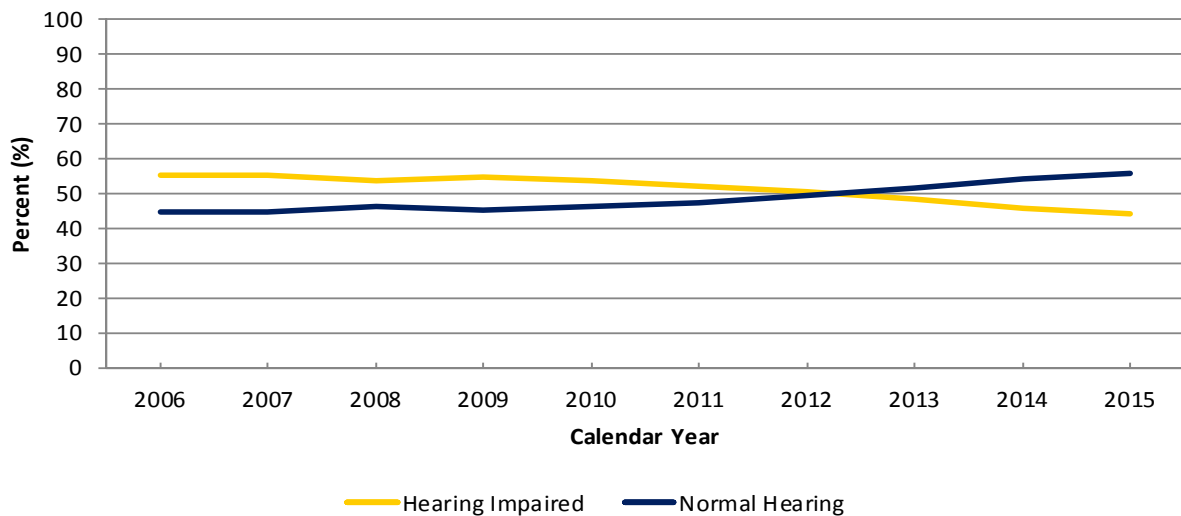
Figure 2B. Proportion of Hearing Impaired^a United States Navy (USN) Reserve Service Members Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
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Figure 3B. Proportion of Hearing Impaired^a United States Navy (USN) Civilian Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015

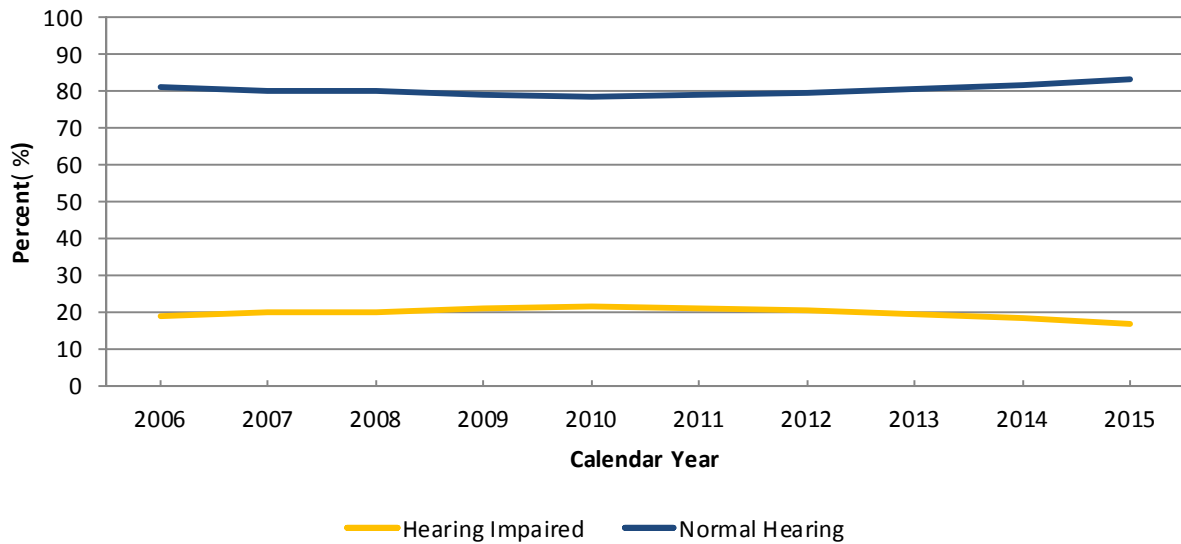


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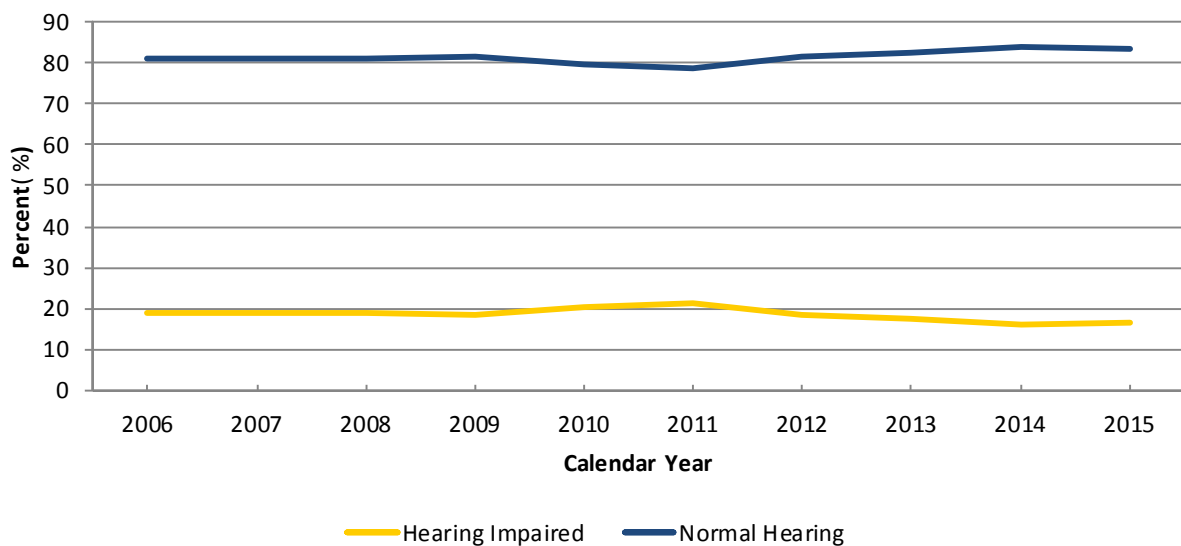
Figure 4B. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Active Duty (AD) Service Members Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Figure 5B. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Reserve Service Members Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015

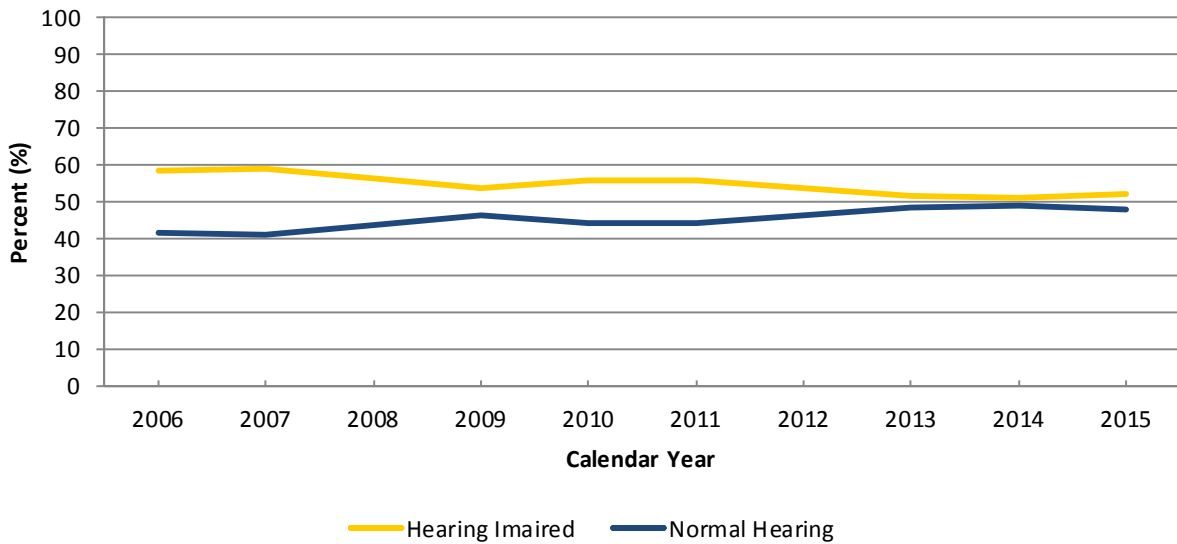


^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016



Figure 6B. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Civilian Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015

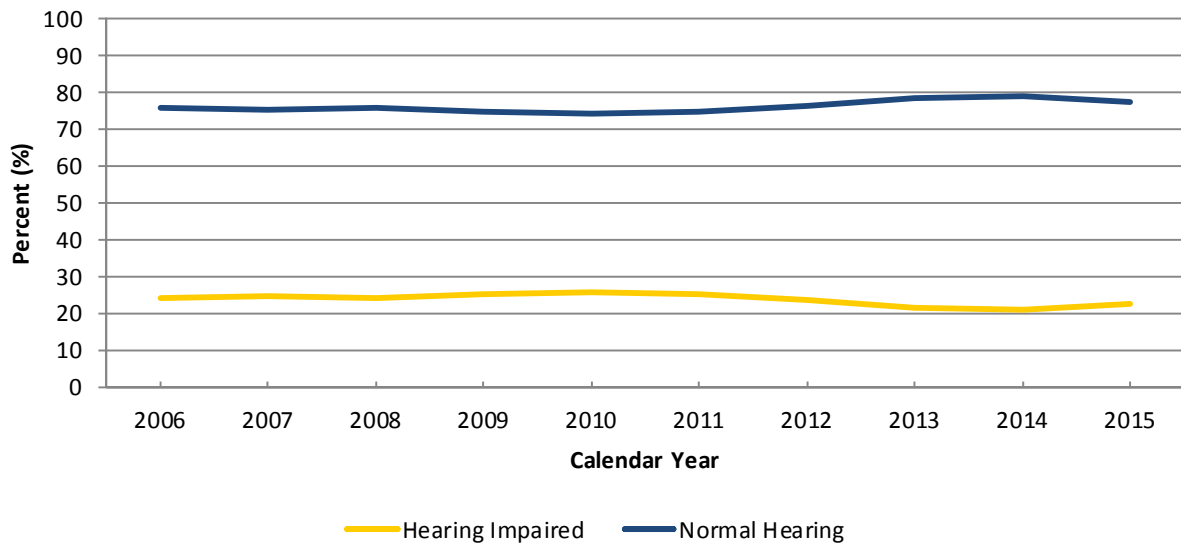


^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
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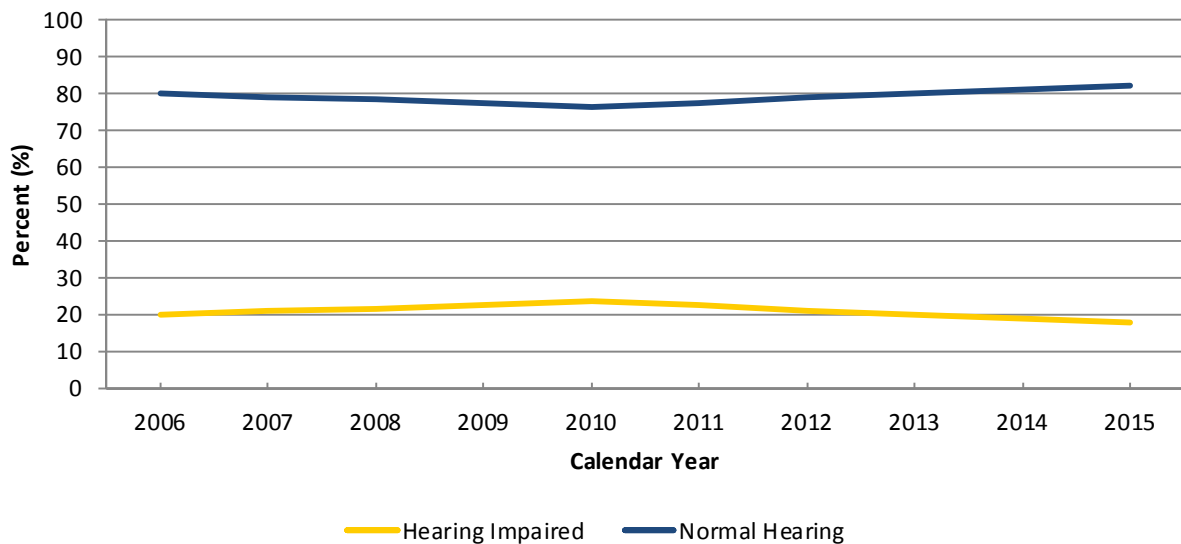
Figure 7B. Proportion of Hearing Impaired^a United States Navy (USN) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Figure 8B. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



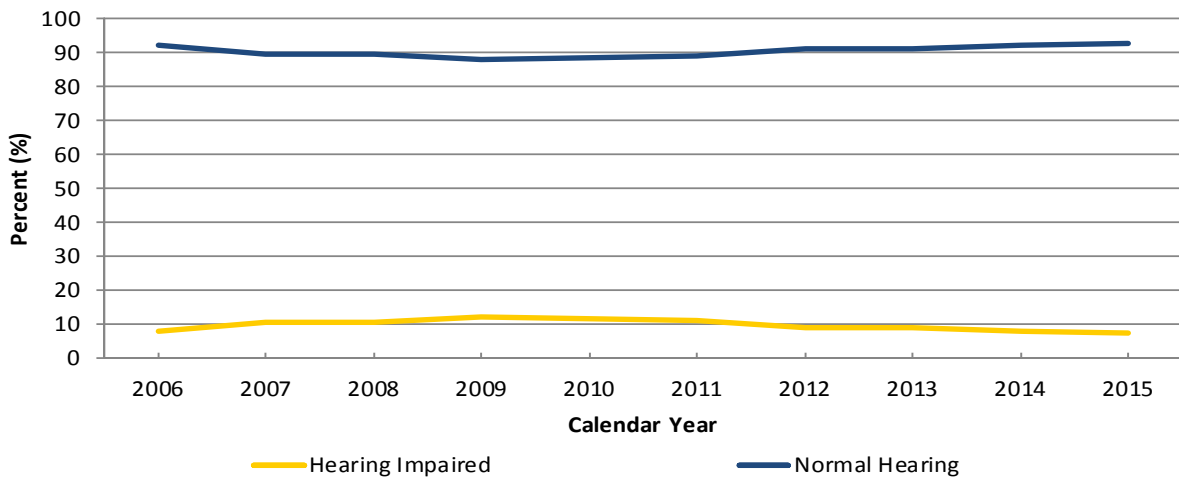
^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
 Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016



Appendix C: Additional MOE 4 Figures

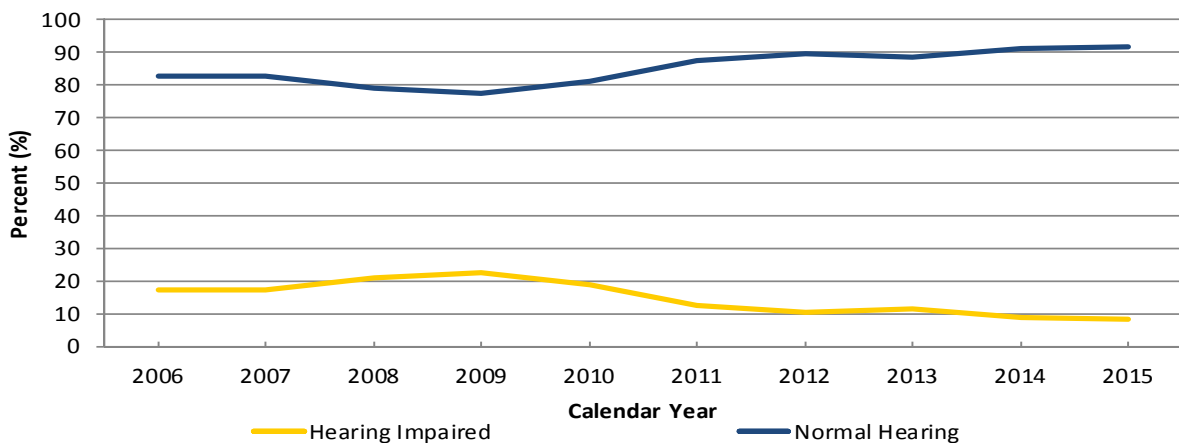
Figure 1C. Proportion of Hearing Impaired^a United States Navy (USN) Active Duty (AD) Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
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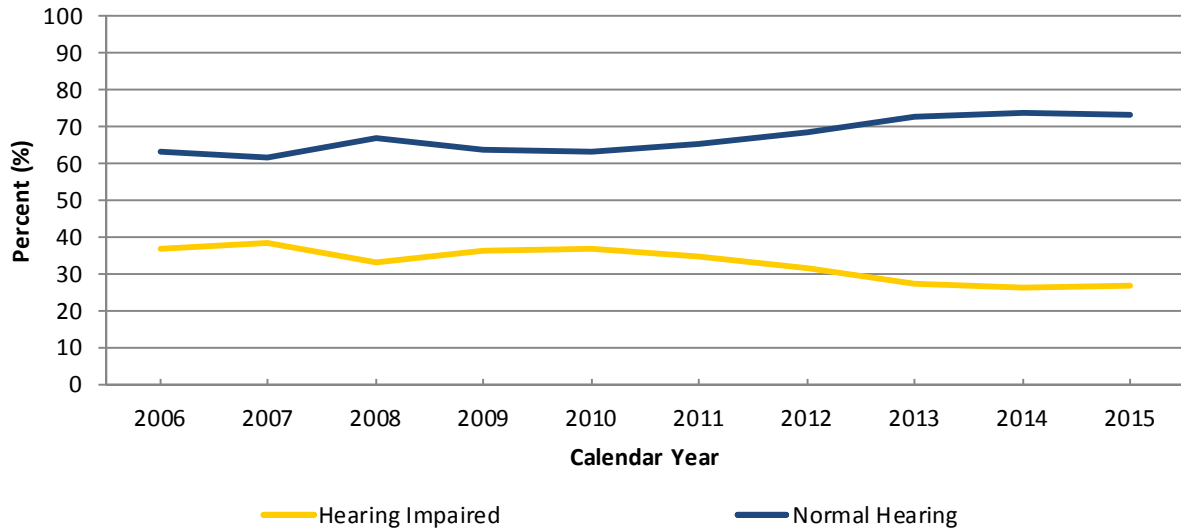
Figure 2C. Proportion of Hearing Impaired^a United States Navy (USN) Reserve Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

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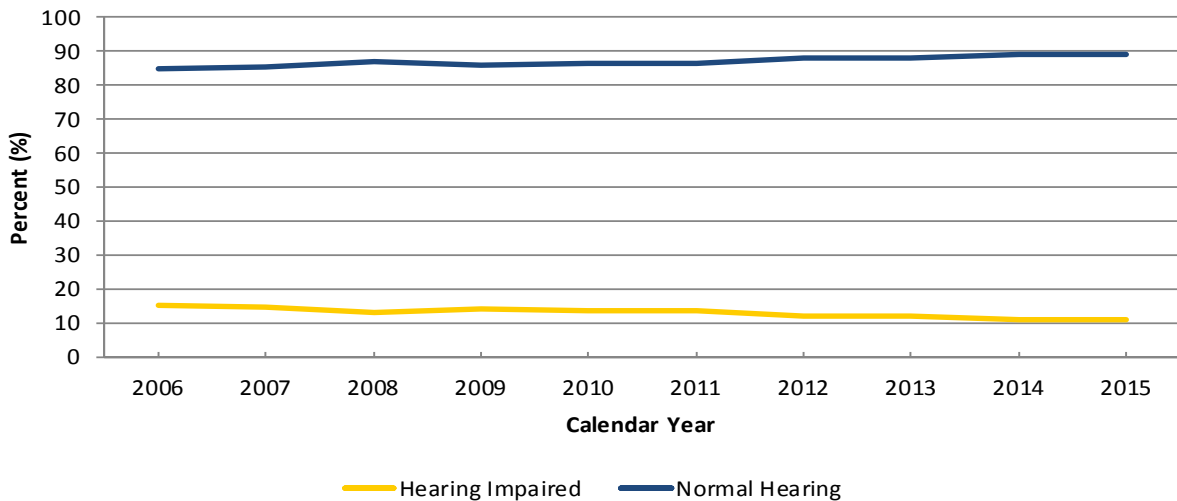
Figure 3C. Proportion of Hearing Impaired^a United States Navy (USN) Accession Civil Service Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

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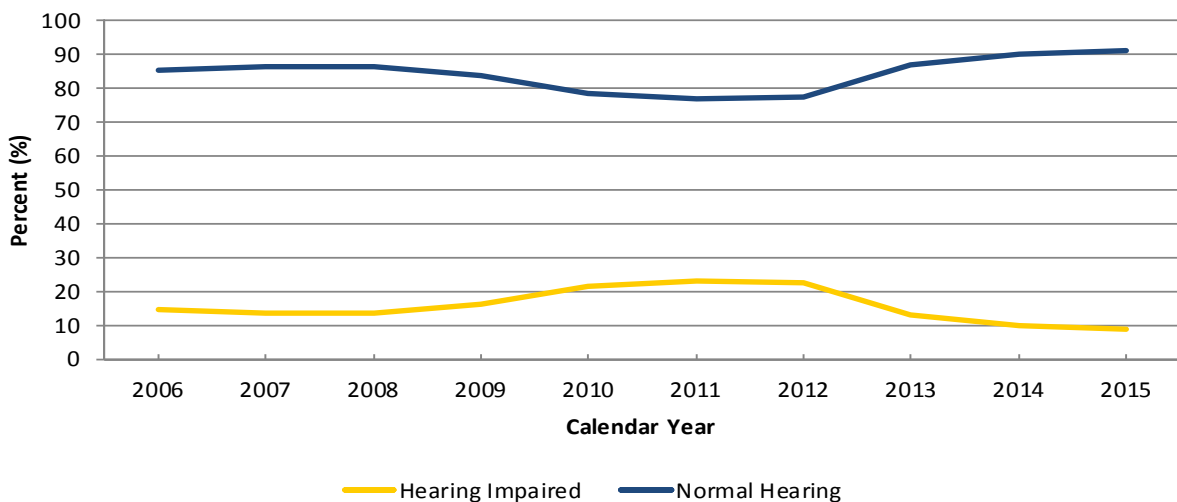
Figure 4C. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Active Duty (AD) Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



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Figure 5C. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Reserve Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015

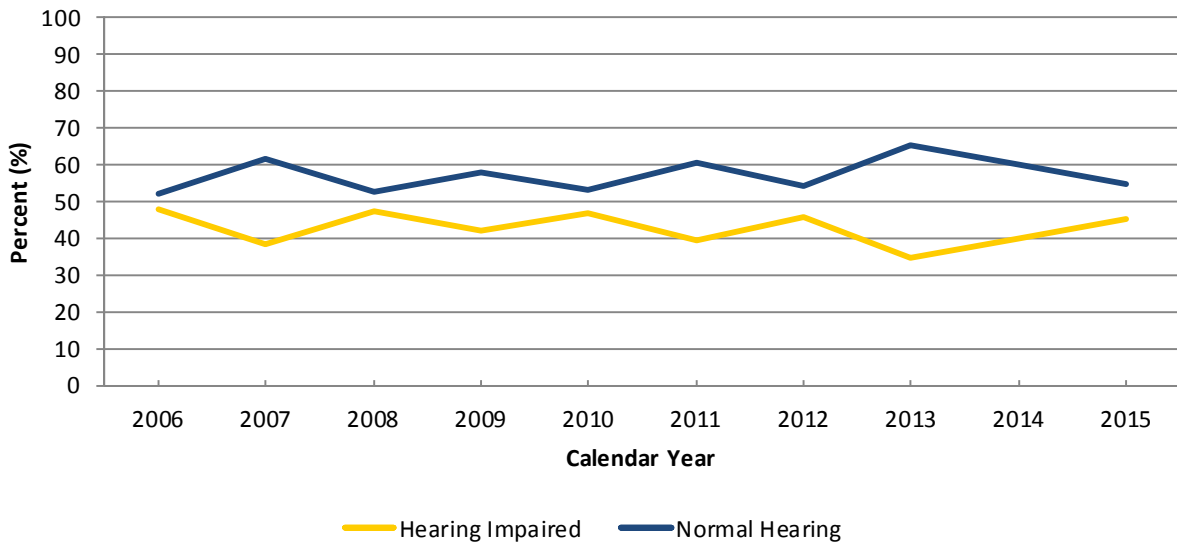


^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
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Table 6C. Proportion of Hearing Impaired^a United States Marine Corps (USMC) Civilian Accession Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



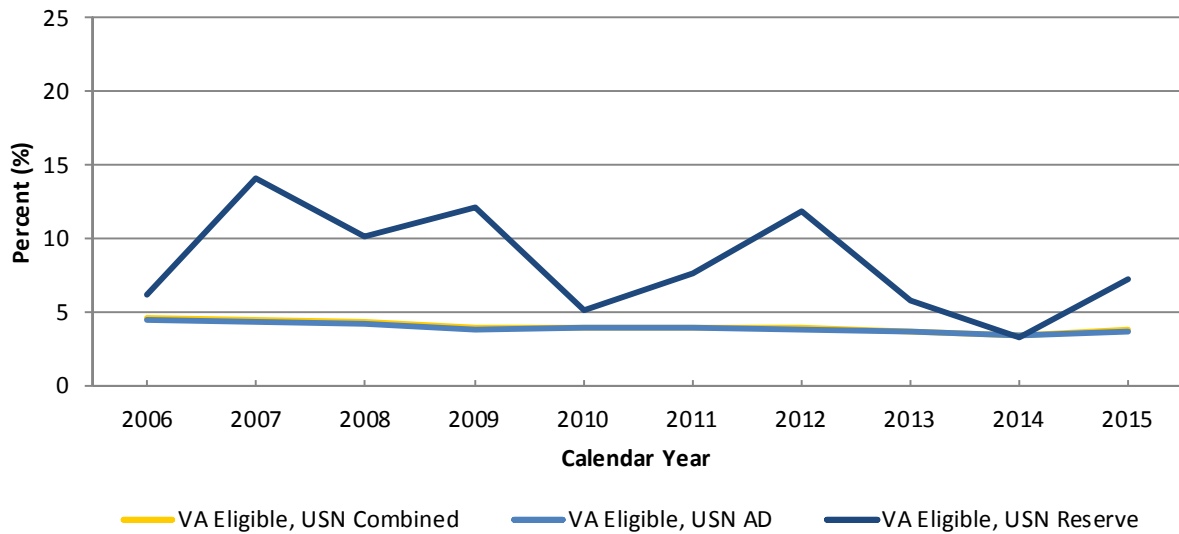
^aAn individual was flagged as being hearing impaired if he/she had at least one tested frequency that exceeded 25dB HL in either ear.

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Appendix D: Additional MOE 5 Figures

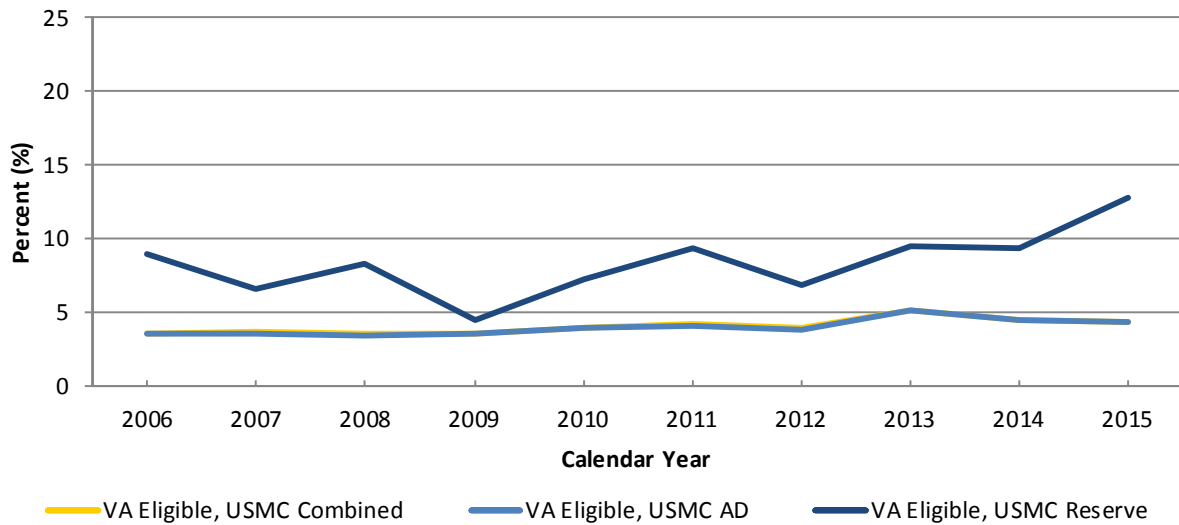
Figure 1D. Proportion of Screenings that Met or Exceeded the Veterans Affairs (VA) Standards for Compensation^a among United States Navy (USN) Terminating Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aVA standards for compensation consideration are defined as any tested threshold greater than 40 dB HL or an average of any three tested thresholds that is greater or equal to 26 dB HL.

Data Source: Defense Occupational and Environmental Health Readiness Hearing Conservation Data Repository
Prepared by the Navy and Marine Corps Public Health Center, EpiData Center, 07 September 2016

Figure 2D. Proportion of Screenings that Met or Exceeded the Veterans Affairs (VA) Standards for Compensation^a among United States Marine Corps (USMC) Terminating Personnel Enrolled in the Hearing Conservation Program, Calendar Years 2006-2015



^aVA standards for compensation consideration are defined as any tested threshold greater than 40 dB HL or an average of any three tested thresholds that is greater or equal to 26 dB HL.

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