Hearing Health Surveillance Data Review
Military Hearing Conservation - CY18

DOD Hearing Conservation Working Group

DOD Hearing Center of Excellence

Distribution A: Cleared for public release

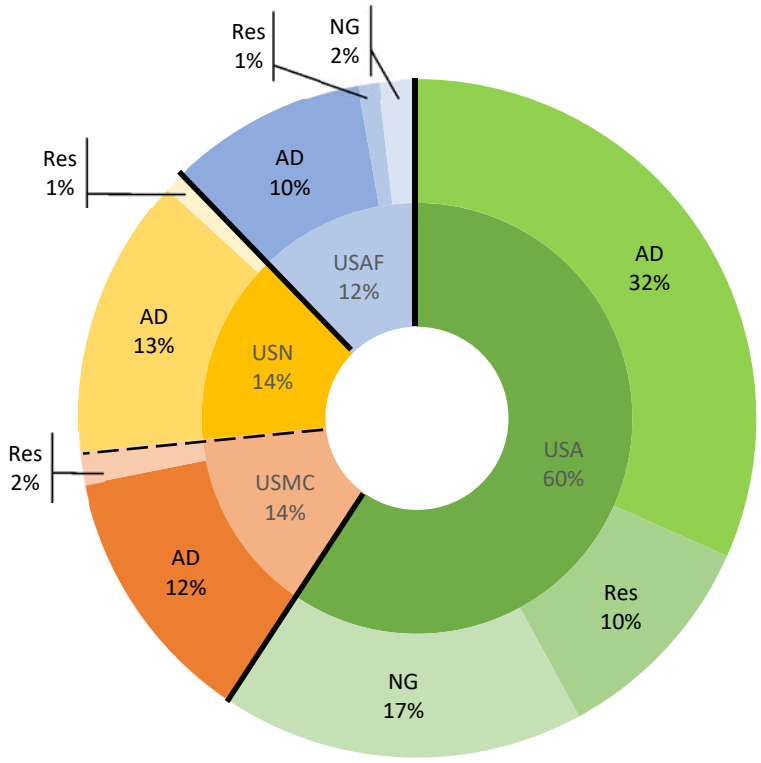
Contents

Executive Summary

It is Department of Defense (DOD) policy to 1) protect all military personnel and noise-exposed Civilian personnel from hearing loss resulting from occupational and operational noise exposure through a continuing, effective, and comprehensive hearing conservation program (HCP) and 2) reduce hazardous occupational and operational noise exposure to personnel to enhance mission readiness, communication, and safety. (DODI 6055.12 – DOD Hearing Conservation Program)

Each DOD component establishes, maintains, and evaluates the effectiveness of their hearing conservation programs. Because of the unique differences in mission execution, Service member requirements, and expected exposure to hazardous noise, not all Service members are monitored as part of a hearing conservation program. The data reported herein only represent Service members and Civilians enrolled in a hearing conservation program. The pie chart below reflects the relative size of each Service's Hearing Conservation Program by showing the ratio of Service members tested in CY18 by Service and Service component (active duty, Reserve, and National Guard).

Service Members Tested by Service and Service Component



CY18 Unique Tests	Mil	AD	Res	NG
USA	881,208	468,902	154,346	257,960
USMC	206,814	183,530	23,284	
USN	210,428	198,018	12,410	
USAF	183,032	141,398	14,554	27,080
DOD	1,481,482	991,848	204,594	285,040

This document consolidates measures of effectiveness (MOEs) from all Service components, and reviews Service level efforts to prevent hearing loss and improve hearing health in DOD hearing conservation programs. The metrics and data

in this report are developed and prepared by the United States Air Force School of Aerospace Medicine, Public Health and Preventive Medicine Department, Epidemiology Consult Service Division and the Defense Health Agency Armed Forces Health Surveillance Branch Air Force Satellite at Wright-Patterson AFB, Ohio. For questions regarding the data presented in this report, contact the Epidemiology Consult Service Division at USAFSAM.PHR.HC.WPAFB@us.af.mil. The metrics and data in this report have been reviewed by each of the Services' hearing conservation programs.

Summary Findings for CY18: hearing health in the DOD is improving for Service members and Civilians in the Hearing ConservationPprogram. Evidence of this is seen in an overall decrease in hearing impairment, decreased hearing impairment in enlisted accessions, and decreased rates of Service members who meet established VA disability criteria. Compliance with follow-up testing showed a marked decline from CY17 to CY18 after several years of improvement.

Hearing Impairment

The percent of hearing impaired Service members (14.7%) and Civilians (40.4%) continues to improve. Active duty Service members have the lowest rates of hearing impairment (12.9%) compared to National Guard (18.9%) and Reserve (18.1%).

The percent of enlisted accessions with hearing impairments (7.6%) continues to improve. Active duty (7.3%) and Reserve (7.2%) accessions have the lowest rates of hearing impairment compared to the National Guard (10.2%).
The percent of Service members who meet established VA disability criteria (4.9%) continues to improve. Active duty Service members have the lowest rates (4.0%) followed by the Reserve (6.7%) and National Guard (6.8%).

Potential Hearing Injury

Potential hearing injury rates (significant threshold shift or STS) for Service members are generally stable with large differences between active duty, and National Guard and Reserve components. While STS rates generally held steady or decreased slightly, permanent threshold shifts (PTS) tended to increase while temporary threshold shifts (TTS) tended to fall. This is likely related to the marked decrease in follow-up testing from CY17 to CY18; without follow-up testing, an STS that would resolve to a TTS will go undetected and, by default, would be incorrectly classified as a PTS. Thus, even when there is no apparent change in STS rates, a slight increase in PTS and decrease in TTS can be observed in CY18.

Follow-up compliance for DOD Service members was improving but declined from 43% in CY17 to 34.5% in CY18. Active duty and noise-exposed Civilians have the highest follow-up compliance rates (63.1% and 59.4% respectively) while the National Guard (14.1%) and Reserve (6.1%) rates remain low. Service differences also exist. A general lack of adequate follow-up testing in the National Guard (particularly the Army National Guard) and Reserve (principally the Army and Marine Corps) makes interpretation of their data difficult.

Current potential hearing injury rates for DOD Service members include: STS – 11.2%, TTS – 2.6%, and PTS – 8.5%. Permanent threshold shift rates for active duty (4.9%) and noise-exposed Civilians (9.4%) are lower (and more accurate) in part due to their higher follow-up testing compliance than the National Guard and Reserve (with PTS rates of 13.0% and 17.0%, respectively).

Definitions

Hearing impairment: Any tested frequency exceeding 25 dBHL in either ear.

Significant Threshold Shift (STS): Hearing thresholds changed, relative to the most recent baseline, an average of 10 dB or more at 2000, 3000, and 4000 Hertz (Hz) in either ear. An STS requires follow-up testing to determine if the STS is permanent (PTS) or temporary (TTS).

Temporary Threshold Shift (TTS): An STS that resolves on follow-up testing.

Permanent Threshold Shift (PTS): An STS that fails to resolve on follow-up testing is determined to be a permanent decrease in hearing. An STS that does not receive follow-up testing within the required timeframe is identified as a PTS.

Follow-up testing compliance: The number of members who completed required follow-up hearing tests following a positive STS on their periodic hearing test.

VA disability criteria: Any reference or periodic test with a pure-tone average (PTA) of 26 dB or more at any three frequencies (500, 1000, 2000, 3000 or 4000 Hz), or a threshold of 40 dB or more at any one of those same individual frequencies per 38 CFR 3.385.

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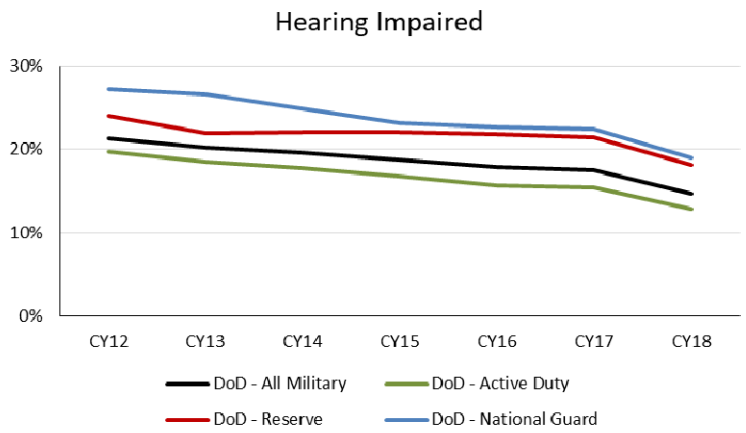
Hearing Health – DOD Hearing Conservation Program

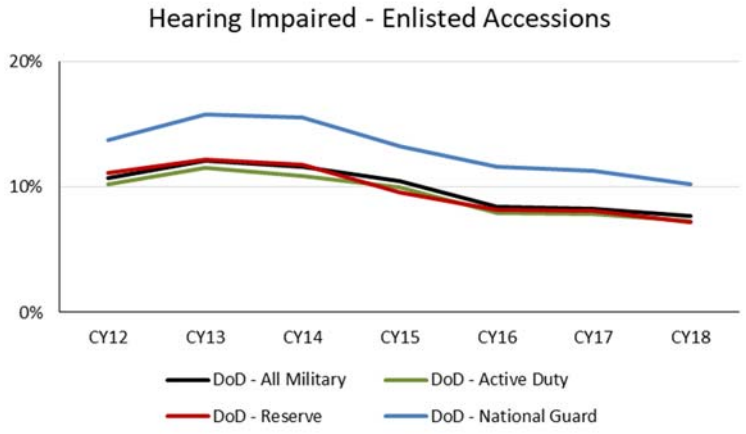
The following data represent Service members and noise-exposed Civilians enrolled in a hearing conservation program. Each Service enrolls Service members into their HCP differently so these data do not represent the hearing health of ALL Service members in the DOD. The general finding of these data is that the overall hearing health for DOD Service members in a hearing conservation program continues to improve.

Hearing Impaired

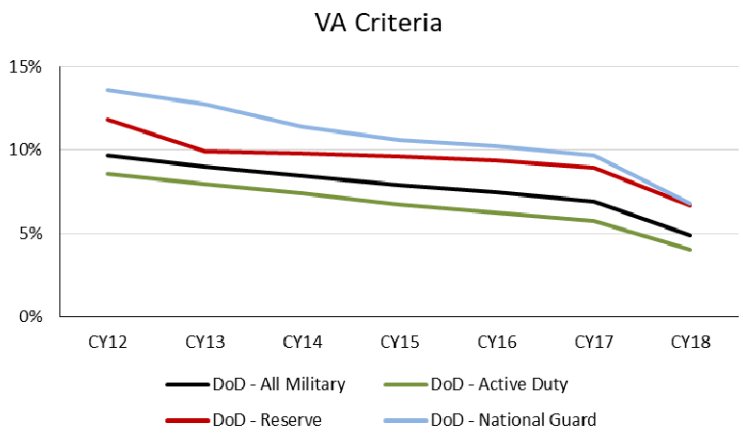
The percent of hearing impaired Service members is decreasing for all DOD components. DOD Service members with hearing impairment decreased from 21% in CY12 to 15% in CY18.



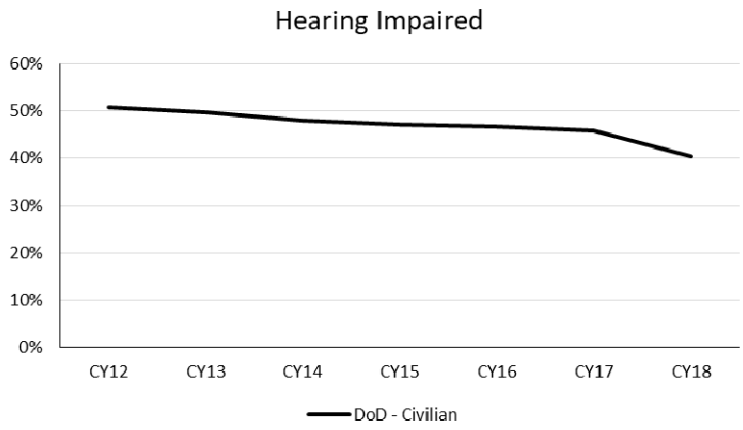
The percent of enlisted accessions with hearing impairment has decreased for all DOD components since CY12 with only slight improvements in CY18 compared to CY17. The percent of enlisted accessions, in the DOD, with hearing impairment decreased from 11% in CY12 to 8% in CY18.



The percent of Service members meeting established VA disability criteria is decreasing for all DOD components. The percentage of DOD Service members potentially eligible for Veteran's Benefits Administration compensation decreased from 10% in CY12 to 5% in CY18.

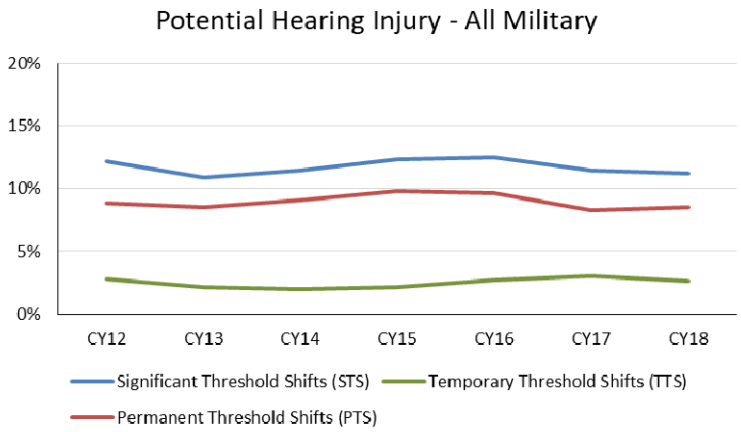


The percent of noise-exposed Civilians with hearing impairment is high with gradual improvement over the last several years. The percent of Civilians with hearing impairment decreased from 51% in CY12 to 40% in CY18.

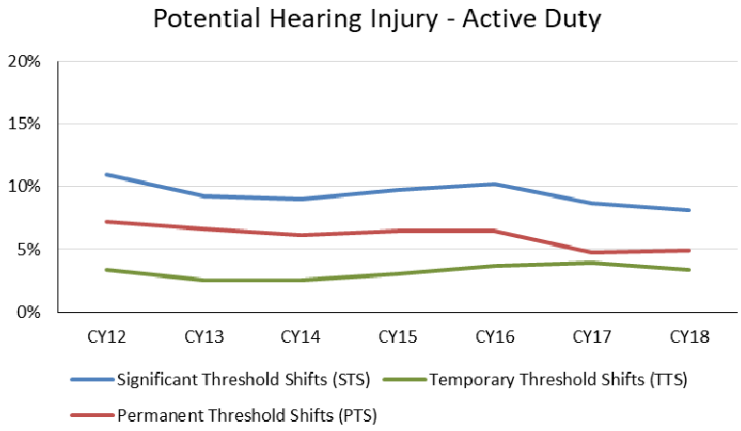


Potential Hearing Injury

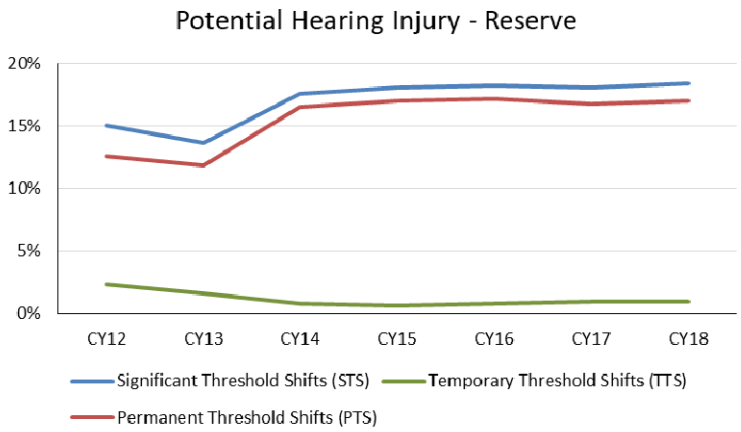
In CY18, all Military DOD STS, TTS, and PTS rates generally held steady. Data indicate an 11% STS, 3% TTS, and 9% PTS rate in CY18.

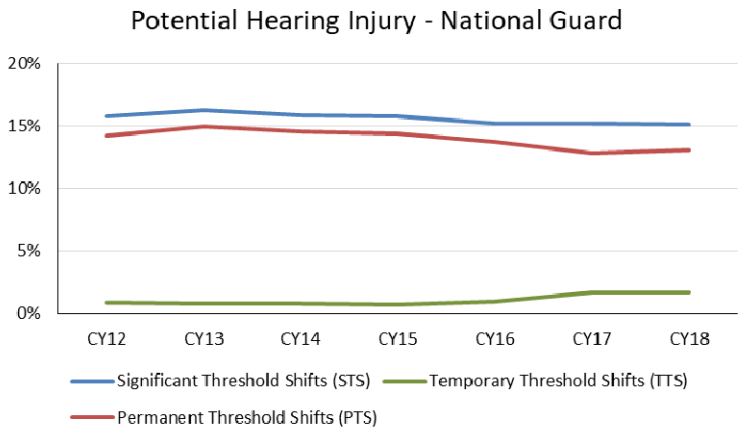


Active duty Service members have the lowest potential hearing injury rates. Active duty Service member rates for CY18 were: 8% STS, 3% TTS, and 5% PTS. The slight increase in PTS and decrease in TTS are likely the result of decreased follow-up testing in CY18 as compared to CY17 follow-up testing. Improved follow-up testing compliance, over a seven year period, in the active duty population (see follow-up compliance graph on page 11), has shown that about half of all potential hearing injuries (STS) are permanent (PTS).

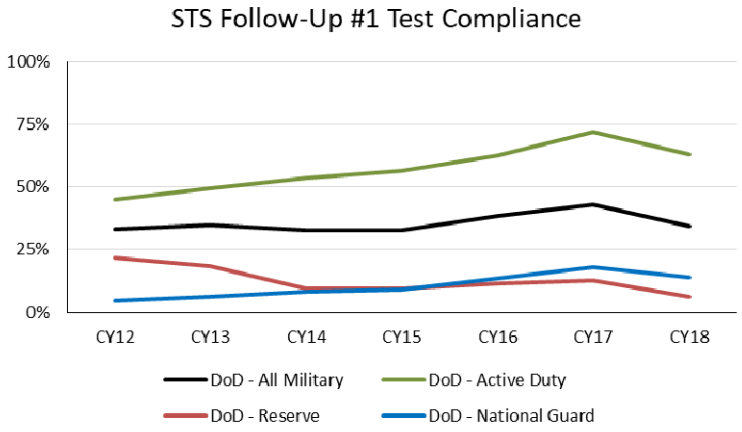


Reserve and National Guard STS and PTS rates remain potentially elevated due to a lack of follow-up testing. Reserve rates for CY18 are: 18% STS, 1% TTS, and 17% PTS. National Guard rates for CY18 are: 15% STS, 2% TTS, and 13% PTS. Failure to conduct follow-up testing prevents the accurate identification of hearing injuries.

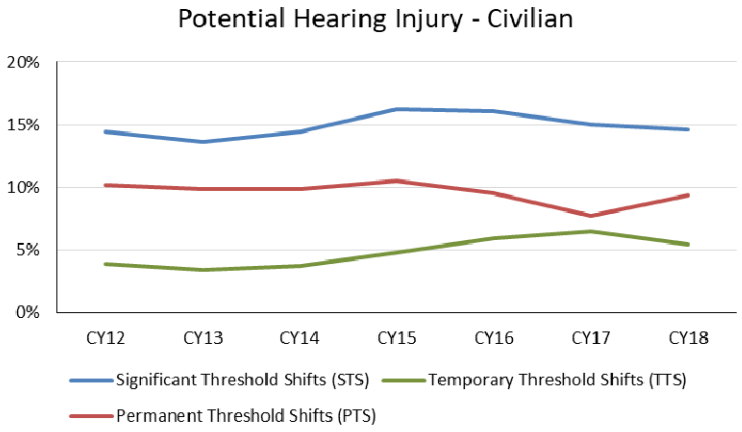




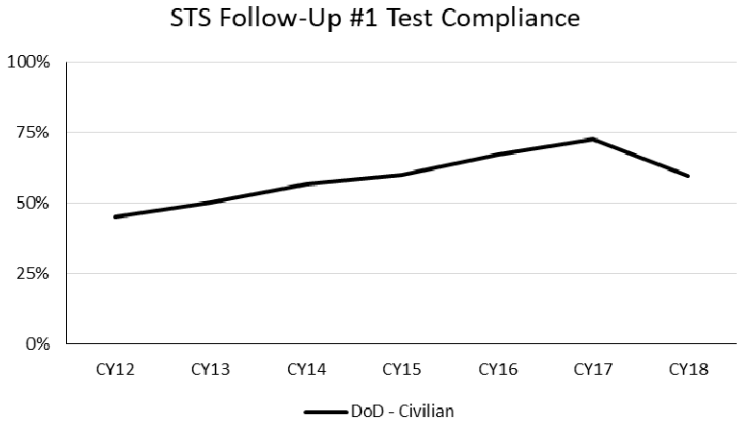
Follow-up testing (required for STS/potential hearing injuries) showed a marked decrease in CY18 compared to CY17. Overall compliance (all military) improved from 33% in CY12 to 43% in CY17 but dropped to 35% in CY18. Compliance in the active duty and National Guard has improved since CY12 while compliance in the Reserve has decreased. Failure to conduct follow-up testing will: 1) Elevate STS rates (the initial STS may be identified every year until follow-up testing is performed and a new baseline is established, if required) and 2) Prevent accurate identification of PTS and TTS (STS with no follow-up hearing test defaults to a PTS when the military follow-up test window has closed, i.e., 91 calendar days after the periodic hearing test identified the STS). This results in artificially high STS and PTS rates that do not reflect the true incidence of new Military hearing injuries.



Potential hearing injury rates for Civilians remain high compared to Service members. Rates for CY18 are: 15% STS, 5% TTS, and 9% PTS. The increase in CY18 PTS and corresponding decrease in CY18 TTS are likely the result of decreased follow-up testing as compared to CY17.



Civilian follow-up testing (required for STS) showed a marked decrease in CY18 after several years of improvement. Compliance peaked in CY17 at 72% with overall improvement from 45% in CY12 to 59% in CY18. Failure to conduct follow-up testing will: 1) Elevate STS rates (the initial STS may be identified every year until follow-up testing is performed and a new baseline is established, if required) and 2) Prevent accurate identification of PTS and TTS (STS with no follow-up defaults to a PTS when the Civilian follow-up hearing test window has closed, i.e., 31 calendar days after the periodic hearing test identified the STS). This results in artificially high STS and PTS rates that do not reflect the true incidence of new Civilian hearing injuries.



Summary and Conclusions

Hearing health for Service members and Civilians in the DOD Hearing Conservation Program is improving. Evidence of this is seen in decreased hearing impairment, decreased hearing impairment in enlisted accessions, and decreased VA eligibility rates. Follow-up testing showed a marked decline in CY18 after several years of improvement. Follow-up testing improves the accuracy of STS, PTS, and TTS incidence rates. These data show that PTS rates decreased to about half of the STS rates with improved follow-up testing compliance. This is seen in the active duty and Civilian population where follow-up testing compliance is well above 50% and the PTS and TTS rates are almost equal. As follow-up compliance continues to increase, accuracy of STS, PTS, and TTS rates will also improve.

Data Summary – DOD

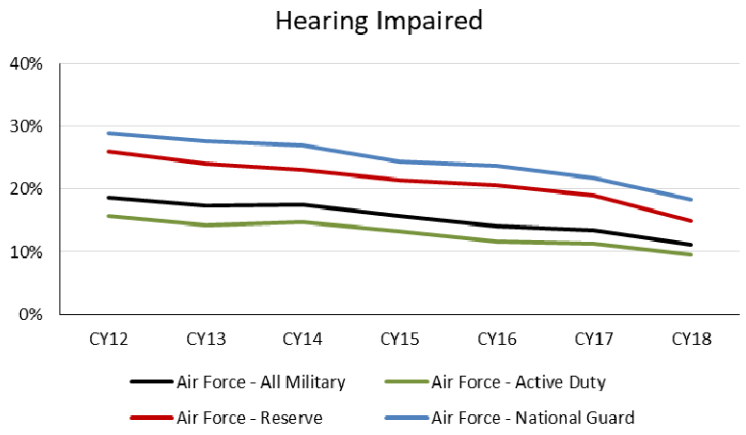
Chart Title	Category	CY12	CY13	CY14	CY15	CY16	CY17	CY18
Hearing Impaired	DOD - All Military	21%	20%	20%	19%	18%	18%	15%
	DOD - Active Duty	20%	18%	18%	17%	16%	15%	13%
	DOD - Reserve	24%	22%	22%	22%	22%	21%	18%
	DOD - National Guard	27%	27%	25%	23%	23%	22%	19%
	DOD - Civilian	51%	50%	48%	47%	47%	46%	40%
Hearing Impaired - Enlisted Accessions	DOD - All Military	11%	12%	12%	10%	8%	8%	8%
	DOD - Active Duty	10%	12%	11%	10%	8%	8%	7%
	DOD - Reserve	11%	12%	12%	10%	8%	8%	7%
	DOD - National Guard	14%	16%	16%	13%	12%	11%	10%
VA Criteria	DOD - All Military	10%	9%	8%	8%	7%	7%	5%
	DOD - Active Duty	9%	8%	7%	7%	6%	6%	4%
	DOD - Reserve	12%	10%	10%	10%	9%	9%	7%
	DOD - National Guard	14%	13%	11%	11%	10%	10%	7%
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	12%	11%	11%	12%	13%	11%	11%
	Temporary Threshold Shifts (TTS)	3%	2%	2%	2%	3%	3%	3%
	Permanent Threshold Shifts (PTS)	9%	9%	9%	10%	10%	8%	9%
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	11%	9%	9%	10%	10%	9%	8%
	Temporary Threshold Shifts (TTS)	3%	3%	3%	3%	4%	4%	3%
	Permanent Threshold Shifts (PTS)	7%	7%	6%	6%	6%	5%	5%
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	15%	14%	18%	18%	18%	18%	18%
	Temporary Threshold Shifts (TTS)	2%	2%	1%	1%	1%	1%	1%
	Permanent Threshold Shifts (PTS)	13%	12%	17%	17%	17%	17%	17%
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	16%	16%	16%	16%	15%	15%	15%
	Temporary Threshold Shifts (TTS)	1%	1%	1%	1%	1%	2%	2%
	Permanent Threshold Shifts (PTS)	14%	15%	15%	14%	14%	13%	13%
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	14%	14%	14%	16%	16%	15%	15%
	Temporary Threshold Shifts (TTS)	4%	3%	4%	5%	6%	7%	5%
	Permanent Threshold Shifts (PTS)	10%	10%	10%	11%	10%	8%	9%
STS Follow-Up #1 Test Compliance	DOD - All Military	33%	35%	33%	33%	39%	43%	35%
	DOD - Active Duty	45%	50%	54%	57%	63%	72%	63%
	DOD - Reserve	22%	18%	9%	9%	12%	13%	6%
	DOD - National Guard	4%	6%	8%	9%	13%	18%	14%
	DOD - Civilian	45%	50%	57%	60%	67%	72%	59%

Appendix A: Hearing Health – Air Force

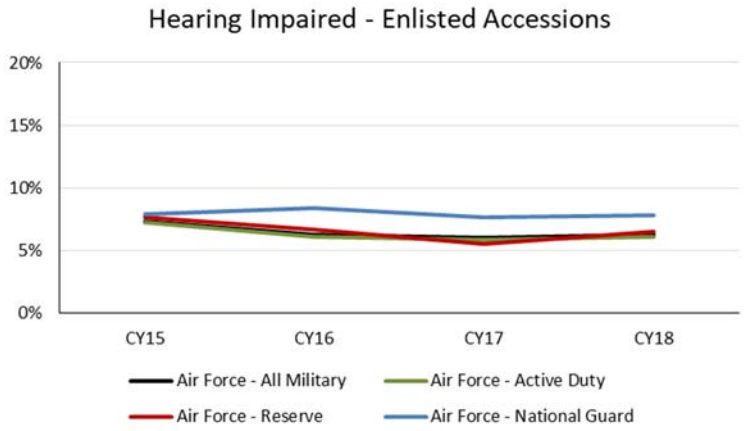
The Air Force Hearing Conservation Program is a risk-based program, enrolling Service members and Civilians that have measured exposure to hazardous noise in an occupational setting. The data below are only a reflection of the members enrolled in the Hearing Conservation Program for a given calendar year. In 2015, the Air Force started hearing testing at Basic Military Training for enlisted and officers. These tests include all Service members at training, regardless of noise exposure risk. Testing in this manner adds a significant number of normal hearing test results to the larger pool of hearing conservation tests within a calendar year, and can affect the data. Likewise, the Air Force completes Separation Health Physical Exams (SHPE) for all Service members, using the system of record for hearing conservation, DOERHS-HC DR, regardless of hearing conservation program enrollment. Because of the hearing tests completed at the beginning and end of military service, regardless of hearing conservation program enrollment, the graphs below are not completely reflective of actual hearing conservation program effectiveness or hearing health of total Air Force population.

Hearing Impaired

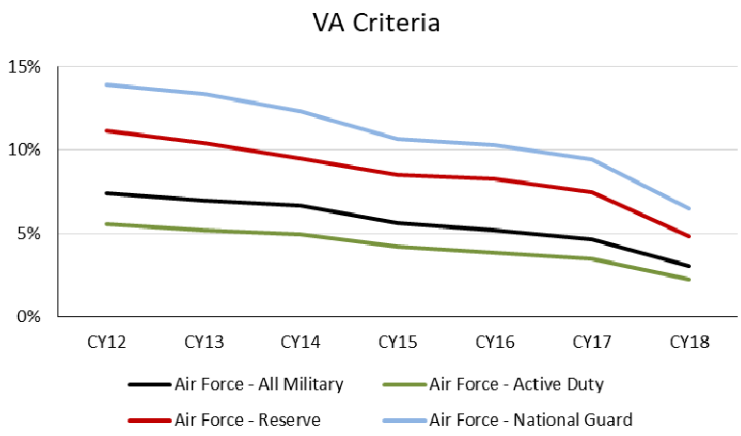
The percent of hearing impaired Airmen is decreasing for all Service components. Airmen with hearing impairment decreased from 19% in CY12 to 11% in CY18.



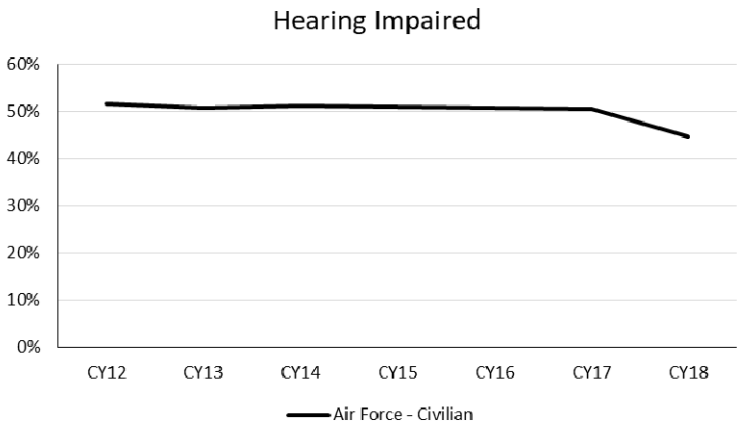
The percent of enlisted accessions with hearing impairment has remained relatively stable. The percent of enlisted accessions with hearing impairment was 7% in CY15 and 6% in CY18. Air Force enlisted accessions did not receive audiometric testing prior to CY15.



The percent of Airmen meeting VA criteria is decreasing for all service components. The percentage of Airmen potentially eligible for Veteran's Benefits Administration compensation has decreased from 7% in CY12 to 3% in CY18

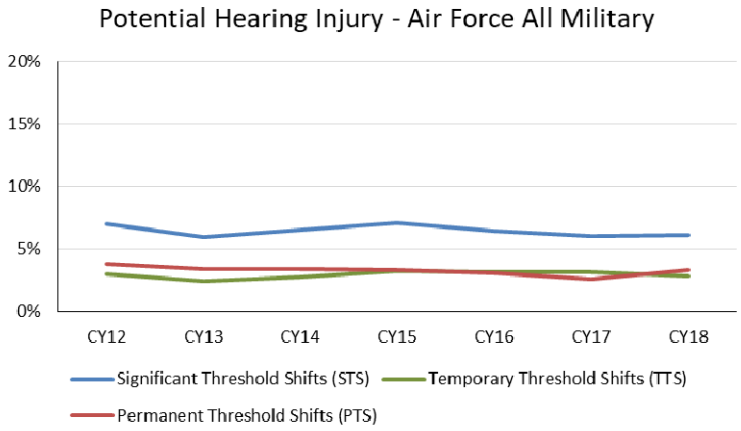


The percent of noise exposed Civilians with hearing impairment remains stable over the last several years. Dip noted in CY18, and analysis will be conducted if trend continues. The percent of Civilians with hearing impairment decreased from 52% in CY12 to 45% in CY18.

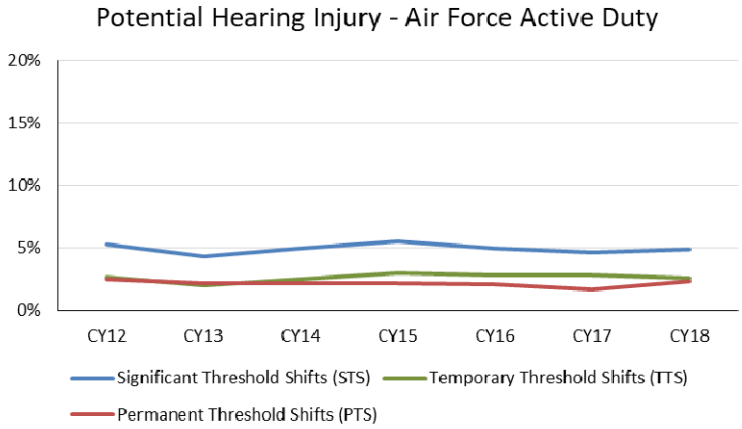


Potential Hearing Injury

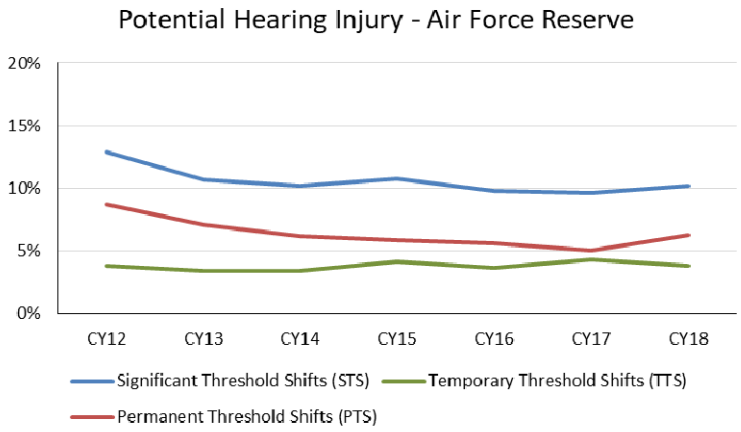
Hearing injury rates in the Air Force are relatively stable. Data indicate a 6% STS, 3% TTS, and 3% PTS rate in CY18. The slight increase in PTS and decrease in TTS are likely related to an overall decrease in follow-up testing in CY18; without follow-up testing by the suspense date, an STS that potential would have resolved to a TTS would then, by default, be classified as an unconfirmed PTS. Thus, even when there is no apparent change in STS rates, a slight increase in PTS and decrease in TTS can be observed and will be reflected in the below Air Force active duty, Reserve, Guard, Civilian service results.



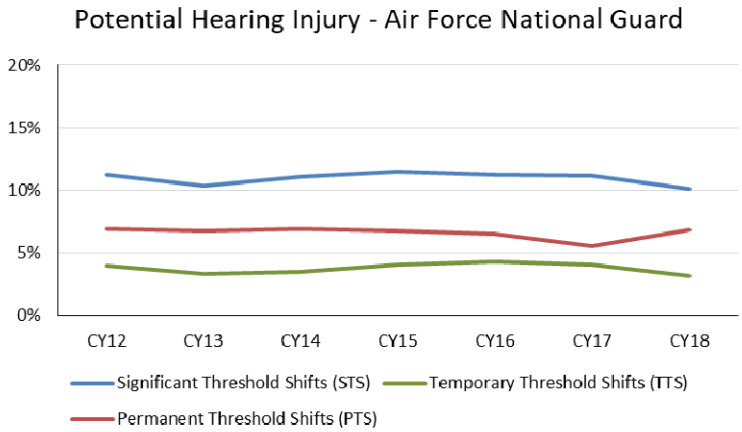
Air Force active duty potential hearing injury rates are generally stable over the last several years. Rates for CY18 are; 5% STS, 3% TTS, and 2% PTS.



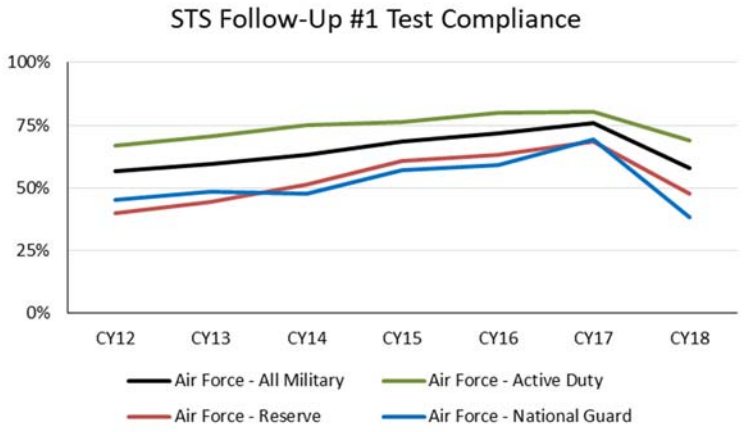
Air Force Reserve potential hearing injury are relatively stable over the last several years. Rates for CY18 are; 10% STS, 4% TTS, and 6% PTS.



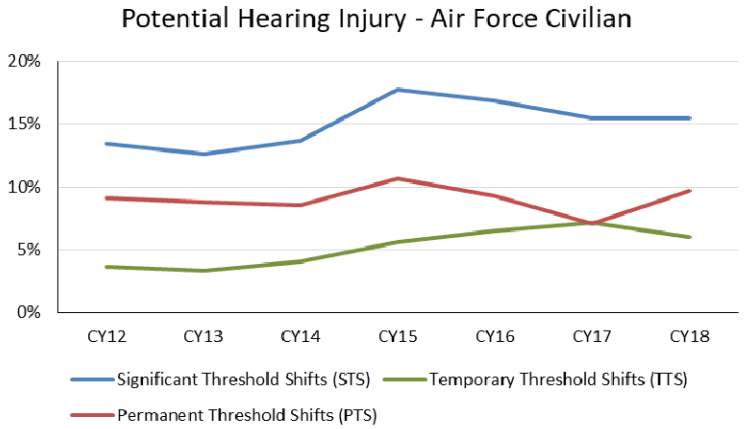
Air Force National Guard potential hearing injury rates are relatively stable over the last several years. Rates for CY18 are; 10% STS, 3% TTS, and 7% PTS.



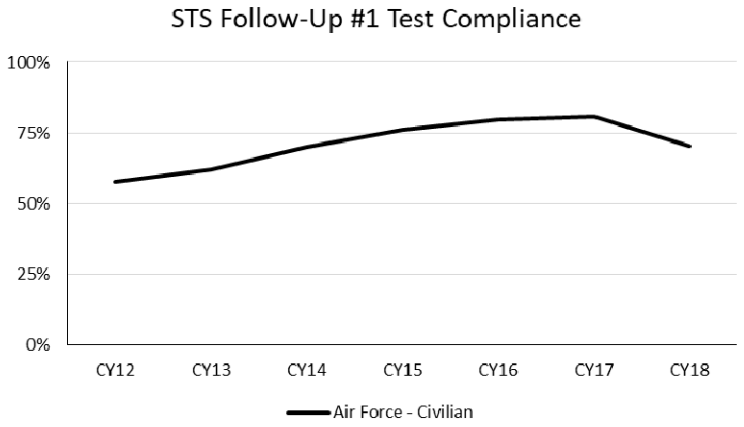
Follow-up testing showed steady improvement from 57% in CY12 to 76% in CY 17 but dropped in CY18 to 58%. Drop in STS Follow-Up #1 was noted, and analysis will be conducted if trend continues.



Civilian potential hearing injury rates are higher than Air Force active duty, Reserve, and Guard but show improvement and could be related to years of
exposure in the workplace. Rates for CY18 are; 15% STS, 6% TTS, and 10% PTS.



Follow-up testing (required for STS) showed a marked decrease in CY18 after several years of improvement. Compliance improved from 58% in CY12 to 70% in CY18. If a member does not meet suspense then STS will become an unconfirmed PTS, which could be the cause for the CY18 increase in PTS rates in the Air Force active duty, Reserve, Guard, and Civilian service. Drop in STS Follow-Up #1 was noted, and analysis will be conducted if trend continues.



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Data Summary – Air Force

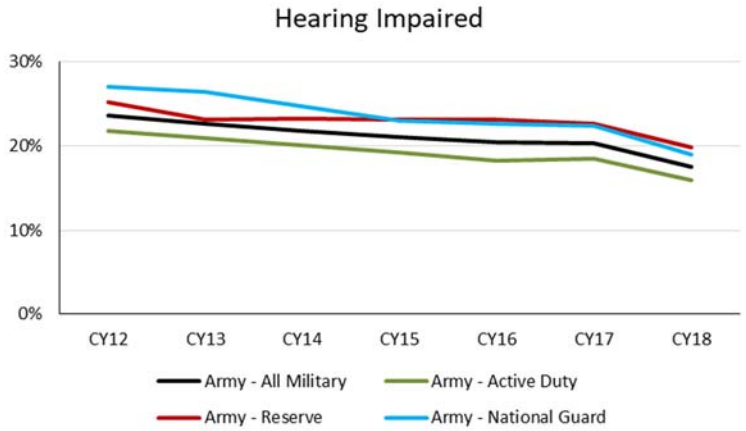
Chart Title	Category	CY12	CY13	CY14	CY15	CY16	CY17	CY18
Hearing Impaired	Air Force - All Military	19%	17%	18%	16%	14%	13%	11%
	Air Force - Active Duty	16%	14%	15%	13%	12%	11%	9%
	Air Force - Reserve	26%	24%	23%	22%	21%	19%	15%
	Air Force - National Guard	29%	28%	27%	24%	24%	22%	18%
	Air Force - Civilian	52%	51%	51%	51%	51%	51%	45%
Hearing Impaired - Enlisted Accessions	Air Force - All Military	-n/a-	-n/a-	-n/a-	7%	6%	6%	6%
	Air Force - Active Duty	-n/a-	-n/a-	-n/a-	7%	6%	6%	6%
	Air Force - Reserve	-n/a-	-n/a-	-n/a-	8%	7%	6%	6%
	Air Force - National Guard	-n/a-	-n/a-	-n/a-	8%	8%	8%	8%
VA Criteria	Air Force - All Military	7%	7%	7%	6%	5%	5%	3%
	Air Force - Active Duty	6%	5%	5%	4%	4%	3%	2%
	Air Force - Reserve	11%	10%	9%	9%	8%	7%	5%
	Air Force - National Guard	14%	13%	12%	11%	10%	9%	6%
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	7%	6%	7%	7%	6%	6%	6%
	Temporary Threshold Shifts (TTS)	3%	2%	3%	3%	3%	3%	3%
	Permanent Threshold Shifts (PTS)	4%	3%	3%	3%	3%	3%	3%
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	5%	4%	5%	6%	5%	5%	5%
	Temporary Threshold Shifts (TTS)	3%	2%	3%	3%	3%	3%	3%
	Permanent Threshold Shifts (PTS)	2%	2%	2%	2%	2%	2%	2%
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	13%	11%	10%	11%	10%	10%	10%
	Temporary Threshold Shifts (TTS)	4%	3%	3%	4%	4%	4%	4%
	Permanent Threshold Shifts (PTS)	9%	7%	6%	6%	6%	5%	6%
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	11%	10%	11%	11%	11%	11%	10%
	Temporary Threshold Shifts (TTS)	4%	3%	4%	4%	4%	4%	3%
	Permanent Threshold Shifts (PTS)	7%	7%	7%	7%	6%	6%	7%
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	13%	13%	14%	18%	17%	16%	15%
	Temporary Threshold Shifts (TTS)	4%	3%	4%	6%	6%	7%	6%
	Permanent Threshold Shifts (PTS)	9%	9%	9%	11%	9%	7%	10%
STS Follow-Up #1 Test Compliance	Air Force - All Military	57%	60%	63%	69%	72%	76%	58%
	Air Force - Active Duty	67%	71%	75%	76%	80%	80%	69%
	Air Force - Reserve	40%	44%	51%	61%	63%	69%	48%
	Air Force - National Guard	45%	48%	48%	57%	59%	69%	38%
	Air Force - Civilian	58%	62%	70%	76%	80%	81%	70%

Appendix B: Hearing Health - Army

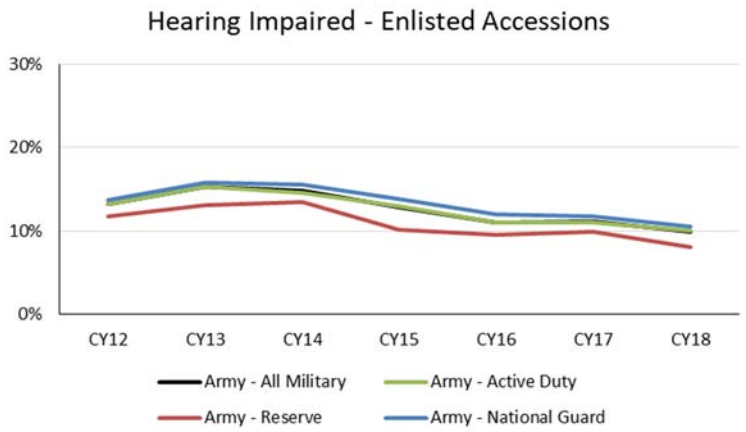
The mission of the Army Hearing Program is to maximize Soldier and Department of the Army (DA) Civilian hearing and communication abilities through implementation of the components of hearing readiness, clinical and operational hearing services, and hearing conservation, thus contributing to survivability, lethality, mission effectiveness, and quality of life. All Army active duty Soldiers require an annual hearing readiness evaluation regardless of their noise-exposure risk. All Army Reserve (USAR) and Army National Guard (ARNG) Soldiers assigned to Table of Organization and Equipment (TOE) units or hazardously noise-exposed USAR and ARNG Soldiers assigned to Table of Distribution and Allowances (TDA) units require annual hearing tests. Soldiers experiencing a change in hearing or other hearing related issues, regardless of exposure, are treated as if they were at risk and receive follow-up testing, counseling, and referrals as needed. DA Civilians are also enrolled in the Army Hearing Program when they meet Hearing Conservation Program exposure criteria. The following data represent the test results from all Soldiers and noise-exposed DA Civilians who received system of record, Defense Occupational and Environmental Health Readiness System – Hearing Conservation (DOEHRS-HC) hearing tests in CY18, and are in addition to the separate hearing program metrics identified and reported by the Army Hearing Program. The definitions and calculations used for the DOD MOEs are not as specific as those used by the Army Hearing Program, particularly when determining follow-up test compliance. That is, the DOD MOE determines if the follow-up process has started, whereas the Army metric reported elsewhere determines if the follow-up process is completed. Data in this review indicate that the overall hearing health for Soldiers is good and continues to improve. The data in this review indicate the overall hearing health for DA Civilians is only fair although essentially stable.

Hearing Impaired

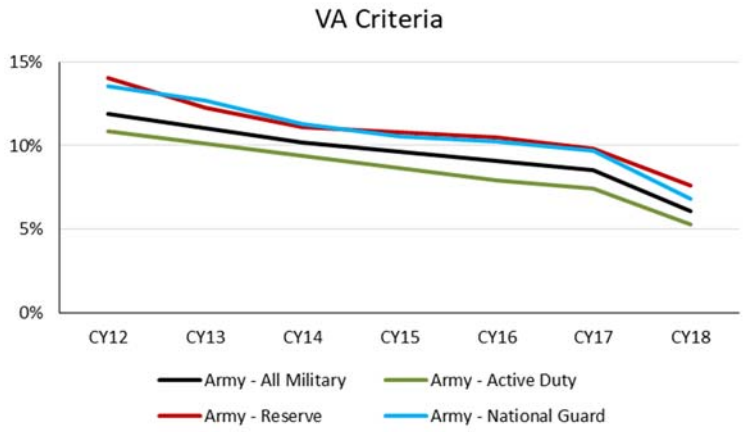
The percent of hearing impaired Soldiers continue to decrease for all Army Service components. The percentage of all Soldiers with hearing impairment decreased from 24% in CY12 to 17% in CY18.



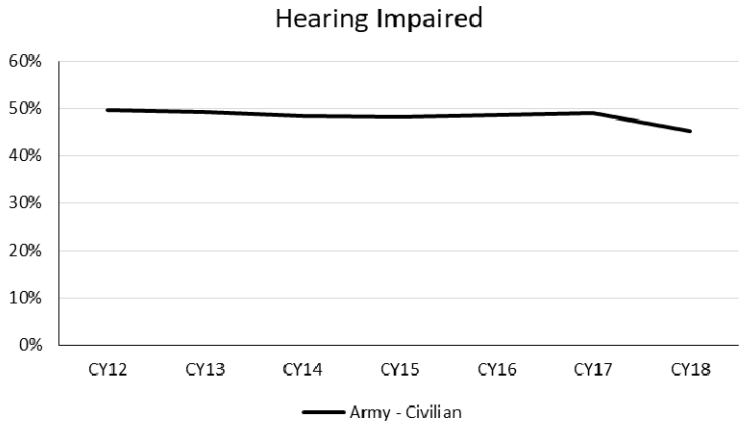
The percent of enlisted Army accessions with hearing impairment has decreased since CY12 for all Army Service components. The percent of enlisted accessions, in the Army, with hearing loss decreased from 13% in CY12 to 10% in CY18.



The percent of Soldiers meeting established VA disability criteria continues to decrease for all Army Service components. The percentage of Army personnel potentially eligible for Veteran's Benefits Administration compensation decreased from 12% in CY12 to 6% in CY18.

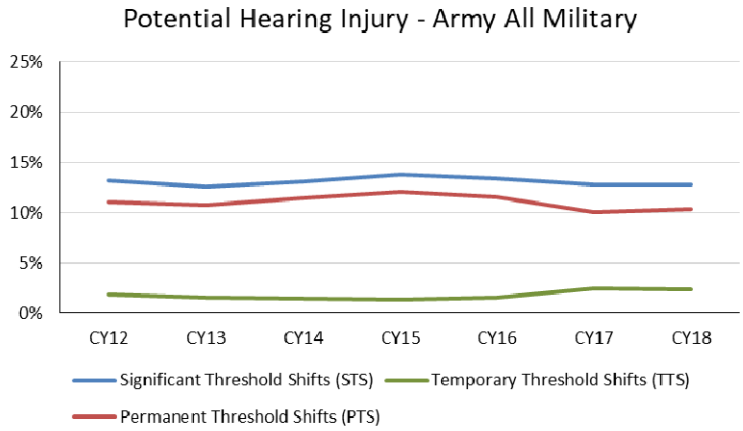


The percent of noise-exposed DA Civilians with hearing impairment remains high over the last seven years with marked improvement in CY18. The percent of DA Civilians with hearing impairment decreased from 50% in CY12 to 45% in CY18.

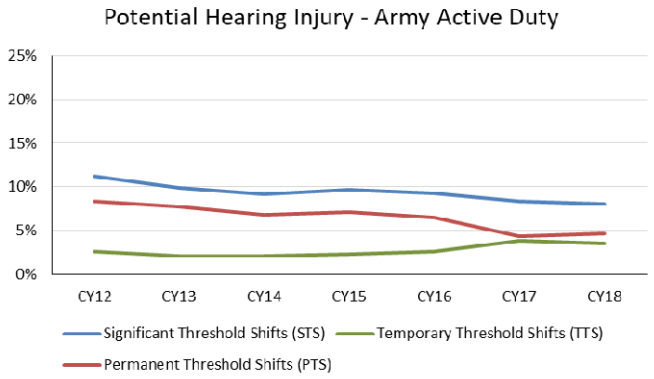


Potential Hearing Injury

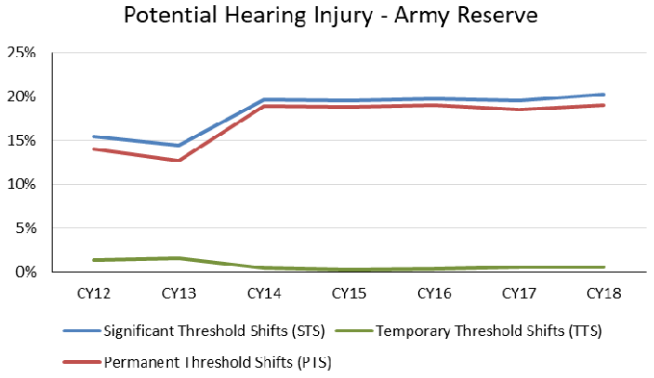
Hearing injury rates for all Soldiers are relatively stable. Potential injury rates for CY18 are: 13% STS, 2% TTS, and 10% PTS. The accuracy of PTS and TTS are dependent upon follow-up testing compliance.



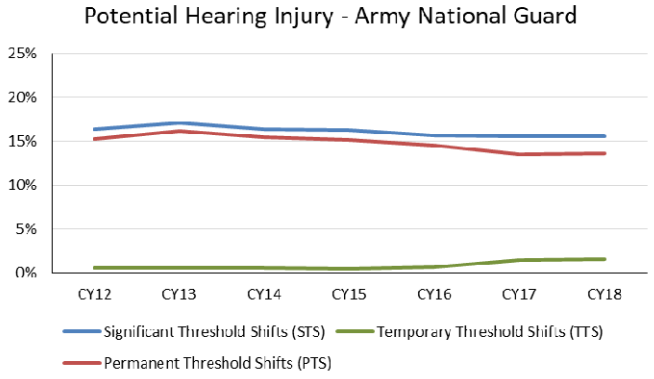
Hearing injury rates for active duty Soldiers have generally decreased. Rates for CY18 are: 8% STS, 4% TTS, and 5% PTS. The accuracy of PTS and TTS are dependent upon follow-up testing compliance. The slight increase in CY18 PTS is likely the result of decreased follow-up testing in CY18 compared to CY17. Improved follow-up testing compliance for active duty Soldiers (compared to USAR and ARNG Soldiers) has shown about half of all potential injuries (STS) are permanent (PTS).



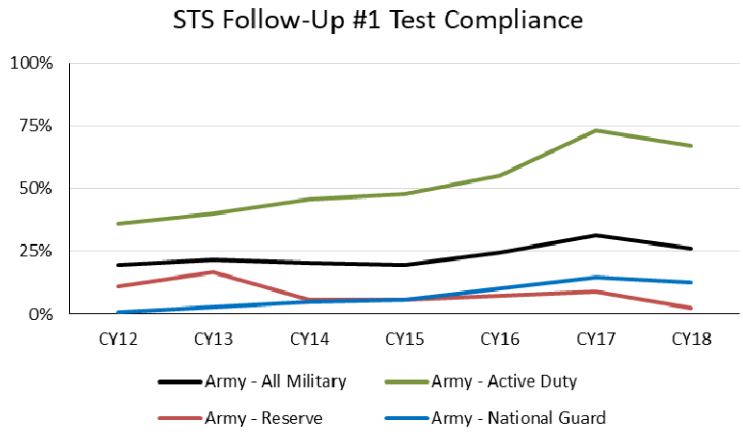
Hearing injury rates in the USAR remain stable since 2014. Rates for CY18 are: 20% STS, 1% TTS, and 19% PTS. STS and PTS rates remain high due to a significant lack of follow-up testing compliance. Failure to conduct follow-up testing causes a given STS to be identified repeatedly until follow-up testing is completed. Failure to conduct follow-up testing also prevents the accurate identification of PTS and TTS.



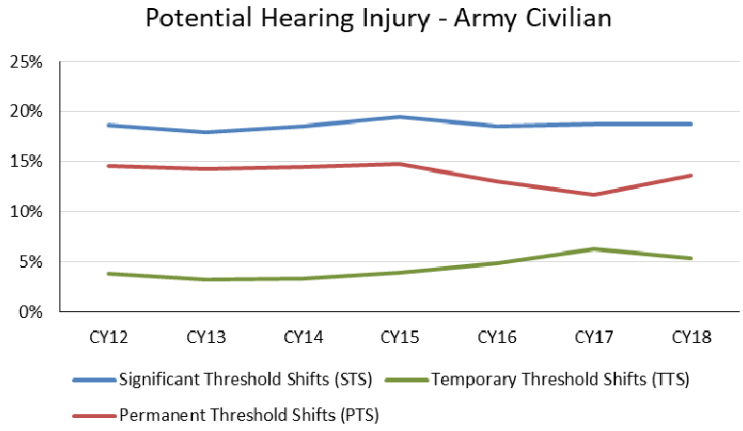
Hearing injury rates in the ARNG show slight improvement since CY12. Rates for CY18 are: 16% STS, 2% TTS, and 14% PTS. STS and PTS rates remain high due to poor follow-up testing compliance. Failure to conduct follow-up testing causes a given STS to be identified repeatedly until follow-up testing is completed. Failure to conduct follow-up testing also prevents the accurate identification of PTS and TTS.



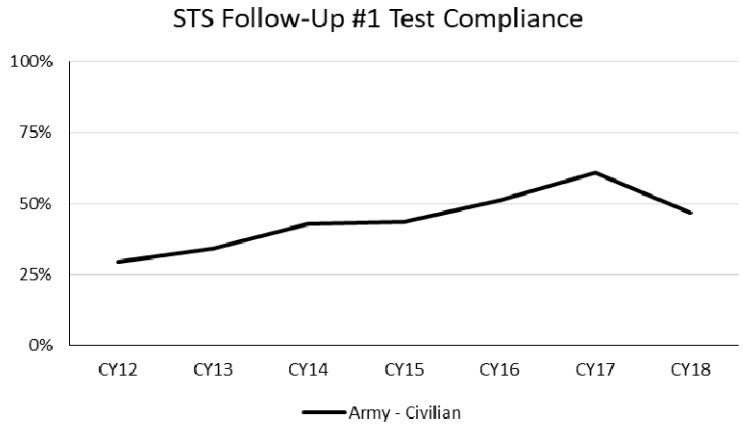
Follow-up testing (required for STS) showed a marked decrease in CY18 after several years of improvement principally in the active duty and USAR. Overall follow-up test compliance (all military) improved from 20% in CY12 to 26% in CY18. Failure to conduct follow-up testing will: 1) Elevate STS rates as the initial STS will be identified every year until follow-up testing is performed and a new baseline is established, if required, and 2) Prevent accurate identification of PTS and TTS (increase PTS and decrease TTS rates).



Hearing injury rates in DA Civilians remain high. Rates for CY18 are: 19% STS, 5% TTS, and 14% PTS. Improved follow-up testing compliance over the past seven years are identifying more temporary injuries (TTS) and lowering permanent injury (PTS) rates. The CY18 marked changes in PTS and TTS are most likely related to the decrease in follow-up testing compliance in CY18 as compared to CY17 rates.



DA Civilian follow-up testing (required for STS) showed a marked decrease in CY18 after several years of improvement. Overall compliance improved from 30% in CY12 to 47% in CY18. Failure to conduct follow-up testing will: 1) Elevate STS rates as the initial STS will be identified every year until follow-up testing is performed and a new baseline is established, if required, and 2) Prevent accurate identification of PTS and TTS (increase PTS and decrease TTS rates).



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Data Summary – Army

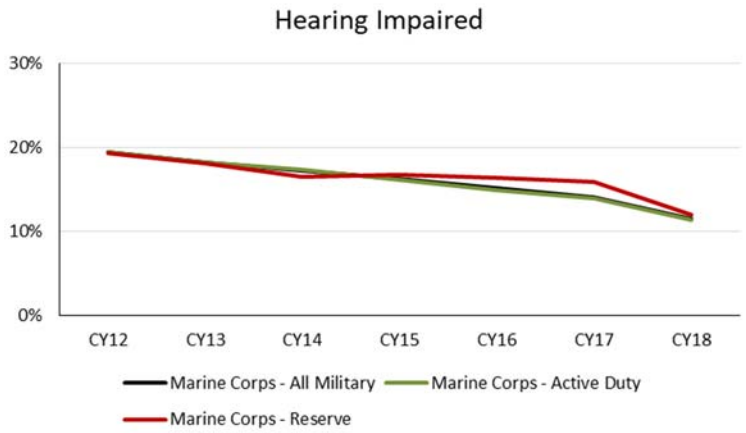
Chart Title	Category	CY12	CY13	CY14	CY15	CY16	CY17	CY18
Hearing Impaired	Army - All Military	24%	23%	22%	21%	20%	20%	17%
	Army - Active Duty	22%	21%	20%	19%	18%	18%	16%
	Army - Reserve	25%	23%	23%	23%	23%	23%	20%
	Army - National Guard	27%	26%	25%	23%	23%	22%	19%
	Army - Civilian	50%	49%	48%	48%	49%	49%	45%
Hearing Impaired - Enlisted Accessions	Army - All Military	13%	15%	15%	13%	11%	11%	10%
	Army - Active Duty	13%	15%	15%	13%	11%	11%	10%
	Army - Reserve	12%	13%	13%	10%	10%	10%	8%
	Army - National Guard	14%	16%	16%	14%	12%	12%	10%
VA Criteria	Army - All Military	12%	11%	10%	10%	9%	9%	6%
	Army - Active Duty	11%	10%	9%	9%	8%	7%	5%
	Army - Reserve	14%	12%	11%	11%	10%	10%	8%
	Army - National Guard	14%	13%	11%	11%	10%	10%	7%
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	13%	13%	13%	14%	13%	13%	13%
	Temporary Threshold Shifts (TTS)	2%	2%	1%	1%	2%	2%	2%
	Permanent Threshold Shifts (PTS)	11%	11%	11%	12%	12%	10%	10%
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	11%	10%	9%	10%	9%	8%	8%
	Temporary Threshold Shifts (TTS)	3%	2%	2%	2%	3%	4%	4%
	Permanent Threshold Shifts (PTS)	8%	8%	7%	7%	7%	4%	5%
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	15%	14%	20%	20%	20%	20%	20%
	Temporary Threshold Shifts (TTS)	1%	2%	0%	0%	0%	1%	1%
	Permanent Threshold Shifts (PTS)	14%	13%	19%	19%	19%	19%	19%
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	16%	17%	16%	16%	16%	16%	16%
	Temporary Threshold Shifts (TTS)	1%	0%	1%	0%	1%	1%	2%
	Permanent Threshold Shifts (PTS)	15%	16%	15%	15%	14%	13%	14%
Potential Hearing Injury – Civilian	Significant Threshold Shifts (STS)	19%	18%	19%	19%	19%	19%	19%
	Temporary Threshold Shifts (TTS)	4%	3%	3%	4%	5%	6%	5%
	Permanent Threshold Shifts (PTS)	15%	14%	14%	15%	13%	12%	14%
STS Follow-Up #1 Test Compliance	Army - All Military	20%	22%	20%	20%	24%	32%	26%
	Army - Active Duty	36%	40%	46%	48%	55%	73%	67%
	Army - Reserve	11%	17%	6%	6%	7%	9%	2%
	Army - National Guard	1%	3%	5%	6%	10%	15%	13%
	Army - Civilian	30%	34%	43%	44%	51%	61%	47%

Appendix C: Hearing Health – Marine Corps

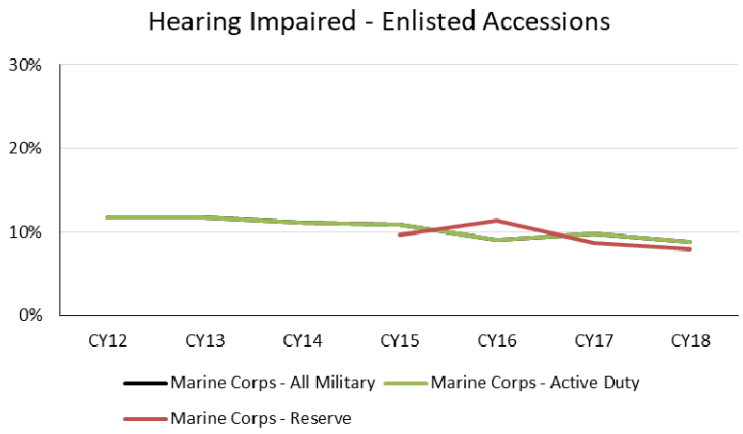
The goal of the Department of Navy's Hearing Conservation and Noise Abatement initiative is to proactively prevent noise-induced hearing loss and ensure optimal auditory readiness. All Marines are considered to be noise exposed and are enrolled in the Hearing Conservation Program. United States Marine Corps (USMC) Civilians are enrolled in the Hearing Conservation Program based on their individual noise-exposure. The following data represent the audiometric test results from all Marines and noise-exposed Civilians who received audiometric testing. The overall hearing health for Marines continues to improve.

Hearing Impaired

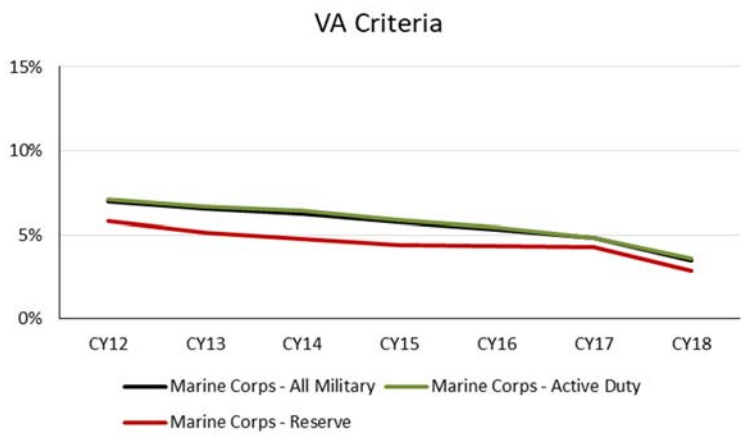
The percent of hearing impaired Marines is decreasing for all Service components. The percentage of USMC personnel with hearing impairment has decreased from 19% in CY12 to 11% in CY18. Marines with normal hearing thresholds in CY18 was at 89%.



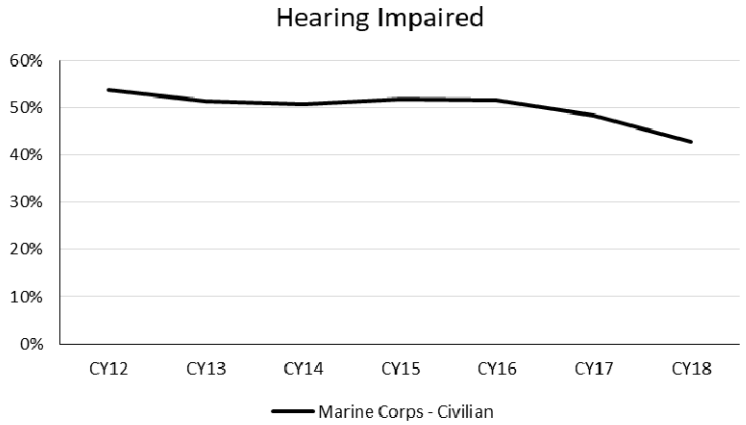
The percent of enlisted accessions with hearing impairment remained stable over the last several years. Data indicate that 9% of USMC accessions had hearing impairment in CY18 compared to 12% in CY12. Enlisted accessions data in the Reserve prior to CY15 are lacking and are not reported here.



The percent of Marines meeting VA criteria is decreasing for all Service components. The USMC percentage of those potentially eligible for Veteran's Benefits Administration compensation has improved from 7% in CY12 to 4% in CY18.

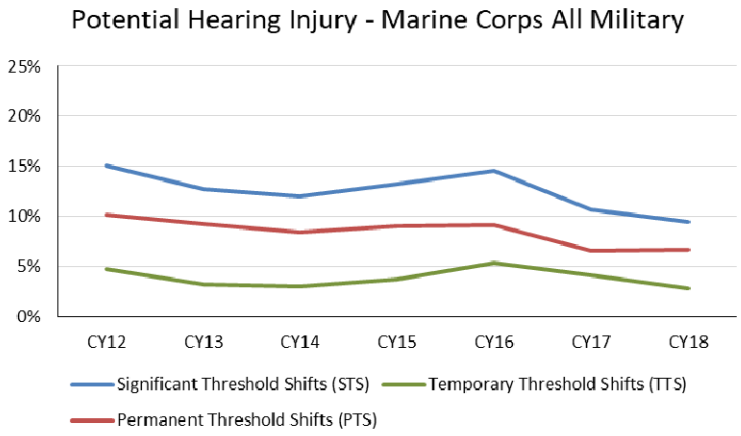


The percent of noise-exposed Civilians with hearing impairment is high with gradual decrease over the last several years. Trend analysis will continue. Data indicate that 43% of USMC Civilians have impaired hearing in CY18 compared to 54% in CY12.

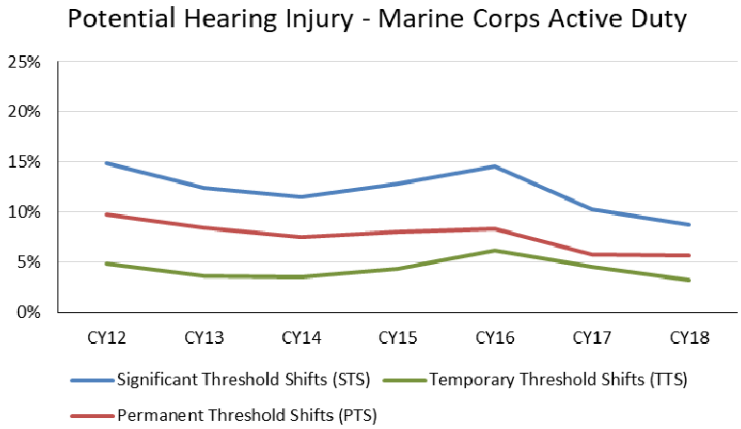


Potential Hearing Injury

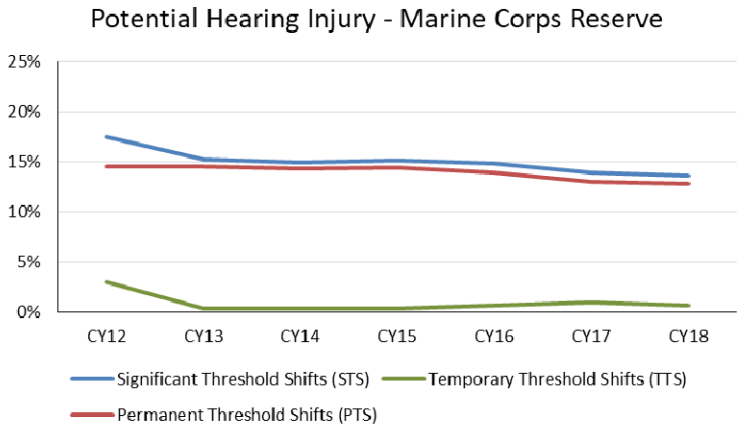
Hearing injury rates in the Marine Corps have generally decreased over the past several years. Military hearing injury rates declined from a 15% STS rate in CY12 to 9% CY18. The increase in PTS and decrease in TTS are likely the result of decreased follow-up testing in CY18; without follow-up testing, an STS that resolves to TTS would go undetected and, by default, would be incorrectly classified as a PTS. Thus, even with a slight decrease in STS rates, a slight increase in PTS and decrease in TTS can be observed.



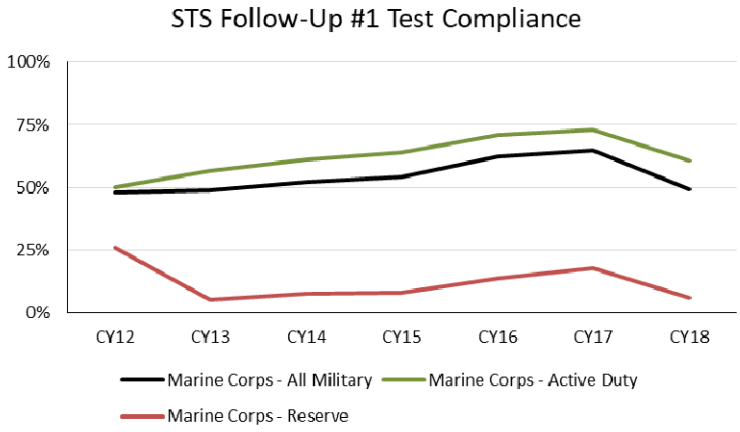
Active duty Marines have the lowest injury rates of all Marine Corps components. Hearing injury rates have declined from 15% in CY12 to 9% in CY18. Improved follow-up testing improves the accurate identification of PTS and TTS. Improved follow-up testing compliance has shown that just over half of all potential injuries (STS) are permanent (PTS).



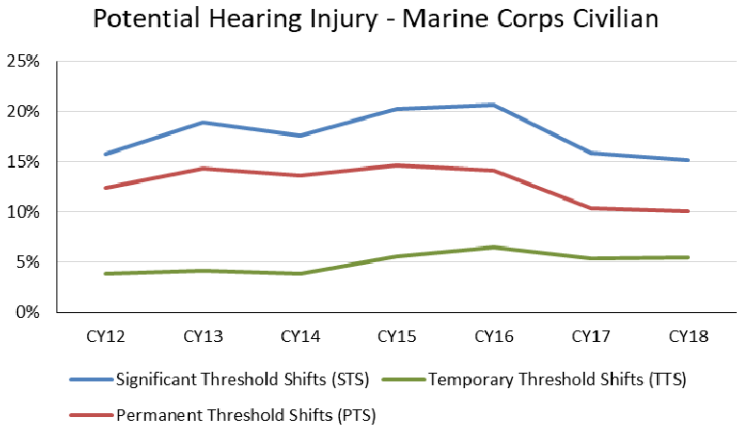
Hearing injury rates in the Marine Corps Reserve show gradual improvement over the past several years. Hearing injury rates have declined from 17% in CY12 to 14% in CY18. STS and PTS rates remain artificially high due to lack of follow-up testing. Failure to conduct follow-up testing will allow a given STS to be identified again and again until follow-up testing is completed. Failure to conduct follow-up testing also prevents the accurate identification of PTS and TTS.



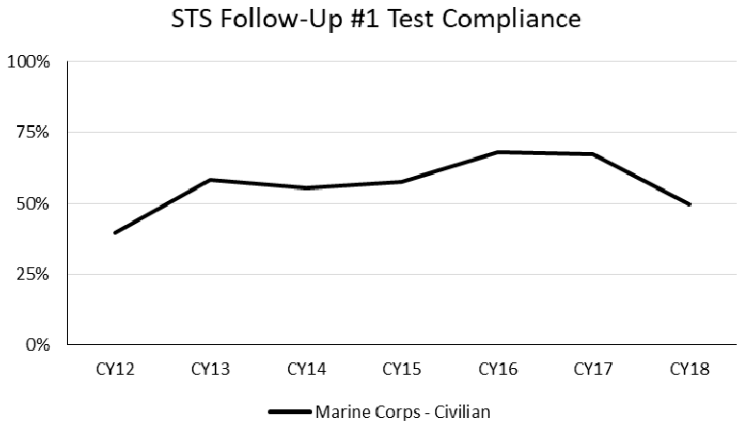
USMC compliance for all military personnel on STS Follow-Up #1 testing for CY18 is 49%. This represents a marked decrease in follow-up rates after several years of improvement from 48% in CY12 to 65% in CY17. Failure to conduct follow-up testing will 1) Elevate STS rates as the initial STS can be identified every year until follow-up testing is performed and a new baseline is established, and 2) Prevent accurate identification of PTS and TTS (increase PTS and decrease TTS rates).



Hearing injury rates for Marine Corps Civilians have ranged from 15% STS rate in CY18 to 21% STS rate in CY16. While potential injury (STS) rates remain high, improved follow-up testing are identifying more temporary injuries (TTS) and lowering permanent injury (PTS) rates. Civilian potential hearing injury rates are higher than active duty and Reserve but show improvement and could be related to years of exposure in the workplace.



USMC compliance for Civilian personnel on STS Follow-Up #1 testing showed a marked decrease in CY18 after several years of improvement. Follow-up compliance improved from 40% in CY12 to 50% in CY18. While this is below the target threshold of 85% this represents a continued improvement.



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Data Summary – Marine Corps

Chart Title	Category	CY12	CY13	CY14	CY15	CY16	CY17	CY18
Hearing Impaired	Marine Corps - All Military	19%	18%	17%	16%	15%	14%	11%
	Marine Corps - Active Duty	19%	18%	17%	16%	15%	14%	11%
	Marine Corps - Reserve	19%	18%	16%	17%	16%	16%	12%
	Marine Corps - Civilian	54%	51%	51%	52%	52%	48%	43%
Hearing Impaired - Enlisted Accessions	Marine Corps - All Military	12%	12%	11%	11%	9%	10%	9%
	Marine Corps - Active Duty	12%	12%	11%	11%	9%	10%	9%
	Marine Corps - Reserve	*0%	*50%	*0%	10%	11%	9%	8%
VA Criteria	Marine Corps - All Military	7%	7%	6%	6%	5%	5%	4%
	Marine Corps - Active Duty	7%	7%	6%	6%	5%	5%	4%
	Marine Corps - Reserve	6%	5%	5%	4%	4%	4%	3%
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	15%	13%	12%	13%	15%	11%	9%
	Temporary Threshold Shifts (TTS)	5%	3%	3%	4%	5%	4%	3%
	Permanent Threshold Shifts (PTS)	10%	9%	8%	9%	9%	7%	7%
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	15%	12%	12%	13%	15%	10%	9%
	Temporary Threshold Shifts (TTS)	5%	4%	3%	4%	6%	5%	3%
	Permanent Threshold Shifts (PTS)	10%	8%	8%	8%	8%	6%	6%
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	17%	15%	15%	15%	15%	14%	14%
	Temporary Threshold Shifts (TTS)	3%	0%	0%	0%	1%	1%	1%
	Permanent Threshold Shifts (PTS)	15%	15%	14%	14%	14%	13%	13%
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	16%	19%	18%	20%	21%	16%	15%
	Temporary Threshold Shifts (TTS)	4%	4%	4%	6%	6%	5%	5%
	Permanent Threshold Shifts (PTS)	12%	14%	14%	15%	14%	10%	10%
STS Follow-Up #1 Test Compliance	Marine Corps - All Military	48%	49%	52%	54%	62%	65%	49%
	Marine Corps - Active Duty	50%	57%	61%	64%	71%	73%	61%
	Marine Corps - Reserve	26%	5%	8%	8%	14%	18%	6%
	Marine Corps - Civilian	40%	58%	56%	57%	68%	67%	50%

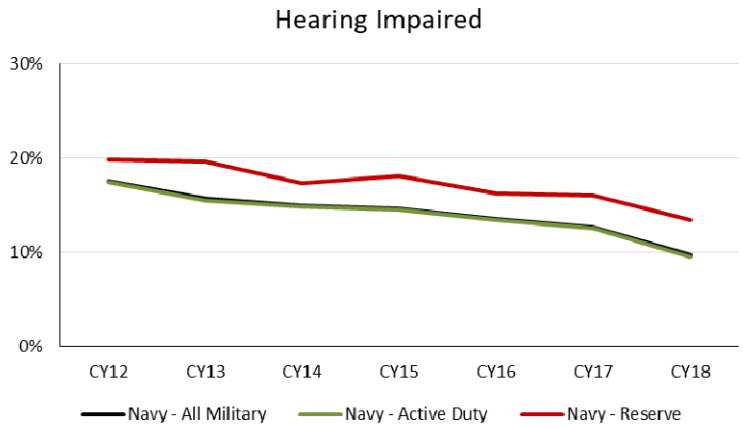
* These data were removed from the graph due to the small number of raw data points (n=15 or less) and the subsequent large deviation from more current data.

Appendix D: Hearing Health – Navy

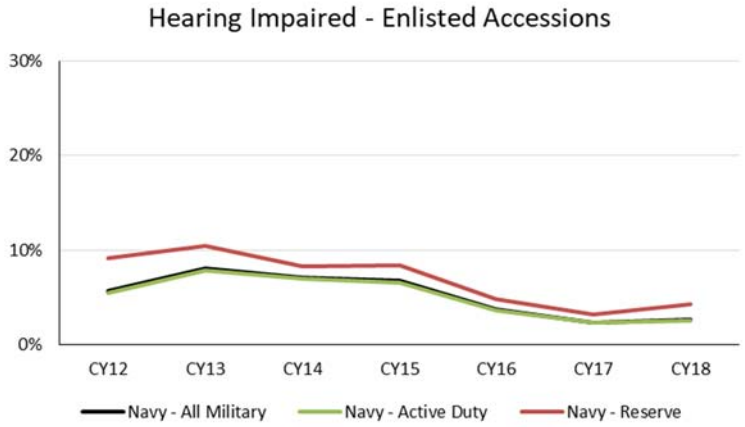
The goal of the Department of Navy's Hearing Conservation and Noise Abatement initiative is to proactively prevent noise-induced hearing loss and ensure optimal auditory readiness. Sailors and Navy Civilians exposed to hazardous noise are enrolled in the Hearing Conservation Program. The following data represent the test results from all Sailors and noise-exposed Civilians who received audiometric testing. The overall hearing health for Sailors is good and continues to improve.

Hearing Impaired

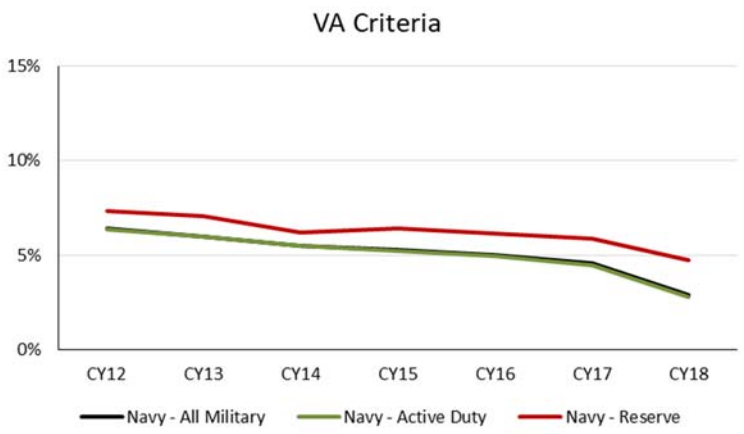
The percent of hearing impaired Sailors is decreasing for all Service components. The percentage of United States Navy (USN) personnel with impaired hearing thresholds decreased from 18% in CY12 to 10% in CY18. Sailors with normal hearing thresholds in CY18 was at 90%.



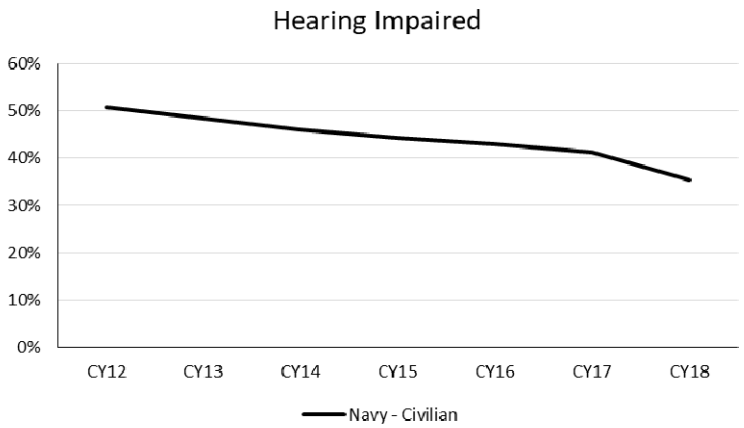
The percent of USN enlisted accessions with hearing impairment shows improvement over the last several years and is currently low. Data indicate that 97% of USN accessions have normal hearing in CY18. Enlisted accessions with hearing impairment decreased from 6% in CY12 to 3% in CY18.



The percent of Sailors meeting VA criteria is decreasing for all Service components. The USN percentage of those potentially eligible for Veteran's Benefits Administration compensation has improved from 6% in CY12 to 3% in CY18.

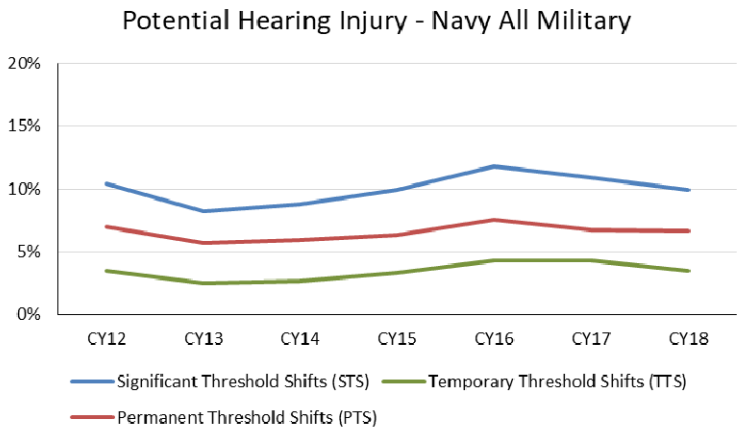


The percent of noise-exposed USN Civilians with hearing impairment is high but decreasing. Trend analysis will continue. Data indicate that 65% of USN Civilians have normal hearing in CY18. The percent of hearing impaired Civilians decreased from 51% in CY12 to 35% in CY18.

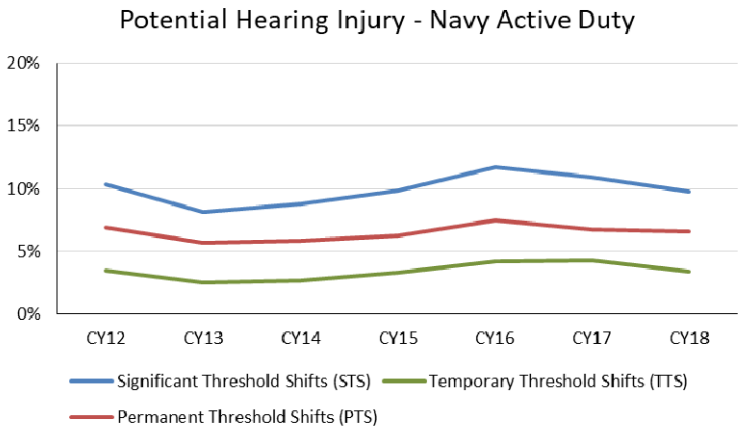


Potential Hearing Injury

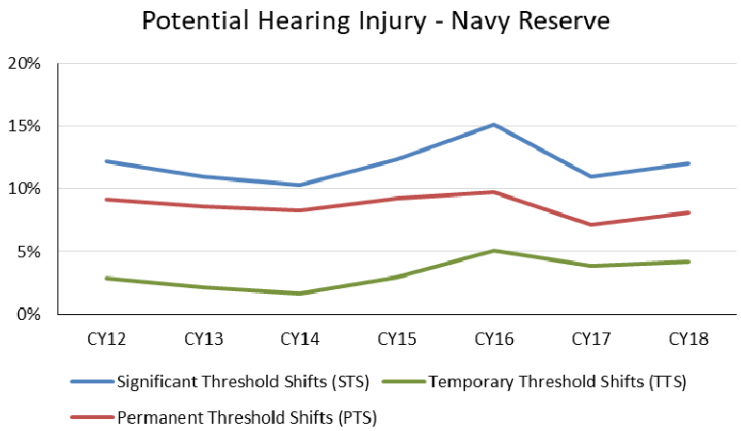
Hearing injury rates in the Navy are relatively stable. Hearing injury rates (STS) were 10% in CY12 and are 10% in CY18. The accuracy of PTS and TTS are dependent upon follow-up testing. The slight increase in PTS and decrease in TTS are likely the result of decreased follow-up testing in CY18; without follow-up testing, an STS that resolves to TTS would go undetected and, by default, would be incorrectly classified as a PTS. Thus, even with a slight decrease in STS rates, a slight increase in PTS and decrease in TTS can be observed.



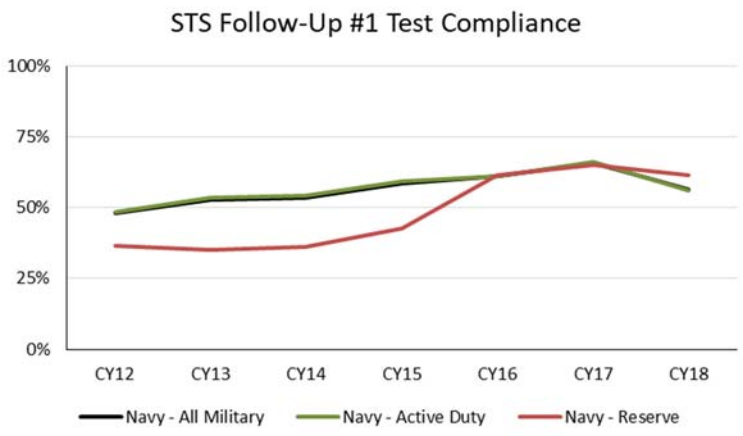
Hearing injury rates in the active duty follow closely that of the Navy as a whole and are relatively stable. Hearing injury rates were 10% in CY12 and are 10% in CY18.



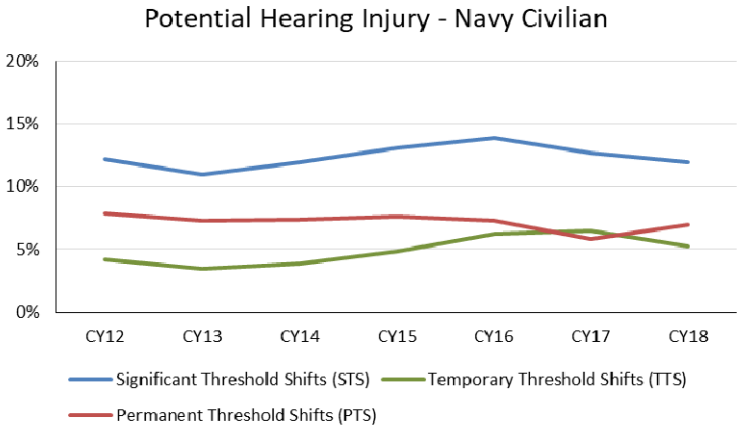
Hearing injury rates in the Navy Reserve have been stable with a 12% STS rate in CY12 and a 12% STS rate in CY18. Improved TTS rates in CY16-CY18 may be the result of improved follow-up testing compliance in the same time period.



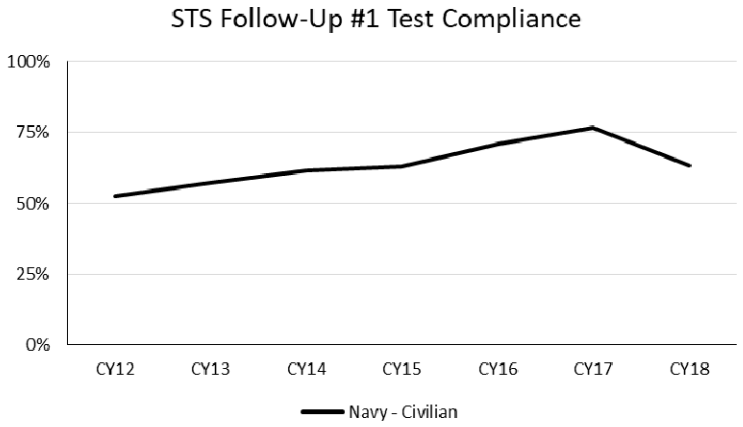
USN compliance for all military personnel on STS Follow-Up #1 testing for CY12 was 48%, and improved to 57% in CY18. While this is below the target threshold of 85% this represents a continued improvement. Follow-up testing (required for STS) showed a marked decrease in CY18 after several years of improvement principally in the active duty. Failure to conduct follow-up testing will 1) Elevate STS rates as the initial STS can be identified every year until follow-up testing is performed and a new baseline is established and 2) Prevent accurate identification of PTS and TTS (increase PTS and decrease TTS rates).



Hearing injury rates for USN Civilians have been relatively stable with a 12% STS rate in CY12 and CY18. Civilian potential hearing injury rates are higher than active duty and Reserve rates but show improvement and could be related to years of exposure in the workplace.



USN compliance for Civilian personnel on STS Follow-Up #1 testing for CY12 was 53%, and improved to 63% in CY18. While this is below the target threshold of 85% this represents a continued improvement. If a member does not meet suspense then STS will become an unconfirmed PTS, which could be the cause for the CY18 increase in PTS rates in the active duty, reserve, and Civilian populations. Data analysis has not been completed at this time to confirm conjecture.



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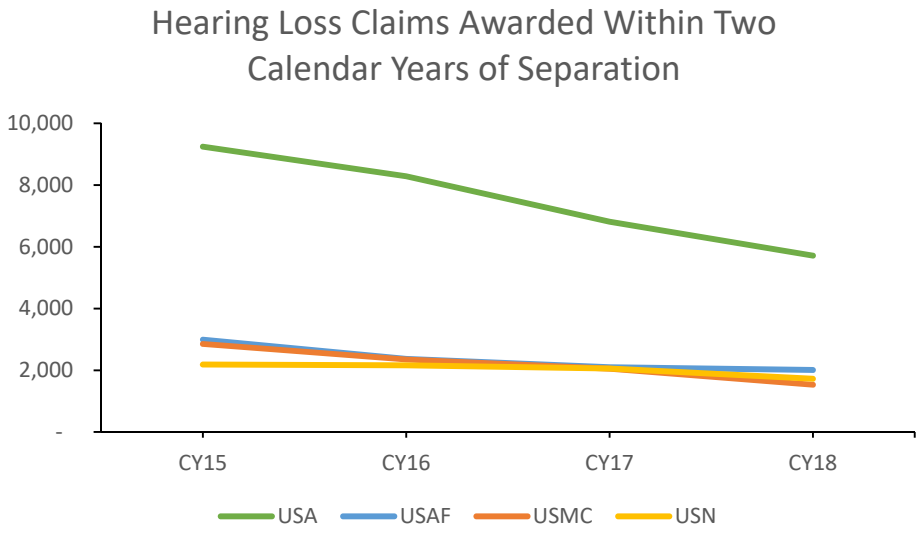
Data Summary – Navy

Chart Title	Category	CY12	CY13	CY14	CY15	CY16	CY17	CY18
Hearing Impaired	Navy - All Military	18%	16%	15%	15%	14%	13%	10%
	Navy - Active Duty	17%	16%	15%	14%	13%	13%	10%
	Navy - Reserve	20%	20%	17%	18%	16%	16%	13%
	Navy - Civilian	51%	48%	46%	44%	43%	41%	35%
Hearing Impaired - Enlisted Accessions	Navy - All Military	6%	8%	7%	7%	4%	2%	3%
	Navy - Active Duty	5%	8%	7%	7%	4%	2%	3%
	Navy - Reserve	9%	10%	8%	8%	5%	3%	4%
VA Criteria	Navy - All Military	6%	6%	6%	5%	5%	5%	3%
	Navy - Active Duty	6%	6%	5%	5%	5%	4%	3%
	Navy - Reserve	7%	7%	6%	6%	6%	6%	5%
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	10%	8%	9%	10%	12%	11%	10%
	Temporary Threshold Shifts (TTS)	3%	2%	3%	3%	4%	4%	3%
	Permanent Threshold Shifts (PTS)	7%	6%	6%	6%	8%	7%	7%
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	10%	8%	9%	10%	12%	11%	10%
	Temporary Threshold Shifts (TTS)	3%	2%	3%	3%	4%	4%	3%
	Permanent Threshold Shifts (PTS)	7%	6%	6%	6%	7%	7%	7%
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	12%	11%	10%	12%	15%	11%	12%
	Temporary Threshold Shifts (TTS)	3%	2%	2%	3%	5%	4%	4%
	Permanent Threshold Shifts (PTS)	9%	9%	8%	9%	10%	7%	8%
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	12%	11%	12%	13%	14%	13%	12%
	Temporary Threshold Shifts (TTS)	4%	3%	4%	5%	6%	6%	5%
	Permanent Threshold Shifts (PTS)	8%	7%	7%	8%	7%	6%	7%
STS Follow-Up #1 Test Compliance	Navy - All Military	48%	53%	54%	58%	61%	66%	57%
	Navy - Active Duty	49%	53%	54%	59%	61%	66%	56%
	Navy - Reserve	37%	35%	36%	43%	61%	65%	61%
	Navy - Civilian	53%	57%	62%	63%	71%	77%	63%

Appendix E: Hearing Loss Claims Awarded by the Department of Veterans Affairs

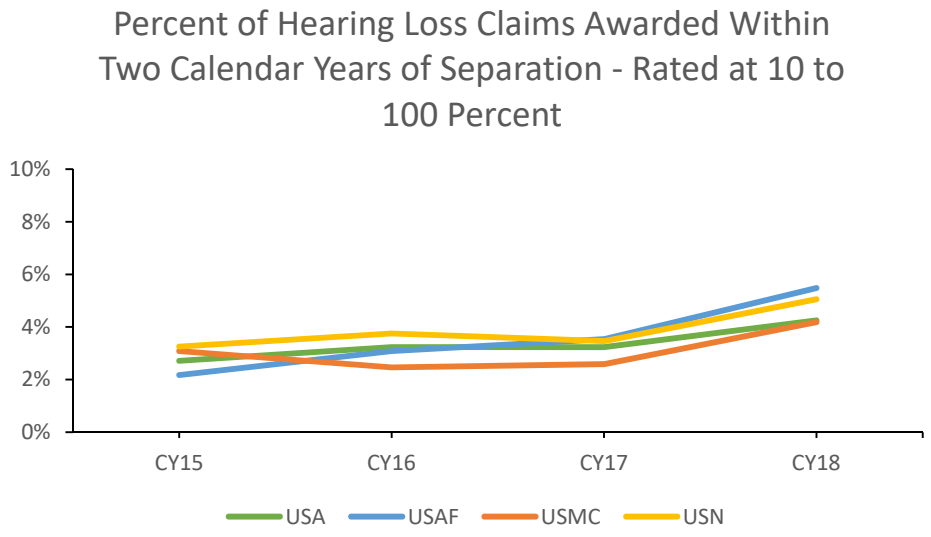
Veterans receiving a service connected hearing loss upon separation or shortly thereafter may be an indicator of hearing health in the military and the effects of the DOD Hearing Conservation Program. The following data represent veterans discharged during the two year period prior to the calendar year they received their service connected hearing loss.

The number of veterans receiving a service connected hearing loss is decreasing. The largest decrease was seen in Army veterans. The number of veterans separating from the military during this time period, and eligible to file a claim, is not known. Knowing this information will help interpret the significance of this decrease in awards for service connected hearing loss. When available these data will also be presented as a percent based on the number of veterans who separated within two years prior to the year reported.



Hearing loss claims awarded within two calendar years of Separation				
	CY15	CY16	CY17	CY18
USA	9,243	8,284	6,814	5,717
USAF	2,995	2,369	2,095	2,008
USMC	2,856	2,353	2,048	1,529
USN	2,183	2,158	2,053	1,722

The severity of a service connected hearing loss may serve as an indicator of hearing health. Service connected hearing loss is rated based on the severity of the loss. Hearing loss ratings range from zero to one hundred percent in ten percent increments. All service connected hearing loss, regardless of the rating, allow the veteran to receive hearing aids and other hearing benefits. However, only veterans with a ten percent or greater rating will receive monthly monetary benefits. In CY18, 95% of veterans awarded service connected hearing loss had hearing loss rated at zero percent. The percent of veterans receiving a ten percent or greater rating increased in CY18 for veterans from all Services.



Percent of hearing loss claims awarded within two calendar years of separation – Rated at 10 to 100 percent				
	CY15	CY16	CY17	CY18
USA	2.7%	3.2%	3.2%	4.3%
USAF	2.2%	3.1%	3.5%	5.5%
USMC	3.1%	2.5%	2.6%	4.2%
USN	3.3%	3.8%	3.5%	5.1%

Appendix F: History of Military Hearing Conservation 1941-2007

The impact of excessive noise exposure on the hearing of military personnel was evident after World War II (1941–1945) and the Korean War (1950–1953). A significant number of veterans returned from these wars with service-connected hearing loss. Hearing conservation programs did not exist in the military at that time. Research programs were initiated to better understand and enhance communications and performance under combat conditions. The Army and Navy established aural rehabilitation programs at select military hospitals across the United States to assist hearing impaired veterans with transition to civilian life by providing training with hearing aids, lip reading and psychological counseling.

In 1947, with establishment of the US Air Force as a separate branch of service from the Army Air Corps, jet aircraft were introduced into the military. This transition to jet aircraft also introduced more harmful noise levels and related negative health effects from these aircraft than seen with propeller aircraft. Concern developed over the proximity of this high level noise and the potential safety risks, as well as the negative impact on Navy flight deck operations. At this time, the Navy requested assistance from the National Academy of Sciences–National Research Council (NAS-NRC) to determine auditory and non-auditory health effects from the noise. In 1952, the Committee on Hearing and Bioacoustics (CHABA) was established with joint participation from the three services, and a benchmark study was conducted on the biological effects of noise.

In 1953, this team published the Biological Effects of Noise Exploratory Study (BENOX) report, which concluded that high intensity noise exposure causes aural pain, hearing loss, communication problems, difficulty with orientation in space, central nervous system effects, psychological effects and it identified limiting factors on the ability to protect the ear from this noise. Several other studies followed, looking at other types of military noise exposures, such as blast effects. As these studies continued to reveal the harmful effects of noise, interest in prevention efforts increased.

Consequently, hearing conservation programs began within the military. A review of military hearing conservation would be incomplete without recognizing the early contributions of Air Force Lt Col Elizabeth (Betsy) Guild. In 1942, Lt Col Guild was selected for the first class of Women's Auxiliary Corps. While assigned to the Aerospace Medical Research Laboratory at Wright-Patterson AFB, she pioneered hearing conservation before it was accepted policy by the government, industry or the Armed Services. She contributed immensely toward efforts to solve noise and communication problems for flight and ground personnel.

In 1948, the Air Force published the first hearing conservation regulation, Air Force Regulation (AFR) 160-3, "Precautionary Measures Against Noise Hazards", which set limits to noise exposures from jets and rocket power plants, and mandated audiometric testing procedures. In 1953, the Navy published the Bureau of Medicine and Surgery (BUMED) Instruction "Hearing Conservation Program". In October 1956, AFR 160-3 was updated and titled, "Hazardous Noise Exposure". This publication became the first recognized comprehensive HCP, both within and outside the military and served as the template used by successive government and non-government organizations for establishing HCPs within their respective agencies. AFR 160-3 was again revised in 1973. In 1957, the Air Force recruited its first two military audiologists.

In 1965, CHABA published the first criteria on "Hazardous Exposure to Intermittent and Steady State Noise", and in collaboration with the Army in 1968, published "Proposed Damage-Risk Criterion for Impulse Noise (Gunfire)". The Army recruited its first 11 audiologists in 1966, and initiated the first military audiology and speech pathology conference in 1967 through an organization called Military Audiology and Speech Pathology (MASPS), now known as the Military Audiology Association (MAA). The Navy acquired its first 10 audiologists in 1979.

In 1969, the Department of Labor, Safety and Health Standards Department amended the Walsh-Healy Public Contracts Act of 1935, requiring that hearing protection be worn when average noise levels exceeded 90 dBA in an 8 hour period (using a 5 dB exchange rate), and when impulse/impact noise exceeded 140 dB Peak.

In 1971, this standard was incorporated into Occupational Safety and Health Act of 1970, eventually leading to the OSHA Hearing Conservation Amendment in 1983. In 1970, the Navy adopted the OSHA noise standard as part of their HCP in BUMEDINST 6260.6B, mandating enrollment in HCPs when the noise levels exceeded 90 dBA.

In the early 1970's the Environmental Protection Agency, Office of Noise Abatement and Control (ONAC) was formed. They produced important research on the effects of noise, along with several documents that established noise level criteria. Funding for this office ceased in the early 1980's and it has never been re-established.

In 1972, the Army established a daily exposure limit of 85 dBA with a 5 dB exchange rate in TB MED 251, "Noise and Conservation of Hearing". This document established guidelines, but no requirements, for implementing a HCP.

The first Department of Defense Instruction (DODI) was published in 1978 in order to implement uniform and consistent HCPs across the services. Subsequently, the Navy's OPNAVINST 6260.2, the Army's TB MED 501, and the Air Force's AFR 160-3 were updated to comply with the DODI. The DODI mandated that each service meet or exceed OSHA standards, whose implementing criteria is 90 dBA with a 5 dB exchange rate. Until approximately 2007 the Navy used a 4 dB exchange rate. Currently, all Services use a 3 dB exchange rate. The DODI has been updated several times since it was originally published, as have the service specific regulations. In 1979, the responsibility for the Navy's hearing conservation program was transferred from BUMED to the Chief of Naval Operations (CNO), ensuring that all Navy personnel would be included in the program. In 1999, all three services began using a common microprocessor-based hearing conservation test system and a common web-based data repository.

Hearing conservation in the military continues to be critically important toward force health protection and preserving hearing readiness of DOD personnel. In 2005, service connected hearing loss and auditory problems comprised the second most common reason for new Veterans Affairs awards for disability. Claims by veterans for hearing loss and tinnitus have risen at such an alarming rate that Congress mandated an investigation by the Institute of Medicine (IOM) to evaluate noise-induced hearing loss and tinnitus associated with military service. Results were published in September 2005. This report has renewed interest in DOD HCPs at all levels.

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* Above information was summarized from the article: Nixon, C.W. (1996), "A Glimpse of History: Hearing Conservation in the Military," Spectrum Suppl. 1, 13, p.29. Additional input was provided by Mr. John Page from the Navy Environmental Health Center, Col David Chandler, US Army (Retired), and Col Ben Sierra, US Air Force (Retired).