

Hearing Health Surveillance Data Review Military Hearing Conservation - CY19

DOD Hearing Conservation Working Group

DOD Hearing Center of Excellence



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Contents

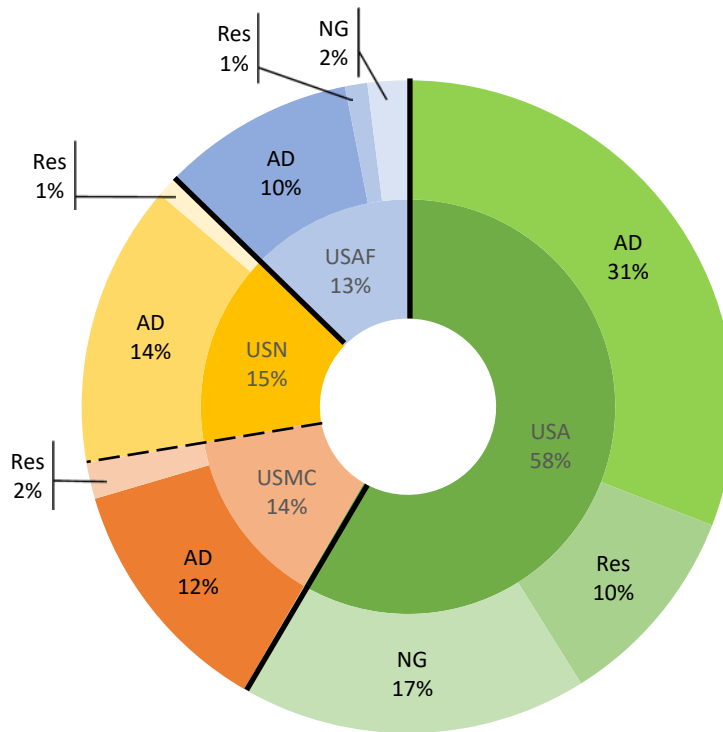
Executive Summary.....	4
Hearing Impairment.....	5
Potential Hearing Injury.....	5
Definitions.....	6
Hearing Health – DOD Hearing Conservation Program.....	8
Hearing Impaired.....	8
Potential Hearing Injury.....	10
Summary and Conclusions.....	12
Data Summary – DOD.....	13
Appendix A: Hearing Health – Air Force.....	14
Hearing Impaired.....	14
Potential Hearing Injury.....	16
Data Summary – Air Force.....	19
Appendix B: Hearing Health - Army.....	20
Hearing Impaired.....	20
Potential Hearing Injury.....	22
Data Summary – Army.....	25
Appendix C: Hearing Health – Marine Corps.....	26
Hearing Impaired.....	26
Potential Hearing Injury.....	28
Data Summary – Marine Corps.....	31
Appendix D: Hearing Health – Navy.....	32
Hearing Impaired.....	32
Potential Hearing Injury.....	34
Data Summary – Navy.....	37
Appendix E: Hearing Loss Claims Awarded by the Department of Veterans Affairs.....	38

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 CY19 by Service and Service component (active duty, Reserve, and National Guard).

Service Members Tested by Service and Service Component



CY19 Unique Tests	Mil	AD	Res	NG
USA	896,913	475,104	156,543	265,266
USMC	213,393	185,674	27,719	
USN	231,302	215,415	15,887	
USAF	195,071	147,492	16,971	30,608
DOD	1,536,679	1,023,685	217,120	295,874

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 CY19: hearing health in the DOD is improving for Service members and Civilians in the Hearing Conservation Program. Evidence of this is seen in an overall decrease in hearing impairment and decreased rates of Service members who meet established VA disability criteria from CY18 to CY19. Compliance with follow-up testing continues to improve. Potential injury rates showed a slight increase in STS rates, however, PTS rates remain relatively stable from CY18 to CY19.

Hearing Impairment

The percent of hearing impaired Service members (14.2%) and Civilians (39.8%) continues to improve. Active duty Service members have the lowest rates of hearing impairment (12.4%) compared to National Guard (18.3%) and Reserve (17.4%).

The percent of enlisted accessions with hearing impairments (7.2%) continues to improve. Reserve (6.8%) accessions have the lowest rates of hearing impairment compared to the Active duty (7.1%) and National Guard (7.3%). 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 showed some increase, permanent threshold shifts (PTS) remained stable, and temporary threshold shifts (TTS) improved.

Follow-up compliance for DOD Service members continues to improve especially in the National Guard. Active duty and noise-exposed Civilians have the highest follow-up compliance rates (74.5% and 75.5% respectively) while the National Guard (31.8%) and Reserve (18.5%) rates remain low. The effect of increased follow-up compliance is best seen in improved TTS and PTS rates in the Civilian, active duty, and National Guard components.

Current potential hearing injury rates for DOD Service members include: STS – 11.7%, TTS – 3.2%, and PTS – 8.2%. Permanent threshold shift rates for active duty (4.6%) and noise-exposed Civilians (7.4%) 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 12.2% and 17.8%, 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.

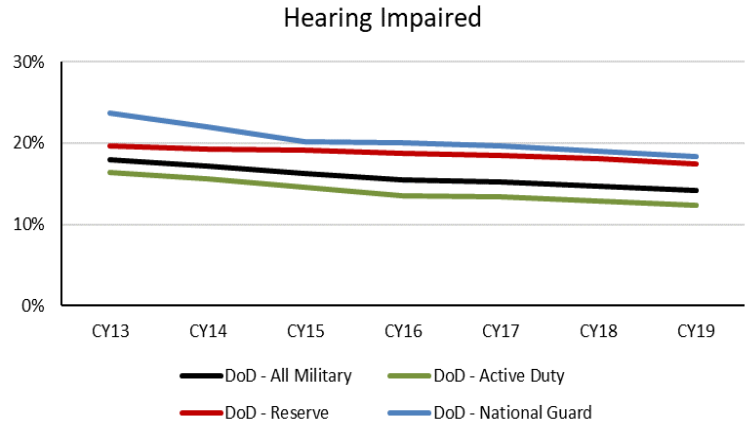
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Hearing Health – DOD Hearing Conservation Program

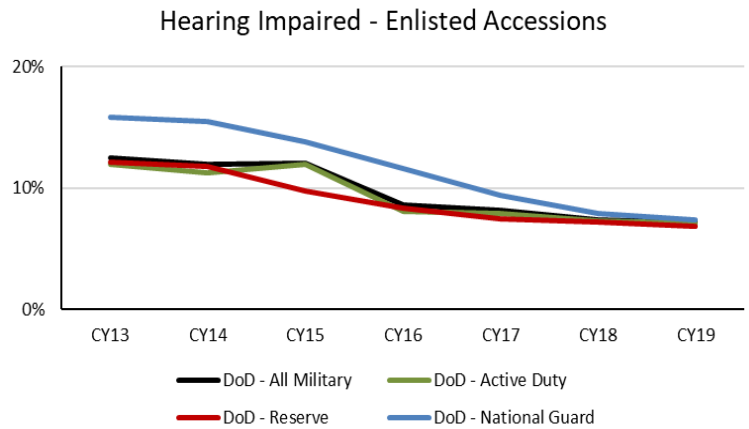
The following data represent Service members and noise-exposed Civilians enrolled in a hearing conservation program. Each Service enrolls Service members into their HCP differently so these data do not represent the hearing health of ALL Service members in the DOD. The general finding of these data is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

Hearing Impaired

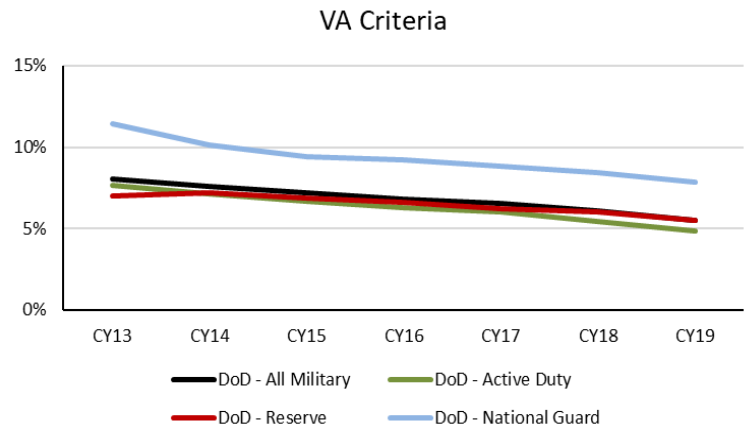
The percent of hearing impaired Service members is decreasing for all DOD components. DOD Service members with hearing impairment decreased from 17.9% in CY13 to 14.2% in CY19.



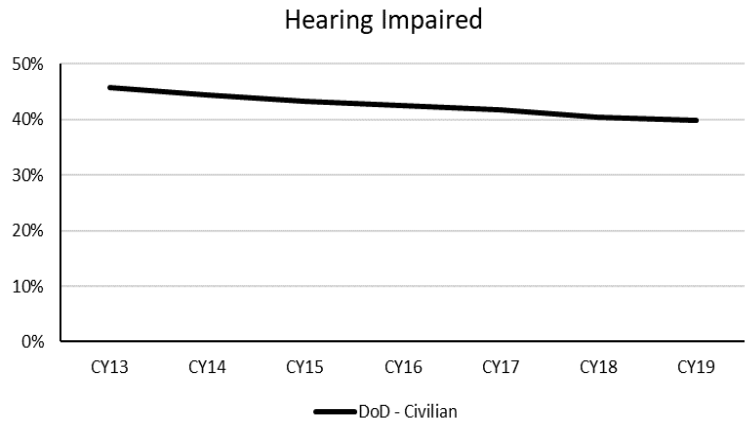
The percent of enlisted accessions with hearing impairment has decreased for all DOD components since CY13 with only slight improvements in CY19 compared to CY18. The percent of enlisted accessions, in the DOD, with hearing impairment decreased from 12.5% in CY13 to 7.2% in CY19.



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 8.0% in CY13 to 5.5% in CY19.



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 45.7% in CY13 to 39.8% in CY19.



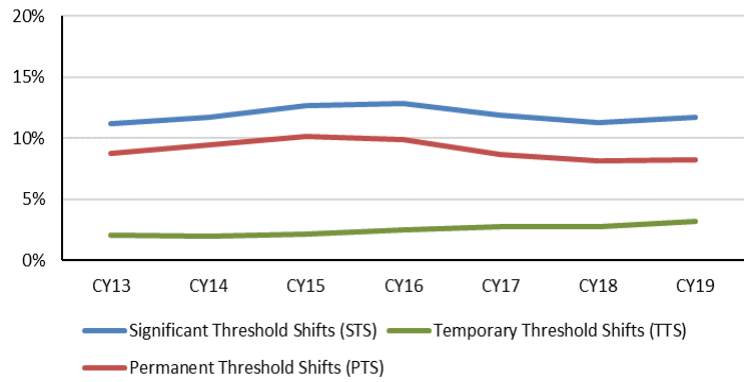
Potential Hearing Injury

In CY19, Military STS and TTS increased slightly while PTS rates remained stable. Data indicate an 11.7% STS, 3.2% TTS, and 8.2% PTS rate in CY19.

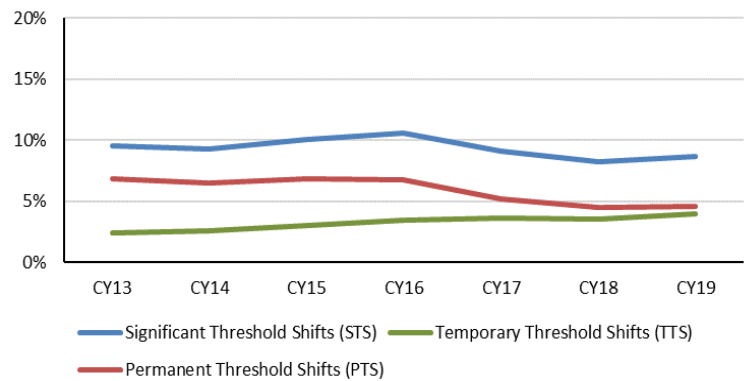
Active duty Service members have the lowest potential hearing injury rates. Active duty Service member rates for CY19 were: 8.7% STS, 3.9% TTS, and 4.6% PTS. Improved follow-up testing compliance, over a seven year period, in the active duty population (see follow-up compliance graph on page 11), has 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 CY19 are: 19.6% STS, 1.2% TTS, and 17.8% PTS. National Guard rates for CY19 are: 15.1% STS, 2.4% TTS, and 12.2% PTS. Failure to conduct follow-up testing prevents the accurate identification of hearing injuries.

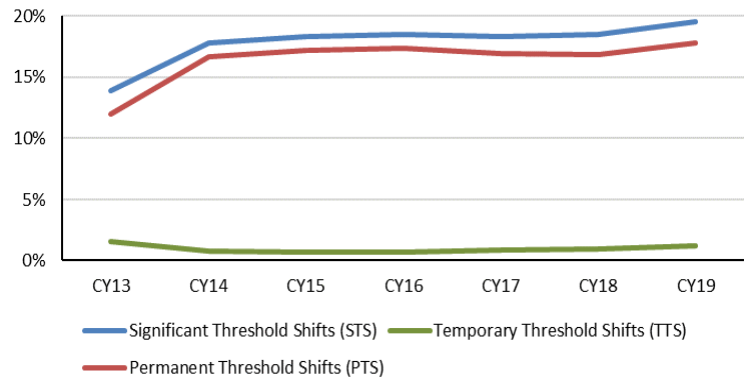
Potential Hearing Injury - All Military



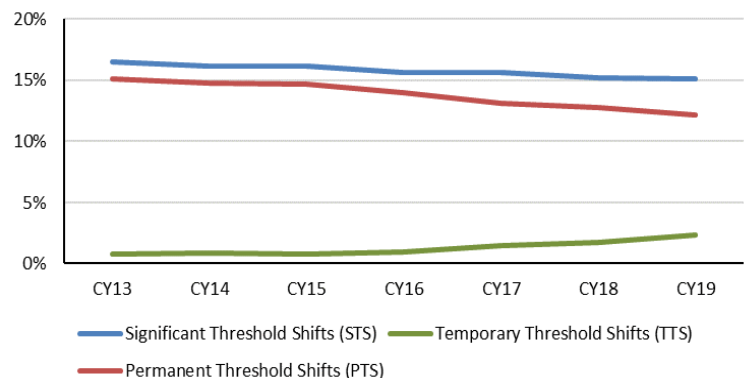
Potential Hearing Injury - Active Duty



Potential Hearing Injury - Reserve



Potential Hearing Injury - National Guard

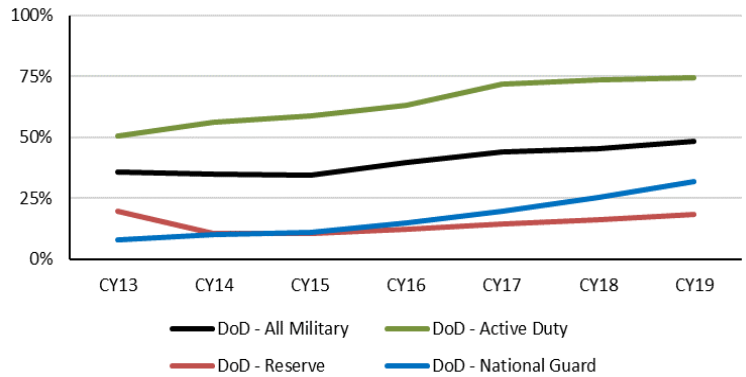


Follow-up testing (required for STS/potential hearing injuries) showed marginal improvement in CY19. Overall compliance (all military) improved from 35.9% in CY13 to 48.4% in CY19. Compliance in the active duty and National Guard has improved since CY13 while compliance in the Reserve has decreased. 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.

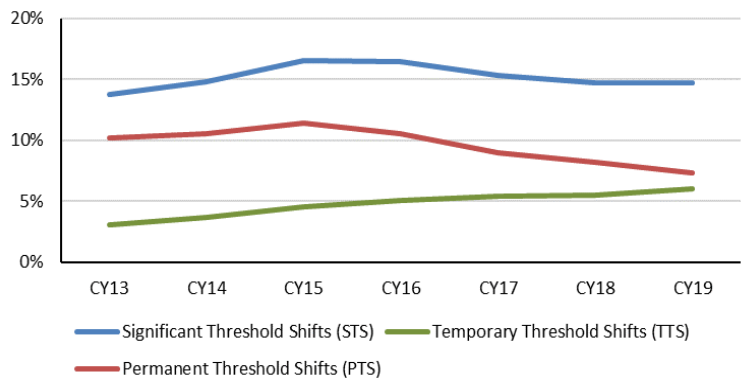
Potential hearing injury rates for Civilians remain high compared to Service members. Rates for CY19 are: 14.7% STS, 6.0% TTS, and 7.4% PTS. The continued gradual increase in TTS and corresponding decrease in PTS are likely the result of improved follow-up testing.

Civilian follow-up testing (required for STS) continues to show gradual improvement. Overall compliance improved from 53.0% in CY13 to 75.5% in CY19 and exceeds active duty follow-up rates.

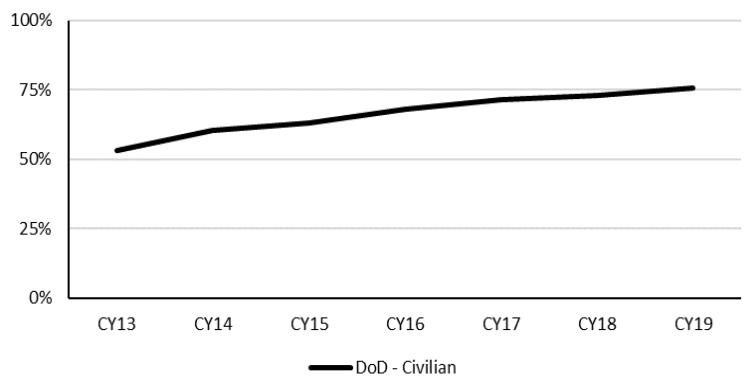
STS Follow-Up #1 Test Compliance



Potential Hearing Injury - Civilian



STS Follow-Up #1 Test Compliance



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. There was an increase in the STS rates for the active duty and Reserve components. High Follow-up testing compliance in the active duty and civilian populations show that PTS rates decreased to about half of the STS rates. As follow-up compliance continues to increase, accuracy of STS, PTS, and TTS rates will also improve.

Data Summary – DOD

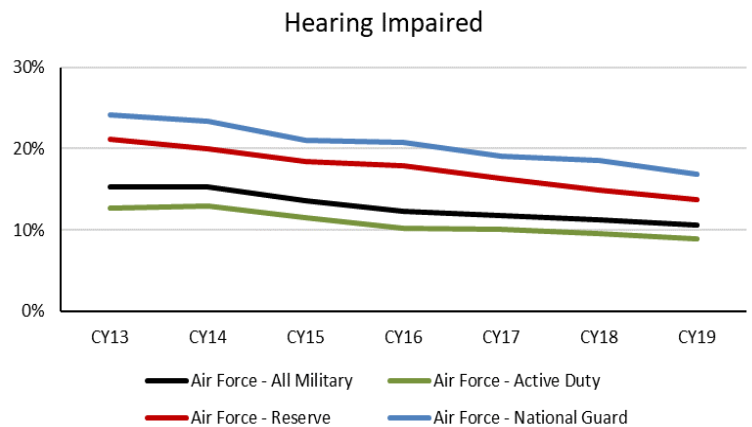
Chart Title	Category	CY13	CY14	CY15	CY16	CY17	CY18	CY19
Hearing Impaired	DOD - All Military	17.9	17.2	16.3	15.5	15.2	14.7	14.2
	DOD - Active Duty	16.4	15.6	14.6	13.6	13.4	12.9	12.4
	DOD - Reserve	19.6	19.3	19.1	18.8	18.5	18.1	17.4
	DOD - National Guard	23.7	22.0	20.2	20.0	19.6	19.0	18.3
	DOD - Civilian	45.7	44.4	43.3	42.4	41.7	40.5	39.8
Hearing Impaired - Enlisted Accessions	DOD - All Military	12.5	11.9	12.0	8.6	8.2	7.4	7.2
	DOD - Active Duty	11.9	11.2	11.9	8.1	7.9	7.2	7.1
	DOD - Reserve	12.1	11.8	9.8	8.4	7.4	7.2	6.8
	DOD - National Guard	15.8	15.5	13.8	11.6	9.4	7.9	7.3
VA Criteria	DOD - All Military	8.0	7.6	7.2	6.8	6.5	6.1	5.5
	DOD - Active Duty	7.7	7.1	6.6	6.3	6.0	5.4	4.8
	DOD - Reserve	7.0	7.2	6.9	6.6	6.2	6.0	5.5
	DOD - National Guard	11.5	10.1	9.4	9.2	8.8	8.4	7.8
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	11.2	11.7	12.7	12.8	11.9	11.3	11.7
	Temporary Threshold Shifts (TTS)	2.0	2.0	2.1	2.5	2.8	2.7	3.2
	Permanent Threshold Shifts (PTS)	8.8	9.4	10.1	9.9	8.6	8.1	8.2
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	9.5	9.3	10.0	10.6	9.1	8.3	8.7
	Temporary Threshold Shifts (TTS)	2.4	2.5	3.0	3.5	3.6	3.5	3.9
	Permanent Threshold Shifts (PTS)	6.8	6.5	6.8	6.8	5.2	4.5	4.6
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	13.9	17.8	18.3	18.5	18.4	18.5	19.6
	Temporary Threshold Shifts (TTS)	1.5	0.8	0.7	0.7	0.9	1.0	1.2
	Permanent Threshold Shifts (PTS)	12.0	16.7	17.2	17.4	16.9	16.9	17.8
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	16.5	16.2	16.2	15.6	15.6	15.2	15.1
	Temporary Threshold Shifts (TTS)	0.8	0.8	0.7	0.9	1.5	1.7	2.4
	Permanent Threshold Shifts (PTS)	15.2	14.8	14.7	14.0	13.1	12.8	12.2
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	13.7	14.8	16.6	16.5	15.3	14.8	14.7
	Temporary Threshold Shifts (TTS)	3.1	3.7	4.5	5.1	5.4	5.5	6.0
	Permanent Threshold Shifts (PTS)	10.2	10.5	11.4	10.5	9.0	8.2	7.4
STS Follow-Up #1 Test Compliance	DOD - All Military	35.9	34.7	34.6	39.6	44.1	45.3	48.4
	DOD - Active Duty	50.6	56.0	58.9	62.9	71.9	73.4	74.5
	DOD - Reserve	19.6	10.4	10.4	12.5	14.5	16.2	18.5
	DOD - National Guard	7.9	10.1	10.8	14.8	19.7	25.5	31.8
	DOD - Civilian	53.0	60.5	63.0	67.9	71.4	72.9	75.5

Appendix A: Hearing Health – Air Force

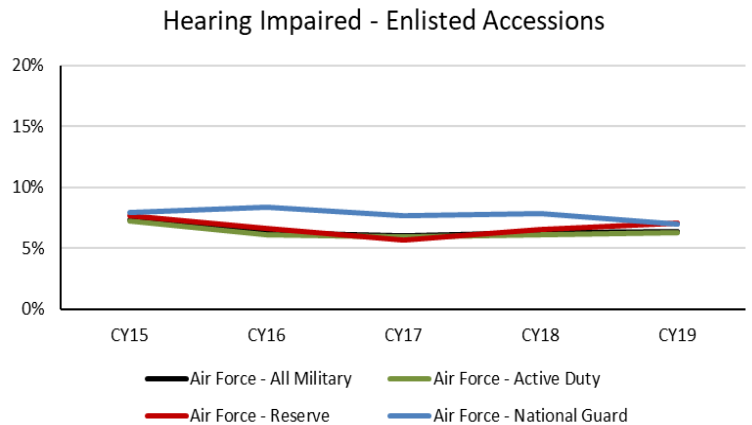
The Air Force Hearing Conservation Program is a risk-based program, enrolling Service members and Civilians that have measured exposure to hazardous noise in an occupational setting. The data below are only a reflection of the members enrolled in the Hearing Conservation Program for a given calendar 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, Defense Occupational and Environmental Health Readiness System – Hearing Conservation (DOEHRs-HC) Data Repository (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

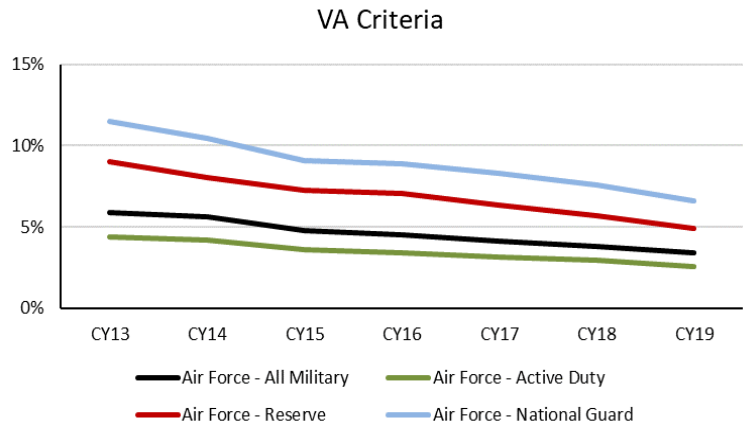
The percent of hearing impaired Airmen is decreasing for all Service components. Airmen with hearing impairment decreased from 15.2% in CY13 to 10.6% in CY19.



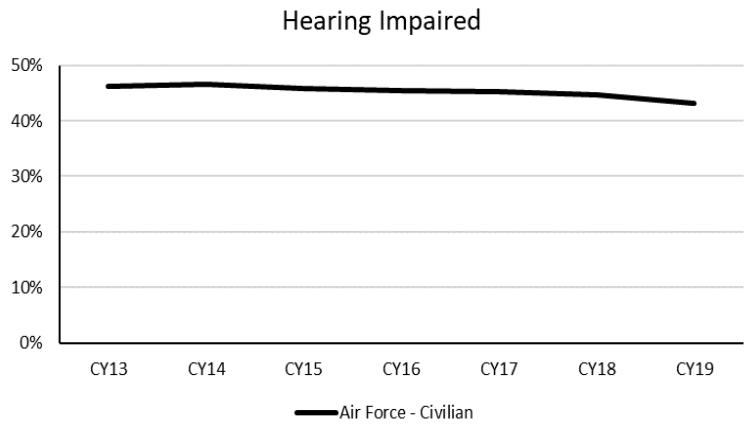
The percent of enlisted accessions with hearing impairment has remained relatively stable. The percent of enlisted accessions with hearing impairment was 7.4% in CY15 and 6.4% in CY19. Air Force enlisted accessions did not receive audiometric testing prior to CY15.



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 5.9% in CY13 to 3.4% in CY19



The percent of noise exposed Civilians with hearing impairment remains stable over the last several years with some improvement in CY19. The percent of Civilians with hearing impairment decreased from 46.2% in CY13 to 43.2% in CY19.



Potential Hearing Injury

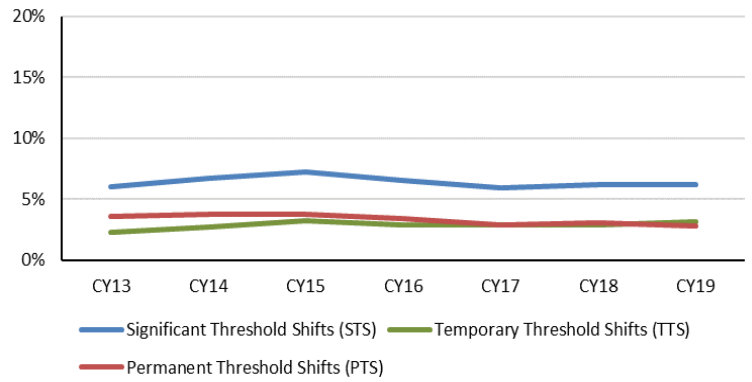
Hearing injury rates in the Air Force are relatively stable. Data indicate a 6.2% STS, 3.1% TTS, and 2.9% PTS rate in CY19

Air Force active duty potential hearing injury rates are generally stable over the last several years. Rates for CY19 are; 4.9% STS, 2.9% TTS, and 1.9% PTS.

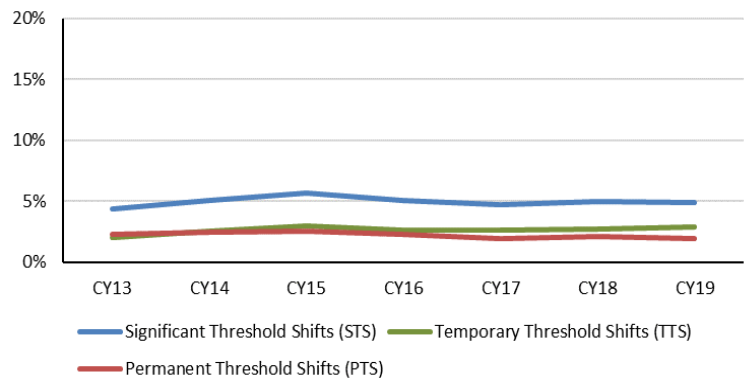
Air Force Reserve potential hearing injury are relatively stable over the last several years. Rates for CY19 are; 11.4% STS, 4.4% TTS, and 6.5% PTS.

Air Force National Guard potential hearing injury rates are relatively stable over the last several years. Rates for CY19 are; 9.3% STS, 3.6% TTS, and 5.3% PTS.

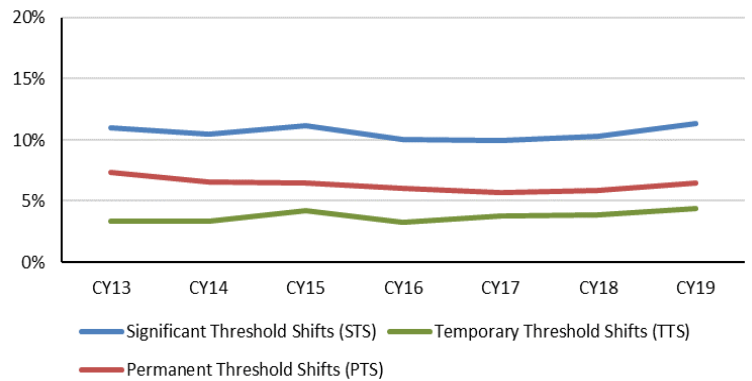
Potential Hearing Injury - Air Force All Military



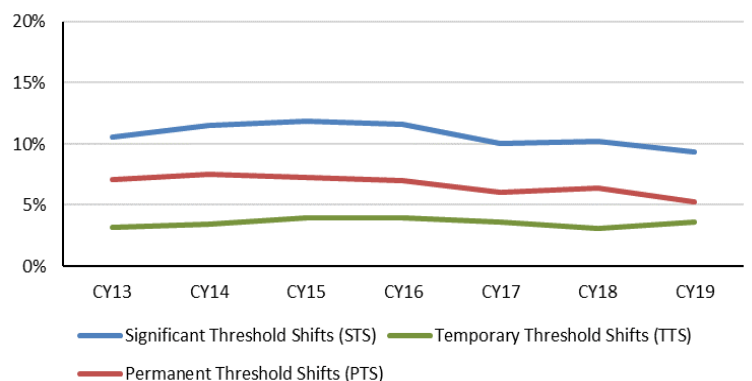
Potential Hearing Injury - Air Force Active Duty



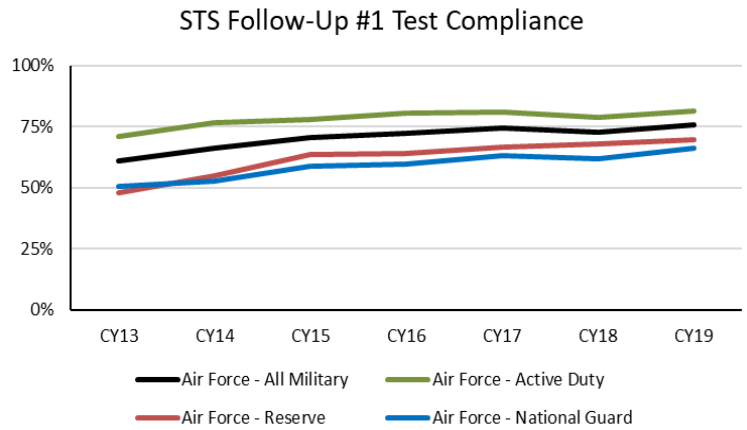
Potential Hearing Injury - Air Force Reserve



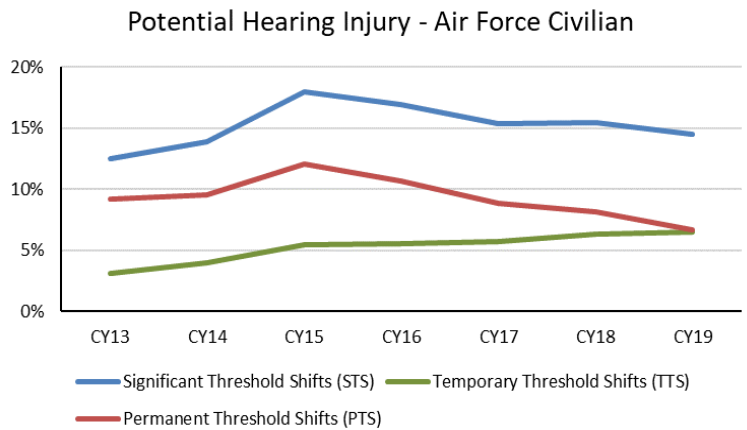
Potential Hearing Injury - Air Force National Guard



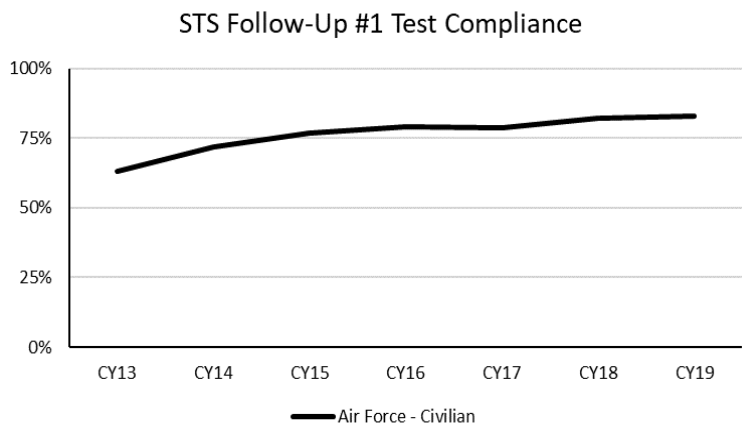
Follow-up testing continues to show gradual improvement from 61.1% in CY13 to 75.8% in CY 19.



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 CY19 are; 14.5% STS, 6.5% TTS, and 6.7% PTS.



Follow-up testing (required for STS) continues to show gradual improvement from 62.9% in CY13 to 82.9% in CY19.



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Data Summary – Air Force

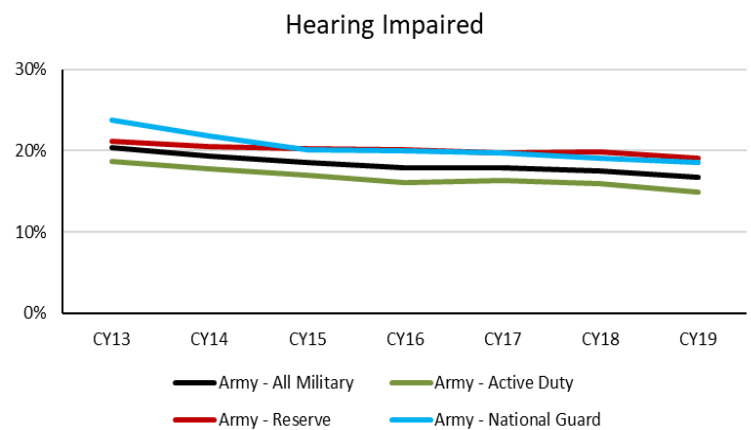
Chart Title	Category	CY13	CY14	CY15	CY16	CY17	CY18	CY19
Hearing Impaired	Air Force - All Military	15.2	15.3	13.6	12.3	11.8	11.3	10.6
	Air Force - Active Duty	12.6	12.9	11.5	10.2	10.0	9.5	9.0
	Air Force - Reserve	21.1	20.0	18.4	17.9	16.3	15.0	13.7
	Air Force - National Guard	24.2	23.4	21.0	20.7	19.0	18.5	16.9
	Air Force - Civilian	46.2	46.7	45.7	45.5	45.3	44.6	43.2
Hearing Impaired - Enlisted Accessions	Air Force - All Military	-n/a-	-n/a-	7.4	6.3	6.0	6.3	6.4
	Air Force - Active Duty	-n/a-	-n/a-	7.3	6.1	5.9	6.1	6.3
	Air Force - Reserve	-n/a-	-n/a-	7.7	6.6	5.6	6.5	7.1
	Air Force - National Guard	-n/a-	-n/a-	7.9	8.3	7.6	7.8	7.0
VA Criteria	Air Force - All Military	5.9	5.6	4.8	4.5	4.1	3.8	3.4
	Air Force - Active Duty	4.4	4.2	3.6	3.4	3.1	2.9	2.6
	Air Force - Reserve	9.0	8.0	7.2	7.1	6.3	5.7	4.9
	Air Force - National Guard	11.5	10.4	9.1	8.9	8.3	7.6	6.6
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	6.1	6.7	7.3	6.6	6.0	6.2	6.2
	Temporary Threshold Shifts (TTS)	2.3	2.8	3.3	2.9	2.9	2.9	3.1
	Permanent Threshold Shifts (PTS)	3.6	3.7	3.8	3.4	2.9	3.1	2.9
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	4.4	5.1	5.7	5.1	4.7	5.0	4.9
	Temporary Threshold Shifts (TTS)	2.0	2.5	3.0	2.6	2.6	2.7	2.9
	Permanent Threshold Shifts (PTS)	2.3	2.5	2.5	2.3	1.9	2.1	1.9
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	11.0	10.5	11.1	10.0	10.0	10.3	11.4
	Temporary Threshold Shifts (TTS)	3.3	3.4	4.2	3.3	3.8	3.8	4.4
	Permanent Threshold Shifts (PTS)	7.3	6.6	6.5	6.0	5.7	5.9	6.5
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	10.5	11.5	11.8	11.6	10.1	10.2	9.3
	Temporary Threshold Shifts (TTS)	3.2	3.4	3.9	3.9	3.6	3.1	3.6
	Permanent Threshold Shifts (PTS)	7.1	7.5	7.3	7.0	6.0	6.4	5.3
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	12.5	13.8	18.0	17.0	15.3	15.5	14.5
	Temporary Threshold Shifts (TTS)	3.1	4.0	5.4	5.5	5.7	6.3	6.5
	Permanent Threshold Shifts (PTS)	9.2	9.5	12.1	10.7	8.8	8.2	6.7
STS Follow-Up #1 Test Compliance	Air Force - All Military	61.1	66.3	70.5	72.3	74.4	72.9	75.8
	Air Force - Active Duty	71.2	76.8	78.1	80.4	81.2	78.8	81.6
	Air Force - Reserve	48.0	54.9	63.5	64.3	66.9	67.9	69.5
	Air Force - National Guard	50.6	52.8	58.8	59.9	63.4	61.9	66.2
	Air Force - Civilian	62.9	71.7	76.7	79.3	78.9	82.4	82.9

Appendix B: Hearing Health - Army

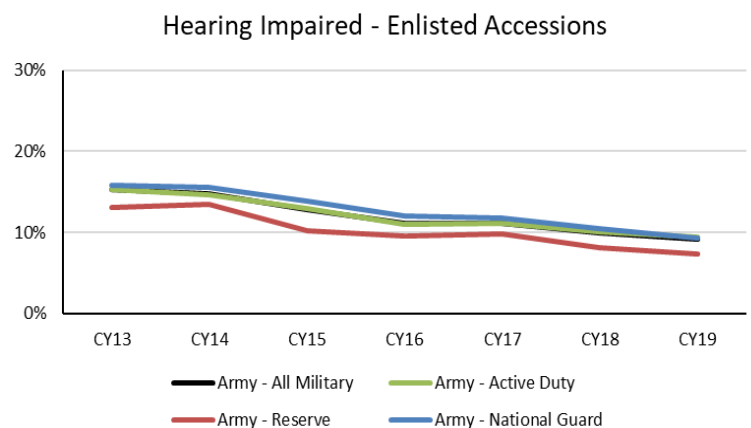
The mission of the Army Hearing Program is to maximize Soldier and Department of the Army (DA) Civilian hearing and communication abilities through implementation of the components of hearing readiness, clinical and operational hearing services, and hearing conservation, thus contributing to survivability, 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, DOEHS-HC hearing tests in CY19, 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

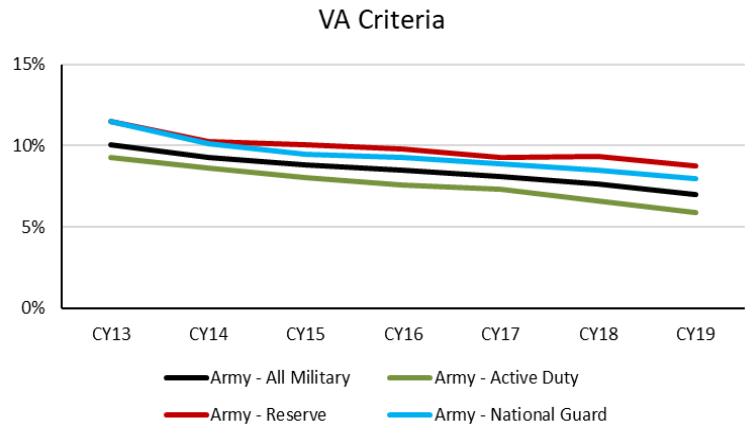
The percent of hearing impaired Soldiers continue to decrease for all Army Service components. The percentage of all Soldiers with hearing impairment decreased from 20.3% in CY13 to 16.7% in CY19.



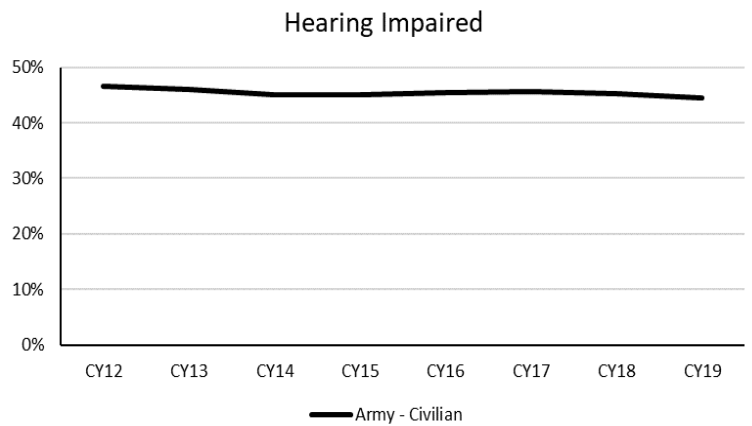
The percent of enlisted Army accessions with hearing impairment has decreased since CY13 for all Army Service components. The percent of enlisted accessions, in the Army, with hearing loss decreased from 15.2% in CY13 to 9.1% in CY19.



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 10.0% in CY13 to 7.0% in CY19.



The percent of noise-exposed DA Civilians with hearing impairment remains high over the last seven years with only marginal improvement. The percent of DA Civilians with hearing impairment decreased from 46.1% in CY13 to 44.5% in CY19.



Potential Hearing Injury

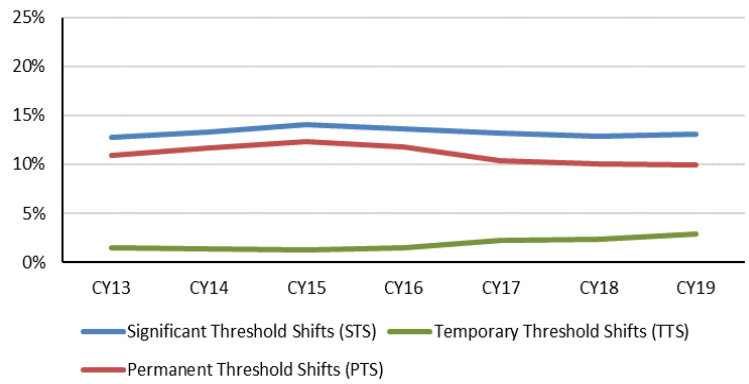
Hearing injury rates for all Soldiers are relatively stable. Potential injury rates for CY19 are: 13.1% STS, 2.8% TTS, and 9.9% PTS. The accuracy of PTS and TTS are dependent upon follow-up testing compliance.

Hearing injury rates for active duty Soldiers have generally decreased. Rates for CY19 are: 8.3% STS, 4.0% TTS, and 4.2% PTS. The accuracy of PTS and TTS are dependent upon follow-up testing compliance. 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).

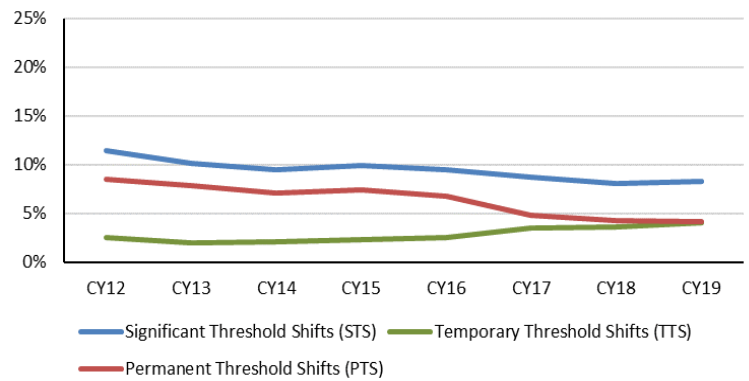
Hearing injury rates in the USAR increase in CY19. Rates for CY19 are: 21.6% STS, 0.7% TTS, and 20.3% PTS. STS and PTS rates remain high due to a significant lack of follow-up testing compliance. Failure to conduct follow-up testing causes a given STS to be identified repeatedly until follow-up testing 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 CY13. Rates for CY19 are: 15.8% STS, 2.2% TTS, and 12.9% 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.

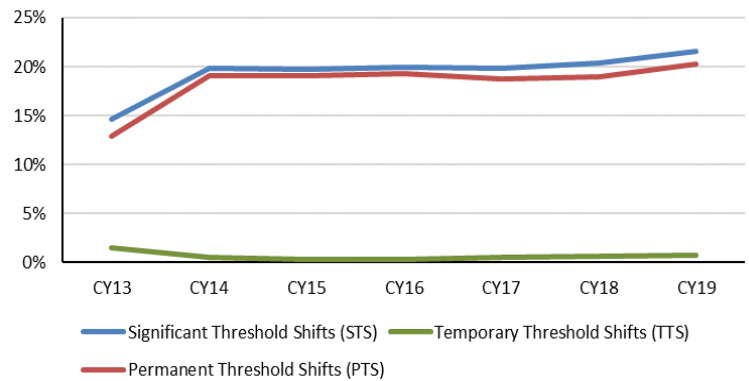
Potential Hearing Injury - Army All Military



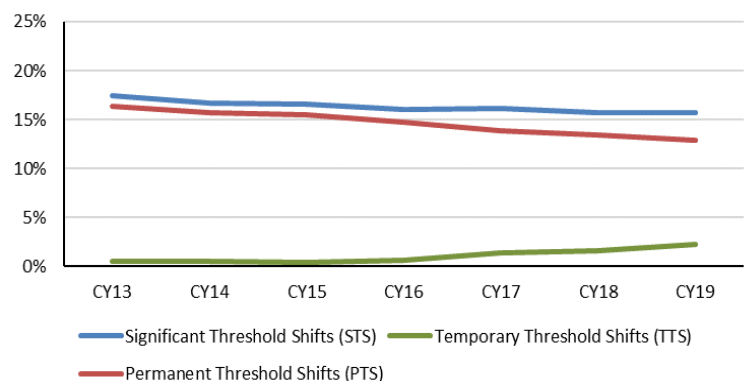
Potential Hearing Injury - Army Active Duty



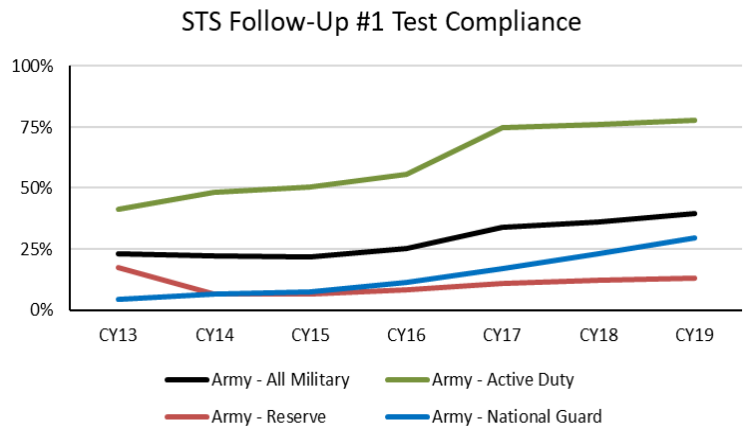
Potential Hearing Injury - Army Reserve



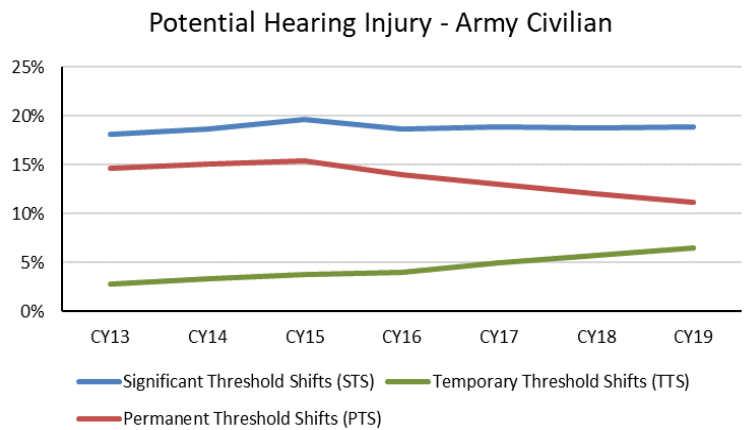
Potential Hearing Injury - Army National Guard



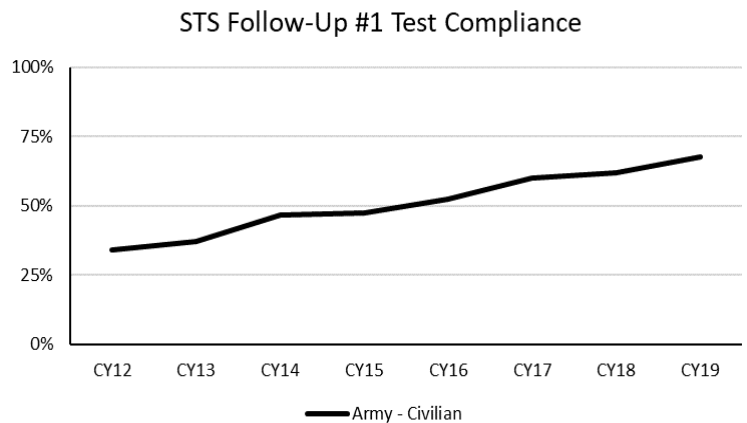
Follow-up testing (required for STS) showed continued improvement for active duty and ARNG since CY13. Overall follow-up test compliance (all military) improved from 23.2% in CY13 to 39.8% in CY18. Failure to conduct follow-up testing will: 1) Elevate STS rates as the initial STS will be identified every 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 but stable. Rates for CY19 are: 18.9% STS, 6.5% TTS, and 11.1% PTS. Improved follow-up testing compliance over the past seven years are identifying more temporary injuries (TTS) and lowering permanent injury (PTS) rates.



DA Civilian follow-up testing (required for STS) continue to show improvement. Overall compliance improved from 37.2% in CY13 to 67.7% in CY19.



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Data Summary – Army

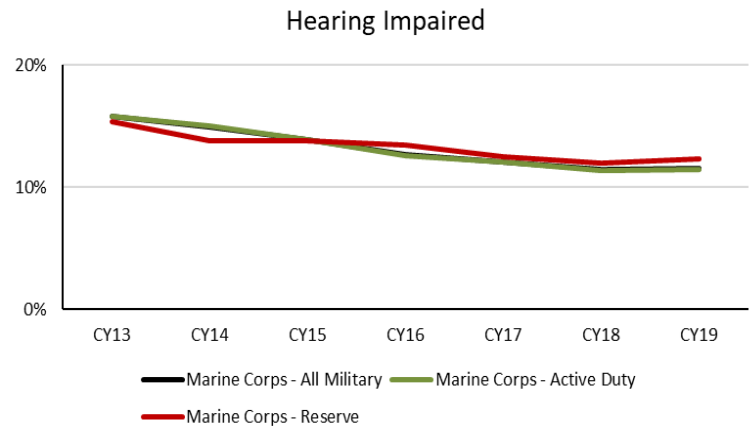
Chart Title	Category	CY13	CY14	CY15	CY16	CY17	CY18	CY19
Hearing Impaired	Army - All Military	20.3	19.3	18.5	17.9	17.9	17.5	16.7
	Army - Active Duty	18.7	17.8	17.0	16.1	16.3	16.0	14.9
	Army - Reserve	21.1	20.5	20.2	20.1	19.7	19.8	19.1
	Army - National Guard	23.7	21.8	20.2	19.9	19.7	19.1	18.5
	Army - Civilian	46.1	45.1	45.1	45.4	45.6	45.3	44.5
Hearing Impaired - Enlisted Accessions	Army - All Military	15.2	14.8	12.8	11.1	11.1	9.9	9.1
	Army - Active Duty	15.3	14.6	12.9	11.0	11.1	10.0	9.4
	Army - Reserve	13.1	13.5	10.2	9.6	9.9	8.1	7.3
	Army - National Guard	15.8	15.5	13.8	12.0	11.7	10.5	9.3
VA Criteria	Army - All Military	10.0	9.3	8.8	8.5	8.1	7.6	7.0
	Army - Active Duty	9.3	8.6	8.0	7.6	7.3	6.6	5.9
	Army - Reserve	11.5	10.2	10.0	9.8	9.2	9.3	8.8
	Army - National Guard	11.5	10.1	9.5	9.3	8.8	8.5	8.0
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	12.8	13.4	14.1	13.6	13.2	12.9	13.1
	Temporary Threshold Shifts (TTS)	1.5	1.4	1.3	1.5	2.2	2.4	2.8
	Permanent Threshold Shifts (PTS)	10.9	11.7	12.4	11.8	10.4	10.0	9.9
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	10.1	9.4	9.9	9.4	8.7	8.1	8.3
	Temporary Threshold Shifts (TTS)	2.0	2.1	2.3	2.5	3.5	3.6	4.0
	Permanent Threshold Shifts (PTS)	7.9	7.1	7.4	6.7	4.8	4.2	4.2
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	14.6	19.8	19.8	19.9	19.9	20.3	21.6
	Temporary Threshold Shifts (TTS)	1.5	0.5	0.3	0.3	0.5	0.6	0.7
	Permanent Threshold Shifts (PTS)	12.9	19.1	19.0	19.2	18.7	19.0	20.3
Potential Hearing Injury - National Guard	Significant Threshold Shifts (STS)	17.4	16.7	16.6	16.0	16.2	15.7	15.8
	Temporary Threshold Shifts (TTS)	0.5	0.5	0.4	0.6	1.3	1.6	2.2
	Permanent Threshold Shifts (PTS)	16.3	15.7	15.5	14.7	13.8	13.4	12.9
Potential Hearing Injury – Civilian	Significant Threshold Shifts (STS)	18.1	18.7	19.6	18.7	18.9	18.8	18.9
	Temporary Threshold Shifts (TTS)	2.9	3.4	3.7	4.0	5.0	5.8	6.5
	Permanent Threshold Shifts (PTS)	14.7	15.1	15.4	14.0	13.0	12.1	11.1
STS Follow-Up #1 Test Compliance	Army - All Military	23.2	22.2	21.5	25.4	33.7	36.0	39.8
	Army - Active Duty	41.3	48.4	50.4	55.5	74.6	76.2	77.6
	Army - Reserve	17.5	6.5	6.6	8.2	10.7	12.1	13.2
	Army - National Guard	4.2	6.4	7.4	11.5	17.1	23.1	29.6
	Army - Civilian	37.2	46.7	47.5	52.2	60.1	61.9	67.7

Appendix C: Hearing Health – Marine Corps

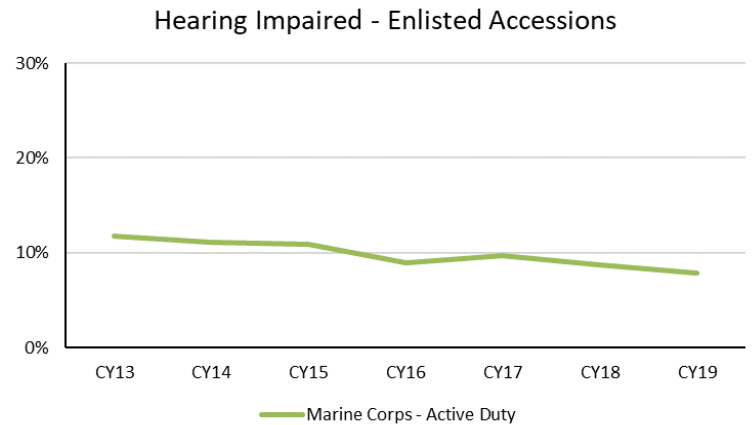
The goal of the Department of Navy’s Hearing Conservation and Noise Abatement initiative is to proactively prevent noise-induced hearing loss and ensure optimal auditory readiness. All Marines are considered to be noise exposed and are enrolled in the Hearing Conservation Program. United States Marine 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

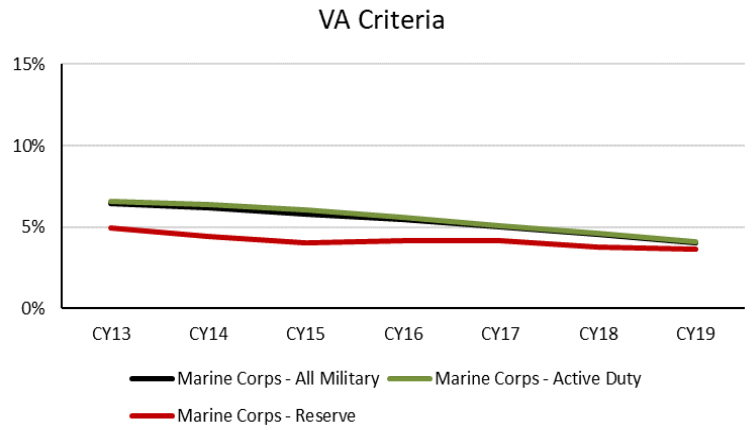
The percent of hearing impaired Marines remained stable from CY18 to CY19. The percentage of USMC personnel with hearing impairment has decreased from 15.8% in CY13 to 11.6% in CY19. Marines with normal hearing thresholds in CY19 was at 88.4%.



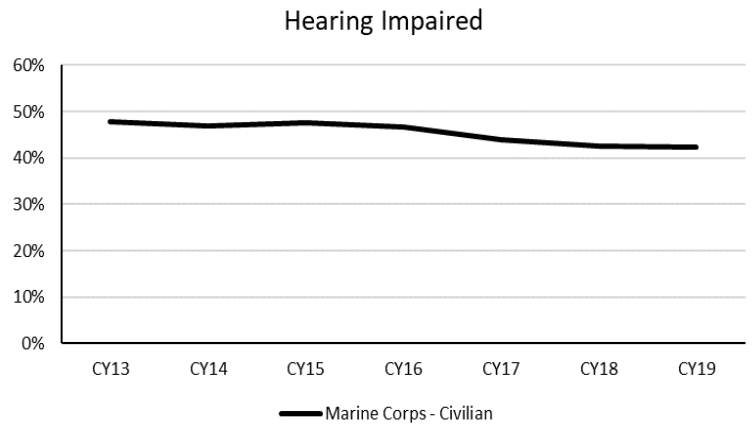
The percent of enlisted accessions with hearing impairment remained stable over the last several years. Data indicate that 7.9% of USMC accessions had hearing impairment in CY19 compared to 11.7% in CY13. Enlisted accessions data in the Reserve is lacking for all years and are not reported here.



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 6.4% in CY13 to 4.1% in CY19.



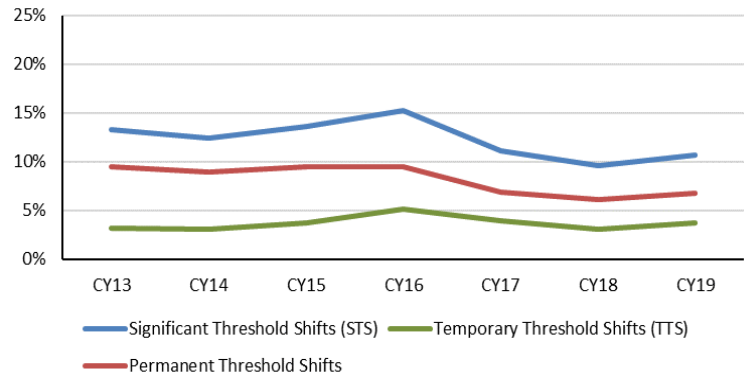
The percent of noise-exposed Civilians with hearing impairment is high with gradual decrease over the last several years. Trend analysis will continue. Data indicate that 42.3% of USMC Civilians have impaired hearing in CY19 compared to 47.9% in CY13.



Potential Hearing Injury

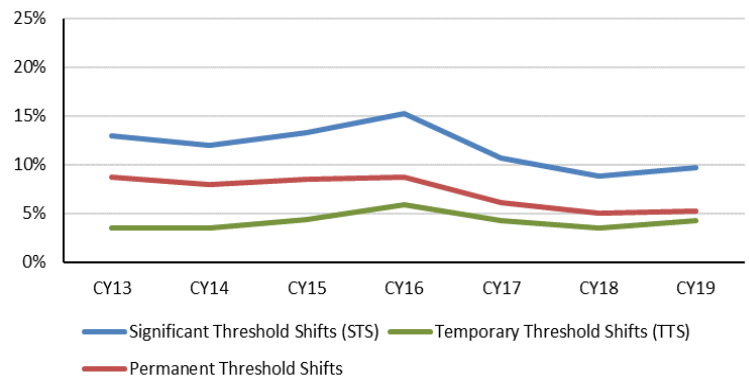
Hearing injury rates in the Marine Corps have generally decreased over the past several years. However, a slight increase was seen in CY19. Military hearing injury rates declined from a 13.0% STS rate in CY13 to 10.7% CY19

Potential Hearing Injury - Marine Corps All Military



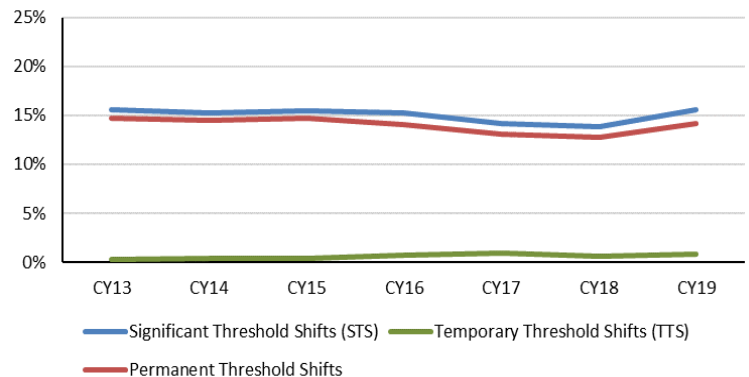
Active duty Marines have the lowest injury rates of all Marine Corps components. Hearing injury rates have declined from 13.0% in CY13 to 9.7% in CY19. Improved follow-up testing improves the accurate identification of PTS and TTS. Improved follow-up testing compliance has shown that just over half of all potential injuries (STS) are permanent (PTS).

Potential Hearing Injury - Marine Corps Active Duty

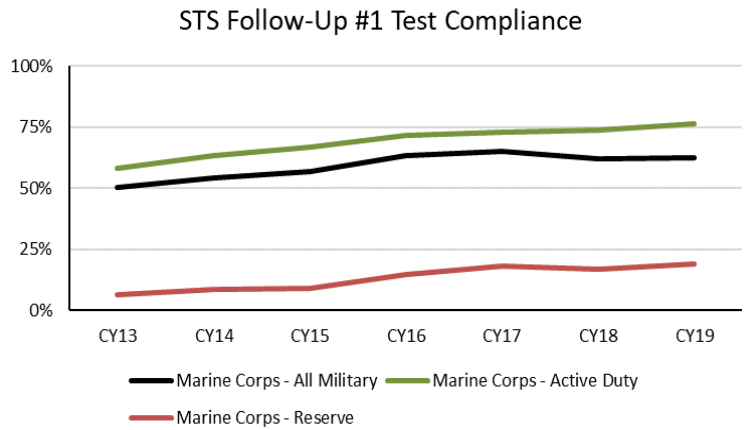


Hearing injury rates in the Marine Corps Reserve show gradual improvement over the past several years but increased in CY19. Hearing injury rates in CY19 are the same as CY13 at 15.6%. STS and PTS rates remain artificially high due to lack of follow-up testing. Failure to conduct follow-up testing will 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.

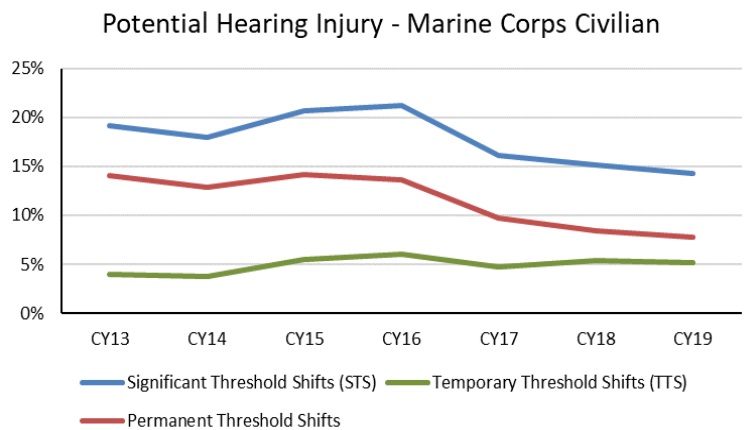
Potential Hearing Injury - Marine Corps Reserve



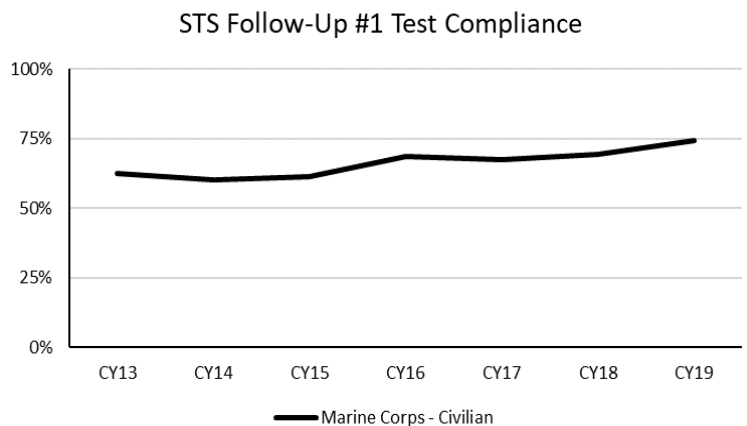
USMC compliance for all military personnel on STS Follow-Up #1 testing for CY19 is 76.4% for active duty, 18.8% for reserves and 62.2% for all military combined.



Hearing injury rates for Marine Corps Civilians are improving from 19.1% STS rate in CY13 to 14.2% STS rate in CY19. 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 continue to show improvement from 62.4% in CY13 to 74.1% in CY19.



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Data Summary – Marine Corps

Chart Title	Category	CY13	CY14	CY15	CY16	CY17	CY18	CY19
Hearing Impaired	Marine Corps - All Military	15.8	14.9	13.9	12.7	12.1	11.4	11.6
	Marine Corps - Active Duty	15.8	15.0	13.9	12.6	12.1	11.4	11.5
	Marine Corps - Reserve	15.4	13.9	13.8	13.4	12.5	12.0	12.3
	Marine Corps - Civilian	47.9	46.9	47.5	46.7	43.9	42.5	42.3
Hearing Impaired - Enlisted Accessions	Marine Corps - All Military	11.7	11.1	10.9	9.0	9.7	8.8	7.9
	Marine Corps - Active Duty	11.7	11.1	10.9	8.9	9.7	8.8	7.9
	Marine Corps - Reserve	*50.0	*0.0	*0.0	*42.9	*0.0	*7.9	*30.0
VA Criteria	Marine Corps - All Military	6.4	6.2	5.8	5.5	5.0	4.5	4.1
	Marine Corps - Active Duty	6.6	6.4	6.1	5.6	5.1	4.6	4.1
	Marine Corps - Reserve	4.9	4.4	4.0	4.2	4.1	3.8	3.6
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	13.3	12.5	13.6	15.2	11.1	9.6	10.7
	Temporary Threshold Shifts (TTS)	3.1	3.1	3.8	5.1	4.0	3.1	3.7
	Permanent Threshold Shifts (PTS)	9.5	8.9	9.5	9.5	6.9	6.1	6.8
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	13.0	12.0	13.3	15.2	10.7	8.8	9.7
	Temporary Threshold Shifts (TTS)	3.6	3.5	4.4	5.9	4.3	3.5	4.3
	Permanent Threshold Shifts (PTS)	8.8	8.0	8.5	8.7	6.1	5.0	5.3
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	15.6	15.3	15.5	15.3	14.1	13.8	15.6
	Temporary Threshold Shifts (TTS)	0.3	0.4	0.3	0.7	0.9	0.6	0.9
	Permanent Threshold Shifts (PTS)	14.8	14.5	14.7	14.1	13.1	12.7	14.1
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	19.1	18.0	20.7	21.3	16.1	15.1	14.2
	Temporary Threshold Shifts (TTS)	4.0	3.8	5.5	6.0	4.7	5.4	5.2
	Permanent Threshold Shifts (PTS)	14.1	12.9	14.2	13.6	9.7	8.4	7.8
STS Follow-Up #1 Test Compliance	Marine Corps - All Military	50.5	54.2	56.7	63.3	65.2	62.0	62.2
	Marine Corps - Active Duty	58.3	63.3	66.7	71.7	72.8	73.9	76.4
	Marine Corps - Reserve	6.4	8.7	9.1	14.7	18.1	16.9	18.8
	Marine Corps - Civilian	62.4	60.1	61.5	68.4	67.5	69.5	74.1

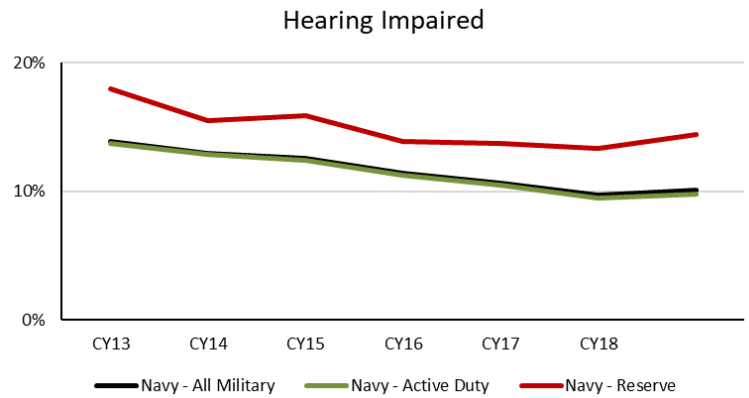
* These data were removed from the graph due to the small number of raw data points (n=15 or less) and the subsequent large deviation from more current data.

Appendix D: Hearing Health – Navy

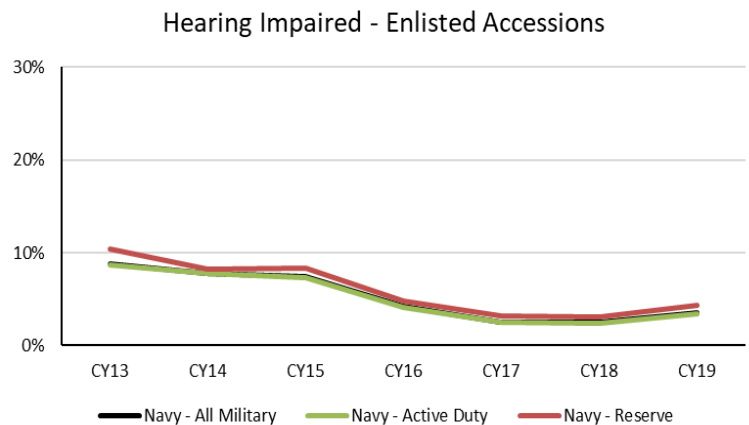
The goal of the Department of Navy’s Hearing Conservation and Noise Abatement initiative is to proactively prevent noise-induced hearing loss and ensure optimal auditory readiness. Sailors and Navy Civilians exposed to hazardous noise are enrolled in the Hearing Conservation Program. The following data represent the test results from all Sailors and noise-exposed Civilians who received audiometric testing. The overall hearing health for Sailors is good but some data points in CY19 require some attention.

Hearing Impaired

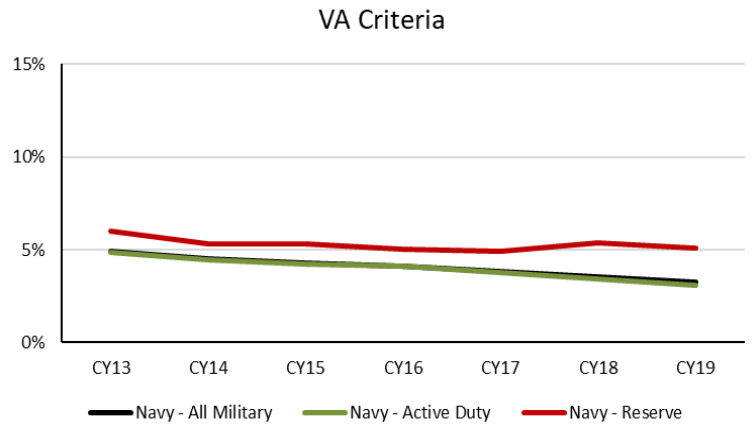
The percent of hearing impaired Sailors increased in CY19 after several years of improvement for all Service components. The percentage of United States Navy (USN) personnel with impaired hearing thresholds decreased from 13.9% in CY13 to 10.1% in CY19. Sailors with normal hearing thresholds in CY19 was at 89.9%.



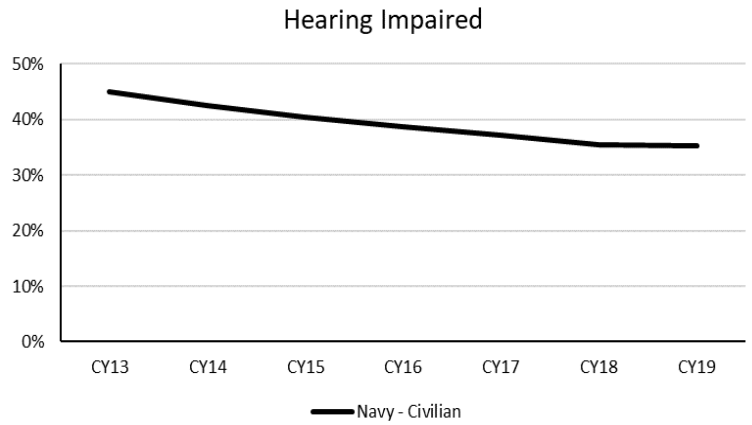
The percent of USN enlisted accessions with hearing impairment increased in CY19 after several years of improvement for all Service components. Data indicate that 96.5% of USN accessions have normal hearing in CY19. Enlisted accessions with hearing impairment decreased from 8.8% in CY13 to 3.5% in CY19.



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 4.9% in CY13 to 3.2% in CY19.



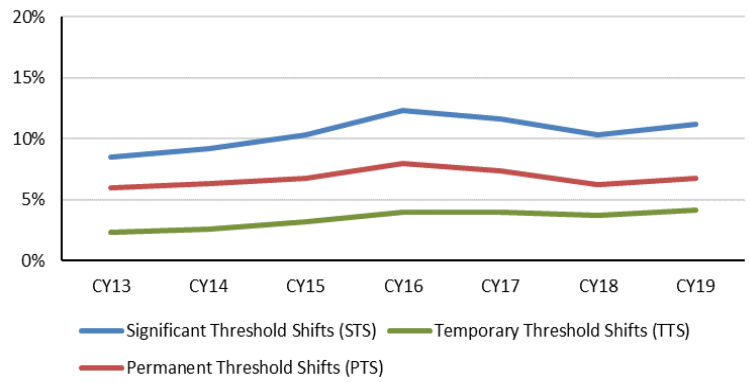
The percent of noise-exposed USN Civilians with hearing impairment is high but decreasing. Trend analysis will continue. Data indicate that 64.7% of USN Civilians have normal hearing in CY19. The percent of hearing impaired Civilians decreased from 45.0% in CY13 to 35.3% in CY19.



Potential Hearing Injury

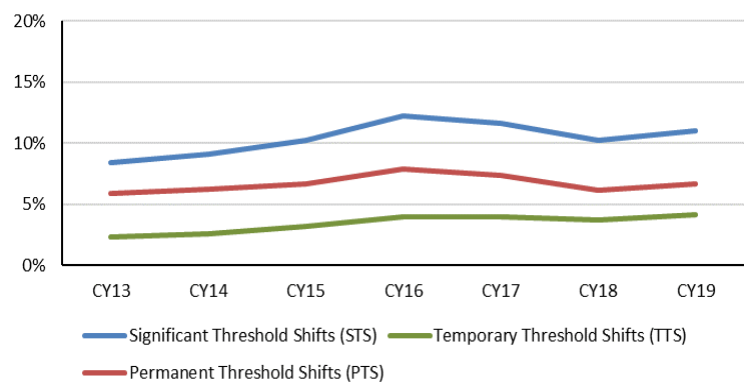
Hearing injury rates in the Navy are showing a general increase from CY13 to CY19. Potential injury rates for CY19 are: 11.2% STS, 4.2% TTS, and 6.7% PTS. The accuracy of PTS and TTS are dependent upon follow-up testing compliance.

Potential Hearing Injury - Navy All Military



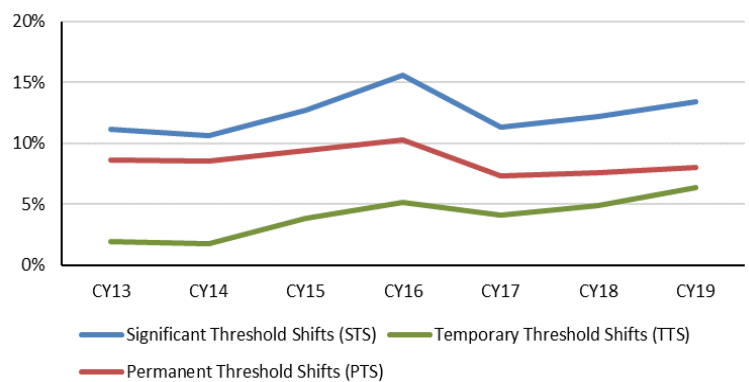
Hearing injury rates in the active duty follow closely that of the Navy as a whole and are generally increasing. Hearing injury rates for CY19 are: 11.1% STS, 4.2% TTS, and 6.6% PTS.

Potential Hearing Injury - Navy Active Duty

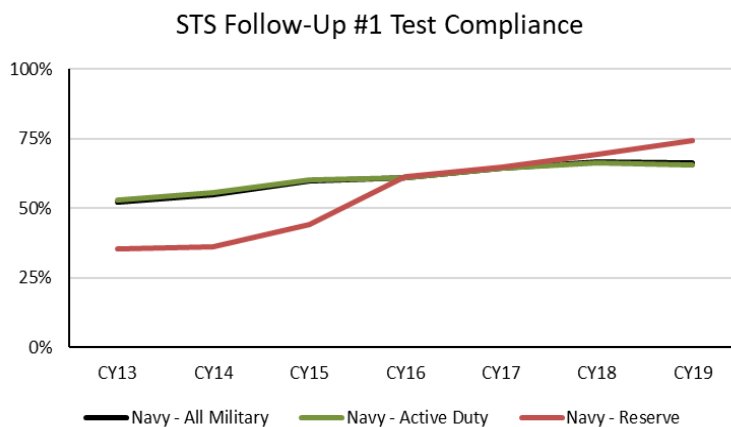


Hearing injury rates in the Navy Reserve have seen some fluctuation. While STS rates have increased, TTS and PTS have improved since CY13 due to increased follow-up testing. Hearing injury rates for CY 19 are: 13.4% STS, 6.3% TTS, and 8.0% PTS.

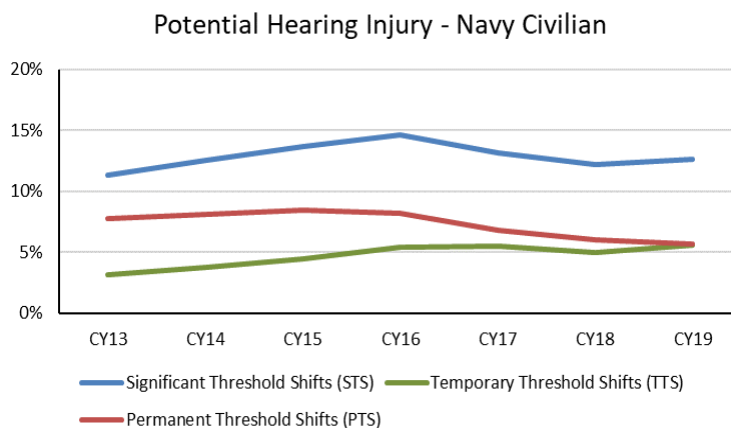
Potential Hearing Injury - Navy Reserve



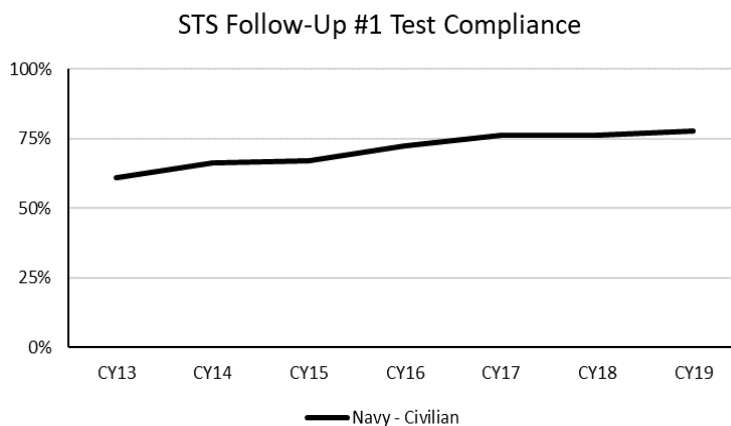
USN compliance for all military personnel on STS Follow-Up #1 testing for CY13 was 52.3%, and improved to 66.4% in CY19. While this is below the target threshold of 85% this represents a continued improvement.



Hearing injury rates for USN Civilians have seen some fluctuation with a somewhat higher STS rate in CY19 compared to CY13. TTS and PTS have shown continued relative improvement due to improved follow-up testing over the last several years. Hearing injury rates for CY 19 are: 12.6% STS, 5.6% TTS, and 5.7% PTS.



USN compliance for Civilian personnel on STS Follow-Up #1 testing for CY13 was 60.9%, and improved to 77.8% in CY19. While this is below the target threshold of 85% this represents a continued improvement.



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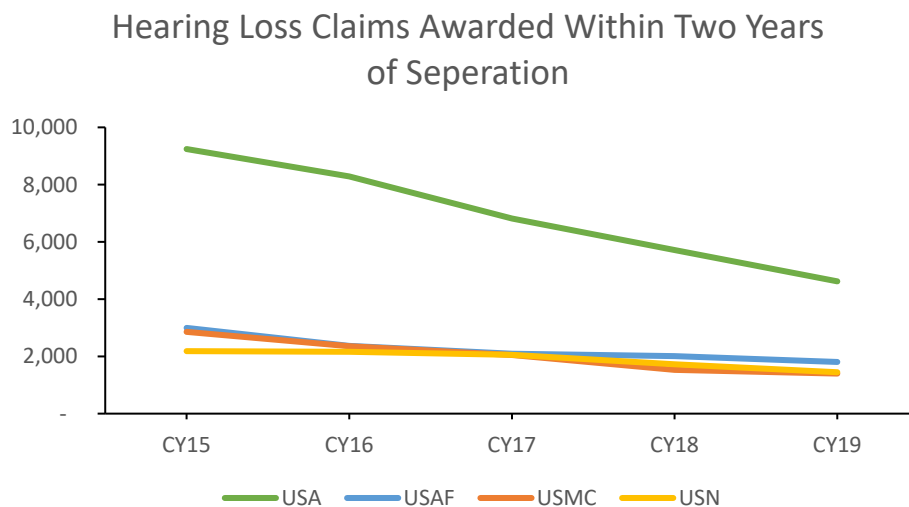
Data Summary – Navy

Chart Title	Category	CY13	CY14	CY15	CY16	CY17	CY18	CY19
Hearing Impaired	Navy - All Military	13.9	13.0	12.6	11.4	10.6	9.7	10.1
	Navy - Active Duty	13.7	12.9	12.4	11.3	10.4	9.5	9.8
	Navy - Reserve	17.9	15.5	15.8	13.9	13.7	13.4	14.4
	Navy - Civilian	45.0	42.6	40.5	38.8	37.3	35.4	35.3
Hearing Impaired - Enlisted Accessions	Navy - All Military	8.8	7.8	7.4	4.2	2.6	2.5	3.5
	Navy - Active Duty	8.7	7.8	7.4	4.2	2.5	2.4	3.5
	Navy - Reserve	10.4	8.2	8.4	4.8	3.2	3.1	4.4
VA Criteria	Navy - All Military	4.9	4.5	4.3	4.1	3.8	3.6	3.2
	Navy - Active Duty	4.9	4.5	4.2	4.1	3.8	3.4	3.1
	Navy - Reserve	6.0	5.3	5.3	5.0	4.9	5.4	5.1
Potential Hearing Injury - All Military	Significant Threshold Shifts (STS)	8.5	9.2	10.3	12.4	11.7	10.4	11.2
	Temporary Threshold Shifts (TTS)	2.3	2.6	3.2	4.0	4.0	3.7	4.2
	Permanent Threshold Shifts (PTS)	6.0	6.3	6.8	8.0	7.4	6.3	6.7
Potential Hearing Injury - Active Duty	Significant Threshold Shifts (STS)	8.4	9.2	10.2	12.2	11.7	10.3	11.1
	Temporary Threshold Shifts (TTS)	2.3	2.6	3.2	4.0	4.0	3.7	4.2
	Permanent Threshold Shifts (PTS)	5.9	6.3	6.7	7.9	7.4	6.2	6.6
Potential Hearing Injury - Reserve	Significant Threshold Shifts (STS)	11.1	10.6	12.7	15.6	11.3	12.2	13.4
	Temporary Threshold Shifts (TTS)	1.9	1.8	3.8	5.2	4.1	4.9	6.3
	Permanent Threshold Shifts (PTS)	8.7	8.5	9.4	10.3	7.3	7.6	8.0
Potential Hearing Injury - Civilian	Significant Threshold Shifts (STS)	11.4	12.5	13.7	14.6	13.2	12.2	12.6
	Temporary Threshold Shifts (TTS)	3.1	3.7	4.5	5.4	5.5	5.0	5.6
	Permanent Threshold Shifts (PTS)	7.7	8.1	8.5	8.2	6.8	6.0	5.7
STS Follow-Up #1 Test Compliance	Navy - All Military	52.3	55.0	59.7	61.0	64.3	66.6	66.4
	Navy - Active Duty	53.0	55.6	60.4	60.9	64.3	66.4	65.7
	Navy - Reserve	35.3	36.1	44.4	61.5	64.8	69.4	74.4
	Navy - Civilian	60.9	66.3	67.1	72.5	76.3	76.2	77.8

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.

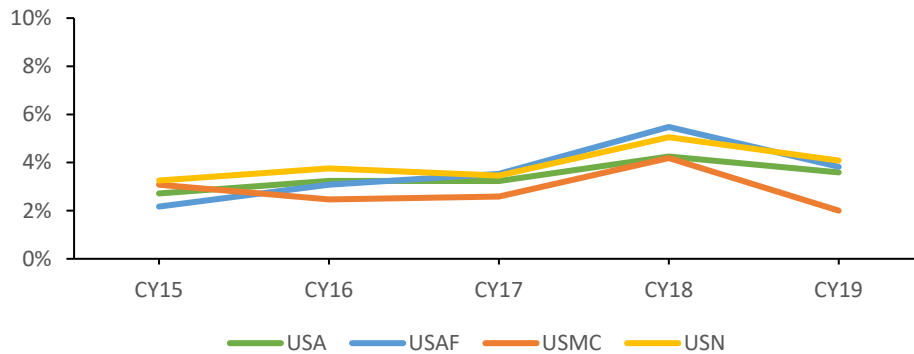
The number of veterans receiving a service connected hearing loss is decreasing. The largest decrease was seen in Army veterans. The number of veterans separating from the military during this time period, and eligible to file a claim, is not known. Knowing this information will help interpret the significance 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	CY19
USA	9,243	8,284	6,814	5,717	4,621
USAF	2,995	2,369	2,095	2,008	1,805
USMC	2,856	2,353	2,048	1,529	1,399
USN	2,183	2,158	2,053	1,722	1,446

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 CY19, 96.5% 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 decreased in CY19 for veterans from all Services.

Percent of Hearing Loss Claims Awarded Within Two Calendar Years of Separation - Rated at 10 to 100 Percent



Percent of hearing loss claims awarded within two calendar years of separation – Rated at 10 to 100 percent

	CY15	CY16	CY17	CY18	CY19
USA	2.7%	3.2%	3.2%	4.3%	3.6%
USAF	2.2%	3.1%	3.5%	5.5%	3.8%
USMC	3.1%	2.5%	2.6%	4.2%	2.0%
USN	3.3%	3.8%	3.5%	5.1%	4.1%