

Hearing Health Surveillance Data Review Military Hearing Conservation Fiscal Year 2022

Defense Health Agency Hearing Center of Excellence



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Definitions

Active duty: Full-time duty in the active military service of the United States.

Audiogram: A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Hearing impairment: Any tested frequency exceeding 25 decibel hearing level (dB HL) in either ear.

Permanent Threshold Shift (PTS): A Significant Threshold Shift (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 also identified as a PTS.

Reserve Component (RC): A term referring to the Army, Navy, Marine Corps, Air Force, Space Force, and Coast Guard Reserves, as well as the Army National Guard of the United States and the Air National Guard of the United States. 38 USC § 101(27)

Significant Threshold Shift (STS): Hearing thresholds changed, relative to the applicable baseline, an average of 10 dB HL or more at 2000, 3000, and 4000 Hertz (Hz) in either ear. An STS may be positive (decreased hearing) or negative (improved hearing) and requires follow-up testing to determine if it is permanent (PTS) or temporary (Temporary Threshold Shift, TTS).

STS Follow-up test compliance: An audiogram conducted after an STS is identified on a periodic exam. Used to determine if the STS is temporary or permanent. Compliance is determined by the number of members who completed required follow-up hearing tests following a positive STS on their periodic hearing test. Follow-up time period for active duty, civilians, and Reserve Components (Reserve and National Guard) is determined by each service.

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

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

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Executive Summary

Department of Defense Instruction DoDI 6055.12, Hearing Conservation Program [HCP], August 14, 2019, p. 3):

- “Protects all military personnel and noise-exposed civilian personnel from hearing loss resulting from hazardous occupational and operational noise exposure through a continuing, effective, and comprehensive HCP, in accordance with Parts 1910 and 1960 of Title 29, Code of Federal Regulations (CFR).”
- “Reduces hazardous occupational and operational noise exposure to personnel to enhance mission readiness, communication, and safety.”
- “Considers hazardous noise control in military capabilities to support operational readiness and integrates noise control into the design and development of defense systems and equipment.”

Annually, the DOD Hearing Conservation Working Group (HCWG); Defense Public Health Agency – Dayton, Public Health and Preventive Medicine Department, Epidemiology Consult Service Division; and the DOD Hearing Center of Excellence (HCE) collaborate to provide information on the effectiveness of DOD HCPs. This report covers fiscal year (FY) 2014 through 2022 and includes DOD and service-level measures of effectiveness (MOEs) on HCP metrics. It consolidates the MOEs from all service components and noise-exposed civilians and examines service-level efforts to prevent hearing loss resulting from occupational and operational illness and injury (MOEs, June 2019).^{1,2}

The MOEs include:

- MOE 1: Examines the potential hearing injuries/illnesses by calculating the percentages of tested individuals who had results of STS, PTS, and temporary threshold shift (TTS).
- MOE 2: Examines the STS follow-up testing compliance for individuals with STS on the annual audiogram.
- MOE 3: Focuses on the measure of the proportion of individuals in the HCP population who have hearing impairment (thresholds above 25 dB HL) vs. the proportion of those with normal hearing (25 dB HL or below) in the HCP population.
- MOE 4: Calculates the percentage of service members who might qualify for Department of Veterans Affairs (VA) based only on auditory threshold disability criteria per 38 CFR §3.385, Disability due to impaired hearing.

1 Service components include Active Component (referred to as active duty [AD] in this report), and Reserve Component (RC) that includes Reserve and National Guard (NG). This data is from DOD Components that use DOEHRs-HC to manage audiometric monitoring information.

2 Herein, the term “civilian” will be used throughout the report when discussing noise-exposed civilians in DOD HCPs.

Each DOD component establishes, maintains, and evaluates the effectiveness of their HCPs. Due to the unique differences in mission execution, service member requirements, and expected exposure to hazardous noise, not all service members are monitored as part of an HCP. The data reported herein only represent service members and civilians enrolled in an HCP. It is important to note that a 1% magnitude of change for the Army compared to the other services is significant due to the total number of Soldiers tested (Table 1). For example, a 1% change in the Army of total Soldiers tested is 83,089 versus 19,985 for the Air Force.

Figure 1 shows the percentage of service members broken out by service and service component with a hearing test in FY22. The largest number of service members tested is from the AD component for all services.

Figure 1. FY22 Percent of Service Members Hearing Tested by Service and Service Component

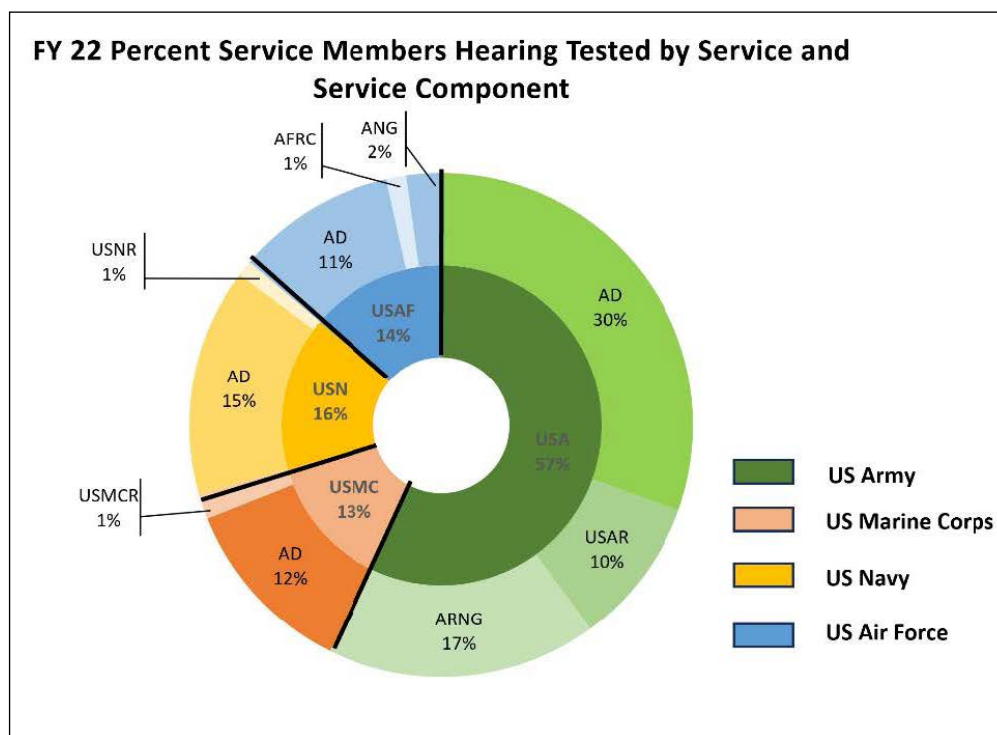


Table 1 below includes the number of unique hearing tests (audiograms) performed in FY22 for each military service component as well as DOD Civilians. U.S. Space Force medical surveillance is included within the US Air Force data.

Table 1. FY22 Unique Individual Hearing Tests

Fiscal Year 2022 Unique Hearing Tests	Military	Active Duty	Reserve	National Guard	DOD Civilian
Army	830,896	441,913	137,158	251,825	20,615
Marine Corps	191,882	169,038	22,844	*	52,749
Navy	227,289	212,810	14,479	*	2,991
Air Force	199,850	149,031	18,655	32,164	22,879
Department of Defense	1,449,917	972,792	193,136	283,989	99,234
Source: Defense Occupational and Environmental Health Readiness System- Hearing Conservation Data Repository (DOEHRS-HC DR)					
*No National Guard Component in the Marine Corps or Navy					

Summary Findings for FY22

The sections below summarize the MOE findings from the HCP hearing test data related to military and civilian personnel.

Unique Individuals by Personnel Category (FY21 and FY22)

The number of unique hearing tests completed by DOD in FY22 shows a slight decrease for AD, Reserve and DOD Civilians components when compared to FY21 data. The NG component shows an increase in FY22 compared to FY21 ([Graph 1](#)). This overall DOD decrease may be due to reduced scheduled HC appointments during the transition of Electronic Health Record (EHR) systems from AHLTA to MHS GENESIS.

Significant Threshold Shift Rates by FY

Significant Threshold Shift (STS) rates are the percentage of service members or civilians who have a change in hearing (an average change of +/- 10dB HL or greater at 2000, 3000, and 4000 Hz in either ear on a periodic audiogram compared to the individual's applicable baseline audiogram). Follow-up testing is required to determine if the STS is a TTS that resolves on follow-testing or a PTS that is confirmed on follow-up testing, or a lack of follow-up testing completed within the required service's timeframe. STS, TTS, and PTS rates have remained stable for all service members ([Graph 2](#)), and STS and PTS showed a slight decrease for civilians ([Graph 6](#)) in FY22 compared to FY21.

FY22 STS rates for DOD service members are 12.4% for STS, 2.8% for TTS and 9.3% for PTS. PTS rates for AD (5.5%) and civilians (9.1%) are lower (more accurate) and may in part be due to their higher follow-up testing compliance than for the Reserve Components. In FY22, the NG and Reserve show PTS rates of 13.5% and 20.1%, respectively. [Graphs 3, 4, and 5](#) reflect the STS, TTS, and PTS rates for AD, Reserve, and NG, respectively.

STS Follow-up Test Compliance

The purpose of the STS follow-up test is to determine whether the hearing change was temporary or permanent. Those who complete the follow-up test and still have an STS are referred for an audiological evaluation. Without follow-up tests, true hearing status is unknown. An increase in follow-up testing compliance will result in more accurate hearing status. Over the past eight years the effect of increased follow-up testing compliance is best seen in decreased PTS rates for civilians and AD service members. Over the past three years, follow-up testing compliance in the NG and Reserve has not shown a significant decrease in PTS. In FY22, AD and civilians have the highest follow-up compliance rates (74.5% and 78.9%, respectively) while the NG (36.4%) and Reserve (19.9%) rates remain low. [Graphs 7 and 8](#) reflect the follow-up testing compliance for service members and noise-exposed civilians, respectively.

Hearing Impairment

The percent of hearing-impaired service members show a slight decrease to 13.3% and civilians to 36.2% in FY22 compared to FY21. AD service members have the lowest rates of hearing impairment in FY22 (12.0%) compared to the Reserve (17.4%) and NG (16.2%). [Graphs 9 and 10](#) reflect hearing impaired rates for all service members and civilians, respectively.

[Graph 11](#) provides the percent of enlisted accessions that are hearing impaired. The percent of enlisted accessions with hearing impairments decreased in FY22 (9.1%) compared to FY21 (11.3%). NG enlisted accessions have the lowest rates (9.0%) of hearing impairment compared to the AD (9.1%) and Reserve (9.4%).

VA Auditory Threshold Disability Criteria

[Graph 12](#) provides the percent of service members meeting the established VA auditory threshold disability criteria³. The percent of service members who meet established VA auditory threshold disability criteria in FY22 remains stable for AD (2.7%) and Reserve (5.2%). The NG show a decrease in FY22 (4.8%) compared to FY21 (5.2%). AD service members continue to have the lowest rates in FY22. VA Auditory Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Conclusions

Overall, the hearing health in DOD appears to be relatively stable for service members and civilians in HCPs, FY14-FY22. The evidence suggests a trend of a marginal decrease in hearing impairment ([Graph 9](#)) for all service members combined and for AD, NG, and Reserve service members when FY22 data is compared to FY21. Service members who meet established VA auditory threshold disability criteria remain stable from FY21 to FY22 ([Graph 12](#)). Compliance for STS follow-up testing in FY22 continues to improve for all service members ([Graph 7](#)) when compared to FY21 data. STS follow-up testing in FY22 continues to improve for civilians ([Graph 8](#)) when compared to FY21. Threshold shift rates for STS and TTS show a slight increase for NG and Reserve and a decrease for AD service members in FY22 compared to FY21. PTS rates show a slight increase for all service components from FY21 to FY22 except AD which show a slight decrease in FY22 compared to FY21. Civilian rates for STS and PTS show a slight decrease in FY22 compared to FY21. Be mindful of comparisons between the military groups as there are significant differences in their sizes and contributions to the dataset including their inclusion criteria and HCP participation. The findings within this report indicate hearing loss trends have plateaued over the past few years showing no notable reduction in hearing loss trends.

3 Service components include Active Component (referred to as active duty [AD] in this report), and Reserve Component (RC) that includes Reserve and National Guard (NG).

Background

This annual report from the DOD Hearing Conservation Working Group (HCWG); the Defense Centers for Public Health - Dayton, Epidemiology Consult Service Division; and the Hearing Center of Excellence, is a collaborative effort that covers DOD hearing health for fiscal year (FY) 2014 through 2022. The report includes DOD and service-level measures of effectiveness (MOEs) for hearing conservation program (HCP) metrics. It consolidates the MOEs from all service components and civilians and examines service-level efforts to prevent hearing loss resulting from occupational and operational illness and injury (MOEs, June 2019).^{4,5}

Each service varies in how the hearing data are gathered and reported. For example, significant threshold shift (STS) and permanent threshold shift (PTS) rates are not always standardized and thus not always comparable due to different approaches to service-level Hearing Conservation Programs (HCPs, Batchelor et al., 2020). For example, the Air Force and Navy provide annual monitoring audiometry only to service members who are routinely exposed to hazardous noise (at risk approach) and the Army and Marine Corps provide annual monitoring audiometry to all AD service members (total force approach).

In 2018, the DOD HCWG agreed to use standard HCP MOEs to resolve discrepancies among the services' HCP reports. The DOD HCWG approved MOEs to include the following: STS rates, STS follow-up compliance, hearing impairment rates, and VA auditory threshold disability criteria. The metrics and data in this report are prepared and codified by the Defense Centers for Public Health-Dayton Epidemiology Consult Service Division and the Defense Health Agency Armed Forces Health Surveillance Branch Air Force Satellite at Wright-Patterson AFB, Ohio (Batchelor et al., 2020). This report provides a consistent method of reporting data on service HCPs using the standard MOEs described below:

- MOE 1 examines the potential hearing injuries/illnesses by calculating the percentages of tested individuals who had results of STS, PTS, and temporary threshold shift (TTS). This calculation is determined by using the number of unique individuals meeting each STS criteria on an annual audiogram per FY and dividing the total number of individuals who received an annual audiogram.
- MOE 2 examines the STS follow-up testing compliance for individuals with STS on the annual audiogram. This is calculated by dividing the number of individuals with STS who did not obtain a follow-up audiogram within each service-specific required timeframe by the total number of STS per FY. The graphs within the report include the STS follow-up compliance that is based on the non-compliance metric.

4 Service components include Active Component (referred to as active duty [AD] in this report), and Reserve Component (RC) that includes Reserve and National Guard (NG).

5 Herein, the term “civilian” will be used throughout the report when discussing noise-exposed civilians in DOD HCPs.

- MOE 3 measures the proportion of individuals in the HCP population who have hearing impairment (thresholds above 25 dB HL) vs. the proportion of those with normal hearing (25 dB HL or below). This is calculated by taking the number of individuals with results showing hearing impairment on a periodic or reference audiogram test per FY and dividing by the total number of individuals who received a periodic or reference audiogram in the same FY.
- MOE 4 calculates the percentage of service members who might qualify for Department of Veterans Affairs (VA) disability benefits based only on auditory threshold disability criteria per 38 CFR §3.385, Disability due to impaired hearing. This percentage is determined by the number of individuals who met the VA hearing (auditory) threshold level criteria per FY divided by the total number of individuals obtaining an audiogram within that same FY.⁶

This report includes a graphic representation of unique hearing tests completed, by each service component, in FY21 vs. FY22. The difference in total unique tests from FY21 to FY22 was divided into the total number of unique tests completed in FY21 to determine the percent increase or decrease for FY22. Service members tested in DOD HCPs in FY22 show the ratio of service members tested by service and service component. [Figure 1](#) includes the number of unique hearing tests (audiograms) performed in FY22 for each military service component.

There are two important caveats for this report that necessitate highlighting. First, the report is not intended to provide a comprehensive, descriptive epidemiological analysis of exposed versus (vs.) unexposed populations. Rather, this report is a summary of HCP participants' hearing health trends to assist HCP managers with identifying HCP performance gaps.

6 The award of VA service-connected disability benefits for hearing loss can be made by Veterans Benefits Administration (VBA), Department of Veterans Affairs (VA) based on many factors - not only changes in hearing (auditory) threshold levels during military service. For example, in granting service-connection for hearing loss VBA considers:

- Word Recognition Scores (testing to determine the veteran's optimum performance for word recognition under controlled and standardized conditions) of less than 94%;
- A permanent positive threshold shift worse than reference audiogram threshold "greater than normal measurement variability" at any frequency between 500 – 6000 Hz; and
- Determination of etiology affected by several facts, per court decisions and/or directed by VBA for instance:
 - Instead of conceding noise exposure for a military occupational specialty (MOS) with moderate or high probability for noise exposure, Veteran Service Representatives and Rating Veteran Service Representatives must now concede noise exposure for ALL military occupational specialties (low, moderate, and high probability of noise exposure rather than only moderate and high probability of noise exposure MOS') for the purposes of establishing an event in service;
 - When hazardous noise exposure is conceded based on the veteran engaging in combat, accept satisfactory lay or other evidence of service incurrence or aggravation of such injury or disease, if consistent with the circumstances, conditions, or hardships of such service, even if there is no official record of such incurrence or aggravation in such service. There is a requirement to resolve every reasonable doubt in favor of the veteran unless there is clear and convincing evidence to the contrary. (Reeves v. Shinseki, 682 F.3d 988, Fed.Cir. 2012)

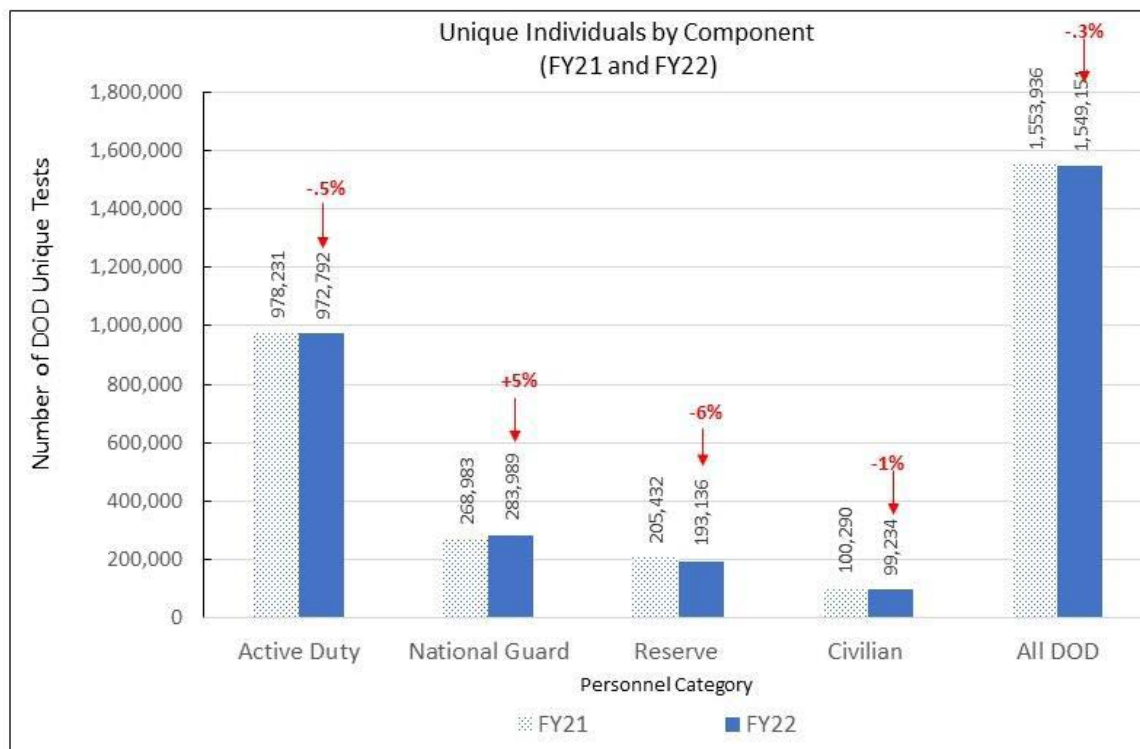
Also, it is important to note that the MOEs report for FY21 and going forward were constructed using a different methodology than the previous year reports. Data from the Defense Occupational and Environmental Health Readiness System – Hearing Conservation Data Repository (DOEHRS-HC DR) used for previous MOEs reports (Calendar years 2018 and 2019 and FY2020), are no longer available as the method of retrieval changed with the server migration. Data validations were run to ensure the queries using the new methodology were within acceptable ranges when compared to the previous reports, and no significant changes in trends were noted across all measures. Data contained in the current report for years FY14-FY22 reflect the new data and methodology. Therefore, report data should not be used interchangeably with earlier versions of report prior to FY22. The leadership of each of the military services’ HCPs reviewed and approved the metrics and data in this report. For questions regarding the data presented in this report, contact the DOD Hearing Center of Excellence Prevention and Surveillance Section at: <https://hearing.health.mil/hcehome/Contact-Us>.

Hearing Health - DOD

Unique Hearing Tests by Personnel Category

The number of unique hearing tests for all service members show an overall minimal decrease of 0.2% during FY22 compared to FY21. In FY22, the NG showed a 5.0% increase in unique hearing tests compared to FY21. There was a 1.0% decrease for civilian personnel in FY22 compared to FY21 (Graph 1), a 0.7% decrease for AD and a 6.0% decrease for the Reserve (all services) in FY22 compared to FY21 (Graph 1). Potential causes to the slight decrease in FY22 may be due to reduced scheduling of HC appointments during the transition of EHR systems from AHLTA to MHS GENESIS.

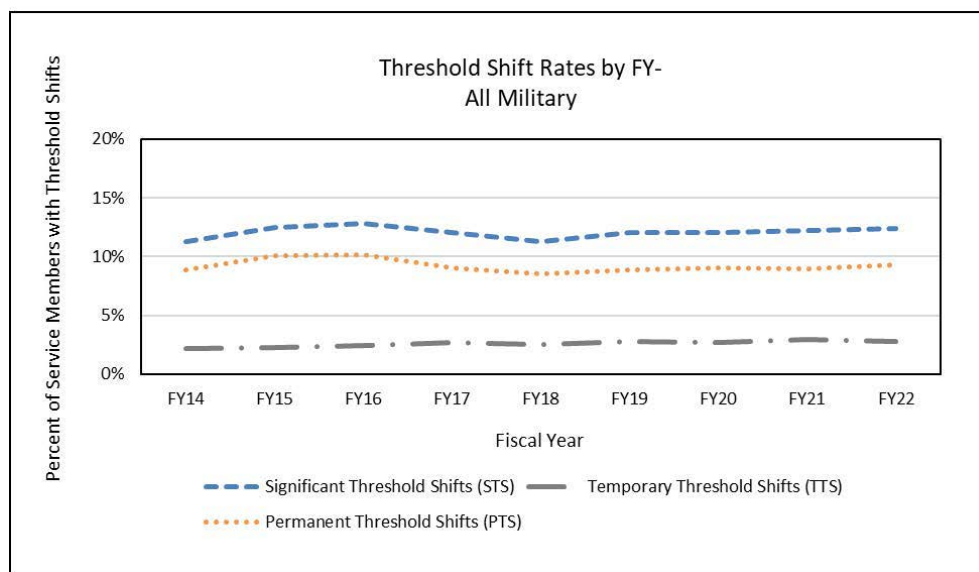
Graph 1. Unique DOD Individual Hearing Tests by Personnel Category (FY21 and FY22)



Significant Threshold Shift Rates by FY

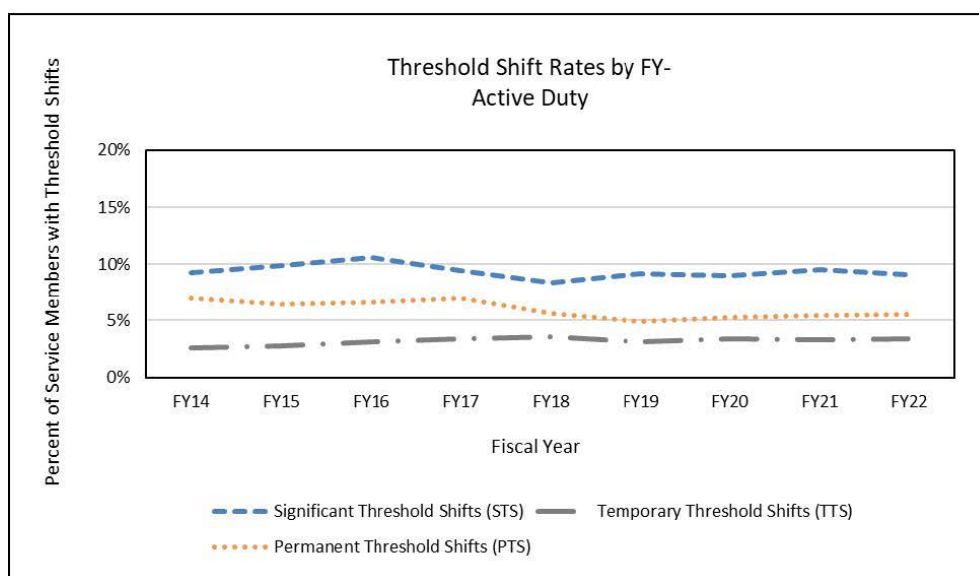
In FY22, military STS, TTS, and PTS rates remain stable when compared to FY21. Threshold shift rates for all service members (all components) indicate 12.4% STS, 2.8% TTS, and 9.3% PTS rates in FY22 (Graph 2).

Graph 2. Threshold Shift Rates by FY - All Service Members



AD service members have the lowest PTS rates compared to other components (Reserve and NG) for FY14 – FY22. Threshold shift rates for AD service members indicate 9.1% STS, 3.3% TTS, and 5.5% PTS rates in FY22 (Graph 3). Improved follow-up testing compliance in the AD population ([Graph 7](#)) shows that about half of all the STS initially identified are found to be permanent.

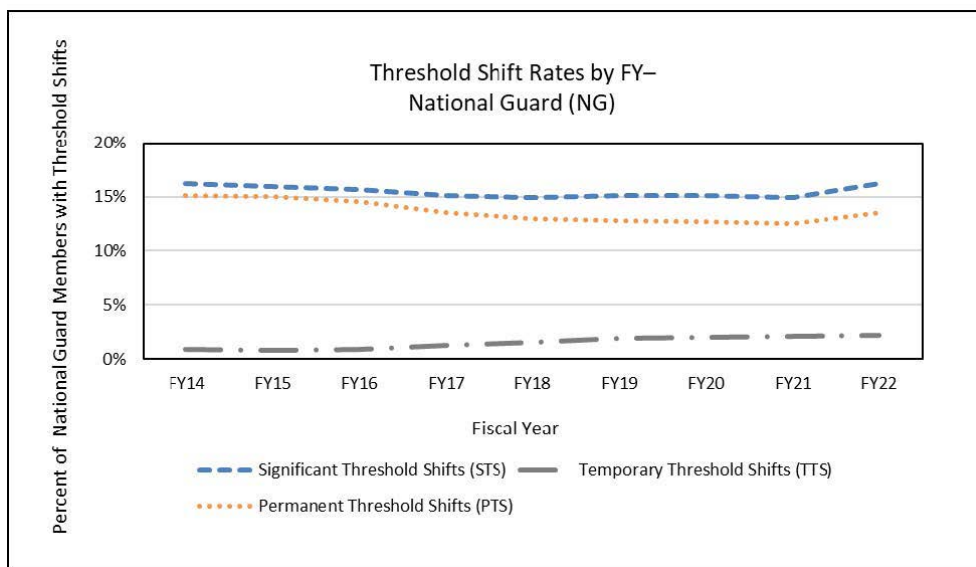
Graph 3. Threshold Shift Rates by FY – AD Service Members



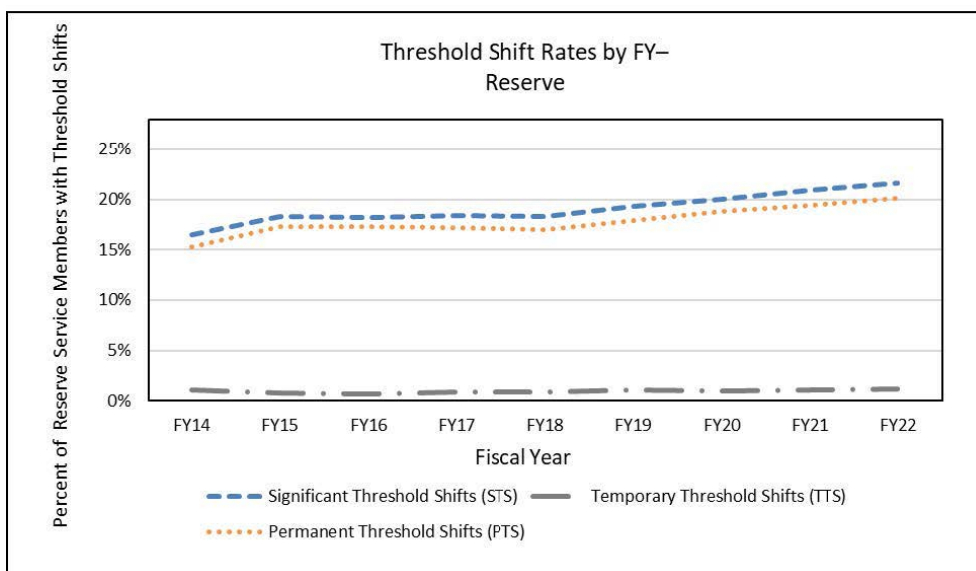
NG (Navy and Marine Corps do not have National Guard service members) rates for FY22 are: 16.2% STS, 2.2% TTS, and 13.5% PTS (Graph 4). However, the NG STS rates increased from 15.0% in FY21 to 16.2% in FY22.

Reserve rates for FY22 are: 21.6% STS, 1.2% TTS, and 20.1% PTS (Graph 5). Reserve and NG STS and PTS rates remain elevated, due to a lack of STS follow-up testing. Failure to conduct STS follow-up testing prevents the accurate identification of TTS vs. PTS. Data from Graph 2 illustrates this in that improved follow-up testing compliance in the AD population ([Graph 7](#)) shows that about half of all the STS initially identified are found to be permanent.

Graph 4. Threshold Shift Rates by FY - National Guard (NG) Service Members

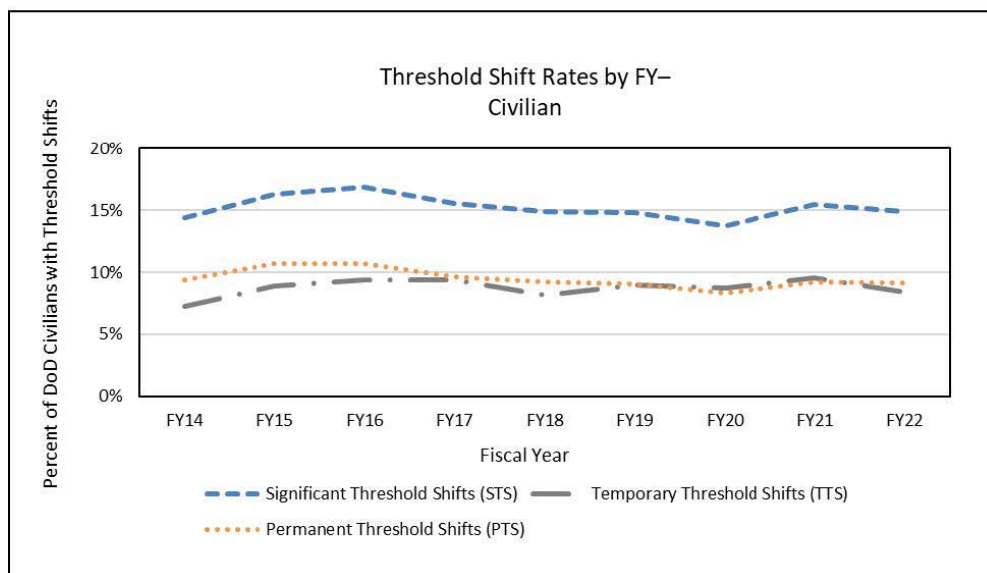


Graph 5. Threshold Shift Rates by FY - Reserve Service Members



The DOD Civilian STS and PTS rates remain high compared to AD service members. The DOD Civilian rates for FY22 are: 14.9% STS, 8.4% TTS, and 9.1% PTS (Graph 6). The data show a slight decrease in STS and PTS for FY22 compared to FY21.

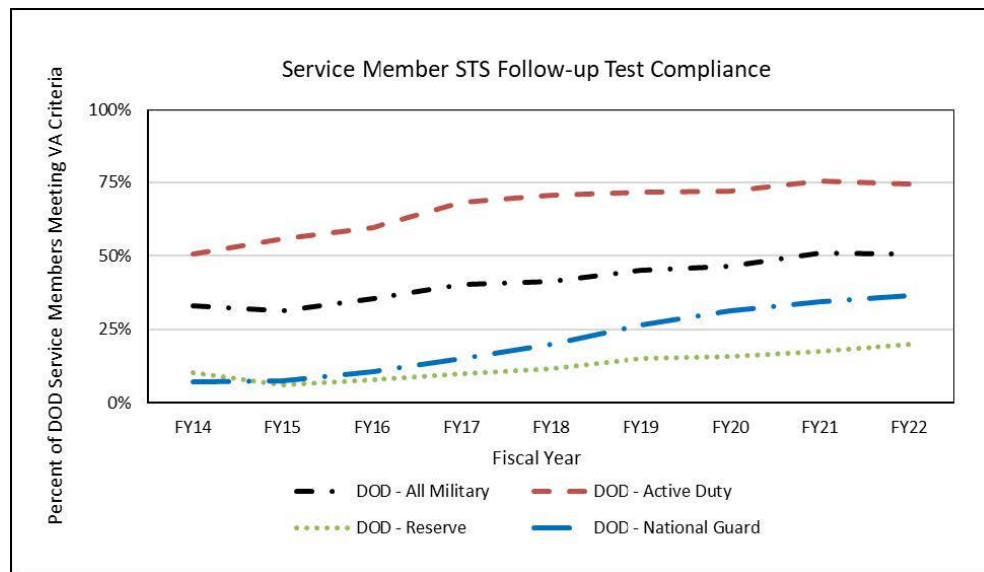
Graph 6. Threshold Shift Rates by FY – DOD Civilians



Significant Threshold Shift Follow-up Test Compliance

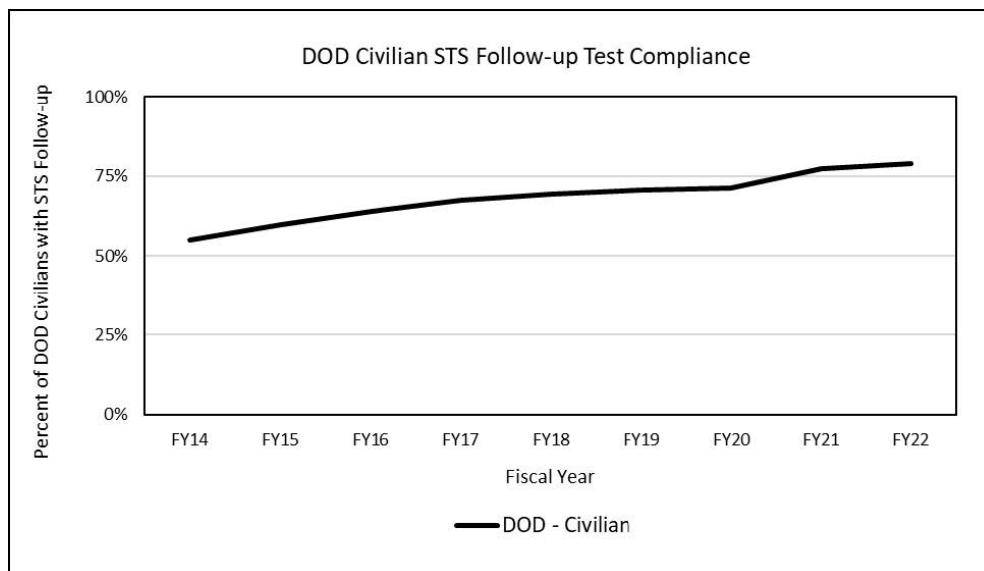
The STS follow-up testing compliance shows marginal improvement in FY22 compared to FY21 (Graph 7). Overall compliance for military follow-up testing increased from 33.1% in FY14 to 50.4% in FY22. NG, Reserve and Civilian follow-up compliance has continued the steady improvement since 2015. However, due to a decrease in AD follow-up compliance in 2022, the overall compliance rate is slightly lower in FY22 than FY21. Failure to conduct STS follow-up testing will: 1) elevate STS rates (i.e., 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 (i.e., STS with no follow-up hearing test defaults to a PTS when the service-specific follow-up test window has closed). This results in artificially high STS and PTS rates that do not reflect the true incidence of new military hearing injuries (McKenna et al., 2018).

Graph 7. Service Members STS Follow-up Test Compliance



DOD Civilian STS follow-up testing compliance increased from 77.3% in FY21 to 78.9% in FY22. Overall compliance improved from 55.0% in FY14 to 78.9% in FY22 (Graph 8).

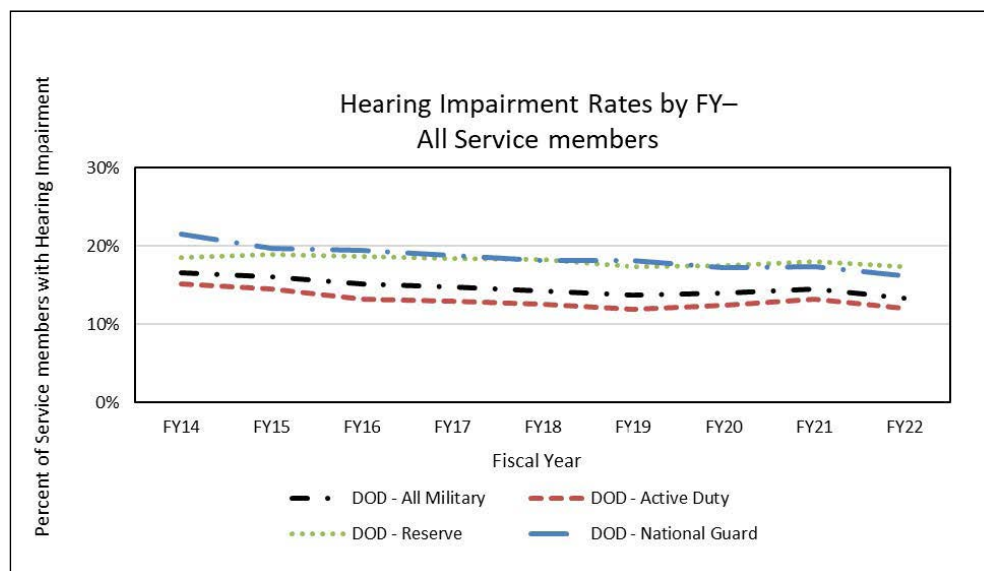
Graph 8. DOD Civilians STS Follow-up Test Compliance



Hearing Impairment

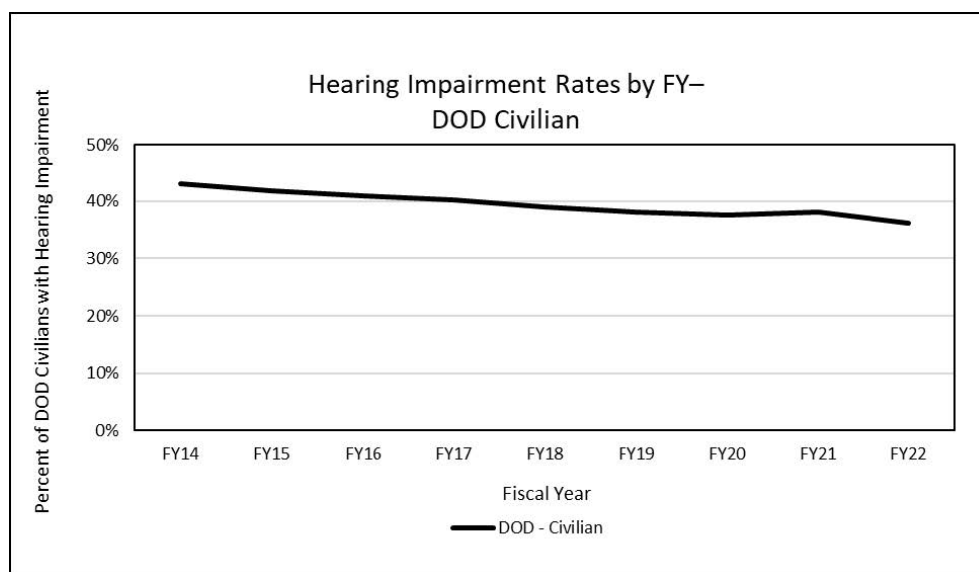
The percent of hearing impaired (hearing worse than 25 dB HL at any test frequency) had increased over the past few years (FY 20-21) but decreased between FY21 to FY22 14.5% and 13.3%, respectively. The percentage of DOD service members with hearing impairment decreased 3.3%, from 16.6% in FY14 to 13.3% in FY22. DOD Graph 9 provides the percent of service members with hearing impairment by component.

Graph 9. Hearing Impairment Rates by FY - All Service Members



The percentage of DOD Civilians with hearing impairment showed a gradual decrease from FY14 to FY20; however, results in FY21 showed an increase in hearing impairment to 38.2% with a 2% decrease to 36.2% in FY22. The percent of civilians with hearing impairment decreased by 6.9% from 43.1% in FY14 to 36.2% in FY22 (Graph 10). The high percentage of hearing impaired civilians is believed to be, in part, due to differences in age and/or years of noise exposure compared to service member populations (Batchelor et al., 2020).

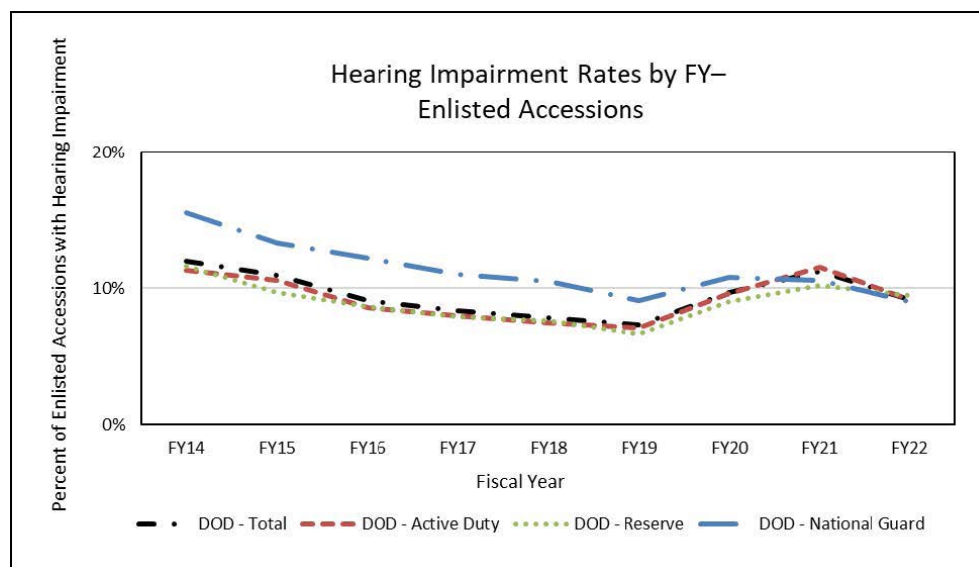
Graph 10. Hearing Impairment Rates by FY – DOD Civilian



Hearing Impairment – Enlisted Accession Data

Service members receive a hearing test as part of basic training at their entrance to military service. Those reference audiograms are used to determine the percentage of all new recruits who come into the military with hearing impairment (hearing worse than 25 dB HL at any test frequency). The percentage of enlisted accessions with hearing impairment show a marginal decrease for all DOD components since FY14. The percent of DOD enlisted accessions with hearing impairment decreased from 12.0% in FY14 to 9.1% in FY22 (Graph 11). Results from FY20-21 show a marked increase in the percentage of enlisted accessions with existing hearing impairment for all components, however, FY22 (9.1%) are lower than FY21 (11.3%).

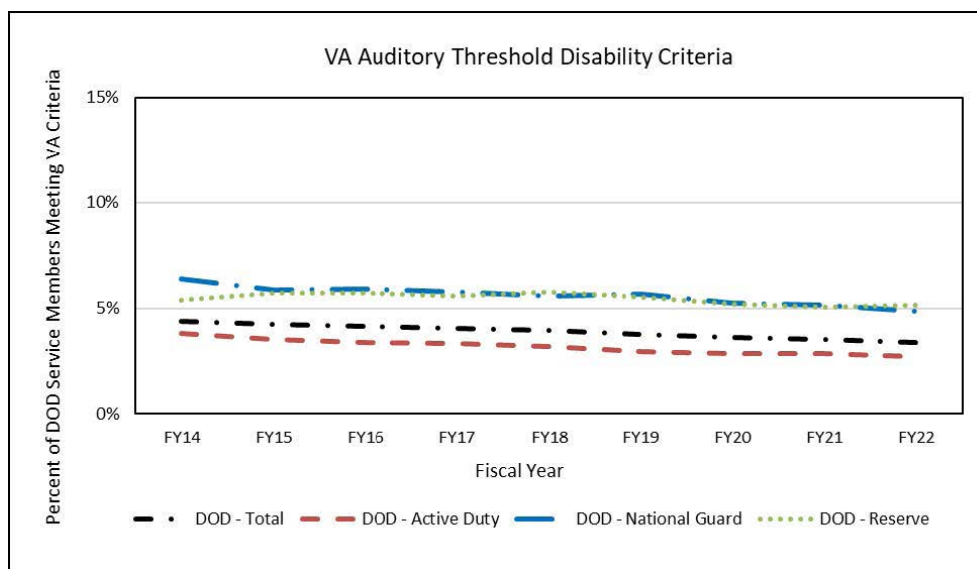
Graph 11. Hearing Impairment Rates by FY – Enlisted Service Member Accessions



VA Auditory Threshold Disability Criteria

The percentage of service members meeting established VA auditory threshold disability criteria is decreasing slightly for all DOD components. The percentage of DOD service members potentially eligible for VBA service-connected disability compensation for hearing loss decreased from 4.4% in FY14 and 3.5% in FY21 to 3.4% in FY22 (Graph 12). NG service members showed the biggest improvement in this metric. VA Auditory Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Graph 12. VA Auditory Threshold Disability Criteria – All Service Members



Summary and Conclusions

Hearing health for service members and civilians in the DOD HCP shows marginal improvement. Evidence of this is seen in decreased hearing impairment (FY21-14.5% and FY22-13.3%), decreased hearing impairment in enlisted accessions (FY21-11.3% and FY22-9.1%), and unchanged rates of service members meeting VA auditory threshold eligibility criteria for hearing loss (FY21-3.6% and FY22-3.6%). The rates of VA auditory threshold eligibility criteria have decreased between FY14 to FY22 but have plateaued in recent years. The STS rates for all military increased in FY22 (12.4%) compared to FY14 (11.3%). There was an increase in the STS rates for the Reserve in FY22 compared to FY14. All AD and civilian populations show the trend of improving follow-up STS testing compliance. According to Batchelor et al. (2020), overall comparisons among these four groups should be undertaken with care because of the differences in their contributions to the dataset (AD, 68%; NG, 19%; and Reserve, 13%). Specifically, changes in AD strongly affect the total numbers; but smaller percentage changes may be more significant for the large AD.

Table 2. Data Summary – DOD - Source: DOEHS-HC DR

Department of Defense - Total										
Chart Title	Category	Percent								
		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Threshold Shift Rates All Members	STS	11.3	12.5	12.9	11.3	12.0	12.0	12.0	12.3	12.4
	TTS	2.2	2.2	2.5	2.7	2.5	2.8	2.7	2.9	2.8
	PTS	8.9	10.1	10.1	9.1	8.5	8.9	9.0	9.0	9.3
Threshold Shift Rates AD Service Members	STS	9.3	9.9	10.6	9.4	8.4	9.1	9.0	9.5	9.1
	TTS	2.7	3.1	3.4	3.6	3.2	3.5	3.3	3.6	3.3
	PTS	6.4	6.6	6.9	5.6	4.9	5.3	5.4	5.5	5.5
Threshold Shift Rates NG Service Members	STS	16.2	15.9	15.7	15.1	14.9	15.1	15.1	15.0	16.2
	TTS	0.9	0.8	0.9	1.3	1.6	2.0	2.0	2.1	2.2
	PTS	15.1	15.0	14.6	13.5	13.0	12.7	12.7	12.5	13.5
Threshold Shift Rates Reserve Service Members	STS	16.5	18.3	18.2	18.4	18.3	19.3	20.0	20.9	21.6
	TTS	1.0	0.7	0.7	0.8	0.9	1.1	0.9	1.1	1.2
	PTS	15.3	17.3	17.3	17.2	17.0	17.9	18.8	19.4	20.1
Threshold Shift Rates DOD Civilian	STS	14.4	16.3	16.8	15.6	14.9	14.8	13.7	15.5	14.9
	TTS	7.2	8.8	9.4	9.4	8.1	8.9	8.7	9.6	8.4
	PTS	9.4	10.7	10.7	9.7	9.2	9.0	8.3	9.3	9.1
STS Follow-Up Test Compliance	All	33.1	33.1	35.4	40.2	41.3	45.2	46.6	51.1	50.4
	Active Duty	50.7	55.8	59.5	68.2	70.5	71.6	72.2	75.6	74.5
	National Guard	7.2	7.4	10.4	15.1	19.9	26.6	31.1	34.2	36.4
	Reserve	10.1	5.9	7.8	9.8	11.6	15.0	15.6	17.5	19.9
	Civilian	55.0	59.9	64.0	67.5	69.4	70.6	71.4	77.3	78.9
Hearing Impairment Rates	All	16.6	16.0	15.1	14.7	14.2	13.7	13.9	14.5	13.3
	Active Duty	15.2	14.4	13.2	13.0	12.5	11.9	12.4	13.2	12.0
	National Guard	21.6	19.7	19.5	18.8	18.2	18.1	17.2	17.4	16.2
	Reserve	18.5	18.9	18.6	18.4	18.2	17.3	17.4	18.0	17.4
	Civilian	43.1	41.8	41.0	40.2	38.9	38.2	37.6	38.2	36.2
Hearing Impairment Rates - Enlisted Accessions	All	12.0	10.9	9.1	8.3	7.8	7.3	9.7	11.3	9.1
	Active Duty	11.3	10.6	8.6	8.0	7.4	7.0	9.6	11.5	9.1
	National Guard	15.5	13.3	12.2	11.0	10.5	9.1	10.8	10.5	9.0
	Reserve	11.6	9.6	8.7	7.9	7.6	6.6	9.0	10.2	9.4
VA Auditory Threshold Criteria	All	4.4	4.3	4.1	4.1	3.9	3.8	3.6	3.5	3.4
	Active Duty	3.8	3.5	3.4	3.4	3.2	3.0	2.9	2.8	2.7
	National Guard	6.4	5.9	5.9	5.7	5.6	5.6	5.2	5.2	4.8
	Reserve	5.4	5.7	5.7	5.6	5.8	5.5	5.2	5.1	5.2

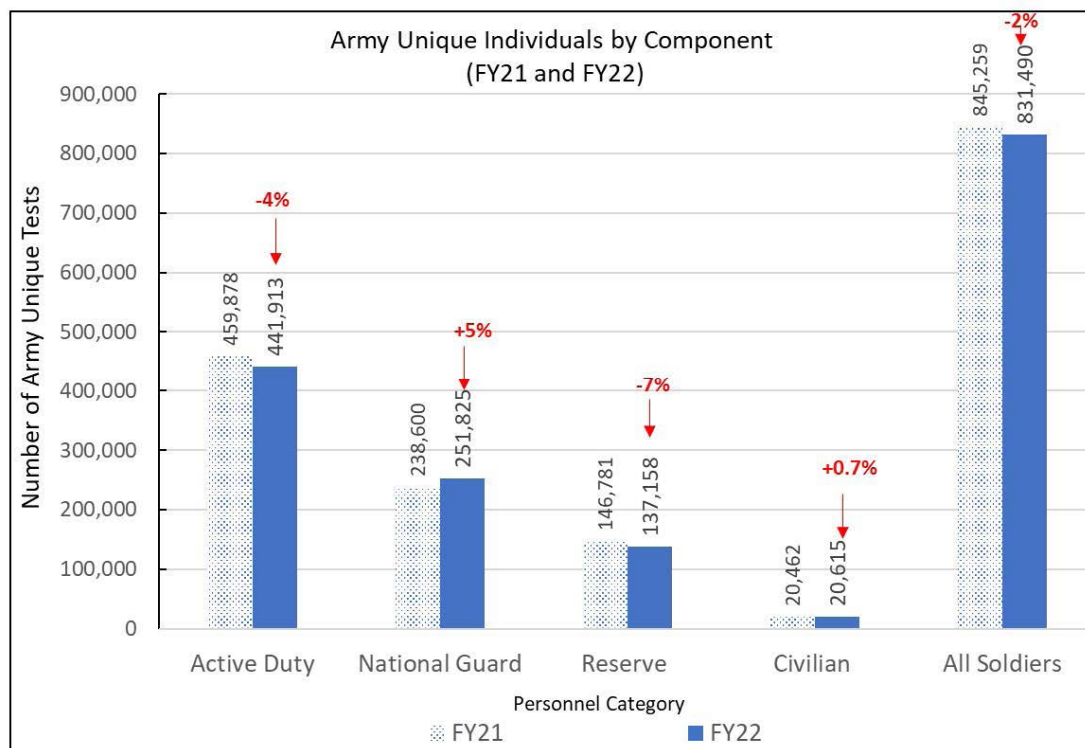
Appendix A: Hearing Health - Army

The mission of the Army Hearing Program (AHP) is to maximize Soldier and Department of the Army (DA) Civilian hearing and communication abilities through implementation of the components of hearing readiness, clinical services, operational hearing services, and hearing conservation, thus contributing to survivability, lethality, mission effectiveness, and quality of life. All AD 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 USAR and ARNG Soldiers, routinely exposed to hazardous noise, assigned to Table of Distribution and Allowances (TDA) units require annual DOEHS-HC 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 AHP when they meet HCP noise-exposure criteria. The following data represent the test results from all Soldiers and DA Civilians who received DOEHS-HC hearing tests in FY22. 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 stable for FY19-FY22.

Unique Hearing Tests by Personnel Category

The number of unique individual hearing tests conducted by the Army shows a decrease in all Army components except for the NG in FY22 compared to FY21. The DA Civilians show a marginal decrease during FY22 compared to FY21. There was a 2% decrease in testing for all Soldiers and a 0.2% decrease for DA Civilians in FY22 compared to FY21 (Graph 13). This decrease in unique hearing tests in FY22 compared to FY21 is thought to be influenced by reduced scheduling of HC appointments during the transition of EHR systems from AHLTA to MHS GENESIS.

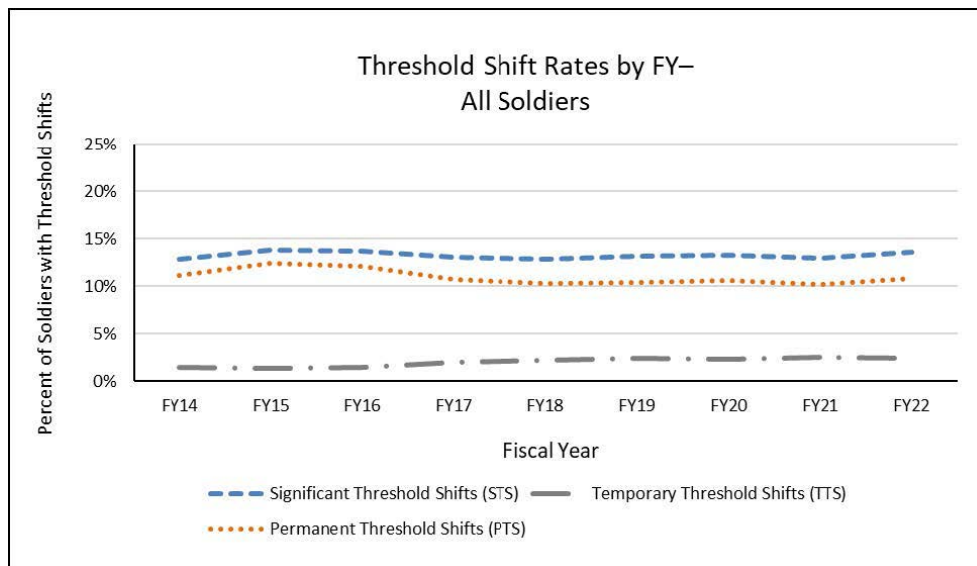
Graph 13. Army Unique Individual Hearing Tests by Personnel Category (FY21 and FY22)



Significant Threshold Shift Rates by FY

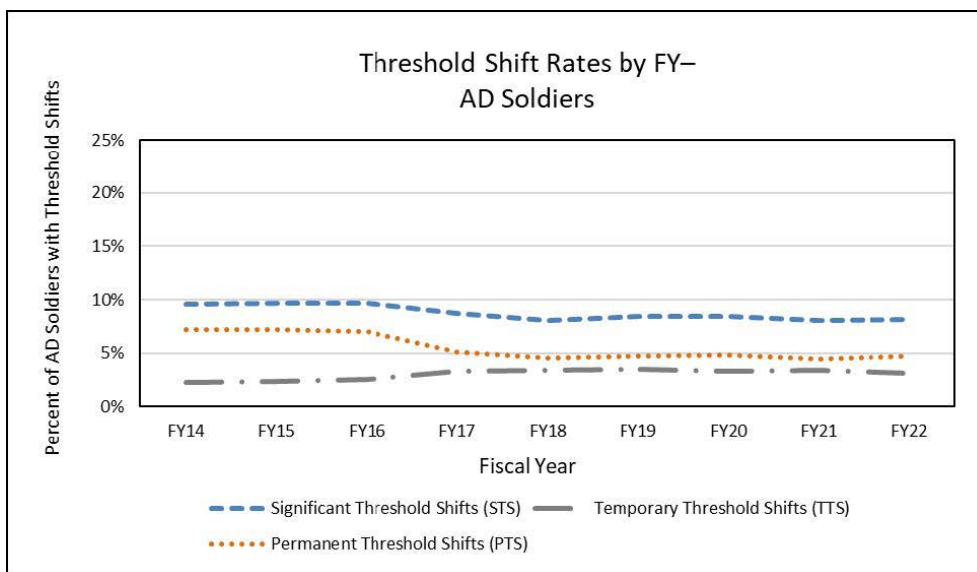
In FY22, all Soldier (all Army components combined) STS and PTS rates show a slight increase compared to FY21 and FY14 rates (Graph 14). Threshold shift rates for all Soldiers are 13.6% STS, 2.4% TTS, and 10.8% PTS in FY22. The accuracy of PTS and TTS can be influenced by STS follow-up testing compliance ([Graph 19](#)).

Graph 14. Threshold Shift Rates by FY - All Soldiers



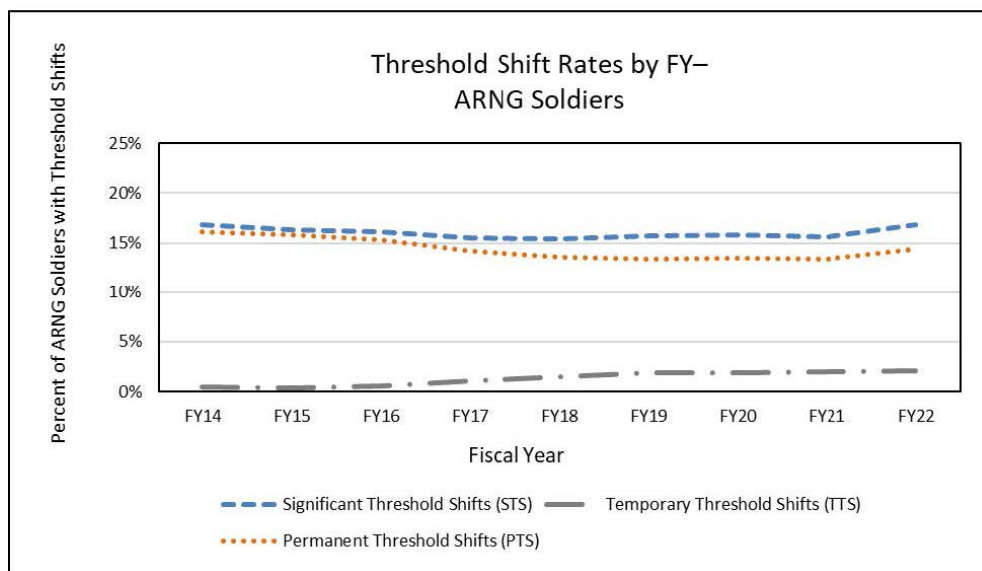
AD Soldier rates remain stable at 8.1% STS, 3.1% TTS, and 4.7% PTS in FY22 (Graph 15) when compared to FY21 rates. Accuracy of PTS and TTS rate can be dependent upon STS follow-up testing compliance ([Graph 19](#)). Improved STS follow-up testing for AD Soldiers (compared to USAR and ARNG Soldiers) show a little over half of all STS identified are found to be PTS.

Graph 15. Threshold Shift Rates by FY - AD Soldiers



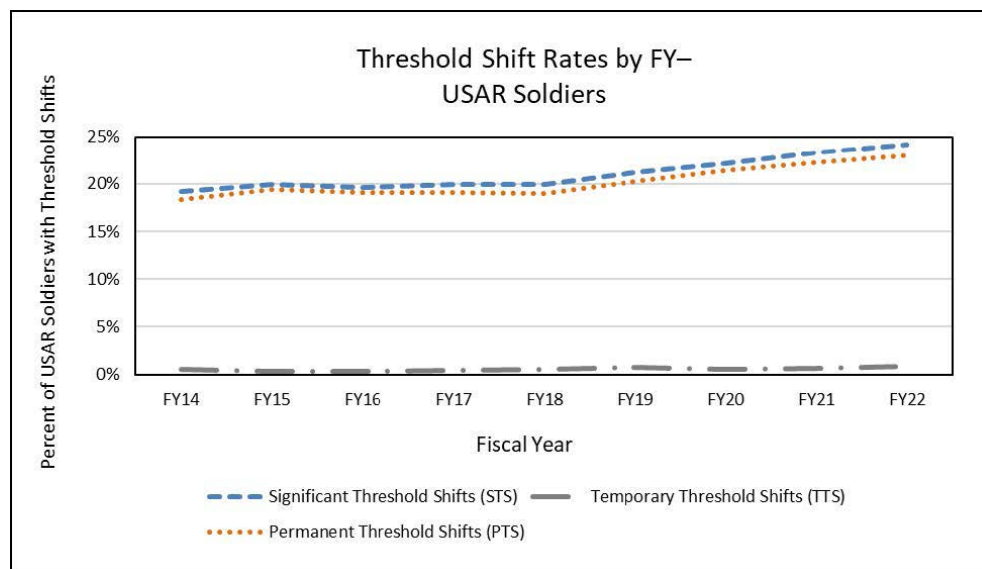
ARNG Soldier rates show a slight increase at 16.8% STS, 2.1% TTS, and 14.4% PTS in FY22 when compared to FY21, 15.7% STS, 2.0% TTS, and 13.4% PTS (Graph 16). STS and PTS rates remain high even with increased STS follow-up testing compliance.

Graph 16. Threshold Shift Rates by FY – ARNG Soldiers



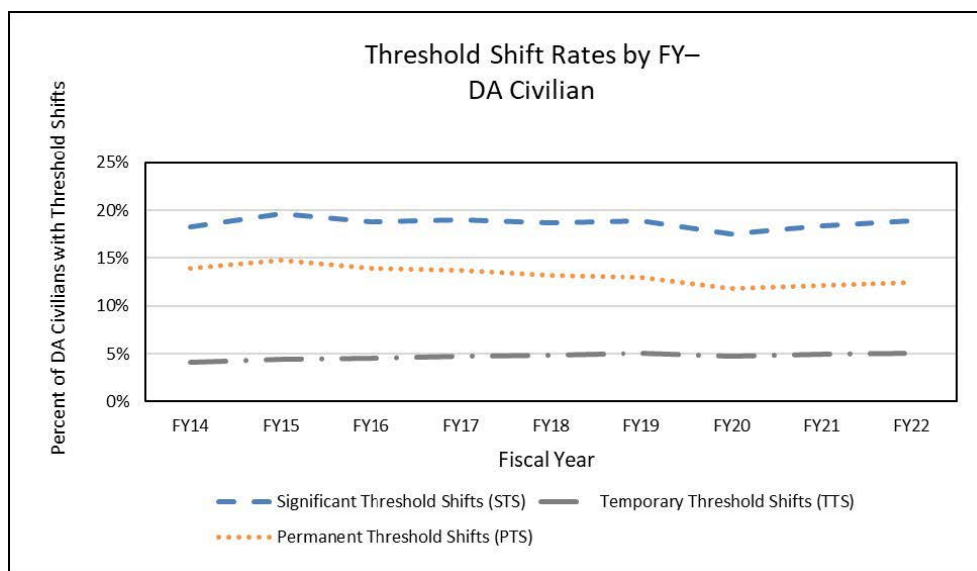
USAR Soldier rates for FY22 are 24.2% STS, 0.9% TTS, and 23.1% PTS (Graph 17). STS show a slight increase in FY22 (24.2%) compared to FY21 (23.4%). Both STS and PTS rates remain high, due to a lack of STS follow-up testing from FY14-FY22.

Graph 17. Threshold Shift Rates by FY - USAR Soldiers



DA Civilian threshold shift rates for FY22 are 18.9% STS, 5.1% TTS, and 12.5% PTS (Graph 18). STS and TTS show a slight increase in FY22 compared to FY14 as well as FY21. (Graph 18).

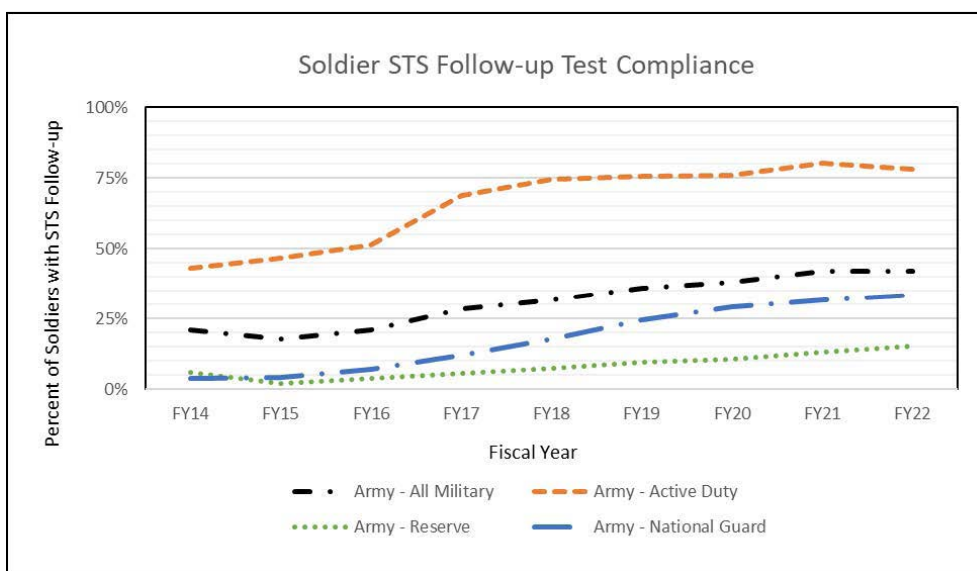
Graph 18. Threshold Shift Rates by FY – DA Civilians



Significant Threshold Shift Follow-up Test Compliance

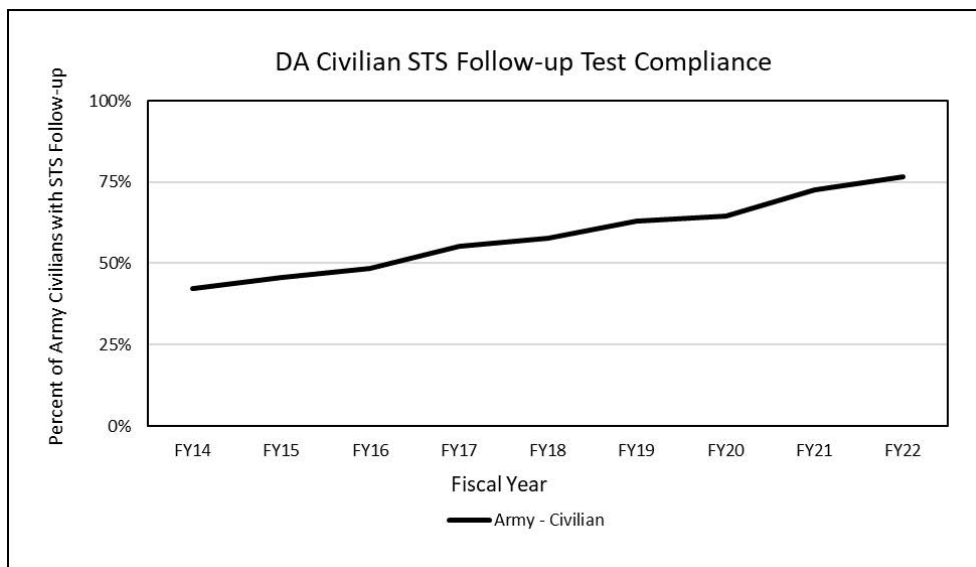
Follow-up test compliance (required for STS) shows continued improvement for all components for FY14-FY22. Overall follow-up test compliance (all Soldiers) improves from 21.2% in FY14 to 42% in FY22 and remains stable for FY21 to FY22 except for a slight decrease for AD soldiers (Graph 19). Failure to 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, i.e., increase PTS and decrease TTS rates.

Graph 19. Soldier STS Follow-up Test Compliance



The DA Civilian follow-up test compliance (required for STS) continues to show increased compliance rates since FY14. DA Civilian follow-up test compliance increased from 42.1% in FY14 to 76.6% in FY22 (Graph 20).

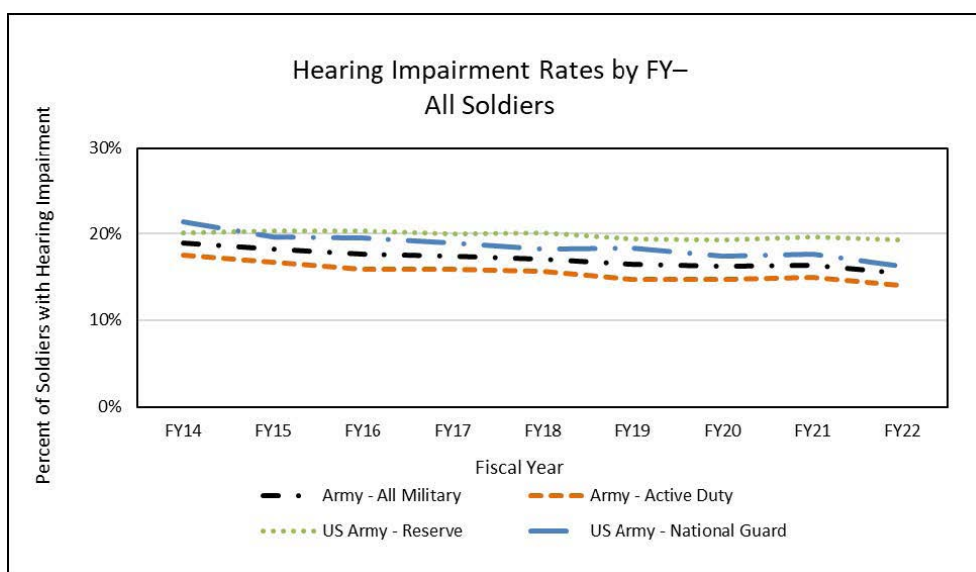
Graph 20. DA Civilians STS Follow-up Test Compliance



Hearing Impairment

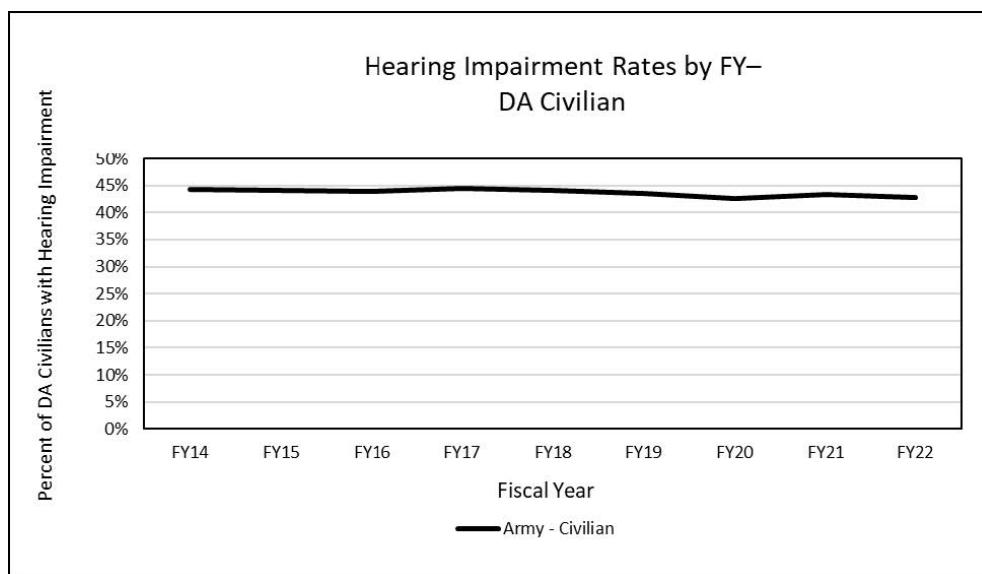
The percentage of all Soldiers with hearing impairment showed a decrease for all Army components combined and individually since FY14. The percentage of all Soldiers with hearing impairment decreased from 18.9% in FY14 to 15.4% in FY22. (Graph 21). Rates of hearing loss for all Soldiers show a small decrease from FY21 (16.4%) to FY22 (15.4%).

Graph 21. Hearing Impairment Rates by FY – All Soldiers



The percentage of DA Civilians with hearing impairment is high but decreased in FY22 (42.8%) compared to FY21 (43.4%). Data indicates that 57.2% DA Civilians have normal hearing in FY22 with the percentage of DA Civilians with hearing impairment decreasing from 44.4% in FY14 to 42.8% in FY22. (Graph 22).

Graph 22. Hearing Impairment Rates by FY – DA Civilians

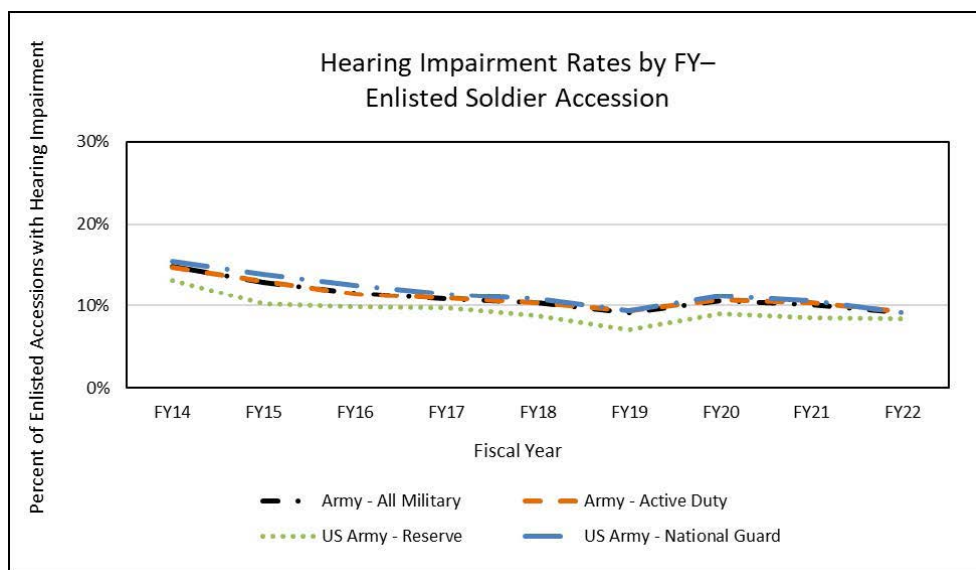


Hearing Impairment – Enlisted Soldier Accession Data

All Soldiers receive a hearing test as part of basic training at their entrance to military service.⁷ Those “reference audiograms” are used to determine the percentage of new recruits who come into the Army with hearing impairment, i.e., hearing worse than 25 dB HL at any test frequency. The percentage of all enlisted Soldier accessions with hearing impairment decreased from 14.8% in FY14 to 9.1% in FY22 (Graph 23). There is a decrease in enlisted Soldier hearing impairment (all Army components combined) in FY22 (8.1%) compared to FY21 (10.1%).

⁷ The military services refer to training at the onset of military service as Basic Combat Training (Army), Basic Training (Navy), Recruit Training (Marine Corps), and Basic Military Training (Air Force). For the purposes of this report the initial training of service members at entry to military service will be referred to as basic training.

Graph 23. Hearing Impairment Rates by FY – Enlisted Soldier Accessions



VA Auditory Threshold Disability Criteria

The percentage of all Soldiers meeting established VA auditory threshold disability criteria remains stable. The percentage of all Soldiers potentially eligible for VBA service-connected disability compensation for hearing loss decreased from 5.5% in FY14 to 4.4% in FY22 (Graph 24). The decrease in eligibility for VBA disability benefits for hearing loss based on auditory threshold disability criteria is consistent for AD, USAR, ARNG from FY14 to FY22, and a negligible decrease between FY21 (4.6%) and FY22 (4.4%). AD and ARNG showed a decrease from FY21 to FY22, with USAR Soldiers showing a slight increase in FY22 (6.2%) compared to FY21 (6.1%). VA Auditory Threshold Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Graph 24. VA Auditory Threshold Disability Criteria – All Soldiers

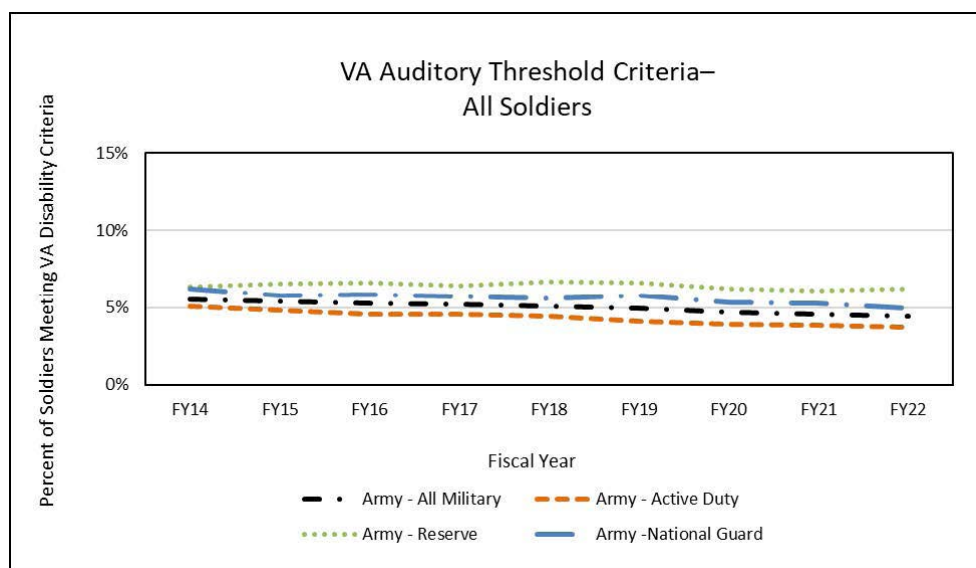


Table 3. Data Summary – Army - Source: DOEHRS-HC DR

U.S. Army										
Chart Title	Category	Percent								
		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Threshold Shift Rates - All Soldiers	STS	12.9	13.9	13.7	13.1	12.8	13.1	13.3	13.0	13.6
	TTS	1.5	1.3	1.5	2.0	2.2	2.4	2.3	2.5	2.4
	PTS	11.2	12.4	12.1	10.7	10.3	10.4	10.6	10.2	10.8
Threshold Shift Rates - AD Soldiers	STS	9.6	9.7	9.6	8.7	8.1	8.4	8.4	8.1	8.1
	TTS	2.3	2.4	2.5	3.3	3.4	3.5	3.3	3.4	3.1
	PTS	7.2	7.2	7.0	5.1	4.5	4.7	4.8	4.4	4.7
Threshold Shift Rates - ARNG Soldiers	STS	16.9	16.4	16.1	15.6	15.4	15.7	15.8	15.7	16.8
	TTS	0.5	0.4	0.5	1.0	1.5	1.9	1.9	2.0	2.1
	PTS	16.1	15.8	15.3	14.2	13.6	13.4	13.5	13.4	14.4
Threshold Shift Rates - USAR Soldiers	STS	19.2	19.9	19.6	19.9	20.0	21.2	22.2	23.4	24.2
	TTS	0.6	0.3	0.3	0.5	0.6	0.7	0.5	0.7	0.9
	PTS	18.4	19.4	19.1	19.1	19.0	20.2	21.4	22.3	23.1
Threshold Shift Rates - DA Civilians	STS	18.3	19.6	18.9	19.0	18.7	18.9	17.5	18.4	18.9
	TTS	4.1	4.5	4.5	4.8	4.9	5.0	4.8	4.9	5.1
	PTS	13.9	14.8	13.9	13.7	13.3	13.0	11.9	12.1	12.5
STS Follow-Up Test Compliance	All Soldiers	21.2	17.8	21.2	28.6	31.7	36.0	38.3	42.0	42.0
	Active Duty	43.4	46.8	51.4	69.0	74.7	75.7	75.9	80.5	78.1
	National Guard	3.9	4.1	7.3	12.2	17.9	24.5	29.2	31.8	33.6
	Reserve	5.9	2.0	3.7	5.7	7.4	9.6	10.7	13.3	15.4
	DA Civilians	42.1	45.7	48.5	55.2	57.6	63.1	64.5	72.5	76.6
Hearing Impaired	All Soldiers	18.9	18.2	17.6	17.4	17.1	16.4	16.2	16.4	15.4
	Active Duty	17.6	16.8	15.9	15.8	15.7	14.7	14.8	15.0	14.0
	National Guard	21.4	19.6	19.5	18.9	18.3	18.3	17.4	17.6	16.3
	Reserve	20.1	20.4	20.3	20.0	20.1	19.4	19.3	19.7	19.3
	DA Civilians	44.4	44.1	43.9	44.5	44.1	43.5	42.6	43.4	42.8
Hearing Impaired - Enlisted Soldier Accessions	All Soldiers	14.8	12.9	11.6	10.9	10.3	9.1	10.6	10.1	9.1
	Active Duty	14.7	13.1	11.5	10.9	10.4	9.4	10.8	10.3	9.2
	National Guard	15.5	13.9	12.6	11.4	10.9	9.4	11.2	10.6	9.1
	Reserve	13.2	10.2	9.9	9.7	8.7	7.1	9.1	8.5	8.4
VA Auditory Threshold Criteria	All Soldiers	5.5	5.4	5.3	5.2	5.1	5.0	4.7	4.6	4.4
	Active Duty	5.1	4.8	4.5	4.6	4.4	4.1	3.9	3.8	3.7
	National Guard	6.3	5.8	5.9	5.7	5.6	5.8	5.3	5.3	5.0
	Reserve	6.4	6.6	6.6	6.4	6.7	6.7	6.3	6.1	6.2

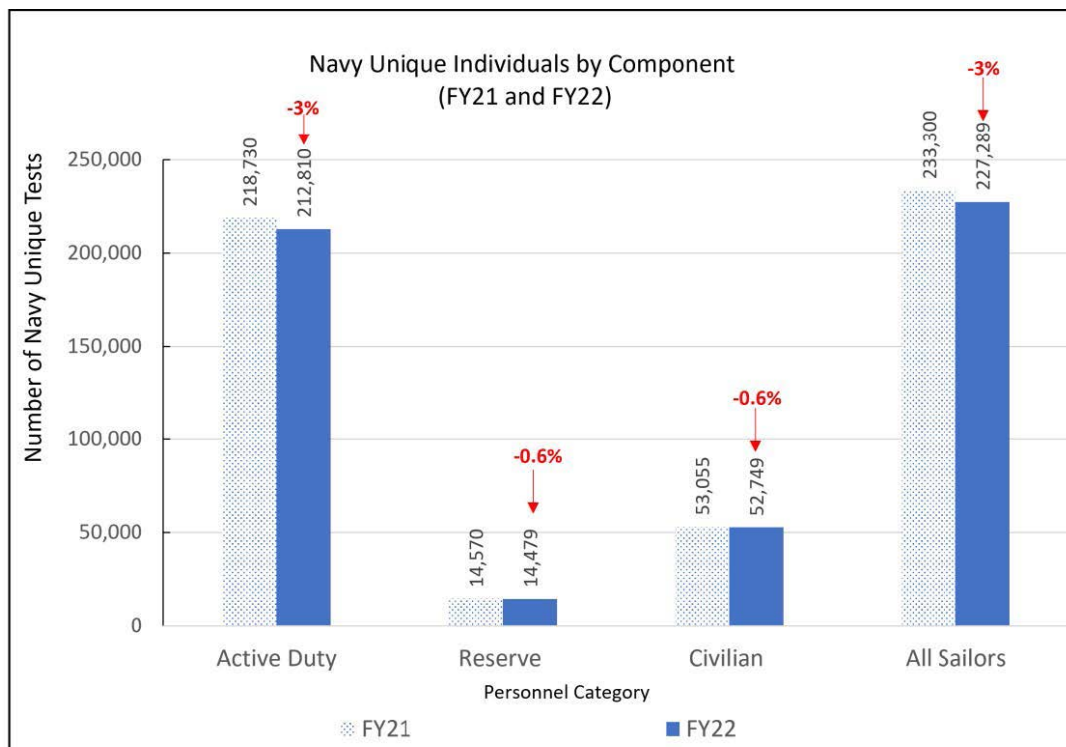
Appendix B: Hearing Health – Navy

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 Department of the Navy (DON) civilians are enrolled in the HCP based on noise survey data. The following data represent the test results from all Sailors and DON Civilians who received audiometric testing.

Unique Individual Hearing Tests by Personnel Category

The number of unique hearing tests by the Navy show a slight decrease in all Navy components and DON Civilians during FY22 compared to FY21. Overall, there is a 3% decrease in testing for all Sailors and a 0.6% decrease for DON Civilians in FY 22 compared to FY21 (Graph 25). This decrease in unique hearing tests in FY22 compared to FY21 is thought to be influenced by reduced scheduling of HC appointments during the transition of EHR systems from AHLTA to MHS GENESIS.

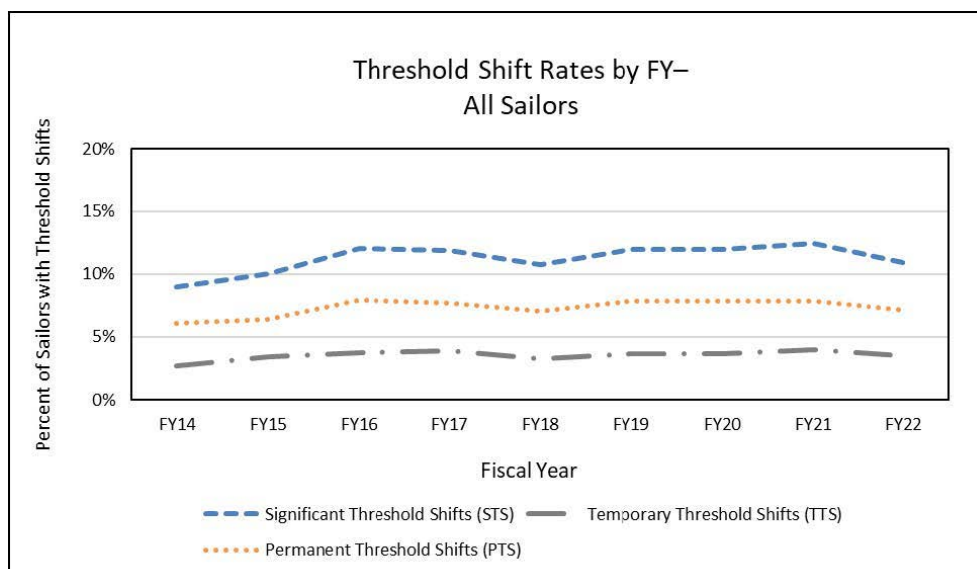
Graph 25. Navy Unique Individual Hearing Tests by Personnel Category (FY21 and FY22)



Significant Threshold Shift Rates by FY

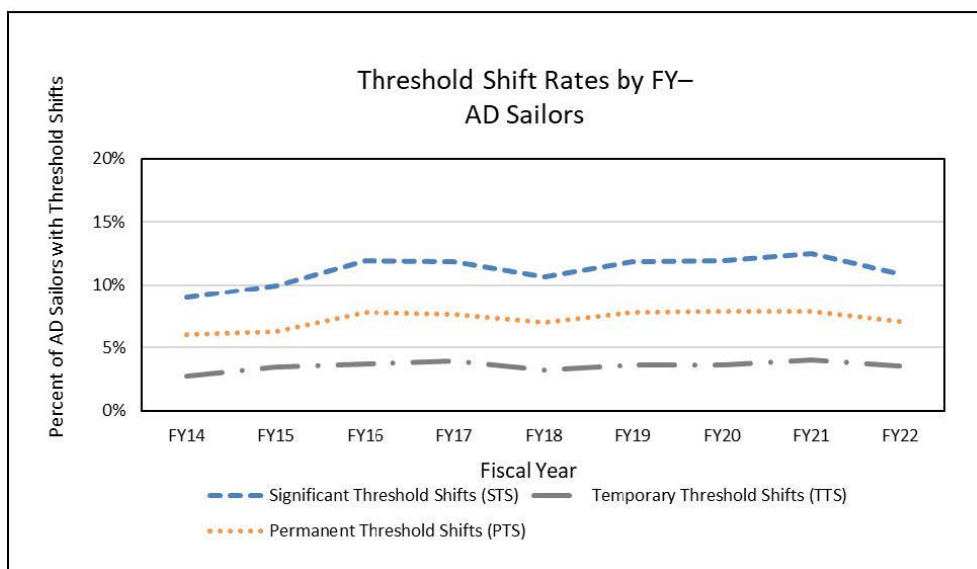
In FY22, Sailor STS, TTS, and PTS show a decrease when compared to FY21 STS, TTS, and PTS rates. Threshold shift rates for all Sailors indicate 10.9% STS, 3.5% TTS, and 7.1% PTS rates in FY22 (Graph 26).

Graph 26. Threshold Shift Rates by FY – All Sailors



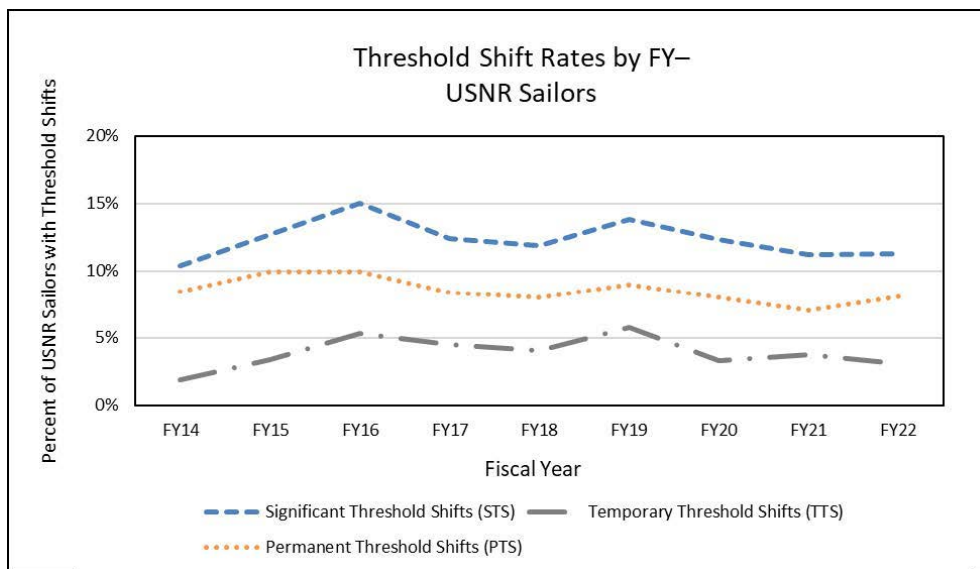
The AD Sailor threshold shift rates show a decrease from FY21 to FY22. Threshold shift rates for AD Sailors were the same as all Sailors rate (10.9% STS, 3.5% for TTS, and 7.1% PTS) in FY22 (Graph 27).

Graph 27. Threshold Shift Rates by FY - AD Sailors



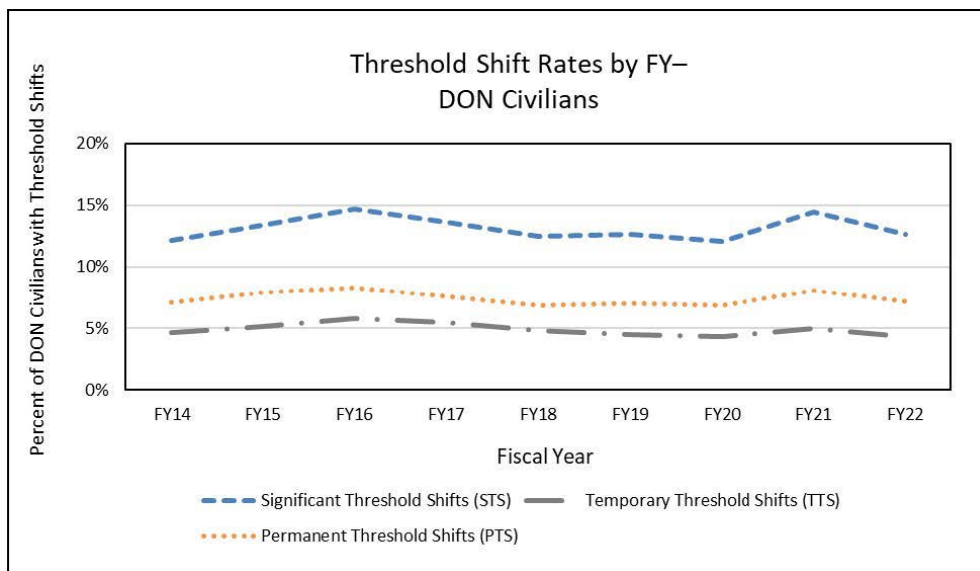
The Navy (USNR) Sailor threshold rates for FY22 are 11.3% STS, 3.1% TTS, and 8.1% PTS (Graph 28). STS remains stable in FY22 (11.3%) compared to FY21 (11.3%). PTS rates show an increase in FY22 (8.1%) compared to FY 21(7.1%). Failure to conduct STS follow-up testing prevents the accurate identification of TTS vs. PTS. It should also be noted that threshold shift rates for USNR Sailors appear to fluctuate from FY14 to FY19.

Graph 28. Threshold Shift Rates by FY - USNR Sailors



The DON civilian STS and PTS rates show a decrease in FY22 compared to FY21. The DON civilian rates for FY22 are: 12.7% STS, 4.3% TTS, and 7.2% PTS (Graph 29). Improved STS follow-up testing for civilians (Graph 31) shows that less than half of all STS identified are found to be PTS.

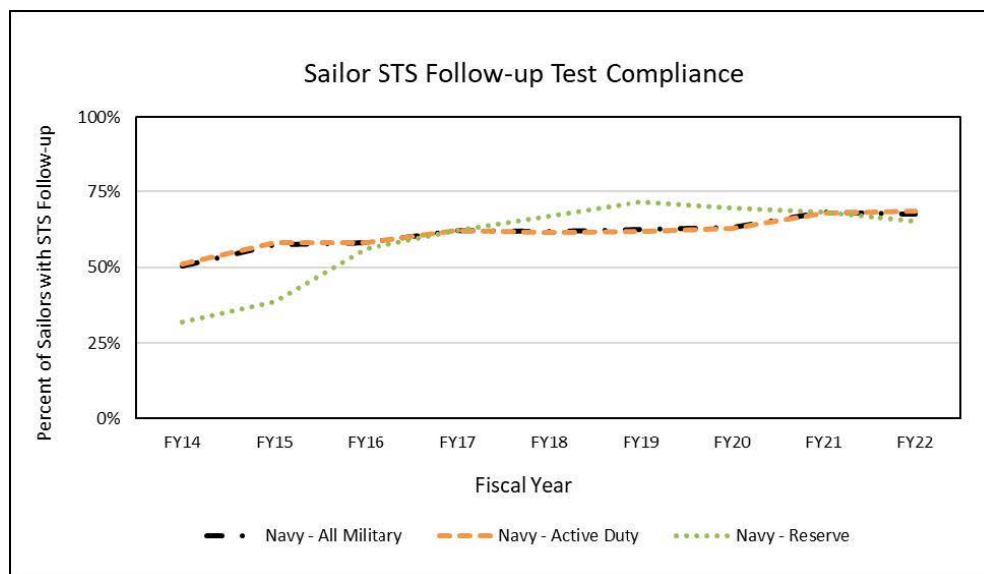
Graph 29. Threshold Shift Rates by FY - DON Civilians



Significant Threshold Shift Follow-up Test Compliance

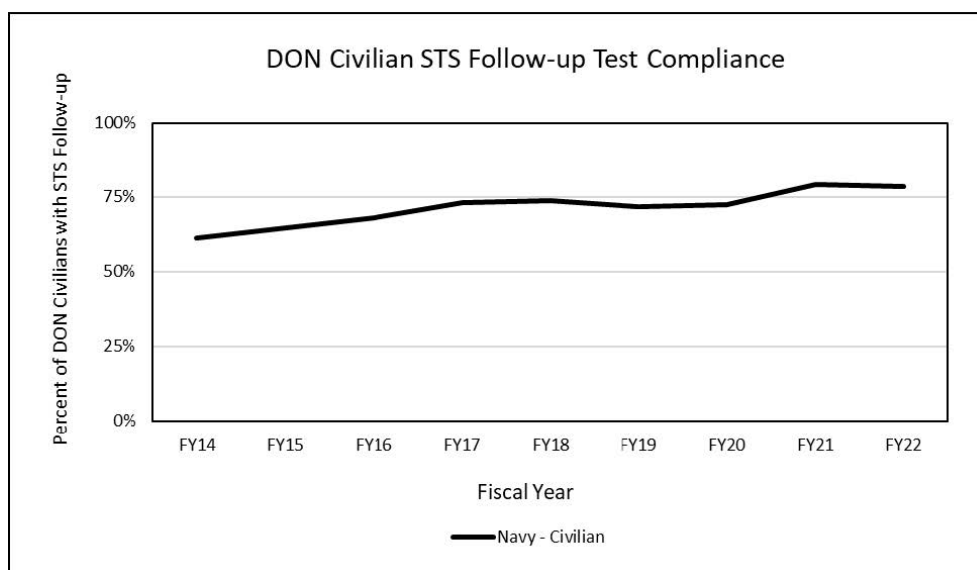
The STS follow-up testing remains stable in FY22 (Graph 30) when compared to FY21 for Sailors for all components. Overall compliance for follow-up testing (all components) increased from 50.5% in FY14 to 67.4% in FY22. The AD compliance increases to 68.5% in FY22 compared to 68.1% in FY21. The USNR compliance increased from 31.9% in FY14 to 65.2 % in FY22; however, there is a decrease in compliance from FY21 (68.3%) to FY22 (65.2%) for USNR.

Graph 30. Sailor STS Follow-up Test Compliance



The DON civilian STS follow-up test compliance shows a marginal decrease in FY22 (78.5%) compared to FY21 (79%). However, overall compliance improves from 61.4% in FY14 to 78.5% in FY22 (Graph 31).

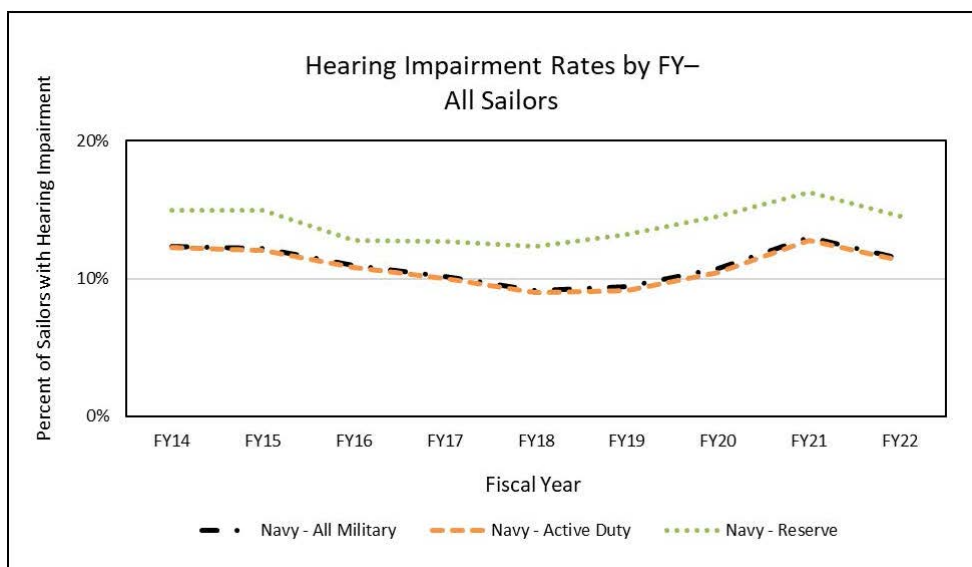
Graph 31. DON Civilian STS Follow-up Test Compliance



Hearing Impairment

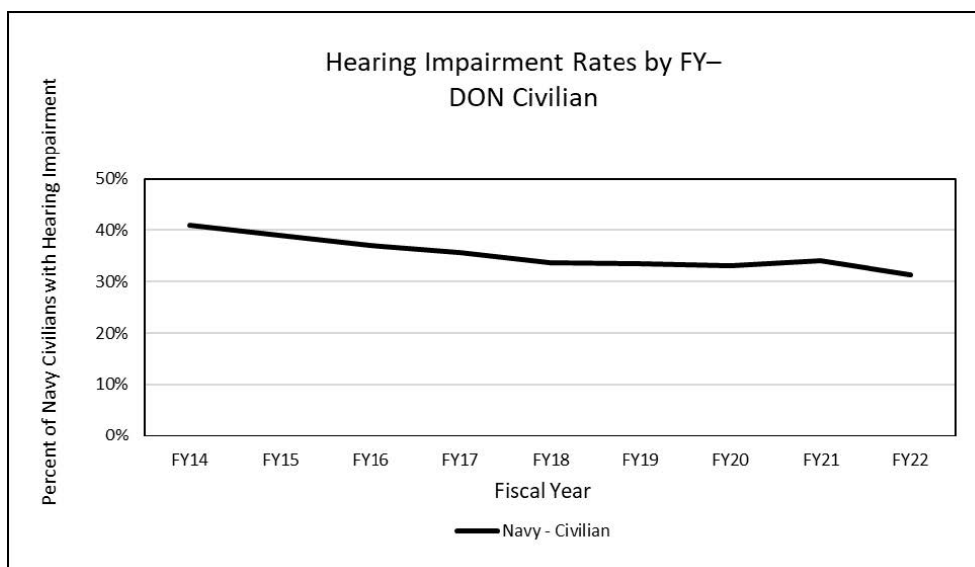
The percentage of all Sailors with hearing impairment show a decrease for all Navy components combined and individual since FY14 (Graph 32). Sailors with hearing impairment decreased from 13.0% in FY21 to 11.5% in FY22. The USNR Sailors exhibit the greatest amount of hearing impairment with 15.0% in FY14 to 14.5% in FY22 with only a very marginal improvement in hearing over these years. The number of sailors with normal hearing thresholds in FY22 is 88.5%.

Graph 32. Hearing Impairment Rates by FY - All Sailors



The percentage of DON Civilians with hearing impairment is high but decreased in FY22 compared to FY21. Data indicate that 68.8% of DON Civilians have normal hearing in FY22. The percentage of DON Civilians with hearing impairment decreased from 40.9% in FY14 to 31.2% in FY22.

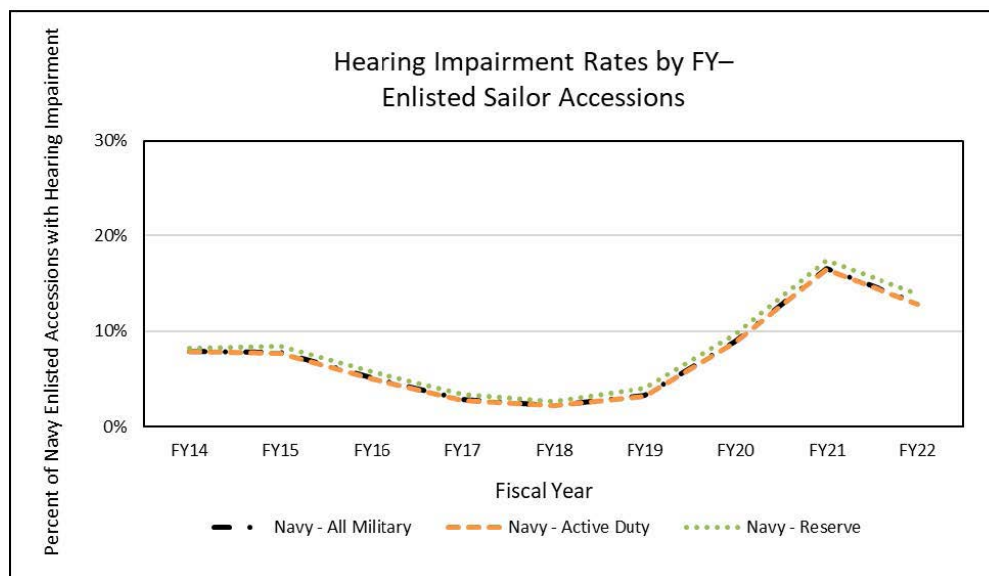
Graph 33. Hearing Impairment Rates by FY – DON Civilian



Hearing Impairment – Enlisted Accession Data

Department of the Navy (DON) accessions receive a hearing test as part of basic training when they enter military service. Those “reference audiograms” are used to determine the percentage of all new recruits who come into the DON with hearing impairment (hearing worse than 25 dB HL at any test frequency). The percentage of enlisted sailor accessions with hearing impairment for all Navy components, show a decrease to 12.9% in FY22 compared to 16.5% in FY21 (Graph 34). The percentage of USNR enlisted sailor accessions with hearing impairment increases from 8.2% in FY14 to 13.9% in FY22. In FY22, 87.1% of all enlisted Sailor accessions had normal hearing.

Graph 34. Hearing Impairment Rates by FY - Enlisted Sailor Accessions



VA Auditory Threshold Disability Criteria

The percentage of Sailors meeting established VA auditory threshold disability criteria remains stable for all Navy components combined and separate over the past nine years, FY14-FY22. The percentage of Sailors (all components combined) potentially eligible for VBA service-connected disability compensation for hearing loss shows a negligible decrease from 2.2% in FY14 to 2.0% in FY22. The highest percentage of Sailors potentially eligible for VBA service-connected disability compensation for hearing loss was in the USNR with 3.2% in FY14 to 3.1% in FY22. (Graph 35). VA Auditory Threshold Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Graph 35. VA Auditory Threshold Disability Criteria – All Sailors

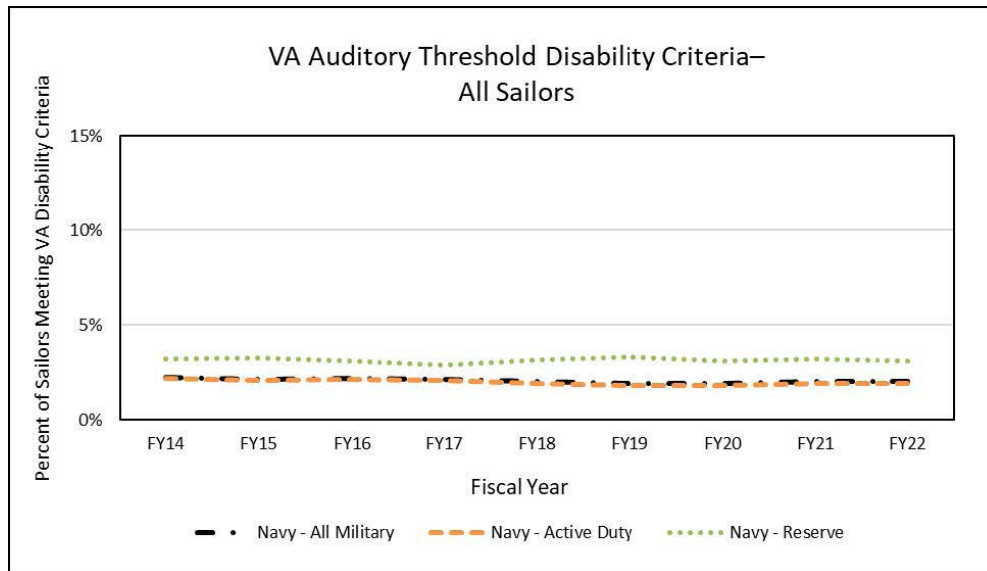


Table 4. Data Summary – Navy - Source: DOEHRs-HC DR

U.S. Navy										
Chart Title	Category	Percent								
		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Threshold Shift Rates - All Sailors	STS	9.0	10.0	12.0	11.8	10.7	12.0	11.9	12.4	10.9
	TTS	2.7	3.4	3.7	3.9	3.3	3.7	3.7	4.0	3.5
	PTS	6.1	6.4	7.9	7.7	7.1	7.8	7.9	7.9	7.1
Threshold Shift Rates - AD Sailors	STS	8.9	9.9	11.9	11.8	10.7	11.8	11.9	12.5	10.9
	TTS	2.7	3.4	3.7	3.9	3.3	3.6	3.6	4.0	3.5
	PTS	6.0	6.3	7.8	7.6	7.0	7.8	7.9	7.9	7.1
Threshold Shift Rates - USNR Sailors	STS	10.4	12.7	15.1	12.4	11.9	13.9	12.4	11.3	11.3
	TTS	1.9	3.3	5.4	4.5	4.1	5.8	3.3	3.8	3.1
	PTS	8.4	10.0	10.0	8.4	8.0	9.0	8.0	7.1	8.1
Threshold Shift Rates - USN Civilians	STS	12.2	13.4	14.7	13.6	12.5	12.6	12.0	14.5	12.7
	TTS	4.6	5.1	5.7	5.4	4.8	4.5	4.3	5.0	4.3
	PTS	7.1	7.9	8.3	7.6	6.9	7.0	6.8	8.1	7.2
STS Follow-Up Test Compliance	All Sailors	50.5	57.4	58.2	62.3	61.7	62.5	63.3	68.1	67.4
	Active Duty	51.1	58.3	58.3	62.3	61.4	61.8	62.9	68.1	68.5
	Reserve	31.9	38.7	56.1	62.3	67.0	71.6	69.5	68.3	65.2
	USN Civilians	61.4	64.4	68.0	72.9	73.7	71.7	72.5	79.0	78.5
Hearing Impaired	All Sailors	12.4	12.2	10.9	10.1	9.1	9.4	10.7	13.0	11.5
	Active Duty	12.3	12.1	10.8	10.0	9.0	9.2	10.5	12.8	11.3
	Reserve	15.0	15.0	12.8	12.7	12.3	13.2	14.5	16.3	14.5
	USN Civilians	40.9	39.0	37.1	35.7	33.6	33.4	33.1	34.1	31.2
Hearing Impaired - Enlisted Sailor Accessions	All Sailors	7.9	7.7	5.1	2.8	2.2	3.3	8.9	16.5	12.9
	Active Duty	7.8	7.7	5.0	2.7	2.2	3.2	8.9	16.4	12.8
	Reserve	8.2	8.4	5.8	3.4	2.7	4.1	9.7	17.4	13.9
A Auditory Threshold Criteria	All Sailors	2.2	2.2	2.2	2.1	2.0	1.9	1.9	2.0	2.0
	Active Duty	2.2	2.1	2.1	2.1	1.9	1.8	1.8	1.9	1.9
	Reserve	3.2	3.3	3.1	2.9	3.1	3.3	3.1	3.2	3.1

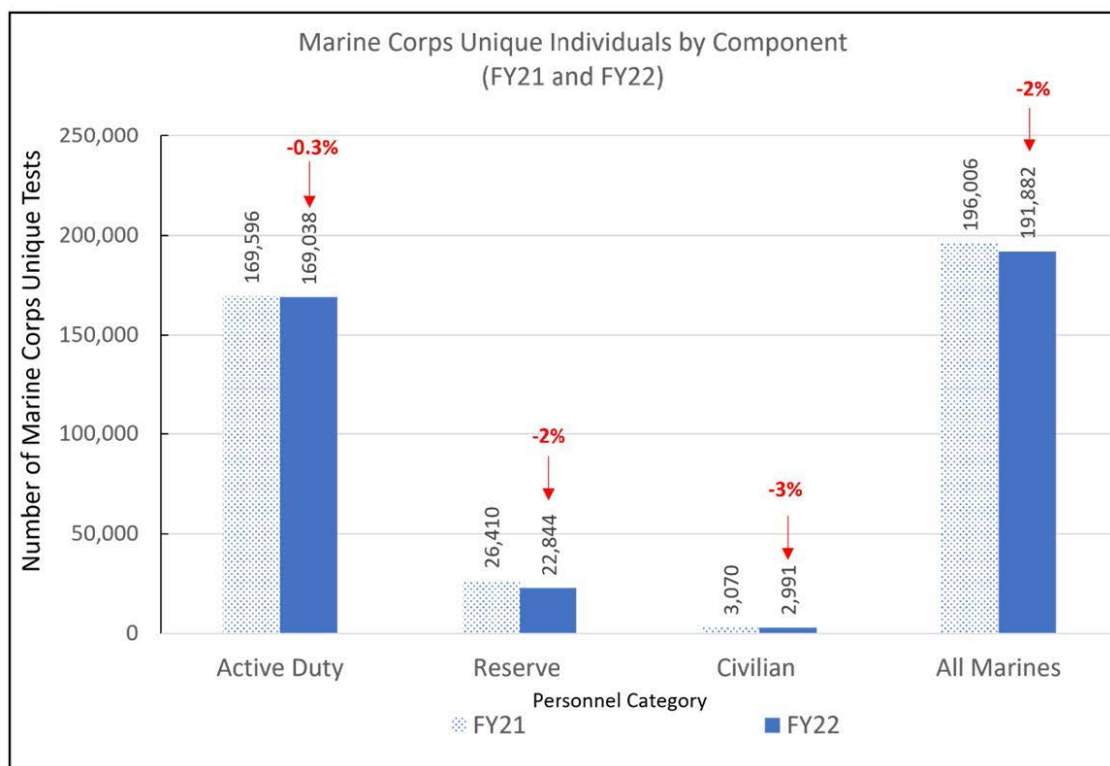
Appendix C: Hearing Health – Marine Corps

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 for Marines. The United States Marine Corps (USMC) enrolls all AD Marines in the HCP. USMC Civilians are enrolled in the HCP based on their individual noise exposure.

Unique Hearing Tests by Personnel Category (FY21 and FY22)

The number of USMC unique hearing tests show a decrease in all components and for USMC Civilians during FY22 compared to FY21. Overall, there was a 2% decrease in testing for all Marines and a 3% decrease for USMC civilian personnel in FY22 compared to FY21 (Graph 36). This decrease in unique hearing tests in FY22 compared to FY21 is thought to be influenced by reduced scheduling of HC appointments during the transition of EHR systems from AHLTA to MHS GENESIS.

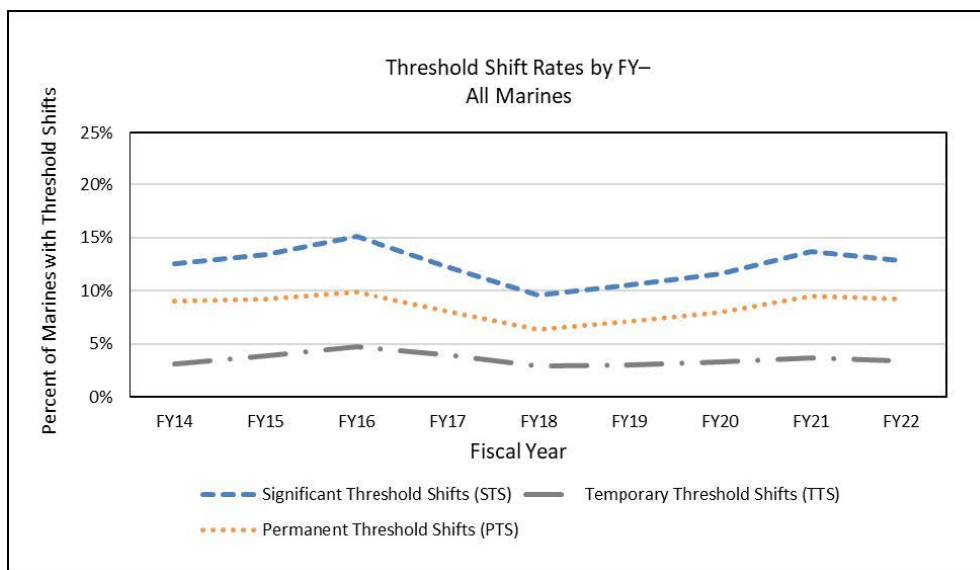
Graph 36. Marine Corps Unique Individual Tests by Personnel Category (FY21 and FY22)



Significant Threshold Shift Rates by FY

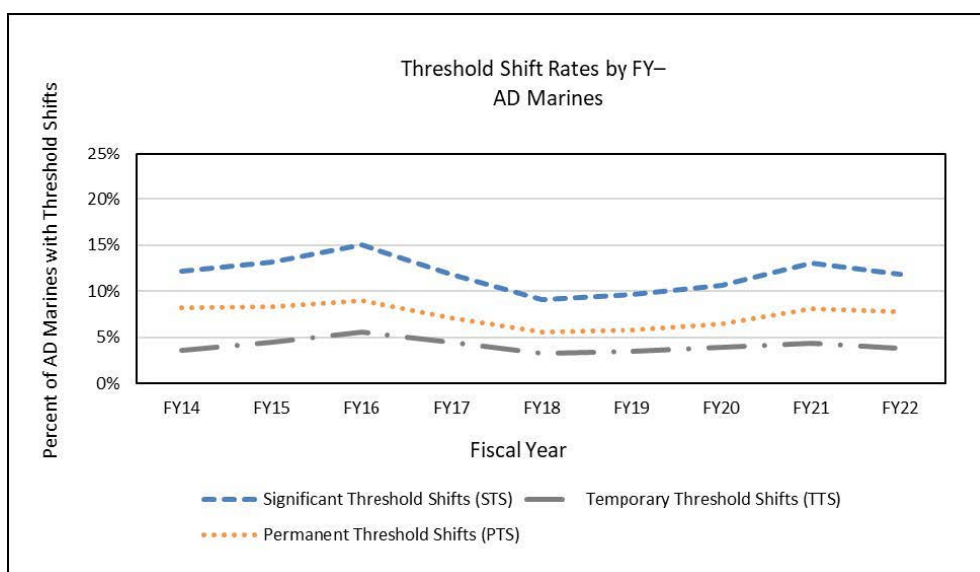
In FY22, USMC STS, TTS, and PTS show a slight decrease when compared to FY21 STS, TTS, and PTS rates. Threshold shift rates for all Marines indicate 12.9% STS, 3.4% TTS, and 9.2% PTS rates in FY22 (Graph 37).

Graph 37. Threshold Shift Rates by FY - All Marines



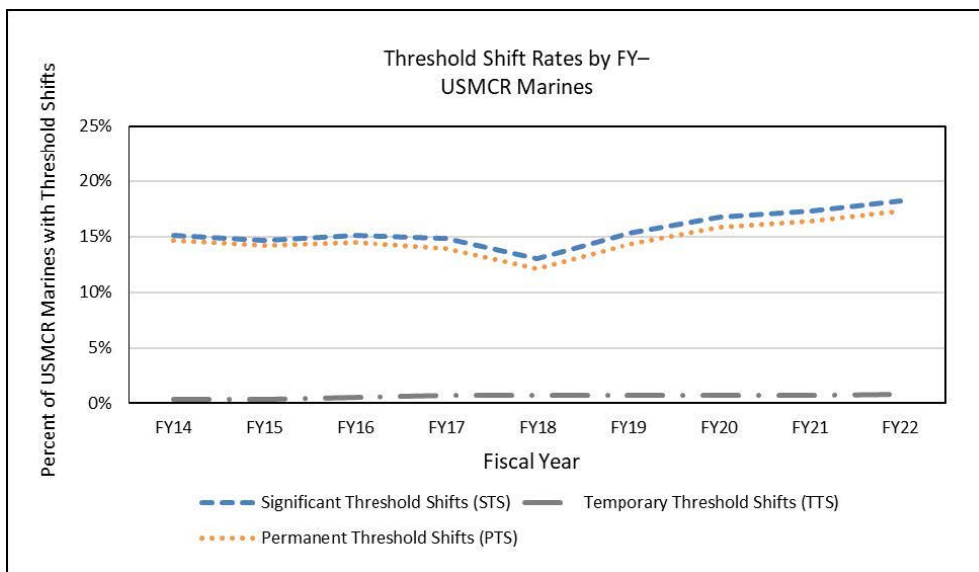
The AD Marines have the lowest PTS rates of all USMC components during FY14 - FY22. This may be due to improved follow-up testing compliance as seen in [Graph 41](#) resulting in accurate identification of PTS and TTS. Threshold shift rates for AD Marines indicate 11.9% STS, 3.8% TTS, and 7.8% PTS rates in FY22. STS rates show a slight decrease in FY22 (11.9%) compared to FY21 (13.0%). (Graph 38).

Graph 38. Threshold Shift Rates by FY - AD Marines



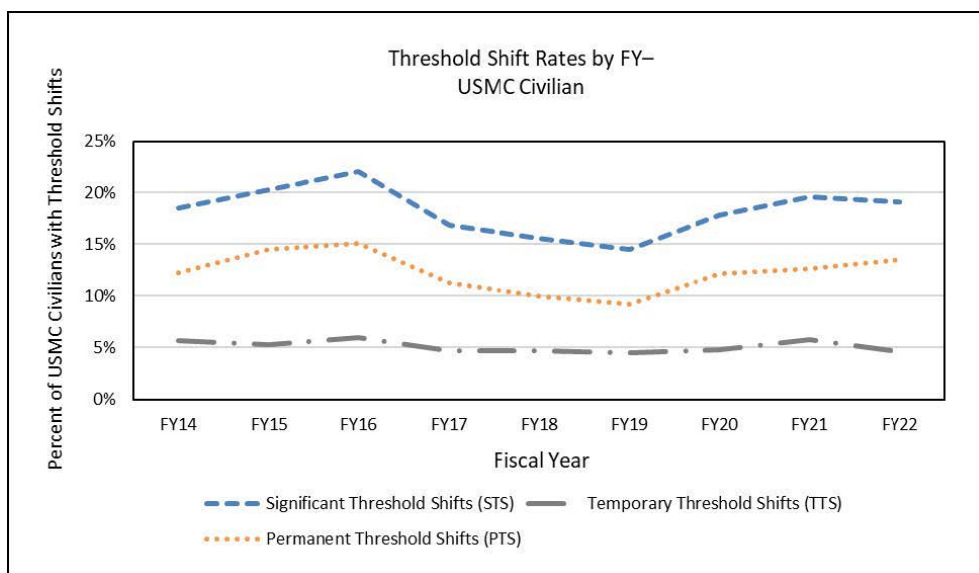
The USMC Reserve (USMCR) rates for FY22 are: 18.2% STS, 0.8% TTS, and 17.3% PTS. PTS rates and STS rates show a steady increase from FY18. PTS rates show an increase in FY22 (17.3%) compared to FY21 (16.4%). STS and PTS rates remain high likely due to lack of STS follow-up testing shown in Graph 41. Failure to conduct STS follow-up testing prevents the accurate identification of TTS vs. PTS.

Graph 39. Threshold Shift Rates by FY – USMCR Marines



The USMC civilian PTS rates show an increase in FY22 compared to FY21. The USMC civilian rates for FY22 are: 19.1% STS, 4.6% TTS, and 13.5% PTS (Graph 40).

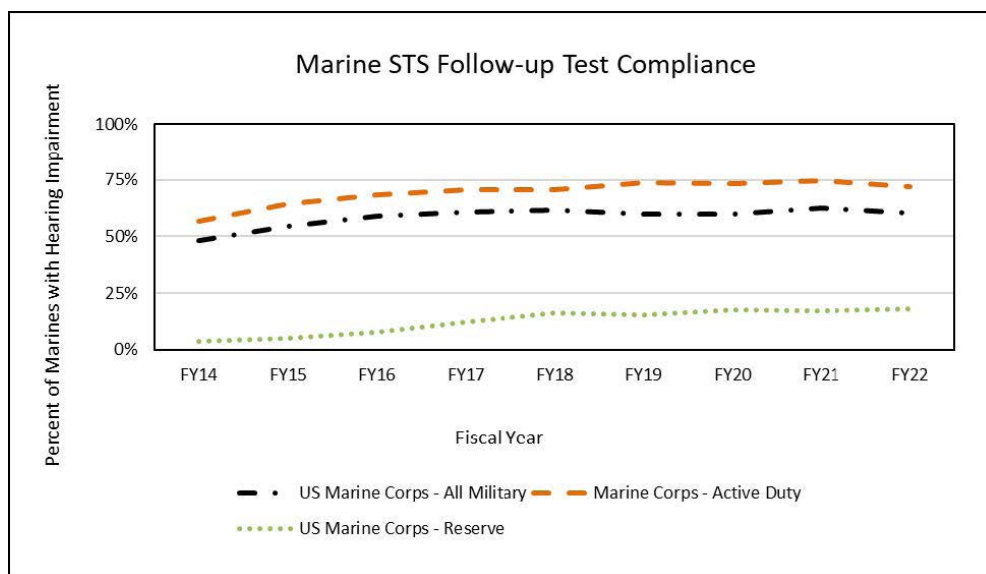
Graph 40. Threshold Shift Rates by FY – USMC Civilian



Significant Threshold Shift Follow-up Compliance

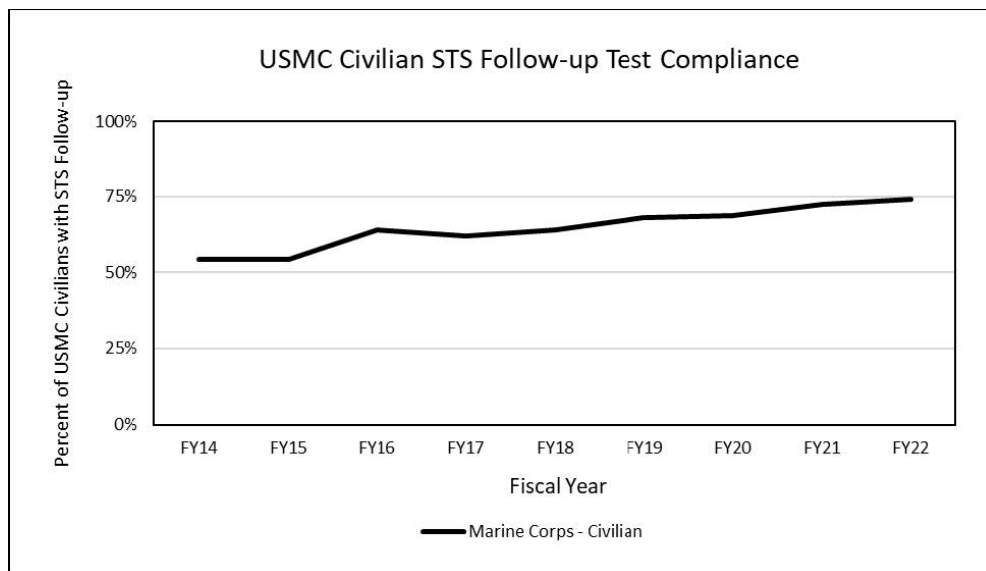
The STS follow-up testing compliance showed a slight decrease from FY21 to FY22 (Graph 41) for all Marine components combined. Overall compliance for follow-up testing for all Marine components combined increased from 48.0% in FY14 to 60.3% in FY22. Follow-up testing compliance in the USMCR showed an increase in compliance from 3.9% in FY14 to 18.3% in FY22. The AD Marine follow-up testing compliance increased from 56.5% in FY14 to 72.1% in FY22.

Graph 41. Marine STS Follow-up Test Compliance



The USMC civilian STS follow-up testing compliance continued to show improvement from 54.3% in FY14 to 73.9% in FY22 (Graph 42). There was a 1.5% increase in STS follow-up testing compliance from FY21 (72.4%) to FY22 (73.9%).

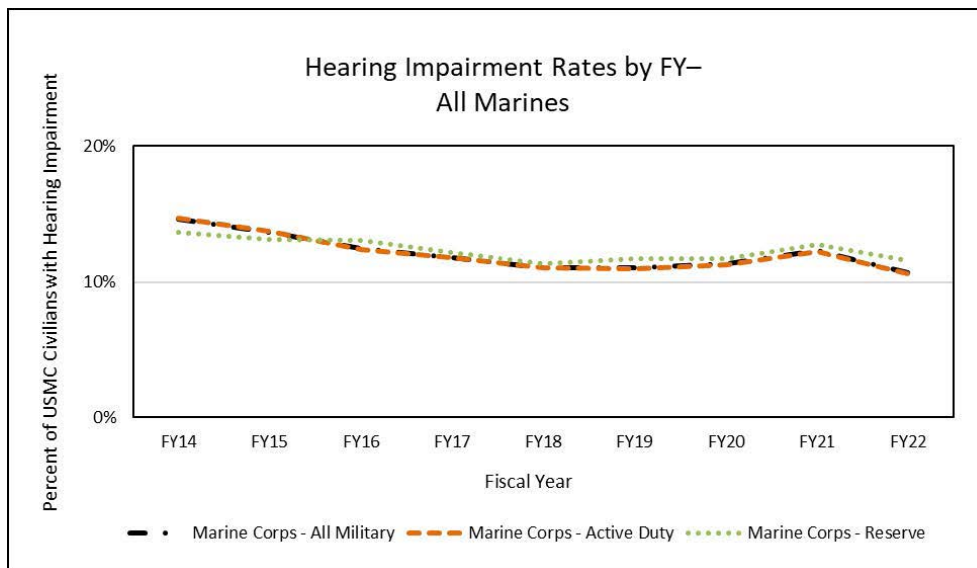
Graph 42. USMC Civilian STS Follow-up Test Compliance



Hearing Impairment

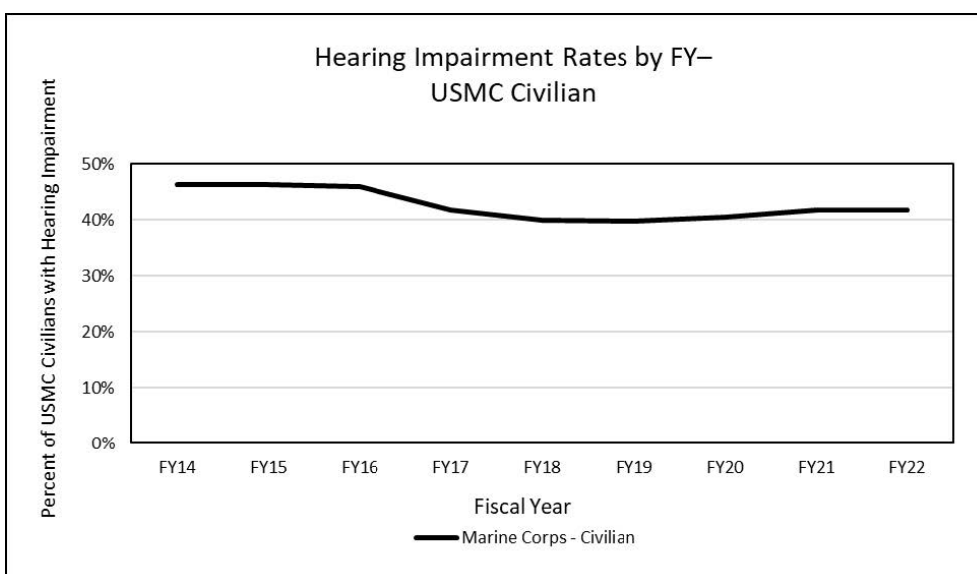
The percentage of Marines with hearing impairment (for combined and individual components) shows a decrease from FY21 to FY22. Marines (combined components) with hearing impairment decreased from 14.6% in FY14 to 10.7% in FY22 (Graph 43). Marines (all components combined) with normal hearing thresholds in FY22 was 89.3%.

Graph 43. Hearing Impairment Rates by FY - All Marines



The percentage of USMC Civilians with hearing impairment is high but remains stable since FY17. Data indicate that 59.2% of USMC Civilians have normal hearing in FY22. The percent of USMC Civilians with hearing impairment decreased from 46.3% in FY14 to 41.8% in FY22 (Graph 44).

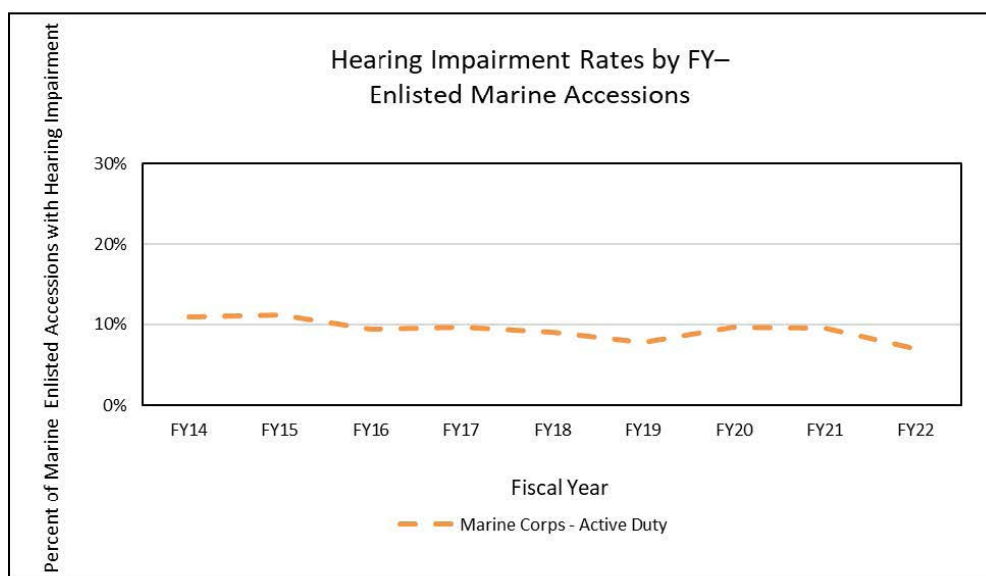
Graph 44. Hearing Impairment Rates by FY - USMC Civilian



Hearing Impairment – Enlisted Accession Data

Marines receive a hearing test as part of basic training when they enter military service. Those “reference audiograms” are used to determine the percentage of all new recruits who enter the USMC with hearing impairment (hearing worse than 25 dB HL at any test frequency). The percentage of enlisted USMC accessions with hearing impairment for AD shows a decrease in enlisted hearing impairment of 11.0% in FY14 compared to 7.0% in FY22 (Graph 45). The percentage of USMCR enlisted accessions with hearing impairment has been lacking for some years and is not reported here. In FY22, 93.0% enlisted Marine accessions had normal hearing.

Graph 45. Hearing Impairment Rates by FY - Enlisted Marine Accessions



VA Auditory Threshold Disability Criteria

The percentage of Marines meeting established VA auditory threshold disability criteria remains stable for all USMC components. The percentage of Marines (components combined) potentially eligible for VBA service-connected disability compensation for hearing loss decreased from 3.5% in FY14 to 2.2% in FY22 (Graph 46). Also, potential eligibility for VBA disability benefits for hearing loss is stable from FY21 to FY22 for Marines (combined and individual components). VA Auditory Threshold Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Graph 46. VA Auditory Threshold Disability Criteria - All Marines

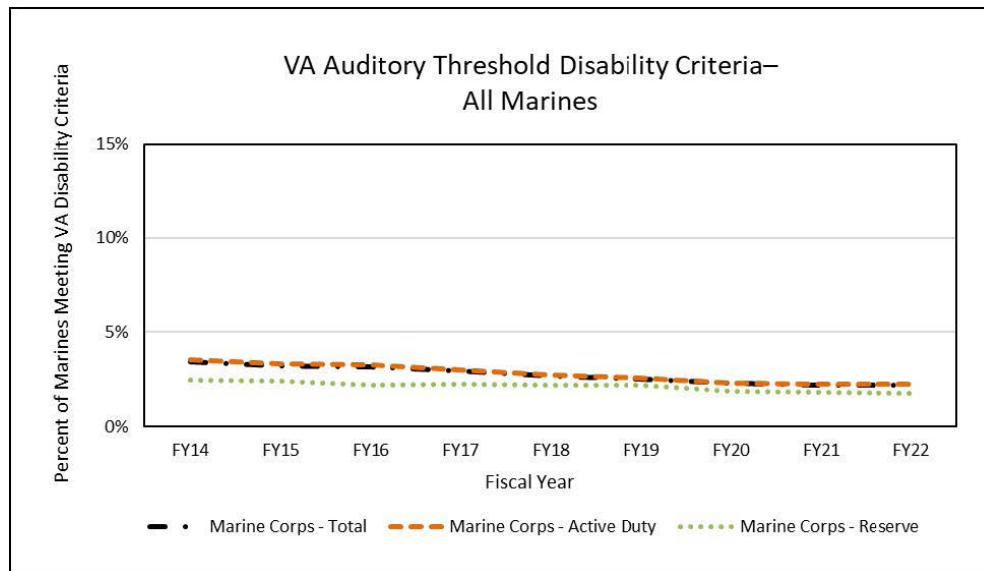


Table 5. Data Summary – Marine Corps - Source: DOEHS-HC DR

U.S. Marine Corps										
Chart Title	Category	Percent								
		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Threshold Shift Rates - All Marines	STS	12.6	13.4	15.1	12.3	9.6	10.5	11.6	13.7	12.9
	TTS	3.1	3.9	4.8	4.0	2.9	3.0	3.3	3.7	3.4
	PTS	9.1	9.2	9.9	8.1	6.4	7.2	8.0	9.5	9.2
Threshold Shift Rates - AD Marines	STS	12.2	13.2	15.1	11.9	9.1	9.6	10.6	13.0	11.9
	TTS	3.6	4.5	5.5	4.5	3.2	3.5	3.9	4.3	3.8
	PTS	8.2	8.3	9.0	7.1	5.6	5.7	6.4	8.1	7.8
Threshold Shift Rates - USMCR Marines	STS	15.1	14.7	15.1	14.8	13.0	15.3	16.7	17.3	18.2
	TTS	0.3	0.4	0.5	0.7	0.7	0.7	0.7	0.7	0.8
	PTS	14.7	14.2	14.5	14.0	12.1	14.3	15.9	16.4	17.3
Threshold Shift Rates - USMC Civilians	STS	18.5	20.2	22.0	16.8	15.6	14.5	17.8	19.5	19.1
	TTS	5.7	5.2	6.0	4.7	4.7	4.5	4.8	5.8	4.6
	PTS	12.2	14.5	15.0	11.2	9.9	9.2	12.1	12.6	13.5
STS Follow-Up Test Compliance	All Marines	48.0	54.3	58.8	60.8	61.7	59.8	59.9	62.5	60.3
	Active Duty	56.5	64.1	68.3	70.7	70.6	73.7	73.5	74.4	72.1
	Reserve	3.9	5.3	7.8	12.5	16.1	15.5	17.5	17.2	18.3
	USMC Civilians	54.3	54.4	64.1	62.1	63.9	67.9	68.7	72.4	73.9
Hearing Impaired	All Marines	14.6	13.7	12.4	11.8	11.1	11.1	11.4	12.3	10.7
	Active Duty	14.7	13.7	12.4	11.8	11.1	11.0	11.3	12.2	10.6
	Reserve	13.6	13.2	13.1	12.2	11.4	11.7	11.7	12.8	11.6
	USMC Civilians	46.3	46.4	46.0	41.8	39.9	39.8	40.5	41.7	41.8
Hearing Impaired - Enlisted Marine Accessions	All Marines	11.0	11.2	9.4	9.7	9.0	7.8	9.7	9.7	7.0
	Active Duty	11.0	11.2	9.4	9.7	9.0	7.8	9.7	9.6	7.0
	Reserve	0.0	0.0	42.9	0.0	7.9	25.0	30.8	11.5	47.8
VA Auditory Threshold Criteria	All Marines	3.5	3.2	3.1	2.9	2.7	2.5	2.3	2.2	2.2
	Active Duty	3.6	3.3	3.3	3.0	2.7	2.6	2.3	2.3	2.2
	Reserve	2.4	2.4	2.2	2.2	2.2	2.2	1.9	1.8	1.8

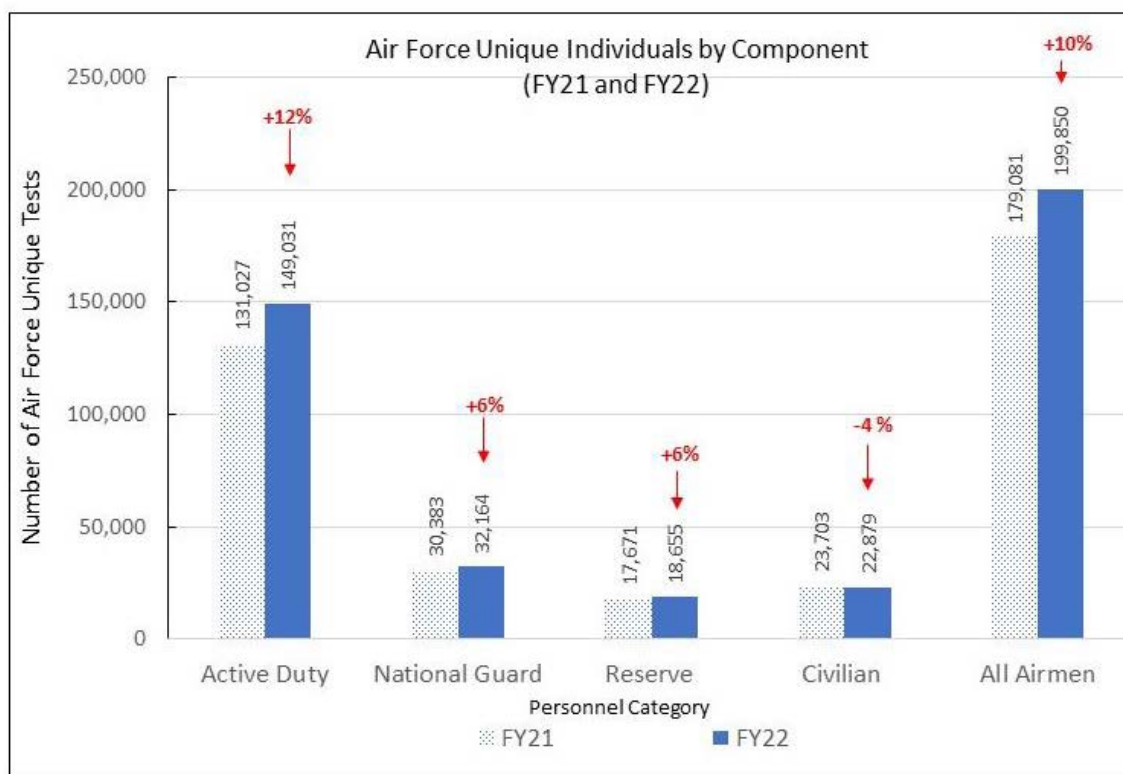
Appendix D: Hearing Health - Air Force

The Air Force (AF) HCP is a risk-based program, enrolling Airmen and civilians based on occupational exposure to hazardous noise. In 2015, the Air Force started hearing testing at basic training for all enlisted Airmen and officers, regardless of noise exposure risk. Likewise, the Air Force completes Separation Health Physical Exams (SHPE) for all Airmen, using the DOEHRS-HC system, regardless of HCP enrollment. As a result, hearing tests completed at the beginning and end of military service, regardless of HCP enrollment, shown in the graphs below, are not completely reflective of actual HCP effectiveness or hearing health of the total AF population.

Air Force Unique Hearing Tests by Personnel Category

The number of unique hearing tests by the Air Force show an increase in all components during FY22 compared to FY21. There was a 10% increase in testing for all Airmen and a 4.0% decrease for AF civilian personnel in FY22 compared to FY21 (Graph 47). This increase in testing for all Airmen is thought to be influenced by reduced COVID-19 pandemic restrictions resulting in easier access to hearing health services.

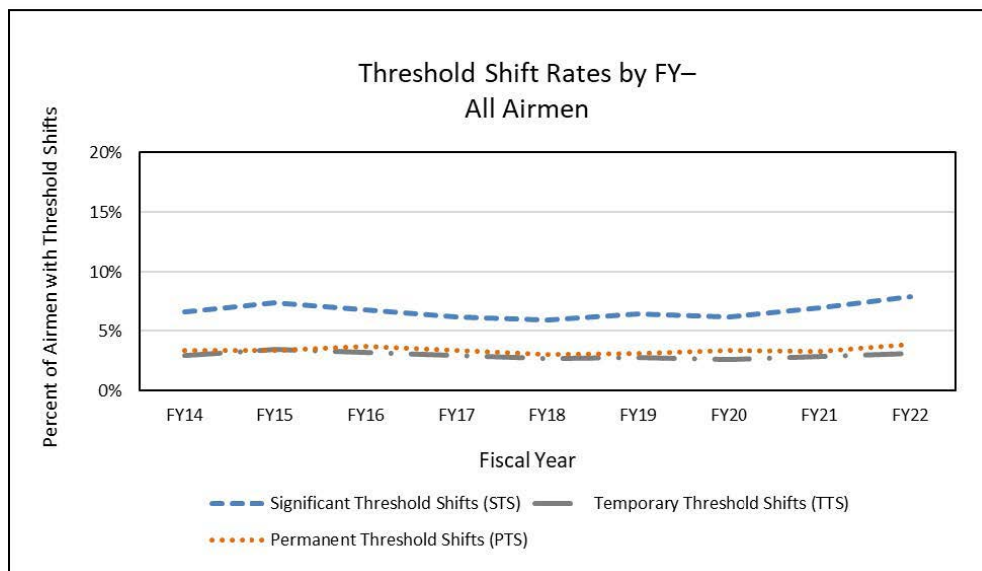
Graph 47. Air Force Unique Individual Hearing Tests by Personnel Category (FY21 and FY22)



Significant Threshold Shift Rates by FY

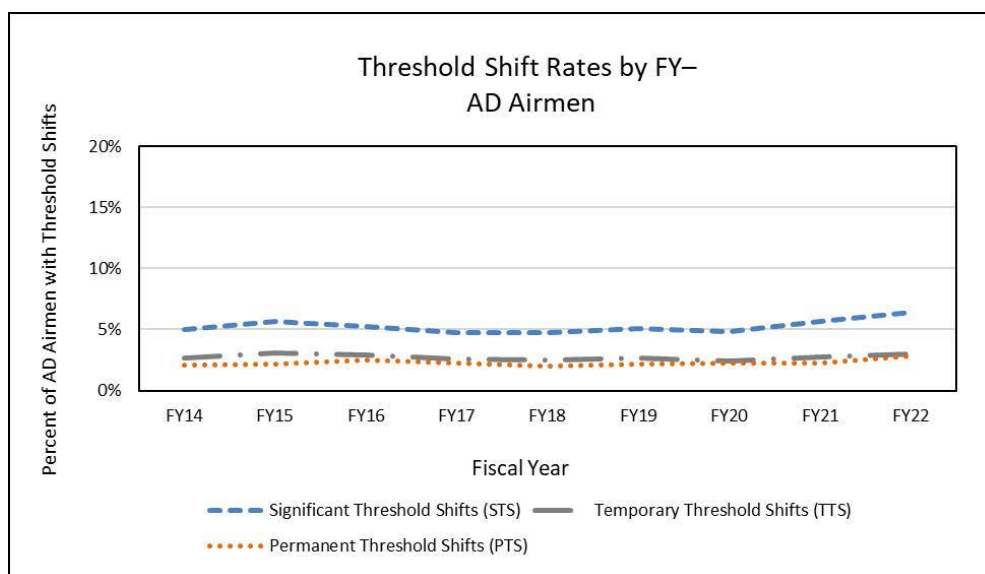
In FY22, all Airmen (all AF components combined) STS, TTS, and PTS rates show a slight increase compared to FY21. Threshold shift rates for all Airmen indicate 7.9% STS, 3.1% TTS, and 34.5% PTS rates in FY22 (Graph 48).

Graph 48. Threshold Shift Rates by FY - All Airmen



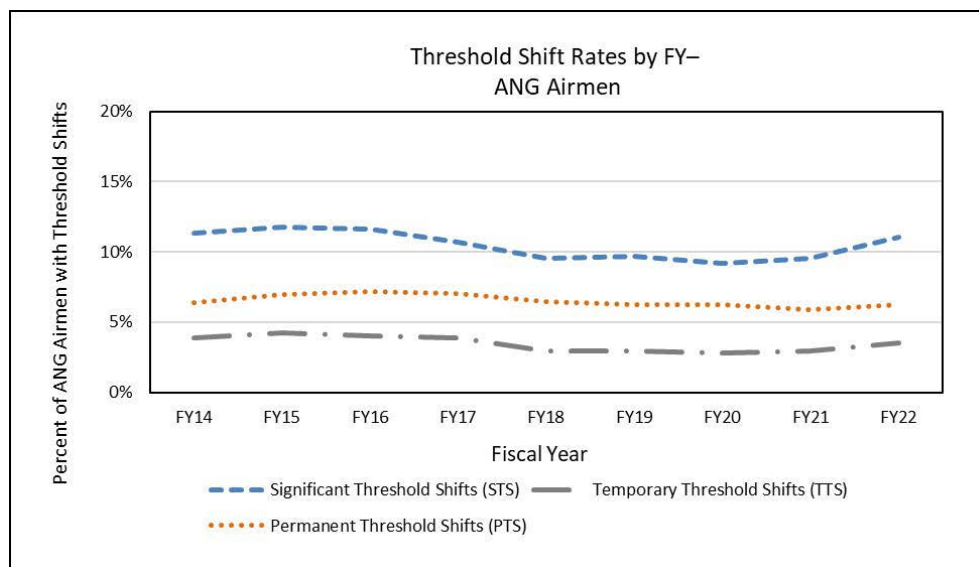
The AD Airmen have the lowest PTS rates of all Air Force components during FY14 - FY22. This may be due to improved STS follow-up testing compliance resulting in accurate identification of PTS and TTS as seen in [Graph 53](#). Threshold shift rates for AD Airmen indicate 6.4% STS, 3.0% for TTS, and 3.2% PTS rate in FY22 (Graph 49). The STS rate shows an increase from FY21 to FY22 for AD Airmen.

Graph 49. Threshold Shift Rates by FY - AD Airmen



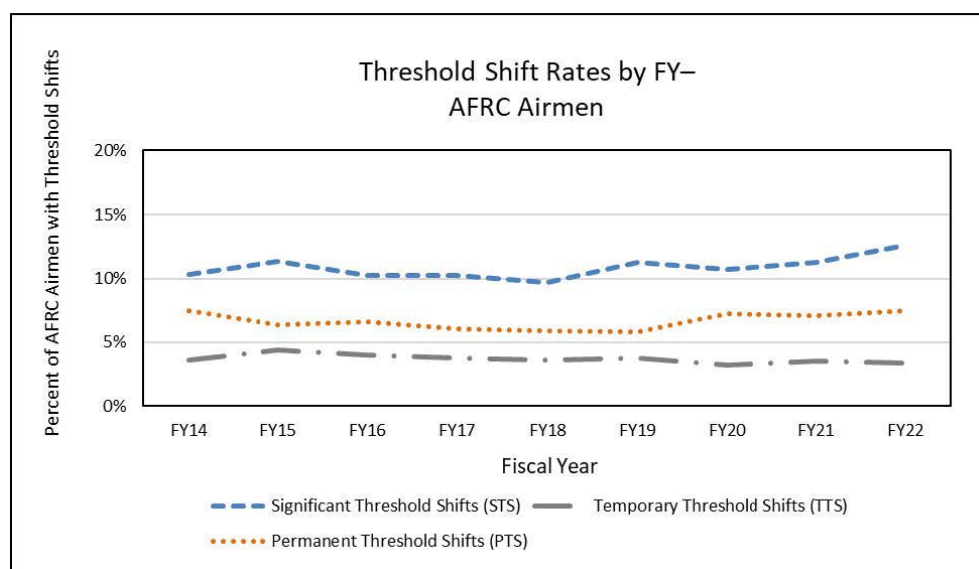
Air National Guard (ANG) threshold shift rates remain stable from FY14 to FY22. Threshold shift rates for FY22 are: 11.1% STS, 3.5% TTS, and 7.0% PTS (Graph 50). The STS, TTS, and PTS rates show an increase for ANG Airmen from FY21 to FY22.

Graph 50. Threshold Shift Rates by FY – ANG Airmen



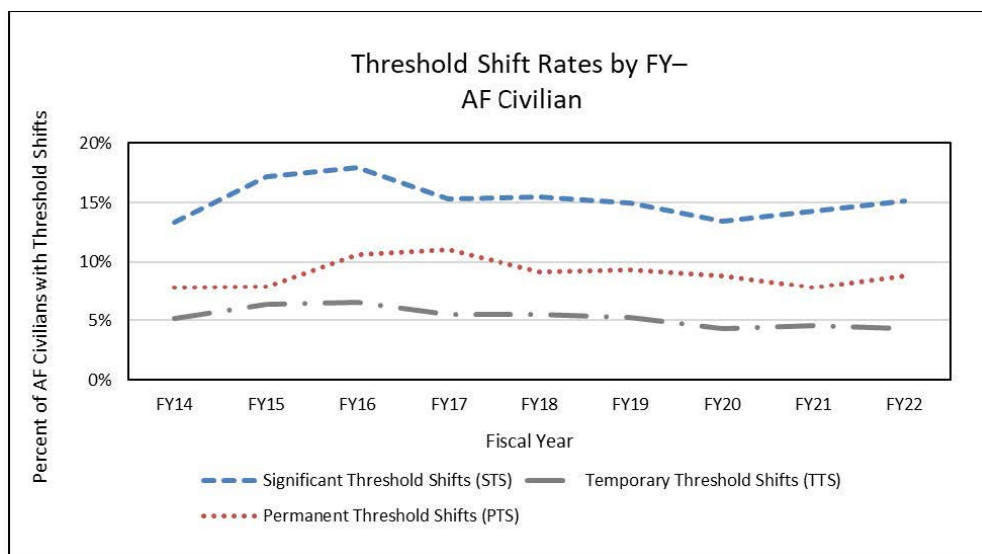
Air Force Reserve (AFR) all threshold shift rates (STS and PTS), show a slight increase from FY21 to FY22 (Graph 51). Threshold shift rates for FY22 are: 12.6% STS, 3.4% TTS, and 8.8% PTS. There is negligible to no improvement in STS, TTS, and PTS rates from FY14 to FY22 for AFR Airmen.

Graph 51. Threshold Shift Rates by FY - AFR Airmen



The AF civilian STS rates show increased rates from 13.3% in FY14 to 15.1% in FY22. There are increases in STS and PTS rates for these AF Civilians from FY21 to FY22. The AF civilian threshold shift rates for FY22 are: 15.1% STS, 4.3% TTS, and 9.4% PTS (Graph 52). The AF civilian STS rates are higher than AF military components.

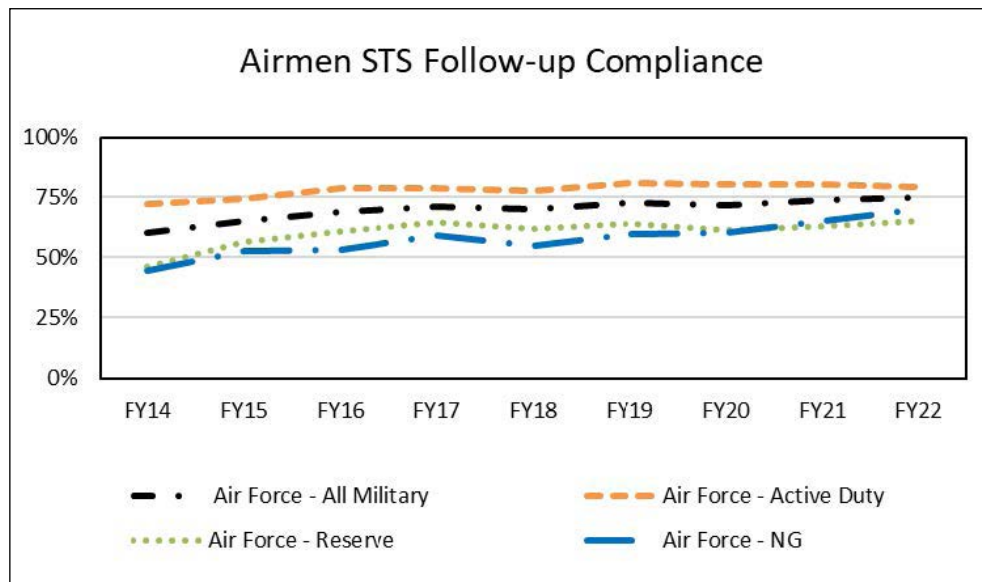
Graph 52. Threshold Shift Rates by FY – AF Civilian



Significant Threshold Shift Follow-up Compliance

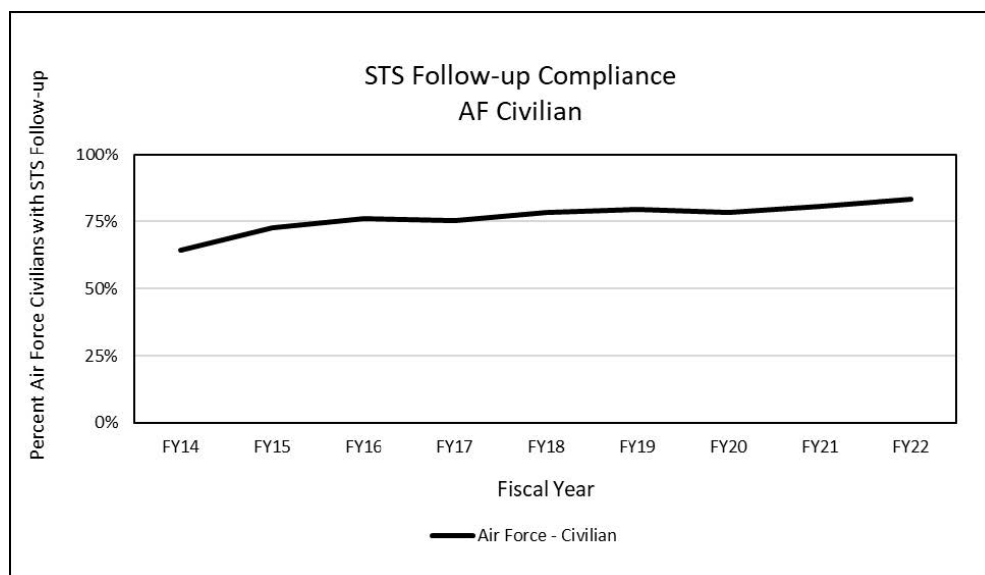
There is an increase in STS follow-up testing compliance in FY22 when compared to FY14 (Graph 53) for Airmen (combined components and individual components). Overall compliance for STS follow-up testing (all Airmen) increased from 60.1% in FY14 to 74.7% in FY22. Compliance for STS follow-up testing for AD Airmen increased from 72.2% in FY14 to 79.2% in FY22 with a marginal decrease in compliance from FY21 to FY22. Compliance in the ANG increases from 44.2% in FY14 to 69.8% in FY22. Compliance in the AFR increases from 46.2% in FY14 to 65.2% in FY22.

Graph 53. Airmen STS Follow-up Test Compliance



The AF civilian STS follow-up testing continues to show increased compliance from 64.4% in FY14 to 83.5% in FY22 (Graph 54) with an increase in compliance from FY21 to FY22.

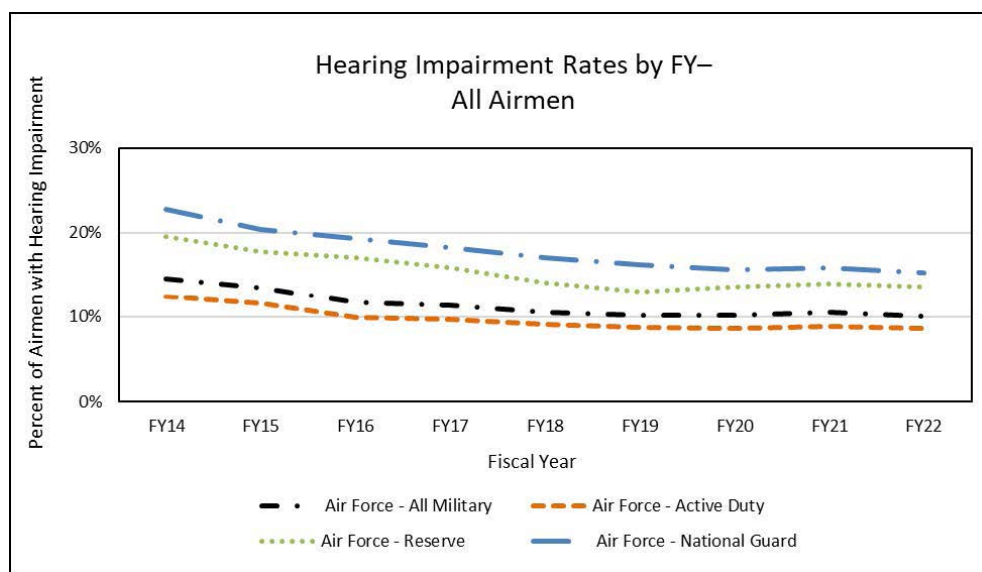
Graph 54. AF Civilian STS Follow-up Test Compliance



Hearing Impairment

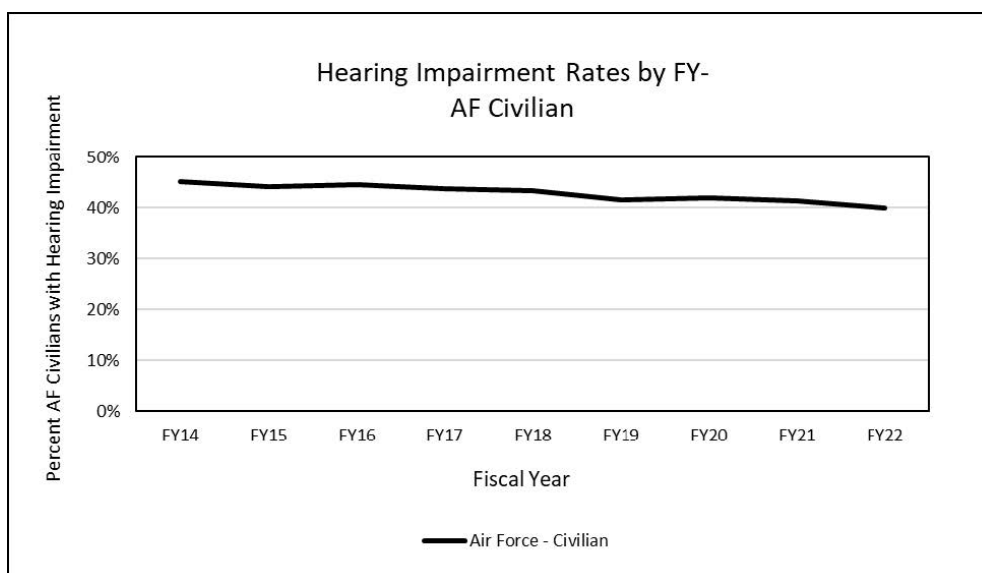
The percent of Airmen with hearing impairment is decreasing for all AF components. All Airmen with hearing impairment decreased from 14.7% in FY14 to 10.1% in FY22 (Graph 55). However, from FY19 to FY22 Airmen hearing impairment remains stable for all AF combined and individual components.

Graph 55. Hearing Impairment Rates by FY - All Airmen



The percentage of AF Civilians with hearing impairment shows a marginal decrease from FY14 to FY22 and from FY21 and FY22. The percentage of AF Civilians with hearing impairment decreased from 45.2% in FY14 to 40.0% in FY22. In FY22, 60% of civilians had normal hearing.

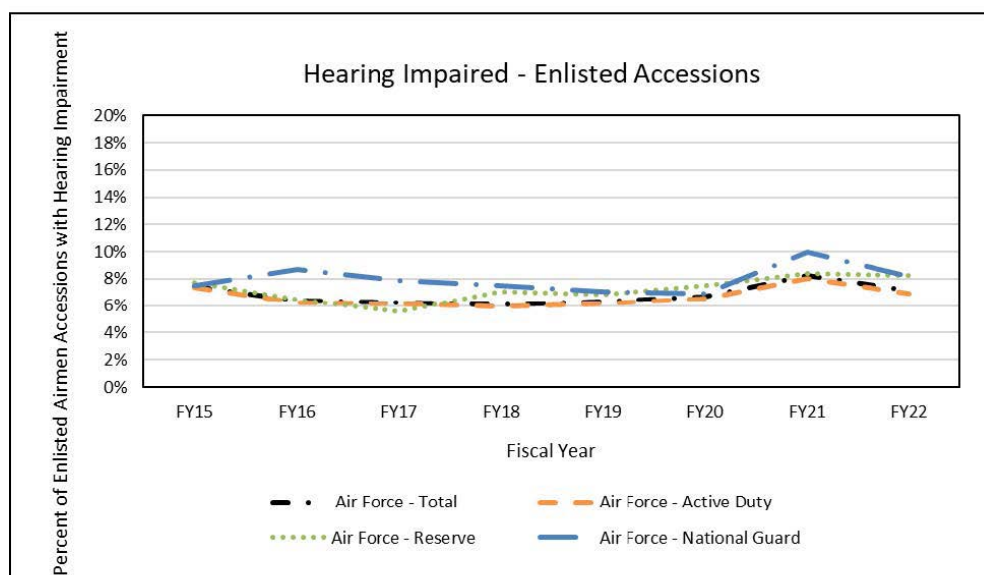
Graph 56. Hearing Impairment Rates by FY - AF Civilian



Hearing Impairment – Enlisted Accession Data

Airmen receive a hearing test as part of basic training when they enter military service. Those “reference audiograms” are used to determine the percentage of all new recruits who enter the AF with hearing impairment (hearing worse than 25 dB HL at any test frequency). Enlisted Airmen accessions did not receive audiometric testing prior to FY15. For all enlisted Airmen accessions hearing impairment show a marginal decreased from FY15 (7.4%) to FY22 (7.1%). The percentage of enlisted AD Airmen accessions with hearing impairment decreases from 7.4% in FY15 to 6.9% in FY22. The percentage of enlisted ANG Airmen accessions with hearing impairment decreased from 9.9% in FY21 to 8.2% in FY22. A negligible increase in hearing impairment is seen for enlisted AFR Airmen accessions from FY15 (7.7%) to FY22 (8.3%) in (Graph 57).

Graph 57. Hearing Impairment Rates by FY - Enlisted Airmen Accessions



VA Auditory Threshold Disability Criteria

The percentage of all Airmen potentially eligible for VBA service-connected disability compensation for hearing loss decreased from 3.4% in FY14 to 2.0% in FY22 and remains stable from FY18 to FY22 (Graph 58). All individual AF component Airmen (AD, ANG, and AFR) had decreases in eligibility for VBA disability for hearing loss from FY14 to FY22 based on VA auditory threshold disability criteria. No change in eligibility is found from FY21 to FY22 for AD and AFR, however, the ANG shows a decrease in eligibility from FY21 to FY22. VA Auditory Threshold Disability Criteria includes other factors in the determination of VA compensation due to impaired hearing.

Graph 58. VA Auditory Threshold Disability Criteria – All Airmen

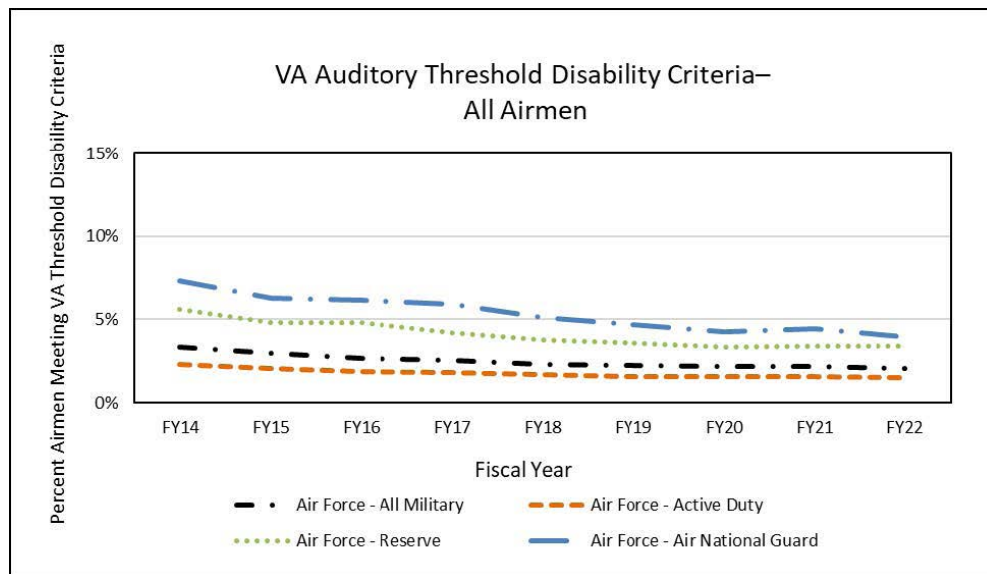


Table 6. Data Summary – Air Force (includes U.S. Space Force) - Source: DOEHRS-HC DR

U.S. Air Force										
Chart Title	Category	Percent								
		FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Threshold Shift Rates - All Airmen	STS	6.6	7.3	6.8	6.1	5.9	6.4	6.1	6.9	7.9
	TTS	3.0	3.4	3.2	2.9	2.6	2.8	2.6	2.9	3.1
	PTS	3.5	3.7	3.4	3.1	3.1	3.4	3.3	3.8	4.5
Threshold Shift Rates - AD Airmen	STS	5.0	5.7	5.3	4.7	4.8	5.1	4.8	5.7	6.4
	TTS	2.7	3.1	2.9	2.6	2.5	2.7	2.5	2.7	3.0
	PTS	2.3	2.5	2.3	2.0	2.1	2.3	2.2	2.7	3.2
Threshold Shift Rates - ANG Airmen	STS	11.3	11.8	11.6	10.7	9.5	9.7	9.2	9.6	11.1
	TTS	3.9	4.3	4.1	3.9	3.0	3.0	2.8	3.0	3.5
	PTS	7.2	7.3	7.1	6.5	6.3	6.3	6.0	6.1	7.0
Threshold Shift Rates - AFR Airmen	STS	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
	TTS	3.6	4.4	4.0	3.7	3.6	3.7	3.2	3.6	3.4
	PTS	6.4	6.6	6.0	5.9	5.8	7.2	7.0	7.3	8.8
Threshold Shift Rates - AF Civilians	STS	13.3	17.2	17.9	15.3	15.5	15.0	13.4	14.3	15.1
	TTS	5.1	6.4	6.5	5.5	5.5	5.2	4.3	4.6	4.3
	PTS	8.0	10.6	11.1	9.1	9.3	8.8	7.9	8.6	9.4
STS Follow-Up Test Compliance	All Airmen	60.1	65.2	68.9	71.1	69.8	72.7	71.7	73.7	74.7
	Active Duty	72.2	74.1	78.5	78.6	77.6	80.5	79.9	80.1	79.2
	National Guard	44.2	52.4	53.2	58.9	54.9	59.5	59.9	65.0	68.9
	Reserve	46.2	56.4	60.8	64.3	61.9	64.1	61.0	63.0	65.2
	AF Civilians	64.4	72.7	76.3	75.5	78.4	79.5	78.2	80.7	83.5
Hearing Impaired	All Airmen	14.7	13.5	11.7	11.4	10.6	10.2	10.2	10.5	10.1
	Active Duty	12.4	11.6	9.9	9.7	9.1	8.7	8.6	8.9	8.6
	National Guard	22.8	20.4	19.3	18.2	17.1	16.2	15.7	15.9	15.3
	Reserve	19.6	17.8	17.0	15.9	14.1	13.0	13.6	14.0	13.6
	AF Civilians	45.2	44.1	44.4	43.8	43.3	41.6	41.9	41.4	40.0
Hearing Impaired - Enlisted Airmen Accessions	All Airmen	*	7.4	6.4	6.2	6.1	6.3	6.7	8.3	7.1
	Active Duty	*	7.4	6.2	6.2	5.9	6.2	6.5	8.0	6.9
	National Guard	*	7.5	8.7	7.9	7.5	7.1	6.9	9.9	8.2
	Reserve	*	7.7	6.5	5.5	7.1	6.8	7.5	8.4	8.3
VA Auditory Threshold Criteria	All Airmen	3.4	3.0	2.7	2.5	2.3	2.2	2.2	2.2	2.0
	Active Duty	2.3	2.0	1.9	1.8	1.7	1.6	1.5	1.5	1.5
	National Guard	7.3	6.3	6.2	5.9	5.1	4.7	4.3	4.5	3.9
	Reserve	5.6	4.8	4.8	4.2	3.8	3.6	3.4	3.4	3.4

*No Basic Training Hearing Test Mission

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