

Veterans with Hearing Loss:

Unique Needs and Audiological Considerations



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HearingReview

Veterans are a unique and complex patient population who deserve the very best hearing care we can give them. However, several factors can complicate their treatment and the delivery of rehabilitative services.

By Karl Strom

Veterans often describe their military service as long hours and days of tedium and toil punctuated by brief periods of stark terror. The brutal physical and mental punishment war can inflict is well documented in our literature, movies, and songs. And military service members don't necessarily need to face combat in order to sustain a grave injury or incur a serious physical or mental condition that can haunt them later in life.

"I worked with a drill sergeant from the Vietnam Era who told me it was literally his job to lie down next to the trainee and watch him closely as he fired an M-1 [rifle]," explains Richard Danielson, PhD, the retired head of Walter Reed Army Medical Center's Audiology and Speech Center and current Manager for Audiology and Hearing Conservation at NASA. "And if that trainee blinked, the sergeant would reprimand him because—although this is a very natural reaction to a loud sound—you can't lose track of the target, right? But the result was that this sergeant spent hours and hours, day after day, lying prone with his head right next to a guy firing an M-1."



Richard Danielson, PhD

Along with the mortal dangers it poses, military service is an inherently hostile environment for the ears. The effect of hearing loss—in all its forms—can be devastating to a veteran, particularly as they adjust to a civilian lifestyle. It may also possibly contribute to depression, heightened stress, fatigue, as well as all the other comorbidities associated with hearing loss—including cognitive decline and Alzheimer's disease, diabetes, falls, heart disease, and more.¹ For many veterans, a lack of proper hearing healthcare exacerbates these problems, leading to strained relationships at home and an inability to maintain or excel within a chosen career.

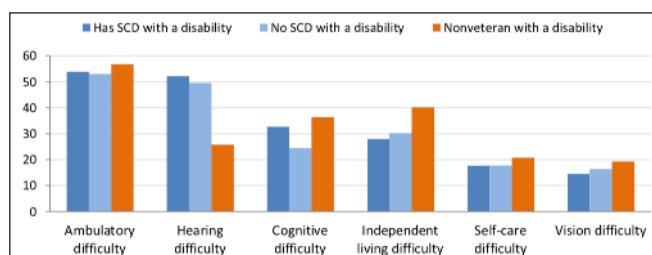


Figure 1. Percentage by disability types for veterans with and without a service-connected disability (SCD) compared with non-veterans with a disability. About 50% of veterans with and without an SCD reported hearing difficulty compared to about 25% of non-veterans with a disability. Of particular interest, hearing loss is the only disability listed in which veterans had a greater incidence than the non-veteran with a disability population. Source: 2014 American Community Survey (US Census Bureau).³

PREVALENCE OF HEARING LOSS IN VETERANS

Hearing loss and tinnitus are consistently the top-two service-connected disabilities (SCD) among veterans.^{2,3} In 2014, more than 933,000 veterans received disability compensation for hearing loss and nearly 1.3 million received compensation for tinnitus at a cost of around \$2 billion.⁴

The first stop for any veteran who suspects he/she has hearing loss should be the VA (see sidebar on p 8). However, as with the general population, there is a reluctance among veterans to seek treatment for hearing loss. A 2014 census survey of people with disabilities³ showed that about half of all veterans (with and without a SCD) report having hearing difficulty, compared to only about 25% of the non-veteran population with a disability (**Figure 1**).

Moreover, veterans are far more likely to report a hearing difficulty than peers in their same age group. The most common type of hearing problem among veterans is tinnitus and high-frequency sensorineural hearing loss (SNHL) which can vary in severity from mild to profound (**Table 1**).

Disability	Number
Tinnitus	1,121,709
Hearing loss	854,855
Post traumatic stress disorder (PTSD)	648,992
Scars, general	574,191
Limitation of flexion, knee	453,704
Lumbosacral or cervical strain	440,795
Diabetes mellitus	398,480
Paralysis of the sciatic nerve	346,572
Limitation of motion of the ankle	343,834
Degenerative arthritis of the spine	335,692

Table 1. Most prevalent Service-Connected Disabilities (SCD) for veterans receiving compensation in 2013.³

THE VA AND HEARING HEALTHCARE

One can reasonably argue that the history of modern audiology in the United States began with the establishment of aural rehabilitation centers for WWII veterans,⁵ as well as the Army's appointment of Captain Raymond Carhart in 1944 to lead the acoustic division at Deshon General Hospital in Butler, Penn. There, Carhart—who is often called the "Father of Audiology"—assisted more than 16,000 hearing-impaired military personnel and helped popularize the idea of audiology as its own distinct research specialization.⁶

"Contemporary hearing healthcare owes a great debt to the men and women who were called to service at the Army and Navy aural rehabilitation centers during World War II," says James Jerger, PhD, Emeritus Distinguished Scholar in Residence at the University of Texas at Dallas (UTD) and a renowned hearing researcher who has written two books on the history of audiology. "The staffs of these clinics were originally recruited from academia, and were, for the most part, trained in the speech and hearing



James Jerger, PhD

sciences. They were by no means clinicians, but they learned a good deal on the job. As the war ended, people like William Hardy, Moe Bergman, Ira Hirsh, Frank Lassman, Fran Sondag, and Raymond Carhart fanned out to their respective academic settings and organized courses and programs designed to combine the study of why people lost their hearing with the study of what you could do about it. Their students eventually organized new programs, combining scientific training with clinical expertise. Over the course of a few decades, a new profession dedicated to serving the hearing-impaired population was born. It came to be called Audiology.”

Today, the Audiology and Speech Pathology Services division of the US Department of Veterans Affairs (VA) is without peer when it comes to helping service members with hearing-related problems, ranging from SNHL to vestibular pathologies. In 2015, the VA employed more than 1,100 audiologists and 340 hearing technicians in over 400 medical centers, outpatient clinics (OPCs), and community-based outpatient clinics (CBOCs)—making the VA the largest employer of audiologists in the world. The number of outpatient facilities serviced by audiologists (and now hearing aid specialists) also continues to grow rapidly, as the VA has focused on reducing wait times and travel distances for veterans, particularly in rural areas.

In our field, there is a saying that “If you’ve seen one VA clinic, you’ve seen one VA clinic.” VA Medical Centers can function quite differently from one another, with distinct sets of protocols geared for their own region’s veteran population. In particular, VA Centers are uniquely set up for collaboration with allied healthcare professionals, such as ENTs, neurologists, psychologists, polytrauma and geriatric specialists, and other medical disciplines. The VA also maintains two primary hearing research centers that have made significant contributions to the field: the National Center for Rehabilitative Auditory Research (NCRAR) in Portland, Ore, and the Auditory Vestibular Research Enhancement Award Program (AVREAP) in Mountain Home, Tenn. The Department of Defense (DoD) also supports the Hearing Center of Excellence (HCE) in San Antonio which tracks hearing loss and auditory injuries across the Armed Forces, develops best practices, and facilitates hearing research and enrollment for veterans.

Through national contracting via the Denver Acquisition and Logistics Center (DALC), the VA is able to provide free hearing aids and other devices to veterans who qualify for VA Health Benefits. All major hearing aid manufacturers have 5-year contracts to supply their devices at the highest available technology levels (they are also bound by law to never sell a hearing aid for



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less than the VA price). In 2018, Hearing Industries Association data⁷ showed that nearly 750,000 hearing aids were purchased by the VA. Other devices and corresponding services include cochlear implants, bone-anchored hearing systems, tinnitus maskers and sound generators, as well as a wide range of assistive/alerting technologies and captioned telephones.

DEMOGRAPHICS OF US VETERANS

Service periods. Although estimates vary, US census data⁸ indicate there were about 18.2 million US veterans in 2017, with over 9 million enrolled in VA healthcare. **Figure 2a** shows a relatively even split between veterans who served in the more recent Gulf Wars (40%) and those who served in WWII, Korea, and Vietnam (47%), with the remaining 13% serving outside those wartime periods.

But these demographics are set to change dramatically due to the reduced numbers of people currently in active duty and the future shrinking ranks of “Baby Boomers” and the “Silent Generation.” In 1966, when the draft was still in effect, 3.1 million people were in active duty compared to the 1.3 million all-volunteer force today. As a consequence, about 1 in 5 US adults (18%) in 1980 were veterans, compared to fewer than 1 in 10 (8%) in 2014, according to census data. A 2013 Pew survey⁹ predicts that Gulf War veterans will constitute well over half (56%) of all veterans by 2043.

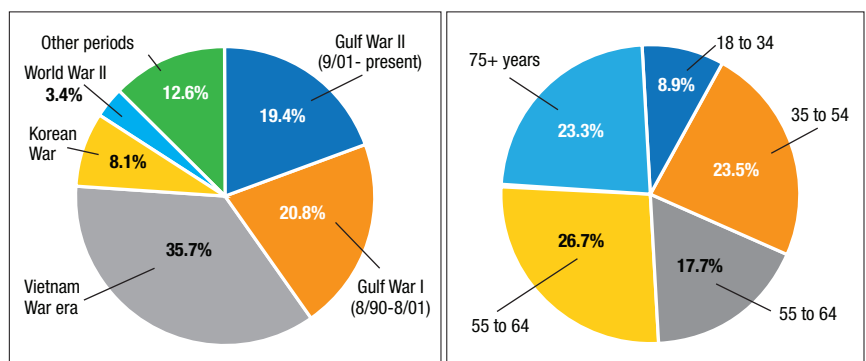


Figure 2a-b. Left: There are now almost equal numbers of veterans who served in the Gulf Wars (1990-present, in dark blue and orange) compared to those who served in the WWII, Korea, and Vietnam Wars (1940-1973, in light blue, yellow, and gray). Right: According to the same census data, half (50%) of all US veterans are age 65 and older, 18% are between age 55 and 64, and about one-third (32%) are age 54 or younger. Source: US Census Bureau, 2017.⁸

The median age of a veteran is 65 years old, with nearly one-quarter (23.3%) being age 75 or older (**Figure 2b**). According to the census, three-quarters of veterans (75%) are white, 12% black or African American, 7% Hispanic/Latino, 2% Asian, 1% American Indian or Native Hawaiian/Pacific Islanders, with the remaining 3% being other or mixed races.

Overall, 15% of active-duty military personnel are women, up from 11% in 1990—but these percentages vary depending on the service branch. Women constitute 19% of the active-duty personnel in the Air Force, 18% of the Navy, and 14% of the Army, but only 8% of all Marines. By 2043, Pew Research predicts 17% of all veterans will be women.⁹

KEY FACTORS INFLUENCING VETERANS' HEARING STATUS

While an analysis of all factors contributing to the hearing status of veterans is beyond the scope of this report, some key issues unique to military service include:

Deployment. Deployment to a war zone greatly adds to the risk of hearing loss, with 71% of returning Iraq or Afghanistan veterans (IAVs) reporting exposure to loud noise, and more than 15% reporting tinnitus.^{10,11} One study of US Army soldiers who visited audiology clinics found that hearing loss was identified in 68.6% of post-deployment diagnoses compared to 4.0% of non-deployment-related diagnoses.¹² Wells et al¹¹ reported that individuals who were deployed and experienced combat were 1.6 times more likely to report new-onset hearing loss than their non-deployed counterparts.

Impulse and steady-state noise exposure. Exposure to peak sound pressure levels (SPL_{pk}) from any firearm is usually sufficient to require the use of hearing protection—even if the gun is fired only one time. NIOSH recommends that exposure to peak impulse noises not exceed 140 dB SPL (ie, just one 140 dB impulse would equal 100% of your daily noise exposure dosage). Their studies have shown SPL_{pk} may range from a low of 144 dB SPL for small caliber weapons such as a 0.22 caliber rifle to as high as 172 dB

SPL for a 0.357 caliber revolver.¹³ Similarly, Amrien notes that peak impulse noise levels in military weapons can range from 157 dB for an M16 rifle to 183 dB for a 105mm towed howitzer.¹⁴

“Many of these high-impulse noises are occurring directly at ear level,” says audiologist Garry Gordon, a hearing conservation expert and president of EAR in Boulder, Colo, which develops specialized hearing protection systems. “So it’s not uncommon to



Garry Gordon, AuD

see a veteran with more severe hearing loss in one ear due to the head-shadow effect. And [asymmetrical hearing loss] is also relatively common in the audiograms of competitive shooters, avid hunters, or people like farmers who are constantly turning one ear to the tractor engine and the wind while looking back at a plow.” He says that, instead of being more proactive about preserving their remaining hearing, many of

these people already have a hearing loss that can make it *less likely* they’ll use earplugs, earmuffs, or other hearing protection systems. “They might already have a mild or moderate hearing loss, so they become concerned that plugging up their ears with anything will make communication totally impossible and therefore decrease their performance in the task at hand.”

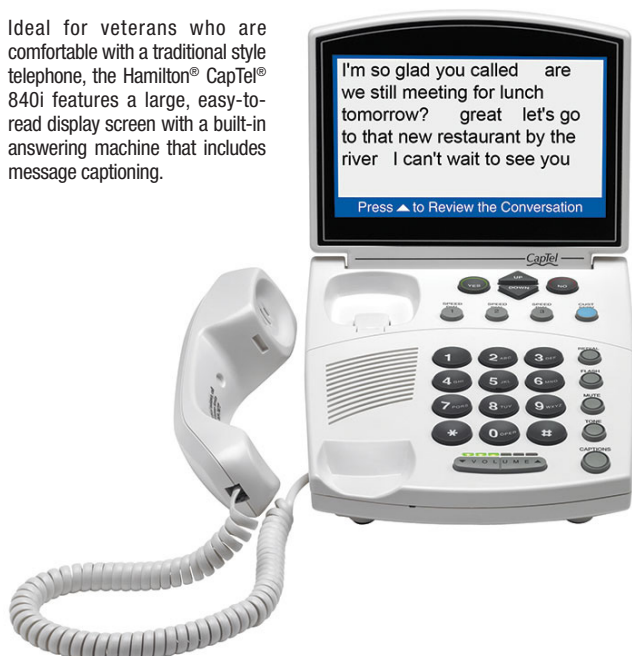
In addition to firearms and weapons, loud steady-state noise is a feature of many military vehicles/vessels and combat systems. For example, decibel levels can be 98-120 dBA for shipboard diesel-driven systems, 115-167 dBA for on-deck operations related to aircraft, 90-118 dBA for tracked vehicles, and 85-121 dBA within aircraft cockpits.¹⁴ Without the benefit of exemplary hearing protection, these environments can lead to hearing loss, tinnitus, hyperacusis, and/or possible auditory processing disorders.

Blast injuries and TBI. Blasts and exposure to very loud impulse noises are a unique feature of the military due to artillery, rocket and mortar shells, mines, and bombs, including improvised explosive devices (IEDs). In addition to life-threatening wounds, blasts can cause TBI or mild TBI (mTBI, also known as mild concussion), which is the most common combat-related injury and is associated with hearing loss, tinnitus, ruptured eardrums, and other types of auditory and vestibular dysfunction. It should be noted that mTBI and post-concussion (PC) symptoms are also associated with greater incidence of substance use, depression, and post-traumatic stress disorder (PTSD), so determining the specific symptom source(s) and most appropriate treatment pathway can be difficult.

As many as 60% of all combat-related blast injuries result in TBI, with some studies suggesting that 10% to 23% of IAVs have experienced a TBI. This means there could be more than a *quarter-million* IAVs with TBI.¹⁵ From 2000 through the first quarter of 2019, the DoD’s Defense and Veterans Brain Injury Center reports 383,947 diagnosed cases of TBI, although this statistic includes *all* causes of TBI in the military, ranging from recreational injuries to combat.

As Wells et al¹¹ point out, besides the primary effects of blast overpressure and burns, “peripheral or central auditory system damage can occur from secondary effects (shrapnel and other blast-accelerated debris), and tertiary effects (body being thrown and impacting other objects).” Blast-related injuries commonly

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involve the middle and inner ear, resulting in conductive, sensorineural, or mixed-type hearing loss, and can also cause tinnitus and balance problems. However, Lew et al¹⁶ reported that pure SNHL was the predominant type of blast-related TBI injury in nearly 60% of inpatients at one VA rehabilitation unit.

Cultural and training issues. Active-duty service members are predominantly in their 20s and trained to be mission- and team-oriented in dangerous tasks. The basic identity of a soldier is one of toughness to the point of invincibility, reflected in slogans such as “The Few, the Proud, the Marines” and “Army Strong.” Thus, they are less likely to complain about what others might consider to be a serious health problem, including damaged hearing. In many cases, this mindset is retained by veterans into their later years.¹⁷

“There are a number of things that affect warfighters, causing them to be more focused on the operational mission and making hearing protection secondary,” says Colonel LaKeisha Henry, MD, Division Chief of the Hearing Center of Excellence. “The ability to



Col LaKeisha Henry, MD

maintain situational awareness and operational effectiveness, as well as just detecting sound, is extremely important. Certainly, there are cultural barriers to overcome, but we also have education and training initiatives regarding the various types of hearing protection for the different situations encountered in the field...So, there’s a broad effort associated with providing education not just to those who need hearing protection, but also those who would either fit it or purchase and supply it.”

HEARING AIDS FOR VETERANS

As **Figure 3** demonstrates, the number of hearing aids dispensed by the VA more than doubled in the 4 years from 1997 to 2000—and kept increasing through the ensuing two decades. Hearing aid unit growth at the VA remained in the double digits in 5 of the 9 years between 2002 to 2010. During the past 5 years (2014-2018), VA dispensing has leveled off with an annual hearing aid unit growth of about 4%, compared to 5% for the commercial/private sector.

Much of the rapid increase in hearing aid use among veterans can be attributed to changes in VA eligibility requirements and audiology resources in the late 1990s, the aging population (eg, all Vietnam Era veterans are now age 64+), the large numbers of returning soldiers from the Gulf Wars (August 1990-present), and the proven benefits of binaural fittings. According to Dr Danielson, another significant factor was the establishment of the Retiree-At-Cost Hearing Aid Program (RACHAP) in the late 1980s, which allowed veterans to purchase hearing aids in selected military audiology clinics, at a reduced government-negotiated cost.

This rapid growth in hearing care services has made the VA the second largest supplier of hearing aids in the world—behind only the National Health Service (NHS) which supplies hearing

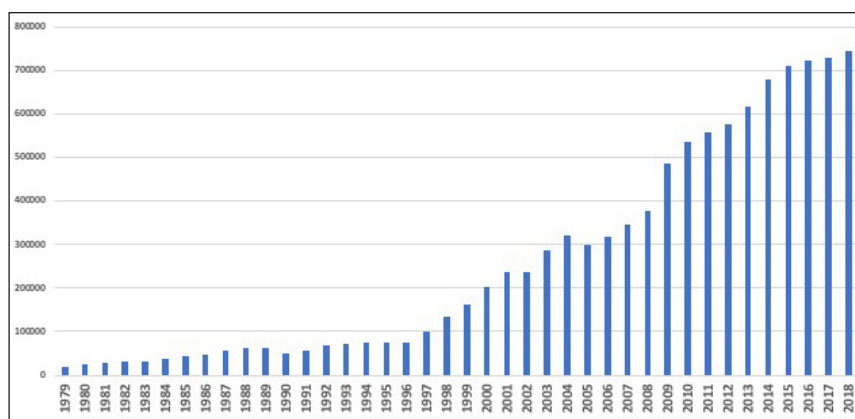


Figure 3. Hearing aid units dispensed by the US Dept of Veterans Affairs (VA) from 1979 to present. Largely due to the aging veteran population, the Gulf Wars, and a loosening of eligibility requirements in the 1990s, the need for hearing aids by the VA grew more than 6-fold in the 20 years from 1997-2016. The VA now accounts for about one-fifth (19%) of all hearing aids dispensed in the United States. Source: Hearing Industries Association (HIA).⁷

aids free to all UK citizens. In 2018, the VA dispensed about 1-in-5 (19%) of all the hearing aids in the United States (about 6% of the global market), compared to only 1-in-10 (10.4%) in 2000. Given these numbers, it’s apparent VA audiologists and administrators have been tasked with an incredible challenge in meeting the demands of veterans with hearing loss.

VETERANS AND TINNITUS

As veteran Sean Lehman points out in his recent webinar and white paper (see sidebar on p 8), you’ll probably meet more veterans who have some form of ringing in the ears (ie, mild to severe tinnitus) than those who do not.¹⁷ Tinnitus might be thought of as the evil sidekick of hearing loss. Mazevski et al¹⁸ recently described the “80/80 Rule,” where about 80% of people with hearing loss appear to have tinnitus, and about 80% with tinnitus have hearing loss.

Exact estimates on the prevalence of tinnitus vary, partly due to a lack of a firm diagnostic criterion. Davis and El Refaie¹⁹ estimated that 10% to 15% of the US population experiences chronic or persistent tinnitus, with about 5% to 8% viewing it as a significant factor from which they seek relief. But these percentages probably balloon for veterans. Nelson et al²⁰ noted studies showing anywhere between 6% to 75% of IAVs were affected by tinnitus, depending on the sample and methods used, with many veterans suffering from acute tinnitus possibly influenced by factors like noise-induced hearing loss, TBI, and/or PTSD.

A number of clinical tools can be instrumental in the assessment and formulation of a tinnitus treatment plan (for a brief review, see Beck²¹), and new useful tools for audiologists continue to emerge, such as the Tinnitus and Hearing Survey²² developed by James Henry and colleagues at the NCRAR in Portland.

Hearing aids remain the most effective sound therapy devices that alleviate tinnitus and can be prescribed by the VA for this purpose, with or without the presence of hearing loss. One study showed that, even though only 6.1% of all hearing aid users reported using hearing aids to treat their tinnitus, nearly *half* indicated their hearing aids provided mild-to-significant tinnitus relief.²³ Beyond hearing aids, several sound therapy devices, maskers, and sleep aids exist to help reduce the symptoms of tinnitus.

For veterans with severe and/or debilitating tinnitus, cognitive based therapy (CBT, and internet-based CBT, or iCBT) is a coun-

seling approach that addresses the negative psychological reactions to tinnitus by changing how an individual perceives and feels about their tinnitus, and can be a lifesaver for some people.²¹ It may also help reduce associated comorbidities, such as insomnia, depression, hyperacusis, and cognitive problems. Again, the VA is an exceptional resource for veterans who suffer from acute tinnitus.

AUDITORY PROCESSING DISORDERS

The auditory system is vulnerable to both peripheral and central damage due to blasts and extremely loud noise.²⁴ In particular, TBI is associated with central auditory processing disorders (CAPD), which can interfere with the ability to localize sound, understand speech in noise, comprehend rapid speech, and more.

“TBI could have major effects on central auditory processing disorders (CAPD) depending on site and extent of the lesion,” explains Dr Jerger. “Brain injury that resulted in aphasia, for example, could affect receptive and/or expressive language disorders, which would almost certainly exacerbate an existing auditory processing problem. Less severe lesions in the brain could also affect cognitive factors like attention, memory, executive function, etc—any one of which could have a negative impact on the existing CAPD disorder.”

“In truth, blasts can have highly variable effects,” says Frank Musiek, a distinguished researcher and expert in neuroaudiology and auditory processing disorders, and Professor in the Department of Speech, Language, and Hearing Sciences at the University of Arizona. Citing work by VA researchers like Katherine Taber and Frederick (Erick) Gallun and colleagues,^{25,26} he says the lack of TBI symptoms following blast exposure(s) can mislead patients and physicians alike into thinking there has been little or no impact on the central nervous system. However, like concussions in sports, blasts may result in cognitive and auditory deficits.²⁷

“One of the main areas involved in a blast can be the upper brainstem, which includes the upper pons and midbrain, and possibly involving the inferior colliculus and the lateral lemniscus,” he says. “This is interesting because the lower brainstem might be thought to be more affected by blasts, because it contains the cochlear nucleus and superior olivary complex, with the auditory nerve inputting into these regions. And it really isn’t one of those areas that most

people immediately think about in blast injuries because it’s bordered and protected by the temporal bone...Also, the perisylvian region [which includes Heschl’s and Wernicke’s area] and the frontal lobe, where one may often see subdural hematomas, can be involved. If these areas are damaged, some effects on central auditory processing tasks are likely to be observed.”



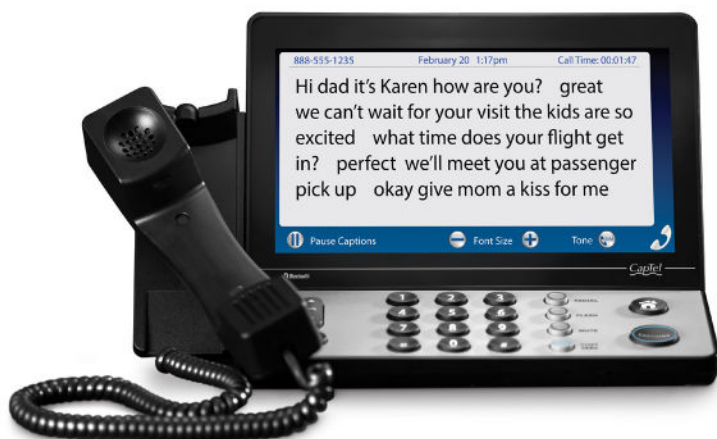
Frank Musiek, PhD

Dr Musiek also says damage to the corpus callosum—the thick nerve bundle connecting the left and right cerebral hemispheres—has been highlighted in the research of Taber et al²⁵ as one of the more common areas affected by blast injury, a result of one brain hemisphere violently accelerating faster than the other. “Even if it’s only for a split second, this can damage the corpus callosum, causing a large left-ear deficit on dichotic listening,” says Dr Musiek. “And that’s why I’ve said for years one of the best things clinicians can do when looking at blast injuries, TBI, and related problems is to look for this type of deficit because: 1) As Taber reports, it’s quite common, and 2) It affects something we can measure quite accurately with fairly sensitive diagnostic auditory tests such as dichotic listening.”

As noted earlier, extremely loud steady-state noise can be routinely experienced in military service and is also associated with CAPD and other auditory processing disorders. “We may not know the exact morphology of the auditory cortex, but we do know there is a pretty strict tonotopic organization,” says Dr Musiek. “Based on recent animal studies, if one is exposed to a particular [long-duration] high-level noise in a specific frequency band, cortical neurons tuned to that frequency band are going to be stimulated and perhaps overstimulated.” He says that the auditory system may shift frequencies in response to long periods of intense noise. Further, he notes that the recent studies by Sharon Kujawa and Charles Liberman^{28,29} about “hidden hearing loss” or “cochlear synaptopathy” have placed an exclamation mark on the early-80’s work of famed neuroanatomist D. Kent Morest who also showed that noise-induced damage to the ear can have far greater consequences than what is revealed by conventional threshold testing. Indeed, evidence suggests high intensity noise can create damage to the cochlear nerve and central auditory pathway—adding to a person’s challenges when trying to understand speech, hear voices in noisy environments, and/or contribute to problems like tinnitus, hyperacusis, and other related conditions.

“The point is, when you piece all this research together, there is a lot of evidence that the entire auditory system is really taking it on the chin when it comes to exposure to high-intensity [and long duration] noises,” says Dr Musiek.

Erick Gallun and his colleagues at the NCRAR write that more sensitive tests and more refined treatment pathways need to be developed for veterans who have CAPD from blast exposure: “Treatment options include low-gain hearing aids, remote-microphone technology, and auditory-training regimens, but clinical evidence does not yet exist for recommending one or more of these options. As this population ages, the natural aging process and other potential brain injuries (such as stroke and blunt trauma) may combine with blast-related brain changes to produce a population for which the current clinical diagnostic and treatment tools may prove inadequate.”²⁶



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VESTIBULAR/BALANCE PROBLEMS

Although this report focuses on veterans with hearing loss, it should be noted that vestibular disorders and dizziness can also be a debilitating problem for veterans, particularly those who have experienced blasts and/or TBI. Various studies indicate that balance problems occur in 15-78% of patients with mild head injuries, and benign paroxysmal positioning vertigo (BPPV) occurs in 10-25% of blast victims.³⁰ Long-term exposure to loud asymmetrical sound (eg, over 140 dB) may also lead to vertigo and balance issues, as can ototoxic drugs to treat medical conditions. There is also recent evidence that veterans with PTSD may have a greater incidence and severity of vestibular impairment.³¹

MILITARY HEARING PRESERVATION AND READINESS PROGRAMS

The VA continues to refine its efforts in the monitoring, prevention, and treatment of hearing loss. For example, the US Army made large-scale changes to its hearing conservation program in 2006, changing the program's name from the US Army Hearing Conservation Program to the US Army Hearing Program (AHP). But this was much more than a simple name change. It marked a new era in military audiology, shifting the focus from hearing conservation to *maximizing readiness and operational capabilities*.

"This change was a tremendous windfall for military audiology," says Dr Danielson. "Before that time, the commander might tell you to go to the clinic and have your hearing tested. But the threat was that, if you ended up with a diagnosis of hearing loss, you might be told that you could no longer be a tank commander, or whatever position you'd achieved, and instead they'd make you a medic or some other job you might not like.

Soldiers often wouldn't show up for hearing appointments. Understanding this situation, military audiologists decided to reposition their approach as a way to *conserve fighting strength*. Among other things, they began to recommend new types of hearing protection—like electronic hearing protectors and nonlinear earplugs that offer acoustic transparency—that could help soldiers perform their jobs better while protecting their hearing and retention for service to the unit. Another important part of the hearing program is the requirement that a commander must have everyone in the unit up-to-date with a hearing test—just like with dental care and physical fitness—before they deploy. So if the unit's readiness is below a certain mark, that's like not having your vehicles ready and not having your units qualified to deploy...and that's points off for the commander."

Similar to industrial hearing conservation, military hearing readiness programs rely on noise hazard identification, noise mitigation, education and training, hearing protection fitting, audiometric surveillance, and program evaluation. Since 2009, the US Army requires all soldiers to obtain audiograms after deployment, and since 2012, all US Marines are required to obtain an annual audiogram.

"There have been demonstrations regarding the different levels of hearing loss and the effect on communication in military opera-

How Can Veterans Get Hearing Aids from the VA?

To obtain VA healthcare, veterans first need to apply for eligibility. This is typically done by applying for disability starting with the VA's Form 10-10EZ. If the veteran is registered with the VA and is receiving healthcare services, they can make an appointment directly with a VA audiologist to determine their hearing status and the need for a hearing aid. Information about obtaining a hearing aid from the VA can be found at: https://www.prosthetics.va.gov/psas/Hearing_Aids.asp



tions," says Col Henry. "One of the effects is that someone may not recognize they have a hearing loss...But if you are on a patrol and the rest of your team has to yell at you to be heard and/or you can't hear them or you're not cognizant of the situation, then you're not making proper decisions. Obviously, this can lead to big problems or mistakes."

The result of the hearing programs—beyond the intended goal of better hearing health and performance for active-duty personnel—was also more objective reporting about the incidence and progression of hearing loss. Overall, Nelson et al²⁰ observed that hearing conservation enrollment has likely decreased hearing disability claims, and "that an established history of reduced hearing ability while on active duty was associated with a significantly increased likelihood of an approved hearing loss disability claim

relative to VA claims without such a history." In other words, soldiers who took part in these programs had better access to the hearing care they needed—both in active duty and later in their lives as veterans. In part, this is due to improved documentation of hearing status. For example, new auditory-related claims increased steadily among younger IAVs, from

151,820 in 2011 to 250,436 in 2015 (Figure 4).¹⁷ And that same documentation reinforces the vital need for hearing conservation—and for overcoming compliance issues.

"In getting a lot of face-to-face time with Vietnam veterans in the 1970s, you'd find that the most any soldier might do to protect his hearing then was to stuff a cigarette butt or a spent cartridge in the ear," says Dr Danielson. "And then, of course, there was combat out in the jungle where [at that time with the available technology] soldiers felt they couldn't wear hearing protection because it would have made the fighting even more dangerous. From an audiologists' perspective, there would also be lame excuses like, "I can't possibly wear hearing protection in the motor pool because I have to hear a tank engine, or hear something clink and clank."

However, Dr Danielson says that due to military hearing conservation programs, as well as veterans warning their brothers-in-arms about the debilitating effects of hearing loss, attitudes about hearing

...When you piece all this research together, there is a lot of evidence that the entire auditory system is really taking it on the chin when it comes to high intensity noises.

—Frank Musiek, PhD

For More about Veterans and Hearing Loss

A recent webinar and white paper, sponsored by Hamilton® CapTel®, looks at the hearing-related needs of veterans as well as their unique personal, cultural, psychological, and physical characteristics and comorbidities—and it presents solutions on how we might be able to help them better—all from the perspective of 20-year military veteran Sean Lehman. It also looks at the Heroes With Hearing Loss® program, which is dedicated to raising awareness and initiating meaningful dialogue about hearing loss experiences among veterans, their families, and friends. You can download the white paper at: <https://bit.ly/2NHCGcx> or view the webinar at: <https://bit.ly/2XC98Sh>.



protection changed. And this change has also occurred gradually in the general public. “In my lifetime, we’ve gone through a transition in hearing conservation very much like we did for seat belts,” observes Dr Danielson. “Seat belts once weren’t even offered in cars. And then, after so many people got injured or died in wrecks, they were first installed by bolting them to the floor... Over the years, safety belts in vehicles became more refined and accepted. Today, my grandchildren will squeal if the car is in motion and they don’t have a double-decker shoulder harness system belted around their chests. I see the same evolution for use of earplugs and earmuffs. In fact, I just had a conversation with a retired astronaut who was saying ‘I can’t go to the firing range with my son-in-law without wearing hearing protection because he just insists on it.’ Well, that’s a big change from the 1970s. So, I think it’s apparent that our attitudes about hearing protection—and our awareness about the impact that hearing loss has on our lives and how it can limit our careers—has changed completely.”

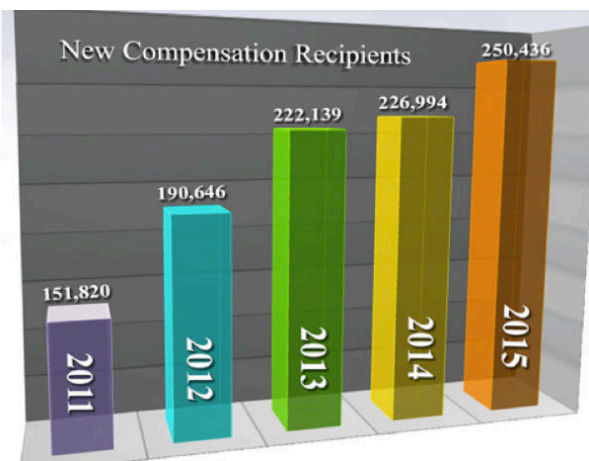


Figure 4. New auditory related claims have steadily increased since 2011—particularly among Gulf War veterans. Taken from Lehman 2017.¹⁷ Source: 2015 Annual Benefits Report, US Dept of Veterans Affairs.

FUTURE DIRECTIONS

The DoD and VA, often in cooperation with academia, coalition countries, and NATO, continue to look for new ways to reduce hearing loss and improve the diagnosis and treatment of hearing disorders, while providing training, monitoring, education, and development of new hearing enhanced communication and protective devices. According to Col Henry, other research efforts include new field diagnostic equipment and teleaudiology capabilities, pharmaceutical interventions that soldiers might take before or after exposure to impulse noise including various delivery methods to restore or regenerate hair cells and nerve fibers/connections, as well as improved integration of audiometric data in medical records.

One of the most exciting large-scale projects is the Joint Hearing Loss and Auditory System Injury Registry (JHASIR) which the HCE is developing to identify and track the incidence and care of hearing loss and auditory disorders. Scheduled for completion in September 2019, the Registry includes DoD, VA, and service member data. Ultimately, it will provide researchers with a treasure trove of information and the capability for deep analytics into records going back to 2001. “Certainly, the

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—Colonel LaKeisha Henry, MD

Registry’s bidirectional data exchange is expected to encourage and facilitate research, but it will also help develop best practices and provide evidence for clinical guidance and practice.” says Col Henry.

ASSISTIVE DEVICES AND CAPTIONED TELEPHONES FOR VETERANS

Veterans may also need a range of assistive devices to help with their hearing loss, and captioned telephones can be particularly useful. Shari Penner is the National Program Manager for the Heroes With Hearing Loss® program which was established by Hamilton® CapTel®, a leading provider of captioned telephone services based in Aurora, Neb. Penner says that captioned telephones can serve as a unique bridge to better communication for veterans: “It’s just a part of their military training that they don’t want to admit any sort of weakness. They were trained to be 100% ready all the time. So, when they come back from service with a hearing problem, they don’t necessarily want to ask anybody for help—even if they have a significant hearing loss. But the problem is that they start to become a little bit more disconnected from everyone and removed from situations when they can’t hear someone or maybe can’t understand them. That’s where a captioned telephone can serve as a great solution, giving them an opportunity to speak with their family, or talk over the phone with their doctor and make their own VA appointments, regaining the kind of independence that they might value more than most people.”

Penner tells the story of two brothers, both of whom were World War II veterans and lived at distant ends of the country. “Both brothers had significant hearing loss,” says Penner, “and in their later lives they had medical conditions that made it impossible to visit each other. So the result was they hadn’t actu-



Shari Penner

ally conversed for more than 20 years. But then they found out about our Heroes With Hearing Loss program (heroeswithhearingloss.org) from a friend and they both received a Hamilton® CapTel® captioned phone at no cost.* After that, they were able to connect with each other for the first time and their conversations became a constant fixture in their lives—something they really cherished and looked forward to. I was told that, even though it was impossible for them to visit each other, they communicated over the phone almost every day and re-established a close relationship. Then one passed away, and only two weeks later his brother followed him.

“Stories like that make you realize just how important staying in touch is, and how big of a difference these types of products can make in someone’s life,” continued Penner. “Captioned phones can provide a huge boost to veterans who really need to stay connected and converse with their family and friends, as well as their buddies from the service.” She says most veterans obtain Hamilton® CapTel® phones through their VA audiologist, Veterans Service Officer (VSO), or through an independent audi-

ologist or hearing aid specialist who can verify that a hearing loss exists (the hearing loss does not need to be service-connected to receive a phone) and then fill out a simple certification form. The captioned telephone service is federally funded, the result of the Americans with Disabilities Act (ADA) which requires equal access to telecommunications for individuals who have difficulty hearing over the phone. (For more information about the Heroes With Hearing Loss program, and the certification form,³² please visit: HeroesWithHearingLoss.org/vso-certify.)

The US population of veterans continues to grow older and experience a high incidence of hearing-related difficulties. Providing excellent hearing healthcare to those who have put their lives on the line for our country remains a top priority and challenge for the VA, as well as the entire hearing healthcare field. Understanding the often complex and unique needs of veterans, as well as active-duty service members, will help ensure they stay connected with friends and family, retain the independence they hold dear, improve their overall general health status, and receive the high-quality care they’ve earned.

Karl Strom is the editor of The Hearing Review and has been reporting on hearing healthcare issues for over 25 years.

*Independent third-party professional certification required.

The Hamilton CapTel phone requires telephone service and high-speed Internet access. Wi-Fi capable. Third-party trademarks mentioned are the property of their respective owners. FEDERAL LAW PROHIBITS ANYONE BUT REGISTERED USERS WITH HEARING LOSS FROM USING INTERNET PROTOCOL (IP) CAPTIONED TELEPHONES WITH THE CAPTIONS TURNED ON. IP Captioned Telephone Service may use a live operator. The operator generates captions of what the other party to the call says. These captions are then sent to your phone. There is a cost for each minute of captions generated, paid from a federally administered fund. To learn more, visit fcc.gov. Hamilton is a registered trademark of Nedelco, Inc. d/b/a/ Hamilton Telecommunications. CapTel is a registered trademark of Ultratec, Inc.

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**HEROES
WITH HEARING LOSS**

They've earned this freedom

For more than a million veterans of every generation, hearing loss is a very personal and solitary challenge. Many of our nation's heroes are enduring these, and other silent wounds of war alone. This is why we're bringing veterans, their families and hearing healthcare professionals together to share proven, lifestyle-focused solutions through the Heroes With Hearing Loss® program.

The veteran patients you treat every day are often also suffering from other comorbidities resulting from their time in uniform. Learning ways to treat veterans holistically can mean the difference between our heroes just living with hearing loss or thriving.

If you're ready to face the challenges of hearing loss head-on, please join the Heroes With Hearing Loss conversation now.



For more information about the Heroes With Hearing Loss program:

HeroesWithHearingLoss.org/hhc

800-974-1517

info@HeroesWithHearingLoss.org



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