

## HEARING LOSS AND TINNITUS:

*The Veterans Health Administration (VHA) needs to provide a full continuum of audiology services.*

As our brave men and women in uniform return from the conflicts in Afghanistan and Iraq, they are facing adversity in returning to civilian life. Many have been wounded by roadside bombs leaving them with both visible and unseen injuries, such as loss of limbs, traumatic brain injury (TBI), and spinal cord injury. The federal government has recognized the need for improved health-care services for these members of the military. Although the medical care component of the VA budget has increased by 83 percent since President Bush took office,<sup>89</sup> it still does not cover the urgent growing needs of our veterans—past, present, and future. Estimates for long-term health care for this new generation of veterans are in the trillions and increase by the week.

Acoustic trauma has been part of military life since muskets and cannons were part of the arsenal, and Operations Enduring and Iraqi Freedom (OEF/OIF) are some the noisiest battlegrounds yet. Roadside bombs—the signature weapon of the insurgency—regularly hit patrols, rupturing eardrums, which leads to hearing loss and tinnitus. In addition, TBI, one of the signature wounds of these conflicts, is producing a whole new generation of soldiers with both mild and severe head injuries that are often accompanied by tinnitus.

The VA Polytrauma Center in Tampa reports that even those soldiers with no measurable hearing loss have tinnitus in conjunction with milder forms of TBI. Head and neck trauma is the second most frequently reported cause of tinnitus. Additionally the VA's own statistics show that tinnitus is currently the *most prevalent* service-connected disability of OEF/OIF veterans.<sup>90</sup> One of the newest research findings from VA, conducted at the James H. Quillen Veterans Affairs Medical Center Tinnitus Clinic, in Mountain Home, Tennessee, noted the increasing association between those with tinnitus and post traumatic stress disorder (PTSD). Of the first 300 patients enrolled at the clinic, 34 percent also carried a diagnosis of PTSD.<sup>91</sup>

These indications of the direct connections between tinnitus and TBI, as well as tinnitus and PTSD, point to the urgent need to address any gaps in research and treatment modalities provided by both the Department of Defense (DOD) and VA, to military personnel and veterans sustaining blast injuries. It is also indicative of the in-

creasing incidence and severity of these conditions caused by combat injuries. It is imperative that all polytraumatic injuries be researched and treated in tandem to provide state-of-the-art care for America's veterans sustaining auditory system and related injuries that can lead to a life of debilitation from combat.

### Invisible Injury

Many service members returning from war are physically disabled. Those types of injuries are easily seen by a physician and are often easily diagnosed and treated. Soldiers exposed to blasts from roadside bombs often suffer internal injuries that are not as easy to detect and treat. One of the most prevalent disabilities from exposure to IEDs (improvised explosive devices) and the many other faces of combat is an injury that is one of the hardest to detect—and even harder to treat—“tinnitus.”

Tinnitus is defined as the perception of sound in the ears where no external source is present. Some who have tinnitus describe it as “ringing in the ears,” but people report hearing all kinds of sounds, such as crickets, whooshing, pulsing, ocean waves, or buzzing. For millions of Americans, tinnitus becomes more than an annoyance. Chronic tinnitus can leave an individual feeling isolated and impaired in their ability to communicate with others. This isolation can cause anxiety, depression, and feelings of despair. Tinnitus affects an estimated 50 million, or more, people in the United States to some degree. Ten million to 12 million are chronically affected and 1 to 2 million are incapacitated by their tinnitus.<sup>92</sup> It is estimated that 250 million people worldwide experience tinnitus.<sup>93</sup>

### Adding to the Rolls Every Year

The number of veterans who are receiving disability compensation for tinnitus has risen steadily over the past 10 years and spiked sharply in the past 5. Since 2001, service-connected disability for tinnitus has increased alarmingly by 18 percent per year. Based on that five-year trend, the total cost of veterans receiving service-connected disability compensation for tinnitus will be near \$1 billion by year 2011. Veterans with tinnitus may be awarded up to a 10 percent disability, which currently equals about \$117 a month. Though it is considered a

“disease of the ear” according to title 38, United States Code, only one “ear” is considered in determining disability rating for tinnitus.

Translated into economic terms, the government paid out nearly \$600 million in disability compensation for tinnitus in 2007. If you couple that dollar amount with what was paid out for hearing loss disability compensation, the total is more than \$1.6 billion for FY 2007. If tinnitus continues on the upward trend seen over the past five years, which as of 2006 was \$539 million, the cost to taxpayers for tinnitus disability claims will reach \$1.1 billion annually by 2011 and top \$2 billion annually by 2020, if not sooner. This is one of the many reasons why the federal government needs to begin addressing this epidemic from an effective medical research and prevention standpoint. With an already existing patient pool of veterans there needs to be a collaborative and robust research effort on the part of VA, the DOD, and the National Institutes of Health.

### Noise-Induced Hearing Loss and Tinnitus

Although tinnitus has a number of different causes, one of the primary causes among military personnel is noise exposure. Service members are exposed to extreme noise conditions on a daily basis during both war and peacetime. During present-day combat, a single exposure to the impulse noise of an IED can cause tinnitus and hearing damage immediately. An impulse noise is a short burst of acoustic energy, which can be either a single burst or multiple bursts of energy. Most impulse noises, such as the acoustic energy emitted from an IED, occur within one second. However, successive rounds of automatic weapon fire are also considered impulse noise.

According to the National Institute for Occupational Safety and Health prolonged exposure from sounds at 85+ decibel levels (dBA) can be damaging, depending on the length of exposure. For every 3-decibel increase, the time an individual needs to be exposed decreases by half, and the chance of noise-induced hearing loss and tinnitus increases exponentially. A single exposure at 140+ dBA may cause tinnitus and damage hearing immediately. The chart shows a few common military operations and associated noise levels, all exceeding the 140 dBA threshold.<sup>94</sup>

It's no surprise that service members using weaponry that emits such high decibel levels, in training or combat, are

Noise Levels—Common Military Operations		
Type of Artillery	Position	Decibel Level (dBA) (Impulse Noise)
105mm Towed Howitzer	Gunner	183
Hand Grenade	At 50 Feet from Target	164
Rifle	Gunner	163
9 mm Pistol	N/A	157
F18C Handgun	N/A	150
Machine Gun	Gunner	145

at greater risk of this type of disability than their civilian counterparts. So what's being done to help our military? Hearing conservation programs have been in place since the 1970s to protect and preserve the ears of our soldiers. However, a study released by the Institute of Medicine in 2005 reviewed these hearing conservation programs and concluded they were not adequately protecting the auditory systems of service members.

Additional studies conducted to assess the job performance of those exposed to extremely noisy environments in the military concluded that the noise not only caused disabilities, but put the overall safety of the service member and their team at risk. Reaction time can be reduced as a result of tinnitus, thus degrading combat performance and the ability to understand and execute commands quickly and properly.

Many soldiers develop tinnitus and other hearing impairments prior to active combat as a result of training. If a soldier is disabled prior to combat, his or her effectiveness already may be compromised at the beginning of active duty. A study in *Tank Gunner Performance and Hearing Impairment* concluded that hearing impairments may delay a soldier's ability to identify their target by as much as 50 seconds.<sup>95</sup>

The same study concluded that people with hearing impairments who were operating tank artillery were 36 percent more likely to hear the wrong command, and 30 percent less likely to correctly identify their target. Further, service members with hearing impairments only hit the enemy target 41 percent of the time, whereas those without hearing impairments hit the enemy target 94 percent of the time. Finally, the article stated that those with hearing impairments were 8 percent more likely to take the wrong target shot and 21 percent more likely to have their entire tank crew killed by the enemy. According to the study, hearing impairments, such as tinnitus, can very much be a life-or-death situation in the military.

## The Role of Medical Research

Research has increased our knowledge on hearing loss and how it occurs, while less has been discovered about tinnitus. Tinnitus is a condition of the auditory system, originating in the brain. This points to the connection between TBI and tinnitus and may help explain why this population of veterans is experiencing tinnitus in record numbers. Of 692 TBI patients at Walter Reed Army Medical Center between January 2003 and March 2006, nearly 90 percent had nonpenetrating head injuries.<sup>96</sup> The extent and epidemiology of how tinnitus and TBI are affecting each other will remain unknown unless the federal government funds more medical research as encouraged by *The Independent Budget*.

Even though tinnitus research has come a long way, especially in recent years, much more needs to be learned. With so many veterans being added to the rolls every year for service-connected tinnitus, VA and the DOD need to continue working collaboratively to emerge as leaders in tinnitus research.

As of November 2007, nearly 70,000 OEF/OIF veterans had been awarded service-connected disability for tinnitus. Prior to that, there were nearly half a million veterans from previous conflicts already on the rolls for tinnitus. VA estimates show that it is likely that the actual number of veterans who have tinnitus sustained from combat and active duty injuries is more like 3–4 million,<sup>97</sup> showing the condition is more prevalent than records actually show.

## Recommendations:

The Veterans Health Administration must rededicate itself to the excellence of program for hearing loss and tinnitus as well as other auditory processing disorders.

The VHA must continue its work with networks, to restore clinical staff resources in both inpatient and outpatient audiology programs, and develop tinnitus components to existing audiology facilities.

Congress must continue to work for increased funding for VA and the Department of Defense to prevent, treat, and cure tinnitus.

<sup>89</sup>([www.gpoaccess.gov/usbudget/fy08/pdf/budget/veterans.pdf](http://www.gpoaccess.gov/usbudget/fy08/pdf/budget/veterans.pdf)).

<sup>90</sup>VBA Office of Performance and Analysis, Audiology Care in the VA. Presented by Dr. Lucille Beck, chief consultant, Rehabilitation Services and Director, Audiology and Speech Pathology Service, November 2007, Washington, D.C.

<sup>91</sup>Marc A. Fagelson, "The Association between Tinnitus and Posttraumatic Stress Disorder," *American Journal of Audiology* 16 (2007): 107–17.

<sup>92</sup>Scott Campbell Brown, edited by Robert C. Johnson and Dorothy L. Smith *Older Americans and Tinnitus: A Demographic Study and Chartbook*, 1990.

<sup>93</sup>Munna Vio and Ralph H. Holme, "Hearing Loss and Tinnitus: 250 million people and a U.S. \$10 Billion Potential Market." *Drug Discovery Today*. 10(19):1263–5, Oct 1, 2005.

<sup>94</sup>U.S. Army Center for Health and Preventative Medicine. (<http://chppm-www.apgea.army.mil/>)

<sup>95</sup>Georges Garinther and Leslie Peters, "Tank Gunner Performance and Hearing Impairment," *Army RD&A Bulletin* January-February (1990):1–5.

<sup>96</sup>Neil Shea, "Iraq War Medicine—The Heroes, The Healing: Military Medicine from the Front Lines to the Home Front," *National Geographic* [archives], December 2006 ([nationalgeographic.com](http://nationalgeographic.com)).

<sup>97</sup>([ncrar.research.va.gov](http://ncrar.research.va.gov)).

## Special Needs Veterans

### BLINDED VETERANS:

*A full continuum of vision rehabilitation services is needed from the Veterans Health Administration.*

The VA Blind Rehabilitation Service (BRS) is well known worldwide for its excellence in delivering comprehensive blind rehabilitation to our nation's blinded veterans. Currently VA operates 10 comprehensive residential blind rehabilitation centers (BRCs) with plans for three new BRCs in Biloxi, Mississippi; Long Beach, California; and Cleveland, but these are now pending construction projects with openings not expected until 2011. Approximately 46,877 blind vet-

erans were enrolled in FY 2007 with the Visual Impairment Service Team (VIST) coordinators' offices, and projected demographic data estimate that by 2012 the VA system could sustain a rise to approximately 53,000 enrolled blind or low-vision-impaired veterans, according to the VHA Blind Rehabilitation Service. National demographic studies estimate that there are 158,000 blinded veterans in America.