Deployment of Audiologists: Forward to the Troops

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After Operation Desert Storm, an Audiology Task Force was deployed to Saudi Arabia to provide hearing tests prior to redeployment of Reserve Component soldiers. This article outlines this unique mission during which over 29,000 soldiers were evaluated using a team concept with audiology officers, medics, and mobile testing equipment.

Combat medical environments have traditionally generated many innovative "firsts" in health care delivery systems. The needs of hearing-impaired military personnel after combat-related noise exposure in World War II, for example, generated the professional field of audiology.[1] Since then, military audiologists have contributed many developments in clinical audiology and hearing research.[2] Recently, the role of military audiology was expanded dramatically in the first-ever deployment of a unit of audiologists to a combat theater of operations.

Need for Deployment

When the ground war of Operation Desert Storm was quickly concluded on February 28, 1991, and large troop concentrations began their redeployment home, a series of events took place that led to innovative clinical and logistical roles for military audiologists. Federal legislation required separation medical examinations (including audiometry) for all National Guard soldiers prior to their release from active duty. The Office of the Army Surgeon General extended the mandatory policy of medical examinations to include US Army Reserve soldiers. Military leaders considered audiometry to be one of the most important parts of the examination process for two reasons. First, previous research has confirmed that military duty (similar to training and combat scenarios occurring in the five months since the beginning of Operation Desert Shield) is a major risk for noise-related hearing loss.[3] A second reason is the high cost of disability claims already paid by the US government to military veterans. This population of veterans, soon to include over 100,000 soldiers called to active duty from the Reserve components, warranted close review of hearing loss prior to their release from active duty. However, when as many as 7,000 soldiers per day began to return to Continental United States (CONUS), the additional tasking was overwhelming to stateside medical facilities. It seemed logical to assign medical personnel stationed in Saudi Arabia (who were relatively idle due to the success of the Multinational Forces' campaign) to complete the medical examination. However, no equipment or trained personnel were available in the Gulf region to perform audiometry in the theater. To resolve this dilemma, a task force of audiology personnel and hearing testing equipment was deployed with ten Military Occupational Health Vehicles (MOHVs) in late March 1990.

Equipment and Personnel for the Audiology Mission

The Army had fielded the MOHV in 1988 to provide mobile occupational health services on fixed installations. The MOHV consists of a 32-foot-long towed trailer containing a 6-man audiometric booth, computer-based audiometer system, and a counseling examination area. Although not originally designed for use in a hostile environment like the Saudi desert, the MOHV's mobility and sound-treated audiometric environment offered the potential to support audiometric testing in the Gulf, especially since the MOHV possessed its own electrical generator and air conditioning system.

The audiology task force included 12 audiology officers and one Non-Commissioned Officer (NCO) (MOS 91U- Ear, Nose, and Throat specialist). This group was attached to the 47th Medical, Supply, Optical, and Maintenance Battalion and then was expanded with 39 enlisted personnel from units already stationed in Saudi Arabia. While the enlisted medics typically had no previous training in audiometry, they received classroom instruction (sometimes with ponchos serving as chalkboards) and hands-on training from the officers and Non-Commissioned Officer in Charge (NCOIC) that qualified the medics for accreditation as Military Hearing Conservationists. Ten MOHVs were airlifted via USAF C-5A aircraft to Dhahran, Saudi Arabia. Within three days after the first vehicle arrived on April 6, it was prepared, used for training, and then employed. The 85th Evacuation Hospital served as the primary base of operations for much of the audiology unit's undertaking: their enthusiastic support for the audiology mission clearly contributed to the overall success of this first-ever effort.

The teams, usually consisting of an officer and two medics, were organized and sent with a MOHV to sites where major troop concentrations were awaiting redeployment. Initially, mechanical problems stalled attempts to transport convoys of MOHVs; adverse travel distances and conditions compounded the dilemmas. Army Reserve Center (ARCENT) then provided maintenance and transportation assistance, and all ten units became operational on April 22, 1991. The audiology teams supported medical examination missions at the 85th, 8th, 144th, 350th, 114th, and 251st Evacuation Hospitals. At many of these hospitals, otolaryngologists had previously expressed frustration at

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the lack of audiological support. For example, the physician who examined 177 US Army soldiers (housed in a Dhahran warehouse hit by a SCUD missile in February 25) reported that the absence of audiometry was a major deficiency in the care and counseling of these patients after their blast injuries.

In operation, the typical audiology team received its patients through the medical examination section. Soldiers were briefed and then asked to complete a short questionnaire providing demographic data, including their military occupational specialty (MOS), typical noise exposure history, and hearing protection use. They were then tested using the Hearing Evaluation Automated Registry System (HEARS), which serves as the basis for the Army Hearing Conservation Program. Unfortunately, since no medical records or previous audiometric results were available in theater, shifts of hearing threshold since mobilization could not be quantified.

After the medics reviewed the audiometric results of the HEARS tests, those soldiers who demonstrated "abnormal" results in the 6-person booth were referred to the team's audiology officer for individual re-testing, counseling, and profile determination. A number of clinical audiometers, middle-ear analsis systems, and one-person audiometric booths (shipped from CONUS and Hawaii) supported the mission. This equipment, absolutely vital to the team's mission, was typically placed within the Temper tents of the Deployable Medical Sets (DEPMEDS).

Outcome

During the deployment, the audiology task force tested 29,192 patients (53% USAR soldiers, 47% USANG; 87% male, 13% female). The majority of these personnel were performing combat service and combat service support roles. As many as 1,300 soldiers were tested in a single day. The audiology officers retested 16% (N = 5,254) of the patients, using the clinical audiometric equipment. Among those retested in Saudi Arabia, 1,465 showed hearing levels generally within normal limits (or H-1 standards of AR 40-501[4]), thereby eliminating the need for referral to audiology clinics at CONUS redeployment centers. Furthermore, approximately 2,700 additional patients with confirmed hearing losses were re-evaluated and counseled in theater, rather than deferred for referral to a CONUS clinic. By having audiologists on site at Saudi Arabia, we estimated that approximately 78 man-weeks of Health Services Command (HSC) clinician time were saved at CONUS audiology clinics. In addition, soldiers returned promptly to units for duty. In the past, medical planners have discussed the theoretical benefits of having audiology resources available in more forward locations, thereby reducing evacuation of patients to the Communication Zone (COMMZ). In this unique test, the participation of the audiology teams significantly accelerated the redeployment process of the Reserve Component soldiers.

A number of patients were still referred for more definitive audiological, otological, and follow-up evaluation. Among the soldiers tested in Saudi Arabia, approximately 3.2% demonstrated hearing losses that were severe enough to consider hearing aid amplification. The audiology unit did not issue hearing aid systems during its deployment to Saudi Arabia, although members examined and repaired several instruments.

The prevalence of hearing loss among the Desert Storm soldiers was analyzed and compared to previous reports among active duty soldiers. Since the original landmark prevalence study by Walden, et al revealed that nearly 22% of US Army soldiers warranted an H-2 or H-3 hearing profile, extensive hearing conservation programs have been developed by the Army Medical Department (AMEDD) which have become models for civilian industries. As a result, the current prevalence of H-2 or H-3 hearing profiles among active duty soldiers has been reduced to less than 9%.[5] Of those Reserve Component soldiers tested by the audiology teams in Saudi Arabia, 12.2% warranted an H-2 or H-3 profile. One could postulate that the higher rates of hearing loss among the Reserve Component forces, when compared to contemporary active Army levels, may reflect either the effects of less stringent hearing conservation efforts in nonmilitary jobs or hearing loss sustained in previous tours of active duty. Perhaps, however, the higher rates of hearing loss reflect attitudes about hearing protection use. Although 85% of the soldiers tested reported that they had been exposed to hazardous noise at least ten times per week, 36% reported that they had either "not used hearing protection" or that "none was available."

Although the number of patients seen by the audiology unit in a 30-day period far exceeded previous records for HEARS productivity, the total number of patients was lower than originally projected. As early as May 6, three of the six evacuation hospitals had begun their own redeployment actions, terminating their physical examination missions and leaving the audiology teams without support. As a result, the teams began to independently schedule hearing tests for units in which medical examination had been performed already but with no audiometry. Over 6,500 soldiers were tested because of direct contact by the audiology teams, thereby expediting redeployment actions at CONUS sites.

To the Army otolaryngologists assigned in theater, the arrival of the mobile audiology teams and their MOHVs offered significant support for otological services. Team members provided several forms of such diagnostic support, including clinics to evaluate soldiers with tympanic membrane injuries secondary to blast trauma in the Dhahran SCUD explosion. At one hospital, officers introduced two team members to a family of a deaf Saudi girl whose education

in Jordan had been curtailed by political rifts of the war. During off-duty time, the audiologists provided civic action services which included deaf education recommendations and enrollment in an American correspondence program for parents of deaf children.

Lessons Learned

This unique deployment provided several valuable lessons. Audiology officers, previously considered to have clinical expertise that was only applicable to fixed medical facilities and conventional clinical missions, were successful in adapting to the fast-changing scenarios of health care in a forward theater. Seven different sources of electrical power were established, using a variety of field generators and shore power. Our mobile teams moved MOHVs (not originally designed for off-road use) to remote locations to meet and test a National Guard field artillery battalion, even through blinding dust storms. Another team arranged to travel to an isolated Convoy Support Center, where unit soldiers received hearing tests as their fellow soldiers simultaneously performed repairs on the MOHV. The MOHVs and the mission presented many challenges during this deployment that have subsequently been addressed as input for Health Services Command planners. The input includes a potential second-generation MOHV, the preparation of a preventive maintenance manual, and increased emphasis in educating audiology enlisted and officer personnel in the operation and maintenance of the MOHV and HEARS equipment. In addition, recommendations have been made for modifying audiological equipment lists in DEPMEDS inventories. The high number of hearing profiles has sparked a proposal for more performance-based criteria (eg, understanding speech in noise), instead of using only audiometric threshold data.

While audiologists in the military had been considered conventionally to have little application to a combat environment, the recent deployment of an audiology unit to Saudi Arabia was rated as a success by field and medical commanders, as well as by the patients receiving care. Audiologists are deployable assets to the AMEDD for future contingency planning.

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