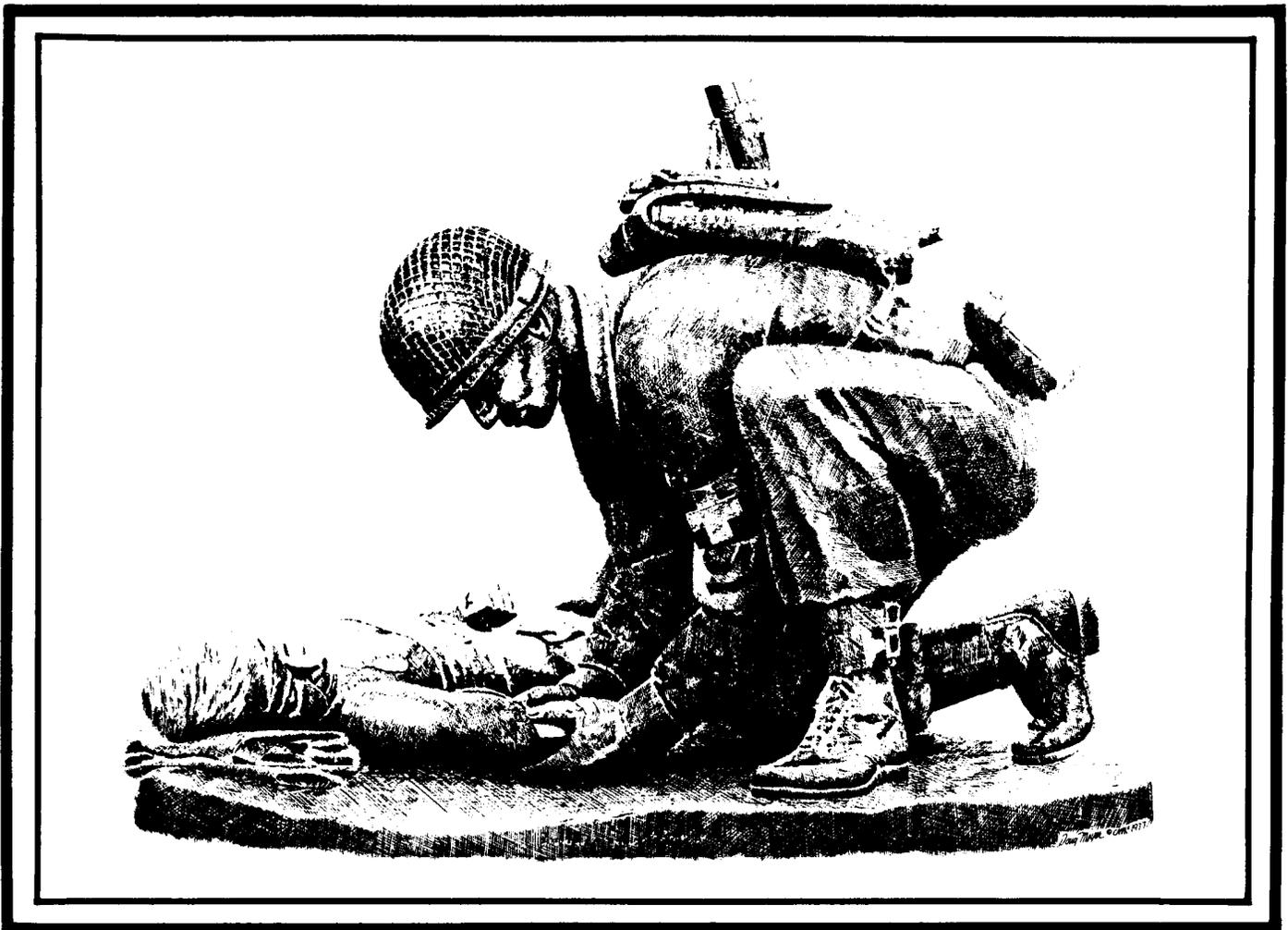


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Asia-Pacific Military Medicine Conference

Knowledge Management in the Army Medical Department

JOURNAL

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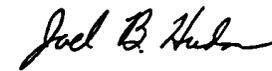
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Perspective

Knowledge Management Network

Knowledge is everywhere. The trick is to capture it and make it available so people can take advantage of it, build on it, and succeed with it. This process of acquiring, cataloging, storing, and providing data and information is termed knowledge management.

To assist the AMEDD in making the leap to the next millennium, the AMEDDC&S' Center for Healthcare Education and Studies has developed a powerful tool to manage knowledge called the Knowledge Management Network (KMN). This computer-based and web-accessible system is designed to facilitate the AMEDD enterprise transformation strategy, improve efficiency, and reduce operating costs. In essence, the KMN will allow the AMEDD to leverage knowledge within the organization to become a high-performing learning enterprise, optimized to meet future challenges.

The KMN offers every soldier and leader in the AMEDD unlimited potential value by improving communication and sharing information. Do you want to write a new or revised unit standing operating procedure (SOP) document? The KMN offers the possibility of maintaining a library of unit SOPs from around the world. Do you need information on the best practices for operating an ambulatory clinic? The KMN allows you to access the experience and historical knowledge of AMEDD clinics from around the world. Do you want to include the latest doctrine and techniques into your in-service training program? The KMN makes it possible for you to link up with the proponent school(s) and courses to get the latest update.

To reach this point, the AMEDD must initially build the required knowledge base and communication links. Among the first projects on the KMN is the Physician Assistant (PA) Grand Rounds continuing medical education (CME) series. Drawing on cases from Brooke Army Medical Center, the program offers PAs the opportunity to obtain CME from virtually any location on the globe. Currently, over 20 hours of CME are available, with more added each month. Similar programs for Army Nurse Anesthetists and others are also available. Eventually, nearly every health-

care provider from medic to physician will be able to access educational information on the KMN.

To reach the KMN, access the web at <http://kmn.army.mil>.



Major General James B. Peake

This AMEDD Journal spotlights the KMN and the information-sharing potential it promises. Also in this issue:

- *Psychological Aspects of Deployment: The Bosnian Experience.* Details the psychological impact of deployment on soldiers, with implications for mission effectiveness and soldier well-being.

- *Stress-Free Endodontics by Case Selection.* Highlights the practice of endodontics in general dentistry practice. All healthcare professionals will appreciate the underlying message of careful patient selection when applying therapeutic treatments.

- *Asia-Pacific Military Medicine Conference: AMEDD Support of the National Security Strategy.* Outlines the AMEDD's continued support and involvement in the nation's security strategy in one of the world's most important social, political, and economic regions. Of particular note is the use of an annual conference to link participants and share information.

- *Human Dimensions Research During Operation "Joint Guard," Bosnia.* Reports on a study from the Walter Reed Institute of Research regarding the psychological status of soldiers deployed to Bosnia. This report has implications for combat stress control measures designed to keep the force fit.

- *Book Review.* A comprehensive examination of a reference textbook dealing with the causes and multiple hazards of sepsis and septic infection.

Stress-Free Endodontics by Case Selection

LTC Frederick R. Liewehr†

Endodontics is no longer relegated entirely to specialists, any more than any other area of dentistry. Today's generalists have all received instruction in endodontic techniques while in dental school and increasing numbers, particularly in the military, have had advanced training of a formal (General Practice Residency [GPR] and General Dentistry Residency) or informal (specialty rotations) nature. Accordingly, some endodontic cases should be included in any general practice.

Treating cases beyond one's mastery, however, can increase the chance of procedural mishaps, post-treatment flare-ups, and litigation. On a daily level, it can make scheduling a nightmare and raise the practitioner's level of stress unnecessarily.

The secret to enjoying endodontics in your practice is to recognize the features that make some cases more difficult than others, and then to schedule time accordingly. Alternatively, you may want to refer some of the most difficult cases until you have had adequate experience and post graduate education to handle them within the time constraints of a busy practice.

The System

Doctor Eugene Natkin developed a system at the University of Washington, and many other authors have developed similar systems, to identify those cases which are more difficult than average. Doctors A.C. Goerig and E.J. Neaverth wrote a chapter for the fifth edition of *Pathways of the Pulp*, which went into case selection in greater detail than I can in a short treatise, but I will briefly outline a system which may be helpful.

In essence, cases can be divided into three groups, from easy to increasingly difficult. Group I consists of most maxillary and mandibular anterior and premolar

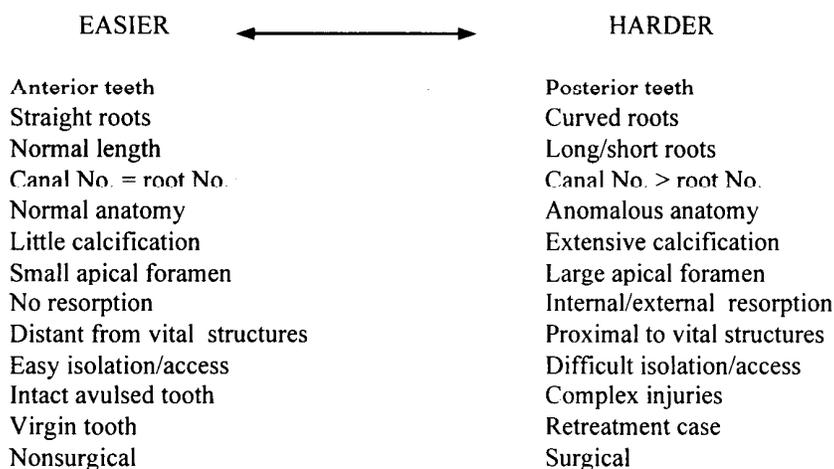
teeth, and selected molars with normal canals and minimal root curvature. Endodontic therapy of these teeth should be within the range of an interested general practitioner. Group II consists of teeth anterior to the second molars with moderate, gradually curving roots, and should be within the range of 1-year GPR graduates or 2-year Advanced Education in General Dentistry trained individuals who obtain consistent success. Group III consists of teeth with very curved, dilacerated, S-shaped, or sclerosed roots as well as features discussed below, and should be reserved for extensively trained and experienced generalists or endodontists. A difficulty assessment table accompanies this article.

After placing the tooth in Group I, II, or III, assess other salient characteristics to further determine the degree of difficulty. These additional features may result in a change in the group to which the tooth is assigned. The following are offered for consideration:

- *Tooth Length* - Shorter-than-average working lengths may indicate teeth with open apices from external resorption or early devitalization, making them considerably more difficult to obturate correctly. Conversely, teeth longer than 25 mm are more difficult procedurally to instrument. Additionally, they are difficult to fill densely due to limitations on canal flare posed by the need to avoid weakening the tooth by removing excessive tooth structure.

- *Canal Morphology* - Many molars have four canals; this anatomical feature increases their difficulty. Second canals in mandibular anterior teeth are frequently missed and difficult to instrument without a strip-perforation. Second and third canals in premolars can add a little or a lot of difficulty to a case. Roots which appear bulbous on the radiograph may possess apical deltas. Anomalies such as dens invaginatus, taurodontism, fused roots, and C-shaped

DIFFICULTY ASSESSMENT



canals are even more difficult and are placed in Group III.

- *Physiologic Age* - In general, the more extensive the calcification, the more difficult the case. Locating sclerosed canals requires extensive dentin removal and increases procedural accidents. These canals, once found, are difficult to negotiate and easy to ledge or perforate.

- *Apical Resorption* - Group I teeth should have apices that correspond to a size 10 to 25 file, depending on the tooth. Larger sizes indicate apical resorption. As size 50 is reached, apexification or specialized techniques may be needed. Large canals, even with complete apical development, are thin-walled and difficult to adequately debride and obturate without fracturing. Teeth with large apices and/or canals should be placed in Group III.

- *Internal/External Resorption* - These teeth are unpredictable and will require special techniques to treat adequately and, therefore, should be classified as a Group II or III.

- *Proximity to Sinus or Mandibular Canal* - Over-instrumentation and/or over-extension of obturating materials near these vital structures increases potential for failure and litigation; these cases may best be classified in Group III.

- *Isolation and Access* - These problems can be time-consuming and frustrating, and require more time and experience to handle. Access through a crown can be deceptive and cause procedural mishaps.

- *Impact Injuries* - Replantation and splinting are classified as Group I. Root fractures, + 3 mobility, or difficulty splinting would fall into Group III.

- *Procedural Problems* - Difficulty in obtaining high quality radiographs, such as in maxillary molar areas, can

be frustrating and time-consuming. Difficulty in diagnosis, due to confusing or inconsistent test results, may require consultation.

- *Retreatment* - These cases are all difficult. Some reasons include difficulty identifying the cause of the failure, poor access due to subsequent restoration, and difficulty correcting previous procedural mishaps. All retreatment cases are either Group II or III.

- *Surgical Cases* - A thorough knowledge of tooth morphology, head/neck anatomy, surgical procedures, and emergency treatment is a prerequisite for endodontic surgery. Some incisor surgeries may be in Group II, but canines, premolars, and molars are in Group III due to access considerations and proximity of anatomic structures.

- *Patient Considerations* - Patients who have had bad past experiences, who are difficult to anesthetize, or who exhibit trismus can easily transform a Group I case into a Group III. Additionally, patients with systemic disease may require consultation or referral, thus increasing the difficulty of the case.

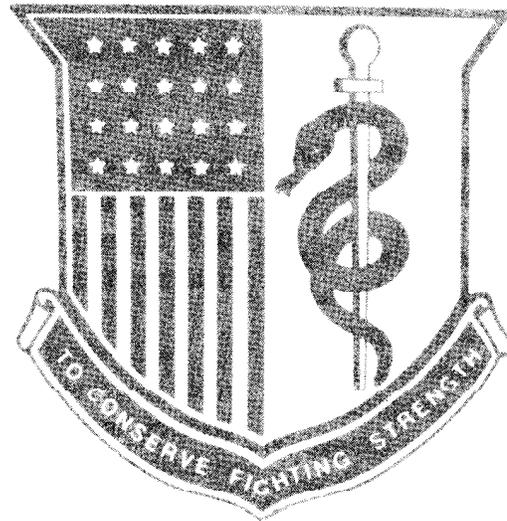
Summary

Endodontics should be an enjoyable and rewarding part of every general dentist's practice. It could also be a headache. The key to successfully incorporating endodontics into your practice is to recognize those characteristics which make a tooth more difficult to treat *before* the time of the appointment. You can then schedule enough time to treat it, just as you would schedule more time for a large multi-surface amalgam than a small occlusal pit.

Another point to remember is that, within the Army Dental Care System, help or referral is available. Your local endodontist can provide assistance in developing your own endodontic practice.

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Human Dimensions Research During Operation “Joint Guard,” Bosnia

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This article presents research that a Human Dimensions Research Team (HDRT) from the Walter Reed Army Institute of Research (WRAIR) conducted during Operation Joint Guard (OJG) in Bosnia. The HDRT assessed the psychological and physical status of the deployed force (the 1st Infantry Division). Comparisons are made to other major Army deployments, including the preceding deployed force (the 1st Armored Division) during Operation Joint Endeavor (OJE). Results showed that the level of psychological distress (as measured by the Global Severity Index) for the soldiers of OJG was higher than garrison norms, lower than during Operation Desert Shield/Storm (ODSS), and similar to both Operation Restore Hope (Somalia), at the same point (6 months into the deployment) of OJE. The importance of this type of real-time assessment is discussed.

Introduction

Peacekeeping Challenges. In a force-projection Army, soldiers and units must be capable of rapid deployment anywhere in the world. Peacekeeping operations present challenging environments to any military organization and its soldiers. Soldiers will often be required to perform duties for which they were not specifically trained. Operations may last an undetermined amount of time with ambiguous goals. United States soldiers may have to function among friendly or hostile populations in areas infested with blight, disease, epidemics, and complete their missions under unfamiliar and changing rules of engagement. Soldiers are required to endure physical and psychological demands that far exceed those of other professions. The study of human dimensions is crucial to maximizing soldiers' ability to accomplish individual and collective tasks or missions under difficult conditions. Soldiers' physiological and psychological limitations make them the most vulnerable part of the peacekeeping system.

Mission. The mission of the HDRT from WRAIR was to: (1) conduct applied research during military

operations in Bosnia by a Stabilization Force (SFOR) in order to provide comprehensive and timely information to commanders on the health and psychological readiness of the deployed force; (2) provide empirical information to senior military leaders, policy-makers, and training personnel; (3) maintain a historical record of information regarding the well-being and adaptation of soldiers in Bosnia by a SFOR; and (4) collect data that can be used to track trends across deployments and assess the uniqueness of future military operations.

Background. In 1991, Yugoslavia disintegrated as a state when some of its constituent republics seceded, despite the attempts by the Serb-dominated Federal Army to prevent it. In the multiethnic region of Bosnia-Herzegovina (B-H), fighting broke out in the summer of 1992 and the situation quickly deteriorated into a ruthless war. The Security Council created the United Nations Protection Force, in Mar 92, mainly to assist humanitarian relief efforts, but also to protect the six proclaimed “safe areas” of Bihac, Gorazde, Sarajevo, Srebrenica, Tuzla, and Zepa. After nearly 4 years of fighting, a peace plan preserving Bosnia as a single state but divided into two separate entities, the Bosnia-Croat Federation and the

Bosnia Serb Republic, was signed in Nov 95. On the basis of the UN Security Council's Resolution 1031, the North Atlantic Treaty Organization (NATO) commenced implementation of the military aspects of the peace agreement. The NATO-led multinational Implementation Force (IFOR) began operation on 16 Dec 95 under the code name "Operation Joint Endeavor" and robust NATO rules of engagement reflected the philosophy of sending in a heavy force, authorizing the use of deadly force for self-defense, force protection, and to enforce compliance with the peace plan.

United States forces had been conducting Peace Operations in B-H since early Dec 95, in accordance with the "Dayton Peace Agreement" as part of NATO IFOR. The IFOR mission was to monitor peace and enforce compliance with the military aspects of the peace agreement. The UNSCR 1031 provided the mandate for a 1-year IFOR mission as described in the agreement. The North Atlantic Council (NAC) authorized IFOR for the 1-year period. The 1st Armored Division from the U.S. was assigned the IFOR mission. The Transfer of Authority from the 1st Armored Division to the 1st Infantry Division took place on 20 Nov 96. The mission was to provide continued military presence, to deter renewed hostilities, and to stabilize and consolidate the peace in B-H in order to contribute to a secure environment for the ongoing civil implementation plans. The operation was named "JOINT GUARD" and conducted by a SFOR.

The NATO-led operation, "JOINT GUARD" in Bosnia, took over from NATO's first-ever ground force operation, its first-ever deployment "out of area," and its first-ever joint operation with NATO's Partnership for Peace and other non-NATO countries. It demonstrated that the Alliance had adapted its forces and policies to the requirements of the post-Cold War world, while continuing to provide collective security and defense for all Allies. It was tangible proof that, in addition to carrying out the core functions of

defense of the Alliance, its military forces had the flexibility to be used outside the NATO areas for operations under the authority of the UN Security Council, with clear political objectives and military tasks given by the NAC. The NATO's own military capabilities and its adaptability to include forces of non-NATO countries were decisive factors in the Alliance's role in implementing the military aspects of the Bosnia Peace Agreement. This operation showed that the Alliance remained vital, relevant, and prepared to deal with the new, multifaceted security risks facing Europe with the end of the Cold War.¹

Area of Operation. The majority of U.S. forces in Bosnia were located at the Tuzla Main base camp, or areas surrounding Tuzla, Bosnia, as shown in Figure 1. The Task Force Eagle (TFE) Commander was located on Tuzla Main. The IIDRT-Bosnia III established an area of operations co-located with the 1st Infantry Division G1, Tent City Two, Tuzla Main. This provided the HDRT access to transportation and flexibility of movement for survey distribution and collection.



Fig 1. Area of Operations for Operation "Joint Guard," (SFOR) Bosnia.

Method

Deployment Assessment Questionnaires. The HDRT-Bosnia OJG/SFOR administered a Deployment Assessment Questionnaire developed by the De-

partment of Military Psychiatry at WRAIR. The Deployment Assessment Questionnaire assessed: (1) soldier and unit characteristics; (2) deployment stressors; (3) methods soldiers used to cope with stressors; and (4) soldier psychological and physical well-being. Soldiers were also asked to provide written comments regarding their experience as part of OJG.

Questionnaire Distribution/Collection. The HDRT-Bosnia OJG/SFOR received a list of base camps from the 1st Infantry Division G1 identifying the types of units, unit strength, and unit location. The base camp list was evaluated to determine the best survey distribution methodology. Each base camp was evaluated to determine the best representation of variety in unit type, unit size, and personnel. The selected base camps best represented a variety in unit type, unit size, and personnel in the area of responsibility (AOR). The HDRT traveled to base camps in the Tuzla Valley area and delivered surveys to S1 (Unit Personnel) representatives. This was done via the Tuzla Valley Shuttle and convoys from the G4 section. Units located outside the Tuzla Valley area received surveys through distribution, ATTN: Unit S1s. The G1 sent the following information to unit S1s in FRAGO 2603, dated 13 Mar 97: "All S1s: the HDRT from WRAIR is in the TFE AOR to conduct applied research for 1st Infantry Division soldiers during OJG. They will hand out surveys as they visit each base camp. S1s must ensure that the surveys are distributed as expeditiously as possible. S1s will collect and forward the surveys within 5 days of receipt to the G1 at Tent City 2, Eagle Main. The POC for this action is the G1 section." Of the 2,259 questionnaires distributed, a total of 1,309 were returned. The questionnaire return rate was 58%.

Limitations of HDRT-Bosnia OJG/SFOR Study. A limitation of the study was the HDRTs time of arrival in Bosnia. The HDRT OJG/SFOR Bosnia arrived on 10 Mar 97 and Units of the 1st Infantry Division started rotating back to Germany the week of 24 Apr 97. The timing of the team's deployment restricted the window of opportunity for data collection.

Results

Soldier Characteristics. Completed questionnaires were collected from 1,309 soldiers while the HDRT

Bosnia OJG/SFOR Team was deployed. Ninety-nine percent of the surveys were collected from soldiers located in Bosnia. One percent of the surveys were collected from soldiers serving in Croatia. Fifty-two percent of the soldiers were in the ranks of Private to Specialist/Corporal, 39% of the sample were noncommissioned officers (NCOs), and 9% were officers. Fifty-five percent of soldiers were in their current company for more than 1 year, while 45% of the soldiers had been in their units less than 12 months. Of the soldiers completing questionnaires, 92.3% were males (n=1153), and 7.7% were females (n=96). The average age of the soldiers was 26.5 years. Fifty-five percent of the soldiers were married, 37% were single, and 7% were separated or divorced. Forty-five percent of the soldiers reported that they had one or more children.

Unit Characteristics. Figure 2 shows that combat, combat support, and combat service support units were represented. A considerable effort was made to collect information from soldiers serving in as many different U.S. Army company-size units as possible. The HDRT Bosnia OJG/SFOR collected information from 10 or

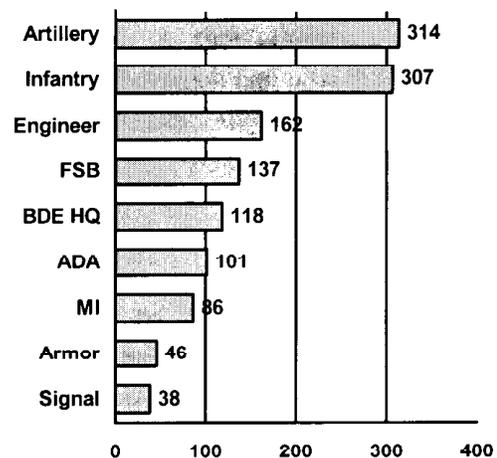


Fig 2. Survey respondents by unit type.

more soldiers from 27 different companies. The number of soldiers completing the surveys ranged from 11 to 174 per company (mean=48). Most companies were Artillery (n=314 total soldiers), followed by Infantry (n=307), Engineer (n=162), Forward Support Battalion (n=137), Headquarters Elements (Brigade) (n=118), Air Defense

Artillery (n=101), Military Intelligence (n=86), Armor (n=46), and Signal (n=38).

Comparison Data Sets. The accurate assessment of a soldier population is largely dependent on the ability to make comparisons with other soldier populations. Meaningful interpretations of assessment instruments often depend on the availability of appropriate normative information. Military samples can differ considerably from nonmilitary populations in regard to demographic variables and personal attributes. Therefore, it is important to compare soldier assessments in Bosnia to previous soldier samples. The following data sets have been collected by the Department of Military Psychiatry at WRAIR and are used for comparison purposes throughout this Bosnia summary report.

- **Operation “Desert Shield,” Saudi Arabia, 1990.** During ODS, a total of 1,293 U.S. Army soldiers were surveyed while deployed to the Persian Gulf region. The HDRT surveys were completed Nov and Dec 90, *prior* to the start of the ground war. When the surveys were administered, U.S. soldiers had been deployed 6 months or less. Soldiers completing the surveys served predominantly in combat arms units.

- **Non-Deployed Soldiers, 1992.** As part of a follow-up study of soldiers who had deployed to ODSS, the HDRT surveyed a total of 770 U.S. Army soldiers in garrison who had not deployed – to be used as a comparison group assessing the psychological consequences of the Persian Gulf War.

- **Operation “Restore Hope,” Somalia, 1993.** Operation “Restore Hope” began in Jan 93. The HDRT collected data on this operation in Jun and Jul 93, *prior* to the fighting with Mohammed Farah Aidee militia that resulted in the death of U.S. Army soldiers. A total of 2,435 U.S. Army soldiers deployed were surveyed during Operation “Restore Hope.” Soldiers completing the surveys served in combat arms, combat support, and combat service support units.

- **Operation “Vigilant Warrior,” Kuwait, 1994.** A total of 731 U.S. Army soldiers deployed to Operation “Vigilant Warrior,” Kuwait, in Nov 94. Soldiers completing the surveys served in combat arms, combat

support, and combat service support units.

- **Operation “Uphold Democracy,” Haiti, 1994.** The HDRT was deployed to Haiti from 12 Nov to 14 Dec 94. Approximately 10,500 U.S. Army soldiers were deployed to Haiti. The HDRT collected a total of 3,205 completed surveys from U.S. soldiers during Operation “Uphold Democracy.” Soldiers completing the surveys served in combat arms, combat support, and combat service support units.

- **Operation “Joint Endeavor,” Bosnia, 1996.** The first Bosnia HDRT (Bosnia I) was deployed from 13 Jun to 2 Jul and collected 2,259 U.S. soldier surveys. The second Bosnia HDRT (Bosnia II) was deployed between 15 Oct and 3 Nov and collected 1,527 soldier surveys. Soldiers completing the surveys served in combat arms, combat support, and combat service support units.

Psychological Well-being of Soldiers Deployed to Bosnia. The HDRT used the Brief Symptoms Inventory (BSI) to assess the psychological well-being of soldiers deployed to Bosnia.² The BSI is a 53-item instrument designed to measure psychological distress. The BSI was derived from the 90-item Symptom Checklist Revised.³ The BSI is used extensively in research and clinical practice to assess psychological distress among psychiatric, medical, and nonpatient populations.^{2,4-14}

The BSI is designed to assess the following nine psychological symptom dimensions: interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, obsessive-compulsive, and somatization. It also includes the three global indices of psychological distress.³ The General Severity Index (GSI) is the most widely used of these global measures and provides an overall index of psychological distress. Researchers, as well as clinicians, use the BSI to determine the overall distress levels of a population by using profiles based on the subscale scores or by using a global index. For this report, the GSI is used as a measure of psychological distress in the population of soldiers deployed to Bosnia.

GSI Across U.S. Army Samples. The mean GSI scores for ODS, the nondeployed soldier sample, Opera-

tion “Restore Hope” (Somalia), Operation “Vigilant Warrior” (Kuwait), Operation “Uphold Democracy” (Haiti), OJE (Bosnia I and II), and OJG (Bosnia III) are presented in Figure 3. Analysis of these data indicates that soldiers deployed to OJG reported slightly *higher* GSI scores than soldiers in the nondeployed soldier (garrison) sample, soldiers deployed to Kuwait, and soldiers deployed to Haiti. Soldiers deployed to OJG reported significantly *lower* GSI scores than soldiers deployed to ODS, Somalia, and both Bosnia I and II.

Psychological Well-Being by Soldier Characteristics. The GSI was analyzed to determine if mean scores signif-

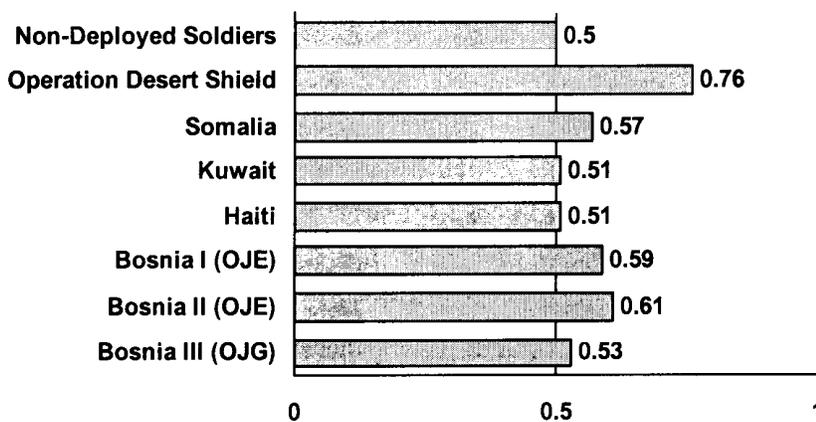


Fig 3. Mean GSI scores across U.S. Army deployments.

icantly differed by rank, time in company, age, gender, ethnic group, marital status, number of children, and number of deployments of 3 or more months within the last 3 years. Results indicated that soldiers in the ranks of E1-E4 reported significantly higher levels of psychological distress (GSI=.65) than NCOs (E5-E9; GSI=.46) and commissioned officers (WO1-O5; GSI=.29). This finding is consistent with previous research. A significant, *negative* correlation was found between age and GSI score ($r=0.2$). In other words, higher GSI scores are associated with younger soldiers who tend to be of lower rank. Female soldiers reported significantly higher distress levels (GSI=.67) than male soldiers (GSI=.53). Married soldiers reported significantly *lower* distress (GSI=.47) than single (.60) or separated/divorced soldiers (.62). There were no significant differences in GSI scores for length of time in the company, number of children, or

number of deployments in the past 3 years. There were also no significant differences in distress levels between White (GSI=.52), African-American (GSI=.51), or Hispanic soldiers (GSI=.48). Soldiers who reported “other” as their ethnic group reported higher levels of distress (GSI=.71), but this is a relatively small sample ($n=124$).

Psychological Well-Being by Unit Characteristics. Analyses were conducted to assess whether GSI scores varied by unit type or by U.S. Army Company. Mean GSI scores were computed for each unit type and each company to determine if there were differences in reported psychological distress. In terms of unit type, Engineers had significantly higher distress levels (average GSI=.71). These units also had been in theater longer than most other unit types. The engineer units surveyed had been in theater from the very beginning of the deployment (Oct 96). They also reported long work hours and little sleep (working between 10 and 11 hours per day for a 6 or 7 day work-week and sleeping about 6 hours per night). As discussed earlier, 27 companies with 10 or more respondents were included in the company level analysis. The statistical analysis indicated that there were significant differences

in GSI scores across companies, with company mean scores ranging from .39 to .84. Companies at the high end of the distribution are of particular interest. These companies reported very high levels of psychological distress. The company with the highest average GSI score (.84) was an engineer company which had been in theater since the beginning of the deployment, worked 10+ hours a day for 6+ days a week, and reported less than 6 hours of sleep per night. Any type of intervention strategy or resource allocation (such as a Combat Stress Control Team) should be focused on these companies at the high end of the distribution. It was important to consider differences across both unit types and companies when making assessments of soldier well-being.

Physical Health Symptoms of Soldiers Deployed to Bosnia. A 25-item checklist was used to assess the physi-

cal health symptoms of soldiers in Bosnia. The top 10 physical health symptoms reported by soldiers, using the past week as a time frame, are summarized in Figure 4: headaches (64% of soldiers reported having headaches within the past week), sinus troubles (55%), cough (53%), head colds (49%), back problems (49%), aching joints and bones (47%), muscles aches or cramps (47%), overly tired/lack of energy (45%), sore throat (45%), and weight loss/gain (42.1). These top symptoms are consistent with the findings of the previous two Bosnia HDRT missions.

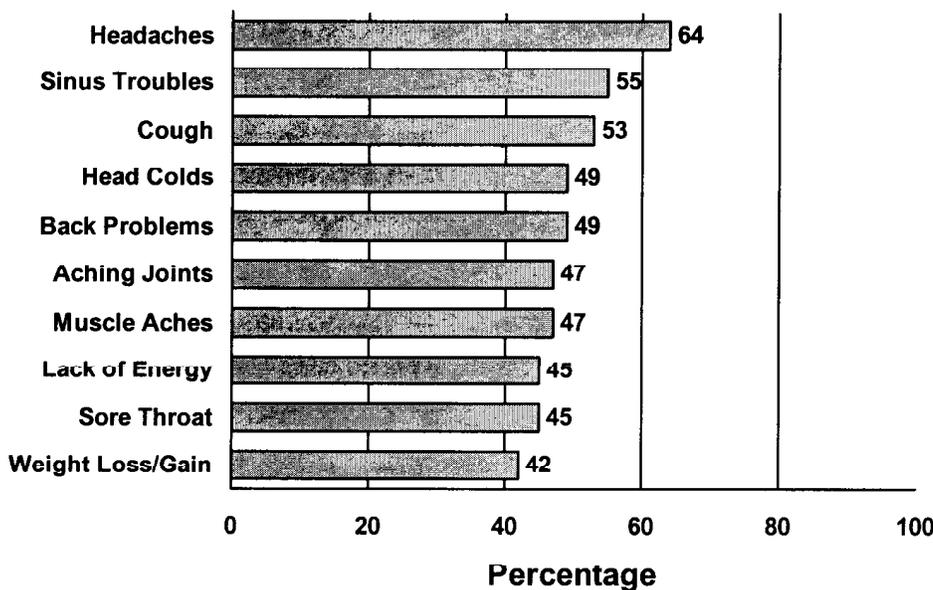


Fig 4. Top 10 physical health symptoms.

These common symptoms point out general respiratory concerns. The sinus troubles, headaches, cough, sore throats, and head colds are indicative of the poor air quality of the Bosnia area of operation. The reported frequency of respiratory ailments was confirmed by the Division Surgeons of both OJE and OJG. In contrast, the HDRT mission to Haiti for Operation “Uphold Democracy” found general gastrointestinal ailments, such as stomach problems and diarrhea, to be the top reported symptoms. This was consistent with the initial poor water quality of the Haitian environment.

Physical Health Symptoms Across Soldier Samples.

The health symptom checklist used in Bosnia as part of the HDRT data collection during OJE/OJG was not used for the other three comparison databases (nondeployed soldier sample; Persian Gulf-ODS; Somalia-Operation

“Restore Hope”). Analysis indicated there were no significant differences in the average number of physical health symptoms reported by soldiers deployed to OJE and soldiers deployed to OJG.

Physical Health Symptoms by Soldier Characteristics.

Analyses were conducted to determine if the physical health of soldiers deployed to Bosnia, as measured by the total number of reported symptoms, significantly differed by soldier characteristics. Results indicated that officers (WO1-05) reported significantly less physical health problems (average of 5.6 health symptoms) than soldiers in the rank of E1-E4 (7.2 symptoms) and less than soldiers in the ranks of E5-E9 (7.7 symptoms). There were no differences between soldiers in the ranks of E1-E4 and E5-E9 in terms of number of physical health symptoms. Female soldiers reported significantly more physical health symptoms (9.3) than male soldiers (7.0). There were no significant differences in number of reported health problems between married and unmarried soldiers or

between soldiers with or without children. Health symptoms did not differ depending on time in company. There were negligible differences between White (7.0), Black (7.0), and Hispanic (7.1) soldiers. A small number of soldiers who marked the “multiracial” category on the survey (n=21) reported significantly more physical health symptoms (11) than did other ethnic groups.

Physical Health Symptoms by Unit Characteristics.

Analyses conducted to assess if the reported number of physical health symptoms varied by unit type and company are summarized in Figure 5. There were few significant differences between unit types on health symptoms. However, artillery units reported less physical health symptoms than other unit types. Engineer units that reported the highest levels of psychological distress also reported the most physical health symptoms. The mean

number of physical health symptoms was computed for each of the 27 companies to determine if there were company differences in reports of physical health symptoms. Results indicated that, overall, there were few significant differences across companies in terms of reported symptoms. Consistent with findings noted alone, the company that had the highest level of number of physical health symptoms was the same engineer com-

pany that also reported the highest level of psychological distress. 49% of soldiers during OJE (Bosnia II) said living conditions caused them little to no stress. A major concern for OJG soldiers was the lack of personal privacy. Sixty percent of soldiers reported moderate to extreme stress from the lack of personal privacy. Due to the restricted availability of living quarters, this issue was a major concern for OJE as well. During OJE (Bosnia I and II), 72% of soldiers reported moderate to extreme stress from the

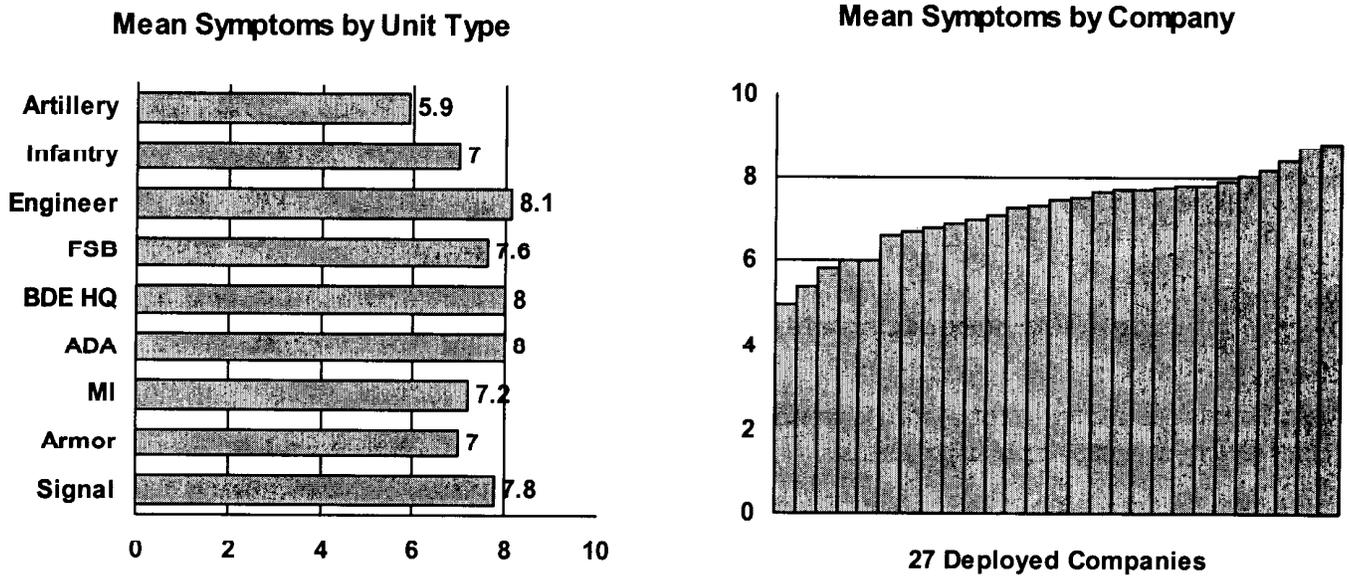


Fig 5. Mean number of health symptoms by unit type and U.S. Army company.

pany that also reported the highest level of psychological distress.

Stress Factors. Figure 6 compares the top reported stressors for OJG (SFOR-Bosnia III) and OJE (IFOR-Bosnia I and II). The OJG soldiers consistently reported lower percentages of moderate to extreme stress due to these common stress factors.

Living Conditions. Sixty-three percent of the soldiers in Bosnia reported that the living conditions caused them little to no stress. Soldiers serving as a member of the SFOR in Bosnia served in a more developed theater than soldiers who served in IFOR. For example, only

lack of personal privacy. Again, the improvements over time in the Bosnian theater, such as the addition of more conexes for soldier quarters, led to a decrease in reported stress from lack of personal privacy.

Fear of Personal Harm. Overall, the soldiers in Bosnia reported little worry about their physical safety. Seventy-six percent of soldiers serving in Bosnia with SFOR reported they felt little or no threat of personal harm. Soldiers felt land mines posed the greatest threat for injury or death. Protective measures were taken to ensure that all vehicles were protected with Kevlar blankets to reduce the impact of a land mine explosion. They maintained the four-vehicle convoy rule, with one vehicle re-

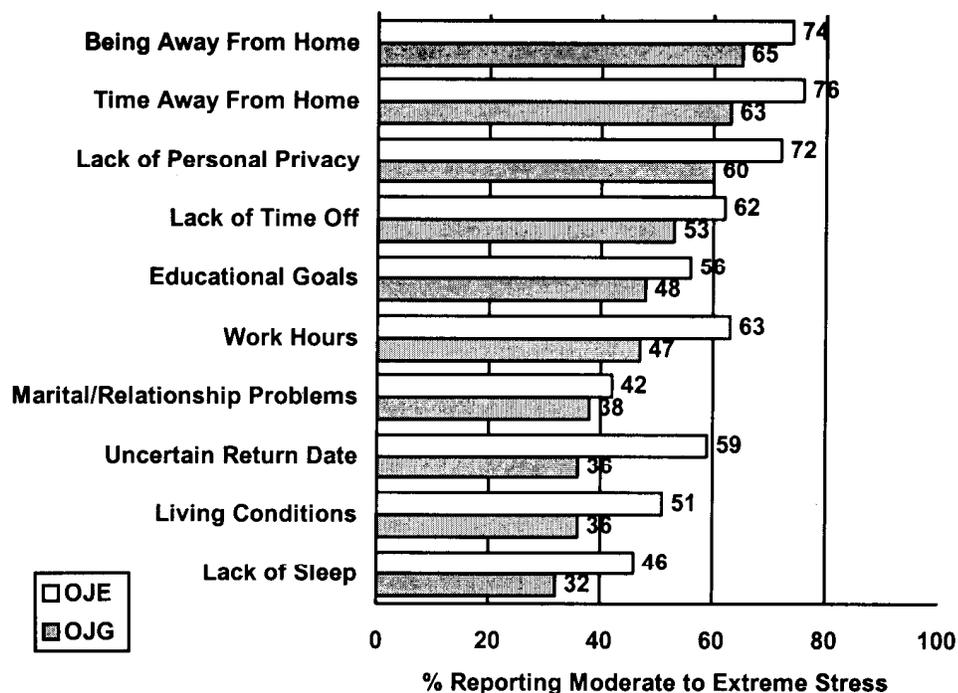


Fig 6. Top reported stressors for OJG compared to OJE.

quired to maintain a crew-served weapon to provide additional security against potential sniper attacks.

Food and Water Issues. The quality of water and food was not an issue for SFOR soldiers serving in Bosnia. Bottle water was available throughout the theater. During the SFOR operation, Brown and Root (the primary contracting company in Bosnia) received the contract to provide portable rest rooms, shower facilities, and to operate the dining facilities. The rest rooms and shower facilities were clean and supplied hot water. Each unit was closed on a regular basis for cleaning done by the locals. Throughout the SFOR area of operation, *three hot meals a day* featured a variety of menus. The dining facilities were operational 24 hours a day, 7 days a week, providing soldiers with a selection of two types of hot soup, fresh baked bread, ice cream, and soft drinks. The food and clean personal hygiene facilities had a positive impact on SFOR soldier morale.

Time Off/Rest and Relaxation. Lack of time off was reported as one of the top stressors. Fifty-three percent of soldiers reported that lack of time off caused them moderate to extreme stress. This percentage, however, was

lower than the reported levels of stress during OJE (Bosnia I and II). Sixty-two percent of OJE soldiers reported that lack of time off caused them moderate to extreme stress. A more mature theater, more rest and relaxation opportunities/facilities, and the fact that on the average, SFOR troops reported working 10+ hours a day compared to 12+ hours per day for IFOR (OJE) troops, may explain the decrease in stress from lack of time off.

The opportunity for rest and relaxation for SFOR troops in Bosnia was a factor that helped them cope with the stressors associated with their mission. Soldiers had access to the Post Exchange (PX) on Tuzla Main where they could purchase televisions, radios, tapes, and CDs. The PX also provided health and comfort items that increased the morale of soldiers, to include IFOR/SFOR memorabilia. The Armed Forces Exchange opened a Robin Hood sandwich shop, Baskin and Robbin's ice cream shop, and an Anthony's Pizza that provided soldiers with a "taste of home." These facilities were clean and the service was fast and courteous. Soldiers also had an opportunity to watch the major athletic events of the year through the Armed Forces Network (AFN). All SFOR bases provided gym equipment to assist soldiers in maintaining their physical condition.

Educational Opportunities. Almost half of the soldiers surveyed (48%) reported moderate to extreme stress caused by the fear of falling behind in educational goals. Educational achievement is crucial for promotion and career progress. Deployments and field time, in general, make meeting educational goals extremely difficult, if not impossible. A forward deployed education center (mainly

via University of Maryland) was established to provide soldiers the opportunity to earn college credit while deployed. Each base received a television and VCR, along with movies that were shown nightly. These amenities provided soldiers an opportunity to advance their civilian education and something to look forward to each day. This also provided the soldier with positive ways to spend time off. The opportunity to take courses through this program was viewed as an extremely positive benefit.

Coping with Stress. All soldiers are susceptible to stress and it is crucial that they cope effectively with the effects of stress. Only 10% of soldiers reported that they were coping poorly with the stress they experienced in OJG compared with 14% of soldiers in OJE. Better facilities and avenues for stress reduction seemed to have had a positive effect.

Family Separation Issues. Being away from home and family caused the most stress for soldiers of OJG and OJE. Sixty-five percent of OJG soldiers reported that being away from home/family caused them moderate to extreme stress. For OJE soldiers, this number was 74%. In terms of rank breakdown, NCOs reported the most stress from being away from home with 70% reporting moderate to extreme stress. Sixty-two percent of junior enlisted and 51% of officers reported moderate to extreme stress from being away from home. Opportunities to contact home acted as a buffer for this stress. The AT&T phone banks and morale calls home alleviated some of the stress of being away from loved ones.

Unit and Work Issues. Overall, soldiers of OJG felt well-trained and competent to carry out their duties. Eighty percent of soldiers reported they felt adequately trained to do the job assigned. Ninety percent said they knew what they had to do to perform their jobs. Even though the soldiers of OJG were predominantly combat arms (1st Infantry Division), over half (53%) said they felt comfortable in the role of peacekeeper. The workload decreased from OJE to OJG. Soldiers of OJE reported working an average of 12+ hours per day. The OJG soldiers reported an average workday of 10+ hours.

Unit Leadership. In general, soldiers rated unit leadership positively. Soldiers generally agreed that unit leaders, both officers and NCOs, cared about the troops'

welfare and established clear work objectives. For example, 72% of soldiers agreed that NCOs established clear work objectives. Horizontal cohesion (peer group bonding) and vertical cohesion (bonding to unit leadership) were extremely important buffers to stress. Both horizontal and vertical cohesion had significant correlations with reported psychological and physical health symptoms. In other words, the closer a group was or the better the leadership, the fewer reported psychological and physical symptoms. Interestingly, the engineer company noted above that reported the highest distress levels and the most physical health symptoms, also had one of the lowest ratings of vertical cohesion (unit leadership) of any company.

Return Date. During the mid-deployment period of OJE (6 months into the deployment), the return date was unknown. Seventy-three percent of soldiers at this unsure time reported moderate to extreme stress due to the uncertainty of redeployment. At the 1-year mark, supposedly the end of the deployment for the 1st Armored Division when a more solid redeployment date was announced, only 59% of soldiers were stressed by the uncertainty of redeployment date. The relatively high percentage may reflect that dates had been given before, only to be changed. For OJG, where redeployment was even clearer, only 36% of soldiers reported moderate to extreme stress from an uncertain redeployment date. As the redeployment issue became more focused, the distress levels of the soldiers decreased.

Belief in the Overall Operation. During Operation "Uphold Democracy" in Haiti, 30% of soldiers reported that they believed in the value of the operation and 27% believed that the U.S. military should have been involved in Haiti. At the mid-deployment point (6 months) of OJE, 37% of soldiers believed in the value of the operation and 33% thought the U.S. military should have been involved in Bosnia. At the end (1-year mark) of OJE, those percentages had increased to 47% believing in the value of the operation and 38% believing that the U.S. military should be involved in Bosnia. For OJG (Bosnia III), 42% of soldiers believed in the value of the operation and 32% thought the U.S. military should be involved in Bosnia.

Summary

The research results from Bosnia on the SFOR demonstrated that, when viewed as a population, soldiers in OJG consistently reported lower levels of deployment stress than soldiers in OJE. Initiatives implemented to help soldiers cope with the deployment have had positive impacts over time.

The overall psychological distress levels for OJG were *higher* than nondeployed soldiers (in garrison), *higher* than soldiers in Kuwait, and *higher* than soldiers deployed to Haiti for Operation "Uphold Democracy." The overall level of distress in OJG was *lower* than ODS, *lower* than Somalia, and *lower* than OJE (OJE-Bosnia I and II). The OJG was closer to garrison levels of overall distress than the levels reported during other deployments.

In terms of individual characteristics, junior enlisted soldiers reported more psychological distress than NCOs or officers. This is consistent with previous research. There were no racial differences in distress. Married soldiers reported significantly less distress than single or separated /divorced soldiers. Female soldiers reported significantly higher levels of distress than male soldiers. Female soldiers, however, were a small sample of the overall number of soldiers surveyed.

In terms of unit differences, engineers reported higher levels of distress than other types of units. Engineers also had been in theater longer and reported a heavier workload than other unit types. There was wide variability among companies in terms of distress.

Reports of physical health symptoms were consistent with those found during OJE. In general, the most frequently reported types of problems were respiratory concerns such as sinus trouble, cough, sore throat, and head colds. Officers reported significantly fewer physical health symptoms than other ranks. Female soldiers reported significantly more symptoms than male soldiers. Artillery units reported the least physical health symptoms, while engineer units reported the most physical health symptoms. Importantly, the engineer company

that had the highest psychological distress levels also reported the most physical health symptoms. The ability

to identify a company, like this "at risk" engineer company, allows the HDRT to suggest efficient intervention strategies.

The top stressors reported by the soldiers were: Being away from home; time away from home; lack of personal privacy; lack of time off; fear of falling behind in educational goals; number of hours worked per day; and marital/relationship problems. As expected, time away from home was the most stress-inducing factor. The large majority of deployed soldiers did not experience stress due to the living conditions or from fear of personal harm. Improvements in the Bosnian theater in terms of safety and living accommodations reduced distress from these issues. The fear of falling behind in educational goals was addressed via the University of Maryland and other colleges offering college credits in theater. As with OJE, soldiers felt their level of training was high, opinions of leadership were generally positive, the rules of engagement were clear, and there was good overall support for the operation. Since the return date for OJG was more fixed (a pre-planned 6-month tour), stress from an uncertain return date was much less than that of OJE.

Lessons Learned

The four sets of issues found to be significantly related to the psychological and physical well-being of soldiers in Bosnia have implications for unit leaders at all levels.

Lessons Learned No. 1. *Lack of time off.* SFOR soldiers reported working 10+ hours per day. The opportunity for rest and relaxation for SFOR troops in Bosnia was a factor that helped them cope with the stressors associated with the deployment. Soldiers had access to the PX located on Tuzla Main that provided televisions, radios, tapes, and CDs. The AFN provided a variety of excellent entertainment and news from home. Soldiers also were provided the opportunity to view the main athletic events throughout their deployment. Gyms located at all SFOR bases assisted soldiers in processing stress and staying in shape. Quality of time off assisted soldiers in successfully coping with operational stress.

Lessons Learned No. 2. *Family separation.* Op-

portunities to contact home via AT&T phone banks and morale calls alleviated some of the stress of being away from home/family.

Lessons Learned No. 3. *Limited educational opportunities.* Forward deployed education centers (mainly via the University of Maryland) provided soldiers the opportunity to earn college credit while deployed. The SFOR soldiers could maintain their educational goals and remain competitive with nondeployed soldiers for promotion and career progression. Educational opportunities also served as an operational stress reducer.

Lessons Learned No. 4. *Anticipated return date.* The 6-month tour date reduced the operational stress from 73% in OJE to 36% for OJG. The recommendation to reduce the Bosnia peacekeeping tour length was made by the second WRAIR HDRT that evaluated IFOR. The recorded decrease in operational stress may be due to the time-limited mission of SFOR in Bosnia.

Lessons Learned No. 5. *Data collection.* Ideally, the HDRT should collect data on units of interest *longitudinally* over time. Baseline measures of units *before they deploy* would provide the necessary comparison levels of distress and physical health symptoms. At critical points during the operation, data would be collected to determine the status of the deployed force, providing significant information to unit and theater commanders. Follow-up assessments after the operation would study the after-effects of the operation and the impact on readiness and retention.

HDRT Observations. Based on previous HDRT missions to Bosnia, the following are observations made by the HDRT on improvements in the TFE AOR: Transit personnel are billeted in tents with hard floors, hardened sides, and kerosene heaters. The majority of permanent personnel currently are billeted in fixed facilities. The living conditions for soldiers on Tuzla Main are greatly improved. The most improved area was in the Mess Facility located on Tuzla Main. The Mess Hall has been repaired and the quality of food and service has been dramatically improved. The Mess Hall currently serves *three hot meals a day* featuring a variety of menus and is open 24 hours a day, 7 days a week. The modified

uniform policy of wearing Battle Dress Uniforms, Kevlar, weapons, and carrying ammo on Tuzla Main has improved morale and kept the focus on force protection. The Army Air Force Exchange Service (AAFES) has improved the PX and offers a variety of personal hygiene items for all personnel. The PX also offers other health and comfort items that boost the morale and welfare of soldiers, to include IFOR/SFOR memorabilia. The AAFES opened a Robin Hood, Baskin and Robbins, and an Anthony's Pizza. This provides soldiers with the opportunity to have a "taste of home." Forward deployed Education Centers offer soldiers the opportunity to earn college credits. This educational opportunity enhances soldier's morale and potential for career progression. These improvements are a positive reflection on the 1st Infantry Division leadership and provide soldiers a safe, positive work environment to meet the challenges of OJG.

Recommendations

Theater Commanders. Theater commanders are encouraged to continue aggressive communication of soldier accomplishments and mission importance to soldiers and spouses; continue improvements in Morale, Welfare, and Recreation and other initiatives begun by previous theater commanders; and encourage a shorter workweek and more sleep, when possible.

Department of Army and Department of Defense Level. Maintain a 6-month tour length policy for peace support operations, and continue to evaluate the impact of multiple deployments, tour length, and OPTEMPO/PERSTEMPO effects on retention.

General Discussion

The HDRT perspective is that the Army force sent to Bosnia functioned well and maintained excellent morale and cohesion required to meet the difficulties, challenges, and frustrations of OJG. The mission capability of the force was extremely high. The overall psychological and physical status of the deployed force of OJG showed improvement from that of OJE.

The HDRT was able to provide the theater com-

mand with the status of the deployed force, comparisons to similar Army deployments, and recommendations to deal with identified stressors within 24 hours of data collection. This ability is an important service for commanders at all levels. Information about soldiers' psychological and physical status may not be available to commanders from any other source in this type of timeline. The HDRT has briefed commanders at all levels, from company level to the Senior Service Counsel at the Pentagon. Recommendations are tailored to the audience's sphere of influence. The ability to assess the overall psychological and physical status of a deployed force in this type of timeline provides a "value-added" aspect of Human Dimensions Research to Army leaders at all levels.

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Asia-Pacific Military Medicine Conference: AMEDD Support of the National Security Strategy

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Mr Dan Horne††††

With the end of the cold war, American security issues changed in fundamental ways. The unified threat of global communist expansion has given way to a much more fractured and diverse set of security threats. These range from ethnic conflicts in various corners of the world to terrorist attacks on U.S. citizens and property. These new perils have no respect for international borders and, indeed, American security in the next century will depend on our ability to manage security risks around the globe. In 1996, the U.S. Government issued a new National Security Strategy (NSS) of Engagement and Enlargement.¹ This was revised in 1997 as a NSS for a new century.² Current National Military Strategy (NMS) describes the armed forces role in support of this strategy.³

All major Army commands (MACOMs) have policies and initiatives in place to support the NMS. The Pacific Command (PACOM), which oversees the entire Asia-Pacific region, has one of the most difficult tasks of any MACOM. The PACOM area of responsibility stretches from California to India and the eastern shores of Africa. Forty-three nations and over half of the world's populations are under its purview. Our interest in assuring the stability and security of the region is demonstrated by the fact that five of our seven mutual defense treaties are with allies in this region. These help to promote and sustain our presence in the Pacific. In addition, Admiral Joseph W. Prueher, Commander in Chief, Pacific Forces (CINCPAC), has a specific Theater Engagement Plan in direct support of the NMS. This program includes pursuing positive security relations with all nations in the area in a form of "deep engagement." Its focal point is

to promote the active presence of U.S. forces and partnership with friendly, foreign armed forces. Enhancing military-to-military relations occurs through various formats, including joint exercises, peacekeeping and humanitarian missions, military conferences, and military officer exchanges.⁴

A major subordinate command, United States Army Pacific (USARPAC), fully supports the CINCPAC Theater Engagement Plan. It accomplishes this by maintaining strong Army-to-Army relations with our allies, forward basing of Army units, as well as frequent deployments throughout the region. In addition, USARPAC's Expanded Relations Program is a major initiative supporting CINCPAC's Theater Engagement Plan. The Expanded Relations Program supports various initiatives that actively engage the military forces of friendly countries throughout the Pacific region. Civilian support projects in the area of civil affairs, engineering, and medical aid are illustrations of this program in action.⁵

The Asia-Pacific Military Medicine Conference (APMMC) is an excellent example of the Army Medical Department's (AMEDD) role in supporting USARPAC's Expanded Relations Program and, by inference, both the NMS and NSS. Historically, this program began in 1990 in Honolulu, Hawaii, with only 12 countries sending representatives and most of the faculty coming from either Tripler Army Medical Center, Hawaii, or the various U.S. military medical research laboratories around the Pacific. The conference has grown consistently over the ensuing years, increasing to 224 delegates

from 26 countries. Subsequent meetings have been held throughout the Pacific area, each being co-hosted by a foreign nation's army medical department and USARPAC. Previous sites have included Thailand, Indonesia, India, Australia, Malaysia, and New Zealand. The most recent iteration was held in Auckland, New Zealand (1998), and was co-hosted by the USARPAC Command Surgeon's Office and the New Zealand Defense Force. The significance of this meeting to the countries attending is attested to by the attendance of 21 flag officers, including the U.S. Army Surgeon General.⁶

The APMMC focuses on goals at two distinct levels. First is the strategic support of the Theater Engagement Plan of the CINC, PACOM, and the Expanded Relations Program of USARPAC. Second, the APMMC provides an operational forum for military healthcare providers throughout the Pacific to exchange information about military medical issues common to all uniformed medical forces. This meeting clearly fosters the development of military-to-military friendships and extensive discussion of a vast array of clinical, academic, and operational topics. A specific objective of the conference is the expansion and facilitation of joint and combined interoperability. This objective provides U.S. medical forces in the Pacific the experience of working and training with friendly nation forces in the Pacific. Examples include combined participation in humanitarian and disaster relief operations, and routine MEDCAP/MEDRETE operations. These activities facilitate more effective responses to regional crises and afford greater regional stability. The conference also supports professional development of military medical forces of all participating countries. It enables officers from over 30 different countries, with diverse levels of medical sophistication, to interact in a friendly, collegial atmosphere. The mutual trust and friendship that develops, in turn, supports the goal of improving joint and combined capabilities of all nations throughout the region.

Now in its ninth year, the conference has continued to improve with each new iteration. Initially focused on Tropical Medicine, subsequent meetings have expanded to cover virtually any subject related to military medicine. Each annual conference has a main theme, providing the focus for the scientific sessions. Past themes have in-

cluded Medical Readiness, Evacuation, Infectious Disease, Preventive Medicine, Humanitarian Assistance, and Healthcare Delivery Systems. Topics ranging from combat psychiatry to telemedicine have been previously presented.^{7,8}

The conference is structured to provide the maximum flexibility for direct interaction between delegates from all nations. An important section is the Senior Medical Officers Forum. Hosted by the USARPAC Command Surgeon and the Senior Military Medical Officer of the host nation, this session brings together the senior military medical leaders of each country for open and frank exchanges covering any topic they wish to discuss. While the official language of the meeting is English, some countries do supply translators for their senior officers. Additionally, U.S. medical officers who are fluent in Chinese and Russian serve to enhance the atmosphere of camaraderie and friendliness.

Large-group plenary sessions, small-group and panel discussions, poster presentations, and technological demonstrations, provide multiple formats for medical officers from all nations to present issues to their colleagues. A number of cooperative research projects have developed as a result of initial contact between researchers attending these meetings. In addition to the academic presentations, the host nation usually provides off-site visits to clinical and scientific venues. This provides the opportunity to showcase accomplishments of their national military medical system. Several social and cultural events round out the weeklong program, promoting the goal of fostering mutual trust.

The APMMC represents a major pillar in the AMEDD's support of the NMS. For 8 years, it has served as the main link between the AMEDD and the military medical forces of nations throughout the Pacific region. The APMMC has enlarged the number of military-to-military interactions between USARPAC and other Pacific armies, and has enhanced combined operability during humanitarian and peacekeeping missions in the area. Lieutenant General William Steele, USARPAC Commander, in his closing remarks to the conference delegates at the eighth APMMC, stated that military medical exchanges have proven to be the least threatening and

most successful means of building trusting and lasting relations with other Pacific nation armed forces.⁹

The continuing success of this program confirms its value to the AMEDD as well as USARPAC and CINCPAC. It deserves greater support from all branches of the AMEDD, and can serve as a premier showcase to demonstrate AMEDD achievements to the rest of the military medical world. The experience gained by AMEDD officers participating in its forums is unequalled in providing international exposure and developing contacts with colleagues throughout the Pacific Rim. For these reasons, consideration should be given to establishing similar programs in other major commands. The APMMC can serve as a template for other CINCs to enhance military-to-military exchanges and support the NMS. A recommendation is to evaluate the feasibility of establishing comparable meetings in EUCOM and SOUTHCOM with goals and objectives similar to the APMMC.

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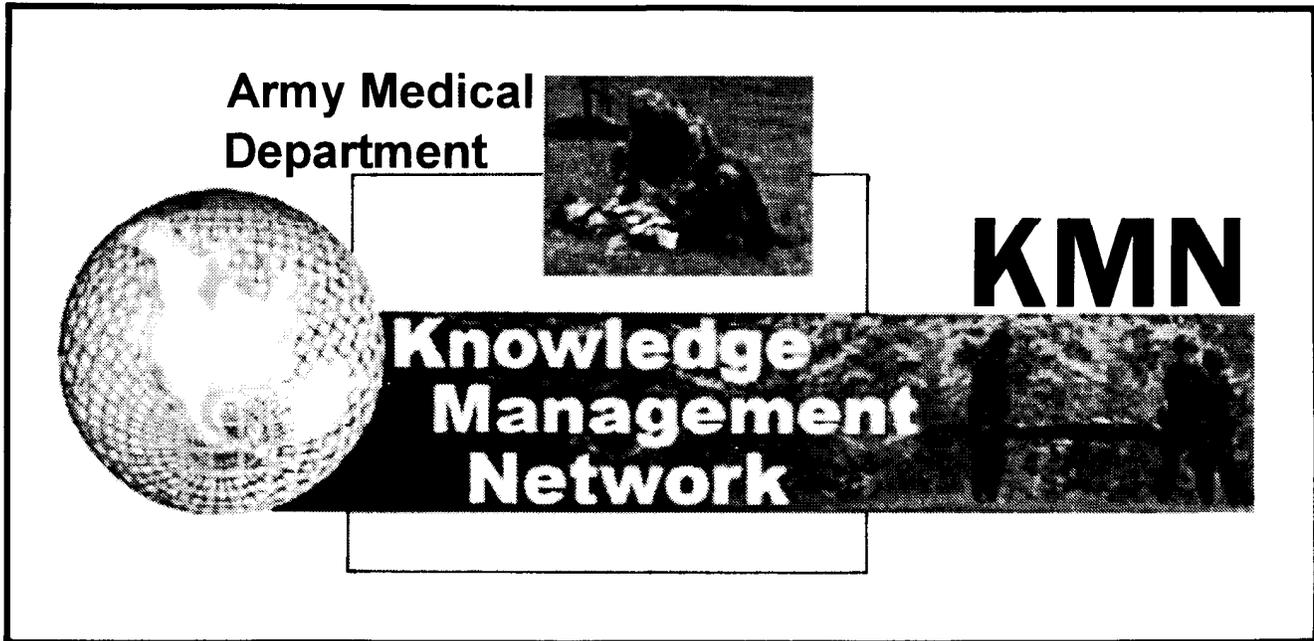
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Knowledge Management in the Army Medical Department

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The Dawning of the Knowledge Age

Major forces of change are impacting the U.S. Army. The one event that best symbolizes the beginning of the Army's new era was the fall of the Berlin Wall. That single event seemed to change – forever – military philosophy and strategy for going to war. With the end of the Cold War, the military quickly reacted to the reality of its new environment. The missions of nation building, drug interdiction, urban warfare, and security and stability operations, have become the Army's building blocks for reinventing itself and forging ahead.

Management tools of the recent past, including business process reengineering, total quality management, and organizational realignment, failed to scale the mountain of late 20th century change. The end of the Cold War and federal budget cuts are only two of many forces of change challenging the Army. Army Medical Department (AMEDD) leaders exhausted management science's toolkit and turned to an emerging management science – Knowledge Management (KM) – to begin the ascent from base camp to summit.

Knowledge Management is an emerging management discipline that involves creating, collecting, storing, and disseminating knowledge and expertise within an organization to perform its business activities. This emerging discipline is the result of changes occurring globally.

These changes are not only monumental, but fundamentally change the way we think, learn, and work. They have been described as the result of evolutionary societal processes. These changes or processes have been described as the shift from the Industrial Age to the Information Age. Some are described as the shift from the Information Age to the Knowledge Age. Regardless of the period of time in which we find ourselves - the birthing pains of a new society, the dying pains of an old or something in between, the forces created by this change affect every market whether global or local, government or commercial, public or private. As a result of these processes, we must create a workforce that is willing and capable of creating new ways to lead, teach, and manage in this volatile environment.

Forces of Change

There are a number of forces that have been unleashed as a result of these changes. One such force of change, and perhaps the most compelling, is the rapidity of change itself. It has taken thousands of years to transition from one Age to another, yet it is anticipated that it will take mere decades to transition from this current Age to the next. In some parts of the world, the agrarian culture is thriving and is the primary mode of economic existence for many peoples. And, we also know that the great Industrial Complex is alive and well; remnants of each of these Ages coexist. These phenomena not only illustrate the accelerated pace of change, but also the complexity of the world we live in.

Another outcome or result of rapid change is that the shelf life of knowledge is increasingly shorter. In the medical field, what is state of practice today may well be obsolete next year. Old remedies find new applications or fade into obscurity while new medical discoveries, practices, and remedies emerge so rapidly that what may be useful knowledge today is replaced by an often better remedy tomorrow. Yet, we realize that knowledge is vital to innovation and it is innovation that is crucial to growth. As the shelf life of knowledge decreases, better means of creating, collecting, storing, and disseminating new knowledge must be found.

Slightly different, but along the same vein, organizations find that there is an increase in the intensity of knowledge in products and services. Think of the commercial where the commentator astutely recites all the things that it doesn't make, yet asserts that it provides the value added that makes the product better, softer, tougher. Their distinction in the marketplace is created by employing a plethora of researchers and chemists whose knowledge becomes embedded in the products that provide their customers with their value proposition – a competitive edge in the marketplace.

The weapons of the Persian Gulf Conflict are perhaps the best demonstration of how knowledge is gaining hold in the military. Stewart, in his book "Intellectual Capital," notes the devastating effect of our "smart bombs" (cruise missiles, etc) where a huge amount of

information and intelligence deliver pinpoint and much more effective destruction with much less TNT than the strategic bombing of World War II (WWII) or the carpet bombing of Vietnam.” These are just two examples of many that signal the dawning of the Knowledge Age. The shift from the manufacturing economy, to the information economy, and now the knowledge economy, is so swift that many barely notice the trend. However, knowledge is rapidly becoming the primary component that makes up what we build, practice, buy, or sell. Knowledge is touted as the most important economic commodity for individuals, organizations, and nations in the coming millennium.

The inroads made in technology, of course, are enormous, particularly in the rapid development and deployment of computers, telecommunications, and networking capabilities. The rapid deployment of these capabilities leave the workforce inundated with information. The American mainstays of the telephone and postal systems have a whole host of companions and offspring (for example, voicemail, e-mail, UPS, RPS, internet and intranet) just to name a few. More ways to access and retrieve information does little to ensure that just enough – and just in time, information gets to the people who need it in a way that is meaningful and productive. Thus, every portal of human sensory perception is filled with the icons that modern technologies provide without the benefit of refined and context knowledge that suits the unique needs of the individual in the workforce.

As a result of globalization and the opening of emerging economic markets abroad, American organizations, to include the military, have responded by cutting their workforces. By becoming leaner and more agile, organizations will position themselves to dominate this new playing field. In the 1996 - 1997 and 1998 - 1999 Army Green Books, the Chief of Staff of the Army stated that the Army has downsized by 33% while simultaneously experiencing a 300% increase in missions (operational tempo [OPTEMPO]). The result, of course, as noted recently by the Joint Chiefs of Staff, is an imbalance in which the Army finds itself working harder than ever before. Organizations at every level of the institution are grappling with the results of selective early retirements, decreased accession rates, early-out incentives, and other

downsizing initiatives. As the Army’s senior leadership leaves earlier and replenishments from mid-career officers and new accessions dwindle, great gaps in knowledge, both corporate and individual, are lost leaving the organization void of what is now touted as its most precious resource – intellectual capital. The results of such losses leave military leadership concerned about readiness and productivity. Nowhere is this more evident than in the AMEDD. Although the AMEDD has also participated in downsizing activities, a 40% decrease in officers and 60% decrease in enlisted personnel, the beneficiary population has not dropped proportionately. The AMEDD truly understands “doing more with less.”

Just as downsizing is an inevitable result of globalization, so too are budget decrements a logical extension of downsizing initiatives. Defense spending now accounts for less than 3% of the Gross Domestic Product, the lowest level since WWII. Fewer dollars to do roughly equivalent or greater work with a shrinking workforce requires leaders at all levels to become more frugal but at the same time creative. The Army currently spends 70% of its dollars on people and training (Army 1996 - 1997 Green Book). Clearly it is the Army’s largest expenditure and ripe for intensive scrutiny. Meanwhile, new technologies and increasing receptiveness towards alternative training methodologies yield potentially substantial cost savings and more effective training and education models. At the Army Medical Department Center & School (AMEDDC&S), every course director is required to analyze each course for *possible* conversion to some type of Distance Learning (DL) modality. The goal is to reduce in-resident training by 50% by the year 2001. In the field, budget decrements have meant that commanders must drastically reduce already sparse training dollars to maintain operational readiness and viability. This is not necessarily a tough choice, given the primary mission of patient care, but it does present a problem for the commander, who has the responsibility of the maintenance of a well trained, certified, and credentialed workforce. The cumulative effect of these forces of change are: a leaner workforce doing more with less, an organization that has fewer financial resources to perform its mission, an organization travelling in information overload, an organization faced with a spiraling OPTEMPO, an organization whose intellectual capital is at risk of being lost or seriously eroded,

and an organization working harder to meet its education and training requirements.

These forces of change are referred to throughout this article as the AMEDD's business drivers. This is not meant to be all bad news. Paraphrasing Peter Senge, clearly understanding the complexity of the environment we work in, coupled with an accurate portrayal of the current reality, will lead to the creation of the requisite skills and tools to navigate towards a desired future.

The Challenge

Given this set of challenges, the Center for Healthcare Education and Studies (CHES), a purveyor of innovation and futures studies for the AMEDD, sought to discover ways to provide the workforce with the requisite tools to navigate in these turbulent times. Tools that would provide the workforce with context and refined information such that its members had access to just enough and just on time information and knowledge.

A study conducted by the Software Engineering Institute suggests that workers spend 60% of their time searching for and validating information. If the AMEDD could reduce that figure by as little as 10%, it could free its workforce to perform higher-order work activities. Therefore, the CHES mission has been to deliver tools that would leverage the organizations intellectual capital through continuous learning that would, in turn, lead to organizational performance improvement.

To do this, the CHES also knew that whatever it created must not add to an already overburdened workforce. It would have to be part of the daily work activities of the worker. Thus, new tools would necessarily require a cultural transition, a feat requiring evolution, not revolution.

Given that training and education dollars must shrink, the workforce would have to have access to alternative means of education and training. The schoolhouse must come to the student. The virtual schoolhouse must provide a carousel of training and education materials that are either pushed to fulfill schoolhouse requirements or pulled by the workforce when they need it and at a place

and time convenient for them to meet their sustainment and continuing education needs.

The CHES also needed to find a way to maintain and enhance the AMEDD's corporate knowledge. The idea of capturing and sharing best business practices had to be a requirement in whatever tool or skill devised. The AMEDD, like most other organizations, can no longer afford to reinvent the wheel.

Lastly, the idea of making tacit knowledge explicit, that is, garnering the knowledge that each individual independently holds as a result of experiences and education and making it available for the entire enterprise to benefit from, had to be explored.

The principles of any tool created or any skill developed had to encompass the ideas of knowledge sharing: innovation, continuous learning, organizational performance improvement, and collaborative work practices. The Knowledge Management Network (KMN) was created to support these stated principles and recognized needs. Every aspect of the KMN is designed to make available the collective wisdom and experiences of the AMEDD to facilitate collaboration, leverage lessons learned, increase productivity, reduce costs, decrease cycle time for learning, and to create and preserve intellectual capital. The KMN is a systems approach to knowledge resources providing web-based, single source access to on-line dialogue and knowledge resources. It is a common user interface linking together all sources of meaningful information and knowledge – a virtual electronic "Town Square" for Army medicine.

The Knowledge Management Network

The KMN was first introduced in Jan 97. By May 97, the CHES and Electronic Data Systems (EDS) Corporation jointly enhanced the features of the KMN. In May 98, the focus of the KMN project was toward building small prototypes of communities of practice. The CHES also focused on incrementally improving the users' navigation through the KMN by adding "trust seals" to library documents to indicate to users the amount of validity associated with each document, thereby reducing search time and increasing the workers productivity. "Worker

Views” were also added. This feature consists of essential information users need to know about or need to know how to do in their particular profession. It is intended to help combat the erosion of intellectual capital and reducing the learning curve by providing those new to their positions with tools and “know how” to perform their duties.

In Apr 98, faced with keen competition for dwindling resources, the focus of the KMN project shifted to understanding and articulating the business value of KM. Building a delivery chassis for the distribution of web-based training (WBT) also figured prominent in the development of KMN during this same time. User demands and the business case also necessitated the expansion of knowledge services offered and the installation of a stronger infrastructure to support the growing network.

There are five essential components that make up the KMN. They are a virtual schoolhouse, communities of practice, virtual collaboration facilities, a library and newscipping service, and the skills and knowledge bank and subject matter expert (SME) database. However, the project is enveloped around a governance structure designed to ensure the process, people, technology, and cultural aspects of the project are addressed.

Governance

An AMEDD KMN program management structure was developed to support this project. It provides the essential framework for ensuring that critical staffing, planning, and task order implementation activities are managed effectively. It also provides for managing the project in accordance with accepted project management principles and procedures.

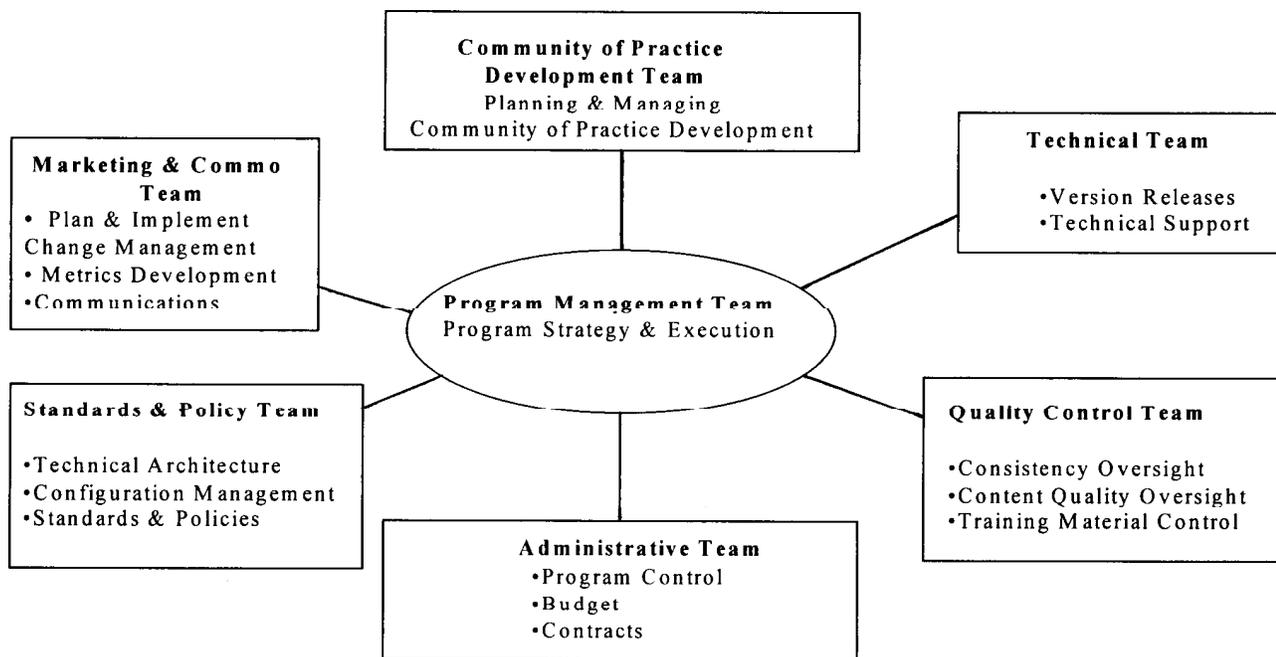


Fig 1. Integrated project teams.

The organizational structure created to deliver the desired results of the AMEDD KMN project is formed around the integrated project team (IPT) management approach. Project responsibility resides with a program manager (PM) who manages discrete tasks using standard project management methodologies. Discrete tasks are implemented through teams. The teams operate within the framework of the overall project management structure.

The PM structured seven IPTs to operate the KMN,

providing authority for most processes, improvements, interventions, and innovations, also providing oversight for KM-related conventions, conferences, and meetings.

The community of practice development team is responsible for planning and managing a community's development process. This team coordinates involvement of specialists (technical team, standards and policy team, and administration team members) in project activities. As the community of practice development process matures, the team must ensure that training and training

Integrated Project Team	Team Leader Personnel	Government Personnel	Contractor
Program Management	Government PM	Government PM	Contractor PM
Community of Practice Development	Senior Analyst Community Manager Technical Rep	ISS Community Advocate Librarian Administration	Senior Analyst Editor/Writer Trainer Graphic Artist
Technical Team Technical Rep	Technical Director	ISS Knowledge Engineer	Technical Director
Marketing & Communication ISS	ISS	Community Manager Community Advocate	Senior Analyst
Standards & Policy	Government PM	Technical Rep ISS	Knowledge Engineer Technical Director Senior Analyst
Quality Control Team	ISS	ISS Technical Rep	Senior Analyst Technical Director
Administrative Team	Government Admin	Government Admin	Contractor PM

Table 1. Integrated Project

sustain existing users, and develop new communities of practice. Figure 1 (preceding page) depicts the names and functions of the teams. Table 1 provides a description of each team's nominal membership. Secondarily, the teams operate the KMN and sustain existing users after the communities have been developed. These teams are primarily designed to participate in discrete stages of detailed communities of practice development process.

The PM team is responsible for overall direction and execution of a campaign plan. It is also the final ap-

materials are developed and provided for all personnel who will be involved in supporting and using the community of practice (Community of Practice Manager, [CPM] Community of Practice Advocate [CPA], Instructional Systems Specialists [ISS], other users). The community of practice development team must perform, among other things, the following functions:

- *Project Concept* - What, how, when, and who of the development project.
- *Readiness Assessment* - How well is the commu-

nity prepared to accept the impending changes rendered by the community of practice development effort?

- *Vertical Alignment Methodology* - How does the work of the selected community support overarching business drivers?

- *Workflow Analysis* - Analyze work processes, document flow, controls, and applicability of information to determine approaches to improvement of performance.

- *Data Collection* - Gathering pertinent content for the creation of repositories for the communities of practice.

- *Metric Development* - Methodology for capturing relevant data useful for measuring results.

- *Project Time Line* - Visual depiction of the events, milestones, and deliverables from initiation of the development effort through conclusion.

There are two primary participants on the communities of practice development team. Members of the other teams throughout the development process support them.

The CPM is a resource of the community under development. The position is complementary to the advocate described below, but represents the resource focused on the KM effort from the user's point of view. The individual is a person who is very familiar with all aspects of the community and its mission. The manager must possess the interpersonal skills and leadership qualities to lead and manage the development activities for a given community. The individual works closely with the advocate to guide, direct, and participate in all aspects of the community of practice development process. The manager is particularly involved with the following:

- Selecting material used to initially populate the KM repositories
- Selecting and encouraging SME
- Initiating and facilitating collaboration activities and conferences
- Encouraging and registering new members of the

community

- Selecting and implementing all KM interventions
- Project oversight at the community level
- Participating in implementing all DL activities for the community
- Participating in implementing workflow and other process oriented activities
- Controlling access and participation in the community
- Recording and reporting community of practice development progress

The manager is dedicated to one community and is initially assigned to work community activities on a part-time basis. As the community matures or as resources become available, the manager and other members of the community take on total responsibility for their community.

The CPA is an individual used to assist the CPM in developing the community. The value-added benefit of an advocate is the infusion of community development effort with outside, trained resources. The advocate is responsible for conducting surveys and analyses, assisting the manager with developing the business plan, selecting and implementing appropriate interventions, training and coaching individual members of the community, and otherwise engaging in all aspects of the development process. The workload of this individual is one or two active community development assignments at a time. The advocate will focus on a given community for 3 months to a year. When the community development process is complete, the advocate will continue to support the community, but with less focus. In a mature KM environment, the advocate will have one or two active development communities at a time, together with several communities that are in sustainment mode.

The technical team is responsible for KMN version releases, technical reports, and systems migration, as well as tracking, reporting and resolving customer change re-

quests. The team provides both a methodology and technology to assist the AMEDD in its efforts to identify, evaluate, and select the best of new and emerging technologies for both clinical and administrative environments.

The marketing and communications team is responsible for planning and implementing the change program, communications strategy, and the performance measurement program. This includes development and execution of both external and internal marketing communications plans. The plans will include programs to attract large numbers of registered KMN users. Such efforts include, but are not limited to: briefings, collateral materials, trade show support, and conferences. The team will also have input to the development team with regard to the look and feel of the KMN interface.

The standards and policy team is responsible for managing the KM technical architecture. This team develops and maintains the configuration management criteria and conducts reviews to ensure the integrity of the various system components. The team also is charged with ensuring the development of appropriate AMEDD KM standards and policies.

The quality control team is responsible for ensuring that the design of the KMN reflects consistency and ensures the quality of the content in the area of training and other materials that are made available on the KMN. This team is particularly engaged in the KMN's DL platform. Its team of ISS also form separate IPTs that are assigned to teaching departments and others engaged in the creation of DL products delivered over the KMN. Their primary function is one of consultation, but are expert at critiquing courseware products ensuring quality products that actually teach, meet rigorous Army academic standards, and that the media used to create such courses is consistent with the academic content.

The administrative team is responsible for project administrative support to include budget, contractual activities, meeting minutes, travel planning, conferences, demonstrations, and the acquisition of necessary project equipment and supplies. The team also provides KMN users with Help Desk assistance such as registration tasks

(passwords, etc) and general information and referrals. The team also provides the mechanism to accept and disseminate user feedback on the system, ensuring that the communities always reflect the needs and desires of the user. In most cases, the teams that make up the PM structure consists of two or more individuals who may also be members of one or more teams and except for contract personnel, are not solely dedicated to the KM project.

The Process

The Technology Readiness Model, EDS's extrapolation of the Software Engineering Institutes Capability Maturity Model, was used to serve a twofold purpose. First, to predict the scope of work to implement further KM interventions based on organizations' level of readiness. Second, to advance the organization to higher levels of performance.

The AMEDD's level of readiness was assessed to be a level 3 (on a scale from 1-5 with 5 being ideal). The readiness level was determined through a series of semi-structured interviews along five axis: (1) presence of communities of practice; (2) adaptability to change; (3) process orientation; (4) readiness for technology; and (5) an organizational culture that supports human development and excellence. The aggregate of the AMEDD's dimensional scores was mapped onto a spider graph to portray the group assessment and highlight areas to focus on. The higher the axis the nearer to the ideal.

The combined efforts of the EDS team and CHES team resulted in an adaptation of the EDS KM progression model that focused the vision of the KMN for the AMEDD. The progression model is a systems view of organizational change with four inter-related levers (process, people, technology, and culture) that advance the organization up the readiness model. By knowing how, when, and where to pull the organizational change levers, a coordinated organizational change occurs.

The systems view of KM helped to decide on a vision facilitated by the KMN. The vision would allow the AMEDD to become a high performing, learning organization, optimized to address critical success factors for

the future. Work in KM has surfaced ten critical success factors for a successful KM effort (see Table 2). This vision can be attained through the use of the KMN in six ways:

- Creating small communities of practice prototypes to research and refine KM interventions and knowledge services and, once established and flourishing, to expand them as needed.
- Replicating successful interventions moving KM from a discipline to a “science.”
- Creating standards which includes policies, procedures, training, etc, for users of the KMN.
- Providing a secure environment in which to share and create intellectual capital and fuel innovation.
- Providing a stable and reliable technological platform to perform business activities.
- Addressing critical cultural nuances to facilitate change.

<ul style="list-style-type: none"> • Executive buy-in • Early adapters at the worker level • Change Management • Business Value • Infrastructure • Organizational Learning • Governance Structure • Technology • Value Proposition • Successful Prototypes
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Table 2. Critical Success Factors

In order to understand the business value of KM, four general work tasks representing the areas where most of the work occurred were derived. These work tasks

were organized and managed by the Program Management Team Structure. The tasks included:

- *Community of Practice Development* - A significant amount of effort took place in this area. The work performed consisted of implementing and measuring the value of targeted interventions, registering and training users, and encouraging the use of KMN in everyday activities. A targeted intervention was selected for its ability to demonstrate the business value of KM within a given community. Targeted interventions were implemented within five AMEDD communities of practice, some of which were selected from existing communities.

- *Operations and Maintenance (OM) of the existing KMN* - A large effort was required in the operation and maintenance of new and existing communities of practice. Work performed in this area consisted of document processing, user support, and technical support. The OM activities support both communities of practice under development and communities in sustainment status.

- *Technical Development* - This area involved the technical effort necessary for continuing the development of the technical infrastructure, implementing a significant DL capability, and improving the “Look and Feel” and navigation of the KMN user interface. The work performed is primarily one of a traditional technical development project involving the management of software engineers, designers, testers, and operators.

- *FYs 1999 and 2000 Related Tasks* - While the Campaign Plan for FY98 focused on demonstrating the business value of KMN, a number of parallel activities occurred during FY98 in order for work to commence in a timely fashion in FY99 without costly startup.

- *KMN* - Development of a long-term plan and strategy.

- *Creating integrated definition models, which relate KMN to other activities in AMEDD* - An activity which will aid in understanding the role of KMN in other health system programs.

- *Documenting the existing technical architecture* - An activity necessary for future enhancements of the technical infrastructure and introduction of more com-

mercial off-the-shelf (COTS) products and solutions.

The work performed in the communities of practice is ultimately involved with encouraging a given community of practice to adopt and perfect the capabilities of KM in order to improve their daily work effectiveness. Figure 2 depicts a high level concept of operations, which highlights the principle activities necessary to develop any given community. All community development activities begin when a community of practice has been identified for development. This normally comes about in one of two ways:

- A result of members of the communities of practice requesting participation and a subsequent analysis of its suitability for KM and potential success.
- A result of management assigning participation based on the communities suitability for KM and potential success.

In each case, an assessment of the KM readiness of the community is initiated using a (Subjective, Objective, Assess, and Plan) Analysis. This readiness exercise looks at various aspects of that community to determine whether it has the need, willingness, and appropriate characteristics for a focused KM effort. Once a decision has been made to “develop a community of practice,” the following set of activities takes place in roughly the same sequence over a period of months or years:

- *Resources are assigned.* This includes a CPM who represents the user community, a CPA representing the KM team, and other support resources as appropriate.
- *A business plan is developed.* Following standard project management discipline, a plan is developed which sets out milestones, activities, and resources required for a successful effort.
- *KM interventions are created.* The exact mix and nature of the interventions to be used are highly dependent on the community itself. These interventions come primarily from a standard set with proven value. Some interventions are specialized to meet the needs and nature of a particular community of practice.

- Users are identified, registered, and trained.
- The selected interventions are implemented. The implementation schedule may vary from one selected intervention to the next. Some interventions mature quickly while others may require months of intense effort. The community’s areas of concentration are mapped to the six AMEDD drivers identified earlier in this article. An extrapolation of Dr George Labovitz’ vertical alignment concept, outlined in his book *The Power of Alignment*, is applied. This exercise allows the community to identify its impact on resolving enterprise-wide problems while allowing those at the enterprise level to understand the efficacy and effectiveness of KM as a management strategy. Additionally, this methodology allows the CHES to understand and design the “science” of KM so successes can be replicated.
- Operations are stabilized and supported as existing interventions are growing in use or value and as new interventions are being implemented.
- A specific exercise is conducted to assess the value of the work performed and the interventions, which are being implemented.

The development of a community of practice is a continuous effort lasting over several months or years. It begins with a prototype and once its efficacy has been established, it undergoes one or more cycles of KM interventions. Each intervention makes it more productive and effective as a community. As one community iterates, others in the same or related organization are undergoing their intervention cycles. Eventually, these isolated communities begin to interact and overlap in their use of KM interventions. As success is achieved, the scope of the effort can be expanded. The end result is a high performing organization better able to meet its needs and goals. Success is measured by community buy-in, signified by a self-sustaining community that flourishes and grows with little to no interventions by the PM team. Success is also measured by cost avoided, savings realized, productivity increases, decreased cycle times for learning, the creation and preservation of intellectual capital, level of collaborative activity, and leveraged lessons learned.

The community of practice development process

is a complex, but predictable sequence of activities. The activities vary in duration. The detail and specific nature of interventions and events are adapted to the needs of the community being served. The skill sets and experience required for successful execution are tailored to fit the needs of that specific community. However, experience with implementation of communities of practice on the KMN to date has shown that the sequence of events leading up to development of a given community follows a standard path.

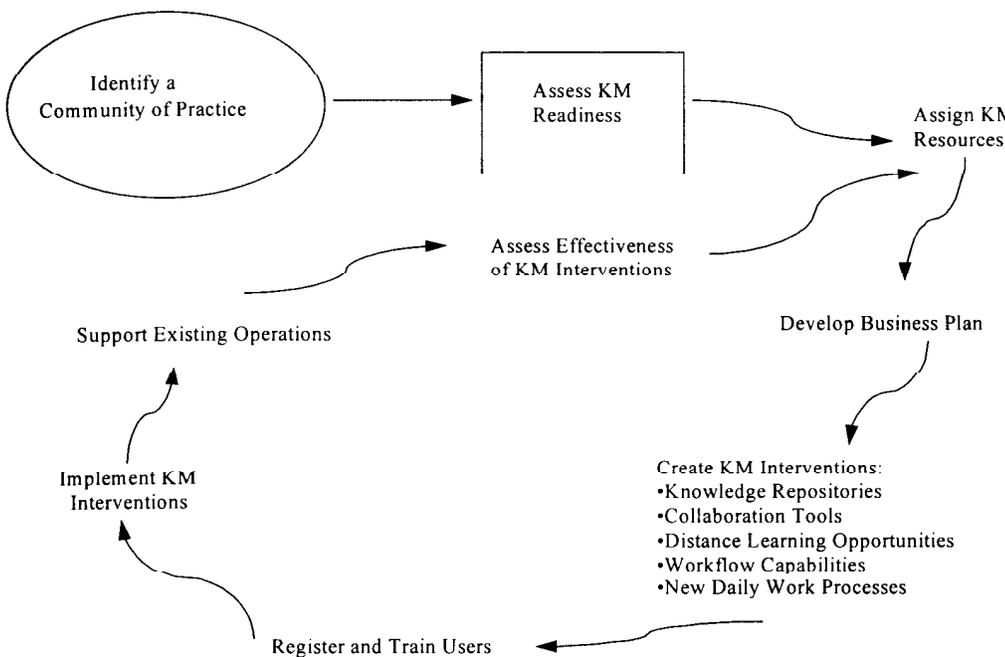


Fig 2. High level concept of operations.

Figure 2 sets out the standard flow of the detailed community of practice development process. This process is repeated in each of the communities that have been selected for development or enhancement.

An important aspect of Figure 2 is that it delineates the responsibilities for execution of the community of practice development process. The responsibilities have been assigned to a number of IPTs, which are described in detail later in this article. There are also specific labor types and skill sets that must be applied at particular phases of the process.

The community of practice development process

calls for rigorous analysis of the community and KM interventions on a regular basis. This analysis takes the form of surveys or assessments, which measure the effectiveness of the interventions, and monitors the state of readiness for a given set of interventions. The work is usually performed by individuals who possess interviewing and surveying skills and have a background in KM. Their prior experience with a given community or its mission is preferable although not required. The following list is representative of the instruments which may be used in this process:

KM Needs and Readiness Assessment, Information Technology Assessment, Analysis of Business and Technology Drivers, Analysis of Business Process Information Needs, and Change Management Preparation.

Key to the concept of the KMN is the idea of specific interventions, or activities which are designed to further the notion of KM. Initially, the interventions are technology based and take the form of databases, libraries, collaboration tools, conference capabilities, etc. In a more advanced community of practice, inter-

ventions take the form of initiatives that change the culture and the way people think about performing their jobs. Each intervention is designed to improve the collection, dissemination, and use of knowledge. Work in the early stages of the AMEDD's KM initiative identified key interventions or tools necessary to proliferate KM throughout the AMEDD. They include, but are not limited to: libraries, DL, virtual collaboration tools, newsclipping service, worker views, SME, skills and knowledge bank, frequently asked questions (FAQ), work flow products, communities of practice, lessons learned repositories, links to internet sites, and many others.

The KMN Components

The work in the KM project has centered primarily on five major components. The Virtual Schoolhouse, Communities of Practice, Virtual Collaboration, the Library and the Newsclipping Service, and the Skills and Knowledge Bank and SME database. The virtual schoolhouse consumed at least half of the effort from Apr 98 to the present.

- *The Virtual Schoolhouse.*

As stated earlier in this article, 70% of the Army's budget is spent on people and training. With fewer people now in the service, training dollars have also shrunk. The Army has undertaken a massive effort to reinvent education and training in the military with their current DL program. This effort is consistent with the changes expected in the workforce over the next 10 years. The U.S. Department of Labor estimates that in the next 10 years, 75% of the workforce – 90 million people – will need to be retrained. United States companies already spend billions of dollars annually to train their employees. These statistics warrant executives at the highest level of the military to make the kind of commitment to training and education currently undertaken by both Training and Doctrine Command (TRADOC) and the AMEDDC&S.

The KMN virtual schoolhouse was created to provide AMEDD workers with training and education that could be “pushed” to them as a prerequisite to resident training or “pulled” by the workforce as a skill refresher or skill developer. The virtual schoolhouse consists widely of teaching departments within the AMEDDC&S, though the organizational mix is limitless and soon will include the Virtual Military Health Institute, a tri-service clearinghouse of education and training materials for healthcare leaders. The AMEDDC&S is involved in an important parallel effort of developing its DL program. In 1996, the Chief of Staff of the Army directed TRADOC to implement the Total Army Distance Learning Plan (TADLP). The TADLP mission is to exploit information technology to train soldiers and units in both the Active Component and Reserve Components (RC).

In the TADLP, DL is defined as “The delivery of standardized individual collective and self-development training to soldiers and units at the right place and right

time through the application of multiple means and technologies.” This implies that the teacher and the student are separated by place and often by time as well. The primary technologies for DL include multimedia CD-ROMs, video teletraining, WBT, and the most traditional form-printed texts.

The military medical training vision is that individual and units will be trained and deployable anytime, anywhere. To accomplish this vision, we must re-engineer military medical training development and delivery. The DL goal is to make DL an integral part of military medical training. To accomplish this goal, the AMEDDC&S has embarked upon an aggressive DL plan requiring course directors to analyze each course for *possible* conversion to some type of DL modality and reduce in-resident training by 50% by the year 2001.

The implementation of DL within the AMEDD has required some reorganization, new ways of constructing development teams, and establishment of new procedures designed to develop DL products. The AMEDDC&S is committed to a combination of contracted development of DL products and, on a lesser scale, in-house development. A new office formed to help implement these efforts is the Advanced Training Office (ATO), which was formed by combining personnel dedicated to traditional correspondence courses as well as a few employees dedicated to innovations in instruction.

The roles of the ATO include the support of IPT, the in-house production of modular DL courseware, and a DL consulting service for the course directors. Courseware must be produced following instructional systems procedures.

There are four course models for the development of DL at the AMEDDC&S. All include at least one phase of DL, with the ability for collaborative work on the KMN:

- The first model, Initial Entry Training (IET), has no DL pre-phase because of the inability to notify students and have them participate before arriving at the institution. However, there can be a DL/KMN post-phase for IET, both to teach tasks not taught at the institution and to sustain tasks after the resident phase.

- The second model, Officer/Noncommissioned Officer (NCO) Leadership and SKILL Progression Courses, including most courses after IET, include a KMN/DL pre-phase, then a resident training phase, followed in turn by a KMN/DL post-phase.

- The third model, Post-Graduate Professional Short Courses, also includes a KMN/DL pre-phase, but the middle phase is attendance at a professional conference, followed by a KM/DL post-phase.

- Some courses are entirely DL courses. Examples of these are the Combat Lifesaver Course and the Field Sanitation Team Course. These involve group learning as well as individual study. As DL classrooms are used more extensively, these courses may also follow a similar model as outlined above, with the classroom phase taking place in dispersed locations.

The AMEDDC&S uses a nine-phase approach to develop DL. Phase I, DL Analysis, is performed by the teaching organization with assistance from the ATO and the Dean's Office. During Phase I, the participants review portions of a resident course to identify which tasks will be reconfigured into DL modules. Phase II, Project Definition and Planning, is a joint effort between the teaching organization and the ATO. During Phase II, they develop a business plan, define the membership and roles within the IPT, and gather and review source materials such as lesson plans and references. In Phase III, Design, the project manager guides the IPT to prepare the course map, select media, and further refine the project plan, including time lines. During Phase IV, Development/Scripting, the IPT develops scripts, storyboards, and text drafts. During Phase V, Data Entry/Programming, the IPT uses DL authoring tools to develop the actual instruction, performs pilot testing, and revises the course to meet the course directors requirements. During Phase VI, Quality Control and Testing, the IPT reviews the content of the modules, makes changes as needed, performs alpha testing and validates the materials with the target audience. During Phase VII, Implementation and Marketing, a marketing plan is developed, training is provided as needed to members of the teaching organization and students and the materials are provided to students. In Phase VIII, Revision, modules are reviewed periodically

and revised as needed. Phase IX, Evaluation, is a continual process pertaining to all phases of development.

The Army dollars provided through the TADLP have enabled the AMEDD to do significant DL development and establish DL classrooms. In addition, TRADOC has provided funding for training of AMEDDC&S ISS to enable them to succeed with the new technologies for DL development. The KMN provides the chassis for delivering DL products over the web. The platform provides a cohort-based, schoolhouse-paced distributed learning environment. Additionally, KMN supports a heterogeneous courseware environment that allows the delivery of courses developed in-house, developed by contract personnel or COTS courses. The KMN also provides students and faculty with library references, course registration, and collaboration tools. The DL has become an integral part of the KMN's services toolkit and is used as an intervention to measure the effectiveness of KM.

One example of the impact of KM on the AMEDD is the NCO Academy. In Apr 98, the NCO Academy needed an Instructional Management System (IMS) to deliver its newly developed web-based courseware. The system had to be operational by Jun 98 in preparation for the 1-99 Advanced NCO class. The NCO Academy moved 1 week of their 13-week Advanced NCO course from traditional classroom instruction to DL via the KMN's virtual schoolhouse. Since their training funds and instructors were diminishing, the Academy was compelled to find a way to deliver the same amount of training at reduced cost and sustained quality. By moving part of the course to DL, they anticipate a cost avoidance of \$40,800 this year. Further, as they pay off their investment and move additional course weeks to DL, they expect their savings to grow over time. An additional benefit for NCOs taking the course has been a reduction in the amount of time spent away from their home units and families. There are, however, remaining issues. For example, better formulas are needed for measuring manpower productivity, establishing staffing standards to include on-line preparation and counseling. Better documentation is also needed as to how the KMN systems can interface with Army Training Requirements and Resources Systems and a standardized methodology for benefit realization. Studies are needed of the costs and impact

of DL development and time for on-line commitment of instructors and staff. Regulatory guidance for RC training is needed to ensure that the benefit realization methodologies account for the training requirements of the RC.

Recent experience with the class 1-99 Advanced NCO Course indicates there must be improved courseware standards and testing and development procedures to guide contractors and in-house staff. Also, the KMN and its IMS must become more user-friendly, freeing the soldier to concentrate on completing the course and not mastering the technology. Installation Directors of Information Management and Medical Treatment Facility (MTF) Information Management Officers must also be educated about DL and assist soldiers with system configuration, scaling fire walls, and other technical issues. More funding is required to reach the goal of 50% reduction of in-resident training by the year 2001. Management strategy changes in the future must focus beyond the virtual schoolhouse and include external stakeholders.

- *Communities of Practice.*

The KMN currently includes numerous communities of practice. These communities are constructed along organization and functional dimensions. Each community is functionally capable of supporting the stated principles and recognized needs of the AMEDD. The primary activities of a community of practice centers on the creation and sharing of knowledge. Each community of practice is provided with the ability to build library repositories, SME databases, worker views, virtual conferences, and others to be discussed. Communities are encouraged to cross organizational, geographical, and disciplinary lines to establish best practices, share lessons learned, and solve pressing problems. These communities reflect the changing business model ushered in by rapid change, technology, and economic conditions. During the 1998 World Congress on Technology, Mr Thomas Trainer, CEO of Eli Lilly and Company, stated, "Powerful KM tools have become critical to success in every aspect of the pharmaceuticals business - and healthcare generally. The U.S. now spends one trillion dollars a year to get well and stay well. If 5% of that amount goes for information technology, that is more than \$50 billion. How much of the nation's resources is the healthcare industry wasting

by not using documented world-class practices that might lower information technology cost or increase its impact by 20% or more? Information is what defines medicine today. The value of better information can be seen in many ways but none more important than the effect on patients waiting for a cure. ...We know what we value - we just have to do an ever better job of managing knowledge and information to deliver it."

At that same congress, Michael Dell of Dell corporation stated, "We have moved into an era where information technologies hold greater promise than ever before to shrink time and distance." Mass manufacturing - the old "one-size fits all" model is being replaced by mass customization. Intranets and Internets are blurring the traditional boundaries between suppliers and manufacturers and manufacturers and customers. This is enabling new business models that leverage virtual rather than vertical integration.

Hickman and Silvashy, in their article entitled *Implementing Knowledge Sharing: Organization-wide*, credit the Gartner Group with reporting that heavy investment in knowledge management is likely at some point to change both the rate of change (or innovation) itself in many industries and the ability of enterprises to respond rapidly and successfully to externally driven change.

- *The Skills and Knowledge Bank and SME Database.*

In Apr 98, a skills and knowledge bank was added. The skills and knowledge bank is a self-certifying database that allows KMN users to share what they know about and what they know how to do. This feature allows users to tap into a wealth of knowledge that heretofore was only tacitly known, but now through this feature, made explicit. Eventually, the skills and knowledge bank will allow the AMEDD quick access to members of the organization who may hold the key to solving enterprise-wide problems. Additionally, the KMN SME database has evolved into a community-sanctioned repository of formal and informal experts its community of practice can call upon to work various issues and problems in their particular field of expertise. The next evolution of the SME database will include a formalized methodology for locat-

ing and certifying a member's expertise. This evolved state will increase the confidence of KMN users outside the community of practice and solidify the experts' expertise. The SME repository, combined with the skills and knowledge bank, have the potential for providing a powerful, rich, and tailored resource for quickly assembling teams of experts to work complex enterprise problems.

- *The Library and Newsclipping Service.*

The KMN contains a library filled with documents that are specific to a given community of practice. The library also contains reference material, briefings, courseware, and other items that are helpful in the daily work activities of the users of the KMN. The library is considered a knowledge repository. As the KMN matures, the library will evolve into an active knowledge repository with features to assist users with the ability to: determine the validity of documents, access the authors of documents through e-mail, and control the updating of documents.

The KMN library also contains search engines that enable a user to quickly locate relevant documents using full text search facilities. The library is maintained by one or more full-time KMN Librarians also referred to as "Cybrarians." The documents themselves are edited by one or more full-time editor/writers.

In the future, resident libraries throughout the Medical Command (MEDCOM) will be able to be accessed through the KMN. Workers will have access to the same on-line databases available at their local MTF. Those MTF's with small offerings will be able to provide full service digital library capabilities to their healthcare providers that have been seamlessly integrated into the KMN.

A newsclipping service is also among the features of KMN. The clipping service provides news and information on more than 147 subjects. These scans thousands of journals, periodicals, and other news sources that the user can tailor to fit their specific interests. The clippings can then be sent to the user's e-mail account on a daily, weekly, or monthly basis. The user can also opt to visit the service as often as preferred and choose among an array of topics and articles. The library and newsclipping

service are meant to provide contexted and refined knowledge and information to the user that can reduce the user's search time, increase knowledge and collaboration, and reduce cycle time for learning.

- *Virtual Collaboration.*

Another key concept of the KMN is collaboration tools. These tools are COTS products, which are seamlessly integrated into the KMN. E-mail is the traditional method of asynchronous collaboration. Other more sophisticated products, such as Weboard and ICHAT, provide a wide array of features that allow members of a community of practice or DL students to collect, share, and distribute information.

Business Value

The business case was designed to meet four goals:

- To understand and articulate the business value of KM within the AMEDD, measured and expressed in the terms of dollars saved or cost avoided, productivity increases, cycle time decreases, quality improvements, and customer satisfaction.

- Link business problems at the community of practice level to the AMEDD business drivers.

- Identify KM interventions that can be applied to the community problems to alleviate or resolve them.

- Measure the effect of interventions on the community problems.

During the 1998 Campaign Plan, four communities of practice were selected to participate in developing the business case. A development plan was written for each community, which detailed the background of each community, and the tactics needed to apply KM practices to the community. A four-phase development process began with a Discovery Phase, which primarily determined the community's readiness for KM. The Design Phase used a vertical alignment methodology, mentioned earlier in this article, to relate community-specific business drivers back to AMEDD-level business drivers and to design KM interventions which addressed those

community-specific drivers. The Development and Implementation Phase began the process of applying KM interventions to targeted areas of the community. The Test and Evaluation Phase continued to apply interventions while measuring and evaluating their progress. Quantifiable measurements were used to determine the business value of KM, primarily to measure tangible assets such as cost avoidance/dollars saved, decreased cycle time customer satisfaction, KMN usage and content availability, and KM funding.

Regardless of their level of prior exposure to KM, all selected communities followed the same development process and assessment standards. Each selected community was assessed for a different period of time due to the ramping up of the KM project. The longer a community had exposure to KM during the assessment period, the more data that is available to support the business case.

One example of a successful KM intervention on a community of practice is the AMEDD Logistics Community. This community possessed all the makings of a successful trial. Brigadier General Ogden DeWitt commissioned the program management team to explore the impact of KM on the Command Logistics Review Program (CLRP). The initiative received wide support throughout many of the MTF logistics offices within the Great Plains Region. Of particular note were the logistics offices at Fort Hood's Darnall Community Hospital and Fort Sam Houston's Brooke Army Medical Center, among many others, who had early adapters leaning forward to embrace the concept and assist with its implementation. Darnall's Chief of Staff COL Ray Burden and Chief of Logistics LTC Haroguchi provided superior support as well. The MEDCOM appointed MAJ Roake as the CPM. Major Roake, also an early adapter, realized the potential benefits that could be achieved and lead the process through to his subsequent change of duty station. The initiative uncovered four areas of concern. The impact of staff reductions at the MEDCOM and dwindling financial resources left the staff with fewer staff members available to travel on the CLRP to educate the field or provide assistance. The high turnover of personnel also resulted in the loss of institutional knowledge. In turn, the working environment was unstable, there was duplication

of effort and, in general, the team was less productive. The team also found itself overwhelmed with information as administrative support staff also dwindled. However, demands for assistance from the field had not subsided and, in fact, may have been exasperated by the personnel losses. The KM interventions called for the creation of a lessons learned repository that would publish Joint Commission on Accreditation of Healthcare Organization (JCAHO) survey results and processes for field review. An on-line conference to discuss important topics such as supply standards, materiel and environmental services, and many others were also provided. A SME registry was established and worker views were developed to provide the community with expert advice in various logistics disciplines. A library was also established to provide the community with core logistics information, schedules, organizational changes, presentations, and event listings. As a result of the KM effort, within as little as 6 months, the prototype community experienced an estimated 10% reduction in time spent searching for information regarding the JCAHO survey process. A total of 20 SMEs spanning the entire gamut of the supply discipline were identified and made available on-line to soldiers in the field. The collaborative work within the community allowed the regions to share two supply standardization processes that resulted in \$192,000. This collaborative sharing experience, coupled with the successful CLRP prototype, the medical logistics leadership has opted to expand the CLRP community prototype to a community that represents the entire medical logistics community of practice and to undertake an ambitious MEDCOM-wide Supply Standardization program to improve their volume buying power. The goal is to recoup \$100 millions over 5 years.

Lessons Learned

A successful KM project begins with a good governance structure. The use of highly decentralized ways of organizing work, such as IPT, has proven to be extremely effective in this work. A successful KM project must also have executive buy-in, but simultaneously, there must be those workers in the trenches that are early adapters willing to lean forward, step out on a limb, and do the work and analysis that ultimately the project lives or dies by.

Executives need to understand the business value of KM. In a resource constrained environment, every dollar counts and competition for shrinking dollars is keen. The KM return on investment must show a significant return on investment in both quantifiable and qualifiable ways. Even in the military, value proposition is extremely important in changing the culture. Providers of knowledge services must be willing to give the user something they “delight” in. The technology must be capable of providing repositories of information and knowledge that are deep, rich, and impact the daily activities of the user. The infrastructure must be sound and stable. That’s the number one focus of the 1999 effort. The knowledge services by which the user

ala carte menu of knowledge services for the workforce. In all, KM promises to be a new business model for organizational learning – the catalyst for organizational performance improvement.

Conclusion

Thus far, the CHES’ work in KM leaves us cautiously optimistic; obviously more study is required. Nevertheless, KM appears to be a discipline that lends itself towards replication of success. Table 3 summarizes the preliminary understanding about how certain KM interventions might be applied towards reducing very broadbase enterprise level problems that can be

KM Interventions ⇒ Business Drivers ↓	Publishing Information	Collaborative Discussions	SME Registry	People Directory	Knowledge Worker Views	DL	FAQs
Less Resident Training						✓	
Leaner Workforce		✓	✓	✓			✓
Fewer Dollars		✓				✓	
Information Overload	✓				✓		
Rapid Change		✓					
Erosion of Intellectual Capital	✓		✓	✓			✓

Table 3. Knowledge Management Interventions to Business Driver Impact

learns must be multifaceted, providing a forum for collaboration, sharing of ideas, and news services that push or pull late breaking news to the user. Education and training materials must be made available so that they can be pulled when needed or pushed when required. A database of SME’s that the community respects and depends on must be developed. There’s also no need to reinvent the wheel when it come to KM. There are a plethora of COTS products and technologies that can be seamlessly integrated to provide an

translated and directed towards very specific problems within a given community.

The Chief of Staff of the Army summarized the Division Advanced Warfighting experiment in 1997, and stated that the results of the AMEDD KM initiative signals “the beginnings of a fundamental cultural change in how the Army conducts business.” Like Peter Senge, we have discovered that “the organizations that excel in the future will be organizations that dis-

cover how to tap people's commitment and capacity to learn at all levels in an organization." The KM has the potential to integrate not only the AMEDD, but the Army as a whole, as it climbs towards the summit of the new millennium.

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Psychological Aspects of Deployment: The Bosnian Experience

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This article details the psychological impact of deployment on soldiers during the initial 12 months of the peace enforcement mission to Bosnia. The five phases of deployment are examined. Unique aspects of this peace enforcement mission are discussed. Implications for mission effectiveness, soldier well-being, and retention are discussed.

Introduction

In Dec 95, the Dayton Peace Accords provided for the deployment of a multinational Implementation Force (IFOR) to separate the warring factions and enforce the peace in Bosnia-Herzegovina. This article will provide a discussion of the five separate and distinct phases of the mission: pre-deployment, deployment, sustainment, redeployment, and post-deployment.

Pre-Deployment

The onset of this phase began with a warning order for potential deployment. This phase ended with the actual movement of individual units. This had a duration of 1 to 3 months.

Despite rigorous and challenging Army training, the deployment notification was a shock to many soldiers. Intense feelings were expressed. Some soldiers appeared quite excited and eager, while others were much more reserved and restrained. Several soldiers volunteered to go in place of soldiers who did not want to deploy. Regardless of motivation, soldiers were immediately forced to make decisions about relationships, family issues, marital issues, child-care plans, profiles, medical retention boards, military schools, reassignments, re-enlistments, and separation or retirement from the service.

The alert notification created an intense desire for information, regardless of the source.¹ Achieving balance was an immediate and ongoing challenge for many leaders. Providing too much information would inadvertently stress-out some soldiers. Deployment plans were very fluid and changed rapidly. As soldiers adjusted to one set of expectations, plans changed. On the other hand, providing too little information was also a problem. In the absence of information, rumors would propagate. Soldiers endlessly speculated on the necessity, the timing, duration, force structure, rules of engagement, and dangerousness of the deployment.

The pre-deployment phase was an extraordinarily busy time. Countless hours were devoted to preparation. At the unit level, issues such as readiness, supply shortages, deadlined vehicles, and load plans became the mission focus. Soldier readiness processing, dependent care plans, and medical fitness all took on greater importance. For some, the reality of impending deployment struck home while making out their wills.

Many soldiers expressed competing emotions ranging from total fear to intense euphoria. The fear was not only for personal safety, but also, had the training the Army provided been good enough? And by what standard would individual performance be measured? Meanwhile, excitement was also quite evident. Soldiers were

eager to do the job that they had been trained to perform in garrison. Some volunteers were motivated by adventure, while others sought a way out of unsatisfying military and personal situations. Many soldiers were enticed by the opportunity to earn awards and for career advancement.

Soldiers began to rely on past challenging experiences in order to cope with the uncertainty of the pre-deployment phase. Those with previously successful deployments appeared to contain their fear most effectively. Soldiers expressed alternating feelings of dread to bravado. A common saying was “we are trained and ready.” Overall, this was tremendously positive because it encouraged tight bonding and unity of effort by soldiers in order to be as prepared as possible.²

At home, the attributes that facilitated unit cohesion resulted in several military spouses complaining that it was as though their loved ones were already “deployed.” Not only did soldiers work long hours; they also conducted intensive training in the field. These absences clearly heralded the prospect of separation from loved ones during the holiday season. This process was further compounded by frequently changing dates of departure. Consequently, soldiers and their families went through the painful separation and good-bye process many times. A common occurrence, just prior to deployment, was for soldiers and their spouses to argue over finances, fidelity, and child care. In retrospect, these arguments were likely a result of the anxiety of pending separation. From a psychological perspective, it was easier for soldiers and spouses to separate if they were angry rather than sad or tearful.^{3,4}

Single soldiers also faced different challenges in the pre-deployment period. Who would pay their bills? Should they store their privately owned vehicles in government lots? Should they cancel the lease on their apartment? Would personal property be safely secured in the barracks? Most unfortunate were single soldiers whose leaves were denied. Being “locked-down,” single soldiers were unable to say their personal farewells to geographically distant loved ones. The most pervasive and prominent stressor was uncertainty. There was uncertainty not only about the date of the deployment, but also the dura-

tion and the rotation policy of the deployment. These three factors varied in intensity throughout the five phases of the deployment.

Deployment

The deployment phase is the period of departure from home base to the establishment of secure perimeters surrounding the base camps. This phase lasted approximately 2 to 3 months.

During the deployment phase, force protection was emphasized at all levels of command. Flak vests, kevlar helmets, and four-vehicle convoys were mandatory for all travel. Soldiers were directed to load magazines in their weapons. During the initial deployment, threat level was considered to be high for a terrorist attack or inadvertent minestrike.

Concerns about the 5 to 8 million land mines haphazardly strewn across the former Yugoslavia also necessitated an additional prevention measure: placement of sandbags on the floor of their High Mobility Multipurpose Vehicles. Likewise, soldiers placed sandbags and five-gallon containers filled with water across their windows to provide protection against sniper attack. Soldiers were told not to stray off bumpy and narrow roads due to the potential for land mines. The long, snail-paced convoy from the Intermediate Staging Base (ISB) in Hungary to the base camps in Bosnia was further delayed by muddy, icy, and unpaved roads in the depths of winter. Hence, absence of privacy to go to the bathroom proved especially difficult for female soldiers. An unsound, self-imposed state of mild to moderate dehydration was common during this period.

The deployment phase had many frantic characteristics similar to the Oklahoma Land Rush. There was a very real concern about setting up base camps on land known to be free of mines. Units often vied for the same real estate. Hoarding anything valuable was also a common occurrence. This even created a requirement to guard equipment from theft not only from civilians, but also from other soldiers. Fortunately, this “look out for number one” survival mentality dissipated when the sol-

diers and units recognized that they would be able to handle the stressors and challenges placed before them.

There were tremendous extremes in operational tempo (OPTEMPO) during the deployment phase. Key leaders and soldiers often went days with minimal sleep. Others complained of boredom, since their exact mission was not well-defined. This inequity of OPTEMPO also varied from unit to unit. Some units were in extremely high demand. For example, engineers and military police were needed to provide for the building of base camps and force protection.

The reality of separation from their families and loved ones hit home during the deployment phase. The ability to communicate home was a great morale boost. In some cases, several weeks passed before soldiers were able to call home. For most soldiers, reconnecting with loved ones was a stabilizing experience. For the minority who had “bad” phone calls home, the contact distracted their mission focus. Unfortunately, some of these soldiers became stress casualties with impaired ability to perform their mission.⁵⁻⁷

Several soldiers who were new arrivals to their units (just prior to the deployment) reported significant feelings of isolation. Old-timers had already tightly bonded and resolved to get through the deployment together. There was an unspoken question of whether the “new guy” could be relied upon or would be a liability. In a parallel process, smaller units attached from continental United States (CONUS) reported feeling like stepchildren of their new chains of command. Insightful leaders made deliberate efforts to actively integrate these new soldiers and attached units.¹ When this did not happen, there was a significant trend toward mission ineffectiveness.

The combined concerns of personal safety, separation from family, and desire to excel often led to heated emotions. Conflict with supervisors and peers was common. Most soldiers were able to move beyond these initial tensions. However, for some, conflicts that occurred at the very beginning became a perpetual cause for resentment. A lack of exercise, sexual intimacy, and privacy also characterized the initial deployment. The last was notable for soldiers working together long hours and

then having to sleep side-by-side without a break in contact or opportunity to blow off steam. Unfortunately, some of these conflicts resulted in disciplinary action when they would have been better attributed to stress.

Sustainment

The sustainment phase began when the base camp perimeters were secured and ended with the warning order to redeploy. This phase lasted approximately 6 to 8 months. It was dominated by a period of tremendous cooperation. There was some role confusion about doctrine versus reality during a peace enforcement mission. At times, it was unclear what each unit and/or soldier should be doing. Despite this, OPTEMPO extremes evened out significantly as work was distributed more equitably.

One of the most common concerns was the amount of time it took to complete everyday tasks. One of the generals even made a comment that “one equals three in the Balkans” because you had to plan on things to take considerably longer than you were used to back in garrison. At the soldier level, this was most evident in the need for four-vehicle convoys to go from one destination to another. Over time, an efficient mechanism of queuing convoys for travel outside the base camps evolved.

“Hootching” was another interesting phenomenon. Soldiers often found it very difficult to concentrate on their mission until they had a place to “hang their kevlar.” As a result, many built little cubicles, or hootches, in their tents with shelves and sheets for privacy. Once they had accomplished this, soldiers appeared to become significantly more mission-effective.

Force protection continued to be a pressing issue. Multinational forces often joked that the American forces were like “Ninja Turtles” because they were wearing their flak vests everywhere. Most multinational troops were not required to wear flak vests, travel in four-vehicle convoys, or load their magazines when leaving base camps.³ Most American soldiers understood that popular opinion at home would severely effect mission success if there were undue loss of life due to lack of preparedness. Some soldiers described themselves as “Prisoners of Peace.” Except for official business, soldiers were not allowed to

leave base camps. Soldiers reported feeling “locked down” to base camp because travel was only permitted for work details.

In retrospect, the truth lies in the actual morbidity and mortality figures experienced by the IFOR. The U.S. soldiers represented one third of the force, yet experienced only one seventh (7 of 50 or 14%) of IFOR casualties. Three soldiers died from heart attacks and two died from motor vehicle accidents. One soldier died when he attempted to disarm a mine without permission or training. The last soldier committed suicide.⁷ It is clear that the force protection measures implemented by U.S. soldiers had a successful impact. This impact was not only felt at the soldier level, but also through continued support for the mission back home.

The meaning of the mission was often a subject of open discussion. Some soldiers strongly believed that their duty was to separate the warring factions and to stop the holocaust caused by ethnic cleansing. Meanwhile, others expressed resentment that they were unnecessarily placed in danger and sacrificing precious time away from family. These soldiers believed a 1-year deployment was futile because the ultimate outcome would be resumption of civil war.

This was a very high-tech deployment. Satellite phones, e-mail, and the internet were accessible to most soldiers. E-mail became one of the more common ways to make contact with home. In spite of the numerous advantages of rapid communication, it was through the speed with which information traveled that produced the damaging consequence of rumors. Rumors and control of false rumors continued to challenge leaders. Tensions and conflicts were reported back to loved ones when they called home. Distortion and misperceptions spread quickly throughout the family support group (FSG) and back again to Bosnia-Herzegovina. Frequently, a soldier uninvolved in a conflict expressed greater outrage than did the individual soldier who voiced the original concern. Loosening of unit cohesion and damaging mistrust among soldiers was further aggravated by intense animosity within the FSGs as a result of baseless rumors. The most damning rumor involved an allegation of infidelity that was difficult to prove as true or false. Destructive

rumormongering was a cause for soldiers to become stress casualties. This often led to referral of the distressed soldier to the Unit Chaplain or Combat Stress Team.^{7,8} Managing information by leadership was crucial. It was important for the chain of command to keep soldiers informed, dispel rumors quickly, and maintain the mission focus.

There was also a general concern about careerism. Specifically, soldiers questioned the motivations behind the decisions of their leaders. Was a given decision made in self-interest or was it the right thing to be done for the mission? Concerns were voiced both privately and publicly. This added another layer of burden for leaders. As a result, leaders found themselves analyzing and agonizing over each and every decision.

Following the Sava River crossing, the lack of media reports in CONUS caused significant distress, especially for families. Many wondered if the American people had forgotten their loved ones.⁹ In fact, IFOR was so hugely successful that there was not a great need for media coverage. This perhaps was less true in the European Theater because of detailed reporting through “Stars and Stripes.”

A general order provided that there should be no alcohol in theater, to minimize accidents. However, tremendous effort was made by leadership to ensure morale and creature comforts. Reinforced tents, hot showers, good food, and bottled water were priorities. Morale, Welfare, and Recreation facilities were set up extensively throughout the theater. There were gyms with free weights and stair-masters, movie tents, libraries, and United Service Organization shows. Four-day passes allowed soldiers to go to Hungary where they could relax and visit a beer tent. Lastly, a Rest and Relaxation (R&R) program was instituted to allow 2 weeks at home station. On the whole, the R&R program yielded positive results by creating a milestone to break-up the yearlong deployment.¹⁰ However, many soldiers did report post-R&R blues for 1 to 3 weeks upon return to theater.^{11,12} Some, wanting to preserve their routine, opted not to take R&R.

Redeployment

The redeployment phase began with the warning

order to redeploy, reached a mid-point at the ISB in Taszar, Hungary, and culminated with arrival at home station. This phase lasted 4 to 8 weeks.

In many ways, the redeployment phase mirrored the initial deployment. It was a time of high OPTEMPO with multiple demands and sleep deprivation. First and foremost, the concern at the unit level was to locate all property and prepare for transport. Leaders put very intense pressure on their soldiers to ensure 100% accountability of all property. Likewise, during redeployment, the process of breaking down base camps began in order to return the land to its original state without any pollution or Environmental Protection Agency violations. Once again, this pressure led to increased work stress.

In the redeployment phase, soldiers, both individually and in small, informal groups began to review what they had accomplished. For many, this had been a difficult but satisfying year. For some, this represented a time of disappointment due to unmet expectations.¹ Soldiers questioned whether awards and efficiency reports would adequately recognize their efforts. Leaders were faced with making tough choices on who was most deserving.¹ All soldiers in the deployment were eligible for the Armed Forces Service Medal or North Atlantic Treaty Organization (NATO) Medal, provided they had stayed in theater a minimum of 30 days.

Soldiers also began to think about their home situation. Once again, issues in marriages and relationships came to the fore. Phone calls increased and expectations about what life would be like upon return from home were discussed in detail.³ Plans for the reunion were made. The role of the family support groups during the reunion was clarified and implemented.^{13,14}

Leaders were extremely concerned during this period about soldiers becoming "short." Specifically, they were concerned that soldiers would be more prone to accidents. Safety and force protection measures were re-emphasized. An overlapping, covering force of approximately 6,000 soldiers complicated the redeployment. This created periods of temporary overcrowding, as well as brief competitiveness with the new force that was coming into theater.

During a mandatory 7-day redeployment exercise at the ISB, soldiers again had an opportunity to put their year into perspective. There, soldiers recounted "war stories" over a beer. Extensive redeployment health survey questionnaires were completed. Chaplains also encouraged soldiers to take time with family and discussed the pitfalls and expectations about homecoming.¹⁴

Post-Deployment

The post-deployment phase began with the arrival to home station. However, the end point appeared to depend on the individual soldier – anywhere from 3 to 8 months. This period was notable in that soldiers were very anxious to take leave and reunite with loved ones. Leaders and chaplains cautioned soldiers to go slow, to be fiscally prudent, and to not drink to excess.¹⁴

From the leadership perspective, getting back into the swing of garrison life was truly a challenge after block leave. There was a high turnover in personnel as soldiers had been held up from reassignment or returned to their original units having served as back-fill. Consequently, there was a general drain of experience from many units. In addition, leaders struggled as get back on track with more predictable training schedules.

During this period, soldiers continued to remain anxious about adequate recognition for their efforts. It was incumbent upon leaders to make sure this occurred in spite of the fact that new missions and new demands were now being asked of their soldiers, as well as new soldiers coming into the unit.

Despite an early honeymoon phase with their loved ones, soldiers experienced some cognitive dissonance between their deployment lives and their home lives.³ While deployed, soldiers expressed that their lives were in many ways much simpler. Soldiers only had to meet the demands of their immediate supervisors. Upon return home, soldiers were faced with the challenges of integrating their unit's demands and the demands of their private lives at home. Many families expressed feeling abandoned during the 12 months of deployment. Married soldiers felt pressed to make up for lost time and missed milestones. Meanwhile, single soldiers reported experi-

encing loneliness with the return to the barracks and the loss of camaraderie and closeness during the deployment.

The post-deployment phase may be the most important phase from the point of view of a soldier's psychological well being. During this period, soldiers tried to put their duty into perspective. Soldiers evaluated the deployment's impact on their marriage, their children, their career, and their sense of personal accomplishment. This time of personnel assessment had tremendous implications for deciding whether or not to re-enlist and stay on active duty. In many ways, the deployment experience clarified for soldiers their willingness to deploy again and commitment to the Army and its increasing role in peace enforcement.

Conclusion

The initial 12 months of the peace enforcement mission to Bosnia was hugely successful in separating the warring factions and halting ethnic cleansing. For soldiers, the psychological aspects of this deployment lasted much longer. The duration of all five phases of this process ranged from 16 to 23 months.

This was a very high profile mission that tested the NATO alliance, our ability to work with the Russian military, and international resolve to end immoral acts of genocide. There was intense scrutiny from leadership at all levels. The American public and Congress were asking tough questions of the Clinton Administration during an election year. The spotlight was, therefore, on the military and it exacted tremendous self-control from U.S. soldiers under very restrictive conditions. The American forces certainly performed with great professionalism and discipline:

"General Nash," said a Bosnian Serbian Army Major General, "came in when the gun barrels were still smoking."

"It was the Balkans in winter," Nash said in an interview in Dec 96. "We knew it was going to be hard. But we didn't blink...his year-long service in Bosnia had a tremendous impact on him as a soldier, and as an individual."¹⁵

Peace enforcement clearly has become a significant part of U.S. Foreign Policy. The question that remains unanswered is, what impact will repeated deployments have on soldiers and their families?

Summary

The authors maintain that the experience of deployment is not a benign process, but rather a significant emotional event in the lives of many soldiers. The cumulative effects of deployments have yet to be determined. These experiences have tremendous potential impact, not only on mission effectiveness during the deployment, but also on the personal and professional lives of soldiers far into the future. For this reason, it is imperative that political and Army leaders at all levels pay particular attention to the psychological aspects of deployment on soldiers and their families. Furthermore, it is also strongly recommended that unit leaders incorporate this information into their training programs and widely disseminate it to their FSGs. This is critically important, not only for future mission success, but also for the well-being of soldiers long thereafter.

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Book Review

Sepsis and Multiorgan Failure by Alan M. Fein, et al, editors, Baltimore: Williams & Wilkins, 1997, hardcover, 675 pages with illustrations (ISBN 0-683-03097-3).

Reviewed by COL James M. Lamiell, MC, Chief, Clinical Investigation Regulatory Office, U.S. Army Medical Department Center & School, Fort Sam Houston, TX.

Much of the care of critically ill patients directly involves sepsis or considerations of sepsis. The consequences of sepsis and systemic infection (for example, cellular hypoxia, regional perfusion abnormalities, and organ system derangements) cause a great deal of critical care unit mortality and morbidity. *Sepsis and Multiorgan Failure* addresses all aspects of this serious and challenging medical problem. Seven outstanding experts in the study of sepsis edited this textbook, and they enlisted the assistance of 100 collaborating colleagues from around the world to write the 53 textbook chapters. This textbook is dedicated to Dr Roger C. Bone, a leader in the study of sepsis. Doctor Bone was one of the textbook editors, and he was instrumental in organizing the 1992 American College of Chest Physicians and Society of Critical Care Medicine Consensus Panel on defining the clinical manifestations of sepsis and multiorgan failure. Doctor Bone's untimely and tragic 1997 death resulted in a significant loss for us all.

The first textbook section deals with sepsis epidemiology and microbiology. It is fitting that Dr Bone wrote the first chapter (systemic inflammatory response syndrome), which provides a valuable systematic approach to classifying patients with sepsis. Subsequent sections cover fundamental issues like the molecular and biochemical mechanisms of sepsis, and the tissue and organ responses to sepsis.

Ensuing sections cover the diagnosis and prognosis

of sepsis, and the surgical aspects of sepsis. These sections make *Sepsis and Multiorgan Failure* a clinically useful reference that deserves space on the critical care unit bookshelf. A wide variety of practitioners can use this section to answer specific questions about real issues like sepsis in pediatric or geriatric patients, imaging in septic patients, and sepsis in urologic patients.

The next section, therapeutic approaches to sepsis, also has significant practical value. However, the perspective of this section is broad enough to incorporate chapters on cost-effectiveness analysis and ethics, as well as a chapter on sepsis care maps (clinical pathways or clinical practice guidelines). The last section deals with new frontiers in sepsis. Here, one finds general information on clinical trials, evidence-based medicine, animal models, and statistics.

Most of the textbook references are current to about 1996. The writing style and textbook illustrations are consistently excellent. This textbook is a valuable reference for anyone with an interest in sepsis. Any clinician that deals with critically ill septic patients will appreciate its broad coverage. *Sepsis and Multiorgan Failure* repeatedly alludes to anticipated advances in the prevention, diagnosis, management, and treatment of sepsis and multiorgan failure that should result in improved outcomes in the future. This textbook is recommended without reservation.

“...Above and Beyond the Call of Duty”

Remembering U.S. Army Medical Department Regiment heroes

Ron Still†

One of the most famous Medal of Honor recipients was Brigadier General Bernard J. D. Irwin, who served as an Assistant Surgeon in the United States Army during the Civil and Indian Wars, and was recognized as the first recipient of the Medal of Honor. His award was based on the dates of his heroic actions on 13-14 February 1861, at Apache Pass, Arizona, in which he took command of a small group of soldiers and led them in the rescue of another group of besieged soldiers, some of whom were wounded. Irwin's actions took place prior to the establishment of the Medal of Honor on 12 July 1862. His award reads:

AWARD OF THE MEDAL OF HONOR

**For conspicuous gallantry and intrepidity
in action at the risk of his life above and
beyond the call of duty**

Assistant Surgeon, U.S. Army, Apache Pass, Arizona, 13-14 February 1861. Voluntarily took command of troops and attacked and defeated hostile Indians he met on the way. Surgeon Irwin volunteered to go to the rescue of 2LT George N. Bascom, 7th Infantry, who with 60 men was trapped by Chiricahua Apaches under Cochise. Irwin and 14 men, not having horses, began the 100-mile march riding mules. After fighting and capturing Indians, recovering stolen horses and cattle, he reached Bascom's column and helped break his siege.

During the Civil War, he was also responsible for setting up the first tent hospital at the Battle of Shiloh, in which Union and Confederate soldiers were treated. Irwin was not only a first class medical officer, but also an outstanding leader. He always ensured that his organization received all of the support that it was entitled to in order to complete its mission. When serving as the Medical Director of the Department of Arizona, while General Crook was carrying on the campaign against the Apaches, the Chief Quartermaster of the Department came to his office and began arguing about support. Suddenly, the Chief Quartermaster picked up an inkwell, threw it at Irwin, and ran from the office. Irwin, always the professional, did not prefer assault charges, but did prefer charges against the individual for being a coward. He did not receive his Medal of Honor until 1894, and continued to serve his country as the Chief Medical Officer of the Military Academy at West Point, New York, from 1873 to 1878, and other key positions throughout the United States Army Medical Department. Although Irwin retired in 1894 with the rank of Colonel, he was promoted to the rank of Brigadier General, U.S. Army, Retired, in 1904.

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AMEDD Dateline

Dr Wayne R. Austerma†

- 2 Jan War Department authorized wearing of the wound chevron upon U.S. Army uniform for the first time. It was to be awarded to men who were wounded or gassed in action and received treatment by a medical doctor. **(1918)**
- 6 Jan In the first recorded ‘Dustoff’ mission, 1st Lt Christian F. Schilt, USMC, “made 10 flights in an aircraft with no brakes, in the rough, rolling street of a burning village – all under. . . withering hostile fire” to medically evacuate 18 American casualties from the rebel-besieged town of Quilali, Nicaragua. Lieutenant Schilt received the Medal of Honor for his heroism. **(1928)**
- 24 Jan Doctor Mary E. Walker became the first woman to be awarded the Medal of Honor. Serving as both a contract physician and spy for the Union forces during the Civil War, she survived 4 months imprisonment in a Confederate prisoner of war camp before being released. **(1866)**
- 27 Jan Lieutenant Colonel William B. Nolde of Mount Pleasant, Michigan, became the last American casualty of the Viet Nam Conflict. Lieutenant Colonel Nolde was killed by a shellburst at An Loc, Republic of Viet Nam, just 11 hours before the truce took effect. **(1973)**
- 1 Feb Retirement of Lt Col Hattie R. Brantley, the last World War II nurse prisoner of war on active duty. At the time of American entry into the war in December 1941, the only women in the military were members of the Army and Navy Nurse Corps. Sixty-six Army nurses were captured in the Philippines and remained in captivity until liberated in February 1945. **(1969)**
- 2 Feb The Army Nurse Corps was established with an initial strength of 202 members, who formed the first component of women in the uniformed armed services. **(1901)**
- 9 Feb Surgeon George M. Sternberg identified the pneumococcus germ as the result of lengthy research efforts. Often called the father of American bacteriology, Sternberg was the first to make a photomicrograph of the tubercule bacillus and conducted pioneering research on cholera, yellow fever, and septicemia. He was Surgeon General at the time of the 1898 Spanish-American War. **(1881)**
- 11 Feb Congress authorized military rank for Army surgeons for the first time. **(1846)**
- 17 Feb Pilot physical examination requirements were first established for Army aviation. The medical officers of the time did not yet understand the unique medical aspects of aviation. “In effect, if the pilot seemed healthy, had no obvious defects of coordination, balance, or vision, it was assumed he

could fly as readily as he could drive a car.” (1912)

- 26 Feb Congress appropriated \$50,000 for the construction of the first Naval hospital. Building started at Norfolk Navy Yard, Virginia, in 1827, but the structure was not completed until 1833. (1811)
- 1 Mar Congress established the Hospital Corps, consisting of hospital stewards and privates as part of the AMEDD. This marked the origin of a formal career field for enlisted personnel in the department. (1887)
- 2 Mar First Lieutenant Benjamin D. Foulois made his first solo flight over Fort Sam Houston, Texas, as medical corpsmen and an ambulance stood ready in case of a mishap. This was also the first military flight west of the Mississippi. Foulois “had earlier been directed by his superiors to take the Army’s only airplane and teach himself how to fly.” (1910)
- 3 Mar Congress established a U.S. Army Dental Corps staffed by commissioned officers. (1911)
- 5 Mar Doctor Harry E. Harvey became the first dentist to serve aboard a U.S. Navy Vessel when he was assigned to the hospital ship *Solace*. (1913)
- 9 Mar Major General Winfield Scott’s Army conducted an amphibious landing near the Mexican seaport of Veracruz and laid siege to the city. Scott’s strategy was dependent upon the quick capture of the town followed by a rapid march inland to avoid the onset of warm weather and the yellow fever season, which threatened to destroy his Army without the enemy ever firing a shot. (1847)
- 11 Mar Congress established the Army Ambulance Corps as a dedicated and specialized component for battlefield casualty evacuation. (1864)
- 17 Mar Congress granted permanent rank of MG to the Chief of the Dental Corps. Major General Thomas L. Smith served as corps chief from 1946 to 1950. (1946)
- 19 Mar Brigadier General Alfred J. F. Moody died of a heart attack in Saigon, Republic of Viet Nam. He was the first of four general officer noncombat fatalities sustained during the Viet Nam conflict. (1967)
- 21 Mar As part of continuing medical research upon the effects of high speed stress, U.S. Air Force physicians selected a bear as the first living creature to be ejected from an aircraft flying at supersonic speed. The sedated bruin was launched at 35,000 feet from the rear cockpit of a B-58 bomber moving at 870 miles per hour and returned to earth unharmed via parachute. (1962)
- 23 Mar Major General Thomas J. “Stonewall” Jackson engaged Union troops at Kernstown, VA. A brilliant tactician but an obsessive hypochondriac, Jackson believed that eating pepper would weaken his left leg, and customarily rode into battle with his right arm extended skyward because he was convinced that it improved the flow of blood to his brain. (1862)
- 26 Mar Second Lieutenant Elsie S. Ott, a 29-year-old Army nurse, won the first Air Medal ever awarded to a

woman when she accompanied five casualties on a 10,000-mile aeromedical evacuation from India to Walter Reed Army Hospital, employing innovative high-altitude procedures in treating her patients during what was her first airplane flight. (1943)

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