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A Professional Bulletin for the AMEDD Community

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Perspective

Health Care Management Challenges

Major General Kevin C. Kiley

How well do we govern the practice of medicine? The Army Medical Department (AMEDD) is a large and complex organization providing medical care to beneficiaries worldwide at numerous medical treatment facilities. These range in size from the small Troop Medical Clinic with a handful of personnel to the large medical centers, such as Brooke Army Medical Center (BAMC) that employs nearly 3,500 military and civilian workers. Military medicine has often been described as the largest health maintenance organization in the United States and faces challenges associated with the delivery of that health care. Effectively governing health care in these circumstances can be a formidable challenge.

There are many significant issues that force the AMEDD leadership to develop organizations that govern more efficiently and effectively without sacrificing the quality that typifies Army medicine. Factors such as the public focus on health care spending, the rising cost of medicine, the increase in the number of beneficiaries, and the economic constraints placed on the Army and the AMEDD force these changes. Other problems unique to the Army include recruiting and retaining quality health care professionals, maintaining soldier readiness, and meeting the requirements created by a higher operational tempo. Monetary and military constraints significantly impact the available resources to meet the readiness and routine health care missions.

The traditional Army approach to governing cannot always be effectively applied to complex organizations such as BAMC where readiness, education and training and quality health care compete for resources. One strategy is to have a centralized command to oversee and track issues instead of allowing committees to work without guidance or directed supervision. In this issue of the *AMEDD Journal*, LTC Dawn M. Smith, former BAMC executive officer, examines the process by which this medical center effectively changed hospital governance in *Evolving Towards Strategic Alignment: A New Governance Model for BAMC.* Her insight into the process of developing a new strategic plan is summarized as follows: "The synergy of the new system effectively translates the strategic vision into daily operational plans that can be easily measured for astute decision-making at the executive level." A model of governance like this should be followed by other AMEDD organizations to meet their mission and ultimately fulfill the Surgeon General's Balanced Scorecard initiative, using top-to-bottom strategic vision and bottom-to-top implementation.

Other articles in this issue of the *AMEDD Journal* include:

- *Medical Regulating Innovation: Unified Digital Intelligence.* This article describes the efforts to assess a new medical regulating system on the battlefield to provide synchronous and updated information on the status of casualty evacuation.

- *Deployment Cycle Effects on the Psychological Screening of Soldiers.* The authors explore psychological screening of soldiers through different phases of the deployment cycle to include the preparation and redeployment phases.

- *BSRF: Community-Based Health Promotion.* This article discusses the Department of Defense's "Put Prevention Into Practice" initiative at Tripler Army Medical Center to promote a preventive health program in the 25th Infantry Division.

- *Supporting Homeland Defense: Training for Chemical Casualty Management.* A timely report that outlines the numerous programs available through the U.S. Army Medical Research Institute of Chemical Defense to prepare medical professionals to treat chemical casualties.

• *Adjunctive HBO Treatment of Children with Cerebral Anoxic Injury.* This comprehensive study evaluates the role of hyperbaric oxygen in anoxic brain injury and demonstrates overall movement with early intervention.

• *Emerging Roles for the ARNG State Surgeons in the 21st Century.* The author highlights the dramatic change of the National Guard state surgeon from a clinical to an administrative role in coordinating and managing numerous health care issues.

FAREWELL TO A SOLDIER

On 20 March 2002, the United States Army, the Army Medical Department, and the Fort Sam Houston community gathered to bid farewell to Sergeant Major of the Army (SMA) (Ret) Leon L. Van Autreve. He was laid to rest with his comrades at the Fort Sam Houston National Cemetery, San Antonio, Texas. Visitors from across the entire Army spectrum were in attendance to pay their respects, including the Commander, U. S. Army Training and Doctrine Command, General John N. Abrams; Surgeon General of the Army and Commander, U.S. Army Medical Command, Lieutenant General James B. Peake; the current Sergeant Major of the Army, SMA Jack Tilley; and Command Sergeant Major James M. Aplin, U.S. Army Medical Command.

Sergeant Major of the Army Van Autreve held that position from 1973 to 1975. Following his retirement from military service, SMA Van Autreve and his family settled in San Antonio. This move began their close and lasting relationship with the Army Medical Department and Fort Sam Houston. Because of his distinguished career and wealth of experience, the SMA was called on countless times by all levels of enlisted, noncommissioned, and commissioned officers for his unique input and leadership; he never turned down a request for advice or mentorship.

Throughout his career, Leon Van Autreve was referred to in many different ways: "A Soldier's Soldier," "The Mentor of Mentors," "A Patriot," and "A Friend." He presented literally thousands of speeches all over the world, making each and every audience into believers, regardless of the subject matter. His career spoke for itself: combat service in World War II and two tours in Vietnam are but two examples of his illustrious service. His awards ranged from the Distinguished Service Medal, the Legion of Merit, the Soldier's Medal, and the Order of Military Medical Merit to name just a few. Although over two decades had passed since the SMA's retirement, he continued to have a considerable impact on today's Army. The Non-Commissioned Officer Education System as we now know it was the direct result of his involvement in its establishment, based on his unwavering care for the soldier.

All who ever knew him and what he stood for will miss Leon Van Autreve. He is survived by his wife of fifty years, Rita; two daughters, Robin Shipkey and Jodi Bearden; and two grandchildren, Ryan Shipkey and Taylor Bearden.

Rest Well, Friend

Medical Regulating Innovation: Unified Digital Intelligence

MAJ Steven P. Middlecamp, MS, USA†
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Theater medical regulating (Figure 1) has been accomplished via ad hoc combinations of labor-intensive tools. They include manual/analog documents, radio/telephone voice coordination, facsimile, and Theater Army Medical Management Information System – Medical Regulating (TAMMIS MEDREG) – a near-obsolete legacy information technology (IT). This oft-times redundant, inefficient collection of techniques and technologies worked acceptably only to a point. Particularly problematic was the uneven reliability of TAMMIS MEDREG – initially deployed in the late 1980's and incapable by design of supporting certain critical requirements.

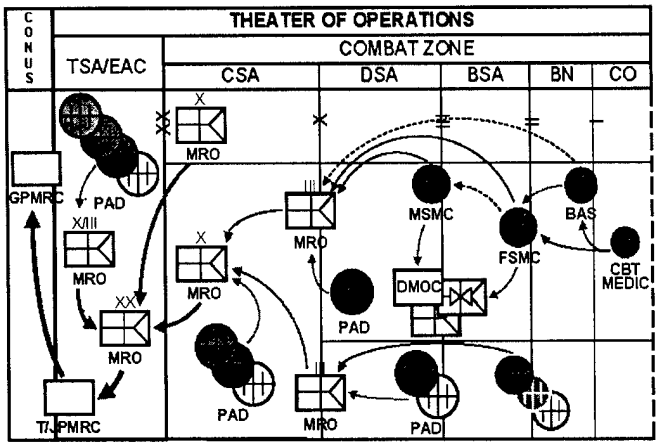

Fig 1. Medical Regulating – Doctrinal Concept.

This article describes the U.S. Army Medical Department's (AMEDD) recent efforts to assess a replacement for TAMMIS MEDREG for operations spanning all echelons of care. In the process, the AMEDD discovered that the U.S. Transportation Command (TRANSCOM) Regulating and Command and Control Evacuation System (TRAC2ES) could deliver more mission enhancing capabilities than originally expected. We are now entering a new era in medical regulating capabilities via the release of a much-needed tool – one that provides a synchronous, dynamically updated and common picture to all. Thus, the AMEDD could replace its current, costly, and nearly unsupportable legacy IT infrastructure earlier than otherwise expected. This would enhance supporting our warfighters through efficient and effective evacuation of injured and ill soldiers.

The Opportunity and the Problem

The TRAC2ES, like many acquisition programs, was originally intended as an incremental effort. It would begin with an initial operating capability (IOC) to satisfy baseline requirements specified in its operational requirements document (ORD) followed by a full operating capability (FOC) that would meet all requirements (Figure 2). For that reason, early in 2001, news the TRAC2ES Program was being truncated to provide only IOC capabilities led to a flurry of high-level interest at the AMEDD Center and School (AMEDDC&S). In light of the cutbacks, would TRAC2ES at IOC provide the TriService, real-time, global patient evacuation management and in-transit visibility (ITV) needed to replace TAMMIS MEDREG? Did it have the capabilities to address AMEDD inter-theater medical regulating needs, and as well as unique AMEDD intra-theater patient movement mission requirements? Could it provide a new capability - to clear the division area?

The need is urgent. Vendors no longer support the TAMMIS hardware or its operating system software. The hardware is obsolete and replacement parts are un-available. The applications software, despite the AMEDD developer's heroic efforts, gradually became a "spaghetti code" of kludged (imperfect) and largely undocumented patches. Thus, the TAMMIS MEDREG reliability in the field concerns senior AMEDD leaders, who are also eager to avoid the system's multi-million dollar annual sustainment bill. Finally, TAMMIS MEDREG, as an

AMEDD legacy IT system, neither interfaces with nor shares data with other battlefield systems. It represents Service-specific, "stovepipe" IT systems that must be replaced by interoperable, objective systems. Thus, the AMEDD has a real incentive to exploit TRAC2ES' potential for theater support. However, in early 2001, there was still much to be discovered about its true capabilities.

Initial Operating Capability	Full Operating Capability
• Replacement of DMRIS/APES • Lift-Bed Planning and Dissemination • Patient Tracking/Visibility • Track Crews, Attendants, *PMI, Equipment* (Origin to Destination) • Track Scheduled/Ongoing Missions • Resource-Centered Evacuation Planning and Execution • *Identify/Predict Scheduling Force Structure and Capabilities to Support Patient Evacuation* • Reactive Re-Planning to Real-World • Required/Ad-Hoc Analysis • GTN, CHCS, TMDS, *TAMMIS Interface* • *Internal/External TMIP System Component Interface to Support Patient Movement and Visibility*	FY02 (Pre-Planned Product Improvements) – Automated Security Guard – Two-Way GTN, CHCS – TMIP Integration (Potential) FY02-07 (FOC ORD requirements) – GCCS, GCSS Integration – *Full Replacement of TAMMIS MEDREG, Interface to MEDPAR* – Personal Information Carrier, AIT Requirements (Smart Card) – Support Care-in-the-Air – DOD Modeling and Simulation (JSIMS, JWARS, STOW-Med, JFCOM Requirements, etc.) – Other Interfaces (Theater Transportation, Personnel Systems, DIMHRS, and others)

Fig 2. TRAC2ES IOC vs FOC.

The Debate

Until recently, answers to the preceding questions – and others with more intricate nuances – were frustratingly absent. According to the TRACES ORD at FOC, it would replace TAMMIS MEDREG, but its capabilities at IOC were in question.

In March 2001, the AMEDD's principal IT systems review and vetting entities – the Colonel-level Advanced Technology Working Group (ATWG) and the Technology Insertion General Officer Steering Committee (TIGOSC) – agreed additional discovery relative to TRAC2ES at IOC was needed. As the year progressed, more questions surfaced and additional TRAC2ES information emerged; but by summer, key leaders still saw no consensus on what TRAC2ES could or would bring to the future operational AMEDD.

Many reasons existed for the uncertainty and the continuing questions about TRAC2ES. First, the program was abruptly truncated to its IOC capabilities. Second, since TRAC2ES was designed as the next-generation Department of Defense (DOD) global patient evacuation IT system, it would eventually impact Army-unique requirements. Unfortunately, few in the Army had direct involvement with earlier prototype testing or limited utilizations.[1] So as TRAC2ES at IOC neared actual worldwide deployment, the AMEDD had limited first-hand familiarity with the system in a theater environment. Third, the "jointness" of TRAC2ES made the program difficult for the AMEDD to influence. These facts, coupled with two changes in prime contractors and 10 years of rapidly evolving requirements, had reduced TRAC2ES visibility vice more immediate IT concerns.

Getting to the TRAC2ES Facts: Reaching Out to the Principals and Stakeholders

The TRAC2ES requirements evolved in the aftermath of the Gulf War with rising expectations for patient management and tracking. The TRANSCOM is the program proponent with the United States Air Force as acquisition lead agent. Many organizations have been involved in the definition, development, and fielding of TRAC2ES. The Military Health System's (MHS) TRICARE Management Activity Information Management Program Executive Office provided Defense Health Program Funding along with key guidance and oversight committees: the Theater Functional Working Group, the Theater Functional Steering Committee, and the Information Management Proponency Committee.

Within the AMEDD, the Office of the Surgeon General Health Care Policy and Services (HPS) Directorate and the Health Care Operations Directorate act as the Army Functional Proponent Representatives (FPRs), both from an AMEDD commander's and patient administration business area perspective. (See Figure 3 for more information on Functional Proponents [FPs] and FPRs.) These directorates represented Army and AMEDD interests in program meetings and in MHS oversight committees. They maintained Army presence with the view that medical regulating required seamless information management systems - digital tool.

The Assistant Commander for Force Integration

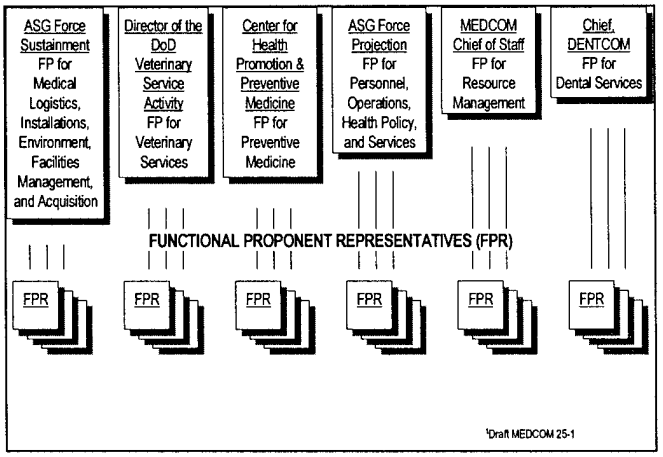

Fig 3. Relationship of FPs to FPRs.

(ACFI), AMEDDC&S, had two subordinate Directorates directly engaged in TRAC2ES: the Directorate of Combat and Doctrine Development (DCDD) and the Total AMEDD Systems Management Directorate (TASM). The DCDD, the AMEDD's combat developers representative, has been responsible for identifying Army patient movement requirements predicated on an approved operational architecture. The TASM, as the AMEDD's IT systems overwatch/synchronizer, collaborates with many of the organizations named above to compile and coordinate the latest TRAC2ES system/program information.

Coordinating and Planning a Functional Capabilities Assessment (FCA) Within a Command Post Exercise (CPX) Framework

In mid-2001, ATWG and TIGOSC members gained a clearer picture of the risks and opportunities relative to TRAC2ES and TAMMIS. They agreed on the need to assess the IT support for medical regulating on the battlefield. In July 2001, TASM began organizing a detailed, disciplined, and objective TRAC2ES assessment that would also compare and contrast it to TAMMIS MEDREG. The chosen "venue" to coax out answers to lingering questions would be a "backyard" CPX.

From July through October 2001, initial coordination ensured an FCA with a 5-day CPX as its centerpiece. The term FCA was chosen as the most appropriate descriptor of what was needed – an objective assessment on two IT systems (both TRAC2ES and TAMMIS MEDREG) that supports critical AMEDD functional mission areas – patient evacuation (matching patient needs with evacuation platforms) and medical regulating (matching patient needs with available beds). The FCA outcome would validate both TRAC2ES's efficiency and effectiveness and its potential for full integration across the AMEDD operational spectrum.[2]

A collaborative planning effort across many organizations was necessary to plan a successful CPX and thereby achieve the July 2001 TIGOSC recommendations. (See Figure 4 for a list of all organizations participating in the FCA.) Organizations involved in planning included ...

- U.S. Transportation Command
- Military Health System
- Global Patient Movement Requirements Center (GPMRC)
- The TRAC2ES Program Management Office (PMO)
- The Medical Communication for Combat Casualty Care (MC4) PMO
- Medical Research and Materiel Command (MRMC)
- The TAMMIS Project Office
- MEDCOM's HPS Directorate and the AMEDD Chief of Information staff
- AMEDDC&S departments under the Dean, Academy of Health Sciences and the ACFI

· MEDCOM H PS	· USTRANSCOM
· AMEDD CIO	· MHS
· MRMC	· PM MC4, TMIP, TRAC2ES, TAMMIS
· AMEDDC&S	· MTOE units:
- AMEDDBD	- 1st Corps
- DCDD	- 3d, & 44th MEDCOM
- DHO (PAD Br)	- 1st, 30th, & 62d MEDBDEs
- DTS	- 56th EVAC BN
- MEPD	- 82d DISCOM
- TASM	

Fig 4. FCA Participants (Planning and Execution).

Five video/telephone conference meetings were held among the preceding organizations to synchronize efforts and coordinate CPX resources and the resultant FCA. In the meantime, an FCA working group was established at Fort Sam Houston, TX. It included participants from MEDCOM's HPS (Patient Administration Branch (PAD), AMEDDC&S Healthcare Operations (DHO) (PAD Branch), DCDD's Medical Information Systems Division , and the TASM. This working group established the following key FCA objectives:

- Define system-independent medical regulating IT requirements that support AMEDD business processes of our operational architecture.

- Functionally assess and compare TRAC2ES at IOC and TAMMIS MEDREG capabilities based on medical regulating IT requirements.

- Effect a TRAC2ES Doctrine, Training, Leader Development, Organization, Material, and Soldier assessment.

- Identify and then set into motion actions to correct identified problems: (for example, training, doctrine, organization, and materiel).

- Support AMEDD leadership decision-making relative to IT programmatic (TRAC2ES vs TAMMIS) adoption, sustainment, or retirement/disposal.

The working group established the FCA foundation by accomplishing the first-ever documentation effort to thoroughly capture theater medical regulating IT requirements – a prerequisite task needed in all AMEDD business areas and prime FPR responsibilities. In the meantime, AMEDDC&S personnel conducted a first-hand review of the TRAC2ES application and developed required theater TRAC2ES tactics, techniques, and procedures (TTPs).

Once the IT requirements were defined independently of any particular IT system, the AMEDD Board was positioned to develop pertinent assessment questions/criteria to support the CPX. They were as follows:

- Will MEDREG support patient movement requests (PMR) management from Level II to III and forward III to rear III?

- In a single transmission, how many PMRs can TRAC2ES at IOC receive from MEDREG? To what extent does the data sent from MEDREG differ from TRAC2ES?

- Can a Level II medical unit use TRAC2ES Mobile in an immature theater to submit inter-theater PMRs and receive responses from the MRA using INMARSAT and intermittent local area network (LAN)?

- Can a PMR be annotated to define a specific MRA (lateral and vertical)? Once defined, can the MRA restrict actions and privileges of the PMR?

- Will TRAC2ES support PMR management from Level II to III and forward III to rear III?

- If the lift bed planner can be used within the theater or area of operations for managing intra-theater lift bed assets, how does the AMEDD use it?

With assessment questions identified and resources committed, the September 2001 ATWG approved a 29 October – 2 November 2001 CPX at the PAD Branch training facility at Fort Sam Houston, TX. The PAD training site provided an ideal setting for the CPX with space to lay out eight theater medical units, computer resources, and knowledgeable support personnel.

The CPX event itself required collaboration from additional organizations within the AMEDD, Army, other-Service medical departments, and the joint arena. They included the joint Theater Medical Information Program (TMIP) PMO, the Navy's TMIP-Maritime PMO, Fort Sam Houston's Information Technology Business Center, and the Marine Forces Medical Liaison Office.

To ensure validity, the CPX "players" were specifically trained to perform medical regulating functions using the target systems. They came from . . .

- MEDCOM – Brooke Army Medical Center.

- U.S. Army Forces Command.
  - 1st Corps (62d Medical Brigade)
  - 3d Corps (1st Medical Brigade)
  - XVIII Airborne Corps (82d Division Support

Command), 44th Medical Command (56th Evacuation Battalion)

– U.S. Army, Europe

– 5th Corps (30th Medical Brigade)

• U.S. Army Reserve – 3d Medical Command.

Once trained, participants were prepared to assess the newly defined medical regulating requirements in the context of current operational business processes. Additionally, their untainted TRAC2ES expectations would provide an objective view of the TRAC2ES application and its associated TTPs for theater medical regulating.

Executing the 5-Day FCA

The CPX kicked off with an overview to give participants background information and stress their importance in the FCA process. After 4 months of planning and coordinating, the 5-day CPX event would provide the AMEDD a side-by-side system comparison between TRAC2ES and TAMMIS and a first-hand view of TRAC2ES adapted to support theater doctrinal and operational concepts. All participants received an initial survey providing information related to demographics, duty position, and specialized training and experience on IT applications and information technology.

The 5 days consisted of three main phases: training, assessing, and data collection. During the training phase, the TRAC2ES PMO, the TAMMIS PO, and PAD Training Branch were the heavy lifters in training participants on their respective systems and procedures. The AMEDD Board, with its surveys and collection tools, was central to the assessment phase. The AMEDDC&S PAD officers, along with students from the PAD Officer Course, served as data collectors during the last phase.

Day One and Two.

The first phase concentrated on providing participants with experience on both TRAC2ES and TAMMIS MEDREG. These systems differ on their information flow to support a PMR from the requesting MTF to the MRA at Medical Command, Medical Brigade, and GPMRC (See Figures 5, 6, and 7). The TAMMIS MEDREG requires PMRs to be sent directly to the next higher MFRA – point-to-point. The TRAC2ES, on the other hand, directs PMRs to the appropriate MRA, but also allows synchronous and dynamic viewing by anyone having access to the TRAC2ES database.

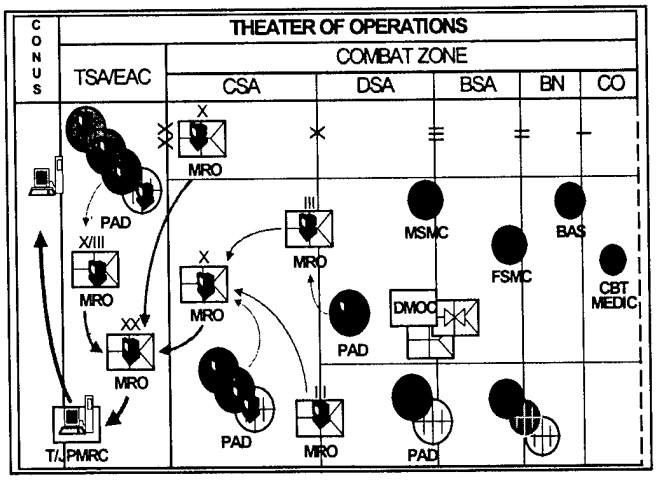

Fig 5. TAMMIS MEDREG System Architecture.

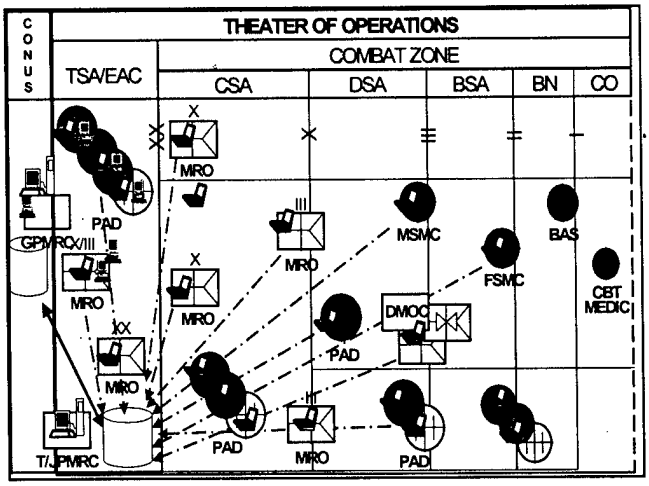

Fig 6. TRAC2ES System Architecture.

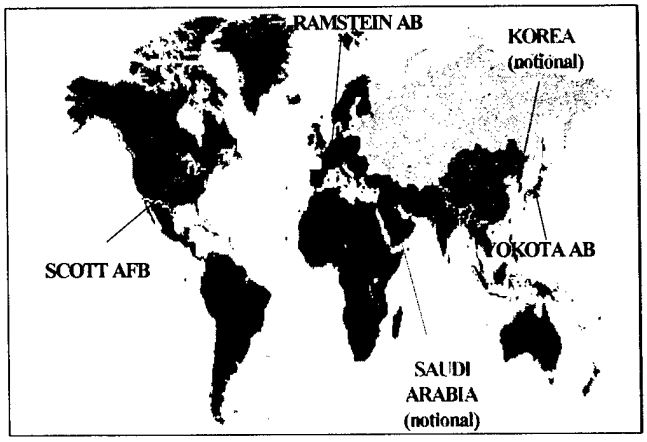

Fig 7. PMR center locations.

The TRAC2ES PMO began the training phase by providing the participants with an overview followed by a session devoted to submitting and validating an inter- and intra-theater PMR using the TRAC2ES web application. Participants were assigned to their respective theater medical regulating positions. Position-by-position, the TRAC2ES trainers outlined responsibilities for PMRs. Through role-playing, participants obtained an understanding of the PMR submission process and their tasks associated with the PMR.

The phase continued with training to selected participants on the TRAC2ES Mobile application for echelon II medical units. In both applications, mass casualty PMRs were used to limit the amount of data entry and improve PMR submission speed. The Day Two phase concluded with a TAMMIS MEDREG-TRAC2ES interface demonstration of the required capability for interoperability between TAMMIS MEDREG and TRAC2ES – transmitting inter-theater PMRs and receiving movement instructions for regulated patients. The training phase ended with a survey to collect information on training content and the participants' ability to use the two systems.

On the periphery, the MC4 PMO hosted the TRAC2ES and the Composite Health Care System Next Technology (CHCS NT) applications on its hardware platform to give students a view of future capabilities. Eventually, an interface will be developed so CHCS NT information will pass automatically to the TRAC2ES application. (See Figure 8 for more information on the relationship between TMIP, TRAC2ES, and MC4.)

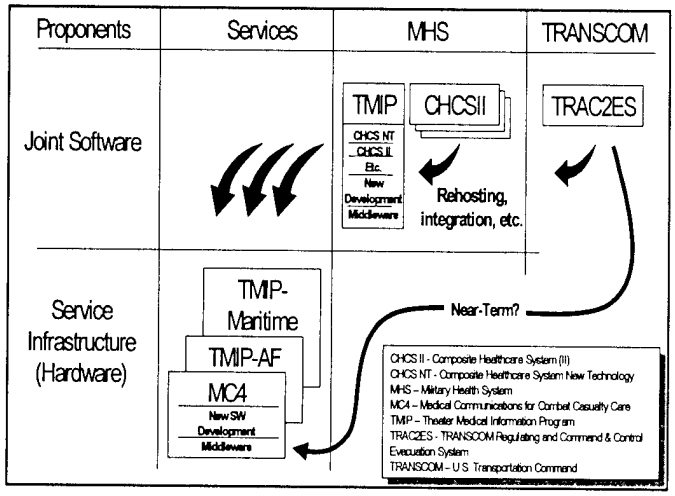

Fig 8. TMIP, TRAC2ES, and MC4 Relationships.

Day Three.

The assessment phase began with the first assessment issue – a Level II medical unit's ability to send inter-theater PMRs and receive responses utilizing TRAC2ES Mobile in an immature theater. Two computers, one located outside and the other inside, were able to connect to an INMARSAT and the garrison LAN respectively using TRAC2ES Mobile. The result was the simultaneous submission of 152 PMRs in 3 hours. Data collectors documented the transmission and receipt of the PMRs from the TRAC2ES Mobile application. Only one of the 152 PMRs did not reach GPMRC and that was due to improperly connecting the power supply to the laptop computer supporting the INMARSAT.

After-action reviews (AAR) led by the AMEDDC&S DHO provided an opportunity to capture accomplishments, comments, and insights learned during each day of the assessment. During the Day Three AAR, participants were enthusiastic about the TRAC2ES Mobile capability to support inter-theater evacuations and in-transit visibility of patients at echelon II.

Day Four.

The Day Four CPX was the assessment centerpiece. In question was TRAC2ES's ability to perform theater medical regulating using the newly established TTPs. Could a PMR in TRAC2ES be annotated to define a specific MRA (lateral and vertical)? Once defined, could the identified MRA control access and changes to the PMR? Could TRAC2ES support PMR management from Level II to III and from forward III to rear III?

Assessment began with echelon II medical units using TRAC2ES Mobile to submit PMRs to MED BDEs for patient movements into the Corps area. Using the TTPs, MED BDEs validated the PMR and planned a patient movement mission. Once the mission was created and a patient assigned, lower units could obtain movement instructions. Periodically, the sending unit checked for the validation and movement instructions. Upon receipt of the instructions, the sending unit annotated in-transit visibility (ITV). The receiving echelon III combat support hospital (CSH) "arrived" the patient by completing appropriate screens and annotating ITV information.

Subsequent scenarios focused on the Corps area –

echelons III and IV. The CSHs used TRAC2ES web to submit inter- and intra-theater PMRs. For intra-theater PMRs, the designated MRA planned for the evacuation by creating a mission for the sending CSH. The CSH then completed ITV information and movement times. For inter-theater PMRs, GPMRC validated the request and placed the patient on a mission. For intra-theater PMRs, the designated MRA also validated the request and placed the patient on a mission. Once CSHs were associated with a mission, all could complete ITV information and movement times for their patients. Adhering to the TTPs, all facilities were able to submit PMRs and obtain movement instructions on their requests. Unlike TAMMIS MEDREG's information flow, MRAs using TRAC2ES had to know which PMRs were their responsibility to regulate. Understanding the changing business processes and responsibilities were keys to the patient movements. Data collectors during this phase documented the PMR's ability to be defined to a specific medical regulating authority, the restriction of privileges on each PMR, and the medical regulating authority's ability to move patients laterally (to another MED BDE's CSH) and vertically (to MEDCOM's CSH). On the critical assessment issue (TRAC2ES performing theater medical regulating), TRAC2ES at IOC was successful, even though it was not intentionally designed to accomplish theater medical regulating. The minor inability to restrict PMRs did not prevent MRAs from coordinating and effecting theater patient movements. At the end of day AAR, participants echoed the preceding day's comments that TRAC2ES provided enhanced ITV capabilities for commanders and supported units with a global, dynamic vision of patient movements.

Day Five.

Day Five concentrated on the legacy system, TAMMIS MEDREG, and its ability to perform theater medical regulating from the Corps area; specifically, the maximum number of PMRs that could be sent from TAMMIS MEDREG to TRAC2ES and the data integrity sent between the two systems. Although a rehearsal had been completed with developmental servers during the training phase, the TAMMIS systems hard drive failed on the assessment day bringing both inter- and intra-theater PMRs to a halt. After the hard drive was replaced, a second problem arose due to the short pull-rate interval between the developmental server's file transfer protocol server and the MEDREG database server. The servers were finally fixed and the assessment eventually began. Three iterations of requests containing a total of 400 PMRs were successfully transmitted from MEDREG to TRAC2ES. Several smaller iterations were sent for a combined total of 1,600 PMRs. The use of 400 as the maximum number of PMR files was based on a key performance parameter in the TRAC2ES ORD requiring the generation of a lift-bed plan for 400 patients in 30 minutes. The data sent between the two systems were compatible. All data elements were correctly received from both systems. TRAC2ES did not accept values that were grossly incompatible with life; for example, an excessive oxygen flow rate, excessive or insufficient blood pressure, and certain blood-related lab results. Three data elements were absent from the TRAC2ES menu – military occupational specialty, family member prefix, and seriously ill/very seriously ill – but these were not essential for patient regulating or evacuation. Data collection for the final assessment day documented the maximum number of PMRs and matched the data fields transmitted and sent from one system to the other.

The final AAR highlighted observations from the Day Four AAR. Unless deployed, TAMMIS MEDREG is not used day-to-day so many participants were unfamiliar with the application prior to the CPX. The hardware is unreliable and the software is dated. The AMEDD Board also administered a post survey to obtain feedback on the CPX, its phases, and user opinions on system friendliness and usefulness.

Assessment Issue Unresolved. The final assessment issue (use of the lift bed planner to manage intra-theater lifts bed assets for theater operations) was not investigated during the CPX. The lift-bed planner obtains information from a PMR, and through the use of complex algorithms, matches patient movement requirements (beds) with patient movement resources (lift). The TRAC2ES PMO never intended or designed the lift-bed planner capability for echelon III/IV use. Rather, it was targeted for strategic level coordination spanning all theaters and worldwide medical treatment facility capabilities. Although lift-bed planner assessment was not accomplished, the CPX did result in the AMEDD identifying a future requirement for integration into subsequent builds of TRAC2ES. (Note that ITV and the lift-bed planner are not present in TAMMIS MEDREG.)

Limitations. The USTRANSCOM could not allow

the external use of its active, real-time, dedicated TRAC2ES server at Scott Air Force Base, IL, for this exercise so the CPX used a surrogate server provided by the TRAC2ES prime contractor out of McLean, VA. Thus, the flow of data may not have been a true representation of what could occur on the TRAC2ES server. Also, the CPX layout had medical units at echelons II and III situated within the same room. This close proximity allowed participants to readily communicate with one another, which would not be the case in a real situation. And finally, since the majority of the participants had no prior experience with either system, not all participants could be trained during the short CPX training phase to work on both TRAC2ES Mobile and TAMMIS MEDREG. This reduced the number of iterations performed and the amount of data collected during the assessment.

The Results: Findings of the FCA

The CPX concluded the operational part of the FCA process. From this point, the FCA objectives would be achieved through analysis and research. The AMEDD Board began analyzing the data collected during the CPX to prepare their conclusions (Figure 9). Senior representatives from participating and supporting organizations began collating and evaluating AAR comments, concerns, and issues – the most notorious being TAMMIS's lack of sustainability and its unsupported hardware and limited software support. Additional shortcomings are that TAMMIS is used only during deployments and therefore requires train-up prior to use. Finding and maintaining resident system experts is also a continuing challenge. Realistic training requires the connection of two TAMMIS systems, which is often difficult and impractical.

Accept the Objective System: TRAC2ES @ IOC provides more functionality than TAMMIS MEDREG

	Legacy *(TAMMIS-MEDREG)*	Objective *(TRAC2ES)*
Ability to manage PMRs	X	X
Surgical / OR Status	X	(TMIP capability)
Ability to create missions		X
Inter-theater evacuation @ Level II		X
In-Transit Visibility		X
Train & Use One system		X
Sustainability of software		X

Fig 9. FCA Finding.

For TRAC2ES, the CPX proved that further testing and evaluation were required for ensuring TRAC2ES operates on the U.S. Army communication infrastructure, especially those resident in AMEDD theater units. Although both TAMMIS MEDREG and TRAC2ES were shown effective in processing PMRs, a majority of the participants rated TRAC2ES as easier to use in terms of reading, understanding the screen icons, and submitting a PMR. Only TRAC2ES provides the capability to submit a PMR from an echelon II medical unit in an immature environment using TRAC2ES Mobile.[3]

In general, the CPX demonstrated that TRAC2ES at IOC provides more capability than expected – matching TAMMIS MEDREG and then some. Both systems can manage and facilitate patient movement; however, TRAC2ES provides an inter-theater evacuation capability. (Figure 10). Therefore, the FPR has advocated accepting TRAC2ES at IOC. It provides the AMEDD with a synchronized view of theater evacuations, ability to track patients via their last known location, and an automated tool to assign medical evacuation missions and clear the division area. Thus, it supports the AMEDD's ability to achieve Objective Force tenets – supporting modular and tailored units; enhancing survivability and training; using the same system for peace and war; and most notably, eliminating legacy software system.

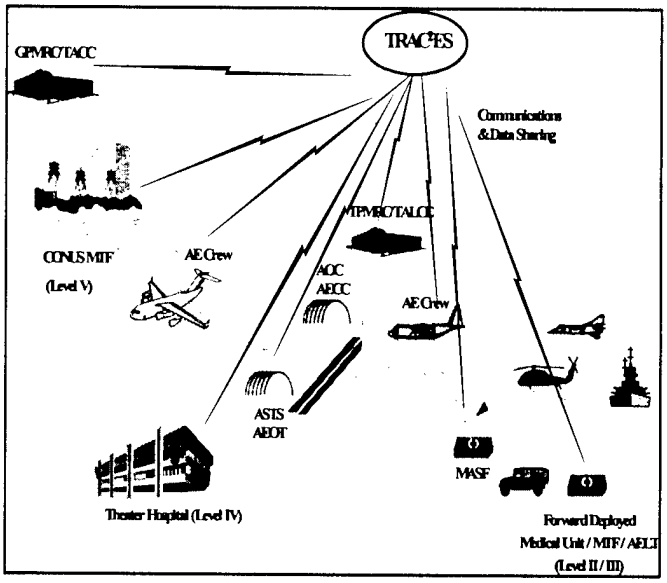

Fig 10. TRAC2ES Connectivity.

Implications of the FCA

The FCA implications go far beyond its immediate concerns, especially in highlighting the importance of enterprise architecture in matching business processes with suitable systems. To survive in a fast-changing world, organizations need a stable ground to bob and weave in the face of strategic and tactical surprises. Enterprise architecture (EA) provides that footing by documenting an organization's operational architecture as a baseline for evaluating such things as business process changes and the suitability of supporting information systems. The AMEDD has been able to fully document enterprise architecture required to support the medical regulating FCA, because of funding limitations. However, it is deliberately moving toward that end. When that goal is realized, future FCAs will be enhanced and much easier to accomplish.

EA: According to OMB Circular A-130, an EA is the explicit description and documentation of the current and desired relationship among business and management processes and information technology. An EA should guide the agency's management of information resources for agency-wide information and information technology needs. The EA will help the agency cope with technology and business changes by serving as a reference for updates toe existing and new information systems. The EA will also assure interoperability of business processes, date applications and technology as agencies integrate proposed information systems projects with one another and with existing legacy systems. The DOD decomposes EA into operational architecture (business process information exchanges) system architecture (IT systems that support the information flows in the operational alarchitecture), and technical architecture (standards to which business processes and systems are to follow).

A second FCA implication is the importance of FPRs in championing their functional area needs. The FPR should be functionally focused and concentrated on the ideal business process, always assessing the risks between what's possible and what's perfect. FPRs are indispensable to an FCA and critical to the delivery of information systems that meet user needs.

A third implication is the need for overarching synchronization of AMEDD-relevant IT systems. In an ideal world, operational architects would define an organization's business rules and system architects would match those business rules to supporting information systems. Unfortunately, the AMEDD does not control most of the information systems that are critical to its business practices – hence the designation "AMEDD-relevant systems" vice "AMEDD systems." Thus, there will be a constant need within the AMEDD for special management to ensure AMEDD business practices are and will be adequately supported by external information systems across time. Well-staffed, acquisition trained organizations such as TASM and DCDD, and also OTSG and MEDCOM directorates, are needed to track external IT programs and life cycle issues. As the TRAC2ES Program illustrates, many critical IT systems capabilities and functions are acquired, configured, tested, and then sustained outside the AMEDD. Having appropriate numbers of competent staff officers and noncommissioned officers to continuously liaise with organizations affecting the future of "our" IT systems is paramount, from conceptualization to requirements generation, through testing, fielding, and sustainment.

The FCA also highlights the criticality of the MC4 Program to the AMEDD's participation in a fully digitized and interoperable force. The TRAC2ES offers immediate advantages and has promise for even Program to AMEDD's participation in a fully digitized and interoperable force. The TRAC2ES offers immediate advantages and has promise for even better things in the future – but for theater users, TRAC2ES (the software) will only be available to users through the budget-constrained MC4 Program (the hardware). Funding for MC4 equipment fielding is critical to maximize TRAC2ES's potential. This is not only true of TRAC2ES, but also for other functionalities slated for hosting on MC4 hardware.

Lastly, from a warfighting perspective, TRAC2ES software combined with MC4 hardware enhances the AMEDD's ability to be modular, agile, flexible, and interoperable – key Objective Force attributes.

A Closing Thought

Throughout the AMEDD's proud history, the innovative use of available technology transformed our operational capabilities and dramatically produced stunning reductions in morbidity and mortality. Letterman's success in realigning disparate battlefield resources into a coordinated process enhanced the

AMEDD's evacuation and treatment of the wounded. At the center of these efforts are adaptive leaders. By exploiting emerging technologies, leaders reinvent business processes along a mission-focused area. The FCA effort described in this article is another example of the AMEDD's innovative ability to improve its business processes by taking a digital tool beyond its intended use. Employing TRAC2ES, all staff will have simultaneous knowledge of locations and conditions of our soldiers, available hospital beds, recommendations on patient movement, and movement resources. The AMEDD's exploitation of this new digital capability contributes to clearing the battlefield and answering the often-unanswerable question from the American people during every conflict, "where in the medical system are our sons and daughters."

References

1. TRAC2ES' capabilities had actually been tested in a limited way and then used in October 2000, during the Cole bombing incident.

2. Echelons IV and V MTFs had already begun (at IOC, in July 2001) initial AMEDD integration with the operational use of TRAC2ES for patient movement between "fixed" facilities, replacing similar (more limited) capabilities provided by two less robust, legacy systems – the APES and the DMRIS.

3. Confirmed in Operation Enduring Freedom where TRAC2ES is used for both intra- and inter-theater evacuations.

Additional Reading

https://business.transcom.mil/TRAC2ES/indexTRAC2ES.html.

Hernandez D. "Functional Capabilities Assessment for the Theater Medical Regulating Information Systems," U.S. Army Medical Board, Project 3-98g, Fort Sam Houston, TX. January 2002.

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Adjunctive HBO Treatment of Children with Cerebral Anoxic Injury

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Hyperbaric oxygen (HBO) therapy has been successfully used to treat a variety of medical disorders, including brain injury. This study evaluated the effects of adjunctive HBO therapy on functional outcomes in nine military dependent children with anoxic brain injury and attempted to identify the optimum number of treatments. Baseline and serial evaluations using multiple functional measures showed improvement in gross motor function and reduced total time of custodial care in the children with cerebral palsy (CP). Early intervention with HBO therapy seemed to effect overall improvement. An optimum number of treatments remains undetermined since improvements were noted to the end of the study.

Cerebral anoxia can result in severe mental and physical disabilities. This condition has many causes including near-drowning, carbon monoxide poisoning, and cardiac arrest. Medical conditions associated with anoxia include stroke and CP. Anoxic brain injuries in children impress their devastation not only on the afflicted child but also their family. Currently, the only treatment options for children with such injuries are supportive and palliative. Most children who suffer an anoxic brain injury are left with lifelong disabilities to include mental retardation, spasticity, seizures, and a myriad of physical deficits. As most of these disabilities are chronic, they are met with multiple co-morbid conditions such as orthopedic deformities, skin breakdown, and recurrent pulmonary infections.

Cerebral palsy is a collation of diverse symptoms of varying etiologic and anatomic types affecting the motor system. The motor disorder is categorized by muscle tone (spasticity vs hypotonia) and anatomic involvement (diplegia, quadriplegia, etc). In addition, there may be mental retardation, epilepsy, and abnormalities of speech and vision. This usually nonprogressive brain injury can occur during the prenatal, perinatal, or postnatal period. Major causes include hemorrhage of fragile brain vasculature and hypoxic-ischemic encephalopathy.[1]

The underlying mechanisms in the development of brain injury due to ischemia are complex.[2] Following a global insult, cerebral perfusion and oxygen availability are reduced. However, not all areas of the brain are equally affected. When critical flow threshold is reached, there is cessation of neuronal electrical activity and failure of ion homeostasis, causing irreversible cellular damage.[3] In the surrounding areas of tissue less affected by hypoxia, there is sufficient oxygen for cells to maintain ion pumping mechanisms and cellular integrity, but not enough for them to generate action potentials and function as neurons.[4,5] The critical parameter in all cases is tissue oxygen availability.

The effects of HBO on hypoxic brain tissue include: relief of hypoxia, improvement in microcirculation, reduced cerebral edema, and improved cerebral metabolism.[2,6] The HBO provides the stimulus necessary for a return to normal cell functioning in those areas of suppressed neuronal activity. As a result of improved circulation and metabolism, patients may recover some brain function.

The HBO therapy has been successfully used in the past to treat brain injury.[2] Recently, there has been a growing interest in using HBO therapy to treat children with CP. There are a multitude of anecdotal reports of treatment success using a variety of protocols. A review of the literature identified only one objective study which showed improvement in motor function and spasticity in children with CP who were treated with HBO.[7] The purpose of this study was twofold: (1) to determine if adjunctive HBO therapy improved functional capacity in

children with anoxic brain injury and (2) to identify the optimum number of treatments required.

Methods

Subjects. Nine volunteer subjects with a history of cerebral anoxic injury participated in this study. Eight of the subjects had varying degrees of CP and one was a near-drowning victim 1 year prior to starting treatment. The CP subjects consisted of 1 boy and 2 girls with spastic diplegia, 3 boys and 1 girl with spastic quadriplegia, and 1 boy with hypotonic diplegia. Seven of the CP subjects had a history of perinatal complications, such as respiratory distress and seizures, consistent with central nervous system hypoxia, and ischemia. The mean age of the 8 CP subjects was 6.4 years (range 1.0 to 16.5 years). The near drowning subject was a 5.6-year-old female. Potential subjects were limited to children age one and older who were eligible for care in a military medical facility. Exclusion criteria included inability to maintain adequate oxygenation without assistance; history of recent thoracic surgery, cancer, or chronic asthma; previous HBO therapy; and age less than 12 months.

One potential subject was excluded during initial evaluation due to difficulty maintaining adequate oxygen saturation levels. One subject was removed from the study after 30 HBO treatments, when he developed a severe viral respiratory infection requiring hospitalization and ventilatory support. Prior to participation, informed consent was obtained from the parent or legal guardian of each child and each of the chamber inside attendants. The children continued their routine physical, occupational and speech therapy during the study. New treatment medications and modalities were prohibited during the study.

Procedures. The procedures followed were in accordance with all ethical standards as approved by the Institutional Review Board of the medical center. The same investigators conducted evaluations before, during, and after HBO treatment. Initial evaluations included an electrocardiogram and chest x-ray to identify disqualifying medical conditions and to serve as a baseline in the event of a medical problem during the study. Prior to treatment, pressure equalization (PE) tubes were placed in all subjects to decrease the risk of barotrauma. An otolaryngologist primarily using *OtoLAM*™ assisted myringotomy inserted the PE tubes.

Pre-treatment evaluation included the Gross Motor Function Measure (GMFM) test, Modified Ashworth Scale (MAS), Functional Independence Measure for Children (WeeFIM), video exam, 24-hour time measure, parental questionnaire, and single-photon emission computed tomography (SPECT) scan. Testing was repeated every 20 treatments to the end of the study except for the SPECT scan and parental questionnaire which were completed at 40 and 80 treatments. The testing procedures consisted of the following:

- *Gross Motor Function.* The GMFM is designed to detect changes in gross motor function in children with CP.[8] The GMFM is an observational measure that evaluates motor function in five areas: lying and rolling, crawling and kneeling, sitting, standing and walking, running and jumping. Each item is scored on a 4-point scale: 0 = cannot initiate activity, 1 = initiates activity, 2 = partially completes activity, 3 = completes activity. This test was administered to all subjects primarily by a neurologist who had no other involvement in the study.

- *Spasticity Level.* Spasticity was evaluated using the MAS in all four extremities.[9] Spasticity was graded on a 0 to 4 scale with 0 being no increase in muscle tone to 4 being limb rigid in flexion or extension. Evaluations were done by the neurologist in conjunction with GMFM testing.

- *Functional Skills.* The WeeFIM instrument was used to evaluate basic living and functional skills.[10] It is modeled after the Functional Independence Measure for Adults and includes 18 items that measure performance across the domains of self-care, sphincter control, transfers, locomotion, communication, and social cognition.[11] Each item is scored on a 7-point scale ranging from 1 (total assistance, child performs little if any of task) to 7 (complete independence). The neurologist administered this test along with the GMFM and MAS.

- *24-Hour Time.* Parents were given a stopwatch and asked to record the total time spent providing care for their child during a 24-hour period. Parents were instructed to only count time spent in physical contact providing direct care, such as bathing, feeding, dressing, and providing therapy. The measure was repeated for two consecutive days and the average time used for analysis. All data were recorded during weekends (Saturday/Sunday), as this time

period was determined to be the least variable in weekly family activities.

• *Video Analysis.* Subjects were recorded on videotape to document the motor disorder to include extremity range of motion and gross motor skills (for example, rolling, sitting, crawling, standing, walking, reaching). An initial session was done prior to HBO treatment and then after every 20 treatments until the end of the study. Investigators analyzed the tapes at the end of the study and recorded changes.

• *Questionnaire.* An 8-item questionnaire was distributed to the parents to complete prior to starting treatment and following 40 and 80 treatments. The questionnaire included the following categories: (1) sitting in chair; (2) sitting on floor; (3) crawling; (4) walking; (5) reaching for/holding objects; (6) eating; (7) personal hygiene/bath and; (8) communication. A 5-point scale described in an earlier CP study was used to score each item.[7] The scale ranged from 0 to 4 (0 = totally dependent, no participation; 1= partially dependent, participates but requires constant help throughout the activity; 2 = partially dependent, needs help only to finish activity; 3 = independent with some form of aid or compensation; 4 = completely independent). There were five additional yes/no questions that addressed changes in sleep pattern, bowel or bladder pattern, emotional state, muscle spasticity, and medication use. Parents were also asked to list all changes noted during HBO treatment.

• *Functional Imaging.* A Tc-HMPAO SPECT scan was completed on each subject prior to HBO treatment and following 40 and 80 treatments. The SPECT scan shows brain function based on uptake of the radioactive tracer documenting regional cerebral blood flow. A radiologist who was blinded to the clinical outcome of the study reviewed the scans.

Hyperbaric Oxygen Therapy. All subjects received 80 treatments in a 12-person multiplace hyperbaric chamber. The HBO protocol was 100% oxygen at 1.7 atmospheres absolute (ATA) for 60 minutes. The treatment schedule was once daily, Monday through Friday for 4 months. The hyperbaric chamber was pressurized with air and the patients received oxygen via a hood. A parent or designated guardian accompanied each child and served as the inside attendant.

Data Aanalysis. For data analysis, each subject served as his or her own control by using pre-treatment scores as the baseline for comparison. Data were analyzed at 20 treatment intervals looking for trends and statistical significance in those trends. The Friedman matched groups signed ranks test was used to determine improvement in patient outcomes as a function of number of treatments. The analysis was applied for each of the separate areas of the GMFM, MAS, and WeeFIM tests. A one-way repeated measures analysis of varience was used to assess differences in care-taking time. To illustrate the effectiveness of HBO treatments, raw scores were converted to mean percent of maximum performance for each measure and percent change for every 20 treatments relative to baseline. Analysis was performed on the seven CP subjects as a group, while the near-drowning subject was evaluated separately. The near-drowning subject was analyzed separately since it was determined that the specific type and severity of her injuries placed her in a separate population.

Results

The GMFM test results for each subject are shown in Table 1. The average improvement in total GMFM score from pre-treatment to each measurement interval was zero-20 = 26.7%, zero-40 = 45.6%, zero-60 = 48.0%, and zero-80 = 58.1%. Figure 1 shows the percent improvement from pre-treatment for each of the functional areas: (1) lying and rolling; (2) crawling and kneeling; (3) sitting; (4) standing; and (5) walking, running, jumping. The largest gains generally occurred at the first 20 treatments, with continued improvement to the end of the study. In analyzing each area separately, significant ($P<0.05$) improvements were shown for areas one, two, three, and five. Younger subjects showed greater improvement (mean=17.8%) compared to the older group (mean=5.2%) but this was not statistically significant, $P=0.21$.

Spasticity was evaluated in both the upper and lower extremities of all subjects using the MAS (Table 2). No change was seen in the majority of subjects. One of the younger children showed minimal improvement in the lower extremities, while one of the older subjects had an increase in upper extremity spasticity. Subject number six had a previous left lower extremity amputation, therefore no data were recorded for this site.

		Area 1 Treatment No.					Area 2 Treatment No.					Area 3 Treatment No.					Area 4 Treatment No.					Area 5 Treatment No.					Total Treatment No.				
Subject	Age	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80
1	2.4	16	18	23	23	23	0	0	2	0	0	0	3	6	6	8	0	0	0	0	0	0	0	0	0	0	16	21	31	29	31
2	3.5	51	51	51	51	51	1	3	6	7	10	43	33	41	48	48	6	5	5	11	14	4	6	7	9	10	105	98	110	126	133
3	1.6	48	51	51	51	51	11	23	27	29	28	1	34	38	39	38	3	11	13	14	26	0	5	8	10	8	63	124	137	143	151
4	1	44	49	49	51	51	3	4	4	5	13	1	17	17	16	20	1	11	10	11	8	0	0	0	2	4	49	81	80	85	96
5	14	49	50	50	51	51	7	19	22	24	24	32	39	41	42	45	2	2	2	2	5	1	0	3	3	3	91	110	118	122	128
6	12.3	10	5	7	7	7	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	10	5	7	7	10
7	16.8	4	4	5	4	5	0	0	0	0	0	6	9	9	9	6	0	0	0	0	0	0	0	0	0	0	10	13	14	13	11
Mean		31.7	32.6	33.7	34	34.1	3.1	7	8.7	9.3	10.7	11.9	19.3	21.7	22.9	24	1.7	4.1	4.3	5.4	7.6	0.7	1.6	2.6	3.4	3.6	49.1	64.6	71	75	80
SD		20.7	22.5	21.4	22	21.8	4.3	9.8	11.1	12.2	11.7	17.9	16	17.8	19.6	19.4	2.2	5	5.3	6.3	9.7	1.4	2.7	3.6	4.3	4.1	39.2	50.1	53.4	57.9	61.2
Maximum		51	51	51	51	51	42	42	42	42	42	60	60	60	60	60	39	39	39	39	39	72	72	72	72	72	264	264	264	264	264

Table 1. Individual Results for the GMFM Test

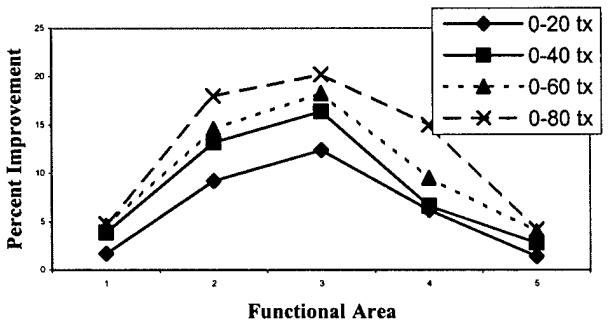

Fig 1. Percent improvement of GMFM score (based on % of maximum potential score) for each functional area by measurement interval.

Table 3 summarizes the evaluation of basic living and functional skills using the WeeFIM. The group as a whole showed only minimal improvement by the end of treatment. However, considerable differences were noted between the two age groups. Averaged across all six test measures at the end of the study, the younger children demonstrated a 58.6% improvement in total score. In contrast, the older group recorded a 6.7% decrease. This difference was found to be marginally significant (P=0.07). Figure 2 shows the percent improvement from pretreatment for each of the evaluated areas: (1) self care; (2) sphincter control; (3) transfers; (4) locomotion, (5) communication; and (6) social cognition. Most of the improvement in skills occurred during the last 20 HBO treatments. The largest gains involved locomotion skills, but these were not statistically significant.

Table 4 shows the total time parents spent providing care for their child during a 24-hour period. The overall results indicate a significant (P=0.03) reduction in the amount of time required. The biggest gains occurred at 20 treatments, with the general trend continuing as more treatments were administered. However, there were large individual variances ranging from 43.9% more time needed to an 81.9% time reduction at 80 HBO treatments. Thus, none of the pair-wise comparisons between time intervals approached statistical significance.

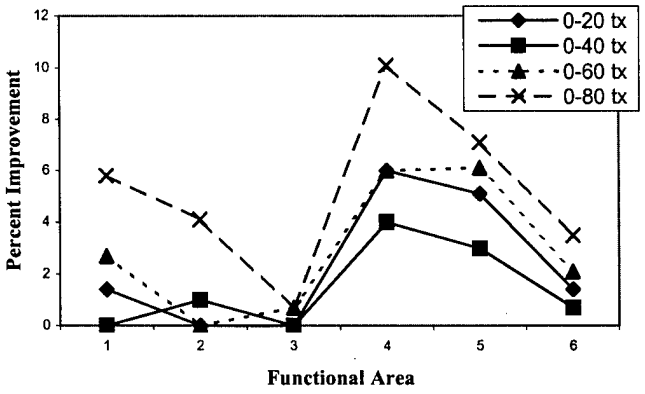

Fig 2. Percent improvement of WeeFIM score (based on % of maximum potential score) for each functional area by measurement interval.

		Left Upper Extremity Treatment No.					Right Upper Extremity Treatment No.					Left Lower Extremity Treatment No.					Right Lower Extremity Treatment No.				
Subject	Age	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80	0	20	40	60	80
1	2.4	3	3	4	4	4	3	3	4	4	4	3	3	4	3	4	3	3	4	3	4
2	3.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1.6	2	1	1	1	1	1	1	1	1	1	3	2	2	2	1	2	2	2	2	1
4	1	1	1	1	1	1	2	1	1	2	2	2	1	1	1	1	2	2	2	2	2
5	14	1	2	3	3	3	1	2	3	3	3	3	4	4	4	4	3	4	4	4	4
6	12	4	4	4	4	4	4	4	4	4	4						4	4	4	4	4
7	17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mean		2.1	2.1	2.4	2.4	2.4	2.1	2.1	2.4	2.6	2.6	2.5	2.3	2.5	2.3	2.3	2.6	2.7	2.9	2.7	2.7
SD		1.6	1.6	1.7	1.7	1.7	1.6	1.6	1.7	1.6	1.6	1.4	1.6	1.8	1.6	1.9	1.4	1.5	1.6	1.5	1.7

Table 2. Individual Results for the MAS

		Treatment No.					Percent Change			
Subject	**Age**	0	20	40	60	80	0-20 tx	0-40 tx	0-60 tx	0-80 tx
1	2.4	18	18	18	18	18	0	0	0	0
2	3.5	28	41	30	40	51	46.4	7.1	42.9	82.1
3	1.6	20	26	31	37	42	30	55	85	110
4	1	19	21	22	23	27	10.5	15.8	21.1	42.1
5	14	28	27	25	25	25	-3.6	-10.7	-10.7	-10.7
6	12.3	27	23	24	23	23	-14.8	-11.1	-14.8	-14.8
7	16.8	18	19	19	19	19	5.5	5.5	5.5	5.5
Mean		22.6	25	24.1	26.4	29.3	10.8	7	17.1	29.8
SD		4.8	7.8	5	8.6	12.4				
Maximum		126	126	126	126	126				

Table 3. Summary Scores for the WeeFIM Test with the Percent Change Relative to Baseline

		Treatment No.					Percent Change			
Subject	**Age**	0	20	40	60	80	0-20 tx	0-40 tx	0-60 tx	0-80 tx
1	2.4	458	622	665	653	659	35.8	45.2	42.6	43.9
2	3.5	210	79	119	85	73	-62.4	-43.3	-59.5	-65.2
3	1.6	443	167	129	196	80	-62.3	-70.8	-55.8	-81.9
4	1	759	730	723	682	605	-3.8	-4.7	-10.1	-20.3
5	14	226	199	170	154	138	-11.9	-24.8	-31.9	-38.9
6	12	251	176	193	127	95	-29.9	-23.1	-49.4	-62.2
7	17	510	249	287	237	240	-51.2	-43.7	-53.5	-52.9
Mean		408.1	317.4	326.6	304.9	270	-26.5	23.6	-31.1	-39.6
SD		197.6	252.1	257.5	252.5	254.1				

Note: negative percent indicates time reduction

Table 4. Individual Results of Time Spent (Minutes) Providing Care in a 24-Hour Period

Two of the investigators reviewed the videotapes at the end of the study. Four subjects (57%) had some improvement in range of motion, with no improvements beyond 60 HBO treatments. All three subjects in the older age group demonstrated improved range of motion. Three subjects (43%) displayed improved gross motor function. All three were in the younger age group. The videos were rated as unchanged for the remaining subjects.

The results of the parent questionnaire are illustrated in Figure 3. The average scores for the seven subjects ranged from 0.1 to 2.4, with no statistically significant improvements. Most improvements occurred by 40 HBO treatments. Parents reported essentially no change in the area of personal hygiene while eating skills were most improved.

Parents provided additional information by answering the yes or no portion of the questionnaire. Sleep patterns improved for two subjects while becoming disrupted for two others. Two children began having routine bowel movements resulting in stool softeners

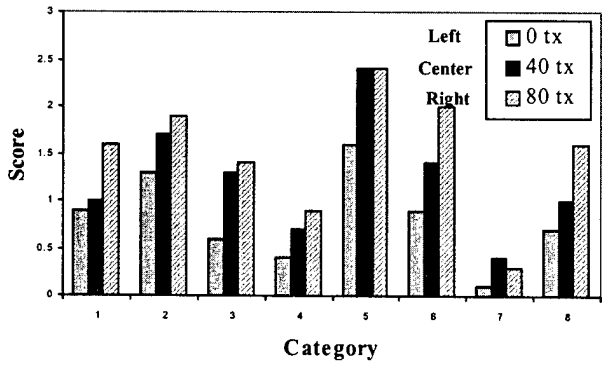

Fig 3. Responses of parents to an 8-item questionnaire.

being discontinued for one of them. After 2 to 3 weeks of HBO treatment, two of the subjects experienced personality changes, becoming more irritable and less tolerant. These changes resolved after 8 to 10 weeks of treatment. Five parents also reported a decrease in muscle spasticity and improved range of motion in their child, while one parent reported increased spasticity requiring an increase in medication. Overall, parents indicated continued improvement in their children through the end of the study.

Parents reported other improvements that were not measured in our assessment. Three children improved their ability to swallow, allowing them to have a greater variety of liquids and foods. The two subjects with strabismus had a reduction in severity, and the nystagmus in one subject resolved. One child who experienced frequent illnesses remained healthy during HBO treatment. One subject had complete resolution of a grade 3 vesicoureteral reflux, resulting in cancellation of her surgery.

The near-drowning subject showed little response to HBO treatment. The GMFM score improved 5.4% by 80 HBO treatments, with a zero score pre- and post-treatment for the areas of crawling and kneeling, standing, and walking, running, jumping. Spasticity remained at the maximum score of four during the entire study. Initial WeeFIM total score was 1.7% of maximum, with no improvement at the end of treatment. Parents reported a 14% reduction in total time spent providing care during a 24-hour period. Videotape review showed minimal improvement in range of motion throughout the study. Parents responded with a zero (totally dependent) score for all questions, pre- and post-treatment, on the questionnaire.

Discussion

This is the first study to collect serial data to objectively evaluate the effects of adjunctive HBO treatment for children with anoxic brain injuries. All subjects continued their routine therapy in addition to receiving HBO. In the CP group, progressive improvements were noted at each of the measurement intervals. Even with the small number of subjects, our findings demonstrated statistically significant improvements in gross motor function in four of the five areas on the GMFM test and in the total time spent by parents providing childcare. Additional improvement trends were noted in functional skills on the WeeFIM test and in the parent questionnaire results.

The near-drowning subject was analyzed separately because the mechanism of injury is significantly different from the CP subjects. Prior to injury, this subject had no obvious decrements in brain function. The acute, prolonged hypoxic event resulted in a large amount of cellular damage with minimal response to HBO treatment.

There are some risks associated with HBO treatment. The primary concern was injury (barotrauma) to the middle ear or sinuses due to daily exposure to pressure change. To eliminate the risk of middle ear injury, all subjects received PE tubes prior to starting treatment. Medical attendants were individually instructed on proper pressure equalization techniques and chamber pressurization was closely monitored to prevent problems. A low treatment pressure (1.7 ATA) with a short exposure (60 minutes) essentially eliminated the risk of oxygen toxicity in subjects. Other potential concerns included pneumothorax and risk of fire. None of the subjects exhibited any adverse symptoms during the study. We believe the benefits of HBO treatment for 60 minutes at 1.7 ATA outweigh the potential risks.

The SPECT scan results were omitted due to multiple procedural problems which were identified post-study. Scan results may be adversely affected by patient movement, patient position, and delays in imaging following tracer injection. The major complications we experienced included variation of head position during the scan process and the relationship between nuclear tracer

injection and scan time. Due to unforeseeable complications related to level of sedation, the time between tracer dose and scan varied from 20 to 60 minutes. Although multiple scans demonstrated improved brain blood flow, the procedural inconsistencies prohibited an accurate statistical analysis of the data.

The serial increases seen in the GMFM scores are considered true improvements from HBO treatment. The GMFM test has been validated as an accurate assessment of gross motor function in children with CP.[8] Since the subjects continued physical and occupational therapy during our study, some measurable improvement was expected. Two previous studies have documented improvement of 3.7% and 7.0% respectively in GMFM scores following intensive physical therapy over a 6 to 8 month period.[12,13] The subjects in our study received HBO treatment over a 4 to 5 month period with improvement in total score of 26.7% at 20 treatments, up to 58.1% at 80 treatments.

Our findings for the spasticity evaluations were much different than previously reported.[7] This is most likely due to a combination of factors. The MAS is a subjective tool that relies heavily on the experience of the evaluator and our neurologist had limited prior experience with this tool. Test reliability has been questioned, especially for lower extremity evaluations.[14] In addition, our score reflected overall limb spasticity, not specific muscle groups. Three subjects had pre-treatment upper extremity scores of zero or one indicating low levels of spasticity, making it difficult to detect improvement.

The WeeFIM instrument was selected to objectively evaluate changes in basic daily living and functional skills. Although the test has not been validated specifically for CP patients, reliability has been shown for children under age 7 with developmental disabilities.[10] Improvement trends were noted in each of the six evaluated areas, but were not statistically significant. The lack of significance was most likely due to the small number of subjects combined with the age and medical condition of some subjects. Three of the seven subjects exceeded the designated age range of the test. Two of these subjects showed a decrease in test scores while the third showed only minimal improvement. The lack of test reliability in older subjects may explain the contrast in scores noted between the younger and older groups.

A 24-hour time measurement was an additional objective tool used to assess improvement. Parents were given a stopwatch and told to activate it each time they provided care for their child. Total time was recorded for two consecutive 24-hour periods. Testing was conducted only on weekends to reduce variability. As the subject's functional and motor skills improved, we expected to see a reduction in time demands on parents. Significant reductions were noted in six out of seven subjects, with a timesaving of 1¼ to 6 hours per day. Although the size of the time reduction may be affected by a parent reporting bias, a time savings did occur. Parents indicated this time savings was important because it provided additional time for other family members and issues. As expected, larger gains occurred in older subjects since younger children generally require more time and attention.

There was some variability in test scores based on age. In general, younger subjects demonstrated a better response to treatment. The mechanism of injury in CP subjects involves a gradient of hypoxia producing a range of cellular effects, from inactivity to cell death.[3,4] As with any injury, persistent ischemia/hypoxia often results in progressive tissue loss. Early correction of hypoxia limits injury effects, and in brain tissue, provides the stimulus necessary for activation of suppressed neurons.[2,6] Therefore, prospects for improvement may be greater in younger children with shorter periods of hypoxia.

An important consideration is whether or not there was true improvement in daily functioning in these children. Both investigators and parents independently observed multiple functional improvements throughout the study. Many of these changes were a result of improved muscle tone and control. This included improved eating and swallowing ability, ambulation, and fine motor control. In addition, observers noted improved cognitive function and verbal skills, improved bladder and bowel control, and a decrease in strabismus and nystagmus. As a result of the changes, the time required for parental care of the children was reduced. The degree of improvement varied among subjects, as did the number of HBO treatments needed to elicit change. Functional improvements continued in several children to the end of the study. Overall, the quality of daily living appeared to improve for the majority of the children and their families.

The study findings suggest that adjunctive HBO

therapy may improve functional capacity in children with CP but not near drowning when treatment is delayed. We were unable to identify an optimum number of treatments, since improvements were noted to the end of the study. We recognize that there are several methodological limitations to the study that include small sample size, lack of a control group, and potential observer bias. In addition, we do not know the long-term effects of this treatment. Further research is needed with large patient populations and follow-up studies to determine the true potential of HBO treatment for children with cerebral anoxic injury.

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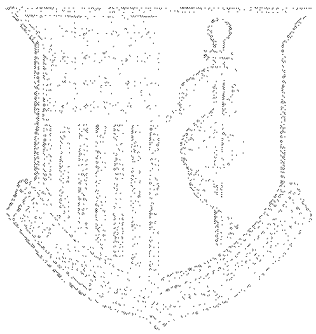

Evolving Towards Strategic Alignment: A New Governance Model for BAMC

LTC Dawn M. Smith, MS, USA†

Conditions Which Prompted the Study

Changes in the turbulent health care environment are forcing governing boards to evolve into proactive, business-savvy teams to ensure organizational viability and quality care for all their patients. Factors such as the rise of integrated delivery systems, strictures on reimbursements, and public focus on health care spending and quality have placed new and increasing pressures on governing bodies to govern more efficiently and effectively. One way boards have adapted is by reinventing their governance process to improve organizational performance. One such board exists at Brooke Army Medical Center (BAMC), a 450-bed Department of Defense (DOD) tertiary care teaching facility. Caught in this storm of external financial and policy pressures, the BAMC governing board, the Executive Committee (EC), needed a governance system that could steady the organization. Discontent with the old governance system, they began searching for a new governance model that would allow the organization to be more effective, efficient, and responsive to the staff and community served.

In May 1999, the new BAMC Commander found BAMC's governance consisted of a series of disconnected management processes that failed to achieve the overall synergy possible in a strategically aligned and performance improvement-based governance system.

The need for governance change and the magnitude of the environmental forces ongoing at BAMC warranted an in-depth review of the existing governance and management structures. Consequently, in August 1999, the Commander directed an overhaul of BAMC's entire governance system from strategic planning down to daily decision-making. He envisioned turning the old disjointed system into a new governance "internet" that built effective organizational performance by linking management processes into a synergistic web of strategic guidance, performance evaluation, and decision-making.

Background

The BAMC provides an integrated health delivery system to a population of over 105,500 active duty soldiers, their family members, retired military members, and retiree family members. The facility employs more than 1,700 military and 1,500 civilian staff members, and 320 contract personnel to provide beneficiary services. In addition to its daily health care mission, BAMC also supports DOD contingency missions around the world and serves as a major training platform for Army medical personnel in more than 50 accredited education programs.

Literature Review

Governance and Governance Redesign.

In today's complex and turbulent health care environment, traditional governance forms face many challenges and may no longer be adequate to manage today's issues.[1,2] Consequently, new standards and forms of governance are constantly being formed to cope with the changing face of health care leadership.

Governance is defined as the activity of an organization that monitors the outside environment, selects appropriate alternatives, and negotiates implementation of these alternatives with others, inside and outside the organization.[3] Governance responsibilities can be summed up under three general role headings of policy formulation, decision-making, and oversight.[4,5] Boards formulate policy to provide the organization with direction and a means of delegating authority and tasks to the managerial staff. Policies also provide a framework for executing the decision-making role. Decisions must be made in each area of responsibility based on data and recommendations

forwarded by the staff. Finally, boards engage in oversight by monitoring performance to ensure it conforms to policy and produces the intended results.[4]

Effective hospital governance does not occur by chance. Rather, it is the result of an integrated process of planning, coordination, implementation, and evaluation woven into the very fabric of an organization's operations. When a board governs by chance or tradition, or simply reacts to whatever chance situations arise, it abdicates its responsibility for leadership and contributes to organizational atrophy.[6]

Overall, increasing board effectiveness requires continuous evaluation and assessment, using a deliberate process that both preserves what is unique and useful about the current governance structure, and addresses areas for improvement. Governing bodies who accept the challenge to change how they govern help create a successful future for their organizations; those who resist, impede the organization's effectiveness by forever living in the past.[2]

Strategic Planning.

Governance research revealed that setting the organization's overall direction and goals are board imperatives. In this light, it can be argued that one of the most critical responsibilities of the governing body within a health care organization is strategic planning. The strategic planning process is initiated with the establishment of the organization's explicit mission and a vision of how the mission will be carried out. Once outlined, the mission and vision are translated into detailed plans expressly designed to meet market needs. Once strategies and priorities are set, the planning process leaves the governing body. This delegation to lower management groups is essential to empower the personnel who run the hospital to execute the strategic plan.[3] These lower management groups develop specific objectives or business plans aimed at accomplishing the strategies. These plans are translated to specific budgets and metrics to guide and measure the success of the individual work units.

Committee Restructuring.

Maintaining outdated governance structures and cumbersome governance processes are critical errors in today's proactive environment. A major example of such ineffective governance is a health care organization with too many committees, a poorly designed committee structure, or committees that address outmoded issues relevant only to past paradigms.[6] Such Byzantine and ineffective committee systems can cause governance gridlock when the organization suffers from unwieldy, drawn-out decision-making processes caused by confusion about which of its multiple committees has the authority to make which decisions. Such gridlock results in a diffusion of the focus and commitment of each committee, which in turn further slows the decision-making cycle.

Leatt and Leggatt recommend organizing committees in accordance with the strategic priorities of the organization since a clear strategic plan with a strong mission statement will keep committee members focused on their fundamental purpose.[7] A streamlined committee system will improve reaction time in accomplishing goals. Orlikoff and Totten note that a lack of strategic alignment between the committees and the board contributes to committees that address irrelevant issues.[2]

Periodic Business Review Methods.

Execution of the oversight role closes the loop on a board's ultimate responsibility. Even a perfectly designed delivery system will deteriorate due to environmental changes, wear, and fatigue if left unmonitored. Governing bodies should routinely review data reflecting the organization's performance against expectations in order to make timely decisions and implement corrective action as needed. The board's oversight role in this context can be built into periodic performance assessments, used to identify the gaps between actual and desired performance that should be priorities for action. Oversight entails three functions – monitoring, assessment, and feedback. The monitoring and assessment functions guarantee that delegated tasks and authority are being executed in accordance with the board's expectations. Feedback provides the information board's need to modify existing policies and formulate new ones.[4]

Study Purpose.

This study focused not on restructuring the governing board, but on restructuring how the board governs. Consequently, the purpose of the project was to assist the BAMC EC develop, formalize, and institutionalize a new governance methodology by revamping and linking a

disparate series of management processes into one strategically aligned governance system with a built-in performance improvement feedback loop.

The study's premise was that a strategically integrated, connected cycle of governance would allow BAMC's EC to more efficiently and effectively deliver quality health care within an environment of constrained resources. The BAMC's performance goals could be realized by a strategic plan translated into usable objectives along with a reengineered committee structure that uses the strategic objectives as guides to maximize resource utilization. The new governance model should culminate in a periodic business review to gage the organization's movement towards realizing the strategic goals by measuring outcomes and then providing timely and accurate data for decision-making and performance improvement. Additionally, a well-documented governance system, clearly inculcated throughout the organization, will ensure managers and their management processes exist in the right relationships; align the interests of internal stakeholders; focus decision makers on strategic aims; and give external entities (higher military authorities, beneficiaries, Joint Commission on Accreditation of Healthcare Organizations [JCAHO]) a clear picture of the institution's governance process.

Methods and Procedures

The selected methods and procedures in this study support three study objectives. The initial two objectives will investigate the creation of the new governance system by studying the flaws and opportunities in the old governance model. The final objective will measure the effectiveness of the new system.

Objective One: Document the Current BAMC Governance Structure

Objective Two: Document the Evolution of BAMC's New Governance Model

Objective Three: Determine the Effectiveness of the New Governance Model

Results

Objective One: Document Current BAMC Governance Structure.

Upon implementation of this study, the BAMC governance system consisted of a series of disparate managerial systems. While a number of good managerial systems existed, there was no mechanism to link them into a strategically focused model that offered synergistic benefits.

Strategic Planning.

The last BAMC strategic plan was completed in September 1998 and quickly became obsolete. This plan, consisting mainly of a list of "Top 20 Priorities for 1999" did not include any manner of devolving responsibility for the strategic objectives to ensure accomplishment. Additionally, there was no mechanism to periodically assess the organization's progress towards meeting the strategic goals. Without ownership or an organizational mechanism to track the objectives, these broad aims quickly fell by the wayside in light of daily operational pressures.

Committee Structure.

The old committee structure at BAMC had evolved over decades into a ponderous, sprawling structure with no head and no tail. With a total of 51 committees and smaller advisory groups, most meeting monthly, the staff complained about lost productivity and duplication among committees. Committees that were no longer required obediently continued to meet and churn out lengthy minutes. The Commander complained of being inundated by the voluminous minutes of over 30 committees per month. Additionally, there was no way to track issues between committees to ensure concerted endeavors and reduce duplicative efforts, especially since the reporting system did not funnel up through a central chain. Identifying issues requiring correction was done on an ad hoc basis.

While issues were certainly identified and addressed, the system was not centralized nor did it lend itself to central oversight. As a work around, each time the Commander identified new issues, he compiled an issues log and assigned responsibility for each issue to a member of the EC. It was up to the EC member to either solve the issue themselves, assign it for resolution to their stovepipe chain of responsibility (nursing, administration, or medical staff), or form an ad hoc group to attack the issue. Rarely were the issues handed off to the appropriate committee

since the committee structure was seen as too unresponsive to meet the Commander's timeline for resolution.

Periodic Business Review.

Under the old governance model, BAMC's periodic business review was the Quarterly Review and Analysis (BAMC [RA]). The purpose of this review was to provide a forum for leaders and staff to depict hospital performance by focusing on selected business practices and metrics. The agenda included reviews of financial performance and managed care operations, concluding with briefs by the chiefs of the larger departments: medicine, surgery, pediatrics, nursing, pharmacy, and logistics. The financial statistics were shown for the entire hospital and did not break down the information to the department level so department managers could see how their individual departments fared. The managed care brief focused on the organization's performance in light of its managed care contract with a civilian network provider. While most of the information was presented at the organizational level, some information provided department level performance indicators. The remainder of the RA consisted of departmental highlights and issues presented by the department chiefs. There was no common format between the department briefs, thus the chiefs presented the EC whatever they deemed appropriate. The lack of detailed information and uniformity down to the departmental level did not allow the EC to truly evaluate the organization's performance against the strategic goals set out in the strategic plan.

Objective Two: Document the Evolution of BAMC's New Governance Model.

There were three major components to BAMC's new governance structure: strategic planning, committee reengineering, and the revised periodic business review. The Commander envisioned a new governance model based on a system that was strategically aligned from determining the organization's objectives right down to daily spending decisions. Additionally, to ensure the system had a built-in method of constant performance improvement, the system included all the steps of the Plan-Do-Check-Act (PDCA) feedback loop. As a result, the board integrated all four aspects of performance improvement as part of the new governance model. The resulting governance model at BAMC is shown at Figure 1 below.

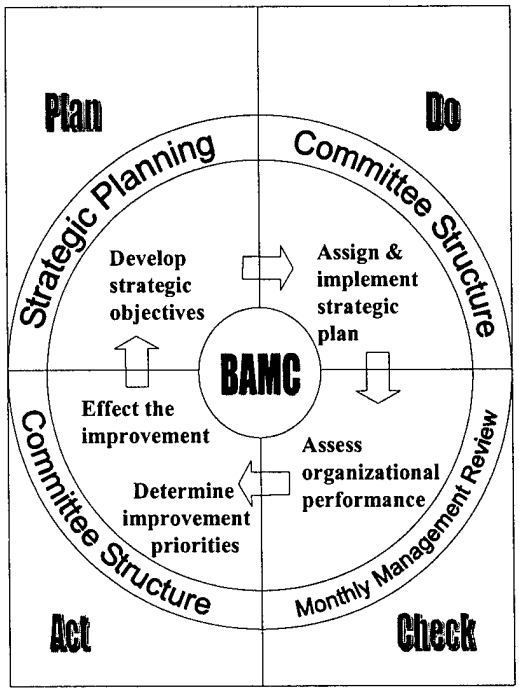

Fig 1. New Governance Model for BAMC.

Strategic Planning: The "Plan" of Governance PDCA.

To begin, the Commander ordered a strategic planning conference to update the organization's strategic plan: the "Plan" step of PDCA. The Commander's goal was to create a plan that described how BAMC would meet its mission of providing high-quality and timely benefits and services to its beneficiaries. The BAMC's strategic planning process was comprised of three stages: (1) strategy formulation; (2) strategy implementation; and (3) strategy evaluation.

The initial phase of strategy formulation involved a Strengths, Weaknesses, Opportunities, and Threats analysis of BAMC's internal strengths and weaknesses followed by its external threats and opportunities. Next, the governing body re-evaluated its customer base and reassessed BAMC's role in meeting their needs. The governing body also reviewed the guidance of higher DOD and Army organizations. In concert with these plans, the BAMC governing body next revalidated BAMC's mission and vision statement and created three overarching goals critical to achieving the mission.

In the strategy implementation phase, the EC charged the senior managerial staff to develop operational objectives and strategies to accomplish the overarching goals. The EC issued guidance for these senior managers to develop a culture that supported strategic change, to form new ways to manage limited resources, to implement real population health management, to re-engineer military readiness, and to develop meaningful performance measures. This phase was initiated at a one-day offsite planning conference and followed by a series of reviews to clarify, consolidate, and summarize the objectives, sub-objectives, performance metrics, and responsible agencies.

The final phase of strategy evaluation involved monitoring the results of strategy formulation and implementation initiatives, measuring performance, and taking necessary corrective action. Strategy evaluation also included periodically evaluating the strategic plan itself for continued relevance in the light of a rapidly changing environment.

Linking the Strategic Plan and Committee Re-engineering.

The next logical step was to forge a link between BAMC's strategic plan and committee structure. To create the link, BAMC's new committee structure was charged with the responsibility of executing the organization's strategic plan. This mission became the "Do" of the PDCA cycle. The first step was to align the committees with BAMC's mission, vision, and overarching goals. The actual responsibility for executing the strategic plan was devolved via assigning each strategic plan sub-objective to the appropriate committee for action and tracking on a Committee Action Log. This assignment enables the EC to know instantly who is responsible for each element of the strategic plan.

Committee Reengineering: The "Do" of the Governance PDCA.

The goal of BAMC's committee restructuring was to improve the "Do" mechanism of the organization. Specifically, to improve the management of information, to make better decisions faster, and to create action groups focused on executing BAMC's strategic plan. The time cherished conventional wisdom of committees who sat and analyzed the past had to make room for dynamic think tanks who blazed the trail for future success. Research and the Commander's vision advocated organizing hospital committees in accordance with the strategic priorities of the organization. With these strategic goals in mind, BAMC began its overhaul of the committee structure.

A small team of four individuals began by analyzing the Commander's vision for the new committee structure and then formulating this vision into goals and a plan of action.

The plan of action included the following specific goals:

- Align committees with the strategic plan (mission, goals, and objectives)
- Increase interdisciplinary collaboration and coordination
- Ensure monitoring and compliance with JCAHO standards
- Increase accountability for solving issues at the department/division level
- Increase efficiency, provide focus, and maximize committee output
- Streamline meeting times and reduce redundancy

The second step was to outline the old system and look for areas that failed to meet the above goals. The team began by examining BAMC Memorandum 15-1, Hospitals, Committees, and Councils. This document, dated October 1997, outlined the old committee structure then in use at BAMC. The team verified whether the committees listed in the memo were still active, and whether any new committees had been added. Next, the team researched which committees were required by outside agencies such as the JCAHO, the DOD, or the Army. With this information, the restructuring focused on the JCAHO functional areas. Once these required committees were identified, the teams turned to streamlining the remaining committee structure using a number of different tools. These tools included: elimination, combination, reducing meeting frequency, altering composition, and altering reporting requirements and meeting plans.

Elimination. A primary streamlining tool was eliminating committees no longer required by outside agencies or circumstances. Twenty committees and subcommittees were eliminated.

Combination. Once identified, committees with redundant functions were combined. One example includes the Health Promotion Council which was combined with the Health Consumer Committee.

Reducing Frequency. Reducing meeting frequency from bimonthly to monthly or from monthly to quarterly greatly reduced the amount of staff time invested in committees without degrading committee's effectiveness.

Altering Composition. Changing, and in most cases, reducing the number of committee members reduced not only the total amount of staff hours spent in meetings but also increased the efficiency of the remaining members by concentrating the decision makers in a smaller group.

Altering Reporting Requirements. One of the most ponderous elements of the old committee structure was the system of reporting minutes to the next managerial level. Over 33 committees reported directly to the Commander or EC; under the new system that number was reduced to 13. This reduction was achieved by creating a five-tiered reporting system within the committee structure (See Figure 2).

Committee Tier 1 consists of the BAMC sub-committees as a base. These subcommittees were grouped by functional area under one of the "Big Four" committees that comprise Committee Tier 2. In line with JCAHO focus area, the Big Four include the Patient Focused Committee, Environment of Care Committee, Management of Information Committee, and the Human Resources Committee. Each Big Four Committee is comprised of the chairs of all the Tier 1 subcommittees under them. In turn, the Big Four report to the third committee tier, the Performance Improvement Committee (PIC), also known as the JCAHO Steering Committee. Other smaller committees or advisory groups also report directly to the PIC. The PIC serves as the central conduit of committee information and recommendations to the EC located at Tier 4. The Commander, Tier 5, retains ultimate authority over the committee structure but does so over a much streamlined system.

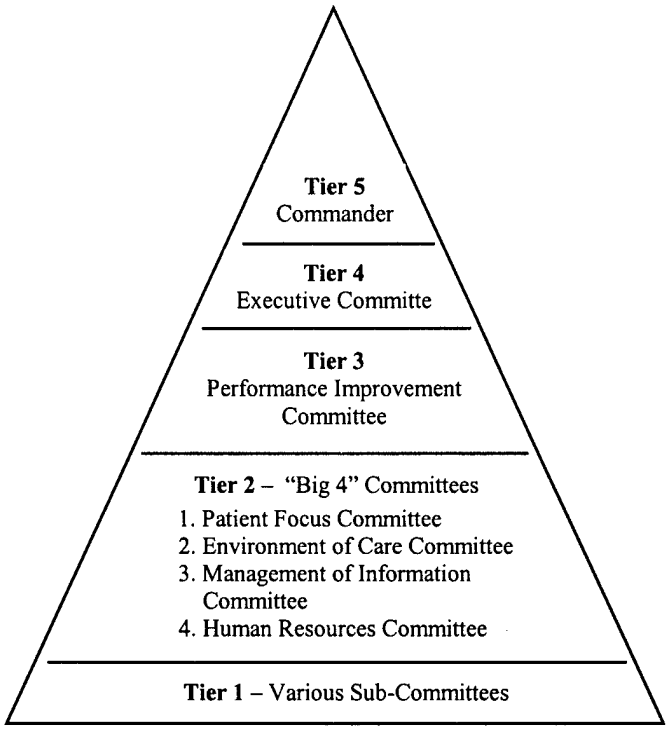

Fig 2. Redesigned BAMC Committee Structure (Simplified).

Meeting Plans. The restructuring team devised a new meeting plan format to standardize meeting conduct and minutes. This format ensures the same information is gathered and reported from each meeting and includes a Committee Action Log that allows a standard way of tracking issues within the organization.

Linking the Periodic Business Review to the Strategic Plan and Committee Reengineering.

The objectives and sub-objectives of the strategic plan became the "yardsticks" or metrics for measuring BAMC's progress toward achieving the strategic plan. Since the new committee structure was charged with operational accomplishment of the strategic plan, they employed the metrics as indicators of action accomplished and actions needed. Consequently, when the EC needed a method of determining whether or not the objectives of the strategic plan were being accomplished, they decided to periodically review the metrics the committees were already tracking. Thus, the Monthly Management Review (MMR) was born at BAMC.

Revising the Periodic Business Review: The "Check" of the Governance PDCA.

Known as the MMR, this new review focused on those business metrics the EC needed to make timely and informed governance decisions aimed at executing the strategic plan. The MMR is divided into 10 major parts: soldier readiness, patient administration, customer and staff relations, information management, logistics, financial review, clinical operations, graduate medical education, JCAHO survey preparation, and credentials status. Like the system it measures, the MMR evolves to meet the needs of the EC as they measure the organization's progress toward its goals.

The EC uses the MMR to review the organization's progress and reshape the organization as needed. Specifically, the MMR forum provides the EC with a platform to overcome inertia towards change, increase standardization, control business outliers, increase cost controls and savings, and inculcate management directives into top and middle levels of management.

The MMR underwent a number of evolutionary revisions and still remains a metric system under revision. The current MMR serves as the EC's single most important check of the organization's performance. By giving the governing body timely, accurate, and pertinent information for decision-making, the MMR is the catalyst for the "Act" stage of the PDCA governance loop.

Objective Three. Determine the Effectiveness of the New Governance Model.

There are two major tests of whether a governance system is effective. First, can it cope realistically with the operational environment and second, does it inspire conviction among those who must implement it? The final objective of this study was to determine if the new governance model is more effective, efficient, and responsive than the previous governance method at BAMC.

Improvements in Governance Culture.

The EC enjoys a number of governance improvements as a result of the new model. Foremost is the knowledge that an integrated and strategically aligned governance system now exists at BAMC to enable them to address organizational issues more efficiently and effectively. Better data available from the MMR allow faster and more informed decision-making. The new committee structure makes it easier to devolve issues down to the appropriate level for resolution. Additionally, the new committee structure is more functional as a tiered structure, resolving issues at lower levels, thereby relieving some pressure on the EC.

Productivity Improvements.

The committee restructuring engendered the greatest appreciable amount of direct productivity savings among the staff. The committee restructuring demonstratively saved staff time and streamlined the process by which committees acted on objectives of the strategic plan. The overall number of committees was reduced from 51 to 37: a 27% reduction. Twenty committees were eliminated and six added. Interestingly, while the number of committees was reduced, the committees that remained maintained, for the most part, the same number of members despite the restructuring goal of reducing committee membership. Still, the committees that were eliminated resulted in the equivalent of 143 staff members being freed an average of 2 hours per month for other activities. This is equal to 286 staff hours each month. A new minutes format was aimed at capturing only the essentials of the issues and eliminating lengthy historical discourses. Those committees which adopted the new minutes format saw a significant reduction in the amount of pages generated each month. As a specific example, nine subcommittees under the Performance Improvement umbrella were examined before and after the committee restructuring. Those committees adopting the new minutes format reduced the number of pages in their minutes by almost 50%. Committees that did not adopt the new format showed no reduction in the number of pages. Finally, one restructuring result had significant positive impact for the governing body; the number of committee reports in the form of minutes that went monthly to the EC for review was reduced from 33 to 13: a reduction of 61%.

Another area of productivity savings occurred in medical supplies and equipment. Once the MMR began showing clinical chiefs the amount of unaccounted expenditures of medical supplies and durable equipment on a monthly basis, the results were extraordinary. Accountability of medical supplies increased by 71%; from monthly unaccounted usage of $68,613 to $20,047. The loss rate for durable pieces of medical equipment dropped from 34 pieces per month to 15: almost 56%.

The accountability and processing of medical records also improved, resulting in faster turn around time for medical billing. Over the length of the study, delinquent medical records (defined as being out over 30 days past the patient's discharge) dropped by 16%.

Customer and Staff Satisfaction.

During this time, customer satisfaction data collected by higher level organizations above BAMC showed little change in customer perceptions. Patient ratings of access to appointments improved slightly and was probably unrelated to the changes in governance. One explanation for the lack of change may be that this data lags 4 to 6 months behind real time and thus did not correspond well to this study period. Another explanation is that the governing body had only recently begun to address key areas of patient dissatisfaction: access to care, waiting times, and telephone access. Additional studies of patient satisfaction will need to be done at a later time.

While customer satisfaction data tracked at Department of the Army level showed little or no change for BAMC, customer complaint statistics collected at BAMC showed a precipitous drop over the 9 month period: from a high of 210 monthly complaints in September 1999 to 64 in May 2000. The MMR showed senior managers customer complaints on a monthly basis and required the managers to address each complaint to the EC. This excruciating focus caused the managers to quickly determine faulty processes and employees under their purview needing remedial action. To assist the senior managers with customer and staff relations, the EC invested in two full time trainers for Customer Hospitality and one part time trainer for intra-staff relations. Consequently, relations among staff members also improved. The amount of Equal Employment Opportunity complaints dropped by almost half as the EC and senior managers focused on intra-staff relations training and addressing employee concerns.

Discussion

On this study's onset, BAMC desperately needed a new, proactive governance system that strategically aligned the organization's long-term objectives with its daily operational decision-making in a system that allowed its governing body to really govern. By early January 2000, BAMC's EC had put in place the final pieces of a new governance model: a new strategic plan which was developed by, and for, the operational level of the organization, a new committee structure which put responsibility for accomplishing the organization's mission squarely upon the management teams, and the MMR which provided leaders at every level insight on how the organization is moving toward its goals and how they can help.

The new BAMC governance model uses the principles of PDCA to forge an effective governance system that allows the EC to accomplish their mission of actively reshaping their organization for a fierce market unforgiving of errors and inertia, while fulfilling their fiduciary commitment to the health and well-being of their beneficiaries.

Conclusions

A governance model that strategically aligns the organization's strategic plan, daily operational objectives, committee efforts, and periodic business review allows the governing body to govern better because:

A strategically aligned governance cycle ensures every effort of the organization is geared towards achieving the strategic mission, vision, and goals of serving the beneficiary population.

A strategically aligned governance model:

- Firmly bases resource allocation on achieving the operational objectives, and not in an otherwise ad hoc manner. This strategic allocation, along with periodic review of the budget execution, keeps the organization on track, spending resources only on those activities that move it toward its strategic vision.

- Ensures leaders have more timely, accurate, and pertinent information available for decision-making via a periodic business review focused on the organization's strategic objectives. Timely information allows the leaders to proactively steer the organization's efforts toward the strategic vision. The MMR also allows mid-level managers to see how their areas are contributing to, or hindering the hospital's progress and adjust practice patterns accordingly.

• Empowers proactive committees that drive strategic mission accomplishment by executing the operational objectives. A committee structure that is focused on driving accomplishments instead of analyzing retrospectively is of greater benefit to the organization. Issues are tracked better and resolved faster through this improved committee structure.

• Improves customer service by keeping the organization focused on its customer service goals. The MMR provides managers at all levels with detailed and timely information about actions affecting customer satisfaction.

Summary

Effective governance of a hospital does not happen by accident. Rather, it is the result of an integrated process of planning, coordination, implementation, and evaluation that becomes woven into the daily operations of the hospital. The traditional ways of governance and managing hospitals will not be suitable for coping with the shifts that have, are, and will continue to take place in the health care setting. Old ways will have to be discarded and new organizational foundations built requiring more sophisticated tools and techniques. All of this, while the hospital is open for business.

The purpose of this study was to develop, implement, and test a new governance system for BAMC. In the final analysis, governance is about purpose – deliberating and deciding on purpose, mission, and values of the institution – in other words, to establish purpose and keep the organization focused on accomplishing that purpose. Results of this study suggest BAMC's new governance model does just that. The synergy of the new system effectively translates the strategic vision into daily operational plans that can be easily measured for astute decision-making at the executive level. This synergy is evident in BAMC's improved performance as an organization.

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Deployment Cycle Effects on the Psychological Screening of Soldiers

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The goal of psychological screening with U.S. soldiers is to identify individuals in need of intervention. Through the expansion of the original screening program, comparison of screening results from across the deployment cycle (garrison, pre-deployment, re-deployment, and post-deployment) is now possible using cross-sectional data. Despite the different missions supported by the screening program (for example, Bosnia, Albania, and Kosovo), the screening process has remained essentially the same. Soldiers scoring above criteria on any one of three symptom scales are briefly interviewed to determine referral need. Results from over 10,000 soldiers in one Army division stationed in Germany revealed that rates of exceeding criteria are highest in garrison (the initial phase of the deployment cycle), at pre-deployment, and at post-deployment, and lowest at re-deployment. Recommendations for improving the screening program, intervention efforts, and follow-up research are highlighted.

Deployment Cycle Effects on the Psychological Screening of U.S. Army Soldiers Psychological screening began as part of the Joint Medical Surveillance Program conducted from 1996 to 1999 for U.S. military personnel prior to the soldiers' completing their deployment to Bosnia. Since that time, soldiers have been screened across the deployment cycle: in garrison, at pre-deployment as they prepared to deploy, at re-deployment just prior to return, and at post-deployment several months later. The screening has also expanded to include deployments to Albania and Kosovo.[1] As a consequence of this expansion, screenings allow for comparisons of soldier well-being across the various deployment phases.

There are six major goals of the psychological screening program: (1) provide proactive mental health outreach; (2) identify deployment mental health issues for interventions; (3) provide commanders with information on the mental health of the force; (4) establish a reference database for comparison to future operations and follow on operations; (5) project the patient load for deployed mental health assets; and (6) monitor the health of the deploying force.[2] However, the comparison of screening data across deployments and across different phases of the deployment cycle has not been conducted. The present study addresses this gap by comparing screening rates cross-sectionally in order to assess the role of deployment cycle in soldier mental health and well-being.

The deployment cycle represents a series of environmental conditions that reflect the requirements and stressors associated with preparing and recovering from a deployment. Initially, soldiers are in garrison, living in the barracks or in a private home performing their regular duties, and possibly going on training exercises as part of a basic readiness plan. In the pre-deployment phase, soldiers intensify their training in preparation for specific deployment objectives, complete packing and preparation of equipment, and take care of personal business in preparation for an extended absence. Screening conducted during this phase is typically completed in the weeks prior to the actual deployment. In the deployment phase itself, soldiers execute their particular mission while living in a base camp or at a remote site. For U.S. Army personnel, a peacekeeping deployment typically lasts 6 months although some deployments have been longer (for example, Operation Joint Endeavor [OJE]) and some have been shorter (Task Force Hawk). The re-deployment phase occurs in the weeks just prior to returning back to home station when soldiers prepare to leave the deployed environment, transfer information to incoming forces where appropriate, and pack professional and personal

belongings. In the post-deployment phase, which lasts about 3 months after returning home, soldiers are engaged in recovery from the deployment. This phase typically involves leave time for the unit, reintegration with family and friends, and concentrated training that returns the unit to its pre-deployment level of readiness. After this 3-month period, soldiers complete the full deployment cycle and resume garrison life, which includes the possibility of participating in regular training exercises.

In order to facilitate comparisons across the deployment cycle, we have selected the screening results from one U.S. Army Division based in Germany. These data are cross-sectional and do not track the same individuals over the course of one deployment. The results presented here are an initial attempt to assess patterns in screening results across deployment phases.

Method

Participants.

A series of screening programs have involved about 10,000 soldiers from one division based in Germany between February 1996 and June 2000. Results from these psychological screenings have been organized cross-sectionally to represent the different phases of the deployment cycle. Table 1 summarizes the screening conducted for one Army division across three different major deployments (Bosnia, Albania, and Kosovo) and at four different points in the deployment cycle. The data presented in this article are a composite from different missions over several years and are to compare cross-sectional screening results across different phases of the deployment cycle.

There were some demographic differences across the samples. In terms of gender, the Kosovo pre-deployment sample had fewer female soldiers than the Bosnia re-deployment samples, χ^2 *(4, N=11,654)=110.82, P<.001* (Table 2). In terms of rank, the Kosovo pre-deployment sample had more junior-ranking soldiers than the Bosnia re-deployment samples and fewer junior-ranking soldiers than the Garrison sample, χ^2 *(8, N=11,624)=95.48, P<.001* (Table 3).

Procedures.

The procedures remained essentially the same across all of the screening programs. Military personnel completed a primary psychological screening survey designed to measure post-traumatic stress, depression, and alcohol abuse symptoms. If scores on one of the scales exceeded established criteria, a mental health staff member conducted a brief on-site interview to determine the soldier's referral need. The brief interview, regarded as a form of psychological triage, resulted in one of four possibilities. The soldier's problems were considered: (1) false positive; (2) mild and not necessarily in need of a referral for follow-up assessment; (3) moderate and in need of a referral; or (4) severe and in need of immediate follow-up. The primary screen was administered in groups of soldiers as large as 100, and mental health personnel conducted on-site interviews immediately after the survey administration and hand scoring of the primary screen. The entire procedure took about 30 minutes.

Instruments.

The psychological screening survey included a section on soldier demographics (for example, rank and gender) and three scales measuring depression, post-traumatic stress symptoms, and alcohol problems. The 20-item Self-rating Depression Scale (Cronbach's α=.74-.76), measured depressive symptoms on a 4-point scale (a little of the time, some of the time, a good part of the time, and most of the time).[3,4] The cutoff criterion was a raw score of 44 points midway in the mild depression range.[5] In addition, personnel indicating any agreement with the statement, "I feel that others would be better off if I were dead," were also interviewed regardless of their overall cutoff score.

The 17-item post-traumatic stress disorder checklist (Cronbach's α=.91-.94), developed by the U.S. Army Medical Research Unit-Europe measured post-traumatic stress symptoms delineated in the Diagnostic and Statistical Manual for Mental Disorders IV.[6-8] Items were rated on a 5-point scale (1= not at all to 5 = very often). Mental health staff briefly interviewed respondents who reported at least six symptoms (often or very often). Alcohol abuse symptoms were measured using the CAGE Questionnaire.[9,10] The CAGE Questionnaire (Split-half reliability = .53-.55) included items such as "Have you ever been annoyed by comments made about your drinking?" and "Have you ever felt guilty about drinking?" Respondents with affirmative responses to two or more questions were then interviewed.

Phase of Deployment Cycle	Mission (Location of Mission)	Screening Site	N	Dates of Screening
Garrison	Garrison (Germany)	Germany	338	Apr 98 - Jul 98
Pre-Deployment	Task Force Falcon (Kosovo)	Germany	1,803	Jun 99 - Apr 00
Re-Deployment	OJE (Bosnia AO)	Hungary	4,746	Feb 96 - Dec 96
Re-Deployment	OJ Guard/Forge (Bosnia AO)	Bosnia	3,891	Jan 97 - Jun 98
Post-Deployment	Task Force Hawk (Albania AO)	Germany	1,043	Aug 99 - Oct 99

Note: AO is the Area of Operations

Table 1. Summary of Deployment Phase and Mission

Phase of Deployment Cycle[1]	Gender	
	Male	Female
Garrison	91.1	8.9
Pre-Deployment[a]	93.0	7.0
Re-Deployment (OJE)[b]	86.4	13.6
Re-Deployment (OJG/OJF)[b]	90.7	9.3
Post-Deployment	94.9	5.1

[1]The Kosovo pre-deployment sample had fewer female soldiers than the Bosnia re-deployment samples, $\chi^2(1, N=5{,}637\text{-}6{,}515)>8.40$, $P<.01$

Table 2. Percent of Sample by Gender Across the Deployment Cycle Phases

	Rank		
Phase of Deployment Cycle[1]	Junior Enlisted Soldier	Non-Commissioned Officer	Officer
Garrison[a]	60.7	33.7	5.6
Pre-Deployment[b]	58.0	32.2	9.9
Re-Deployment (OJE)[c]	49.1	35.8	15.0
Re-Deployment (OJG/ OJF)[C]	52.8	33.9	13.3
Post-Deployment	58.4	32.9	8.6

[1]The Kosovo pre-deployment sample had more junior-ranking soldiers than the Bosnia samples and fewer junior-ranking soldiers than the Garrison sample χ^2 (2, N=2, 104-6,401) 6.1, $P<.05$.

Table 3. Percent of Sample by Rank Across the Deployment Cycle Phases

Results

Data were analyzed to evaluate the impact of different phases of deployment on soldiers' responses to psychological screening. Overall rates exceeding primary screen cutoff criteria differed by deployment phase (Figure 1) such that soldiers who were re-deploying reported lower rates of exceeding criteria than soldiers in other phases of the deployment cycle (in garrison at the initial phase of the deployment cycle, at pre-deployment, or at post-deployment). Soldiers who were deployed reported lower rates of exceeding criteria when compared to soldiers in garrison, $\chi^2(4,N=11,753)=76.48, P<.001$. The primary screen differences across samples were found for both men and women as well as for junior-enlisted soldiers and noncommissioned officers (NCOs).

When the three psychological screening scales were examined separately, the same pattern of results was found only for depression. On the depression scale, soldiers screened during pre-deployment and garrison reported higher rates of depression symptoms than soldiers screened during post-deployment and re-deployment, $\chi^2(4,N=11,821)=85.84, P<.001$ (Figure 2). The depression screen differences across samples were found for both men and women as well as for junior-enlisted soldiers and NCOs.

The post-traumatic stress and alcohol problem scales had a different pattern of results although the redeployment rates for OJE were below the rates obtained during other deployment phases, $\chi^2(4, N=6,548)=7.30, P<.01$ (Figure 3). The post-traumatic stress screen differences

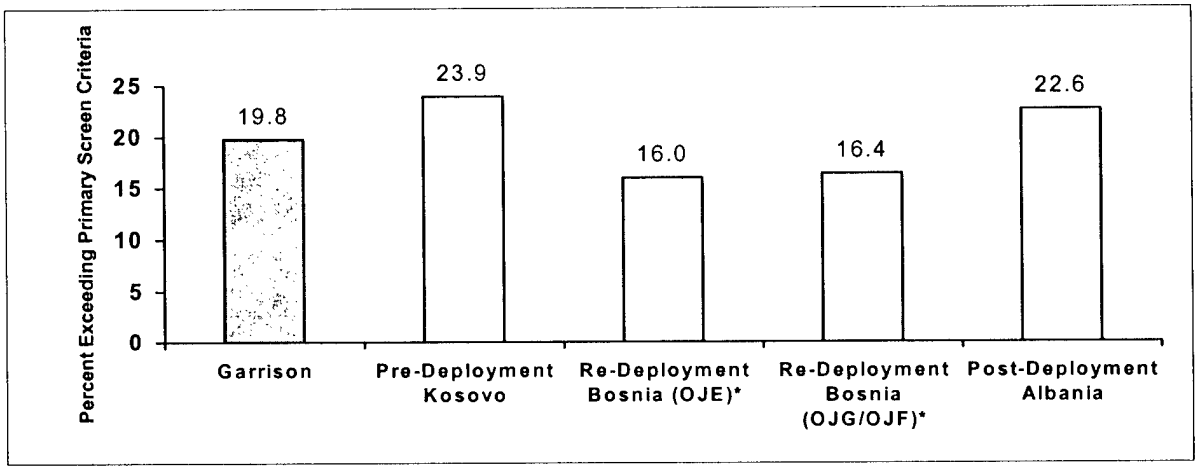

*Fig 1. Rate of exceeding criteria on primary screen as a function of deployment cycle phase. *$\chi^2(1, N=5,687\text{-}6,483)>44.88, P<.001$.*

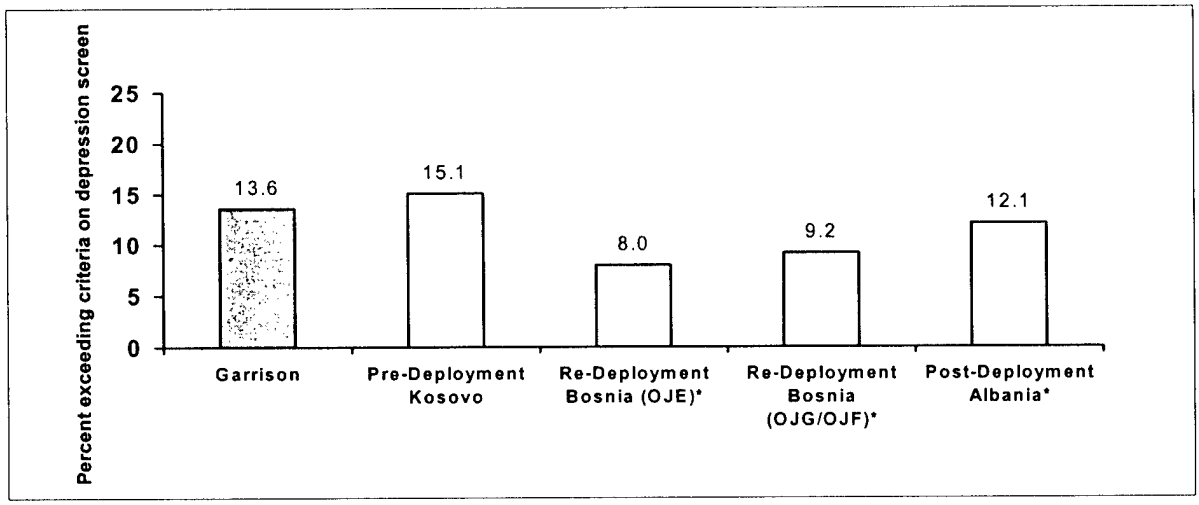

*Fig 2. Rate of exceeding criteria on depression screen as a function of deployment cycle phase. *$\chi^2(1, N=2,845\text{-}6,549)>5.09, P<.02$.*

across samples were found for women and for junior-enlisted soldiers.

On the alcohol scale, the pre-deployment and post-deployment rates were similar (Figure 4). The re-deployment and garrison rates were similar to each other, but lower than the pre- and post-deployment rate, $\chi^2(4, N=11,760)=33.98, P<.001$. The alcohol screen differences across samples were found for men and for junior-enlisted soldiers.

Conclusion

Data from several different psychological screening programs conducted across different deployment cycle phase indicate a pattern of psychological effects (Table 4 for summary). Rates of exceeding primary screen criteria depended on when the screening occurred during the deployment cycle. Specifically, soldiers who were in the garrison phase of the deployment cycle, in the pre-deployment phase, and in the post-deployment phase reported higher rates of distress than soldiers returning from deployment.

Results also suggested some unique deployment cycle patterns for specific symptom categories. In the case of alcohol problems, soldiers at pre- and post-deployment reported more problems than at re-deployment. This difference may be related to the fact that soldiers are not allowed to drink alcohol during deployment to Bosnia or

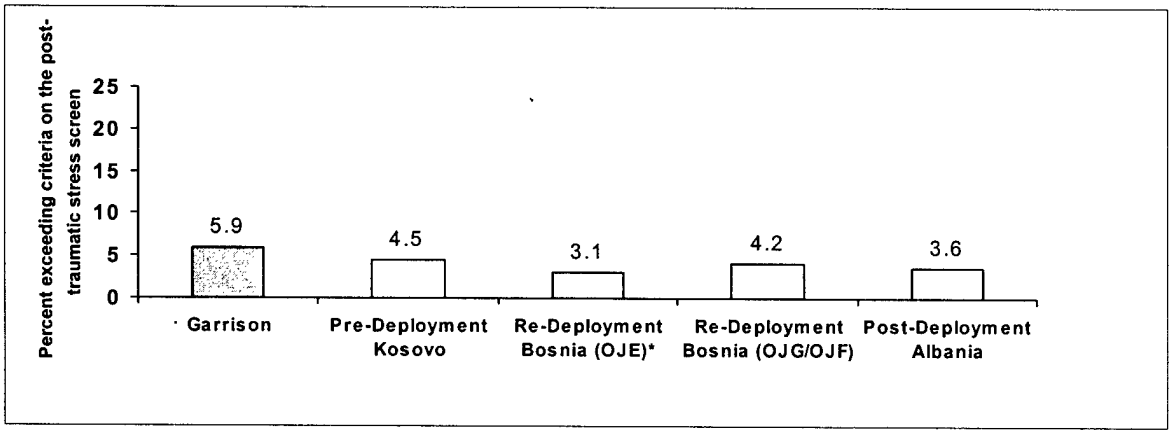

Fig 3. Rate of exceeding criteria on post-traumatic stress screen as a function of deployment cycle phase. $*\chi^2(1, N=6,548)=7.30, P<.01$.

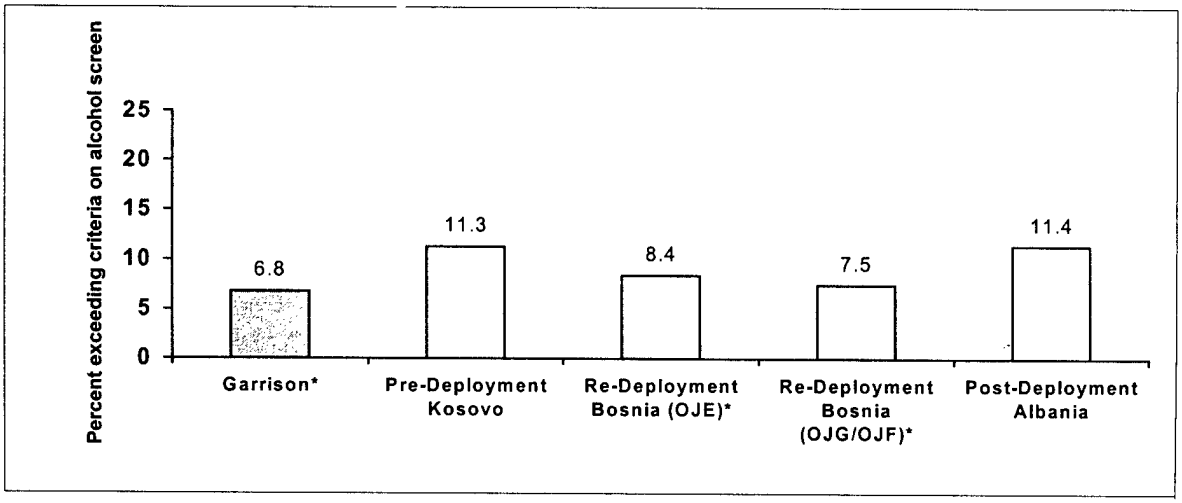

Fig 4. Rate of exceeding criteria on alcohol screen as a function of deployment cycle phase. $*\chi^2(1, N=2,135\text{-}6,489)>6.07, P<.01$.

Deployment (Phase)	Finding
Garrison	Elevated rates on all scales but alcohol Highest on traumatic stress
Pre-Deployment	Elevated rates on all scales Highest on depression
Deployment	No data available
Re-Deployment	Lower rates on all scales
Post-Deployment	Elevated rates on all scales Highest on alcohol problems

Note: Data came from three separate deployments which did not involve direct combat

Table 4. Summary of Screening Results Across the Deployment Cycle

Kosovo and so have less opportunity to experience problems with alcohol. In addition, the increase in alcohol problem rates before and after deployment may also reflect some kind of alcohol compensation effect in which soldiers have more drinking problems in anticipation of not being allowed to drink and following a long period of time in which drinking is not allowed.

The results indicating that rates were lowest at redeployment were found regardless of rank and gender for the overall screen and for depression. The patterns found for post-traumatic stress and alcohol problems differed slightly by gender and rank. Differences based on deployment cycle phase were not found for officers.

The data presented here are taken from real-world applications of a screening program that has been revised several times. Given the limitations of the current cross-sectional analysis, the findings need to be re-examined using longitudinal data. For example, as noted above, the sample groups reported in this paper were not matched and the data were collected at different times and over the course of different deployments. In future screening and research, we plan to track individual soldiers over the course of one deployment cycle in order to assess more closely the impact of the deployment cycle phases on soldier well-being. Such an analysis could also then demonstrate whether the findings from the cross-sectional data are indeed a good reflection of mental health patterns associated with the deployment cycle. In addition, screening over the course of the deployment cycle should include a mid-deployment assessment – a phase for which we currently do not have screening data.

Another limitation is the extent to which screening results are being compared between Bosnia and Kosovo, two deployments that differ in terms of level of threat and theater maturity. The differences we found in screening outcomes could be confounded by the unique nature of each deployment. Furthermore, the degree to which the findings apply to other kinds of deployments, including other peace enforcement operations as well as combat missions, is unclear. Future screening programs with these other types of deployments can address this question.

Additional screening issues that require study include further development, expansion, and assessment of screening scale content. For example, family distress and soldier hostility levels are important symptom areas that are now included in the current screening program with soldiers deployed to Kosovo. Such programming also needs to emphasize the integration of psychological triage in the training of mental health personnel and the formal evaluation of the screening program's validity and effectiveness.

In an environment where the rate of military operations for U.S. Forces is increasing, it is critical to provide operational commanders and division health staff information on the psychological readiness of the deploying force.[7] A psychological screening program can identify risk factors at different phases of the deployment cycle and provide continuous monitoring of the mental health of soldiers, resulting in effective prevention and education. Through the integration of psychological screening with a comprehensive health screening system, the U.S. Army has the opportunity to bring medical care

to the soldier as part of a proactive health promotion effort. This effort can be increasingly tailored to meet the mental health needs of soldiers at particular points in the deployment cycle.

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BSRF: Community-Based Health Promotion

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Building Strong and Ready Families (BSRF) is a holistic, proactive, preventive approach to health promotion, soldier and family readiness, and well-being. BSRF is a Commander's training program led by the Chaplain Ministry Team in partnership with Health Promotion Community Health Nursing (CHN). The goal of the BSRF program is to help participants build a strong family physically, mentally, relationally, and spiritually – to support "Readiness."

Background Information

In April 1998, the Department of Defense (DOD) designated Tripler Army Medical Center (TAMC) as a "Put Prevention Into Practice" (PPIP) Model Site. This was part of a health promotion development to field "core" programs within the Army Medical Department (AMEDD). The TAMC embraced its PPIP initiative as an extension of its belief in a dynamic health promotion and wellness program and in support of the AMEDD mission. The initiative also reflects a commitment to promote the *Army's Well-Being Strategic Plan*. As part of the PPIP initiative and in compliance with Army Health Promotion Regulation (AR 600-63), TAMC Community Health Nurses in collaboration with the Chaplain Ministry developed and implemented the BSRF in the 25th Infantry Division (Light) in Hawaii.

The BSRF program substantially supports the TAMC's Balanced Scorecard (BSC). The BSRF impacts *13* strategic objectives in the TAMC's BSC to meet the goal of mission effectiveness. This significant impact on the strategic mission demonstrates the clear strategic benefit of sustaining this strong preventive health program.

This holistic preventive health initiative focuses on the wellness of not only the soldiers, but their families as well. This initiative aims to educate individuals as to the effects of adverse health-related behaviors. Adverse health behaviors are defined as those related to alcohol and tobacco use, nutrition, physical fitness, reproductive health, stress, and safety (which include family violence and accidents/injury). The BSRF program emphasizes recognition of health risk behaviors, develops skills for self-wellness care, and lays out the assortment of community services available for health risk behavior change.

The purpose of this article is to provide the conceptual basis for and a description of the BSRF program.

Conceptual Basis

Simply stated, risk behaviors affect health and health affects combat readiness. The Health Promotion literature is in its infancy in terms of research on the impact of risk reduction on morbidity and mortality. Here is what we know about risk behaviors. It is estimated that almost one half of all deaths can be attributed to one or more risk behaviors.[1] In addition, modifiable risk behaviors like obesity, inactivity, and smoking increases health care costs. Furthermore, as a persons health risks increase, there is a disproportionate rise in health services utilization.[2,3]

It is also clear that health behavior change is a complex and dynamic process. Change is a process that is defined with five progressive stages of readiness. The five stages are:

Stage I	Precontemplation	Not intending to change
Stage II	Contemplation	Intending to make change in the next 6 months
Stage III	Preparation	Taken steps towards changing, change will occur within 1 month
Stage IV	Action	Has taken specific action and changed behavior
Stage V	Maintenance	Made the change and is fighting relapse

People can move forward and backwards through these stages of change. For example, a woman who wants to lose weight might move from contemplation to preparation by planning a diet and exercise routine that will begin in 4 weeks. Two weeks later, she begins a new job and decides she will not begin her planned weight loss routine. By not fulfilling her intention to start weight reduction, she has moved back into contemplation. Di Clemente and colleagues argue that for effective change to occur, the provider must tailor interventions to the stage of change for risk behavior.[4,5]

The BSRF program uses a theoretical basis and an innovative collaboration between Community Health Nurses, Chaplain Ministry, and Community Support Services.

Innovative Partnerships

Health Promotion Practice in the Community.

An essential aspect of TAMC's PPIP effort is to build systematic community-based health promotion partnerships. Collaboration was necessary between the health service providers, community support services, and the beneficiaries or community members – the soldiers, their families, and the commanders. The focus of community practice is on groups of military units to strengthen unit wellness. Building partnerships means creating new methods and approaches. We want to facilitate the planning of a health promotion initiative that would target and tailor the beneficiary's needs and the resources available. Key to such initiatives is outcome measures that enable monitoring the intervention's effectiveness on an ongoing basis. In the end, we anticipate that this intervention will be adopted and integrated elsewhere.

It's apparent that unit commanders lack sufficient knowledge to develop appropriate access to wellness-promoting programs. Also, commanders do not receive information and guidance in how to promote and maintain a healthy unit. They lack the knowledge of how to guide their soldiers and families in managing their wellness.

The key factors to the success of the Infantry Division (Light) Artillery (Div Arty) Unit Ministry and community health promotion partnership wellness promotion strategy are:

- Commanders were encouraged to support the initiatives
- Chaplains were willing to collaborate with CHN
- Many programs and referral agencies were available at no cost
- Open communication between Commanders, Chaplains, and CHN
- There is ongoing evaluation and refinement of the program

Infantry (Light) Div Arty Unit.

Community Health Nurses worked with the Chaplain of the Div Arty Unit Ministry to plan and implement "BSRF program." The design of the BSRF program applies three skill-building levels for groups of single active duty soldiers and married couples. Level I focus is on AWARENESS, Level II builds SKILLS for health and well-being, and Level III is an INTEGRATION of the program (Figure 1). The chaplain's part of the program emphasizes a proactive approach that builds skills to help families grow relationally and spiritually. Thus, it is a natural fit to interface health promotion into the program.

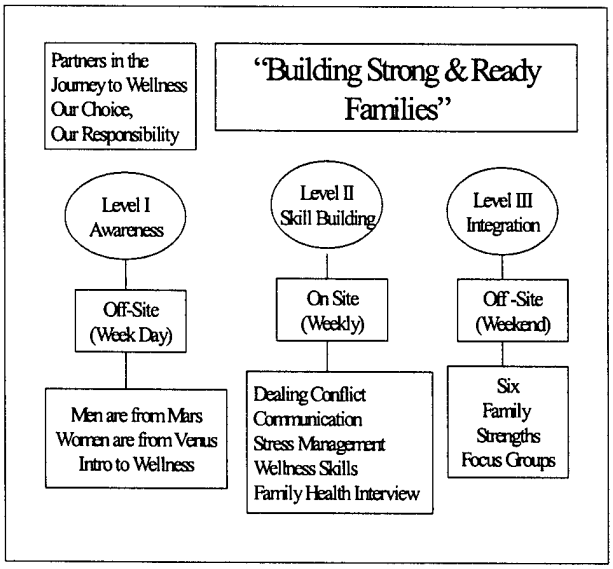


Fig 1.

The BSRF piloted between January and December 1999. The aim was to make it mandatory for all Div Arty incoming soldiers. The pilot phase served to assess the population health and needs, identify risks that pose the greatest threat to unit health, and test health promotion interventions.

Today, the BSRF is a command-sponsored program that is an integrated part of the support training cycle. For the chaplains, this program is a paradigm shift from crisis counseling and intervention to a proactive approach to pastoral care. The chaplain portion of the program emphasizes gender differences, communication and relationship skills building, stress management and family life skills.

The health promotion aspect of the BSRF program integrates health promotion and education, raises wellness awareness, and provides early intervention for health risk reduction. At Level I, which is the first session, soldiers and their spouses develop an **awareness** of how their risk behaviors today will affect their health and well-being. The focus is an overview of the effects of risk *behaviors* on health and wellness. It consists of a 1 hour interactive seminar where a CHN guides the participants through a family focused risk assessment tool, hereafter referred to as the genogram (Figure 2). The genogram is a pictorial map of family generational health risk behaviors. This tool serves two purposes. First, it helps to identify health and risk perceptions of individuals and populations. Second, it makes the participants more aware of their own health risk behaviors as well as that of their families. With the genogram, individuals can better customize and visualize their family health risks and behavior patterns over generations. The genogram creates an awareness of past exposures and family experiences and how that affects behavior (if the parents smoke, they are more likely to smoke). After an awareness of individual health risks are determined, participants are asked to consider what, if any, health risk behavior they might try to change in the next 30 days. All participants complete a self-administered tool, based on stages of readiness to change (Figure 3). This stage of readiness to change tool along with the genograms is used during Level II to guide CHN wellness interventions.

The focus of Level II is health promotion skills building. The goal of Level II is to have soldiers and their spouses develop health promotion and disease prevention skills that will ultimately promote wellness and to begin to move forward through stages of readiness to change their health risk behaviors. This 3-hour **skill-building** session is a dynamic mix of entertainment and education. Participants complete a HEAR 2.1 survey and receive a tailored message about their health risks. A Community Health Nurse instructs a variety of mini-educational sessions – some focusing on stress control, planning a healthy menu, how to access the Health Care Information Line and obtain information via the Internet. In addition, participants go through self-paced wellness skills and information stations based on the PPIP initiative. The stations include models for self-breast and self-testicular examination with questions like "How many lumps can you find on the breast model?" and "At what age is a man at most risk for developing testicular cancer?" Other stations focus on tobacco, weight and Body Mass Index (BMI), nutrition, fitness, alcohol, and safety. Screening metrics are completed on each participant. This includes height, weight, BMI, blood pressure, and body fat analysis. Finally, each participant attends a family health interview with a CHN to review their health risk factors and assess readiness to change health risk behaviors. The assessment of client's stage of change precedes wellness interventions and serves as a guide for tailored education and targeted referrals. The CHN will provide tailored education and targeted referrals, as necessary, and will follow-up with the high-risk participants.

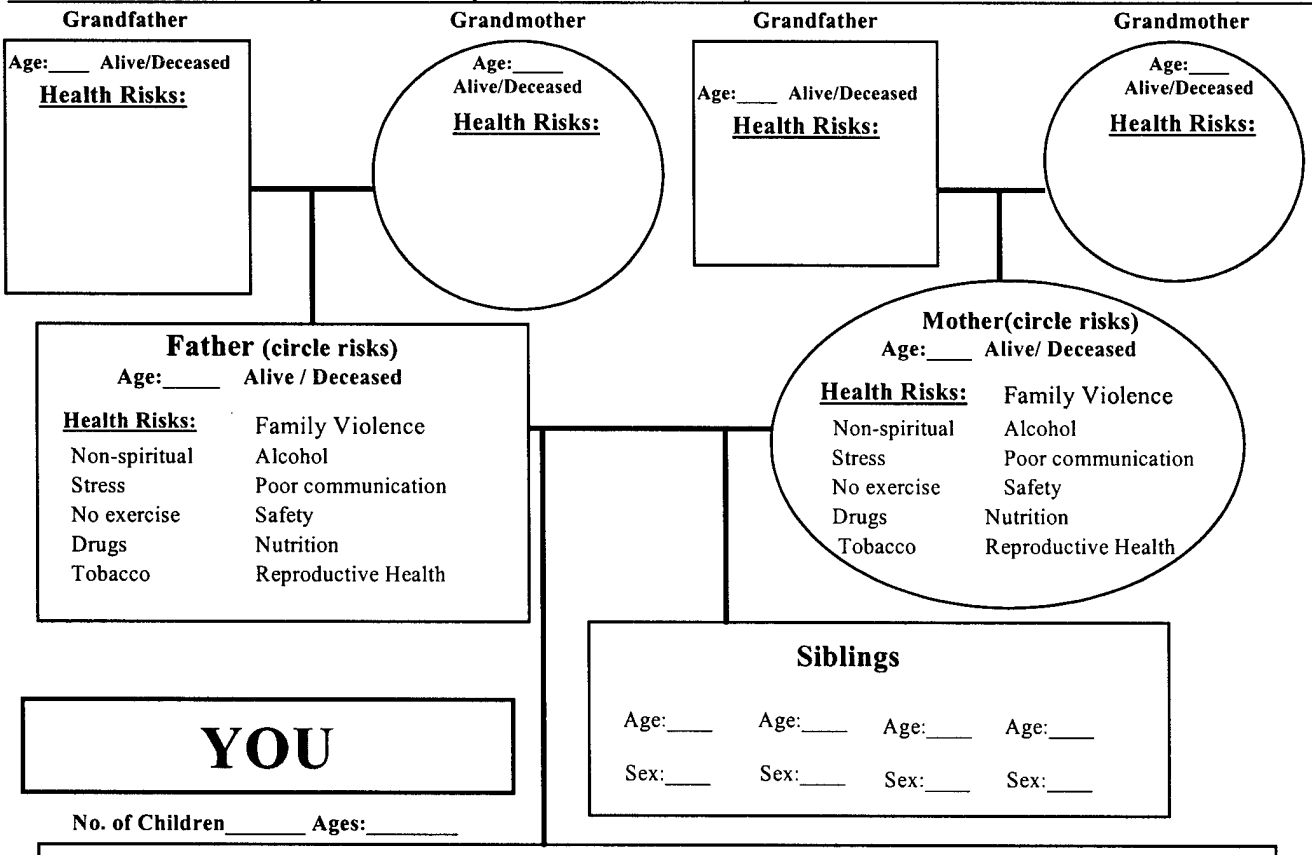
The CHN conducts focus groups Level III. The purpose of these focus groups is to identify perceptions of health, wellness management, as well as health services needs and resources support. The theme of each group centers on: the participants' perceptions of (1) health and feeling well; (2) the enhancement or hindrance of health (3) who is in charge of health; and (4) what is needed to strengthen health. In addition, the focus groups provide an abundance of information and valuable opinions about the impact of the BSRF program on soldier and family well-being. The participants clearly enjoy sharing their experiences openly and together.

Actual Impact

Multiple methods are in place to evaluate the impact of the comprehensive BSRF program. Every aspect of the program requires specific evaluation methods and tools.

Name_____Date_____ Age_____ Gender:Male/Female Active Duty/Civilian

Marital Status: married/single/divorced/separated Number of years married



No. of Children_____ Ages:_____

1. Tobacco use NO YES → No. cig per DAY____ Use smokeless tobacco? NO YES Times per week____
2. Alcohol use NO YES → No. drinks per day_____ OR No. drinks per week_____
3. Illicit drug use NO YES → Type of drug(s)_____ Times per week?_____
4. Nutrition Height_____inches Weight_____pounds
5. Stress During the past 30 days, how much stress are you experiencing related to.....

work?	A lot	quite a bit	somewhat	little	none
family life?	A lot	quite a bit	somewhat	little	none
personal?	A lot	quite a bit	somewhat	little	none
money?	A lot	quite a bit	somewhat	little	none
Other?_____	A lot	quite a bit	somewhat	little	none

6. Safety: Do you use a.....

seatbelt?	Always	Sometimes	Never	
bike helmet?	Always	Sometimes	Never	Don't ride a bike
motorcycle helmet?	Always	Sometimes	Never	Don't ride a motorcycle

7. Family violence: Have you experienced any kind of abuse in your lifetime? YES NO (Go to No. 8)
If you have experienced abuse, what type of abuse have you experienced? (CIRCLE ALL THAT APPLY)
PHYSICAL EMOTIONAL SEXUAL NEGLECT other_____
8. How does your spiritual connection help you cope on a day to day basis?
A lot quite a bit somewhat little not at all
9. How would you rate you ability to communicate with others?
excellent very good good fair poor
10. How many days per week do you exercise for at least 20 minutes?
0 1-2 3-4 5-6 7
11. Do you practice safe sex (use condoms or have the same partner).....
All the time Most of the time Some of the time Never practice safe sex Not sexually active
12. How would you rate your overall quality of life in the past 30 days?
Excellent very good good fair poor

Fig 2.

The Family Health Profile is a tool to help you visualize the risk factors associated with your health and well-being. We would like you to think about what risk factors, if any, you are willing to change.

Select the **ONE** corresponding letter that reflects your feeling about the following risk factors.

A. "I do not plan to change this behavior in the next 6 months "

B. "I intend to try and change this behavior in the next 6 months."

C. "I'm convinced. I know what I need to do. I'm am ready to try and change within the next 30 days"

D. "I'm doing it! (But I might not make it.)"

E. "I have made the change and am getting more confident it will be permanent"

F. "I DO NOT participate in this behavior **OR** this is NOT a risk factor in my life"

Cigarette Smoking	A	B	C	D	E	F
Tobacco Chewing	A	B	C	D	E	F
Alcohol Use	A	B	C	D	E	F
Drug Use	A	B	C	D	E	F
Nutrition	A	B	C	D	E	F
Stress	A	B	C	D	E	F
Safety	A	B	C	D	E	F
Violent Behavior	A	B	C	D	E	F
Communication Skills	A	B	C	D	E	F
Unsafe Sexual Practices	A	B	C	D	E	F
Fitness	A	B	C	D	E	F
Spirituality	A	B	C	D	E	F

Fig 3.

Figure 4 represents the evaluation plan for Level I, II, and II of the BSRF program.

Ongoing data is collected and tracked in a database. Data is being collected from HEAR 2.1 survey, family focused health risk assessment (genogram), metrics (height, weight, BMI, blood pressure, body fat), movement through stages for readiness to change (precontemplation, contemplation, preparation, action, maintenance) and program evaluations after Level I, II, and III.

What have we learned from this intervention?

- Soldiers and their families are "at risk." About 27% smoke, 5% use smokeless tobacco, 32% report quite a bit or a lot of stress at work, 32% report family stress, 16% don't wear seatbelts all of the time, 9% report poor communication and 12% report not practicing safe sex (condom use or same partner).

- Soldiers and their families are ready to change at least one risk behavior.

- We are able to access a population that is not accessible in the "traditional medical model" of health care. Health promotion is brought into the "foxholes."

During the focus groups, several reoccurring themes emerged. Highlights of issues presented by focus group members are:

- Building Health and Strong Families program is highly valuable and has helped improve communication between soldier and spouse.

- The program increases understanding of relationships and lowers stress.

- Family Support Group and sponsorship program are not adequately addressing the needs of the family.

- Informational gaps are serious regarding access to resources, support services, spiritual support, employment opportunities, and community connections.

- Isolation upon arrival to Hawaii is severely felt.

- Many participants experience childcare and transportation problems.

During the focus groups participants offered the following recommendations:

- Make Building Healthy and Strong Families program mandatory.

- Organize a built-in childcare system: Those who have completed Level I will provide childcare for the next group who plan to attend Level I – make that part of the program.

- Organize groups like this focus group to get people together for the wives to talk and where they feel safe to bring their children, organize activities (for example, baby sitting exchange, transportation, get together and have fun, help each other, and exchange information).

- Strengthen Family Support Groups and make soldier attendance mandatory.

- Make new arrivals feel welcomed, supported, and part of the military family.

- Have updated military websites accessible to all.

- Have information available on a flyer about spiritual services, how to find a connection.

- Send out a fact sheet to families to get information about interest, school needs, spiritual needs, work, etc. before coming to Hawaii. Have the Welcome Center review the needs, match sponsorship, and provide specific information.

The CHN offered the following observations about the BSRF program:

- Smoking, alcohol, stress, and communication stand out as having begun active behavior changes with nearly half the clients.

- A marked difference noted with the Div Arty clients in their efforts toward behavior changes compared to other clients.

- Increased awareness of family wellness is notably higher among all seen.

- Consistent positive feedback regarding the program, BSRF.

Ongoing Studies.

Ongoing impact evaluation of the BSRF Chaplain and CHN partnership continues. As of this writing, a retrospective study is being conducted, examining the association between participation in the BSRF program and quality of life (measured by the SF-12). In addition, the Health Promotion Center at TAMC is conducting a quasi-experimental controlled prospective study. This study began in October 2000 and will evaluate the relationship between participation in the BSRF program and quality of life, health risk behaviors, stages of change for risk behaviors, stress, health services utilization, and reenlistment.

The BSRF program has received wide attention and recognition as a proactive approach to health and well-being. The success of this new community-based health promotion approach is attributed to the sound theoretical curriculum base and the partnership with the chaplain ministry team. Seventeen brigades in the Army have been selected to participate in pilot programs during fiscal year 2001-2002. It is anticipated that this innovative, collaborative, community-based health promotion and wellness initiative will expand to the entire Army in the next years!

TAMC/Schofield Barracks CHN Health Education & Promotion
25th Infantry (L) DIV ARTY Unity Ministry Team

A Community Partnership Project: BSRF
CHN General Guidelines and Procedures for Interfacing with DIV ARTY Program

1. OVERVIEW

Program: "BSRF" is a holistic, proactive, preventive approach to family readiness and well-being. BSRF is a Commander's training program led by the Chaplain Ministry Team in partnership with CHN.

Goal: To help participants build a strong family physically, emotionally, relationally, and spiritually – to support "Readiness."

Population participants: Active duty single soldiers, married soldiers, family members (spouses/children)

2. PROGRAM DESIGN – Partnership Activities Interfacing with CHAPLAIN MINISTRY TEAM and CHN in three Levels

Levels	Chaplain Ministry Team	Community Health Nursing	Outcome Measures
Level I Awareness	**Method of Instruction:** Seminar **Length:** 7 hours **Content:** - Men are from Mars, Women are from Venus Training - Meyers Briggs Personality Assessment	**Method of Instruction:** Seminar **Length:** 1 hour **Content:** - Why CHN & Chaplain Ministry Partnership; - Concept of Health & Wellness - Awareness of how risk behaviors affect health - Family Health Profile (genogram) - Assessment of stage of readiness to change for risk behaviors	- Number of participants - Population data on self-reported health risk factors - Population data on self-reported stage of readiness to change for health risk behaviors - Program evaluation for Level I
Level II Skill Building	**Method of Instruction:** Seminar **Length:** 4 hours **Content:** PREP training	**Method of Instruction:** Interview, interactive skill building **Length:** 3 hours **Content:** - Wellness skill building activities - Wellness metrics (height, weight, blood pressure, body fat analysis) - Individualized Family Health Risk Appraisal (FHRA): HEAR 2.1 survey, nurse wellness interview - Identification of readiness to change - health risk behavior(s) - Targeted & tailored health promotion intervention (education, referrals, follow-up)	- Numbers of families completed FHRA - Data on health risks and stages of behavior change - Data on targeted and tailored interventions - Program Evaluation for Level II - Wellness Metrics
Level III Integration	**Method of Instruction:** Seminar **Length:** 2 days with overnight at hotel **Content:** Six Family Strengths	No formal instruction during Level III, CHN facilitates occasional focus groups to assist with program evaluation	- Focus Groups Group participant feedback on the partnership program and its effectiveness - Program Evaluation Level III - Evaluation for complete BSRF Program - Stages of readiness to change for health risk behaviors

Fig 4.

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Supporting Homeland Defense: Training for Chemical Casualty Management

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The need for training in the medical management of chemical casualties has never been greater than now. The U.S. Army Medical Research Institute of Chemical Defense (USAMRICD) conducts what the General Accounting Office (GAO) has termed the "gold standard" of training in this area for medical professionals both military and civilian. The training products and initiatives of the USAMRICD are surveyed and future directions enumerated.

Introduction

The USAMRICD is the Army's lead laboratory for the development of medical countermeasures to chemical warfare agents (CWA). It is also the Army's primary training site for the medical management of chemical casualties. It functions as a subordinate command of the U.S. Army Medical Research and Materiel Command, Fort Detrick, MD. The USAMRICD was established in response to extensive use of CWA on the battlefields of Europe during World War I. The Army Medical Department (AMEDD) was given the responsibility for designing protective equipment against CWAs by the War Department in 1915. By 1922, the Medical Department's mission in this area was vested in the Medical Research Division of the Gas Defense Service, Edgewood Arsenal, MD. This division was charged with studying the pharmacological action of CWAs, developing the best possible methods of treating "gas" casualties, and disseminating this information among the officers of the Medical Corps. It was later redesignated as the U.S. Army Biomedical Laboratory in the early 1960s.

On 1 July 1979, the U.S. Army Biomedical Laboratory (formerly the Medical Research Division) became a part of the Office of The Surgeon General and the U.S. Army Medical Research and Development Command, known today as the U.S. Army Medical Research and Materiel Command. Although formal command relation-ships with the Chemical Systems Laboratory and the U.S. Army Materiel Development and Readiness Command were discontinued, close support characterized the relationship after the Biomedical Laboratory embarked on a mission in support of the AMEDD's research, development, testing, and evaluation program for medical defense against chemical agents. On 11 May 1981, the U.S. Army Biomedical Laboratory was redesignated as the USAMRICD.

Anthology of the Training Program

In 1973, the Biomedical Laboratory initiated a training program in the medical management of chemical casualties. That program has undergone several key transformations until it resembles the present course(s) offered at the USAMRICD.

Training and consultation in the area of chemical casualty care falls under the auspices of the Chemical Casualty Care Division (CCCD), USAMRICD. The CCCD has responsibility for instruction in the principles of medical and field management of chemical casualties to military and, by extension, to civilian health care professionals. It executes this mission through several means, including both resident and nonresident courses and distance learning initiatives. The Chief, CCCD, plans, directs, and facilitates coordination between intramural programs and extramural commands, agencies, organizations, and authorities concerning all aspects of chemical casualty care in routine and field combat operations. The CCCD also advises the nation's Improved Response Program, the research arm of the Domestic Preparedness Program established by the Nunn-Lugar-Domenici amendment of 1995. The CCCD also furnishes support to organizations providing crisis and consequence management, including the State Department's Foreign

Emergency Support Team, the Department of Justice's Domestic Emergency Support Team, and the Army's Chemical-Biological Rapid Response Team. Additionally, the CCCD advises other government organizations, including the U.S. Marine Corps' Chemical and Biological Incident Response Force through its Reachback Team, the Army's Special Augmentation Response Teams-Nuclear/Biological/Chemical (NBC), the U.S. Army Reserve Command, the Special Operations Command, and Restoration of Operations, an Advanced Concepts Technology Demonstration sponsored by PACOM and led by the Defense Threat Reduction Agency. As stated earlier, the CCCD executes its mission through several forms of training, both resident and nonresident. Let us examine these courses.

The Courses

The primary training vehicle is the Medical Management of Chemical and Biological Casualties Course (MCBC) (AMEDD Center and School Course No. 6H-F26). This six-and-one-half day course is normally presented 8 times a year at the USAMRICD and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID). It is the direct evolutionary descendant of the original Medical Management of Chemical Casualties Course that began in 1973. It serves as the "prototype" for all other course offerings. The course is conducted jointly by the USAMRICD and the USAMRIID. The MCBC Course is designed for physicians, nurses and other medical professionals. Classroom, laboratory, and field instruction focuses on pathophysiology, diagnosis, and treatment of chemical and biological casualties. There is no fee for participating; however, advance registration is required and space is limited (Figure 1).

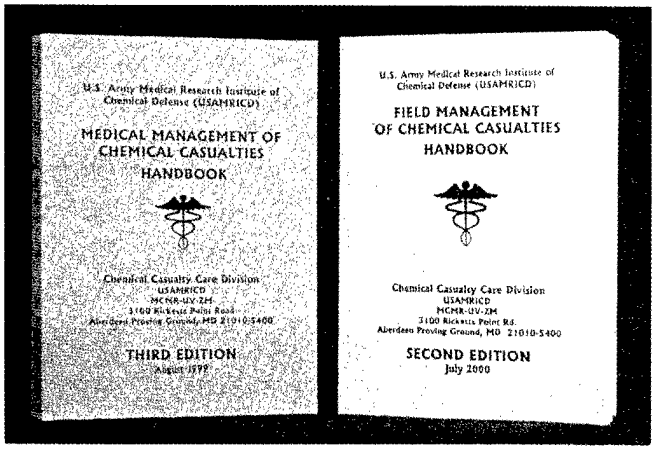

Fig 1. Medical Management of Chemical Casualties and Field Management of Chemical Casualties Handbook.

Classroom discussion includes the history and current threat of chemical and biological agent use, the characteristics of threat agents, the pathophysiology and treatment of agent exposure, and principles of field management of threat agent casualties.

In the laboratory, attendees gain valuable, hands-on experience by participating in the resuscitation of a laboratory animal exposed to a nerve agent stimulant. (This laboratory, of course, is conducted in accordance with the "Guide for the Care and Use of Laboratory Animals of the Institute of Laboratory Animal Resources, National Research Council" (Figure 2).

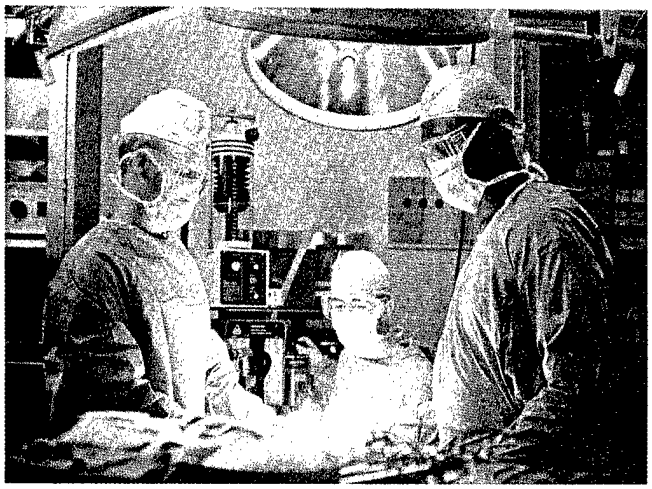

Fig 2. Laboratory exercise.

In the field, attendees practice the principles of personal protection, triage, treatment, and decontamination of chemical casualties. During this exercise, attendees learn the capabilities and limitations of mission oriented protective posture when treating casualties in a contaminated environment (Figure 3).

The USAMRIID instructors at Fort Detrick give biological instruction, and USAMRICD instructors at the Edgewood Area of Aberdeen Proving Ground, MD, give chemical instruction. Application for this course is via the Army Training Requirements and Resources System. Requests for attendance should be made through your training branch. The course is also available via several distance-learning products, including satellite broadcast,

Fig 3. Sponge decontamination.

video teleconference, and videotape series. The course is approved postgraduate education for physicians and nurses, and is approved military education for entry on the Officer Record Brief.

A newer offering, the 5-day Field Management of Chemical and Biological Casualties Course (FCBC), is normally presented four times per year at the USAMRICD. Occasionally, iterations are requested and paid for by the Reserve Components to train members of Weapons of Mass Destruction Civil Support teams under the National Guard, among many others. The FCBC is designed for medical and chemical noncommissioned officers, Chemical and Medical Service Corps officers, and civilian first responders. Classroom instruction and laboratory and field exercises prepare graduates to become trainers in the first echelon management of chemical and biological agent casualties. Instruction focuses on emergency treatment, triage, and decontamination and evacuation of casualties (Figure 4).

Classroom discussion includes the current global threat of chemical and biological agent use, the characteristics and effects of threat agents, recognition and emergency treatment of agent exposure, and principles of triage and decontamination of chemical and biological agent casualties. Small group exercises reinforce these casualty management principles. A limited block of instruction on the pre-hospital management of biological casualties, given by USAMRIID instructors, forms part of the FCBC.

Fig 4. Field training exercise.

As with the MCBC, in the laboratory, attendees gain valuable, hands-on experience by participating in the resuscitation of a laboratory animal exposed to a nerve agent simulant.

During 2 days of field training, attendees establish a casualty decontamination site and use the site during scenario-based exercises to manage litter and ambulatory casualties. Using this site, attendees practice principles of personal protection, agent detection, triage, emergency treatment, and decontamination of chemical casualties.

For information on either of the courses, contact the CCCD, USAMRICD at DSN 584-2230/3393, commercial (410) 436-2230/3393, DSN FAX 584-3086, commercial (410) 436-3086, e-mail: **ccc@apg.amedd.army.mil,** or write to: CCCD (MCMR-UV-ZM), USAMRICD, 3100 Ricketts Point Road, Aberdeen Proving Ground, MD 21010-5400.

The third major (live) course offering is the MCBC Exportable Course. This 3-day version of the MCBC has been presented at various locations, both continental Untied States and outside the continental United States, for each of the last several years. Demand for this course is such that it must be planned approximately 18 months in advance. As an example of productivity, the total number of students taught (with live training) in 1999 was 2,516 and in 2000 was 1,636.

Studies Emphasizing the Importance of MCBC

Over its 28 years of existence, interest in, and support of, the specialized medical management of chemical casualties training has waxed and waned as would be reflected by student attendance totals from 1981 through 2000. Nevertheless, since 1987 or thereabouts, there has been a succession of studies supporting the resourcing and enhancement of the training. A brief summary and description of these studies is provided in the table. The changes implemented as a result of these studies, while not reaching the total medical force, have significantly enhanced the quality and availability of the training. The GAO report on chemical and biological training in 2001 recognized MCBC as the "gold standard" of instruction in this field in the U.S. (see table, page 50).

To address the concerns in all of the above studies, the Medical Command's training guidance for FY 02 will require that 30% of physicians, physician's assistants, and Nurse Corps, and Profession Filler System complete the MCBC.

Recent Innovations and Future Directions

As mentioned earlier, in recent years a number of developments increased the availability of medical chemical/biological training. These include: satellite broadcasts, videotapes, an enhanced Website, and CD-ROMs. Let us look at each in turn.

Satellite Broadcasts. The USAMRICD presented its first satellite broadcast in April 1999. It resulted in the training of upwards of 40,000. The 3-day program was written and presented by the CCCD and produced and directed by the U.S. Food and Drug Administration (FDA). Among the awards garnered by the broadcast were a bronze award in the 1999 Annual International Mercury awards competition, finalist awards in the New York Festivals and the Aegis Awards programs, the Communicator Award program's Crystal Award of Excellence in Distance Learning Program Award for Healthcare/Telemedicine, presented by the United States Distance Learning Association. A second satellite broadcast, also called "Medical Response to Chemical Warfare and Terrorism" was presented worldwide on three successive days, 5-7 December 2000. Over 5,000 health professionals worldwide received continuing professional education credit for this course, and over 60,000 watched all or part of the course, making it one of the largest continuing medical education events in history. The course has been submitted for several media awards and is still playing video streaming on the World Wide Web. This telecast was granted continuing medical education credit by the American Medical Association under the auspices of the AMEDD Center and School at Fort Sam Houston, TX.

In the wake of the terror attacks of 11 September 2001, The Surgeon General of the Army mandated a new satellite course covering the essentials of both chemical and biological casualty care. The USAMRICD and USAMRIID, in conjunction with the U.S. Department of Veterans' Affairs and the FDA, prepared this new video course in just 7 weeks and broadcast it 28-30 November 2001 to over 8,000 registered students across the United States and Canada. Note the increased exposure of this training when made available through satellite broadcast as compared to the 1999 and 2000 figures for the live training.

Videotape, Medical Management of Chemical, and Biological Casualties Course. During 2000, these videotapes of lectures from the Medical Management of Chemical and Biological Casualties Course were professionally edited and prepared for distribution. This video course was also granted continuing medical education credit by the American Medical Association under the auspices of the AMEDD Center and School. This product is now available for distribution both inside and outside the Department of Defense (DOD) and represents yet another way of making course content available outside our scheduled courses.

CCCD CD-ROM. This product is now available and is being distributed to all graduates of our in-house courses. It includes a complete mini course, "Fundamentals of Medical Management of Chemical Casualties" lecture series, including full graphics of our in-house presentations, plus access to all of our key references. This CD-ROM contains eight interactive patient scenarios with video clips, as well as over 80 minutes of educational video footage. The CD-ROM is mass-produced at minimal cost and is intended not only as a refresher for our graduates, but also as an educational resource to military installations and other organizations

Date	Performing Organization	Type of Document	Finding/Recommendation
1987	DA-IG		DOD needs to improve medical readiness for military operations in an NBC environment. Medical MCBC Course is best available doctrinal training.
1987	DA-IG		DOD needs to improve medical readiness for medical support of demilitarization operations.
1992	GAO	GAO/NSIAD-92-175	Identified problems with Army Medical NBC medical preparedness during the Gulf War.
1993	GAO	GAO/NSIAD-93-189	Training in treatment and management of NBC contaminated casualties For U.S. Navy medical personnel needed improvement.
1993	GAO	GAO/NSIAD-94-58	Training in treatment and management of NBC contaminated casualties for U.S. Air Force medical personnel needed improvement.
1995	ASD(HA)	DODI-1322-24	Defines essential military skills for readiness to include NBC specialty training. Emphasizes requirement for comprehensive training so that can provide essential medical support during military operations in support of CINCs. Includes CB in both military and medical task training. Sets requirements for interval for training. Also "establish a tracking and reporting mechanism to assess the status of medical readiness training." Defines health care/provider personnel.
1996	GAO	GAO/NSIAD-96-103	Very critical of DOD efforts to protect troops from the effects of biological and chemical agents despite awareness of problems identified during the Persian Gulf War. Medical NBC preparedness explicitly addressed.
1998	GAO	GAO/NSIAD-98-68	Follow-on to 1996 Report. DOD and Congress have acted to provide greater protection for U.S. forces but "DOD needs to decide on major policy and doctrine issues, improve, and increase its capability to detect toxic agents, provide forces with improved and sufficient number of individual protective equipment, and deal with problems of collective protection and decontamination."
1999	ASD(HA)		Implements Section 1107 of Title 10, U.S. Code and Executive Order 13139 requirements that "the DOD to provide ongoing training and health risk communication on the requirements of using an investigational new drug in support of a military operation to all military personnel, including those in leadership positions, during chemical and biological warfare defense training and other training as appropriate."
2000	GAO	GAO-01-27	Emphasizes integration of CB defense training using realistic wartime scenarios.
2001	GAO	GAO-02-38	DOD needs to establish medical CB training as a priority (MCBC is most comprehensive training available).

Table. Studies and Documents Supporting MCBC's Essentiality and Materiality with Respect to Medical NBC Readiness

where it is highly unlikely that we will ever present a course in person.

The Website ***http://ccc.apgea.army.mil.*** This Website was developed in 1999 in preparation for the first satellite broadcast described above. It was also developed to assist in the enhancement of other distance learning products. During 2000, the CCCD Website has undergone continuous quality control and improvement. It now includes a complete slide set from the MCBC, for which continuing medical education credit is being sought. It also includes complete texts of our basic references and field manuals, allowing the customer 24-hour access to our key information resources. Registration for continuing professional education credit for the satellite course is available via this Website. We monitor the average daily usage of the Website on a monthly basis. The number of daily hits on this Website has risen from 2,300 per day before September to approximately 22,000 per day in October and November 2001. We also monitor search strings, search engines, and downloads as part of the ongoing review of course materials.

The Future. Three trends that result in continuous modification of course content and delivery. These are: (1) critiques and evaluations by the attendees; (2) improvements in diagnostic capabilities, preventive countermeasures or treatments that are occurring constantly; and (3) new technological advances in the ability to present the information effectively and to disseminate the information to a wide audience.

Critiques. Attendees at the MCBC and FCBC courses, through their critiques, have inspired many worthwhile improvements to both courses. The FCBC, in particular, has seen its field training go through several iterations to reach its present state, in which students learn to operate a field decontamination site through crawl, walk, and run phases. Student critiques were among the strongest factors pushing the staff to establish a block of instruction on chemical terrorism as far back as 1998, the relevance of which has only increased in the intervening years.

Improvements in Medical Countermeasures. The Medical Chemical Defense Research Program has an active research, development, and acquisition program bringing more than a half dozen products to full fielding in the last dozen years or so. These products include diagnostic devices, pretreatments and protective ointments, decontaminants and therapeutics. Moreover, these products have, in nearly every case, received full FDA approval for their intended use. This active acquisition program has necessitated periodic changes to classroom pedagogy as well as to the field training exercises.

The interaction between the clinical end-users of the three military medical services, who make up most of the MCBC and FCBC student group, and the Institute's scientific staff forms a crucial link in keeping the research program relevant and focused upon the clinical needs of the military medical services.

Technology and Training. The achievability of distance learning has changed radically in the last few years. Distance learning for the MCBC includes CD-ROMs, web-based training, and satellite broadcasts. In the future, although there is presently no standardized instrumentation system that can realistically portray all facets of NBC effects, the Army will soon have the capability to provide virtual simulation for many aspects of NBC environments. The applications of these virtual simulations to medical training are limitless and have been widely recognized at the Uniformed Services University of the Health Sciences and elsewhere in military medicine. With particular reference to chemical casualty care, where actual experience in caring for these syndromes will be minimal, this sort of simulation as a training aid is of special import.

Summary

The need for training in the medical management of chemical casualties has never been greater. The USAMRICD conducts what the GAO has termed the "gold standard" of training in this area for medical professionals both military and civilian. The training products and initiatives of the USAMRICD were described. It has become evident that there is increased interest in these products. Initiatives designed to increase availability and enhance the quality of training were also presented. Finally, the impact of student critiques, improvements in medical countermeasures, and educational technology on the training programs was also described.

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Emerging Roles for the ARNG State Surgeons in the 21st Century

COL Roger A. Lalich, MC, WIARNG†

Introduction

Like much of the Army Medical Department (AMEDD) community, the responsibilities of the Army National Guard (ARNG) State Surgeon have undergone significant changes in the last decade. These changes have been mandated by the rapidly evolving revolution in military affairs. Each state, the District of Columbia, Puerto Rico, The Virgin Islands, and Guam has an ARNG State Surgeon. In most states there is also an Air National Guard State Surgeon. The ARNG State Surgeons are selected by the state Adjutant General and their appointments are for varying lengths of time. The surgeon's position is Colonel (O-6) and depending on the state, is special staff to the Adjutant General, Deputy/ Assistant Adjutant General or the Chief of Staff.

Changing Roles

Since World War II, and until recently, the State Surgeon was a physician with primarily clinical duties. Each state varied significantly on the personnel make-up of the surgeon's office. Most states had a State Nurse and, possibly, other AMEDD personnel such as a Medical Service Corps officer or senior Noncommissioned Office in the surgeon's section. The surgeon's section was part of the State Area Reserve Command (STARC). Other than the State Surgeon's section, there was no command authority of the State Surgeon over the medical assets and personnel in the state's ARNG.

The State Surgeon's responsibilities included approval of the medical portion of Line of Duty investigations and incapacitation pay, as well as approval of physical profile changes. Another State Surgeon responsibility was the recommendation of physical standards waivers for initial military entry, officer candidate school applications and entrance into state active duty from reserve status (approval authority is the ARNG Surgeon). Although, in many instances, the State Surgeon was not directly involved in the physical exam and immunization process, he or she was responsible for quality control. As directed by the National Guard Bureau and the Department of the Army, medical standards and changes to medical standards were disseminated to the state's medical units and personnel through the State Surgeon's office.

Beginning in the mid 1990s, the State Surgeon's responsibilities have increased. The ARNG no longer has hospitals; these now reside in the Army Reserve. With a major portion of its medical assets lost, the ARNG developed STARC medical detachments to perform physicals, immunizations, dental screenings, and mobilization activities. A national total of just over 4,000 medical personnel are in the medical detachments. The State Surgeons are commanders of these units. Any support staff previously in the State Surgeon's section are now incorporated into the detachments.

In 1999, the Medical Advisory Council (MedAC) was formed and is composed of all 54 State Surgeons. This organization, along with its Executive Committee, acts as a communication channel between National Guard Bureau and the states. Through the MedAC, medical issues from the states can be brought "up" to the national attention of the Guard Bureau or "down" from the Guard Bureau to the unit level. State Surgeons are now missioned with oversight in their states of implementation of Medical Protection System, 91W conversion and sustainment training/certification, aviation medicine, annual training site support, budgeting pertaining to medical functions, and health promotion programs as well as other taskings by the Guard Bureau and the MedAC. The State Surgeon no longer has to be a Medical Corps officer; it is an AMEDD branch immaterial position. In states where the State Surgeon is not a physician, a Medical Corps officer is selected for duties that require a Medical Corps officer approval, such as profiles or waivers. The ARNG Surgeon's office sponsors a course

for State Surgeons which teaches the technical aspects of the job.

All of these new taskings and command responsibilities of the State Surgeon are in addition to the more traditional duties. As the State Surgeons transition to more administrative and command duties, how do they perceive their manager/commander roles? The State Surgeon role may be approaching that of the Army hospital Deputy Commander for Administration (DCA). These hospital chief operating officers' managerial duties may, in many ways, be similar to the new functions of the State Surgeon. This is not to imply that the job of a full-time DCA is similar to a part-time drilling reservist State Surgeon. Their managerial skills and their roles as managers representing their hospital for the DCA and their state AMEDD community for the State Surgeon, may be comparable.

This article describes the self-perceived roles of State Surgeons. A managerial survey is utilized and the results will be compared to DCAs' and civilian hospital administrators' perceived roles.

Survey

Henry Mintzberg has suggested that the classical perception of managerial functions (planning, organizing, coordinating, and controlling) are not what managers actually do, but are vague objectives managers have when they work.[1,2] He states that all managers are vested with formal authority which leads to status, interpersonal relations, and information access; all of which enables the manager to make decisions and strategies for their organization. The manager's job, Mintzberg asserts, can be described in a set of behaviors or roles (figure). These roles are derived from formal authority (figurehead, leader, and liaison), giving rise to informational roles (monitor, disseminator, and spokesperson), enabling the manager to perform the decisional roles (entrepreneur, disturbance handler, resource allocator, and negotiator).

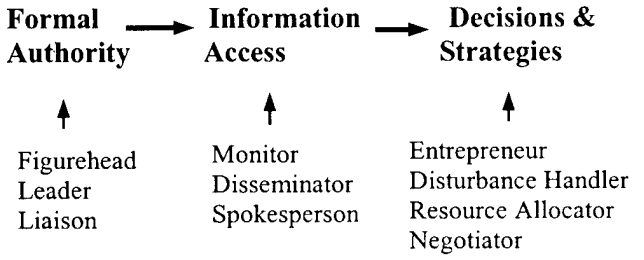

Fig. Managerial functions and roles.

Richard Dwore and Bruce Murray, using Mintzberg's roles, developed a survey that they administered to Utah hospital administrators in 1985.[3] This survey asked questions based on the 10 roles in relation to self-perceived job performance, education, time constraints, job survival, and satisfaction. David Rubenstein has used the survey to collect role perception data on DCAs biennially since 1988. The results obtained from the DCAs in the 1988 and 1999 surveys have been published in this journal.[4,5]

The Mintzberg-based survey was given to all 54 State Surgeons to complete. Brief definitions of the roles are shown in Table 1. Minor wording changes were made to the role definitions and original survey questions in order to reflect the State Surgeon's job as compared to those of the hospital administrators and DCAs. Institutional Review Board approval was obtained. The survey results of these self-perceived roles of the State Surgeons are presented and compared to the results obtained from the 1999 DCA and 1985 Utah hospital administrator surveys.

Results

Forty-five of fifty-four (83%) State Surgeons completed the survey. The respondents have been State Surgeons an average of 5.2 years, a mean of 3.5 years. All but one is a physician. Table 2 lists the 10 questions, in abbreviated form, with the most frequent responses for the State Surgeons, DCAs (1999) and Utah hospital administrators. There were 23 DCAs and 118 Utah administrators responding to the survey.

Discussion

The roles of leader and entrepreneur are what State Surgeons feel they perform best, but also feel they would still like to improve in these roles. They get the most satisfaction from these two roles and feel they are the most critical to their survival as State Surgeons. Although the Surgeons thought their education prepared them best for the disseminator role, leader and entrepreneur roles were the next most frequent selections.

Figurehead.....Representative for ceremonial duties

Liaison.....Developer of outside contacts/networks for information and favors

Leader.....Aligns the needs of subordinates with those of the unit/AMEDD

Disseminator.....Shares outside information with subordinates

Spokesperson.....Informs outsiders concerning medical matters

Monitor.....Sifts information to maintain unit/AMEDD awareness

Entrepreneur.....Initiates changes to solve problems and create opportunities

Disturbance Handler.....Deals with problems and crises

Resource Allocator.....Establishes priorities and determines who gets what

Negotiator.....Brings information and authority to negotiate with other parties

Table 1. Definition of Roles

Questions	State Surgeons (%)		DCAs (%)		Utah Admin (%)	
The role--						
-- you perform best?	Leader	33	Leader	39	Leader	36
	Entrepreneur	24	Disturbance Handler	26	Entrepreneur	27
-- you would like to improve?	Leader	24	Entrepreneur	30	Entrepreneur	31
	Entrepreneur	24	Monitor	17	Liaison	18
-- most important to your job survival?	Leader	33	Leader	30	Entrepreneur	43
	Entrepreneur	27	Negotiator	26	Leader	24
-- least critical to your job survival?	Figurehead	77	Figurehead	83	Figurehead	61
-- your education best prepared you for?	Disseminator	20	Resource Allocator	43	Resource Allocator	25
	Leader	16	Entrepreneur	22	Leader	25
	Entrepreneur	16	Leader	17	Entrepreneur	14
-- your education least prepared you for?	Figurehead	23	Negotiator	26	Figurehead	23
	Resource Allocator	18	Entrepreneur	22	Entrepreneur	20
-- you spend the most time?	Disturbance Handler	38	Disturbance Handler	52	Disturbance Handler	31
	Leader	22	Resource Allocator	17	Leader	25
-- you spend the least time?	Figurehead	58	Figurehead	48	Figurehead	53
	Liaison	12	Spokesperson	26	Spokesperson	15
-- that brings you the most satisfaction?	Leader	40	Entrepreneur	43	Entrepreneur	42
	Entrepreneur	36	Leader	22	Leader	27
-- that brings you the least satisfaction?	Figurehead	47	Disturbance Handler	30	Figurehead	46
	Disturbance Handler	33	Figurehead	26	Disturbance Handler	26

Table 2. Role Perceptions for State Surgeons (n=45), DCAs (n=23) and Utah Hospital Administrator (n=118)[3,5]

State Surgeons felt they spent the most time as disturbance handlers and the least time as figureheads. The two roles were also the most frequently cited as the roles that bring the least satisfaction. Additionally, the figurehead role was the role State Surgeons felt least prepared for by their education.

Table 2 shows the many similarities in the self-perceived roles of the State Surgeons, DCAs, and civilian hospital administrators. One major exception is that DCAs and hospital administrators feel they are best prepared by education as resource allocators. The role of resource allocator was the second most frequent selection of State Surgeons for which they felt their education least prepared them. This may represent the nonphysician DCAs' and hospital administrators' formal education as opposed to the mainly physician State Surgeons' education. Despite using comparative results from as long ago as 1985 and using civilian personnel, there were only two other significant differences between State Surgeons and the Utah administrators. Utah administrators did not list the leader role as needing improvement and they, as well as the DCAs, did not feel that their education prepared them well for the disseminator role.

The results from the three groups surveyed are so similar that their role perceptions may be generic responses of managers. It may not be job specific perceptions but, in fact, it may be that managers in general have these self-perceptions.

Conclusion

As State Surgeons accumulate more administrative duties and become commanders, managerial skills are essential to achieve success. The leader and entrepreneur roles are paramount to the State Surgeon. Like many managers or commanders, the role of disturbance handler is where most of the State Surgeon's time is spent. They feel their military and civilian education has prepared them well.

Current State Surgeons perceive their managerial skills ready to meet the demands of the current revolution in military medical affairs. What about future State Surgeons? What education and experience will serve them best? Since leadership and entrepreneurship are most critical to the State Surgeon's job, the Army's Leader Development System of education and assignment must be utilized. Command and General Staff College should be recommended for those aspiring to be State Surgeons. Leadership and entrepreneurship are difficult to teach but, experience as successful commanders may be an indication of those individuals who have mastered these skills. Civilian experience, such as hospital department heads or clinic managers, and civilian education in business areas may also help predict success.

The military is only effective if the commanders are skilled. Medical readiness can only be assured if State Surgeons are competent managers.

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WRITING AND SUBMITTING ARTICLES FOR THE AMEDD JOURNAL

The AMEDD Journal is published quarterly to expand knowledge of domestic and international military medical issues and technological advances; promote collaborative partnerships among Services, components, Corps, and specialties; convey clinical and health service support information; and provide a peer-reviewed high quality print medium to encourage dialogues concerning health care initiatives.

Submit manuscripts with the following guidelines:

1. Manuscripts will be reviewed by the Journal's Editorial Board and, if appropriate, forwarded to the appropriate Subject Matter Expert for further assessment.

2. It may be necessary to revise the format of a manuscript in order to conform to established page composition guidelines.

3. Articles should be submitted in disk form (preferably Microsoft Word on 3.5" disk) accompanied by two copies of the manuscript. Journal format requires four double-spaced typewritten pages to complete one page of two-column text. Ideally, manuscripts should be no longer than ***20 to 24 double-spaced pages****. Exceptions will be considered on a case-by-case basis.*

4. The American Medical Association Manual of Style should be followed in preparation of text and references. Abbreviations should be limited as much as possible. A list identifying abbreviations and acronyms ***must*** *be included with the manuscript or materials will be returned to the author.*

5. Photos submitted with manuscripts can be black and white or color. Color is recommended for best print reproduction quality. Space limitations allow no more than eight photos per manuscript. Photo prints are preferred, but we will accept electronic graphic (i.e., BMP, JPG, or GIF) and photo files in Microsoft Word or PowerPoint. Avoid excessive use of color and shading. Please do not send photos embedded in PowerPoint. Slides, negatives, or X-ray copies will not be published. To avoid possible confusion, the top of photos should be marked on the reverse and their position within the article should be clearly indicated in the manuscript. Photo captions should be taped to the back of photos or submitted on a separate sheet.

6. A complete list of references used in the text ***must*** *be provided with the manuscript. This list should include no more than 25 individual references, if possible. Each should provide the author's last name and initials, title of the article, name of the periodical, volume and page number, year of publication, and address of the publisher.*

7. Drugs should be listed by their generic designations. Trade names, enclosed in brackets, can follow.

8. The author's name(s), title, current unit of assignment, PCS date (if applicable), and duty phone number ***must*** *be included on the title page.*

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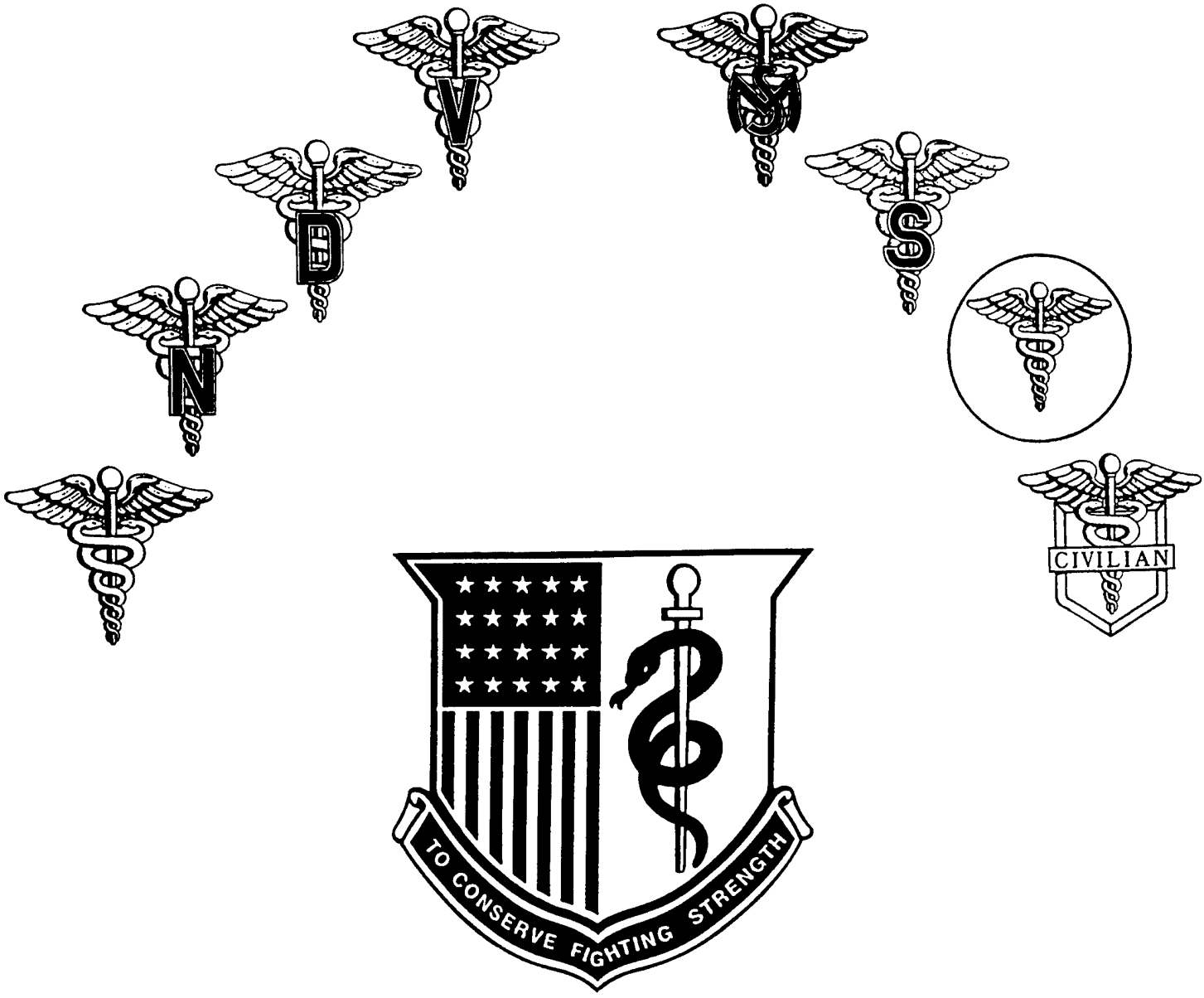

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