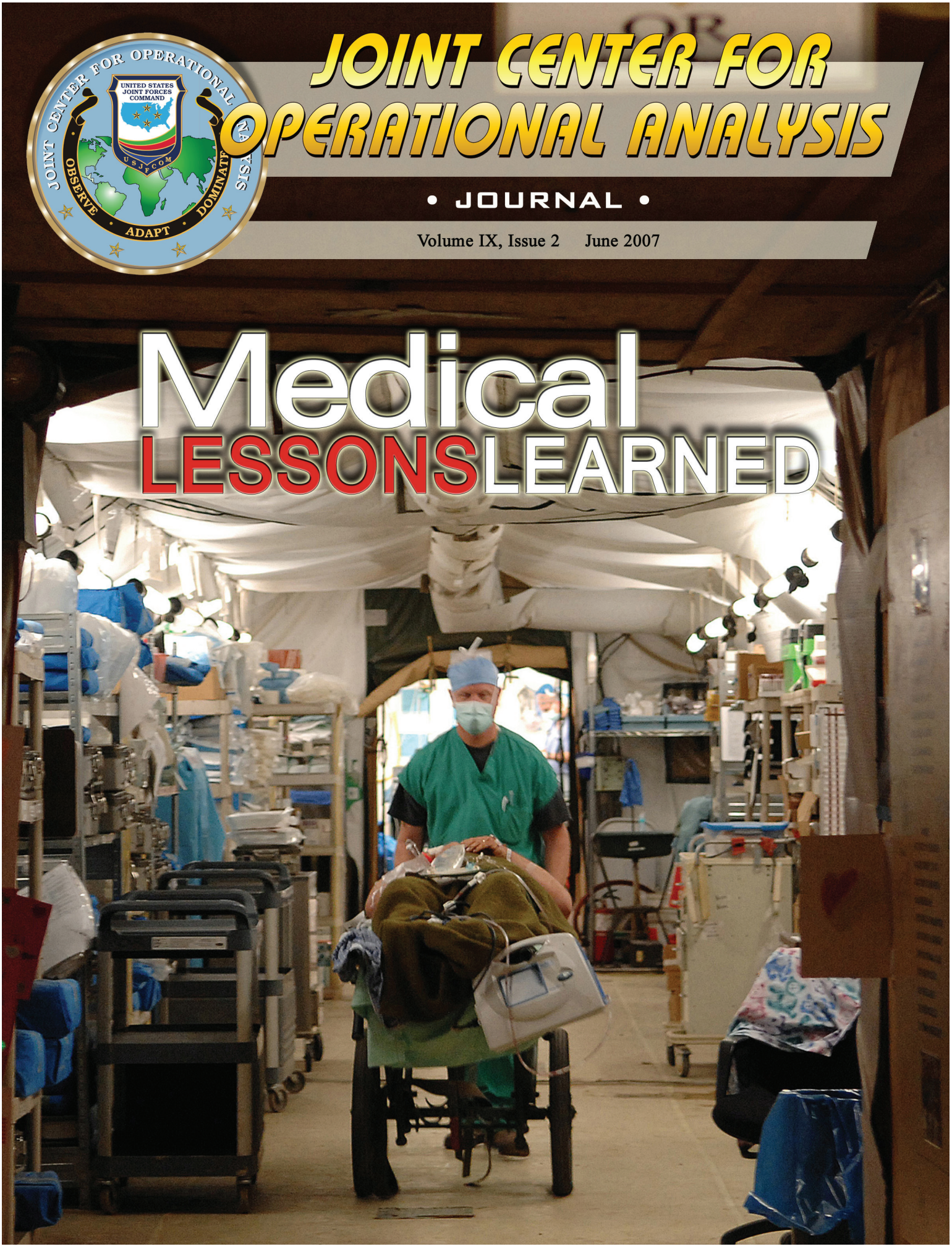
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What's in a name???

After over 10 years of being known as the Joint Center for Lessons Learned **Bulletin,** and later the Joint Center for Operational Analysis **Bulletin**, we have officially changed our name to the Joint Center for Operational Analysis **Journal.**

What is a Journal?
A journal differs from both a bulletin, which is a brief public notice issuing usually from an authoritative source, and a magazine in some combination of the following ways: Journal articles are written by scholars or experts for people with a serious interest in the topic, as the articles report the authors' research or scholarship. Magazine articles usually are written by journalists or professional writers for people with a general or casual interest in the topic, as the articles report on interesting events, news, or other popular topics. Journal articles include the author's name and credentials, whereas magazine articles usually include only the author's name, if that. Journal articles usually include footnotes or a bibliography of articles or books that the author used in his work, while magazine articles usually do not include footnotes or a bibliography.

Over time, it is our belief that the JCOA publication has transformed from the informative Bulletin of its founding, to the more professionally oriented journalistic format of today. We look forward to continuing this growth in the future as the JCOA Journal.

Message From the Director

BG James O. Barclay, III, USA
Director, JCOA

This issue of the Joint Center for Operational Analysis (JCOA) Journal is focused on medical lessons learned and capabilities available to support Department of Defense (DOD) efforts during national emergencies, stemming from conflict or natural disaster relief. Recent experiences in the Middle East and in support of humanitarian relief efforts to Pakistan and the United States Gulf Coast area have highlighted the need for a coordinated response to medical demands. Hopefully, the articles in this issue of the Journal will help to stimulate thought and preparation for future responses.

In *Military Medical Support for Humanitarian Assistance and Disaster Relief: Lessons From the Pakistan Earthquake Relief,* LTC (Dr.) Will Mosier and LTC (Ret) Walt Orthner, discuss the differing demands between a humanitarian assistance and disaster relief (HADR) response in the US and in foreign countries, neither of which differs drastically from an asymmetric combat environment. They argue for a modular approach to unit deployment to adapt to the changing environment.

Medical Aspects of Disaster Preparedness and Response: A System Overview of Civil and Military Resources and New Potential, is the first of three articles submitted by the State Defense Forces (SDF) publication library for inclusion in this Journal. Colonel Nelson, Ph.D., and Capt (Dr.) Arday provide an overview of the National Disaster Medical System, the National Response Plan, and the SDF Medical Reserve Corps, and show how the three interrelate to provide a unity of effort in disaster relief.

The third article, *Combat Stress: Posttraumatic Stress Disorder in the Military – Identification, Diagnosis, and Intervention*, looks at the causes, risk factors, symptoms, and intervention strategies for dealing with posttraumatic stress in a combat environment. The authors, LTC (Dr.) Mosier, Majors Shymanski and Kettel–both former members of the White House Medical Staff–and LTC (Ret) Orthner, give an in-depth analysis of the causes and treatment options for the disorder.

The fourth and fifth articles are both from the SDF publication library and present an integrated picture of the State Defense Forces capability to field and utilize medical support teams to supplement both DOD and National Guard forces in times of national disasters. *Developing Vibrant State Defense Forces: A Successful Medical and Health Service Model*, delves into the response to Hurricane Katrina by the Maryland Defense Force 10th Medical Regiment, and its efforts to garner support from within the medical community to fill the shortfall of volunteer members.

The article *The Texas Medical Rangers in the Military Response of the Uniformed Medical Reserve Corps to Hurricane Katrina and Hurricane Rita 2005: The New and Tested Role of the Medical Reserve Corps in the United States*, by COL Greenhouse, Ed.D. and J.D., provides an after-action review of the Texas Medical Rangers in HADR response to the Gulf Coast. He provides statistics and observations for planning for the next HADR event response.

The final article by LTC (ret) Orthner, is a comparison of the governmental response to the devastation from the Galveston, Texas, hurricane of 1900 and Hurricane Katrina in 2005. Many of the problems encountered in 1900 were also evident in the hurricane Katrina response.

JAMES O. BARCLAY, III
Brigadier General, U.S. Army
Director, Joint Center for Operational Analysis

JCOA UPDATE

Mr. Bruce Beville
Deputy Director JCOA

There have been a few changes since our last Journal – some new and some a continuation of ongoing activities. First, we continue to field a collection team in Iraq. Our new major study, Joint Adaptation and Innovation (JAI), is taking shape and is supported by that team. Based on several of JCOA's past and current studies, we have identified recurring themes in today's changing environment with regard to an ever adaptive enemy and our "best practices" to defeat him. The study examines this changing warfighting paradigm in order to align joint and national capabilities to counter this emergent threat. The focus is on how we are responding to what is happening and why (i.e., Are we incorporating innovation and institutionalizing change?).

Second, after a year absence, we now have a team back in Afghanistan embedded with the Combined Security Transition Command Afghanistan (CSTCA). The purpose of this collection effort and the follow-on study is to document lessons associated with transitioning security responsibilities from coalition forces to Afghanistan security ministries and forces capable of establishing stability throughout Afghanistan. It will be used to inform future commanders of the challenges and opportunities involved in organizing, training, and equipping indigenous security forces while operating in a counterinsurgency environment.

Next, our Knowledge and Information Fusion Exchange (KnIFE) division continues to grow as word gets out about its increasingly robust capability. As a 24-hour, seven-day a week operation, it provides the warfighter with a means to: exchange information, offer timely responses to requests for information (RFI), consolidate best practices, facilitate knowledge reach-back, collate data sources, and develop a lessons learned repository. Each week, the number of RFIs and "hits" on the web site (http://knife.jfcom.smil.mil) increases significantly. Currently focused only on the threat from improvised explosive devices (IED), future plans are to expand KnIFE to include all asymmetric threats and to provide an increased analytical capability. Partial funding for this new capability has been approved and provided by the Defense Intelligence Agency (DIA). The wheels are now in motion to get all the resources in place, with a goal for initial operational capability (IOC) sometime in late fall. For those looking for answers to any IED question, KnIFE can be contacted via a variety of venues. It offers a secure phone and fax service, classified and unclassified network websites, and a Combined Enterprise Regional Information Exchange System (CENTRIXS) presence for allowing access by coalition members.

Finally, the Joint Lessons Learned Information System (JLLIS) is making progress towards becoming a viable tool for the entire Department of Defense (DOD) lessons learned program. JLLIS is a global information grid (GIG) compliant, net-centric, web-based collaborative tool that enables creation of an efficient and effective Joint Lessons Learned Program (JLLP). JLLIS will automate joint lessons learned collection, validation, distribution, and search processes for both action officers and planners in combatant commands, combat support agencies, and the Joint Staff. When completed, JLLIS will interface with all the Service lessons learned systems and will host a central repository of all lessons learned (joint and otherwise) for support to exercises, training, and continuing operations, including federal disaster response. In addition, JLLIS will feed information back to the assessment phase of the Joint Training Information Management System (JTIMS), and will interface with the Defense Readiness Reporting System (DRRS) and Joint Doctrine Education Information System (JDEIS). Physically residing on the US Marine Corps server farm, users will access it through their organization's lessons learned home page. Published observations, issues, and lessons learned will be shared across the joint community for rapid infusion into joint training and research. Lastly, JLLIS information will be metadata tagged to Universal Joint Task Lists (UJTLS) and Joint Mission Essential Task Lists (JMETLS) in order to share data with JTIMS, DRRS, and JDEIS – and eventually other key DOD systems.

"To a very high degree the measure of success in battle leadership is the ability to profit by the lessons of battle experience."
- Lucian K. Truscott, Command Missions, 1954, p. 533

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Editor's Note: I'd like to thank Mr. Josiah McSpedden for providing the layout and cover design over the past several years. His efforts have been outstanding and were greatly appreciated.

Military Medical Support for Humanitarian Assistance and Disaster Relief: Lessons Learned From the Pakistan Earthquake Relief Effort

Lt Col William A. Mosier, USAFR
LTC Walter H. Orthner USA (Ret)

> *"The US Military has always succeeded because we have great people - both line and medical personnel. We succeed in the tasks we are given- like HADR- even without extensive planning. However, it often is accomplished at great personal cost in terms of time, effort, and stress. Each time, we seem to start all over again from scratch. We can continue to turn a blind eye to issues in this report or we can face them and make changes to make our efforts better. It is as if we are victims to our own success. 'If we are so successful, why do we need to change anything?' This attitude must change. We are not prepared or set up to do humanitarian assistance and disaster relief as efficiently as we could. We need to change our approach to planning for and actions during these capacity building efforts."*
> *- RADM Timberlake, USJFCOM Surgeon*

Military personnel engaged in providing humanitarian assistance and disaster relief (HADR) do a commendable job. Individuals bend over backwards to mold and adapt the existing force structure and available supplies to successfully provide humanitarian assistance and disaster relief. For example, during the Pakistan earthquake relief effort in 2005, two United States (US) military medical units treated tens of thousands of patients, conducted nearly 500 surgeries, and administered over 10,000 immunizations. The challenges faced during HADR efforts are not unlike those faced in an asymmetric combat environment. These challenges require adaptive changes in force structure, training, and requirements.

In order to respond quickly, efficiently, and effectively to today's dynamic demands, the military medical force structure must be able to transition from its primary role in force health protection to medical civil-military operations in support of capacity-building operations that assist in stabilizing the infrastructure of developing nations. For this to occur, a modular approach to unit deployment needs to evolve. This is not a new issue, but is one that has not yet been fully implemented. Therefore, units continue to face the same challenges while trying to adapt a rigid structure in an attempt to meet the changing requirements of offering HADR as part of the US Department of Defense (DOD) capacity building efforts in support to developing nations.

The following points need to be considered when planning for HADR missions:

- International health disaster response (IHDR) requires different skill sets and training than traditional combat health service support.
- Responding to emergencies in foreign countries demands cultural awareness, knowledge of joint capabilities, and the ability to work effectively in an interagency environment to augment and support, not replace, a host nation's existing medical infrastructure.
- The current tables of organization and equipment (TOE) and deployment platforms do not authorize the full range of supplies, equipment, and personnel necessary to respond quickly to HADR missions.

This study suggests that the following shortfalls need to be addressed in order to resolve current limitations to effective and timely HADR deployments:

- Training (skill sets, exercising joint, interagency roles within international health disaster response)
- Policy (clearly established roles and responsibilities)
- Requirements (supplies, equipment, and personnel)
- Force Structure (transition to capability-based, modular units)

Shortfalls in any one of these areas reduce the effectiveness of medical relief efforts. Why these issues need to be understood can best be seen by reviewing the current policy and guidance that directs HADR missions.

> *"Foreign assistance is an essential component of our transformational diplomacy. In today's world, America's security is linked to the capacity of foreign states to govern justly and effectively. Our foreign assistance must help people get results. The resources we commit must empower developing countries to strengthen security, to consolidate democracy, to increase trade and investment, and to improve the lives of their people. America's foreign assistance must promote responsible sovereignty, not permanent dependency… We were attacked on 9/11 by terrorists who had plotted and trained in a failed state: Afghanistan. Since then, we have cycled tens of thousands of troops through the country, spent billions of dollars, and sacrificed precious lives to eliminate the threat and to liberate the brutally repressed people of Afghanistan. In the final analysis, we must now use our foreign*

assistance to help prevent future Afghanistan's and to make America and the world safer."
- Secretary Rice, January 19, 2006

The Challenge

HADR efforts present medical challenges not uncommon to those challenges faced in today's asymmetric combat environment. These challenges imply a change is needed in how we should address military force structure, training, and equipment that will be deployed for HADR events.

What is the Problem?

- Existing training and joint exercises do not fully prepare military personnel for medical operations during HADR missions.
- Evolving policy and doctrine do not provide a basis for joint task force (JTF) medical operations organized to engage in HADR events.
- HADR planning staff are not typically organized or manned to write complete medical concept of operations and complete an initial medical needs assessment.
- Typically, medical units arrive on-scene after the requirements for trauma-care have already passed.
- Organization, manning, supplies, and equipment necessary to treat civilian populations during HADR efforts differ from those required to support US/coalition troops in combat operations.
- HADR education is not typically required for military personnel.
- Joint HADR training is limited.
- There is no way to track personnel who have completed HADR education or training.
- No skill or special experience identifiers exist outside of the Air Force. USAF International Health Specialists (IHS) are the only medical personnel formally trained in HADR intervention.

How can DOD medical response to HADR events be enhanced?

- Develop joint and Service specific health service support doctrine and detailed operational guidance and procedures that more clearly establish roles and responsibilities for all government agencies participating in HADR operations.
- Develop functional plans for theater engagement and theater cooperation strategies as they apply to medical assets.
- Intensify initiatives to develop self-sustaining, rapidly deployable, modular, flexible, and interoperable medical elements, with providers matched to population needs and medical supply packages specifically tailored to support HADR operations.
- Increase availability of training exercise opportunities that include humanitarian assistance and disaster response scenarios in a joint, combined, and interagency environment. These events should incorporate international health standards and include inter-Service, interagency, international, and nongovernmental organization (NGO) participation.
- Units need to address the following in a (*non-ad hoc)* pro-active fashion:
    - Disaster response standards.
    - Serving as augmentation to, rather than replacement for, host nation (HN) medical infrastructure.
    - HN requirements for medical record-keeping and administrative oversight.

Background: Policy and Guidance

Currently, there is no over arching strategic guidance or policy directing DOD involvement in humanitarian assistance or disaster relief. The Office of the Coordinator for Reconstruction and Stabilization (S/CRS) under the Department of State (DOS) was formed to serve as a central coordinating authority. However, there is no counterpart in DOD that has been designated to interface with S/CRS. Since United States government policy clearly recognizes humanitarian assistance and disaster relief as a secondary mission for the military medical community while in a support role to DOS, military coordination with S/CRS should be directly addressed.

There is no specific DOD policy addressing the "how to" of deploying medical assets for HADR events. However, authority for conducting HADR is granted in US Code 10 USD 2561. Although it does not go into detail, this document gives skeleton guidance as to how we are to respond during disaster situations. Regulatory and policy guidance is not specific. In fact, it is unclear. Likewise, doctrine impacting the implementation of medical HADR is vague.

Reference to policy and guidance for HADR events can be found in the following:

- US Code
- 2006 Quadrennial Defense Review (QDR)
- DOD Directives (DODD)
- Joint Publications (JP)
- Service manuals

Several sections of US Code 10 cover the provision of HADR to countries in need of humanitarian assistance.

This is addressed primarily in chapter 20, *Humanitarian and Other Assistance*, and chapter 152, *Issue of Supplies, Services and Facilities*. Section 401 of the Code addresses humanitarian and civic assistance provided in conjunction with military operations and is, therefore, applicable to humanitarian assistance (HA) operations as they relate to Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF). However, this section does not address disaster relief efforts like the Pakistan earthquake in 2005.

Section 402 authorizes transportation of humanitarian relief supplies to foreign countries; section 404 addresses circumstances under which the Secretary of Defense will provide foreign disaster assistance; section 2557 speaks to excess (non-lethal) supplies available for humanitarian relief; and, section 2561 covers tracking and funding of humanitarian assistance.

The only section that specifically addresses the provision of health care services is section 401. It is simply addressed as: "Medical, dental, and veterinary care provided in rural areas of a country…" in conjunction with military operations. This vague phrasing allows for a great deal of interpretation. In fact, it does not directly limit services that can be provided during HADR efforts.

The Quadrennial Defense Review (QDR), dated 6 February 2006, recognizes the importance of humanitarian relief and support to civil-authority missions as a learning tool for adaptability to change:

> *"In addition to its operations in Afghanistan and Iraq, the US military has conducted a host of other missions, from providing humanitarian relief in the aftermath of the Indian Ocean tsunami and the South Asian earthquake to supporting civil authorities at home and responding to natural disasters such as Hurricane Katrina. Lessons from these missions, which informed the QDR's deliberations and conclusions, include the critical importance of: having the authority and resources to build partnership capacity, achieving unity of effort, and adopting indirect approaches to act with and through others to defeat common enemies… shifting from conducting activities ourselves to enabling partners to do more for themselves. Shifting from responsive actions toward early, preventive measures and increasing the speed of action to stop problems from becoming conflicts or crises.… Applying these lessons will increase the adaptability of the force when confronting surprise or uncertainty. Maintaining a joint process to identify lessons learned is important to support a process of continuous change and improvement."*

The QDR specifically addresses the importance of humanitarian assistance and early preventive measures in the following terms:

> *"US forces continue to conduct humanitarian assistance and disaster relief operations around the globe. Preventing crises from worsening and alleviating suffering are goals consistent with American values. They are also in the United States' interest. By alleviating suffering and dealing with crises in their early stages, US forces help prevent disorder from spiraling into wider conflict or crisis. They also demonstrate the goodwill and compassion of the United States."*

DODD 2205.2, *Humanitarian and Civic Assistance* (HCA), dated 6 October 1994, does not provide guidance on actual conduct of HCA activity, but simply states there must be training value for participating medical personnel.

> *"To ensure that US Armed Forces personnel participate in a particular HCA activity in a meaningful manner, US military occupational specialists must provide services relevant to their specialty. Medical HCA activities... should include personnel such as US military doctors, dentists, nurses, pharmacists, or health administrators…Assistant Secretary of Defense for Health Affairs [will] ensure that HCA activities involving medical personnel enhance the operational readiness skills of these personnel."*

Joint Publication 4-02, Health Service Support (HSS) in Joint Operations, dated July 2001, makes only one brief reference to humanitarian assistance and disaster response. The current revision, under final coordination, provides a definition of civil-military medicine and what it covers. Civil-military medicine will be described as:

> *"...civil-military interface (foreign or domestic)… including peacetime medical security cooperation activities, humanitarian assistance, disaster response and disease outbreak response in a permissive environment, pre-conflict health-related civil-military activities, and health-related civil-military activities during major combat operations (MCO) and post-conflict Stability Operations. Although the primary mission of HSS is to enable force health protection (FHP), HSS personnel may be tasked*

to conduct or support Medical Civil-Military Operations (MCMO) in activities that build host nation (HN) capacity in the public health sector. Close coordination between the joint task force surgeon and civil affairs (CA) elements is essential to the success of MCMO."

JP 3-07.6, Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance (FHA), states:

"US military forces are not the primary US Government (USG) means of providing FHA. Ultimately, military participants in FHA normally only supplement the activities of US and foreign civil authorities as well as private organizations."

JP 3-57, Joint Doctrine for Civil Military Operations, addresses how and why DOD resources should be used:

"The use of HSS resources has historically proven to be a valuable low-risk asset in support of CMO. HSS is generally a non-controversial and cost-effective means of using the military element to support US national interests in another country. The focus of HSS initiatives, although possibly targeted toward the health problems in the operational area, is not normally curative, but primarily long-term preventive and developmental programs that are sustainable by the HN. HSS operations conducted to enhance the stability of a HN must be well-coordinated with all concerned agencies and integrated into the respective US Embassy plans. Independent, unplanned health service civic action programs should not be undertaken."

The *"Multi-Service Procedures for Humanitarian Assistance Operations"* is the only multi-Service manual on this topic. It was prepared in October 1994, under the direction of the commanders of Army Training and Doctrine Command (TRADOC), Marine Corps Combat Development Command (MCCDC), Navy Doctrine Command (NDC), and Air Combat Command (ACC). The document does not provide specific details on the provision of healthcare to local nationals. The manual addresses humanitarian assistance both abroad and within the United States. However it is written under the assumption that the military will not normally provide medical care to non-US or non-coalition patients unless the JTF causes the injury. Chapter Four states:

"Medical considerations for the JTF in an HA environment are significant. The two areas to consider are medical care for the JTF and coalition forces and medical care for the local populace. In general, JTF medical assets support JTF personnel, while HN facilities, NGOs and UN [United Nations], and ICRC [International Committee of the Red Cross] health organizations support themselves and the civilian population…. Title 10, US Code, prohibits use of military medical assets for treatment of civilians except when specially authorized by the appropriate authority. This can cause problems for the JTF regarding the perception that the US cannot and will not assist the area with medical care."

After reviewing the preceding policy, doctrine, and guidance, one might conclude that the documents have not kept up with the increased role of US military forces in using humanitarian assistance as a vehicle for stability operations and capacity building.

A Timeline of HADR Medical Policy and Doctrine

Some 30-plus years ago, foreign disaster relief was identified as including "medical" assistance. No further guidance was provided, nor was it forthcoming for the next 2 decades. The following section provides an overview of policy and doctrine decisions addressing HADR efforts involving DOD medical assets:

DODD 5100.46 Foreign Disaster Relief (4 December 1975)

– Defines foreign disaster relief to include: *"humanitarian services and transportation; the provision of food, clothing, medicines, beds and bedding, temporary shelter, and housing; the furnishing of medical materiel, medical, and technical personnel; and making repairs to essential services."*

Two decades after foreign disaster relief was defined to include *"medical,"* the Multi-Service Procedure for Humanitarian Operations manual was published. However, it stated a very narrow view of medical humanitarian assistance. It stated that care could ONLY to be provided to host nation patients if the injury was caused by JTF actions. (This manual was rescinded 10 yrs later. Multi-Service Procedures for Humanitarian Assistance Operations (Joint Effort Manual) October 1994 *(Rescinded October 2004)*)

JP 3-57 Joint Doctrine for Civil Military Operations (8 February 2001) states:

As referenced above, this view of civil-military medical operations included recognizing the importance of facilitating sustainable health operations and aiding long-term development in close coordination with DOS, host nation colleagues, and non-governmental agencies.

JP 3-07.6 Joint Tactics, Techniques, and Procedures for Foreign Humanitarian Assistance (FHA) (15 August 2001) states:

– *"Primary consideration must be given to supporting and supplementing whatever medical infrastructure exists."*

– *"…JTF surgeon and staff will develop a medical concept of operations that will (if possible) combine the efforts of the military HSS forces, NGOs, and the existing medical infrastructure."*

– *"Prior to deployment, the combatant command surgeon should acknowledge the country's standard of care and ensure that, at a minimum, the same level of care is provided to the affected population, if such actions are part of the mission and/or the commander's intent."*

– *"Once approved by the JFC, the JTF staff should initiate planning and action required to support the standard of care. If, upon execution, a JTF surgeon thinks that modifications should be made to the standard of care, a request for modification can be made through the supported combatant command surgeon."*

- *"Contact NGO and IO* [international organizations] *medical personnel before commencing the operation. Identification of needs and cooperation by all …of the parties involved early on will increase efficiency and reduce redundancy."*

This clarification of the role of military medical assets in HADR stresses the importance of developing and following a concept of operations that is consistent with the host nation needs and standards of care. To accomplish this it is vital to work closely with the host nation to ensure an accurate needs assessment is obtained. Unfortunately, as was seen in the Pakistan earthquake relief effort of 2005, a lack of initial medical assessment, comprehensive planning, and differing standards of care can become roadblocks to optimizing intervention efforts.

JP 4-02 Health Service Support (HSS) in Joint Operations, (30 July 2001) makes only limited reference to humanitarian assistance and disaster response, with no specific clarification of the role of medical involvement.

Logistics Supplement to the Joint Strategic Capabilities Plan (JSCP) (FY 2005) directs each Service to ensure that medical civil-military support operations include:

- public health activities
- preventive medicine
- veterinary care
- food sanitation and hygiene
- immunizations of humans and animals
- infant and child health care
- preventive dental hygiene
- medical logistic programs
- continuing HSS education programs
- HSS intelligence and threat analysis
- apppropriate methods for supplying and sustaining existing HN medical infrastructure and facilities.

The JSCP provides additional guidance on the medical role, stressing the importance of working closely with the host nation infrastructure.

DODD 3000.05 Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations (28 November 2005) states that it must be ensured that DOD medical personnel and capabilities are prepared to meet military and civilian health requirements in stability operations.

With such a broadly phrased requirement, additional guidance is needed to help define what the *"be prepared"* requirement really means.

Quadrennial Defense Review **(**30 September 2001) did not address humanitarian assistance and disaster relief. However, Quadrennial Defense Review **(**6 February 2006), as referred to above, describes a proactive approach to HADR. Taking a preventive role for HADR, QDR recognizes that helping partners globally is both consistent with American values, and US national strategy and interests.

Case Study – The Pakistan Earthquake Relief Effort (2005)

With this brief review of DOD policy/doctrine in reference to the role of military medicine in HADR efforts, let us turn to see how the lack of clearer guidance produced some negative consequences for DOD efforts during the Pakistan earthquake relief operation of 2005.

Following the Pakistan earthquake, the US had its first relief supplies on the ground within 24 hours of the initial quake. However, it took 16 days before the first medical unit was fully operational. Some assets were not fully operational until 40 days after the initial earthquake. Without realizing the negative impact that it would have, all units continued seeing patients for almost five months after there were no more victims with wounds resulting from the earthquake. Later in this article, Figures 2, 3, and 4 provide dramatic evidence of the reality of patients seen after the Pakistan earthquake who were treated for health conditions unrelated to the disaster relief effort.

Conducting accurate needs assessments for HADR efforts

Without adequate assessment, medical support requirements cannot be accurately determined. Assessments provide the necessary background data for sizing the force protection package required, reducing the threat to DOD force personnel and assets, and determining the needs of the HN.

Timeliness of the needs assessment is of paramount importance. An initial assessment should be carried out as soon as possible. A more in-depth assessment will be needed later to identify gaps in assistance. In the case of the Pakistan earthquake relief effort, if an adequate mission analysis had occurred prior to the deployment of DOD assets, it would have become apparent that there was no justification for deploying two surgery teams to Pakistan.

Medical Task Force Initial Crisis Assessment Team

In their defense, one surgical unit assigned to the mission requested to send a two-person assessment team to coordinate with the Combined Disaster Assistance Center-Pakistan (CDAC-PAK) staff on capabilities and requirements of the task force. Response given through US European Command (USEUCOM) was that an assessment team from US Central Command (USCENTCOM) was already in the area and the mobile Army surgical hospital (MASH) unit was restricted from sending personnel to be part of the assessment team. Unfortunately, the assessment team that was sent was not familiar with how to plan for the US capabilities and space requirements, as evidenced by the small-sized pre-selected site locations, difficulties in meeting strategic airlift requirements, and development of the concept of operations (CONOPS). Similarly, discussions with the Navy medical planner at CDAC-PAK revealed that preliminary medical assessments were not conducted before requesting medical support from Combined Forces Command-Afghanistan (CFC-A) and USCENTCOM.

Capability-Based Modular Units and Force Flow

HADR missions require modular, agile units that can rapidly deploy in phases with the right capability, personnel, equipment, and supplies. HADR missions require immediate deployment of the right capability in order to be effective. Due to the limited time for planning prior to deployment for a HADR event, having a pre-compiled list of joint modular capabilities would allow the joint force commander and planners to select the appropriate assets and facilitate a rapid response.

Army medical units are not modular. Air Force medical units are modular but do not come with base operating support. Navy is presently transitioning to capability-based modules. The Army medical re-engineer initiative (MRI) combat support hospitals (CSH) have a 44-bed break-out that can separate from the main hospital, but it is only designed to maintain split-based operations for 30-days. Beyond this, the MRI CSH is not designed to either break-out or build capability. While the Army has large units that must be scaled back, the Air Force has small unit type codes (UTC) that build onto a central core and are based on required capability. The only drawback is that existing medical units, such as the expeditionary medical units (EMU) and expeditionary medical system (EMED) do not have base operations support (BOS) packages. Since Air Force medical units traditionally set up on bases with resources and available BOS, this removes AF medical units from the picture when services are required in austere environments. There is an initiative underway to add this additional capability when required, but the change has not yet been fully instituted. Navy medical units are moving towards capability-based "off-the-shelf shopping" to provide commanders with "exactly" the resources required. However, the transition has not been fully implemented and many providers do not receive the field training necessary to operate in austere environments.

When the US reacted to the Pakistan earthquake by sending military medical capability, a MASH surgical unit appeared to be the closest and most capable unit available to respond. The MASH unit still had their equipment packed because they had just returned from a humanitarian mission in Angola two weeks before the earthquake. Some of the providers in another surgical company tasked with responding to the disaster had participated in a tsunami relief the year prior to the Pakistan earthquake. So, both units were well-prepared in terms of personnel with experience in HADR missions.

Military medical units are designed for linear battlefield operations where medical units treat US and coalition casualties behind the forward line of troops. The units were structured to come in with a heavy footprint and set up as a whole in one location to treat combat injuries. In HADR missions, as well as in the non-linear warfare seen today, the current medical force structure is too large, rigid, and cumbersome to move quickly across the area of operations to provide tailored healthcare services. The two deployed surgical units were not conducive to phased-deployment because they lacked a capabilities-based force flow to enable a small core footprint upon which elements of greater capability could be built. The planning was for both units to be erected, with each as a whole element.

The Operations Plan Annex Q (Medical Annex) used for the earthquake relief effort primarily addressed health care of military forces, not civilians in a disaster situation. However, the following guidance specifically addresses how US Forces should provide support to the host nation:

– *"Provide services targeted at reducing pain and suffering, mitigation of disease effects and water purification. The underlying focus of US medical operations will be to assist the host nation in reestablishing its healthcare system while re-enforcing the sovereignty of the HN and provide support for the people and that Government."*
– *"… Provide HSS [health services support] to host nation civilians who have been affected by the disaster or whom are providing direct support to US Forces. All host-nation civilians will be treated for emergencies and returned to national control once stabilized."*
– *"…Be prepared to utilize medical personnel offered by the host nation in an effort to enhance US-HN relations. Host nation medical support will be provided to host nation patients only."*
– *"…Be prepared to aid in redistribution of NGO/PVO [private voluntary organizations] medical material to local national medical authorities"*

Key points:

- The systems mandated for use were not designed to capture non-US military patients. An alternative system needs to be made available for HADR events. (DOD patient administration requirements are unsuited for use during HADR events. The DOD systems require data entry of social security numbers (SSN), birthdates, and next of kin. These were pieces of information that were unavailable in the local Pakistan patient pool. Staff were forced to create pseudo-SSNs and had to be careful not to duplicate them just so the computer programs would advance to the next screen. Earthquake victims who would be released from care where identified as "returned to duty" because that was the only way the computer program would respond.)
- Medical rules of engagement did not provide adequate guidance. *"Local Nationals will be afforded the full spectrum of acute/emergent care and regulated back into the host nation healthcare system as soon as their condition permits."*
- Although family practice, obstetrics and gynecology, and pediatrics were specifically called for in the Annex Q, these skills are NOT authorized in a MASH because of its combat trauma support mission. Likewise, pediatric ventilators are not authorized for military field medical units. Even though this capability mismatch was eventually overcome (by augmentation), there needs to be better contingency planning for how military assets are equipped to support HADR events.
- Pakistani physicians complained that the free medical care provided was undermining their private practices.
- Pakistani pharmacists in town complained that we flooded the area with free drugs and their business dried up.
- Medication given to patients by the HADR team was being sold on the local black market.
- Pakistan Institute of Medical Sciences (PIMS) complained that we did more harm than good by evacuating patients to their hospitals in Islamabad. They opined that the US cost the people of Pakistan money and created displaced civilians.
- Medical supplies and equipment essential for HADR events were not authorized, or not authorized in sufficient quantities. These included:

  * Supplies for pediatric care
    – Medications
    – Ventilators
    – Blood pressures cuffs
    – Nasal aspirators
  * Supplies for orthopedic care
    – Ankle stirrup braces
    – Knee braces
    – Wrist splints
    – Crutches (all sizes)
  * Supplies for obstetric care
    – Ultrasound equipment
    – Speculums
    – Suction machines or large curettes
  * Disposable accessories for all equipment
  * Portable X-Ray (and an adequate number of radiology technicians)

Priorities of Need after an Earthquake

Disasters follow a pattern and earthquakes are no exception. Figure 1 depicts the priorities of need that occur, over time, during a disaster situation. The DOD effort extended far beyond this two-month period, leading to negative consequences for the Pakistan economy.

As is evident from the graph in Figure 2, after the initial case load of 8-16 patients per day during the first week of intervention services, the average daily patient census dropped to just one per day for most of the period troops were on the ground.

Figure 3 vividly demonstrates that only 118 of the over 14,000 patients treated during the Pakistan earthquake relief effort were actually victims of the earthquake. Over 95 percent of the patients treated were being treated for health conditions unrelated to the devastation caused by the earthquake.

Figure 1

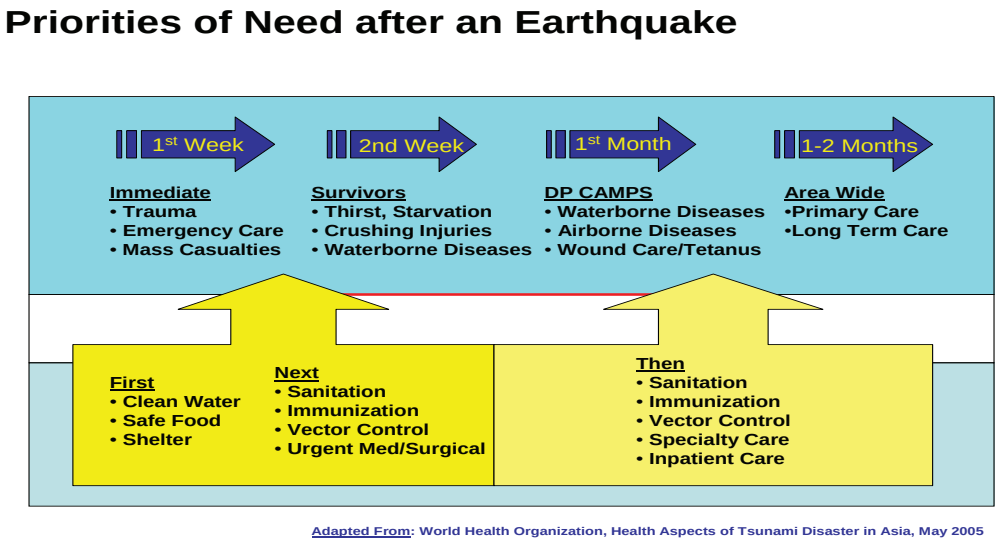

Figure 4 depicts the surgeries performed during the disaster relief effort. As can be clearly seen from the graph, the vast majority of surgical procedures performed were elective surgeries, rather than emergency procedures.

Findings

- This study indicates that the DOD medical teams stayed too long. Pakistani physicians and pharmacists were closing their offices/shops and leaving their local communities because their livelihoods were destroyed by the presence of the no-cost US medical care. Pulling from the same patient pool as local health care providers caused considerable negative fallout in the community. Local providers were angry. Physicians working at the local health care facilities were seeing one quarter of the patients they would have normally seen before the US DOD medical team arrived.
- With no international health specialist or medical planning guidance from CDAC-PAK, the standard of care for this theater was not determined or published until weeks into the operation. Had this been coordinated and published prior to deployment, units could have entered the theater with a lighter footprint and contributed to medical continuity instead of destroying the infrastructure of the local medical community. Offering the community a higher standard of care than they were accustomed to receiving resulted in negative consequences for the local community.
- Following a disaster, the first-wave of humanitarian assistance should focus on managing trauma. Most of the US medical assets arrived in-country too late to provide this type of disaster relief. The second-wave of health care is necessary to treat and control disease and infection. This is what the US medical assets ended-up doing, but it went beyond that. When the second wave of disease and infection dropped-off, the US role was to provide support in the form of augmentation for the HN health care capability. What actually happened is the US medical assets took the place of the HN health care. This caused fallout that will have a negative impact on the communities served for many years to come.
- Allowing the tasked unit to send an assessment team to assist initial disaster area assessments, communicate capabilities, and coordinate for requirements is an important consideration. Without an accurate initial assessment of medical need, visibility on requirements is severely limited.
- Focus was on intervention, not prevention.
- No measures of effectiveness were used to determine if operational goals were met.
- Tetanus is not uncommon after an earthquake. The DOD medical assets were not set-up to adequately handle/ address this concern.

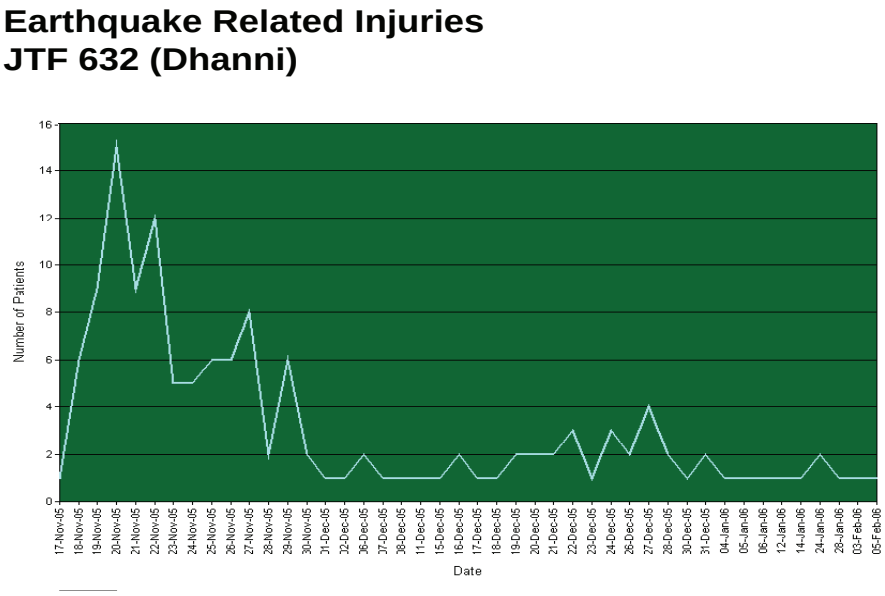

Figure 2

- No training was provided for medical planners in how to write an annex Q that is appropriate for use during HADR efforts.
- At all levels of planning, the appropriate people were not invited to assist with the medical logistics piece.

Conclusion

The Disaster Response Standards (JP3-07.6), which clearly states that US Government efforts must *"Support and Supplement Existing Medical Infrastructure,"* was not enforced. For example:

CDAC-PAK medical units provided a quality of care in excess of the pre-earthquake HN capabilities and, unfortunately, this direct medical assistance negatively impacted local economies. Once uncovered, the undesired secondary and tertiary effects were not adequately addressed and resolved.

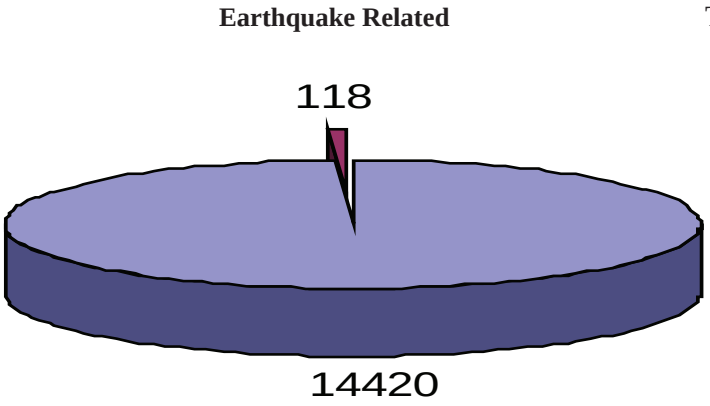

Figure 3 - Earthquake Related Patient Encounters Combined Medical Relief Team-3 (Shinkiri) 16 Nov 05 - 23 Feb 06

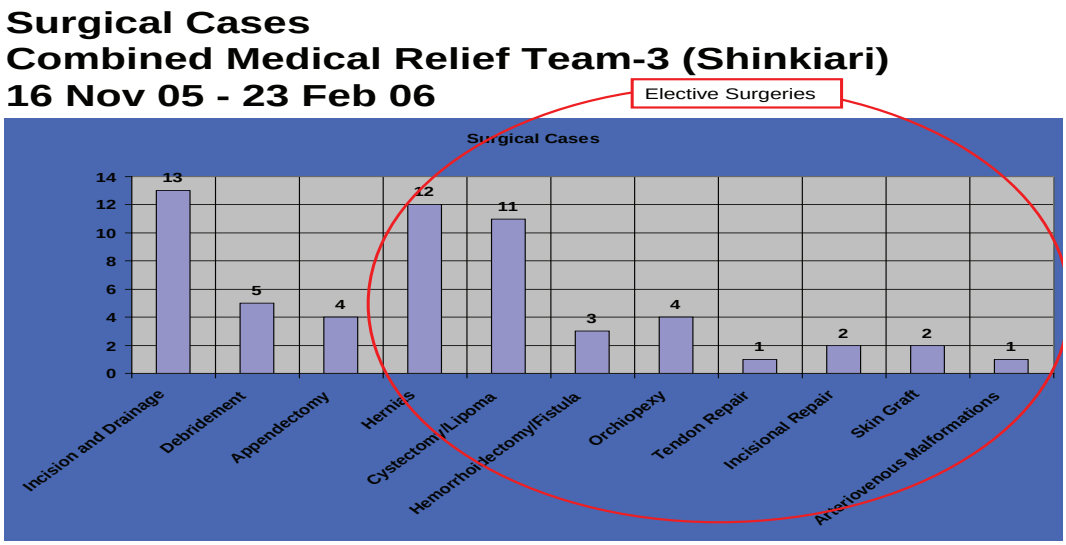

Figure 4

- Free medications undermined local pharmacies and created a pharmaceutical black market in the local towns.
- Local Pakistan physicians lost patients.
- Local Pakistan physicians and pharmacists actually relocated due to loss of work/business.

Appendix G to Joint Publication 3-07.6, Health Service Support in Foreign Humanitarian Assistance Operations, states, *"Primary consideration must be given to supporting and supplementing whatever medical infrastructure exists. No operation should be considered that would or could have the effect of supplanting the existing medical infrastructure."*

One critical role of the combatant command surgeon and JTF medical planner or physician/surgeon is to determine the standard of care that will be needed during a HADR event. The standard of care determines what capabilities, providers, equipment, and supplies a medical unit deploys with. Bringing in too much capability not only results in a larger footprint than is useful, but also upsets the local medical infrastructure. Local nationals will tend to choose free western medicine over their own providers. Providing a US DOD medical standard of care can undermine the local medical infrastructure and remove what little monetary compensation the system provides, further crippling the HN's ability to provide care following a disaster.

When the military provides a US DOD standard of care, the continuity of care may well be disrupted because it may be impossible to maintain the same regimen of care after discharge from military facilities. This makes well-intended DOD medical care a potential threat to a host nation's existing medical infrastructure. We need a standard operating procedure to ensure that this does not continue to occur in future HADR interventions.

Factors affecting the outcome of the HA mission depend on decisions made during planning and deployment. This becomes complicated when there are no medical planners or medical/surgical providers at headquarters-level to interpret information, analyze data, and provide ongoing adjustments and guidance based on information received from subordinate units.

The negative impact of the Pakistan earthquake HADR effort on the local economy could have been avoided. Throughout this operation medical information was being generated, but there was no medical person to relay information to decision-makers regarding the gap between the care DOD was providing and the care the host nation was able to provide. The results of this study indicate that for future HADR operations decision-makers would be well advised to include medical personnel with training and experience in humanitarian assistance and disaster relief in all aspects of planning for contingencies related to international capacity building efforts.

Infant being ventilated by an improvised anesthesia machine

About the authors

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Treating a young victim Combined Medical Relief Team-3 (Shinkiari)

Pakistan Earthquake Relief

MEDICAL ASPECTS OF DISASTER PREPAREDNESS AND RESPONSE:

A SYSTEM OVERVIEW OF CIVIL AND MILITARY RESOURCES AND NEW POTENTIAL

Colonel H. Wayne Nelson, Ph.D., MDDF
Captain David Arday, M.D., MPH, USPHS

INTRODUCTION

A disaster (in the federal government lexicon) is defined as a low probability, high impact event that overwhelms the local emergency resources requiring the deployment of surge capacity assets to the scene from outside the impacted area (Arday & Gaffney, 2004). In this sense, mass medical emergencies are similar to any other type of disaster preparedness and response, except that medical disasters involve human casualties. A "mass casualty incident" is a mass medical emergency that does not overwhelm local response and medical assets, though it may still be referred to as a "disaster" locally (Geiling, 2004).

The term "catastrophe" is a term of art connoting a larger scale calamity that requires a comprehensive federal emergency intervention of a proactive or largely self-directing nature. This is because the hugely degraded local first responders in the midst of a veritable social breakdown may not be able to identify or communicate accurate disaster assistance needs to higher authorities (Rude, November 1, 2005). For the purposes of this article, we will posit that typical disasters do not need a national military response, but catastrophes do (Catastrophe versus disaster, n.d.) (see Table 1).

An alternate view of large-scale emergencies is to classify them not by the cause, but by the event's impact. In this view, the two categories are populations and infrastructure; note that the term 'population' need not specifically refer to humans, but may also include pets, livestock, and wild animals (Arday & Gaffney, 2004). Obviously, saving human lives takes priority over saving animals and infrastructure, but Hurricane Katrina showed that some people died and many risked their lives to save their pets, which has led to increased attention to animal protection and relief by emergency health planners at all jurisdictional levels. Any discussion on medical disasters, however, is best served by focusing on the human population.

MEDICAL DISASTER PLANNING OVERVIEW

Response planning for a true medical disaster generally involves four functional levels: (1) local private and government emergency response, including local surge capacity; (2) initial treatment facilities; (3) local and state government departments (public health, emergency services); and (4) federal agencies. Although each level develops its own plans, the goal is to achieve functional interoperability between all levels. Ideally, plans developed at any functional level will complement those at the levels immediately above and below.

Disaster health planning can also be examined through the lens of the disaster mitigation model of ***preparation***, ***response,*** and ***recovery***, which roughly parallels the public health model of primary, secondary, and tertiary prevention. Disaster preparation, or pre-disaster mitigation (PDM), involves the development and implementation of all-health hazard mitigation projects designed to limit casualties when disaster strikes.

Table 1. Emergency Incident-Disaster Continuum

Event	Characteristics	Example
Mass casualty incident	• Local emergency response capable of handing incident • Outside assistance not required (but may be used) • Communications intact	• Crash of AA Flight 587 (2001)
Disaster	• Local response capability overwhelmed • Outside assistance required to provide for casualties, rescue, or recovery • Communications disrupted • Federal disaster declaration (usually)	• Hurricane Ivan (2004) • World Trade Center terrorist attack (2001)
Catastrophe	• Local response capability decimated • Proactive external assistance required to both handle casualties and coordinate most or all aspects of the response effort • Extensive loss of communications • Federal disaster declaration • Military response indicated	• Hurricane Katrina (2005)

Preparation: Pre-incident preparation activities include health surveillance, vulnerability analyses, and strengthening health emergency infrastructures, including the recruiting, supply, and training of first responders and surge medical reach-back personnel, as well as joint field training between emergency management agencies (EMA), emergency medical services, local emergency planning committees, academic health institutions,

and other non-governmental health service organizations [Center for Disease Control (CDC), n.d.].

Response. When a major disaster strikes, all four of the planning levels mentioned above respond by performing direct disaster mitigation during the acute phase. Responses will vary according to the nature of the emergency. A mass casualty terrorist attack, for example, will involve the transportation of seriously ill patients to intensive care and trauma programs, followed by definitive hospital care. During such events, hospitals will scramble to maximize their emergency capacity, but the inevitable overflow will trigger hospital triage, sending the walking worried and wounded to field treatment centers where fist aid and basic life support will normally be administered.

If the event involves hazardous materials (HAZMAT), then decontamination and evacuation will be priorities, followed by medical triage and treatment. The incipient outbreak of mass infectious disease may entail mass emergency inoculations, perhaps drawing upon the CDC's strategic stockpile of medical supplies if local resources are depleted. There is an almost limitless array of other possible health response objectives including, body recovery, forensic and mortuary services for mass fatalities, as well as medical transport, sanitation, and possible veterinary response and animal rescue efforts (CDC, n.d.).

Recovery: Post incident mitigation (recovery) follows the acute phase. The goal of post incident mitigation is to restore the health infrastructure to its pre-incident status and to maximize the affected population's remaining health potential. Activities include, for example, continued and even long-term casualty care, ongoing mental health reassessment and counseling, and public health program restoration, among many other long-term health objectives.

When considering recovery, a key aspect of disasters and their impact needs to be kept in mind. While acute casualties are the primary concern of medical personnel preparing for and responding to a disaster, the greater impact of most disasters within the US has been, and will likely remain, the subsequent disruption of daily life, which can extend for months or years after the disaster's immediate or acute phase. These disruptions result from: (1) loss of infrastructure and other economic after effects; (2) from heightened vigilance and psychological effects; and (3) from the loss of life and the long-term needs of the injured. More than a year after Katrina, New Orleans exhibits all three of these long-term after effects and their resultant disruptions.

All Disasters Are Local: The well-known mantra of emergency planners everywhere is the old bromide that "all disasters are local." Whether or not a disaster involves a federal response - or rises to the level of a catastrophe, mandating a federal response - the fact is the great majority of events are handled by local police, fire, and emergency responders along with community hospitals. Larger, multi-jurisdictional disasters, requiring neighboring emergency resources, are coordinated by county EMAs, which in turn can also be activated and coordinated by state emergency management agencies, through each state's emergency operation center (EOC).

State EMAs are the lead state agencies for analyzing disaster information and disseminating findings, issuing warnings, and for actually coordinating state, federal, and local private and public disaster response operations through the implementation of the first responder incident command system (ICS) in the impact area. Larger regional disasters or catastrophes require a higher-level area incident command system to coordinate the multi-tiered responses by multiple geographically coordinated ICSs.

Private and Public Disaster Response Agencies: Although this article focuses on state and federal government disaster response efforts, it bears mentioning that America's non-governmental (nonprofit or third sector) emergency response efforts represent a huge relief capacity that is crucial to all mitigation phases, but especially to the immediate post acute and long-term recovery phases. The American Red Cross and Salvation Army, for example, are easily the largest and best known of a myriad of volunteer secular and faith-based disaster response agencies. These agencies add considerable heft to disaster relief efforts by pushing out and sustaining large numbers of organized volunteers and supplies into disaster zones to provide shelter management, and food services (to both victims and rescuers), as well mental health and financial support to victims, among many other services (Red Cross builds, 2007; *American Red Cross disaster response functions*, n.d.).

Academic institutions are also crucial to disaster planning and preparedness through their general disaster research initiatives, and their research on various threats including geological, HAZMAT, engineering failures, meteorological crises and all aspects of emergency and disaster medicine.

The remainder of this article addresses medical threats across all four functional planning levels. It also discusses state and federal emergency medical system shortages and coordination problems, and examines when and what federal and state civil and military medical resources might be brought to bear during or immediately after a disaster.

CURRENT MEDICAL THREATS

Potential US mass casualty medical threats fall into two major categories: (1) natural; and (2) man made disasters. The latter may be sub-categorized as accidental or intentional

(see Table 2). In the broadest terms, and during an average year, one would expect about 1,000 US deaths and perhaps 6,000 to 10,000 injuries to occur as a result of roughly 25 extraordinary events that would be called "disasters."

Table 2. Leading Threats With the Potential to Cause Mass Casualties Within U.S. Borders and Expected Annual Death Toll, Based on Past 30 Years Experience.

Type of Disaster	Annual Expected Annual Deaths
Natural Disasters	
Hurricanes	90[a]
Tornadoes	65
Floods	85
Earthquakes	10[a]
Wildland/urban interface fires	30[b]
Volcanoes	2[a]
Heat waves and hot weather	200
Cold waves and winter storms	70
Tsunamis	0[a]
Pandemics	0[a]
Manmade Disasters	
Accidental	
Aircraft crashes	120[c, a]
Other transportation accidents	80[b]
Industrial accidents (HAZMAT, mining)	30[b]
Structural failures	10[b]
Major structural fires	30[b]
Terrorism/International	
Conventional explosive and incendiary weapons[d]	150[a]
Bioterrorism	1[a]
Chemical weapons	0[a]
Radiological weapons (dirty bombs)	0[a]
Nuclear explosions	0[a]

[a] Some years with few or no fatalities.
[b] Estimate based on events with 10 or more fatalities, only.
[c] Excludes general aviation. Expected number reduced due to declining trend.
[d] Most arson cases excluded.

Typically, there are fewer than 15 events per year that cause more than 40 deaths each (Hogan & Burstein, 2002). Yet, no year is truly average. In 2001, there were four times the expected number of deaths, due largely to the 11 September (9/11) terrorist attacks and the subsequent American Airlines crash in Queens, NY, two months later. And prior to hurricane Katrina, in 2005, expected annual hurricane deaths were only about 25 based on the previous 30 years.

Natural Disasters: Despite the recent attention to the threat of terrorist attacks, natural meteorological and geophysical disasters remain the most immediate threat and the primary cause of disaster related casualties within the US.

The deadliest point-in-time disaster in US history was the 1900 Galveston hurricane that killed 10,000 people. Although improved weather forecasting and evacuation planning greatly reduce the likelihood of another Galveston scale event, rapid coastal area population growth over the years has sharply increased the number of people at risk. Katrina's 1,800 total fatalities and tens of thousands of injured or displaced persons needing urgent medical attention prove that hurricanes remain a disaster threat. In fact, former National Hurricane Center Director Max Mayfield, worries that "10 times as many fatalities could occur in what he sees as an inevitable strike by a huge storm during the current highly active hurricane cycle, which is expected to last another 10 to 20 years" (Williams, January 3, 2007).

Conversely, in recent years, floods, tornadoes, heat, and cold waves have together killed fewer than 500 people annually, though they do so with some consistency. There have been only a handful of fatal earthquakes, only one deadly volcanic event (Mt. Saint Helens), and no tsunamis that have swept the US since 1964.

Although strong catastrophic earthquakes and tsunamis are rare, they pose the greatest potential mass casualty threat to US citizens, especially if they strike with little or no warning. Consider, for example, the New Madrid Fault Line, in the lower Mississippi Valley. In the early 19th century, it caused three of history's most powerful tremblers (measuring an estimated 8 points or higher on the Richter scale) shattering this area. Back then, however, there were very few European inhabitants in this region. Now more that 12 million people live there, many in structures that were not built with earthquakes in mind (Central United States Earthquake Consortium, 2006).

And while it is the point of some scientific debate, the Benfield Grieg Hazard Research Centre at University College London warns that a volcanic explosion on Mt. Cumbre Vie Ja on the Canary island of La Palma, could send a monstrous landside into the sea hurling an unprecedented 60 foot high (at impact) tsunami traveling hundreds of miles per hour towards the East Coast, dooming thousands to injury and death (Atlantic ocean tsunami, September 2005). Simply consider that the Asian Tsunami of 2004 killed nearly 270,000 people in the space of a few hours, a truly catastrophic event.

Despite ongoing threats from severe weather and geologic events, the deadliest disaster in US history was the 1918-1919 Spanish flu pandemic, killing roughly 600,000 Americans (and many millions worldwide). It is sobering to note that most of these deaths occurred in a few short weeks in the autumn of 1918, overwhelming hospitals, medical personnel, and morgues across the nation. A second, smaller wave of transmission and death occurred again in early 1919.

As of this writing, 270 people have contracted and 164 of them have died of the avian flu worldwide (World Health Organization, 29 January 2007). A new worldwide influenza

pandemic, perhaps caused by the emerging H5N1 strain of avian influenza, could rival the 1918-1919 Spanish flu. It would clearly overwhelm local response efforts and fundamentally devastate America's business community (Crimando, December 2006). One report estimates as many as 142 million would die worldwide and many times that number would need acute and subacute care, while economic devastation would exceed four trillion dollars (*An analysis of the potential impact*, August 2005). This would surely overwhelm America's hospitals and primary care facilities, necessitating the establishment of surge capacity sub-acute treatment in nursing homes, retirement homes, school gymnasiums, and other public and private institutions.

Furthermore, such an event would likely stifle the normal type I (neighbor to neighbor helping) response that occurs in virtually all weather and man made disasters, as the fear of contagion grips the citizenry and causes widespread "bunkering," which is a type II, isolation oriented, threat-avoidance response. Cremando estimates that in this circumstance, half of all public healthcare workers would avoid the dangers of working, despite the greatly increased need (December 2006).

Shortages of primary caregivers, acute care beds, ventilators, vaccines, and antiviral medicines–coupled with the inevitable prioritizing of patients (seemingly abandoning whole segments of society)–could further lead to a type III response, which constitutes panic. Panic "arises from two perceptions: (1) the perception of limited opportunity for escape; and (2) the perception of limited availability of critical supplies" (Crimando, December 2006). Panic destroys social cohesiveness, incites violence, looting, anarchy, murder and mayhem, and, in the worst cases, even pushes desperate caregivers to abandon or even euthanize their charges, as reportedly happened during Katrina.

To say that the range of adverse mental health effects following such a horror would be widespread is, of course, an understatement. The need for critical incident stress management teams to mitigate the serious emotional impact for those most severely affected could not possibly be met in the worse cases scenarios. And even long afterward, an estimated "11-1 percent of affected population will need long-term assistance, requiring a multilevel approach involving both some public health assets, as well as private business employee assistance programs in order to assure any chance of a normal business recovery over time " (Crimonda, December 2006).

While no influenza pandemic similar to the Spanish flu has occurred since 1919, even with today's usually effective vaccines influenza kills an average of 36,000 Americans annually (Arday & Gaffney, 2004), far more people than all of the disasters listed in Table 2. Yet, even though influenza is perennial and widely threatening, the actual percentage of those who die is very low, and extant medical resources can handle the afflicted with little difficulty. Consequently, people don't fear the annual flu outbreaks the same way as they fear the equally predictable seasonal hurricanes or tornados, or less predictable terrorist attacks - all of which are sure fixtures in our future.

Man-made Disasters: Man-made disasters are either unforeseeable accidental events, or they are deliberate attempts to kill and injure targeted groups. Accidental man-made disasters include mass casualty vehicular crashes, chemical and other HAZMAT releases, explosions, abrupt structural failures, large urban fires or suburban wildfires, and any other major unplanned event that causes or threatens acute loss or injury.

Because many such events (e.g., fatal traffic accidents) occur with high frequency but result in few deaths per occurrence, it is hard to determine how many of these episodes nationally actually constitute true "disasters" by our definition. Laymen, for example, consider a drunk driving crash that kills a carload of teenagers a tragic "disaster" for a local community, but this is not likely to require outside resources. On the other hand, a 100-car pile-up on a foggy rural interstate highway that kills 12 people and injures 30, will in all likelihood overwhelm local emergency responders making this a true disaster, albeit a small one.

Ironically, an aircraft crash that kills ten times as many people but seldom leaves anyone alive to rescue, triage, or treat, is almost always effectively managed by the local first responders. Hence, despite many more per incident fatalities such events are often characterized as mass casualty incidents as opposed to disasters (see Table 1).

A hazardous material release - chemical, biological, radiological, nuclear, or explosive (CBRNE) - in a populated area is much more likely to constitute a disaster (or in some cases, a catastrophe) than even a colossal highway pile up. The horrific industrial release that occurred in Bhopal India in 1984 killed nearly 4,000 people and injured and disabled many thousands, overwhelming India's regional (and to some extent national) resources. It required a massive international intervention of human and material medical support. Post incident mitigation (recovery) lasted for years and even entailed the funding of special medical research conferences to identify best treatment modalities for the disaster's many permanent victims (*Incident response*, 2006).

Although natural disasters remain the most consistent threat, emerging terrorist threats since 9/11 have increased the citizenry's threat consciousness and heightened sense of vulnerability, which has motivated greatly increased preparations to mitigate deliberate terrorist slaughter.

Consequently, terrorism threat planning has consumed most disaster preparedness resources in recent years. Much effort has been directed toward improved rapid detection of a bioterrorism or chemical weapons attack, improved interoperability of communications systems, upgrading of equipment for first responders, and increased planning at all levels. Despite these efforts, it remains apparent that more needs to be done to reach what might be considered to be optimal readiness.

Among the types of terrorist attacks listed in Table 2, conventional weapons and explosives are clearly the most frequently used. However, bioterrorism has already taken place twice in the US. Before the 2001 anthrax attacks, there was a 1984 salmonella attack in Oregon, initiated by a cult follower of the Baghwan Shree Rajneesh that sickened about 750 people, of whom 45 were hospitalized (Hugh-Jones & Brown, 2006). A 1995 sarin gas attack in Tokyo, Japan, sent more than 5,500 people into hospitals for assessment. A thousand of these were diagnosed as moderately to severely ill, while the great majority constituted the "walking worried" who demanded medical attention to assuage their rational anxiety about contamination (Taneda, 2005, p 75). In 1995, a Moscow businessman was killed by a direct release (as opposed to explosively dispersed) radiological attack (Cameron,1996).

Only the intentional detonation of a radiological ("dirty") bomb or of a nuclear device remains unfulfilled threats. It is clear that a nuclear attack in a major metropolitan area would be a worst case scenario and true catastrophe in terms of both total deaths and injuries, and would vastly overshadow the 9/11 attacks should it ever occur. The Homeland Security Council estimates that a modest 10-kiloton bomb detonated in Washington DC, would kill from 99,000 to 300,000 people depending on the wind drift and other factors (cited in Mintz, May 3, 2005). Mass triage would be stunningly grim as medical providers would be forced to ignore huge numbers of victims deemed too sick to recover (Mintz, 2005).

Although a detailed discussion of terrorist attack planning and response is beyond the scope of this article, a couple of points are worth mentioning. Explosive or conventional weapons, most chemical weapons, or a nuclear attack will result in immediate casualties and high patient flows. On the other hand, release of a bio-weapon or the non-explosive spread of radiological material will likely result in an incubation or latency period lasting hours, days, or even weeks. Barring detection of the attack by propositioned sensor equipment, initial identification of the attack may only be accomplished through what is called "syndromic surveillance"–essentially hypervigilence on the part of medical personnel for excessive numbers of patients with certain complaint patterns (see Table 3, below). In either type of attack, once word of the attack spreads, more "worried well" or mildly exposed patients may appear at medical facilities seeking help than truly injured victims of the attack (Auf Der Heide, 2002).

THE NATIONAL DISASTER MEDICAL SYSTEM (NDMS) AND NATIONAL RESPONSE PLAN (NRP)

The NDMS is a cooperative asset sharing partnership among the Department of Health and Human Services (HHS), the Department of Defense (DOD), the Department of Veterans Affairs (VA), and the Department of Homeland Security (DHS). NDMS operations entail a highly coordinated, multiagency local, state, and federal effort.

The statutory mission of NDMS is to organize a coordinated effort by the NDMS federal partners–working in collaboration with the states and other appropriate public or private entities to provide health services, health-related social services, other appropriate human services, and appropriate auxiliary services– to respond to the needs of victims of a public health emergency, and to be present at locations, for limited periods of time, when such locations are at risk of a public health emergency.

NDMS also provides resources and assets to support federal government activities under Emergency Support Function (ESF) #8, Public Health and Medical Services, of the NRP. Further, the federal partners agree that NDMS also continues the availability of the NDMS hospital network as backup to military and veterans' hospitals in a military health emergency.

Table 3. Symptom Patterns That May Indicate a Previously Unsuspected Bioterrorism or Radiological Attack If Suddenly Seen At a Much Higher Rate Then Usual[a]

- Gastroenteritis of any apparent infectious etiology
- Pneumonia with the sudden death of a previously healthy adult
- Widened mediastinum in a febrile patient without another explanation
- Rash of synchronous vesicular or pustular lesions
- Acute neurological illness with fever
- Advancing cranial nerve impairment with progressive generalized weakness
- Nausea, vomiting, or diarrhea accompanied by abnormally low blood cell counts

[a] Adapted from Burkle, 2002.

Prior to 1 March 2003, the HHS Office of Emergency Response functioned as the overall action agent for coordinating the implementation of health and medical services delivery in the event of NDMS activation. This included the development and oversight of NDMS medical

assistance teams, as well as the planning and coordination of patient evacuation and definitive care. With the standing up of the new DHS, however, all responsibility for the NDMS response teams shifted to the DHS Emergency Preparedness and Response Directorate–also known by its pre-DHS acronym of FEMA (Federal Emergency Management Agency)–while most of the non-NDMS related health response planning and coordination function remained in HHS. During this brief period, four cabinet level federal agencies provided oversight and support to the NDMS: DHHS, DHS, DOD, and VA (Arday & Gaffney, 2004).

This all changed on 19 December 2006, when the president signed the Pandemic and All-Hazards Preparedness Act (Public Law No. 109-417), which returned primary responsibility for coordinating the federal response to public health and medical emergencies to the HHS Secretary, effective 1 January 2007. Under this act, the NDMS will still retain its three primary functions, which are: (1) medical response; (2) patient evacuation; and (3) definitive care. Upon activation, the NDMS can respond to a disaster location with a variety of medical assistance teams. In the event of an overwhelming number of casualties, arrangements can be made to evacuate patients from the local disaster area to other areas of the United States. And, once those patients are evacuated, the NDMS has a network of approximately 1,800 participating hospitals that can provide definitive in-patient care to casualties.

Activation of the NDMS and its disaster response teams may occur as a result of five circumstances. First and foremost, is to respond to a presidential disaster declaration, under the authority granted by the Stafford Act (full title: Robert T. Stafford Disaster Relief and Emergency Assistance Act). Second, if a disaster has not occurred, HHS may activate the NDMS under its own authority in anticipation of an event, or to support a state governor's or other federal agency's request for major medical assistance. This is often done to support special events of national significance [known as a National Special Security Event (NSSE) if so designated] such as the Olympics or a national political convention, where prepositioning disaster response assets is merely prudent planning. Third, the National Transportation Safety Board may request activation to support their response to a transportation accident. This usually involves a Disaster Mortuary Operational Response Team (DMORT), to assist with victim recovery and identification. Fourth, the State Department may request NDMS activation in the event of a disaster involving US nationals overseas (e.g., an embassy bombing). Finally, the NDMS may be activated at the request of DOD, should an overseas military conflict result in an overwhelming number of casualties returning to the US.

In the event of NDMS activation, the basic operational concepts are found in the NRP which prescribes how all federal agencies mobilize resources to support state, local, territorial, and tribal government responses to major disasters or emergencies involving any type of hazard. The NRP establishes and describes policies and planning assumptions, and outlines federal actions and capabilities that can be activated to support state, local, territorial, and tribal government response efforts during a specific crisis episode. The NRP also establishes a means of facilitating federal and state coordination during response operations. This coordination is through the aforementioned ICS, which is itself part of the National Incident Management System, or NIMS. Adoption of both the NRP and NIMS is mandatory for all federal agencies, and is a prerequisite for any private or public agency applying for federal disaster or terrorism preparedness, response, mitigation, or recovery funds (Department of Homeland Security, December 2004).

The National Response Plan details how 27 federal departments and agencies along with the American Red Cross (which functions as a federal agency pursuant to this plan) will respond to a disaster or catastrophe by allocating human and material resources to the states following the president's issuance of a federal disaster declaration under the Stafford Act. FEMA steers other federal lead agency activities through the FEMA appointed Federal coordinating officer (FCO) who supervises the multi-level implementation of the plan by assigning resources and responsibilities according to the NRP's 15 ESFs, which are listed in Table 4.

US Army Major Timothy A. Doherty, 148th Medical Company, Georgia National Guard, helps an elderly man up through an opening on the roof of a flooded school near downtown New Orleans. (DOD Image Collection)

Table 4. Emergency Support Function (ESF) Areas Within the National Response Plan.

ESF No.	ESF Area
1	Transportation
2	Communications
3	Public Works and Engineering
4	Firefighting
5	Emergency Management
6	Mass Care, Housing, and Human Services
7	Resource Support
8	Public Health and Medical Services
9	Urban Search and Rescue
10	Oil and Hazardous Materials Response
11	Agriculture and Natural Resources
12	Energy
13	Public Safety and Security
14	Long-Term Community Recovery and Mitigation
15	External Affairs

Each of these ESF functions is assigned a lead agency. For instance, Mass Care, Housing and Human Services (#6), which involves the provision of food, shelter, basic first aide and so forth, is the lead responsibility for the American Red Cross. Public Health and Medical Services (#8), which involves a host of health functions from disease surveillance and control, to mass casualty triage, patient assessment, definitive care, evacuation and mortuary services, among others, is the responsibility of HHS. These two lead agencies (as with all lead ESF agencies in the NRP) have state and local level partners. The American Red Cross has state and local Red Cross chapters as well as a myriad of other local not-for-profit voluntary relief agencies to support it in a crisis. HHS will coordinate its NRP initiatives with state and county health departments, which have their own operational plans detailing their jurisdictional responsibilities to meet the primary ESF functions. An important aspect of ESF #8 involves medical surge capacity, to which we now turn our attention.

NDMS Teams

As of April 2006, the NDMS counted among its disaster response resources 100 separate response teams categorized into eight different types (see Table 5). Of these eight, the Disaster Medical Assistance Teams (DMAT) are further subdivided into specialty teams such as burn, pediatric, mental health, and crush response teams. There are also four levels of teams (see Figure 1, below) rated by their ability to field, equip, and sustain their mixed complements of doctors, nurses, EMTs, PAs, paramedics, and support personnel in the field for a stipulated period of time. For example, fully functioning, 35-member, Type I DMAT teams can deploy on short order and sustain themselves in the field for three days. These teams have met the highest readiness designation by satisfying all NDMS training, personnel, and equipment requirements, along with having prior deployment experience, including a demonstrated ability to mobilize rapidly and perform its mission under austere conditions.

Table 5. Current NDMS Response Team Assets[a]

No. of Teams	Type of Teams
	DMAT Specialty Teams
37	Disaster Medical Assistance Teams (Fully Operational/Operational)
15	Disaster Medical Assistance Teams (Augmentation/Developmental)
4	National Medical Response Teams (WMD capable)
4	Burn Teams
2	Pediatric Teams
1	Crush Medicine Team
	Other Teams
3	International Medical/Surgical Teams
2	Mental Health Teams
4	Veterinary Medical Assistance Teams
11	Disaster Mortuary Operational Response Teams (One WMD capable)
10	National Pharmacist Response Teams
10	National Nurse Response Teams
1+	Management Support Team(s) (as needed)

[a]Source: National Disaster Medical System, April 2006.

For an all out effort such as the Hurricane Katrina response, NDMS was prepared to field a total of 72 teams and had 57 teams in the field by the third day after the hurricane struck – an impressive record in the abstract, yet insufficient under the extreme circumstances.

As Figure 1 shows, not all DMAT teams are fully operational 100 percent of the time, some teams may be short of personnel or equipment, may be newly organized and still under development, or (in the case of different types of teams that are geographically collocated) may share resources with another team. In this last context, some of the NDMS National

Medical Response Teams (specialized teams trained for post weapons of mass destruction (WMD) decontamination and treatment), or the 200-member National Nursing Response Teams (NNRT) (which are primarily targeted to provide mass pre- or post-incident inoculations) share personnel and resources with geographically collocated standard DMATs. It goes without saying that such collocated teams cannot be deployed simultaneously. Figure 2 below illustrates the geographic locations (home bases) of the NDMS DMATs.

Figure 1. NDMS/FEMA Criteria for Basic DMATS

Resource: Disaster Medical Assistance Team (DMAT)–Basic

Category: Health & Medical (ESF #8)
Kind: Team

Minimum Capabilities (Component)	Minimum Capabilities (Metric)	Type I	Type II	Type III	Type IV
Overall Function (see Definition and NOTE 1)	Patient-Care Capabilities	Triage and treat up to 250 patients per day for up to 3 days without resupply	Triage and treat up to 250 patients per day for up to 3 days without resupply	Augment or supplement Type I or II team within this team's local area	Personnel may be used to supplement other teams
Personnel and Equipment Readiness	Roster Fulfillment, Equipment Loading	Upon alert, full 35-person roster within 4 hours. After activation, deployment ready within 6 hours	Upon alert, full roster within 6 hours. After activation, deployment ready within 12 hours	Upon alert, 75% rostered within 12 hours. After activation, deployment ready within 24 hours	Does not meet minimal deployable team requirements
Demonstrated Readiness	Readiness Testing and Deployment History	100% rating on NDMS readiness test in past 12 months. History of prior full deployment to austere environment	100% rating on NDMS readiness test in past 12 months	75% or greater rating on NDMS readiness test in past 12 months	Less than Type III
Personnel Standard DMAT deploys with 35 personnel for all missions (NOTE 2)	Membership Level	105 or more deployable team personnel on NDMS roster; 12 or more physicians; 3 or more of each of PA or NP, RN, RPh, and paramedic	90 or more deployable team personnel on NDMS roster; 9 or more physicians; 3 or more of each of PA or NP, RN, RPh, and paramedic	50 or more deployable team personnel on NDMS roster; 6 or more physicians; 2 or more of each of PA or NP, RN, RPh, and paramedic	Less than Type III.
Shelters, Equipment, and Supplies	Logistics Status	Full DMAT equipment cache properly managed, stored, and inventoried per NDMS requirements	Full DMAT equipment cache properly managed, stored and inventoried per NDMS requirements	Full or partial DMAT equipment cache properly managed, stored, and inventoried per NDMS requirements	Less than partial cache.
Transportation	Vehicle Status	Pre-arrangement for obtaining primary and alternate use vehicles	Pre-arrangement for obtaining primary and alternate use vehicles	Incomplete transportation arrangements	None

Minimum Capabilities (Component)	Minimum Capabilities (Metric)	Type I	Type II	Type III	Type IV
Didactic Training	Basic (Core) and Advanced Training Modules	90% completion of NDMS basic core training plus 50% of advanced training modules (By 08/05)	80% completion of NDMS basic core training plus 25% of advanced training modules (By 08/05)	50% completion of NDMS basic core training plus 25% of advanced training modules (By 08/05)	Less than Type III
Training Experience	Field Exercises (FEXs)	Participate in at least 2 NDMS approved FEXs, one observed	Participate in at least 2 NDMS approved FEXs, one observed	Participate in at least 1 NDMS approved FEX	N/A

Definition: A DMAT is a volunteer group of medical and nonmedical individuals, usually from the same State or region of a State, who have formed a response team under the guidance of the National Disaster Medical System, or under similar State or local auspices.
NOTE 1: TYPE I = fully operational; Type II = operational; Type III = augmentation/local team; Type IV = developmental.
NOTE 2: Personnel include a mix of physicians, nurses (RN), nurse practitioners (NP), physicians' assistants (PA), pharmacists (RPh), emergency medical technicians (EMT), other allied health professionals, and support staff.

Figure 1. NDMS/FEMA Resource Classification Criteria For Basic DMATs[a]

[a] The information in this figure is no longer fully current; however, the correct information is in flux and this information was posted on the NIMS website pending revision.

Although personnel or equipment shortages prevent teams designated at the augmentation and developmental (Type III and IV teams) levels from deploying effectively as a full team, they may supply individuals to supplement a standard DMAT deployment complement of at least three

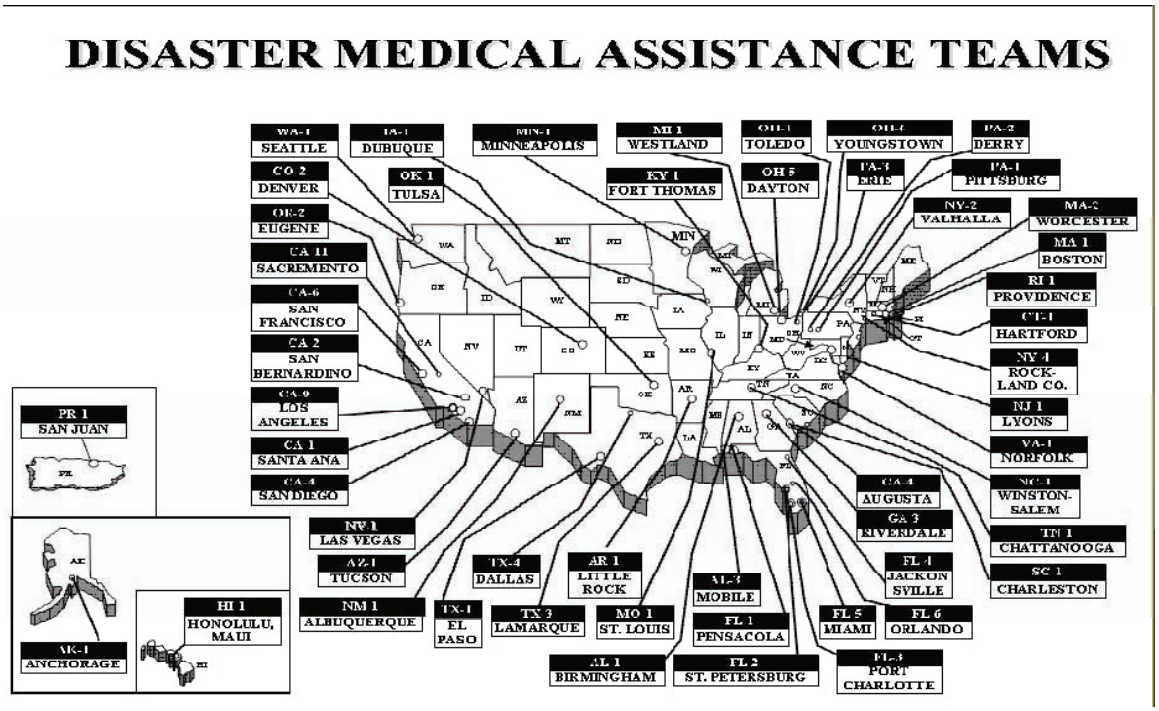

Figure 2. Geographic Distribution of Disaster Medical Assistance Teams (DMATs)

physicians, four physician assistants or nurse practitioners, eight nurses–including two supervisory nursing specialists, four paramedics or emergency medical technicians, one pharmacist, and one pharmacy assistant. Most DMAT medical professionals have training in emergency medicine or a primary care specialty, and are certified in advanced trauma life support and advanced cardiac life support. There are also several non-medical personnel, including logistics, communications, safety, and administrative personnel. To ensure the ability to muster and deploy personnel rapidly, a team should be at least three deep at each position, and a fully operational DMAT will have over 100 volunteers on its roster. In fact, some DMATs have over 200 volunteers (Arday & Gaffney, 2004).

Historically, NDMS teams were organized by a local sponsor (such as a hospital, local government, or public safety organization) under the guidance of the NDMS and HHS Office of Emergency Response. The sponsor signed an agreement with the federal government to place the team in the NDMS system when needed, and in exchange for allowing the team to gather experience through federal deployments (and reimbursing all deployment costs), the sponsor agreed to recruit, train, and maintain the team in accordance with NDMS policies. As such, many teams are active locally and serve as state or local assets in the event of a local disaster or event. Under DHS/FEMA, however, the focus moved away from dealing with the sponsoring organization as a prime intermediary and more toward dealing directly with the team and its member personnel. While this may be a perfectly reasonable approach, many teams have not existed as legal entities separate and apart from their sponsors. In some cases the sponsoring agency has been reluctant to simply walk away from its investment in their team.

Under pre-2003 HHS leadership, prior to the move to the DHS, team members were designated as intermittent federal employees who stayed in the payroll system as non-employees until they were "federalized" and compensated when deployed, or otherwise utilized by the NDMS. This methodology left intact the volunteer nature of these team members at the federal level. Under FEMA, however, team members on intermittent employee designation were considered full-time, yet uncompensated, employees and subject to all applicable federal employee rules and ethical standards. Again, while reasonable, this status change created subtle issues for many team members who wished to pursue certain activities outside of the NDMS (Arday & Gaffney, 2004).

The most critical benefit of federalization is that it allows the team's licensed medical professionals to legally practice outside the state in which their license is issued. Federalization provides team members with liability protection under the Federal Tort Claims Act, as well as federal workers' compensation coverage for the duration of the team deployment. In addition, team members are compensated at the corresponding federal civilian employee pay grade and have the same job protections as members of the National Guard (NG) and Reserves.

Depending on the mix of casualties, a DMAT can handle up to 250 patients per 24-hour period, and can initially operate for up to 72 hours without resupply. In addition to medical supplies and equipment, teams bring their own

shelter, power, communications, food, and water to sustain them for three days. However, the maximal throughput assumes that most of the casualties seen will be ambulatory and have relatively minor injuries or illnesses. Depending on the availability of evacuation (transport) assets, a DMAT can reasonably handle up to 50 seriously ill or injured patients a day, providing initial stabilization for subsequent transport to a definitive care facility. However, holding capacity is limited, and a DMAT has no surgical capability nor any integrated medical evacuation capability.

In addition to deploying to medically austere environments, such as disaster sites, DMATs and other NDMS teams can go into existing fixed facilities to assist or supplement overburdened local medical staffs. For example, following the February 2003 Rhode Island nightclub fire, NDMS burn team personnel and equipment deployed to local hospitals in the area and supplemented existing burn ward assets. Another example is found in the Fall 2004 hurricane season. In several instances DMATs were inserted outside of pre-existing hospital emergency departments and served as triage and ambulatory care facilities. This allowed hospitals to minimize their census to victims requiring inpatient care. The teams also provided clinical providers to the hospitals themselves. This allowed some hospital staff to stand down and attend to their own personal situations; a luxury they would not otherwise have had for the duration of the post hurricane recovery period.

Patient Evacuation and Definitive Medical Care

Neither the NDMS teams nor DHS/FEMA own any patient evacuation assets. Until Hurricanes Katrina and Rita, all NDMS domestic activations relied on local private and governmental evacuation resources, primarily ground and helicopter ambulance services, to move patients from NDMS triage and treatment facilities to local and regional hospitals, as required. When these resources are exhausted then military transport is usually required. In response to these two hurricanes, the NDMS evacuation and definitive care functions underwent activation for the first time; 900 patients were evacuated from facilities in Katrina's path and 1,200 from facilities in Rita's path.

The DOD has lead responsibility to evacuate large numbers of casualties from a major disaster location to other areas within the US because it owns the vast majority of patient evacuation resources within the federal government. In such an event, control of patient staging, regulating, movement, and reporting is performed by DOD, making use of the existing network of 62 Federal coordinating centers (FCC).

The FCCs, which are jointly managed by DOD and the VA, provide the link between the NDMS patient evacuation and definitive care mission functions. The FCCs are concentrated in major metropolitan areas, have access to airports or helicopter pads for patients arriving or departing by air, and have local hospital support. They have the responsibilities of providing patient reception and distribution, and coordinating NDMS definitive medical care in their assigned local areas. They also solicit local hospitals to participate in the NDMS, and coordinate with local authorities for planning purposes or in the event of an NDMS activation that would involve local medical assets.

The NDMS has a network of roughly 1,800 local participating hospitals that have made a voluntary commitment to support the NDMS and treat its patients on a reimbursable basis, as required. The DOD and VA are the two federal agencies that jointly share responsibility for executing the NDMS definitive care mission, and participating hospitals have signed joint agreements to participate in the NDMS system (all DOD and VA hospitals are automatically NDMS participants). All participating hospitals provide periodic bed availability data on a routine basis to their nearest FCC and agree to provide the same information when requested on an emergency basis. They also participate in NDMS sponsored readiness exercises (Arday & Gaffney, 2004).

Other Implications of the Pandemic and All-hazards Preparedness Act of 2006

Unfortunately, in spite of the NDMS, Katrina demonstrated that "the United States is incapable of delivering mass care" leading some to bluntly assert that the emergency medical response system is woefully inadequate, and that the NRP is nothing more than a vague aim (Rood, November 1, 2005, p.38). The worrisome state of pre-Katrina planning was glaringly reflected in the DHS Medical Director's 2005 call for another volunteer medical system to supplement the NDMS, apparently unaware that one already existed in the Office of the Surgeon General's Medical Reserve Corps (MRC) (Rood, 2005).

By the time of Katrina's onslaught, the MRC had over 400 units and 50,000 volunteers nationwide. Over 6,000 of these volunteers served in their own afflicted states during Katrina, and many others served in neighboring states, freeing up other volunteers to respond to the disaster zone (Franco, et al., 2006). However, MRC involvement might have been far more significant, except that the MRC was unable to mount a national scale response due to the structural inability of the community-oriented MRC program office to coordinate such an unplanned endeavor (Franco, et al., 2006, p.140). Still 1,500 were deployed to the disaster zone from elsewhere "through state agencies, the American Red Cross, and HHS" (Cannon cited in Franco, et al., 2006, p. 140).

FEMA's actions during Katrina also pointed out many shortcomings in operational planning and execution that

adversely affected the NDMS to a certain extent. Among the many issues that the NDMS faced following its migration from HHS to DHS/FEMA was an alteration in its basic structure and mission. For example, hospitalization at or away from a disaster site is a routine part of definitive health care and, as such, is well within the understanding and purview of HHS "the primary coordinator of the federal medical response" (Franco, et al., 2006, p.142). Conversely DHS generally, and FEMA specifically, had no clinical components or interests other than the NDMS. Another problem was that FEMA had not previously funded, nor did it have a legal mechanism to readily fund, any patient care beyond the immediate local disaster response (Arday & Gaffney, 2004).

Katrina also underlined how the "United States simply doesn't have the medical personnel to attend to large number of casualties, or the means to distribute supplies needed to provide care to thousands of sick and injured" (Rood, pp. 44-45). NDMS and all other health components, despite valiant efforts by those actually deployed, were inadequate to the task. Some NDMS teams were never called up despite being ready. Others found viable field missions but were so overwhelmed that they could only provide mass triage or the rudimentary forms of first aide (Franco, et al. 2006). One well equipped DMAT was deployed to the outskirts of New Orleans, but never received authorization to enter the city despite the tremendous need and the unit's ability to respond (Franco, et. al. 2006).

These and countless other problems led think tank and executive branch analyses to conclude that the return of the NDMS to HSS (along with other fragmented volunteer medical surge programs) was necessary. The resulting legislation–the Pandemic All-Hazards Preparedness Act–redefines, clarifies and empowers a range of federal agency health disaster preparedness roles. Among its many provisions, the Pandemic All-Hazards Preparedness Act requires the HHS Secretary to critically evaluate the NDMS and to coordinate and generally expand extant organized medical emergency surge capacity.

The Act also gives the HHS Assistant Secretary for Preparedness and Response direct oversight of all public health emergencies generally and for the NDMS system specifically. Although there is still much that is open to interpretation in this new legislation, it is clear that the HHS Assistant Secretary will ramp-up, lead, staff, and deploy not only the NDMS, but other health emergency surge responders who had not hitherto been under the HHS umbrella. It specifically codifies the Surgeon General's all volunteer MRC. Under this act, HHS will be broadly responsible for the integration of federal, state, and local emergency medical response resources whose interstate allocation shall be coordinated through the Emergency Management Assistance Compact (EMAC) [Sec. 2811(a) - (c)]. Specifically the HHS Assistant Secretary now has the authority and responsibility for the following [Sec. 2811 (1) - (2)]:

- The National Disaster Medical System
- The Hospital Cooperative Agreement Program
- The Medical Reserve Corps
- The Emergency System for Advance Registration of Volunteer Health professionals (ESARVHP)
- The Strategic National Stockpile (in collaboration with the CDC)
- The Cities Readiness Initiative

The Act also seeks to strengthen America's health infrastructure in general by funding specific public health preparedness initiatives, including increased training for public health emergency workers, upgrading health information technology, increasing emergency care facility treatment capacity, improving influenza vaccine allocation efficiency (Sec. 204), and boosting the 6,000 member Public Health Service Commissioned Corps' ability to quickly respond to federal and state health emergencies (Sec. 206), among many other initiatives.

Finally, in direct response to the Katrina shortfalls, the Act takes measures to increase surge capacity by promoting health volunteerism generally (Sec.303) and, specifically, non obligated unpaid service with the Medical Reserve Corps units at the "state, local, and tribal levels" [Sec. 2813 (a) and (b)].

THE MEDICAL RESERVE CORPS

A significant feature of this law is that it codifies the MRC, which was developed, in part, to organize volunteer medical resources to better coordinate organized volunteer surge convergence on local disaster scenes and, as a human resource backfill, to support over-extended first responders. This was also to be an antidote to the common phenomenon of spontaneous convergence of unaffiliated volunteers to disaster scenes, pursuant to the type I (neighbor to neighbor helping) response that occurs in many emergencies. In most local disasters this is a good thing, especially, for example, when unskilled laborers show up to shore the dykes or help clean up after acute flood devastation.

However, when emergencies assume such huge proportions, as in 9/11 and Katrina, spontaneous volunteer convergence is much more likely to contribute to the chaos and further burden emergency service officials, thus degrading the response infrastructure (Franco et al, 2006). Consider for example, how under catastrophic circumstances, hordes of unaffiliated and disorganized volunteers that show up during the acute or immediate post-acute phases, present profound logistical problems: who will feed, house, and protect them?; who will

coordinate their services and track their involvement?; and, who will check their credentials and their clinical skills and abilities? If nothing else, recent disasters have pointed to the need for a "coordinated system for recruiting, deploying, and managing" organized volunteer health teams as a viable reach-back force that can enhance mitigation efforts without adding to the problem (Franco, p. 135). The MRC was developed to help meet the need for such an organized and credentialed resource.

The MRC was established by the Surgeon General in 2002, as a component of the USA Freedom Corps, to help strengthen America's health, emergency service, and homeland defense infrastructure. The MRC concept is a decentralized, community based initiative intended to perform a range of self-selected emergency and non- emergency public health roles, and to become integrated into their local public health and emergency preparedness and response systems. Thus, like the DMATs, MRC units reflect partnerships between many kinds of public and private health service organizations and federal agencies. Most MRC units are sponsored by county and state health departments, but others are sponsored by academic health institutions, churches, other nongovernmental agencies, and two are sponsored by state military departments.

Unlike DMATs, MRC units are less structured, more flexible, and embrace diverse mission orientations. Although many community-based MRCs chose to develop cohesive medical and health teams to serve in a surge capacity as force multipliers for local disaster relief operations, others opted to engage exclusively in non-emergency public health promotion and disease prevention initiatives. Regardless, since MRC units are primarily local resources, they have not had to meet national DMAT-like field sustainability standards, unit size or professional mix requirements, or other "set" operational status criteria. However, the passage of the Pandemic All-Hazards Preparedness Act may change this somewhat.

While the full implications of the Act remain speculative at this time, the Act specifically guarantees that the newly codified MRC will incorporate and preserve the "established existing state, local, and tribal teams" [Sec. 2813, (b)]. On the other hand, in a marked departure from the past, the Act now calls for specific certification training standards, which was scrupulously avoided in the previous grassroots, community based "plant the seed and let a thousand blossoms grow" model.

Under the new Act, MRC teams must self-identify as to whether or not they are willing to serve outside of their communities, as authorized by their state or local sponsoring agencies [Sec. 2813. (e)]. This is not a new concept, as there is a track record of MRCs serving nationally, as illustrated below. Now, however, those willing to serve outside their community under the Secretary's direction are eligible to receive federal "travel or transportation expenses…including per diem in lieu of subsistence" [Sec. 2813. (f)].

To illustrate the full potential of the MRCs to augment surge responders during a catastrophic health crisis, we will examine a state military sponsored MRC that partnered with a large state civilian MRC, in order to provide effective emergency surge support during the Katrina catastrophe. Before we do this, however, we should examine the military's role in providing support to civil authorities during health emergencies.

Military (Medical) Support to Civil Authorities

We have mentioned in the context of the NDMS the DOD's role of providing military medical support to federal, state, and local civil authorities (referred to by the military as Military Support to Civil Authorities, or MSCA). Since 2003, guidance for this function within the US has been the responsibility of the Assistant Secretary of Defense for Homeland Defense, with implementation through the United States Northern Command (NORTHCOM), which is responsible for federal military homeland defense initiatives, including civil support for domestic medical emergencies of either a natural or human origin. Federal military support to states can occur only after a state's governor declares that a state of emergency exists and formally requests aid from the president. At this point, the president may order a military response, but such support will always be under the control of a federal civilian lead agency, such as DHS or HHS, as outlined in the National Response Plan. The military never acts as a lead federal response agency for a domestic disaster.

MSCA has three spheres of involvement in providing health related support to designated federal lead agencies: (1) military support to domestic relief operations (DRO) for natural or man made disasters; (2) support to civilian law enforcement agencies; and (3) MSCA for response to CBRNE events (*Doctrine for civil support*, 2001). Primary medical support occurs through the DRO function which includes:

> "rescue, evacuation, and emergency medical treatment of casualties, maintenance, or restoration of emergency medical capabilities, and safeguarding public health . . . the rescue or movement of people [and the]. . . recovery, identification, registration, and disposal of dead bodies" (Cechine, et al., 2004, p.38).

It bears stressing that no armed forces medical unit (nor virtually any other military unit) is fully dedicated to MSCA DRO duties (Cechine, et al., 2004). Nevertheless, military help is frequently called for. For example, the DOD

authorized 73 MSCA medical missions between 1998 and 2000 (Cechine, et al.). Most of these provided evacuation services for victims using the military's vast fleets of ambulances, helicopters, transport aircraft, and ships.

Generally, the US military prefers to receive requests for needs as opposed to requests for specific military assets (Cechine, et al., 2004) so that it can dynamically coordinate its MSCA obligations with its higher defense priorities. As a general rule, the military involvement is greatest during the acute and immediate post-acute phase, after which its involvement significantly attenuates. The military's overriding commitment to its primary defense role and its desire to avoid extended commitments of assets can lead to some misunderstandings with civil authorities.

Following Kartrina, for example, FEMA claimed that the DOD had refused some missions (which the DOD has denied) (Basu, 2006, March). Regardless, the military's need to manage its resources and safeguard its essential war-making missions may contribute to qualms that some civil authorities seem to have about requesting federal military assistance (Cechine et al., 2004). Other concerns arguably spring from simple confusion about the military's role, or entail worries about losing jurisdictional control to military "top-brass" (Cechine et al.). Experience shows that, even at the municipal level, local first responders often worry that military involvement will crowd "their lane" (Nelson, et al., in press).

At the state level, governors are quick to rely on their state military assets (the Army and Air National Guard). In fact, the reliance on the NG for state disaster response is so heavy that state governors are sometimes reluctant to allow their NG units into federal service, which happened during Katrina in Louisiana, for example. Recent changes in the Insurrection Act of 1807, however, (Peterson, 2007) make this somewhat less likely, as federal law now allows the president to call-up the federalized National Guard for "natural disaster, epidemic, or other serious public health emergency, terrorist attack or incident" in addition to its time honored role "of putting down rebellions or enforcing constitutional rights. . ." (Congress cited in Peterson, no page).

State Military Medical Assets

Governors control their National Guards based on state militia laws; however, NG units are dual hated entities with both state and federal roles. Most NG emergency service is performed during state active duty, under command of the governor as "commander-in-chief," acting through The Adjutant General (TAG) of that state. However, the president, can also order the NG into federal service as part of the armed forces, with the president as commander-in-chief, as mentioned above.

To assure that state governors will always have state military assets for civil emergencies, even when their NG is federalized and taken out of state control, which seems more likely now than in the past, Congress passed 32 USC, Sect. 109 in 1955, which allowed the states to once again (as in WWI, WWII, and before) maintain "other troops" in addition to their state NG. Federally designated as the state defense force (SDF), these "other troops" bear various working titles at the state level, but are invariably governed by the same state militia laws as the NG, with special provisions outlining their specific state-only missions. Most state statutes designate their SDF unit as the third component of their state's organized militia (along with the Army and Air National Guard). Officers in all three elements, for instance, are commissioned by the governor in their state role, pursuant to the same state militia law, although NG personnel can be called into federal service, while SDF personnel cannot. Presently, 22 states have an active SDF unit. Since 9/11, most of these are working to develop new missions and roles in response to emerging homeland defense concerns. These units typically serve without pay, although legal provisions allow remuneration for compulsive state active duty (an expedient only rarely exercised since World War II, when the SDF was known as the "state guard").

All three state military assets are available to the governor for any natural or human made disaster. As mentioned, NG support to civil authorities is famously reliable in this regard, with a long history of effectively mitigating natural disasters, including, most notably, hurricanes, tornados, floods, blizzards, and wildfires among other disasters (Priess, 2004). Since 9/11, the NG has adapted to emerging homeland defense needs as is reflected in their staffing state and territorial 22-member WMD civil support teams (CST). These WMD CSTs are responsible for supporting:

> " … local and state authorities at domestic WMD/NBC [nuclear, biological, and chemical] incident sites by identifying agents and substances, assessing current and projected consequences, advising on response measures, and assisting with requests for additional military support" (GlobalSecurity.org, n.d.)

The United States Air Force Counterproliferation Center (5 October 2006) describes how these rapid response teams are coordinated in the field by personnel housed in mobile unified command suites, replete with state of the art "real-time voice, data, and video connectivity (classified and unclassified)" that enables NG WMD specialists to keep civilian emergency service authorities apprised of whether or not a terrorist NBC threat really exists and, if so, what measures are needed to achieve maximal mitigation. Identified needs in this regard will be coordinated with the Metropolitan Medical Response System (MMRS), which, in turn, helps coordinate municipal police, EMT, hospital, fire

department, and academic institution response to WMD, as well as other major health disasters.

Despite expanded homeland security missions, natural disasters will remain the NG's MSCA mainstay into the future as it continues to demonstrate its reliable workhorse capability to respond to countless seasonal disasters at community and state levels every year. On the other hand, true catastrophes like Katrina, will quickly overwhelm state military assets, forcing the governor to request federal help pursuant to the Stafford Act. This allows the federal National Guard Bureau to coordinate the federal activation and deployment of NG assets from other states to the smitten area.

This influx of sister state NG units into a disaster zone can take a variety of command and control configurations, but suffice it to say that during major catastrophes, out-of-state federalized NG troops under NORTHCOM might well be serving alongside an afflicted state's non-federalized NG units, which usually remain under the governor's control (though not necessarily, as happened in Louisiana during Katrina). Some argue that this leads to dual command inefficiencies (Basu, 2006, March), while others counter that this allows for more flexibility at the local level. Regardless, over 58,000 Guardsmen from nearly every state responded in Katrina's aftermath, greatly relieving many thousands of stricken residents. Most of these NG troops were deployed under Title 32 (state) orders so that they would not be hamstrung by the Posse Comitatus Act if they were asked to perform law enforcement roles. Also, most of these troops went to Louisiana and Mississippi under EMAC, which left the state governors in command. Troops who were brought in under federal sway pursuant to Title 10 were effectively prevented from law enforcement duties unless martial law was declared, which it was not during Katrina.

Historically, unlike NG units, SDF units have not played a significant emergency service role, although their successful involvement in Katrina recovery efforts suggests movement in this direction. The Mississippi State Guard (MSSG), for example, provided medical care to that state's victims, as did the Texas State Guard (TXSG), which activated its Medical Command (The TXSG Medical Rangers) for in-state service (Nelson, et al., in press). Uniquely, the Maryland Defense Force (MDDF) sent over 200 regular and temporary officers and enlisted personnel (mostly physicians, nurses, and EMTs) from its 10th Medical Regiment/MDDF, under Title 32 orders, to Jefferson Parish, Louisiana, for three weeks of field duty.

The SDF-MRC Connection—a Joint Civil and Military Model

Prior to Katrina, both the Texas State Guard and Maryland Defense Force had registered with the Office of the Surgeon General (OSG), as uniformed MRC units. This gave these military organizations a name that was recognizable to civilian community emergency health planners and offered new avenues for technical support, including a gateway to participation with the Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP), (an electronic database that verifies the credentials and qualifications of participating emergency medical and allied health volunteers). MRC registration also opened doors to funding opportunities without transferring any operational or command authority from the state adjutant general to the OSG. Registration as an MRC greatly enhanced MSCA networking opportunities resulting in the MDDF's effective integration with various local and state-wide disaster response plans (Nelson, et al., in press).

The MDDF's dual role as a state military entity registered as an MRC unit with the OSG reflects a unique status, not only in terms of its federal-state relationship, but also regarding its pattern of state-local relationships. For example, the MDDF is a state agency within the Military Department of Maryland. And although it is federally authorized, it otherwise operates pursuant to the state's militia law. But it is also dual-hatted as an OSG sponsored MRC unit with a delimited MRC responsibility at the local level (Baltimore County), where it manifests under its working MRC name as the MDDF Baltimore County Emergency Volunteers (see http://www.co.ba.md.us/Agencies/health/ bioterrorism/mrc.html).

Baltimore County emergency planners can request that these emergency (MRC) volunteers be activated during a local emergency, but this must be approved by the Maryland Governor, through the state TAG who commands all state military forces. MDDF medical personnel cannot act without lawful military orders, but the MDDF's excellent (military) liability and worker's compensation insurance facilitate the TAG's support of this local MSCA mission. Also, Baltimore County planners fully understand and realize that during a statewide or national emergency the MDDF may be ordered somewhere other than Baltimore County, as happened during Katrina.

The MDDF MRC During Katrina

Although nearly 1,500 MRC members served during Katrina, the MDDF (in its dual capacity) was perhaps the only MRC unit to respond to the disaster as a cohesive internally and externally integrated unit from outside the afflicted zone. Its effectiveness was, at least partially, dependent on the last minute expedient of temporarily swearing into its ranks members of another MRC activity, the Maryland Professional Volunteer Corps, which is sponsored by Maryland's Department of Health and Mental Hygiene. The latter represents a huge pool of nearly 5,000 volunteers who

can be activated by the state health department in a health crisis, but who are not organized or trained to act as a unit.

News of Katrina's devastation and urgent need for assistance prompted Maryland's Adjutant General, Major General Bruce F. Tuxill, to activate state military department resources, including the MDDF's 10th Medical Regiment, to prepare for a humanitarian mission to the stricken area. About 30 members of the MDDF, including six physicians, seven nurses, and other health and command and support personnel were able to voluntarily break off their civilian responsibilities to quickly assemble as the first of three MDDF cadres that would augment NG and Maryland civilian first responders who were preparing to deploy to Louisiana in three NG C130J transport planes.

When this group assembled at the Warfield ANG Base, they met another 70 or so civilian volunteers from the Maryland State Health Department's pool of MRC volunteers. As indicated above, these civilian volunteers were all experienced practitioners, but had never worked as a unit before. Moreover, since there was not yet a formal request for their services through the interstate EMAC, their deployment was not completely certain. Further, without a formal EMAC request, they had no liability coverage and were not protected by workers compensation, unlike their MDDF counterparts.

NG officials, who were ready to fly the whole group to Louisiana and wanted to avoid unnecessary delays, seized upon the idea that these otherwise acephalous and legally vulnerable civilian MRC volunteers could be easily sworn into the MDDF on a temporary and entirely legal basis–allocating them military rank based on their education and civilian health credentials–and thus making them *"bona fide* state military personnel" for their term of service. This would afford them "absolute immunity from suit for any act done within the scope of their MDDF 10th Medical Regiment duties" (Nelson, et al., in press). It also provided them other military benefits if they were injured in the line of duty in addition to military air transport, billeting, security, and other forms of sustenance and supplies. Moreover, they could serve under the MDDF's experienced command personnel, gaining a sense of order, support, and accountability that was otherwise unavailable.

Although the EMAC request was eventually processed, the improvised military swearing in worked so well that during the course of the operation (5-21 September 2005) nearly 200 MRC volunteers working under the MDDF command effectively staffed up to six clinics in Jefferson Parish, Louisiana, and treated over 6,200 patients. Moreover, these (hitherto) civilian MRC members found this temporary military experience to be so positive that nearly half of them chose to stay with the MDDF on a permanent basis after Katrina.

Although a full discussion of events during this deployment is beyond the scope of this paper, this military MRC model approximates the proposal made by former DHS Security Secretary Tom Ridge's medical advisor, Dr. Jeffrey Lowell, who called for a medical surge corps "on the model of the National Guard, complete with rank and uniform" (Rood, 2005, p. 45). But, can America's state defense forces help fulfill this vision on a larger scale? Evidence suggests yes, and in the same tradition of state-federal partnerships blazed by volunteer DMATs and MRC activities that continue to hold great promise in meeting America's need for organized surge medical capacity.

How did the Maryland SDF (uniformed MRC) succeed in finding a viable out-of-state disaster relief mission, for which it had neither planned nor trained, when some NDMS teams and most MRCs were unable to? There are many reasons for this, including, no doubt, a measure of luck. But the lion's share of credit goes to Maryland's TAG and other state military department personnel who seized a new vision for state military emergency resources in a time of compelling need. Cooperation from the Maryland Department of Health and Mental Hygiene was also crucial, as potential turf concerns were swept aside to solve problems that might have otherwise taken months to resolve. MDDF commanders also deserve credit, not only for the smooth operation of this unique joint deployment, but also for finding the Jefferson Parish Mission after the first requested hospital support mission fell through.

SUMMARY

America's surge capacity medical infrastructure was in many respects launched in 1984, when the National Disaster Medical System, in a partnership between and among many public and private sector organizations and four federal agencies, emerged. Although this system has provided a critical service to those with medical needs, 9/11 and recent reassessments of the current medical threat environment pointed to emerging threats that have lead to the development of other surge responders, including the Surgeon General's MRC, reemphasis upon DOD and NG health related missions, and an incipient revival and expansion of SDF medical missions.

The recent passage of the Pandemic and All-hazards Preparedness Act presents a renewed call for organized health volunteerism generally, and is a mandate for strengthening of all emergency health preparedness initiatives, as well as a strengthening of the uniformed Public Health Service and Veterans Administration to help meet emerging medical, mental health, mortuary, and veterinary disaster response

needs. Although the nation's medical system has struggled with the jurisdictional changes since 9/11, it remains evident that America's emergency health volunteers will continue as never before to come to the aid of those with medical needs after a disaster befalls them.

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APPENDIX - LIST OF ACRONYMS AND ABBREVIATIONS FREQUENTLY ASSOCIATED WITH DISASTER MEDICAL RESPONSE

Acronym and Abbreviation	Definition
CBRNE	Chemical, biological, radiological, nuclear, explosive (event)
DHS	Department of Homeland Security
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Operations Response Team
DOD	Department of Defense
EMA	Emergency Management Agency (state or local)
EMAC	Emergency Management Assistance Compact
FCC	Federal Coordinating Center
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FRP	Federal Response Plan
HAZMAT	Hazardous materials
HHS	Department of Health and Human Services
ICS	Incident Command System
IMSuRT	International Medical Surgical Response Team
MCI	Mass casualty incident
MDDF	Maryland Defense Force
MRC	Medical Reserve Corps
MSCA	Military Support to Civil Authorities
NDMS	National Disaster Medical System
NG	National Guard
NMRT	National Medical Response Team
NNRT	National Nurse Response Team
NPRT	National Pharmacist Response Team
NRP	National Response Plan
TAG	The Adjutant General (within state military organization)
VA	Department of Veterans Affairs
VMAT	Veterinary Medical Assistance Team
WMD	Weapons of mass destruction

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Combat Stress: Posttraumatic Stress Disorder in the Military - Identification, Diagnosis, and Intervention

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Abstract

Although clearly defined in the literature, posttraumatic stress disorder (PTSD) tends to defy accurate diagnosis in a military setting. Recognition of this disorder is the first step toward helping a person who has symptoms of combat stress. Who is at risk for developing PTSD, how the signs and symptoms can be recognized, when treatment should be initiated and what the best interventions for prevention are has a strong foundation in evidence-based medicine; even though it is not widely accepted. Once an accurate diagnosis is made, management must begin in a timely manner to avoid debilitating sequelae. Treatment may involve psychotherapy, pharmacologic therapy, or both. Choosing the right approach from an array of potential treatments can be a challenge. Research indicates that although psychotherapy alone may be appropriate for mild PTSD, in cases of individuals with moderate or severe symptoms it needs to be combined with pharmacotherapy to optimize intervention effectiveness.

Although the terrorist attacks on 11 September 2001 and their aftermath have brought about increased awareness of posttraumatic stress disorder, it is not a new condition. What is now referred to as PTSD has been identified by more than a dozen labels in the past century alone. Some of the labels for combat related stress have been: nostalgia, asthenia, soldier's heart, shell shock (WWI), combat neurosis, operational fatigue-(WWII), 1000-mile stare, battle fatigue, post-Vietnam syndrome, and Gulf War Syndrome.

In fact, psychological stress, in response to wartime conditions, has been talked about for centuries. The Diagnostic and Statistical Manual (DSM-IV-TR) of the American Psychiatric Association uses the term acute stress disorder (ASD) to identify the cluster of symptoms commonly observed in a soldier with combat stress. No matter what the condition is called, if it is not treated promptly and appropriately it can progress to the potentially debilitating condition known as Posttraumatic Stress Disorder. (The current name for the disorder was codified in the 1983 edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*.)

Psychiatric diagnoses are within the top five reasons for evacuation from both Iraq (Operation Iraqi Freedom (OIF)) and Afghanistan (Operation Enduring Freedom (OEF)). During the period of 19 March 2003 to 31 July 2005, evacuations from theater due to psychiatric reasons were 6.4 percent (1267) of 19,801 soldiers from OIF and 7.2 percent (125) of 1,733 soldiers from OEF.

In 2004 alone, a combat stress clinic in Afghanistan reported 600-800 encounters per month, with approximately 17 percent of that number evacuated to Germany with the diagnosis of depression, anxiety, and PTSD. In 2006, the same clinic reported 400-450 encounters per month with 98 percent returned to duty and 2 percent evacuated to Germany. These data would reinforce the assertion that a focus on early intervention is the most effective prevention.

What is Combat Stress?

Combat stress is a psychological reaction manifested during or immediately following combat. This stress reaction typically resolves if recognized early and treated appropriately. Using basic combat stress management principles, the military health care team can provide successful intervention, with as many as 80 percent of combat stress casualties returning to duty.

Whether we like it or not, war is a constant of the human condition. In fact, more than 150 wars have erupted just in the last fifty years alone. Research conducted with combat casualties demonstrates that the most common manifestation of acute combat stress is a cluster of symptoms that are common to individuals manifesting anxiety and/or depressive disorders. Appropriate and timely intervention is the key to limiting morbidity. An important complicating factor to consider is that the concomitant use of alcohol or other drugs of abuse compound the difficulty in treating and resolving the symptoms of combat stress.

Risk Factors

To experience stress under combat conditions should not be viewed as a sign of "weakness." It can happen to normal individuals who are placed in the extreme situation of war. It is important for military personnel to realize that experiencing fear as a response to the changes that occur in a battle zone is not uncommon. It is not an indication of cowardice. However, it is also important to realize that

one can experience fear and still continue to competently perform his or her military responsibilities.

Research indicates that reserve personnel tend to be more susceptible to the effects of combat stress than active duty personnel. (Eighteen percent [18%] of individuals presenting to medical facilities with complaints consistent with symptoms of combat stress are from Reserve or National Guard units.) This is a very politically sensitive point. However, knowing this does not mean that we should avoid addressing the issue. It must be addressed so that appropriate intervention strategies can be formulated. This is a significant consideration given the current military doctrine of relying heavily upon Reserve Forces for carrying-out Department of Defense (DOD) taskings.

A review of military medical records reveal some types of military units tend to have a higher incidence of individuals who eventually develop PTSD. The data indicates that individuals assigned to support units tend to be more vulnerable to combat stress than individuals assigned to combat units.

Table 1

Factors Associated with Increased Risk of Combat Stress

- Prolonged combat duty
- Intensity of combat
- Holding a defensive position as opposed to an offensive position
- Bombardment by an enemy force
- Hunger/thirst
- Lack of planning
- Enforced passivity
- Darkness/night
- Physical fatigue
- Loneliness
- Pessimistic rumors
- Avoidance of talking about personal feelings (maintaining a stiff upper lip)
- Belief that symptoms get you out of responsibility
- Sleep deprivation (less than at least one 4-hour block of sleep in every 24-hours)

Recognizing the Symptoms of Combat Stress

It is rare that a combatant will present with obvious symptoms of combat stress. The clinical picture may vary from individual to individual. A wide range of psychiatric symptoms might be observed. More than 60 percent of combat stress casualties present with symptoms that are consistent with the diagnosis of major depressive disorder. Complaints of memory difficulty and vague somatic complaints are also common.

Regardless of the presentation, 80 percent of individuals who present with symptoms of combat stress can be returned to duty in a short period of time, if they are identified and treated promptly. However, handled poorly, one in five combat casualties end up with symptoms of PTSD that render them unfit for carrying out their typical military duties.

Table 2

Early Symptoms of Combat Stress

- Irritability
- Lost sense of humor
- Sleep disturbance
- Social withdrawal
- Personality change
- Increased nervousness, jumpiness
- Abrupt change in habit patterns, (increased cigarette/ coffee use)
- Poor performance

What is PTSD?

PTSD is an anxiety disorder that can develop after exposure to a terrifying event or ordeal in which grave physical harm occurred or was threatened. Common types of trauma that can lead to PTSD include: combat, rape, molestation, being physically attacked or threatened with a weapon, an accident, natural disaster, witnessing a traumatic event, and child neglect/abuse.

The prevalence of PTSD in the United States is 10-12 percent of the population. About 3.6 percent of US adults aged 18 to 54 years experience symptoms of PTSD in any given year. Although one in three Americans is exposed to a severe trauma at least once in their lifetime, **only one in five** of those who are exposed to a trauma **will develop PTSD**.

Given that many people may undergo the same traumatic experience—consider the survivors of the attacks on the World Trade Center towers and the Pentagon—how can a clinician predict who will and who will not develop PTSD? A recent study, revealed a 7.5 percent prevalence of PTSD among persons living in lower Manhattan one to two months after 11 September 2001. One factor that is important to consider is a person's perception of control over his or her life. Someone who feels a sense of mastery over an event for having survived, may feel more in control than someone whose sense of helplessness was reinforced by the event.

A person's stress response is another probable predictor for developing PTSD. The stress response to a critical incident (a sudden, unexpected, and potentially life-threatening event that inhibits a person's ability to mobilize adequate coping mechanisms) may set the stage for ASD which may progress

to PTSD if not treated appropriately. Research indicates that PTSD is most probably a biologically-based syndrome of maladaptive processes unique to the individuals who are predisposed to developing the disorder.

Time-line of PTSD versus ASD

PTSD is characterized by: (1) an exaggerated startle response, (2) fear-conditioned responses to cues of a traumatic experience, (3) impaired memory of the incident, and (4) social withdrawal. These symptoms appear within one to three months after a traumatizing event. One-third of those experiencing an acute stress response recover within that same three month period; one-third continue to have mild, intermittent symptoms; and, the final third continue to have persistent moderate or severe symptoms, despite treatment.

The initial symptoms of PTSD are identical to those of ASD. Therefore, when symptoms appear within four weeks of a traumatic experience and persist for longer than two days but not longer than four weeks the diagnosis should be ASD, not PTSD. A change of diagnosis to PTSD should be considered when the symptoms have been present for over one month (see Table 3 - *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*.).

TABLE 3
DSM-IV criteria for the diagnosis of PTSD

Exposure to a traumatic event in which both of the following are present:

- The individual experienced, witnessed, or was confronted with an event that involved actual or threatened death or serious injury.
- The individual's response involves a sense of helplessness or fear. (In children, this may manifest as agitation or an increased level of disorganized behavior.)

The traumatic event is "relived" by experiencing at least one of the following:

- Intrusively distressing recollections of the event. (In children younger than 9 years, it may manifest as repetitive play involving specific aspects of the traumatic event.)
- Recurrent distressing dreams about the traumatic event. (In children, it may manifest as night terrors, without identifiable content.)
- A sense that the traumatic event is reoccurring via "flashback" episodes
- Intense psychological distress in response to cues that recall the traumatic event
- Physiologic symptoms cued by recalling the traumatic event

Persistent avoidance of stimuli associated with the traumatic event and "numbing" of social responsiveness (which was not manifesting prior to the trauma) as indicated by at least 3 of the following:

- Avoidance of thoughts, feelings, or conversations associated with the traumatic event
- Avoidance of activities, places, or persons that arouse recollection of the trauma
- Inability to recall an important aspect of the trauma (selective amnesia pertaining to the event)
- Diminished interest in previously enjoyed activities
- Feeling of detachment from others
- Blunted affect (eg, inability to express emotional bonding with others)
- A negative view of the future (eg, anticipation of a foreshortened life)

Symptoms of hyperarousal (not present prior to the traumatic event) as indicated by at least 2 of the following:

- Insomnia
- Explosive behavior
- Difficulty concentrating
- Hypervigilance
- Exaggerated startle response

Symptoms have persisted for more than 1 month

Symptoms result in a clinically significant impairment in social or occupational function

Specify if :

- Acute PTSD: symptoms lasting <3 months
- Chronic PTSD: symptoms lasting >3 months
- Delayed-onset PTSD: initial symptoms manifesting >6 months after the traumatic event

Adapted with permission from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Copyright 2000 American Psychiatric Association.

Shell Shock
US Marine in action at Peleliu Island, Palau Islands, Ca. September 1944. (Navy)
DOD Image Library Collection

Only about 10 percent of patients whose symptoms meet the diagnostic criteria for ASD develop acute PTSD (symptoms that persist for at least one to three months), and 25 percent of those go on to develop chronic PTSD (symptoms that persist longer than three months). The key to prevention of PTSD is the aggressive treatment of ASD. Early recognition and intervention can prevent the progression of acute PTSD to chronic PTSD.

So called "delayed-onset" PTSD is defined as symptoms that do not appear until more than six months after the trauma. The prevalence of diagnosed delayed-onset PTSD is less than 10 percent of all cases of PTSD. However, in most cases symptoms of PTSD were actually well-documented in patient charts, but not treated at the outset. Delayed-onset PTSD is usually refractive to treatment. In fact, a person with symptoms of PTSD persisting longer than 6 months tends to have long-lasting social or occupational dysfunction. Ninety-four percent of patients who have delayed-onset PTSD will have had a documented history of untreated ASD. In other words, it is most probable that the individual's symptoms were overlooked or minimized by a clinician when they initially appeared.

Pathophysiology and predisposition

The pathophysiology of PTSD is not yet completely understood, although evidence suggests that a biological predisposition may be responsible for an exaggerated hypothalamic-pituitary-adrenal axis response to trauma. Evidence suggests that an alteration on chromosome 5 may be a causative factor in the exaggerated startle-response found in individuals who appear to be predisposed to PTSD.

This alteration tends to run in families and may be related to an abnormal regulation of the neurotransmitter gamma-aminobutyric acid (GABA). An exaggerated startle-response is a key symptom of PTSD. It was originally assumed that the exaggerated startle-response commonly observed in individuals diagnosed with PTSD was a stress reaction resulting from the critical incident triggering the PTSD. However, studies of over 10,000 Israeli soldiers, comparing inductee data records with data status post being diagnosed with PTSD, indicate that the individuals who eventually manifested symptoms of PTSD tended to have a more exaggerated startle-response than the soldiers not developing PTSD. An exaggerated startle response in a person who has not been exposed to trauma may suggest a predisposition to PTSD—such a startle response is reported in 86 percent of patients who have the disorder.

The role of 5-HT (serotonin) in PTSD is not fully understood. However it is known to have a significant role in the body's response to stress by inhibiting serotonin synthesis. The irritability frequently manifesting in individuals with PTSD (a common symptom of stress) may have a genetic basis.

Imaging studies (performed post-trauma) have demonstrated hippocampus atrophy in persons who manifest PTSD, but not in those who have no symptoms of PTSD, even though both groups experienced equivalent trauma. It is not known whether atrophy is caused by a traumatic experience or is seen only in persons who are predisposed to glucocorticoid or catecholamine hyperactivity in response to stress. The scientific community's understanding of the neurobiological consequences of, and pathophysiologic responses to, extreme stress is incomplete. However, it cannot be argued that even without knowing the exact cause of hippocampus atrophy appearing on imaging studies of individuals with PTSD, the atrophy does **not** appear on the brain scans of trauma victims who do not develop PTSD.

A person who has PTSD will tend to respond to cues of the trauma with rises in blood pressure and heart rate, and with reduced skin conduction. Slow skin conduction and elevated heart rate in response to stress may indicate a biological predisposition to PTSD mediated by the stress hormones cortisol and epinephrine. This suggests that the development of PTSD in trauma survivors is related to neurobiological processes and not, exclusively, to the traumatic experience. Persons who have higher than normal resting heart rate appear to be more likely to develop PTSD than individuals with lower resting heart rate.

An elevated cortisol level may be a risk factor for PTSD. The incidence of PTSD is highest among persons who have a history of depression or a family history of psychopathology, particularly depression or anxiety.

What we know about predicting the development of PTSD is that:

- PTSD is not an inevitable result of exposure to severe trauma
- Not every person has the same stress response to equivalent trauma
- Some persons are more predisposed than others to PTSD.

PTSD and personality

A person's attitude toward expressing emotions and his locus of control may suggest whether or not that person will develop PTSD. Someone who has negative beliefs about expressing emotions is more likely to develop PTSD than one who is willing to explore and express emotional responses to stressful situations. One's personality characteristics can influence cognitive processing following a traumatic event. For example, the decision to seek help for emotional turmoil after a traumatic event may be stifled in an individual who is less willing to talk about feeling responses to a distressingly critical incident.

Locus of control refers to a person's perception of what controls his life: outside forces (external) or the self (internal). Research indicates that an external locus of control is a predisposing factor for PTSD.

Five characteristics of personality have been shown to be associated with the development of PTSD:

- A negative view of the self and others
- Negative expectations and beliefs about life
- Shyness or inhibited and withdrawn behavior
- Avoidance used as a primary coping mechanism
- Focusing on negative emotions.

Comorbid conditions

PTSD is associated with higher rates of hypertension, asthma, and peptic ulcer disease. Persons with PTSD are three-times more likely to have major depressive disorder, another anxiety disorder, a personality disorder, or a substance abuse disorder (see Table 4). Someone with PTSD is 90 times more likely to have a somatization disorder than a person who was exposed to the same trauma, but who does not have PTSD. Sixty-two percent to 91percent of persons who have PTSD will meet the diagnostic criteria for at least one additional disorder as described in the latest edition of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. (DSM-IV-TR),* and 35 percent will meet the diagnostic criteria for two *DSM* disorders. At least 50 percent of persons who have PTSD have a history of depression.

TABLE 4
Comorbid conditions existing prior to onset of PTSD*

Condition	Percentage
Major depressive disorder/bipolar disorder	95
Substance abuse or dependence	28-52[†]
Panic disorder/agoraphobia, generalized anxiety disorder, obsessive-compulsive disorder	15.8
Somatization disorder	24.7

*Two or more preexisting comorbid psychiatric disorders are present in 75% of persons who have posttraumatic stress disorder.
[†]% women, 52% men.

Data from Brady KT, Killeen TK, Brewerton T, Lucerini S. Comorbidity of psychiatric disorders and posttraumatic stress disorder. *J Clin Psychiatry*. 2000;61(suppl 7):22-32; Breslau N. Outcomes of posttraumatic stress disorder. *J Clin Psychiatry*. 2001;62(suppl 17):55-59; Kessler RC, Sonnega A, Bromet E, et al. Postraumatic stress disorder in the National Comorbidity Survey. *Arch Gen Psychiatry*. 1995;52:1048-1060*;* Solomon Z, Bleich A. Comorbidity of posttraumatic stress disorder and depression in Israeli veterans. *CNS Spectrums*. July-August 1998;3(suppl 2):16-21.

A common assumption that rescue workers and professionals who work with trauma victims are at greater risk of developing PTSD than the general population is unfounded. Brain research indicates that chronic exposure to stress actually triggers a message to be sent to emotional receptors in the brain that turns-down the body's hyperarousal to stressful situations in order to protect the body from too much cortisol stimulation. In other words, if a person has a job with frequent exposure to stressful situations the brain sends a message to the adrenal gland to taper-off the secretion of cortisol in response to stress. This mechanism is designed to protect the system from damage produced by an over-abundance of stress hormone circulating in the blood that might cause organ damage. Therefore, a rescue worker or health care provider caring for the wounded who develops PTSD is one who most likely carries one or more risk factors for developing PTSD.

Clinical Assessment

Distinguishing normal adjustments to a distressing situation from an acute stress reaction that can advance to PTSD is important. An accurate diagnosis may be a challenge.

Symptoms—although clearly defined in the DSM-IV—may be masked by physiologic complaints or a separate psychologic disorder. A Service member may complain of panic attacks that result from an inability to stop reliving the event and may be accompanied by tachycardia [rapid heart beat]. ASD/PTSD should be suspected in personnel who describe avoiding situations that trigger a memory of the traumatic event; especially if the triggering situations were previously pleasurable. The diagnosis should also be suspected in Service members who appear to be hyperaroused and hypervigilant; or who talk about re-experiencing the event.

Obtain a detailed pre-trauma history and assess the Service member's adjustment since the traumatic event. The pre-trauma history should identify any mental health conditions that could predispose the individual to PTSD. Evaluate the startle response and heart rate, which are two clues to the presence of PTSD. If possible, compare the heart rate to the patient's prior recorded heart rate. Because another risk factor for PTSD is "survivor guilt" when others have died, ask the patient whether he or she feels guilty for surviving.

If a person has been exposed to a traumatic event, has a history of trauma, and an elevated resting heart rate, he should be considered at-risk for developing ASD or PTSD, and be monitored biweekly for three months post-exposure.

PTSD should be considered when anger is an initial presenting symptom after trauma because anger suggests that a person has difficulty dealing with feelings about the trauma. A person who responds to trauma with intense anger will respond less favorably to therapeutic interventions. A person who openly demonstrates emotional distress in response to a trauma will likely respond well to intervention and not develop long-term sequela.

Effective intervention strategies

Early intervention

Whether or not a Soldier/Marine/Sailor/Airman will develop ASD that resolves within four weeks of the event, or progresses to PTSD, may be directly influenced by whether or not the individual receives appropriate crisis intervention immediately after the initial on-set of symptoms.

A crisis situation (defined as an acute response to a critical incident-traumatic event, or stressor) in which a person shows evidence of distress or dysfunction will not always be readily apparent. Typically, crisis intervention (psychological support to minimize distress resulting from a crisis situation) is initiated at the first signs of a stress reaction. Research indicates that early intervention reduces the chance that ASD will develop and reduces the chance of its progression to PTSD.

Effective early crisis intervention begins with:

- Recognizing that a person is in distress
- Acting quickly to minimize escalating distress
- Eliminating or reducing current symptoms
- Restoring functional capability

To help personnel overcome and resolve symptoms of PTSD, health care providers can use various techniques—from simply listening, to helping a person express emotions, to recommending group dynamics, psychotherapy, and/or pharmacotherapy.

Intervention Strategies

It is imperative that combat stress casualties be initially treated at the 1st Echelon of Care (1E) and 2nd Echelon of Care (2E) and not wait to be treated at a 3rd Echelon of Care (3E) facility. If treatment is not successful at levels 1E and 2E, rapid recovery of the individual and return to duty is rarely successful. Treating these casualties at a 3E facility puts them at high-risk for developing long-term psychiatric problems. The longer combat stress symptoms persist, the more likely they will become incorporated into an individual's personality and result in chronic PTSD.

1st Echelon of Care

Treatment is basically prevention. Periodic rest and support is key. Previously referred to as: "3 hots and a cot." (During the Vietnam War, combatants typically spent two weeks in the field then three days rest and recuperation in a support base as prevention against combat stress.) Initiate crisis intervention immediately! Do not wait for evacuation.

2nd Echelon of Care

If an individual is displaying signs of combat stress and the decision is made to send him to 2E, treatment should be brief; no more than three days. Then the individual should be returned immediately to his unit. Treatment should be done in a location separate from the hospital. This decreases self-identification as a "sick" person. Provide the care as close as possible to the individual's unit. This maintains bonding with the unit and allows friends to visit. The need for care must be identified early, rather than waiting for the individual to manifest a complete clinical picture.

Don't wait for psychiatric consultation to initiate treatment or for evacuation to another facility. It must be clear to the individual, through verbal and nonverbal messages from professional staff and the chain-of-command that he or she will be returning to duty in a few days. Avoid referring to the condition as an illness. This is a transient stress reaction and one from which recovery is usually assured. The individual has been temporarily overwhelmed by stresses. Help strengthen the military self-image by requiring the wearing of the uniform during the day and by symbolic duties such as calisthenics, drill, or area clean-up. The goal of treatment is to restore the individual to combat readiness, not to do any deep psychological work. Rest, reassurance, and "exhortation" will help in restoring the individual's ability to deal with the stresses of combat. **Research has demonstrated that this approach typically results in an 80 percent "cure" rate. (i.e., return to duty)**

Shell shocked
British soldiers in WW I (DOD Image Collection)

Table 5

GUIDELINES FOR 2ND ECHELON OF CARE

Follow the BICEPS approach to treatment:

Brevity.....……Keep the treatment brief. No more than three days in length.

Immediately..……Start treatment as soon as symptoms become apparent.

Centrally…….....Keep stressed combatants close together for mutual support.

Expectancy……...Expect that stressed individuals will recover.

Proximity……..Treat near unit.

Simplicity……..Treat only stress reaction, not somatic symptoms and avoid psychotherapy.

Soldiers who are unable to return to duty within three days of being at a 2E level of care should be considered for evacuation to a 3E treatment facility. This treatment area must continue to identify the victim as a soldier/marine/sailor/airman–not a patient. Rest, drill, organized sports, and other activities must be part of the primary therapy.

Key Treatment Points to Consider:

1. Primary emphasis is on returning the individual to duty.
2. Individuals with combat stress must be treated as soldiers, not patients. The constant message **must be** "You are not a coward, you are not sick, you are just worn out and you will be all right in a day or two."
3. Group "therapy" for individuals with combat stress should only focus on learning how to use words to express feelings, not to discuss intellectualizations about what events they experienced. Group meetings should also be used to assign details or make duty schedules.
4. Research indicates that individual psychotherapy is no more effective than group dynamics.
5. Visits from friends in the soldier's unit should be encouraged.
6. The soldier should be allowed and encouraged to visit his/her unit.
7. The use of medication should be minimized. (Medication reinforces the patient role.)

Avoid Inappropriate Intervention

This type of casualty places special pressures on medical personnel. "War is hell" and these soldiers will want to talk about the horror they have experienced. Medical personnel are in the business of taking care of people and the natural inclination is to remove the person from danger. There are three arguments against this approach to intervention.

1. The decision not to return an individual to combat means making a decision to send someone else. The negative aspect of this is that a replacement, not being psychologically bonded to the unit, tends to be at greater risk of becoming a casualty than someone who has a history of personal identity with the unit.
2. If no replacement is sent, the unit is at greater risk of having more casualties.
3. If the individual is evacuated, he/she is in the category that has a higher probability of developing chronic PTSD. The guilt associated with leaving ones buddies behind can be extremely debilitating. Sending this individual to the rear is doing him no favor.

When appropriate, the provider can employ the following crisis intervention techniques:

- Listen
- Encourage the person to express emotions, not stories about the stressful event
- Teach relaxation techniques that can help the person feel in control of his stress response
- Encourage desensitization by helping the person confront situations that trigger a stress reaction
- Activate memories that stimulate the victim's stress reaction to the traumatic event
- Educate victims about the role of the autonomic nervous system in overcoming distress
- Help the person find resources such as a support group
- Correct the person's irrational and incongruent, negatively focused memories of the trauma
- Encourage self-reliance.

Research indicates that the ability to talk about the negative emotional impact of a traumatic event is crucial in recovering from ASD or PTSD. A person can gain a sense of self-control by openly discussing his emotional response to how the event has affected his or her personal life. Group therapy is useful for helping the individual avoid isolation and the emotional numbing that is characteristic of PTSD only if the facilitator guides the group to keep the focus on feelings, rather than events.

A preexisting negative attitude toward emotional expressiveness can be a risk factor for developing PTSD after a traumatic experience. The clinician can help a patient understand that suppressing an emotional response to a trauma might exacerbate the symptoms that he or she is trying to avoid and can, ultimately, slow or prevent recovery.

Psychotherapeutic intervention

The goal of psychotherapeutic intervention is to attenuate or reverse debilitating symptoms, promote positive emotional growth, and foster self-awareness. Helping the patient achieve self-determination is the top priority. Once ASD has progressed to mild PTSD, psychotherapy can be an appropriate intervention. Psychotherapy with pharmacological interventions should be used in moderate to severe PTSD.

Psychotherapeutic interventions include management of anxiety and exposure therapy techniques. Anxiety management (helping the patient cope with stress) includes relaxation training, assertiveness training, training in how to use positive self-talk, and deep-breathing retraining. The goal is to block the obsessing on negative thoughts. Weekly psychotherapy during the first few weeks of treatment is most effective.

Exposure therapy (desensitization) helps a patient confront situations, people, objects, or emotions associated with a traumatic experience. It may reduce the risk of PTSD becoming a chronic debilitating condition. In exposure therapy, a person is encouraged to recall the traumatic event in detail until he (or she) no longer experiences immobilizing distress. Because exposure therapy is less effective in someone who has chronic PTSD, appropriate intervention should begin as soon after the trauma as symptoms appear.

Pharmacotherapy for PTSD

For moderate to severe symptoms of PTSD, pharmacotherapy is an appropriate first-line treatment in combination with psychotherapeutic interventions. Medication monitoring—assessing the patient's response to the agent and dosage and adjusting dosage as necessary—should occur weekly for at least the first three months of therapy.

In selecting a treatment, consider which of the appropriate agents will best control the core symptoms of intrusive thoughts, avoidance behavior, emotional numbing, and hyperarousal. Think also about which drugs will reduce associated disabilities, minimize exacerbations, and control comorbid psychological disorders (see Table 6).

Although an inadequate response to pharmacotherapy may warrant a dosage increase, a partial response to the maximum safe dosage should be followed by the addition of another agent, rather than a switch to a different medication. For example, if only marginal improvement is observed with a selective serotonin reuptake inhibitor (SSRI), assess the

TABLE 6
Targeting pharmacologic therapy to prominent symptoms of PTSD

Symptoms	Recommended agents	Consider also
Difficulty concentrating	SSRI,* venlafaxine	Tricyclic antidepressant, duloxetine
Dissociative symptoms	†	SSRI, venlafaxine, duloxetine, antipsychotics
Flashbacks	SSRI, venlafaxine	Tricyclic antidepressant, duloxetine
General anxiety (hyperarousal, hypervigilance, startle)	SSRI, venlafaxine	Tricyclic antidepressant, antiadrenergic agent, buspirone, benzodiazepine,
Guilt, shame	SSRI, venlafaxine	Tricyclic antidepressant, duloxetine
Intrusive thoughts	SSRI, venlafaxine	Tricyclic antidepressant, duloxetine
Irritability, anger	SSRI, venlafaxine	Mood stabilizer, antiadrenergic, tricyclic antidepressant, duloxetine
Numbing, detachment from others, loss of interest	SSRI, venlafaxine	Tricyclic antidepressant, duloxetine
Sleep disturbance	Trazodone (Desyrel)	Zolpidem, diphenhydramine, tricyclic antidepressant, antiadrenergic
Trauma-related fears, panic, and avoidance	SSRI, venlafaxine	Tricyclic antidepressant, duloxetine, benzodiazepine

*** SSRI,** selective serotonin reuptake inhibitor (sertraline, paroxetine, fluoxetine, fluvoxamine, citalopram).

† None target these symptoms.

Adapted with permission from Foa EB, Davidson JRT, Frances A. The Expert Consensus Guideline Series. Treatment of posttraumatic stress disorder. *J Clin Psychiatry.* 1999;60(suppl 16):18.

person's symptoms; if irritability is a problem, consider adding a mood stabilizer or an anticonvulsant. If delusional thinking, flashbacks, or dissociative symptoms are prominent, consider adding one of the atypical antipsychotic agents.

Before deciding that symptoms are not responding to a prescribed agent, consider whether the dosage is appropriate and whether you have allowed enough time for the agent to work. At least six weeks of therapy at an appropriate dosage may be necessary for full effects to be achieved.

The SSRIs escitalopram, sertraline, paroxetine, fluvoxamine, citalopram, and fluoxetine; and the antidepressant agents venlafaxine and duloxetine are the first-line pharmacologic interventions regardless of presenting symptoms. Combination therapy should be considered in the presence of comorbid conditions not controlled by the initial agent.

The SSRIs can dramatically reduce symptoms of PTSD and common comorbid conditions. For example, an SSRI may help someone reduce alcohol consumption—an important consideration given the high rate of alcohol abuse among persons who have PTSD. SSRIs are effective in treating the depression and anxiety that may accompany PTSD.

For patients who have severe symptoms of PTSD, the antidepressants mirtazapine, duloxetine, and venlafaxine have been shown to relieve the primary symptoms of PTSD and associated depression as effectively as the SSRIs.

The anxiolytic buspirone is a useful adjunct if symptoms of hyperarousal persist with the use of an SSRI or a serotonergic antidepressant. Buspirone is the only anxiolytic available that does not produce tolerance with extended use.

Mood stabilizers and anticonvulsant agents have demonstrated an antikindling effect that may reduce irritability, anxiety, and hyperarousal. The anticonvulsants valproate and carbamazepine can reduce hyperarousal and avoidant behavior. A narcotic antagonist such as naltrexone may be useful to alleviate the numbing symptom of PTSD.

The newer atypical antipsychotic agents: aripiprazole, olanzapine, quetiapine, risperidone, and ziprasidone may be useful for someone with PTSD who demonstrates low self-esteem, social isolation, physical aggressiveness, or trauma-related delusions.

Second-line agents

The tricyclic antidepressants (TCA) are less effective than SSRIs at controlling symptoms of PTSD, and the side effects of TCAs are not well-tolerated. An agent from this class should be considered only after all SSRIs have been determined to be ineffective. Monoamine oxidase inhibitors (MAOI) such as tranylcypromine, or phenelzine should be used with caution because of the potential for drug interactions and the mortality risk associated with noncompliance with dietary and alcohol restrictions.

The beta-adrenergic antagonists (e.g., propranolol) and alpha-adrenergic agonists (e.g., clonidine) effectively reduce arousal symptoms of PTSD. **Propranolol may, however, intensify symptoms of depression in someone who has a history of depression.**

Although **benzodiazepines** (alprazolam [Xanax], clonazepam [Klonopin], lorazepam [Ativan]) are often prescribed for the treatment of PTSD, their **efficacy against core symptoms have not been proven**. These agents can reduce symptoms of anxiety, but they may interfere with a person's responsiveness to psychotherapy **and tend to intensify comorbid depression**.

Over the long term

Once the patient has responded adequately to treatment, a maintenance phase follows. Someone who has mild acute PTSD should be seen by a clinician every two weeks for three months to review progress. A person whose moderate or severe PTSD is well-controlled by pharmacotherapy should continue taking the drug, or drugs, for at least 12-months and be seen monthly for medication monitoring (see Table 8). Psychotherapy in combination with an appropriate agent should be maintained for as long as symptoms persist. In cases of referral for psychotherapy, communication between the primary care provider and psychotherapist is vital to effective medication monitoring.

Table 8

Reasons to continue pharmacotherapy
• Persistent symptoms
• High risk of suicide
• Comorbid condition
• New stressors
• History of violent behavior
• History of severe, chronic expression of PTSD symptoms
• Inadequate social support

A person who has been previously diagnosed with chronic PTSD should be seen by a health care provider monthly for one year for medication monitoring, even after all symptoms have abated, and every three months for one more year thereafter. Consider referral to a psychiatrist if symptoms remain or reemerge. Referral is appropriate when the clinician is unsure of the appropriate treatment, or when the patient is not responding to interventions.

Prevention

Does early intervention work with combat stress casualties? The data indicates that the answer is a resounding: YES. Unit cohesiveness is key to prevention and motivation of personnel. Stress is intensified when personnel perceive that their military efforts are futile. Commanders need to be educated as to what constitutes a normal reaction to the stress of deployment and combat.

The key to prevention of combat stress progressing to PTSD is to aggressively treat ASD so it does not progress to PTSD. Search for ways to toughen each combatant's ability to face the stresses of war. Exposing personnel to direct experiences of stress using simulated danger can be a useful tool to facilitate this. The more confidence that is built into the individual, the less energy is needed to worry about performing duties during combat. Each soldier must be confident that he or she has the ability to carry out his/her professional duties correctly, whether in a simulated situation or under battlefield conditions. Confidence in ones abilities reduces fear substantially. In some instances the stressors in a support unit could be more intense than the stresses on the "front-lines," because support personnel see the casualties from the front lines who are channeled, for care, through support units. This may provoke "survivor's guilt." Support personnel may grow to feel guilty for being less "in harms way."

Sleep deprivation can be a significant contributor to combat stress. To minimize the risk of personnel acquiring symptoms of combat stress, a soldier should be provided the opportunity to have at least four hours of sleep in every 24-hour period.

Not many people of the current generation have ever seen dead or dismembered bodies. Realistic training must prepare and harden soldiers for this inevitability of war. Combat stress, if responded to improperly, will represent a large manpower loss. The average number of stress-related combat casualties is one for every three soldiers who are wounded in action (WIA). If identified and treated properly, 80 percent or greater of these casualties can be returned to duty in a short period of time. Manifesting a temporarily disabling stress response to a combat situation can be a normal reaction to an abnormal situation. The most important thing to remember is - **"If they aren't physically hurt, don't evacuate them."**

Table 9

Prevention Considerations

• Commanders should ensure all members get a minimum of four hours uninterrupted sleep within every 24-hour period. (This is important to provide adequate REM and Delta sleep.) • Do not talk about "how tough it is." • Treat stress symptoms early. • Watch for symptoms of poor morale.

Table 10

Factors Associated with Decreased Combat Stress

- High unit morale and cohesion
- Good mail service
- A sense of winning the war effort
- Adequate training
- Rotation of troops
- Keeping busy
- Understanding why one is fighting the war
- Believing that the war is a just cause
- Knowledge of how the fear mechanism works
- Good leadership

We must help combatants to understand that it is okay to feel fear. To feel fear without losing focus on the mission will help the team succeed in obtaining its military objectives.

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DEVELOPING VIBRANT STATE DEFENSE FORCES: A SUCCESSFUL MEDICAL AND HEALTH SERVICE MODEL

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The Katrina disaster spiked concern among Federal planners that "the United States is incapable of delivering mass care ... the emergency medical response system is woefully inadequate" (Rood, 2005, p. 38). Katrina starkly revealed numerous holes in our ability to deal with mass casualties, including the lack of any "coordinated system for recruiting, deploying, and managing volunteers" who invariably show up at crises, often only to add to the chaos (Franco, et al., 2006, p. 135). In this article we present a significant counter example to these uncoordinated, impaired, spontaneously converging volunteers by documenting how well trained and highly disciplined state defense force (SDF) medical units can provide basic to mid-level acuity medical capacity to augment overwhelmed first responders during mass casualty events.

One such unit, the Maryland Defense Force (MDDF) medical command [now the 10th Medical Regiment (10MEDRGT)], served with distinction during the Hurricane Katrina crises when called up by Maryland's Adjutant General, Major General Bruce F. Tuxill, as approved by Governor Robert L. Ehrlich, Jr. During the two and one-half weeks they were deployed in the field, the 10MEDRGT provided a variety of medical services for more than 6,000 injured and suffering patients at six MDDF field treatment stations.

The success of the Maryland Defense Force demonstrates that these virtually unknown state military organizations [which are lawful reserves to their state National Guard (NG)] can, under proper direction, provide much needed surge medical capacity to first responders who are quickly overwhelmed in large scale crises like Katrina (Rood, 2005). The need for a sufficient and reliable source of cohesively organized emergency medical volunteers is too great to have to rely on the spontaneous unaffiliated volunteers who converge on disaster scenes, only to become part of the problem. Instead, why not expand SDF medical commands which are well situated to ramp up in order to provide this organized surge capacity manpower. This can happen if SDFs conduct two major activities. First, they must exploit the sense of national jeopardy that, research shows, stirs volunteerism in the wake of critical events like Hurricane Katrina and 11 September 2001 (9/11). And second, they must recruit and organize medical professionals into cohesive SDF medical units.

Predictably, emergency service volunteerism has increased dramatically since 9/11 and Katrina Penner, 2004). This spike of pro-social enthusiasm was evident in many emergency service organizations, including the uniformed, paramilitary auxiliaries of the Armed Forces of the United States: the US Air Force's Civil Air Patrol (CAP) and the US Coast Guard Auxiliary (CGAUX). The CAP fields more than 58,000 volunteers and flies 95 percent of the nation's air search and rescue missions, while the CGAUX utilizes another 32,000 volunteers in, among other duties, critical waterborne civil preparedness roles. These auxiliaries are more or less subject to the direct control of the armed forces that parent them, and have no official ties to the states in which their members serve.

Volunteers also flocked to the state defense forces, which are a grossly "overlooked asset" that provides an opportunity for citizens to serve in a less demanding military environment than the Federal Active or Reserve Forces (Bankus, 2006). SDFs are lawful militias, not to be confused with the unofficial groups of political malcontents who usurped the title "militia" in the mid-1990s. Instead, SDFs are explicitly sanctioned by Congress, pursuant to the provisions of the US Constitution prohibiting the states from maintaining troops other than the NG (as the state militia) without Congressional approval. As such, SDFs are housed in state military departments and legally subject to military discipline and state codes of military justice.

SDF Purpose and Roles

Adjutants General and their SDF commanders, who desire to provide their states with enhanced emergency medical resources, can take advantage of the emotional impact caused by events like Katrina and 9/11 that research shows spurs the public to seek opportunities for meaningful participation when communities face the need for mass casualty disaster relief operations (DRO). If SDFs can adapt to this new reality, then the desirable goal of finding and keeping sufficient volunteers to make these state forces a truly effective means to help relieve states facing domestic emergencies.

To a large extent, SDFs suffer from a peculiar sort of chicken-and-egg conundrum that afflicts volunteer service organizations in general. That is, the organization will not get meaningful, real-world missions unless it has a credible force that can execute them, but it cannot attract and hold such members unless and until it has the missions to keep their interest. Later in this paper, we shall show how critical mass can be achieved if an extraordinary external event

atalyzes the volunteer reaction and organizational planners exploit this event for the public good.

Thus far, many state Adjutants General (TAG) seem to not recognize the opportunities for SDFs presented by the post 9/11 environment. Instead, many have either minimized or closed out their state's SDF, or relegated them to the traditional SDF role of replacing NG units when federalized, which happened on a giant scale during World Wars I and II, when SDFs also safeguarded public property.

However, since Lieutenant General H. Steven Blum, Director of the National Guard Bureau, pledges that no more than one-half of any state's NG resources would be mobilized in the post-Cold War era, these traditional SDF "force replacement" roles, for now, are effectively meaningless (although, if the DOD succeeds in doing away with extant limitations to domestic federal NG call up for natural or man-made disasters, then these traditional SDF "force replacement" roles may once again breathe life). But new exigencies and emergent threats show the need for large numbers of trained medical or health personnel is great, and are thus far unmet. SDF medical units can help plug these gaps, but too often have not for a variety of reasons that we shall now explore.

With a few notable exceptions, TAGs' support for SDF's are ambivalent for understandable reasons. Some TAGs and/or their operations and planning directors, for example, see their SDFs as potential sponges for already constrained state funds, while others just do not see the need for largely "on-paper" units, already overloaded with high ranking cadre. Others simply do not see how such forces might be reconfigured. The professional literature that might trigger such new thinking is limited to only two sources: *The State Guard Association of the United States of America Journal*; and the *State Defense Force Publication Center* (http//www.sdfpc.org); however, only the latter expressly explores new missions and functions in its *Journal* and *Monograph Series*. This scant, but developing, literature already suggests that professional directorates–particularly those comprised of medical, legal [Judge Advocate General (JAG)], communications, Chaplaincy, and military emergency management units–can provide a meaningful substitute for the obsolete and unrealistic (and often hollow) light infantry military police, or constabulary roles (although the latter do prove useful in rare cases, like Alaska, with its sparse population and gigantic land mass) that traditionally framed so many SDF missions and, for the most part, still do.

The material presented in this article examines how two states have restructured their SDFs around core units of professional directorates by recruiting highly skilled volunteer experts who already have the necessary preparation and credentials to deploy with very little additional training, to become essential medical components that can augment emergency first responders in DRO. Furthermore, SDF medical units are in a particularly enviable position to be able to provide needed clinical support to the NG by "providing back-fill for physicians, dentists, and mid-level providers who are deployed or on training missions" and by serving as "medical readiness assets for mobile support teams, labs, immunizations, latent TB [Tuberculosis] screening, and post-deployment assessments." (COL Eric Allely, Maryland State Surgeon, 2006).

This article provides insights into how such units may be formed and how they can function to effectively augment overwhelmed first responders and other exhausted health infrastructure in the mitigation of anticipated health and terrorism threats. These roles provide opportunities that can reverse historic SDF recruitment and retention problems, by offering meaningful roles that attract and keep professionals who wish to contribute to the well-being of their communities. If this challenge is not accepted by the state military hierarchy, then the recent gains realized by some SDF's post 9/11 may disappear in "been there, bought the cap and shirt" disappointment.

Background: SDF Legal Status and Role

As a volunteer citizen "army" every community, from Colonial days forward, sponsored some form of a lawfully sanctioned, organized standing militia; however, these uniformed select units were localized (as opposed to the general) militias that only trained annually, and were composed of all males of arms-bearing age who were not specifically exempt (Nelson, 1995). SDFs are Congressionally authorized in 32 US Code, Sect. 109, as "other troops" rather than as militia. Since 1903, the term "militia" has generally signified a state's National Guard. Notwithstanding this unique "other troop" definition, state legislatures have invariably classified their SDF as a third component of the state's organized militia, the other two elements being the Army and Air National Guards in their state status. This makes SDFs unique creatures of the state. Its members have no Federal Reserve status as their NG colleagues do, nor can they be federalized except *in extremis*, should a desperate president exercise his constitutional and statutory emergency powers to federalize all state militias. Otherwise, SDF units may assist in a major multi-jurisdictional DRO under the command of the state Adjutant General, even if unified command is exercised by Federal military authorities.

While NG troops are paid for their activities in uniform, SDF soldiers serve as unpaid volunteers for training, normal drills, and duty (Nelson, 1995), and they typically purchase their own uniforms, which Army regulations specifically authorize them to wear with distinguishing state insignia. SDF troops are occasionally paid if activated by the Governor, but SDF

soldiers overwhelmingly serve under voluntary state active duty orders (SAD) without pay.

SDF personnel are authorized to wear any earned federal military and civilian awards and decorations, and may earn and wear state authorized NG and SDF awards and decorations, as well as those awarded to them by other nations and states.

During the Cold War, when there was a potential for the United States to be exposed to land, sea, and air attack, the SDFs, with "traditional" deep reserve and NG replacement missions, maintained a reasonable size and growth pattern. Since 9/11 there have been widespread calls for citizen participation, and many "think-tank" appeals for the expansion of the SDFs, leading to (as yet unenacted) legislation to strengthen them (Homeland Security IntelWatch, 2004; Brinkerhoff, 2001; Tomisek, 2002; Bankus, 2005; Bankus, 2006; Carafano, &. Brinkerhoff, 2005; Freedberg; 2002; Kennedy, 2003; Phillips, n.d.; Tulak, Kraft, & Silbaugh, 2005). Oddly enough, however, even in this era of heightened homeland defense awareness and regular NG deployment, SDFs, remain small, with only about 14,000 mostly middle aged or older personnel nationwide still typically plying their obsolete Cold War era missions. In contrast, the CAP has 60,000 members nationwide, half of whom are senior members (over age 21), and the other half Cadets (ages 11-21). Many argue that SDFs could do as well.

Proponents of the proposed State Defense Force Improvement Act of 2005, for example, believe that even relatively token federal support could boost SDF ranks to 250,000 (Kennedy, 2003), which is far fewer than the 400,000 that the Military Order of World Wars (MOWW) believes could be raised if SDFs were "properly supported" (MOWW, n.d.). The Department of Defense (DOD) also believes that SDFs "could be expanded" (DOD, 2005). Even without additional resources, a succession of national traumas (9/11, the Gulf War, to say nothing of a string of natural disasters) has pushed SDF numbers up (appreciably in some organizations), though growth is far from even across states due to a variety of factors that bear examination.

Theories of Emergency Volunteerism and SDF Strength Levels

It is axiomatic that "historic events" and profound crises inspire volunteerism, driven by the impulse to protect one's nation, home, and hearth against a perceived threat (Penner, 2004). To some extent this is a function of the socially and evolutionarily useful trait of altruism. Research clearly shows, for example, that the humanitarian instinct to help in a crisis, as pushed by "rescue hope or need to support a sentinel effect," is much more common than the selfish malevolence of looting (Tierney, 2003). Unfortunately, research also shows that this pro-social surge is often "short lived" (Penner, 2004, p.653). Consider, for example, Penner's finding of how the more than 300 percent nationwide increase in volunteerism inspired by 9/11 eventually dropped back to pre-disaster rates, despite serious efforts to sustain these high levels of participation. Sadly, the American populace often has a short attention span.

Wholly apart from altruism, terror management theory TMT) predicts that defensive emergency service volunteering affords the threatened, or "mortality sentient," volunteer an enhanced sense of anxiety-reducing control over a perceived threat. This vicarious agency brings the threat into the realm of indirect personal control (Greenberg, Solomon & Pyszeszynski, 1997). Of course, altruism, which is a well-researched volunteer motive (Nelson, Hooker, DeHart, Edwards & Lanning 2004), complements TMT insofar as, in the context of emergencies, altruism may represent an adaptive response that promotes within-group survival (Raphael, 1986). In this view, altruism also is stoked by threat salience and perceived vulnerability.

The protective volunteer response attenuates over time for two main reasons. First, the threat "decays" over time. Just as yesterday's news doesn't sell newspapers, yesterday's threats often soon fade away in the face of new concerns. Second, for non-spontaneous organizational volunteers, the volunteer organization might not be perceived as making a meaningful contribution to disaster mitigation. In either case, the altruistic impulse to make a meaningful protective contribution is diffused or redirected to other pro-social endeavors (Mileti, 1999).

It is clear that volunteer levels historically rise and fall in proportion to the citizenry's perceived susceptibility to an external threat. The unparalleled menace of World War II, for example, made mortality sentience a rational mode for males of arms-bearing age, and the altruistic drive toward self-sacrifice soared. By the time of the Pearl Harbor attack, roiling war clouds pushed State Guards' membership rolls to more than 89,000 volunteers. By 1943, 170,000 men were so serving (Nelson, 1995). Many of these, like the Home Guard in the United Kingdom, or even the *Volkssturm* in Germany, were veterans of World War I, too old or not physically fit for military service overseas.

Although the end of the war terminated these all-volunteer units, the Korean War sparked a revival of sorts. Even though a federal law got the state Adjutants General back into a State Guard (now renamed SDF) planning mode, implementation was strangled *inter alia* by lack of funding (Historical Evaluation and Research Organization, 1981). By 1955, the escalating Cold War saw the formal revival of the classic all-volunteer state militia. But growth was sluggish until "the collapse of U.S.-Soviet détente in the late 1970s"

(Stentiford, cited in Bankus, 2005, p. 30). This heightened threat level sparked SDF volunteerism. SDFs were identified, for example, by the Reagan Administration as a "vital element of plans to protect the population against a massive Soviet nuclear attack and to reconstitute society under civil rule in the aftermath of an attack" (Brinkerhoff, 2001, no page). Threat salience and a real mission spiked SDF numbers. In 1985, the State Defense Force Association [now the State Guard Association of the United States (SGAUS)] was formed. Unfortunately, the actual number of SDF troops enrolled during this period is not precisely recorded.

Inferences about total SDF troop strength can be gleaned from occasional hints in the literature. Nelson (1995) reported an earlier phone survey of SDF personnel officers, suggesting the national SDF volunteer force hovered around some 20,000 soldiers during the late Cold War. Indeed, this number may already have mirrored a decline in strength from the peak. The evidence for this speculation is indirect. Anecdotally, Nelson's own organization at the time, the Oregon State Defense Force (ORSDF), fielded more than 400 soldiers at the unit's semi-annual training throughout the mid-to-late 1980s. By 1994, with no more Cold War and no viable mission other than to replace a federalized NG, which had not been federalized on any appreciable scale since World War II (despite Viet Nam and the Cold War), ORSDF exercises drew fewer than 200 soldiers. In 1995, Oregon's Adjutant General ordered a major downsizing and reorganization of the ORSDF, which consequently became limited to an active cadre of 150 personnel–mostly officers (Norris, 2001).

Indeed, forced downsizing was common beginning in the very late 1980s and continuing throughout the 1990s. During this period several SDFs were "stood down" or disbanded (the Utah SDF, the Michigan Emergency Volunteers, and the Georgia SDF, for example), or were maintained "on the books," but in reality were "ghost" units (Louisiana, New Mexico). Published information shows that the total number of SDFs declined during the 1990s from an apparent high of 26 (Nelson, 1995) to an apparent low of 19 (Hall, 2003). Indeed, a *USA Today* analysis of SDF membership bluntly concluded that "the forces had become nearly non-existent" by the turn of the Millennium (Hall, 2003). Fortunately, this report of the death of SDFs was, like Mark Twain's famous obituary, premature. Freedberg's claim "that most of these state-controlled forces have faded away since the 1980s…" is erroneous. We estimate that total SDF strength probably never dipped below 8,000 troops nationwide.

Nevertheless, those that remained struggled, largely in vain, for meaningful roles. Many SDFs persisted in training for combat support and other traditional military roles that required a supply of "from-scratch-trained" enlisted troops, such as military police, constabulary, light infantry, and so forth.

However, without a good deal of funding, part-time volunteer soldiers without prior military experience could not possibly be trained to capability levels even remotely approaching comparable active component military occupational skill standards. The modern force utilization environment demands, for example, a high level of sophistication on fine points of military and constitutional law on the part of military police troops. World War II-vintage notions of making a soldier a military policeman, simply by giving him a weapon and a brassard, obviously could not survive Kent State. Nor could ill-trained personnel be expected to mesh seamlessly with their NG counterparts. Still, even if it is a bit dated, SDF personnel often have great stores of military experience, "In many cases it is not uncommon in a group of four or five SDF officers to find 100 plus years of military experience and dozens ... of military training schools ..." (Patterson, 2006, page 5).

As a result of this lack of funding on the one hand and experienced troops on the other, many TAGs elected to eliminate, drastically reduce, or simply ignore their SDF. Other missions – such as search and rescue – proved somewhat more viable, but there are many overlapping resources trained specially and even primarily for this mission, such as CAP cadets and even Explorer Scouts. SDFs lacked such groups' equipment, money, infrastructure, or even name recognition. Put simply, SDFs had no market niche.

Following the end of the Cold War SDFs were commanded and staffed primarily by veterans, a significant number of whom had earned combat decorations, yet they were often detailed as parking guides, staffing county fair first aid stations, marching in parades, and other functions normally performed by local veterans groups. Nevertheless, community service roles became the mainstay of most surviving SDFs during the 1990s. As should be obvious, such missions relegated SDFs to the backwaters of public service, utterly failing to attract or retain sufficient numbers of high quality volunteers. Such organizations could only hope to attract and keep die-hards whose desire to serve outweighed the lack of a meaningful role in which to serve.

At the same time, many TAGs were uncomfortable with the image projected by grey-templed field grade officers directing parking lot traffic. The effect of all this, lamented Freedberg (2002), was that most SDFs became "little more than social clubs," consisting largely of aging veterans yearning for military camaraderie and shared reminiscences. As Brinkerhoff put it in 2001: "State Defense Forces today are moribund." (2001, no page).

However after 9/11, COL Byers W. Coleman, Executive irector of SGAUS and a member of the Georgia State Guard, quickly concluded that homeland security missions held promise for increased SDF volunteerism, reporting that "many groups have had enormous growth since the September 2001 terrorist attacks" (Kelderman, nd.). *USA Today* reported that "after September 11, the membership of state defense forces had grown by thousands to nearly 12,000 in 19 states and Puerto Rico" (Hall, 2003 www.usatoday.com/news/sept11/2003-09-07-state-defense_x.htm).

However, this growth was uneven. For instance, although Virginia and Georgia grew by more than 100 percent, growth in Alaska, Tennessee, New Mexico, and Washington (State) was more modest (Hall, 2003). A few SDFs actually declined in membership during this period. New Mexico, for example has nearly halted volunteer recruitment. Captain Ken Hacker, director of personnel for New Mexico's SDF 2nd Brigade (personal communication, 4 February 2006) explains that his SDF is officially reorganizing, but is actually downsizing and can currently muster only about 200 of the 500 people needed for current, basic missions.

Of course, not all loss of SDF strength can be attributed to lack of missions or of TAG support. During the 1990s, membership in volunteer fire companies also plummeted precipitously due to factors that could also influence SDFs and other emergency service organizations. This is reflected by the experience in Pennsylvania, where the 1970s pool of more than 300,000 volunteer firefighters has slipped to 72,000 today (Hampson, 2005). Hampson offers some reasons for this drastic decline:

> "...blame it on changes in society: longer commutes, two-income households, year round youth sports, chain stores that won't release workers midday to jump a fire truck... Blame it on stricter training requirements, fewer big fires and the lure of paying jobs in the cities." (2005, no page).

Other social factors are also making it harder for organizations to find and keep volunteers who will stay for the long term. Consider, for example, how short-term, episodic volunteering is up, while long-term organizational joining (the type required by SDFs) is down. This is exacerbated by increased competition for organizational volunteers, in government agencies and private not-for-profit organizations. Other social factors that discourage volunteerism include the phenomenon known as "bunkering," in which people seem to be less civically involved generally, preferring to stay at home engaging their cable televisions and digital video devices, or pursuing vicarious socializing via cyber-space.

Finally, we suggest that another factor contributing to the decline in volunteers is the increasing level of professionalism, acquired only through intensive training, which is required of today's volunteers. For example, a young person joining a volunteer fire company cannot simply learn the necessary firefighting skills to be certified as a firefighter by riding along on the back step of a fire truck–even if they still had back steps, now banned as safety hazards. Instead, the erstwhile volunteer must complete hours of classroom and practical instruction to achieve the level of firefighting professionalism demanded in today's environment. The same, of course, is true in spades for volunteer emergency medical technicians, paramedics, cardiac rescue technicians, and so forth (Hampson, 2005).

Interestingly, even following the 9/11 attacks, where firemen loomed as iconic heroes, fire company volunteerism continues to fall. Thus, threat salience and altruism, the hallmarks of emergency volunteer motivation, must be assessed in the broader social context, and more narrowly within the context of national trends in volunteerism.

Still, despite these negative trends, SDF volunteer membership is on a clear upward swing. Two years after the aforementioned *USA Today* article on SDF troop strength (2003), Carafano and Brinkerhoff (2005) reported that SDF volunteers had risen to 14,000 troops in 23 states, a number that has been confirmed by the DOD (2005). Experts expect this growth trend to continue, albeit at an attenuated rate, stimulated by persistent worries about pandemic influenza and other infectious diseases; the seemingly increasing frequency and intensity of natural disasters; and continued anxiety about biological, radiological, chemical, and nuclear terrorism. These factors clearly should encourage volunteers to flock to their SDFs in order to be able to provide their communities with the necessary emergency support; however, this can only happen in those states where TAGs direct SDF leaders to develop highly visible commands with missions that are relevant to today's threats and vulnerabilities. Nothing less will attract and keep volunteers who wish to serve their community.

Moreover, these reconfigured SDFs should consider building their forces around professional units who can draw already experienced and credentialed professionals who are proficient in skills that are highly useful to the NG (e.g., medical, chaplaincy, JAG). Doing this will eliminate the problem of job incompetence that can trouble SDF units who try to transform raw civilians without military training into competent and reliable military service support or security personnel, as these health professionals are already trained, licensed, experienced, and often recognized practitioners and even leaders in their fields.

Another necessary feature is to tailor different levels of time commitment and participation patterns in order to draw in the widest possible pool of volunteers. For example, many physicians and other health professionals are very busy and do not have time to drill two evenings, or a weekend every month, but who could serve during a catastrophic event. These professionals might form a standby reserve pool of volunteers who could be activated under state voluntary orders to serve in a crisis. These reserve "minutemen" should be invited, but not required, to attend all training opportunities, group exercises, and regular drills. Minimal mandatory training for these standby professionals might be limited to half-day quarterly seminars, and perhaps a one day annual muster to assess the correctness of uniform and refresh their skills in basic military customs and courtesies. They should also be kept abreast of all unit activities and developments via proven long-distance management techniques, including monthly electronic newsletters, and regular email announcements. They should also be encouraged to take any of a staggering range of home study courses that are available online that relate to disaster relief, the National Disaster Medical System, incident command, and a host of other subjects important to homeland security work.

Moreover, building medical commands also opens new opportunities for other volunteers with limited skills and training. Much experience shows that the SDF medical commands serving in the field have a need for significant numbers of non-medical support personnel. People without health backgrounds can provide valuable administrative support, victim tracking, logistical assistance, and crowd flow control, among other duties that require little training but are essential in a deployment.

In a recent state-wide mass casualty, hazardous materials (HAZMAT) training event, 35 Maryland SDF medical personnel were tasked to provide simulated surge capacity health support to county hospitals by staffing two field treatment centers. These medical troops were accompanied by only six support personnel, who were too few to quickly assemble the 70 cots and perform other necessary support roles that needed to be accomplished in this real-time simulation. The nurses and physicians pitched in, to no ill effect, but in actual emergencies this could harm unit efficiency and perhaps imperil patient health and safety.

Emerging SDF Medical and Public Health Roles

"Emergency services" has long been discussed as a possible prime SDF post-Cold War mission, and some analysts have argued that "all (SDFs) share a responsibility to provide the states capabilities to respond to disasters, both natural and man-made, including terrorist attacks and subversive acts" (Tulak, et al., 2003, no page; Hershkowitz & Wardell, 2005, no page). Moreover, the SGAUS has long urged SDFs to embrace an emergency services role, and it has recently revised and enhanced its Military Emergency Management Specialist Academy, a "distance learning" program for training SDF troops in emergency management. But, SDF involvement in this area, with the exception of Maryland, Georgia, South Carolina, and Texas, is still limited and uneven.

Many TAGs are concerned about liability issues should such forces be deployed, but other TAGs have found solutions to these concerns and now even the DOD (November, 2005) sees a viable niche for SDFs as value-added force multipliers in a range of missions, including homeland security and during natural emergencies.

Such catastrophic events as the 9/11 terrorist attacks and Hurricanes Katrina and Rita, have provided opportunities to demonstrate the potential success of this new approach to SDF community support. For instance, the New Jersey Naval Militia provided disaster medical assistance immediately following 9/11; the Texas State Guard, including their Medical Rangers, provided in-state support for both citizens and police during Hurricanes Katrina and Rita; and, most uniquely, the Maryland Defense Force (MDDF) deployed some 200 medical professionals under state military orders to the Katrina disaster site in Louisiana.

Maryland Defense Force's 10th Medical Regiment (10MEDRGT)

Following Katrina, the Maryland Defence Force's Medical Command (now designated the 10th Medical Regiment, linking it to its historic WWII Maryland State Guard roots), has grown from fewer than 20 medical and allied professional volunteers just prior to Katrina, to more than 130 such personnel. Today, high calibre applications are still coming in–albeit at a predictably diminished rate a year after the catastrophe.

As a consequence of its growth and demonstrated ability, Maryland's civil emergency service authorities have integrated the MDDF into the state's public health emergency plans. In a display of confidence for ability to represent the state, Maryland sent MDDF physicians and a dentist to Bosnia as part of a Maryland Air National Guard humanitarian and training mission–a first for any SDF. The 10MEDRGT's demonstrated successes (along with those of the MDDF JAG, Finance, and Chaplain Corps) encouraged the Maryland NG State Surgeon to begin to integrate the 10MEDRGT into the Maryland Joint Medical Team.

Emergence of the MDDF Medical Role

During the 1990s, the MDDF was constituted as a military police unit; however, its missions mainly involved providing parking assistance, crowd courtesy, and light first aid work at various public holiday celebrations. In the mid-to-late 1990s, SDF commanders Brigadier Generals (MD) Frank Barranco, M.D., and M. Hall Worthington, both promoted the emergency service and ground search and rescue mission, and actively supported staff actions to design disaster mitigation missions and creative recruitment programs (Hershkowitz, 1998, no page; Hershkowitz, 2000, no page); however, these were rejected by TAG at the time resulting in a sharp decline in officer appointments, enlistments, and morale. In 2002, the MDDF was downsized in order to permit a change in personnel profile and mission structure.

The new MDDF Commanding General, Brigadier General (MD) Benjamin F. Lucas, II, a retired US Air Force Colonel, with prior service in the US Marine Corps and in the MD Army NG (ARNG), and an experienced lawyer, recommended a realignment of the MDDF and its personnel in order to permit a viable mission structure by providing legal, chaplain, and medical services that would both support the NG and provide medical emergency resources to state civil authorities when faced with a major medical crises. A new TAG, Major General Bruce F. Tuxill, Maryland Air NG (MD ANG), not only embraced the new SDF plan, but provided unprecedented resource and moral support. This allowed the SDF to enrich jobs and build new roles and competencies that would bring superior value to the National Guard and the State of Maryland (and later to the citizens of Jefferson Parish, Louisiana, and to Bosnian mountain villagers).

With this support, the MDDF command reorganized its medical directorate and proceeded with development of a mission oriented structure. Using the Texas State Guard's "Medical Rangers" as a guide, MDDF registered its new medical directorate as a medical reserve corps (MRC).

The MRC program, established under the Surgeon General nationwide in 2002, was based on the USA Freedom Corps, which was created after 9/11to strengthen America's health and emergency service infrastructure to promote homeland security. The MRC's specific role is to augment civil health agencies' capabilities with rapid response, trained and organized local medical and health volunteers when faced with a major health crisis. MRCs also provide health education, disease prevention, and other non-emergency public health services consistent with local needs and priorities.

The Texas State Guard (TXSG) had been the first SDF to register its medical unit as a statewide MRC, in March 2003, when the Texas Medical Rangers (the MRC's working name) was headquartered at the University of Texas Health Science Center in San Antonio. The Rangers also received one of the 167 US Department of Health and Human Services MRC start-up grants for $50,000. The MDDF decided to follow the TXSG model in order to gain technical assistance from the Office of the Surgeon General (OSG), and also to garner the added recognition and credibility that the MRC title might confer. The MDDF also hoped coming under the MRC tent would lead to some funding opportunities, and would serve as an entrée to public health and emergency planners who were as yet unaware of SDF capabilities.

But the new MDDF MRC would differ in certain key respects from the TXSG's model: first, the MDDF learned that the funding for new units was no longer available from the OSG; and second, the MDDF was discouraged by the OSG from registering as a statewide unit, as the OSG was aggressively pushing local, community-based models, specifically identified with geopolitical locations (usually counties). Besides, Maryland already had one highly unusual statewide-chartered MRC sponsored by the state's Department of Health and Mental Hygiene (DHMH), which would later prove to have an important connection to the MDDF. MDDF planners prepared to solicit local, county level resources and partners as an initial step to broader statewide recognition and involvement.

Another major developmental difference between the TXSG MRC and the MDDF MRC would be Maryland's bottom-up approach to program development, as opposed to the top down approach that had been adopted in Texas. The key to Texas' success was its adherence to OSG's guidance that MRC's must cultivate "champions" whose "connections and enthusiasm can make a big difference for an MRC that is otherwise struggling to make itself known and to be taken seriously" (OSG, 2004, p. 11).

Texas had a powerful champion indeed! Major General USA, ret.) Harold L. Timboe, M.D., former commander of the famed Walter Reed Army Medical Center and Assistant Vice President for Research Administration at the University of Texas Health Science Center, was the TXSG MRC's first commander. He was a classic internal champion, with huge state and national clout. General Timboe's national prestige in the military and health care communities undoubtedly influenced Texas Governor Rick Perry's order for the Texas TAG to establish the TXSG MRC at the University of Texas Health Science Center at San Antonio.

Unfortunately, the nascent MDDF Medical Directorate did not (at its formative stage) have an "inside champion" of this high level of influence, nor did it have a connection with a medical school. It would thus have to be built from the bottom up. Fortunately, a respected local physician, who

was a retired Regular Naval Captain, commanded it. Its Deputy Commander and MRC project action officer–one of the authors, Nelson–was a professor in the Health Science Department in Towson University (TU), which, although lacking a medical school, has a nursing school and other allied health departments. Nelson also had a store of prior experience in responsible posts with SDF and SDF-type organizations, including the Oregon and Washington SDFs and the Civil Air Patrol. Consequently, TU was targeted as the initial MDDF external MRC partner, a prerequisite established by the OSG for MRC registration.

Meetings with TU administrators led to the university president's approval for officially hosting the MDDF MRC. University officials determined that there would be no liability issues barring it from assisting in the development of various future MDDF MRC projects, or in providing in-kind support, primarily in the service time of the MDDF MRC action officer.

It was at this point that the MDDF MRC project action officer petitioned the OSG for the formal audit that was required for official MRC registration. In approving the petition, the MRC National Program Officer concluded that the MDDF model would be a strong model, "as Military based MRCs tended to be the strongest" (personal communication, Nelson w/ LCDR April D. Kidd, USPHS, 11 January 2004).

The TU connection led directly to the next partnering contact, which would be crucial. The Baltimore County Health Department's Coordinator of Public Health Emergency Preparedness (PHEP) was serving on TU's Homeland Security Master's Degree Program Advisory Committee – as was Nelson, the MDDF MRC project officer. As the County PHEP coordinator had just written a plan for the development of a Baltimore County MRC, she quickly realized that the TU/MDDF MRC (in Baltimore County) would readily fill the bill.

With this new county level external champion, the MDDF Medical Directorate and its MRC began to grow rapidly. In June 2005, the Baltimore County Health Department hired a part-time temporary recruiter for the MDDF MRC, and provided the organization with a local office, phone, computer, administrative, and other in-kind support for six months in order to kick-start the MRC's development. The recruiter, a recent TU graduate, was also commissioned into the MDDF, which lent the credibility of her military status to her recruiting efforts. The County Health Department also designed and printed several thousand color-brochures, which included the TU, Baltimore County Health Department, and MDDF logos and insignia (in a conscious effort to "brand" the MDDF Medical Directorate). The Health Department also disseminated numerous public service announcements, and gave the MRC a full page in the County Emergency Services.

More recently OSG, working with the National Association of County and City Health Officials (NACCHO), has implemented plans to boost MRC capacity by giving $10,000 to any duly registered MRC, regardless of its sectoral auspice as long as it meets the following criteria:

- The MRC must be duly registered with the Office of the Surgeon General.
- Has the ability to accepting funding through a NACCHO contract.
- Have an up-to-date unit profile on the Medical Reserve Corps web site.
- Is working towards NIMS implementation.

The MDDF MRC meets and exceeds these criteria. And although the MDDF MRC is jointly sponsored by the Baltimore County Health Department and TU, the MDDF retained full operational control through its military command structure. This also was to pay dividends in the future. While the unit soon availed itself of new training opportunities with various county agencies (which invariably led to broader state contacts, as the Public Health Officers in Maryland counties are actually state-appointed officers), all partners were well aware that the MDDF MRC could only be activated by the Governor, through TAG, as a state military unit.

Interestingly enough, the MDDF's military nature was greatly appreciated by the County health authorities, and clearly elevated the MRC's status among local public health and emergency preparedness leaders. Illustrative of this was an occasion when a Baltimore County hospital emergency training task force planned a press conference for an impending mass casualty HAZMAT event. Health department officials specifically requested that MDDF medical officers show up in uniform to be photographed with other (Health Department, university, and hospital) participants.

Traditional civilian first responders were initially more cautious. Police and fire department rank structures are quite different from military rank structures, though they often share the same titles and badges of rank, and non-supervisory MDDF officers often held higher grades than high-level, supervisory fire and police personnel. This caused some initial tension in planning meetings, in the form of territorial posturing by the local uniformed first responders who bluntly reminded MRC staff of their emergency arena primacy. However, MDDF planners quickly overcame such concerns by stressing the supplementary, secondary-responder nature of the MDDF MRC's role, and by making it clear that MDDF resources were always subordinate to the civilian

first-responder incident commander. This approach paid off. Soon, MDDF MRC staff officers were fully accepted by all involved uniformed civilian agencies, and there followed invitations to a range of joint training programs from multiple government agencies, including, most significantly, the Baltimore City Fire Department which sponsored its own MRC!

Although they help sponsor the MDDF medical unit in its county level MRC status, county health authorities cannot directly "order" the MDDF MRC into the field as this is the Governor's exclusive prerogative as the state's military commander in chief. Instead, civil authorities must requestMDDF MRC support through Maryland's Joint Operations Center, or MJOC [civil–Maryland Emergency Management Agency (MEMA) and military (MDNG)]. The request is then routed to TAG through channels for consideration by the Governor. In the event of a local or Baltimore County level emergency, the full force of the MDDF would be, theoretically, free to respond as a county resource. However, in a larger statewide crisis, the MDDF in its State role would go wherever incident command determined the need to be the greatest. Regardless, in subsequent county training activities, Baltimore County planners articulated time and again how the MDDF medical unit was an exceptional bargain whose involvement added real muscle to the local surge capacity infrastructure.

Also, the fact that people cannot join the Baltimore County MRC without joining the military MDDF put off some otherwise interested health professionals, who balked at being identified in any capacity with a military organization. The idea of forming an MDDF civil auxiliary was abandoned, although a civilian style uniform was later approved for those who were either unable or unwilling to meet military grooming standards, but only a very few members fall into this category.

Just prior to the Hurricane Katrina disaster, recruiting into the MDDF MRC increased; however, attracting volunteers was still not easy. At this stage, there were always many more inquirers than actual joiners. Nevertheless, by mid-August, the medical directorate (MDDF MRC) had grown from no more than six active members to more than twenty, largely thanks to first-rate recruiting material and the talents of the recruiting officer. People were ready enough to become involved in homeland defense and public health emergency preparedness, even though many were initially leery of the military nature of the organization.

TXSG MRC commander Major General Timboe had warned MDDF medical commanders that a military-based MRC would never grow fast, as many health professionals without prior military service would balk at its military aspect. Still, MDDF medical planners remained optimistic. They realized that it would take at least another year before they could count anywhere near 100 allied health personnel in the ranks.

Potential members' concerns ranged from worrying about the threat of a mandatory call-up to the extremely remote fear of being court-martialed for going "absent without official leave" (AWOL) which is mentioned in the application. Other fears, such as being federalized and sent overseas, were baseless and quickly dispelled whenever raised. More realistic, though, were concerns that members might need "to be available at their local hospitals during times of emergency" (Aboulafia, et al., 2006, p.19), or that there would be a conflict between their private practice and their MDDF MRC service. Finally, more than a few applicants were excited about joining, but ultimately did not because of a spouse's concerns about the potential downside of military involvement.

Unit recruiters redesigned the application to be less intimidating. They became proficient in countering the number one fear: mandatory call up. They did this by stressing how they would probably never be called to involuntary state active duty, as this would essentially destroy the organization (by harming the careers of the MDDF MRC members). Recruiters explained how members would only be requested to accept a mission voluntarily, which if agreed to would result in them being put under voluntary orders for state active duty without pay. True, this would obligate them to a military chain of command. However, such negative concerns were countered when recruiters stressed how state active duty conferred both unparalleled liability protection against malpractice suits and workers' compensation coverage should they be injured in the line of duty. These incentives sealed the deal in many cases, and although most nibblers still didn't bite, more did than ever before, and some of these new members would later emerge as key players during the Katrina relief effort. For example, there was LTC (MD) Jim Doyle, a VA hospital physician who, although new to the MDDF, acted as the second Katrina deployment medical director after the first commander, LTC Patrick Shanahan (a three year MDDF veteran) returned to his private practice following a stage-setting initial week in the field.

The Katrina Activation

Official and media reports on the extent of the Katrina crisis prompted the Maryland Military Department to prepare to mobilize human and material resources to aid in the impending recovery effort. Calls for urgent assistance from Louisiana were first answered by the MEMA, which dispatched emergency managers south almost as soon as the massive scale of the hurricane's effects became apparent. This was followed by further pressing requests from Louisiana for medical resources support to assist with anticipated mass

casualties, and to provide health care for those trapped in New Orleans. These requests were channeled through a federally mandated, interstate mutual aid agreement–the Emergency Management Assistance Compact (EMAC)–which allows for the pooling and centrally coordinated allocation of state disaster response resources to help when local, state, or regional emergency service infrastructures are overwhelmed.

MG Tuxill (MD TAG) contacted MDDF Commanding General, BG Frederic N. Smalkin, with a request to see what medical resources the MDDF could bring to bear at the scene, not only in its role as an MRC, but also as a command and control cadre through which the state Department of Health and Mental Hygiene's MRC volunteers could best be utilized. Consequently, by order of Maryland Governor Robert Ehrlich, Jr., and direction of TAG, MDDF BG Smalkin issued Special Order No. 05-01 on 30 August 2005, directing MDDF Acting Medical Director COL Wayne Nelson, to select "medically qualified soldiers" who would accept assignment to "participate in humanitarian missions in response and recovery from Hurricane/ Tropical Storm Katrina."

Working day and night, COL Nelson and others assembled a team – the first of three – for deployment. Twenty-two MDDF medical and support personnel reported five days later to the Warfield ANG Base, Middle River, Maryland, where they met with 68 civilian volunteers of the Department of Health and Mental Hygiene's statewide MRC. Governor Ehrlich, MG Tuxill, Assistant Adjutants General for Army and Air (BG Edward Leacock and Brig Gen Charles Morgan), as well as BG Smalkin were also present, along with a bevy of press, to cement final arrangements and to bid farewell to the assembled task force, now preparing to fly to New Orleans Naval Air Station on two MD ANG C-130J aircraft.

In anticipation of the deployment several significant issues had to be resolved, for instance: (1) the need to provide legal protection for medical personnel practicing outside their area of insurance coverage; (2) protection in case of injury while on deployment; (3) air and ground transportation, billeting, and other logistical concerns; and (4) on-site communications. An additional complexity was how to resolve these issues for the civilian volunteers who had not yet been requested through EMAC. Normally, sorting all this out would take several committees virtually months to hammer out multiple memorandums of Understanding (MOU), to say nothing of hours of legal review.

In conversations between MDDF BG Smalkin and COL Jim Grove, Maryland Joint Forces HQ J-3, a solution to this difficulty suggested itself. It was a solution that would literally make history. They came to the realization that all the foregoing problems and concerns might be eliminated if the civilian DHMH MRC's personnel could be sworn in as MDDF soldiers, at least "for the duration." They agreed that the following requirements were key:

- Give the volunteers absolute immunity from suit for any act done within the scope of their MDDF duties.
- Provide the volunteers with protection under the Maryland Tort Claims Act should the immunity be questioned.
- Provide the volunteers with protection against occupational disease, injury, or disability under the Maryland Workers' Compensation law while on active service.
- Ensure that, as state troops, the volunteers could utilize military air and ground transportation, billeting, communications, and supplies.
- Provide the volunteers with a military command and control environment, allowing them to fully concentrate on the medical and humanitarian aspects of the mission.

Looking into the statutes and regulations governing the MDDF, BG Smalkin and staff concluded that there was no impediment, and full statutory authority for, the Governor to authorize induction of the volunteers as MDDF officers and enlisted personnel, as appropriate, and to order MDDF troops, whether previously members or specially inducted, to deploy to assist the governors of other states.

The status question having been thus settled, all volunteers reported to Warfield, were given appropriate immunizations by personnel of the Baltimore County Health Department, and were processed for entry into the MDDF by MDDF G-1 volunteers and other members of the MDDF General Staff. Uniforms, of course, could not be supplied to everyone, but at least those who were previously members of the MDDF (no matter how little time they had been members) were able to be properly uniformed before deployment.

Appropriate military grades were assigned to the DHMH volunteers on their induction as an expedient for the Katrina Hurricane deployments, roughly on the following basis:

- Major. . . . . Medical and health related personnel with a Doctorate Degree
- Captain . . . . . Medical and health related personnel with a Master's Degree
- First Lieutenant. . . . . Medical and health related personnel with a Bachelor's Degree
- Second Lieutenant. . . Other Registered Nurses
- Sergeant First Class. . Non-degree holding specialists (paramedics, EMTs, etc.)
- Sergeant. . . . . Other non-degree holders.

All DHMH MRC volunteers agreed to their "tarmac induction," with virtually no dissent after it was explained to them that this would provide them with essentially "bulletproof" liability coverage plus workers' compensation, would allow for their transportation in military conveyances, and their being watched over by military personnel for logistical and security support. They were told their service would be without salary, but they expected none from the beginning. MDDF command hoped that the returning volunteers would decide to remain within the MDDF, forming a growing medical contingent; however, the civilian temporary military volunteers were assured that they could resign upon their return if they so wished. After these things were explained, each new MDDF soldier signed the oath of appointment or enlistment, and the group was sworn in by BG Smalkin *en masse*. They then boarded the aircraft, and virtually no one present that day had any realistic idea of what would await them upon their arrival "in theater."

The new volunteer soldiers were fortunate that the MDDF route was chosen as the vehicle for utilizing their strong desire to serve. From the outset, all the civilian volunteers were eager to help the Gulf Coast victims of Hurricane Katrina, but, prior to MDDF, they were leaderless, had no organized structure, had no provisions, and no security–to say nothing of lacking the malpractice coverage that would prove essential in the unstable Katrina disaster zone. It is highly likely that, had things gone differently, many of these civilian volunteers would end up like others who converged on the 9/11 and Katrina disaster scenes. As Orloff notes:

> "Many community volunteers responding to 9/11 reported the frustration feeling underutilized and unsure … [and] Four years later ... volunteers on the Gulf Coast …[were left] to fend for themselves; instead of being part [of the] relief effort, they became the victims" (September 9, 2006).

But this fate did not befall Maryland's militarily-led medical "troops" because the NG and its sister organization the MDDF were the solution; they assured military transport and security, as well as state-provided liability and workers' compensation coverage. As an unexpected bonus, the unique military camaraderie shared by "combat" troops soon captured even the newcomers with no prior military service. A strong, but at the same time responsive, touch by the field commander sealed the success of the mission.

MDDF and Bosnia

Shortly after the Katrina mission, COL Barish, one of the authors, took command of the medical directorate. As the Vice Dean of Clinical Affairs at the University of Maryland School of Medicine, as well as Professor of Emergency Medicine and Professor of Medicine, he had the high profile needed to recruit and keep health care workers–especially physicians–in the medical directorate, later the 10MEDRGT.

The 10MEDRGT had attracted a large number of members from the health care community who appeared inclined to volunteer their services in a military mission environment; however, many were disinclined to commit themselves to the NG due to their concern over involuntary mobilization. COL Barish, recognizing this concern, sought out creative missions that incorporated the basic concept that physicians are particularly attracted to humanitarian service.

This logic led COL Barish to promote an existing State Partnership program between Maryland and Bosnia. He believed that the 10MEDRGT could participate in the NG's annual humanitarian mission to Bosnia.

His initial proposal received an enthusiastic response from the MDDF command and TAG. Despite apparent legal barriers, the joint military leadership put their heads together and a plan emerged. In the Spring of 2006, the Commander of the 175th Medical Group of the MD ANG, Lt Col Randy Brown, requested MDDF physicians and dentists to augment the unit's annual training, a humanitarian assistance mission in medically under-served rural Bosnia. There was initial resistance from the DOD to having non-federalized SDF personnel on an overseas NG mission. However, this was resolved by issuing invitational travel orders to the MDDF medical personnel who volunteered for the event. Another issue was the wearing of military uniforms for those personnel. However, force protection required that the MDDF soldiers not stand out visually from the rest of the NG team, so the MDDF class C uniforms were authorized for the mission.

In the Fall issue of the Maryland Military Department Digest (5 November 2006), MG Tuxill (TAG) noted with pride, that this was the first time that the MDDF has been deployed outside the US. In fact, it is almost certainly the first time any SDF has been deployed overseas. This mission gave five MDDF physicians and one dentist a chance to serve with over 70 NG medical and support personnel in a four week initiative that treated over 2,000 Bosnian citizens, some of whom had not received medical care in many years. In a letter to SDF Commander BG Smalkin, the US Ambassador to Bosnia, Douglas L. McElhaney, praised the "volunteer doctors of the Maryland Defense Force and the 175th Medical Group" who worked hand in hand with doctors from the Armed Forces of Bosnia and Herzegovina, thus raising the prestige of both militaries" (McElhaney, 2006) (the same NG journal detailing the Bosnia mission also highlighted how one of the MDDF's veteran nurses was selected by the

Maryland Nurse's Association, in her military capacity, as one of the 12 "Face of Nursing" calendar profile subjects who reflect an outstanding example of nursing).

The Bosnia mission, despite not reaching the high profile of the Katrina mission, proved to be an exciting concept and attracted still more volunteers for the 10MEDRGT. COL Barish's creative thinking about meaningful missions has opened a new vista for SDF participation in NG activities, one that, if emulated, should enhance the growth and mission portfolio of the SDF nationwide.

The MDDF into the Future

Following Katrina and Bosnia, the growing 10MEDRGT has been involved in a number of initiatives in support of the NG and civil authorities. It staffed two surge capacity field treatment centers during a statewide emergency mass casualty field exercise, provided mental health professionals in Post-Deployment Health Reassessments (PDHRA) for the MD ARNG, and participated in a joint state military medical conference among many other program development activities.

Most recently, the MDARNG PDHRA program manager, LTC Michael Gafney, sought additional MDDF personnel (medical doctors, physicians assistants, and registered nurses) to assess both physical and mental problems of soldiers from the 243rd Engineering Company, which had returned from Iraq in July 2006. PDHRAs are a mandatory three- to six-month post-demobilization reassessment for new or persistent physical or mental health problems. Prior to this, the screenings were done by a DOD contractor, with the MDDF providing a mental health team to care for soldiers identified by the DOD contract providers. The MDDF is, as always, providing this medical care at no charge, which MDDF LTC Jim Doyle says is "our proud duty." And since the 243rd is a "high profile" unit which suffered heavy casualties in Iraq, and the DOD contractor was unavailable, the MDDF's help was necessary to accomplish the PDHRA in the mandated time frame. This reflects yet another way the MDDF can boost NG capacity.

10th MDDF Medical Regiment Mental Health Team

The 10MEDRGT Mental Health Team (MHT) was especially busy after Katrina. Its commander, who was recruited just prior to Hurricane Katrina, MAJ Mark Ritter, then a psychiatrist with the National Institutes of Health, is now serving as the Chair of the Maryland ARNG Mental Health Commission, which is a joint civil and military entity that brokers, or directly provides, resources to enhance a comprehensive mental health plan for NG soldiers and their families.

The MDDF MHT also actively supports the above-mentioned DOD PDHRA initiative, wherein MDDF mental health personnel have helped organize the demobilization site process, by screening the *Battle Mind* video and making presentations designed to de-stigmatize the PDHRA mental health self-reporting process. MAJ Ritter and his team also help educate soldiers to change their attitudes about asking for mental health support. The core mental health goal of PDHRA is to determine whether a soldier's mental health complaint is related to injuries suffered in the line of duty (LOD). If so, as a follow up, the Mental Health Commission, which includes the Department of Health and Mental Hygiene MRC volunteers, assures effective referral to ensure that soldiers needing mental health will be treated with the same respect and compassion as those who are physically wounded.

Training opportunities for mental health personnel, and all medical specialties, have exploded. 10MEDRGT personnel can choose from a range of classroom and online experiences on an almost continual basis. This is an integral part of the unit's solid record of retention in the year following Katrina. Although many of the Katrina "temps" chose to stick with the 10th in the standby reserve status, others have assumed active and even command positions. The leadership of those without prior military service aptly demonstrate that integrating SDF volunteers in support of key NG missions can help bridge the much talked about estrangement between civil and military cultures, and promotes the image that true citizen soldiers in battle dress uniforms are also neighborly doctors, nurses, and other healers and helpers–and, above that, dedicated community servants (Feaver and Kohn as cited in Hooker, 2003-2004, p.6).

The vibrant record of the 10MEDRGT represents the fruits of not only effective pre-Katrina strategic planning in anticipating new roles and missions, but also reflects the creative pro-social exploitation of emergent threats and opportunities. This allows newly attracted volunteers to meaningfully contribute their skills in highly difficult and chaotic real life crises–as well as ongoing, multiagency, public preparedness field training simulations, performing hearts-and-minds winning humanitarian missions, and providing support to the heavily taxed state NG.

The newly structured MDDF ensures that top-notch health professionals in all fields, who have both the will and time to serve when needed, can be used by SDFs to help the nation. This resolves the previously mentioned "chicken-and-egg" conundrum by succeeding at meaningful, real-world missions that support the NG, TAG, and state military department to build mutual trust, reliability, and respect–thus ensuring 21st century relevancy and success to the long overlooked SDFs.

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THE TEXAS MEDICAL RANGERS IN THE MILITARY RESPONSE OF THE UNIFORMED MEDICAL RESERVE CORPS TO HURRICANE KATRINA AND HURRICANE RITA 2005: THE NEW AND TESTED ROLE OF THE MEDICAL RESERVE CORPS IN THE UNITED STATES

Colonel James L. Greenstone, Ed.D., J.D.
DABECI, TXSG

ABSTRACT

"The stormy waters of Louisiana crashed against the sturdy shores of Texas." This quote from the Dallas Chief Medical Officer, Raymond Fowler, M.D., set the stage for what happened after Hurricane Katrina and Hurricane Rita in 2005, and for what follows here. Dr. Fowler went on to say that one-third of all those transported out of Louisiana were received by his service in North Texas. Treatment was given to more than 8,000 patients in the first two week period. There were no fatalities and no adverse outcomes. And the Texas Medical Rangers of the Texas State Guard, in North Texas, were an integral and pervasive part of making this happen. This previously untested uniformed medical reserve corps demonstrated its ability to deliver what it had promised: medical augmentation, reliability under extreme stress, practical attention to diverse and special populations, and military professionalism.

INTRODUCTION

The Texas State Guard was organized by Congressional passage of the state defense force statutes in 1940. The tradition of the Texas State Guard dates to the Republic of Texas in 1835. The Texas Medical Rangers (Rangers) have been established for only about three years. They were first organized within the Texas State Guard on 10 March 2003, with the Headquarters in San Antonio, Texas. The northern area command was organized 27 March 2004. Texas Medical Rangers are a Uniformed Medical Reserve Corps (MRC) developed much like their civilian counterparts. A major difference is the military structure and organization. Whereas a civilian medical reserve corps is organized along county lines, the uniformed medical reserve corps is organized on a state-wide basis.

DEPLOYMENT

The Rangers were first called to State Active Duty and deployed throughout the State of Texas in the wake of Hurricane Katrina. They were again deployed shortly thereafter to respond to the effects of Hurricane Rita. This mandatory deployment of state military forces lasted for several weeks for each deployment.

TEXAS MEDICAL RANGERS, NORTH

The Rangers in the northern part of Texas augmented the emergency medical care operations at the Dallas Convention Center and the Dallas Reunion Arena, and established the disaster hospital site in Tyler, Texas. Heretofore an untested good idea, the Rangers provided on-site medical and support assistance to evacuees and patients presenting for help. They provided roving medical patrols on a 24-hour basis to assess and reassess evacuees who might need additional medical assistance. To their credit, several lives were saved by this procedure. They set up isolation areas to control disease and instituted a hand-sanitizing program throughout their area of responsibility that actually prevented an epidemic. They worked continually for the chief medical officer on the sites.

During the aftermath of Hurricane Rita, Texas Medical Rangers established and administered a disaster hospital that provided for special needs patients evacuated from the South of Texas. An inspector from the Office of the Surgeon General of the United States said in her report that the hospital was a "best practices model." It was organized along the specifications of a field military hospital and, in so doing, was able to administer in an effective manner to hundreds in serious need of help. The military organizational ability of the uniformed medical reserve allowed this to happen flawlessly. Structure to the overall organization was provided where chaos may have prevailed.

MEDICAL AND SUPPORT

The Rangers brought many medical and support specialties to the assigned sites. These professionals included:

- Physicians
- Nurses
- Physician Assistants
- Psychologists and other Mental Health Professionals
- Respiratory Therapists
- Emergency Medical Technicians
- Paramedics
- Infection and Disease Control Specialists
- Administration Specialists
- Logistics Personnel
- Operations Officers
- Command Staff Officers and Command Sergeants Major.
- Computer Operators
- Force Protection Personnel
- Laboratory Technicians

SIGNIFICANT QUOTATION

"Y'all's efforts controlled an epidemic." This quote from Dr. Fowler begins to spell out the value of the Texas Medical Rangers, Uniformed Medical Reserve Corps. An outbreak of dysentery was occurring when the Rangers arrived in Dallas. At the direction of the chief medical officer, instituting a 100 percent hand-sanitizing program throughout the Dallas Convention Center and Dallas Reunion Area almost immediately brought an end to this potentially destructive outbreak.

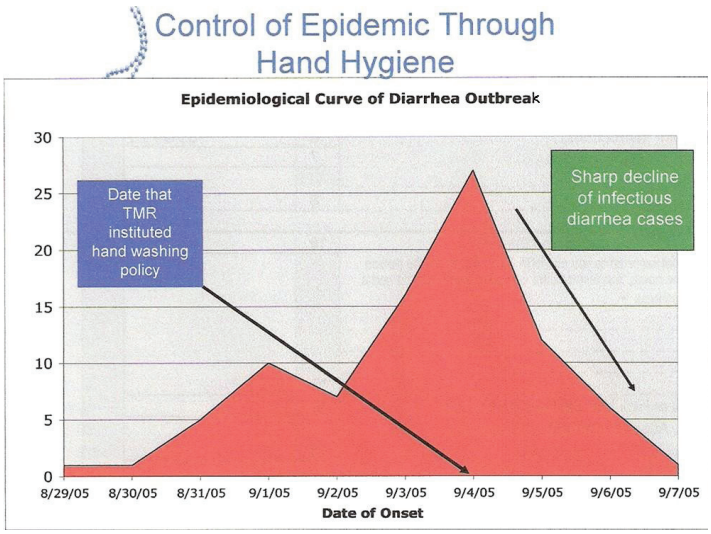

Figure 1: Results of Deployment of Hand-Sanitizing Program

THE NUMBERS

Numbers of evacuees assigned to the various sites worked by the Texas Medical Rangers at any one time were as follows:

- Reunion Arena. 7,649
- Dallas Convention Center 12, 659
- Tyler Disaster Hospital 800

Evacuees as of 12Sep05 at 0800

➢ **Reunion Area**	**7,649**	**Registered**
	271	**Overnight**
➢ **Dallas Convention Center**	**12,659**	**Registered**
	842	**Overnight**
➢ **Total**	**20,308**	**Registered**
	1,113	**Overnight**

Figure 2: Evacuees as of a Particular Date During Operation Katrina

ILLNESSES AND CONDITIONS TREATED

Illnesses treated included:

- Wound care
- One Baby delivered
- Two Myocardial infarctions
- Diabetes
- Mental health problems
- Hypertension
- Diarrhea
- Heat injuries
- Asthma
- Respiratory illnesses in children
- Isolation for dysentery and vomiting
- Viral meningitis
- Injuries due to off-site fighting
- Tuberculosis
- HIV
- Special medical needs.

(See Figures 3 and 4, below, for details.)

QUOTATION

Dr. Fowler, the Chief Medical Officer in Dallas reported that, "The Urgent Care Clinic at Dallas Convention Center is seeing more patients in a 24-hour period than the Emergency Room at the county Parkland Hospital. Parkland sees 300 patients per day. The clinic at Dallas Convention Center is seeing 719 patients on average in a 24-hour period."

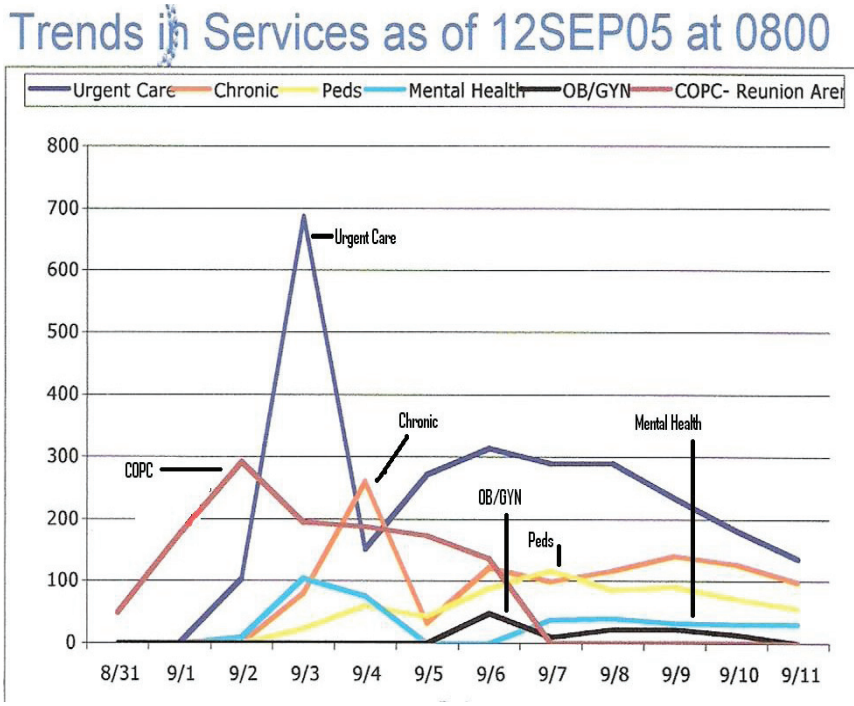

Figure 3: Trends in Services

During this increase of patients at the Convention Center, no increase occurred in the patients seen in the Parkland Emergency Room when compared to both 2004 and 2005 figures during the same time frame. The implication for the Rangers is that they contributed to developing the surge capacity that was so urgently needed. (See Figure 5 for details.)

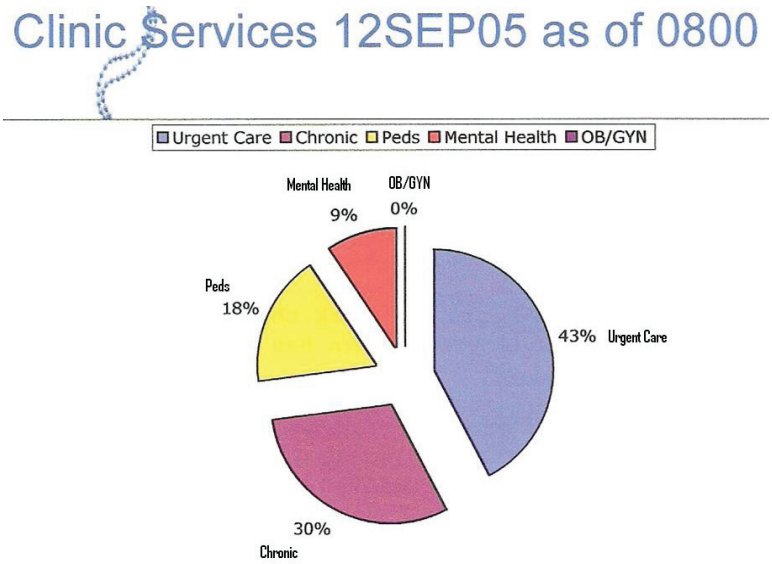

Figure 4: Clinic Services

STRENGTH

Texas Medical Ranger strength included:

- Medical in Dallas. 30
- Non-Medical in Dallas. 20
- Medical and Non-Medical in Tyler. . . 23

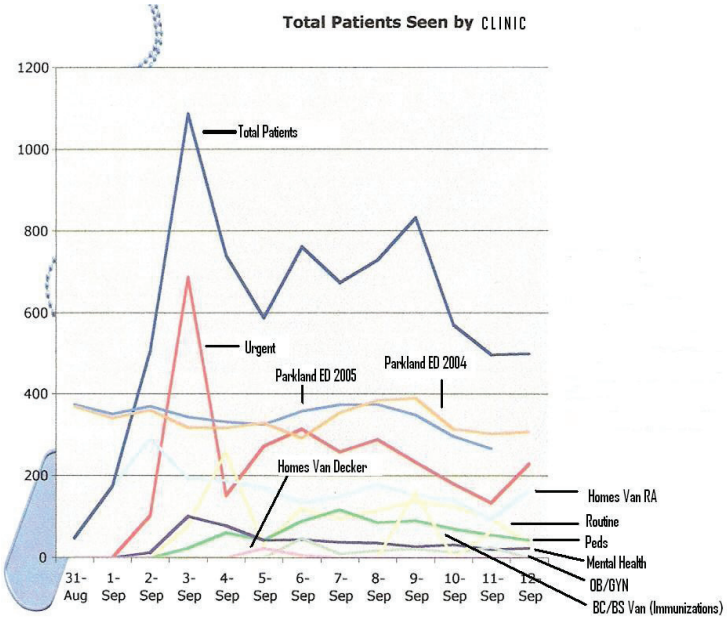

Figure 5: Surge Capacity

DUTIES

Daily duties included:

- Two Medic Team Roving Patrols (two soldiers each team)
- One Team Isolation Management (two soldiers)
- Laboratory assistance (one soldier)
- Administrative (nine soldiers)

Over 6,000 man-hours were worked.

KEY EVENTS

Key events occurring during the several deployments included:

- Rangers worked with the chief county epidemiologist to effectively handle the diarrhea outbreak.
- Rangers were assigned by the chief medical officer, and administered mandatory hand-sanitizing for all residents and workers.
- Roving teams of medics identified many patients with mental and physical needs that might have otherwise been overlooked.
- Unsanitary conditions in the feeding lines were corrected.
- Reorganized the dining procedures to make them more efficient.
- Designed and built an isolation and containment area to control a dysentery outbreak at the direction of the county public health officers and the chief medical officer.
- Worked with officials of the Centers for Disease Control.
- Recognized, treated, and referred cases involving heat injuries to evacuees.
- Found and returned several lost children.
- Obtained help for evacuees identified with mental health issues.
- Reconnaissance of Reunion Arena residents for emergent medical problems.
- Assistance to evacuees in the Federal Emergency Management Agency (FEMA) lines.
- Evacuation of chest pain victim from FEMA assistance lines.
- Identification of several critical diabetic patients.
- Coordinated Tuberculosis control with Dallas County Health Department.
- Shelter management.
- Assisted individuals in obtaining identification cards.
- Developed a psychological force protection program.
- Identified abandoned beds and public health problems.
- Provided assistance to special needs and nursing home patients.

DEPLOYMENT EVENTS

There were three main roles that were filled by the Texas Medical Rangers at the Dallas Convention Center and at Reunion Arena. These three functions included providing roving medic teams, assessing public health needs for, and participating in, infection control and staffing of the urgent care area.

Upon arrival at the Convention Center and after COL James L. Greenstone and CPT Mark Ottens had spoken with the chief medical officer, roving medic teams were established throughout the Convention Center. These roving medic teams were found to be invaluable to the health and welfare of the population. They identified physical and mental health issues that would have undoubtedly gone unnoticed and led to less than desirable outcomes or even death. Some of the events that the medics discovered and cared for are as follows:

- All roving teams early on in the deployment immediately started noticing patients with extreme mental disturbances who had not received care. The teams were also able to assist people who had been sexually assaulted or witnessed terrible actions during their evacuation from Louisiana.
- The roving team of 1LT Richard Nessner and SGT Olivia Anderson identified a way to better route evacuees through the lunch line. This better organization allowed for the enforcement of proper hand hygiene to prevent disease proliferation.
- The roving team of TSGT Lisa Bureau and SPC Terry Smith found food vendors in the Convention Center who were passing out food without hand hygiene in place and with no use of gloves. They immediately corrected the issue, and averted a problem.
- When FEMA opened their registration line outside in the heat on a day with the heat index above 100 degrees, the roving team of 1LT Mike Hudson and MAJ William Kaschub were sent to watch for heat injuries. Four evacuees had to be sent to the hospital for care due to heat injuries. MAJ Steve Sanderfer and CPT Mark Ottens were notified of the problem and took Gatorade and cold water to the line and then convinced FEMA to move it inside where it was cooler.
- The roving teams maintained surveillance of hand hygiene on the food line. On several occasions they professionally and immediately shut down the serving line when they found that hand hygiene principles were not in place. The lines were reopened when hand-sanitizing was established.
- TSGT Lisa Bureau and SPC Terry Smith attended an individual who, while in the FEMA line, started having chest pains. He was rapidly evacuated to a medical facility where emergency care could be delivered. It was later discovered that this gentleman had a heart attack.
- TSGT Bureau and SPC Smith on four separate occasions during the deployment identified patients who did not appear to be well. Upon further assessment these patients were found to have severely low blood sugar due to their poorly managed diabetes. Bureau and Smith are credited by the chief medical officer for having saved the lives of these individuals.
- 2LT Harold Timboe and 1LT Richard Nessner noticed that evacuees were moving out of the Convention Center and had left their bedding behind. This was determined to be a public health hazard. A process for tagging and removing abandoned bedding and personal belongings was developed during a conference with the chief medical officer. This process was then initiated by the medic teams to control a potential health hazard.
- As the population of the Convention Center dwindled and the population at Reunion Arena increased, roving teams were sent to the Reunion Arena to be the only medical teams that were on the floor to assess the needs of the population. They did have Dallas Fire Department on the scene to utilize for evacuation of patients, as needed.

PUBLIC HEALTH ISSUES

The public health needs of such a large number of people packed into a tight space were evident. The infection control aspect, of dealing with the issues of having so many people, fell to the medical personnel of the Texas Medical Rangers. An outbreak of infectious dysentery was well underway upon their arrival; however, with the implementation of hand hygiene and infection control procedures, this potentially disastrous epidemic was prevented. The Chief Medical Officer, Dr. Fowler, stated that "The Texas Medical Rangers prevented an epidemic."

- MAJ Carol Olivier and SGT DiAnna Jones upon their arrival began to work with Dr. John Carlo, Chief Epidemiologist with Dallas County Health and Human Services, to do surveillance on the source of the outbreak of dysentery. The CDC epidemiologists arrived and the Rangers were attached to them to continue the search for the source of the outbreak. It was determined early on that the source was most likely poor hand hygiene. A hand hygiene policy was placed into effect that required all persons entering and exiting any area of the Convention Center, food lines, and bathrooms to use alcohol based hand sanitizer. Within only a few days the epidemic was under control.
- MAJ Olivier and SGT Jones, upon recommendation from the CDC, designed, built, and organized both an isolation and containment area for both pediatric

and adult patients to prevent the spread of infectious dysentery and vomiting. This proved to be a epidemic was under control.

- MAJ Olivier and SGT Jones, upon recommendation from the CDC, designed, built, and organized both an isolation and containment area for both pediatric and adult patients to prevent the spread of infectious dysentery and vomiting. This proved to be a highly efficient and effective way to prevent spread of disease in those persons already affected.
- All of the Texas Medical Ranger staff maintained due diligence by monitoring and enforcing the hand hygiene policy throughout the deployment.
- As a public health recommendation, the Rangers identified trash and abandoned bedding that needed to be removed. They assisted in educating the population and in removing these items as necessary.
- Rangers provided the primary force for staffing of the adult and pediatric isolation area.

Most of the civilian volunteers were not willing to go into this area. Texas Medical Ranger nurses, emergency medical technicians, paramedics, and doctors staffed this area 24 hours a day until its closure. Texas Medical Ranger staff was asked to maintain public health surveillance of Reunion Arena. This was done by sending teams of infection control specialists to that location to report back to the chief medical officer with their findings.

URGENT CARE

The urgent care area at the Convention Center was a highly functional area that saw patients 24 hours a day and 7 days a week. They averaged 719 patients a day and by the end of the deployment had seen more than 8,000 patients. More than 300 patients were evacuated to the hospital. They helped to maintain the health of the population, and, as a result, there were no deaths or severe adverse events at the Convention Center. The Texas Medical Rangers augmented the civilian volunteer staff in this area.

- Rangers provided the only medical technicians to staff the lab during the entire operation. They maintained the staffing in this area 24 hours a day until the clinic closed.
- Nurses and Paramedics triaged patients continually.
- There were nurses, paramedics, physician's assistants, and physicians on duty in the urgent care area from the Texas Medical Rangers to augment the civilian staff for virtually 24 hours of every day. For the last week of the deployment, after nearly all of the civilian volunteers left, Rangers provided the main force for staffing of this area.
- Texas Medical Rangers found and treated, along with the civilian volunteer doctors, an infant that was suffering from infectious dysentery. This case was so severe that, according to the chief medical officer, the infant was near death. Through quick treatment and fluid resuscitation this infant was saved.

DIGNITARIES

Several dignitaries visited Dallas Convention Center to witness the efforts, among others, of the Texas Medical Rangers. These included:

- US Surgeon General Richard Carmona
- Mayor Laura Miller - Dallas
- Mayor Ray Nagin – New Orleans
- Kathleen Blanco – Governor of Louisiana
- Kay Bailey Hutchison – US Senator
- Pete Sessions – US Congressman
- Michael Levitt – Director of US Department Health and Human Services
- MG Jerry Ragsdale – Commander, Texas Air National Guard
- MG Richard Box – Commander, Texas State Guard. (See Figure 6, below, for his personal commendation.)
- MG Charles Rodriguez – Texas Adjutant General
- COL Cruz Medina – Task Force Commander, Texas Army National Guard
- COL Raymond Peters – Chief of Staff, Texas State Guard
- CSM Robert Smith – Command Sergeant Major, Texas State Guard

OPERATIONS

The Texas Medical Rangers at the Dallas Convention Center, Dallas Reunion Arena, and Tyler, Texas functioned in a highly organized manner. Shifts were staffed from 0800-2000 and 2000-0800 daily. There was an officer-in-charge (OIC) and a noncommissioned officer-in-charge (NCOIC) for each shift. BG Scantlin, the North Texas Area Commander and the Deputy Commanding General of the Texas Medical Rangers, held a daily briefing for commanders and staffs, and to address concerns of the previous day. Also, there was a daily meeting conducted for the Texas Medical Ranger's Command Staff with the Chief Medical Officer, Dr. Ray Fowler. This was done in order to stay abreast of medical concerns and events related to the treatment and housing of evacuees. A formation of Ranger personnel was held prior to each shift to inform every one of events and of the mission. This allowed the troops to be informed of conditions as they changed shifts, and to give specific assignments.

In addition to the other assignments, CPT Robert Rain served as the Psychological Force Protection/Protective Medicine Officer for the Texas Medical Rangers. As troops became

overwhelmed with the burden of caring for thousands of evacuees who had lost everything, CPT Rainey maintained contact with them to assist as needed. As a result, morale and psychological injuries were minimal. CPT Leopold Celiz served as Physical Force Protection Officer-in-Charge to make sure that the belongings of personnel were protected at all times.

Figure 6: Commanding General, Texas State Guard,

Command Staff Texas Medical Rangers

The command staff of the Texas Medical Rangers deployed in the North was composed of the following:

- BG Marshall H. Scantlin – NORTEX Area Task Force Commander
- COL James L. Greenstone – Deputy Area Commander – Medical
- LTC Paul Moore – Executive Officer of the Dallas/Fort Worth Medical Response Group and Special Liaison to the Chief Medical Officer
- MAJ Steve Sanderfer – Executive Officer
- CPT Mark Ottens – Operations Officer
- CPT Robert Rainey – Logistics Officer
- CPT Phil Vaughn – Personnel Officer
- CSM Bill Schaaf – Area Command Sergeant Major
- CSM Cecil Rickman – Deputy Area Command Sergeant Major – Medical

OBSERVATIONS

There were several observations made to improve future deployments of the Texas Medical Rangers:

- Deployment packets must be ready at all times.
- Early meetings should be established with the chief medical officer.
- Medical Supplies should be available to augment medic supplies.
- Communications must be established early. It must be maintained with appropriate and sturdy communications equipment.
- Texas Medical Ranger staff should be in-place and ready to assist early on with the psychological effects of deployment.
- For long deployments, laundry and billeting must be arranged in advance.
- Office supplies (paper, pens, pencils, computers, printers, projector, and fax machine) should be maintained on a stand-by basis to take care of required forms and reports.
- Water tight boxes need to be obtained to pack deployment gear for easy access and transportation.

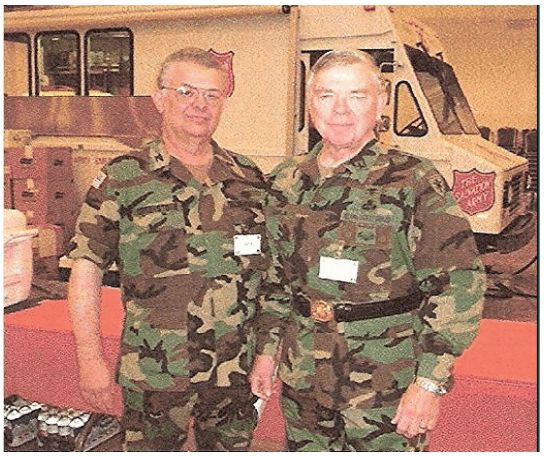

Figure 7: BG Marshall Scantlin, Commanding General, Texas Medical Rangers *(right)* **and COL James Greenstone, Texas Medical Rangers** *(left)***.**

There have been many historical moments for the Texas Medical Rangers, Medical Reserve Corps, since it was first deployed for Hurricanes Katrina and for Rita. Another major history-making event occurred in Tyler, Texas. A representative of the United States Public Health Service, from Surgeon General Richard H. Carmona's office, visited the Tyler shelter. She told LTC (Dr.) Luis Fernandez, Tyler Medical Response Group Commanding Officer, and the Disaster Hospital Commander, that this was not a "shelter" or even a "special needs shelter." It was truly a disaster hospital organized and run on the military medical scale and was a "best of practice model."

The Texas Medical Rangers was an untested "good idea" prior to Katrina. The Ranger concept has now been tested, with veterans who can augment a major disaster medical system. It is also capable of staffing and running a full-blown disaster hospital. What has been accomplished may well serve as the model for such disaster responses, at least

according to the words of Dr. Carmona's representative. We have a lot to be very proud of as a uniformed MRC. The Texas Medical Rangers will always go where it is needed and will do whatever is necessary to accomplish the mission.

Retired Navy Rear Admiral (Dr.) Peter Andrus, Texas Medical Ranger, examines a boy with stomach discomfort during Operation Lone Star. Aside from the community service aspect of the mission, Andrus cites OLS as important for the military forces because it allows them to train for contingency operations, such as hurricane relief. (photo by Spc. Brian Henretta, 100th Mobile Public Affairs Detachment)

Texas State Guard Lt. Col. (Dr.) Luis Fernandez, commander of the Tyler-based Texas Medical Rangers. (photo by Sgt. 1st Class Brenda Benner, 100th Mobile Public Affairs Detachment)

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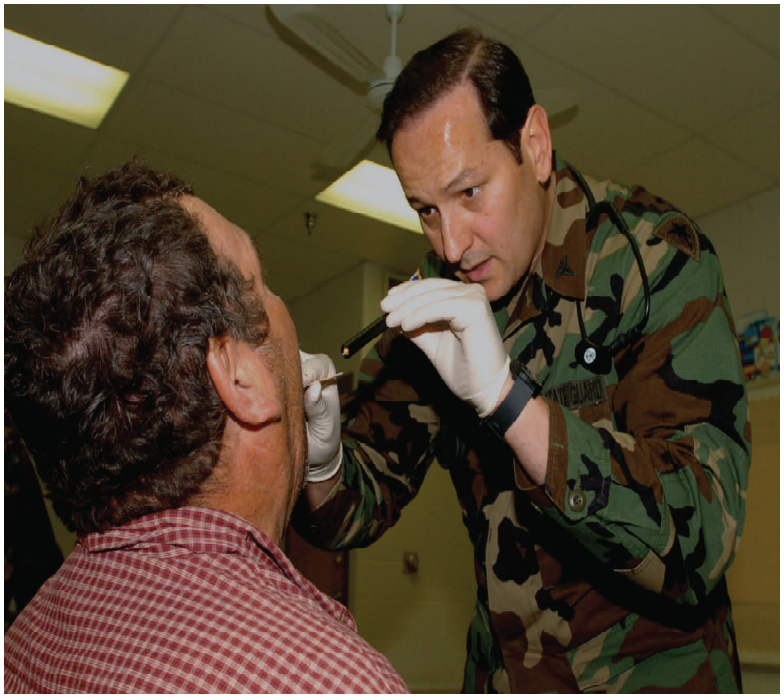

Galveston Hurricane of 1900 and Hurricane Katrina of 2005 Comparison

Walter H. Orthner
Operations Analyst

The Comparisons

This paper will examine and compare the emergency services provided by government officials in reaction to the Galveston Hurricane of 1900 and Hurricane Katrina in 2005. The comparison will focus on five areas: early warning, mortuary affairs, law and order, communications, and casualties. While the two natural disasters occurred 105 years apart, there are many similarities to be drawn. The devastation to both the Galveston, Texas, and New Orleans, Louisiana, communities was significant.

Galveston Hurricane of 1900

"On September 8, 1900, a massive hurricane hit landfall at Galveston, Texas. While not the most severe hurricane in strength since, or costliest in property damage since, the Great Storm of 1900 is still considered the deadliest of all natural disasters in US history, officially, at least."[1] Although official estimates vary, casualties are generally recognized to be between 6,000 and 12,000 fatalities.

Destruction in Galveston, Texas 1900

Hurricane Katrina 2005

"On August 23, 2005, Hurricane Katrina formed as a tropical storm off the coast of the Bahamas. Over the next seven days, the tropical storm grew into a catastrophic hurricane that made landfall first in Florida and then along the Gulf Coast in Mississippi, Louisiana, and Alabama, leaving a trail of heartbreaking devastation and human suffering. Katrina wreaked staggering physical destruction along its path, flooded the historic city of New Orleans, ultimately killed over 1,300 people, and became the most destructive natural disaster in American history." [2]

Early Warning

The Galveston Hurricane caught most of the population in Texas by surprise. The category 4 storm approached the Texas shoreline with little or no warning from the government weather bureau. Government officials failed to recognize the early indicators of the impending storm, and many people went to the beach to observe the storm as it approached. There were no evacuations, most people had only one day of warning before it hit landfall. During Hurricane Katrina, most residents of the Gulf Coast had up to four days warning that a hurricane was approaching the Gulf of Mexico. "Despite hurricane watches and warnings throughout the day, it appeared many people along the Gulf Coast either remained unaware or unconcerned about the storm that would soon ravage their communities."[3] The federal, state, and local governments in both the Galveston Hurricane of 1900 and Hurricane Katrina in 2005 were unable to provide early warning notification to impress upon the general public the seriousness of the impending disasters.

Mortuary Affairs

The Galveston Hurricane produced 7,000-8,000 casualties as the hurricane passed over the city during the late evening on 8 September 1900. The worst of the hurricane lasted until midnight, and at first light, the bodies of the deceased were strewn throughout the city and floating in the bay. The City of Galveston and the federal government were not prepared to collect, identify, and bury the significant numbers of casualties that the hurricane had produced. Many corpses were either left to the ravages of the sea or collected by the National Guard and burned on the beach.

Casualty Removal in Galveston, Texas 1900

In Hurricane Katrina, lives lost during the hurricane were significantly less than during the Galveston Hurricane. Still, the response by the State of Louisiana, as well as the response of the federal government to the mortuary needs of the community, was lacking. Early on, disagreements on recovery responsibilities between state and federal officials caused public confusion. Cancellation of the Federal Emergency Management Agency (FEMA) mortuary affairs contract with the Kenyon Corporation to help with body recovery resulted in a mortuary affairs nightmare. Eventually, the federal government relinquished authority to the state coroner who oversaw the identification of the dead. In both hurricanes, local, state, and federal governments were not prepared to handle the mortuary affairs effort during the recovery period.

Law and Order

After the Galveston Hurricane ended, the criminal element in the city started the looting which resulted in civil disorder. Thieves could be seen robbing hurricane survivors. Survivors started hoarding food, and a shortage of building supplies caused prices to skyrocket. It took the police force and Texas National Guard three days to restore order to the City of Galveston. "By the third day after the storm, 75 men who had been caught robbing the dead, had been shot and killed. One of these had in his pocket twenty-three human fingers with costly rings on them. The fingers had been cut from the victims of the storm found on the beach, or floating in the waters of Galveston Bay."[4] Likewise, Hurricane Katrina crippled the law enforcement operations in the entire Gulf Coast, severely affecting the City of New Orleans the most. Criminals were seen on television looting stores and businesses of everything that was not secured. Additional Federal Police, Department of Justice Officers, and Louisiana National Guard assets were required to quell the disorderly crowds. As with the Galveston Hurricane, it took at least three to four days to restore order in the wake of Hurricane Katrina's destruction.

Support Operations for Hurricane Katrina 2005

Communications

The lack of communication during the 1900s caused problems in the early warning of the approaching Galveston Hurricane. The primary communication method of the day, telegraph machines, were damaged before the hurricane reached landfall and were not restored until many days after the hurricane had passed. It took over three days for the information of the devastation of the Galveston Hurricane to reach the rest of the country. Similarly, Hurricane Katrina caused massive disruption in the communication capabilities of the Gulf Coast. While much more advanced then the 1900s, most of the communications systems required power, and once the power was disrupted, the communications systems failed. Battery backup systems, when available, only lasted for two days. Inadequate communications in both hurricanes hindered first responder's efficiency and delayed recovery operations. "Finally, the communications problems had a debilitating effect on response efforts in the region and the overall national effort. Officials from national leaders to emergency responders on the ground lacked the level of situational awareness necessary for a prompt and effective response to the catastrophe. This was a recipe for an inefficient and ineffective Federal Response."[5]

Casualties

The loss of life in Galveston was significant and many families who had lived in Galveston for three generations

were wiped out completely. "While there was no exact count of victims, most storm experts agree that there were at least 6,000 fatalities, or around one-sixth the city's 37,788 population (US Census) at the time. Some accounts at the time placed fatalities as high as 12,000, but storm experts since generally agree upon a figure of 7,000-8,000"[6] In addition to the loss of life, over 66 percent of the buildings were destroyed. In comparison to the Galveston Hurricane, Hurricane Katrina fatalities are usually estimated between 1,700 and 1,800 dead and with over 330,000 homes destroyed. The total devastation affected the road to recovery for both cities.

Conclusion

A lesson observed is often not a lesson learned. It is evident that after 105 years, many of the same common problems exist in the aftermath of a massive natural disaster.

Search and rescue crew members from Helicaopter Sea Combat Squadron 28 (HSC 28) observe a rescue in progress along the Louisiana coast on August 31, 2005, during Hurricane Katrina
(DOD Image Collection)

Endnotes:

[1] Fact Sheet, Galveston's 1900 Hurricane's, "The Great Storm" September 9, 2005.
[2] The White House, http://www.whitehouse.gov/reports/katrina-lessons-learned/foreword.html
[3] The Federal Response to Hurricane Katrina: Lessons Learned, February 2006, page 25.
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Walter Orthner is a retired Army officer having more than twenty five years of active duty service with the Army Medical Department as a Logistics and Operations Officer. His experience includes assignments involving joint operations, joint training, and joint concept development and experimentation. Employed by the Booz/Allen/Hamilton, Defense Team, he currently serves as an operational analyst focusing on medical related issues for the Joint Forces Command Joint Center for Operational Analysis.

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