

INTEGRATION OF NATIONAL GUARD MEDICAL CAPABILITIES DURING DOMESTIC DISASTERS: DEVELOPING THE SYNERGIES

BY

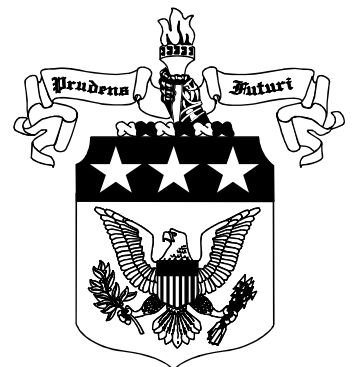
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USAWC CLASS OF 2009

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USAWC CIVILIAN RESEARCH PROJECT

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DOMESTIC DISASTERS: DEVELOPING THE SYNERGIES**

by

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Disclaimer

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ABSTRACT

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RESEARCH GOALS

The goal of this research paper is to develop concepts and identify changes that will improve integration of National Guard (NG) medical capabilities during a domestic disaster response.

The fifteen National Planning Scenarios depict the broad range of natural and man-made threats facing our nation. Several of which, would significantly exceed our ability to respond. In any large scale disaster, key components of the already stressed civilian healthcare system will be overwhelmed. As occurs during battlefield mass casualty events; patient evacuation, emergency, surgical and critical care assets are most rapidly and frequently overwhelmed. American hospitals and emergency medical services have, by fiscal necessity, eliminated almost all excess capacity in the system. In the event of a large, no notice disaster the ability to rapidly respond with critical medical capabilities will save lives and reduce human suffering. As America's resident "911" military response force, the National Guard will surely respond to the call for assistance.

The National Guard has undergone a significant change over the past several years. The Guard has moved from the strategic to an operational reserve of the Department of Defense. Although the Guard has long history of responding to domestic disasters of all types, events of the past decade have made clear that our efforts must

be more coordinated and synchronized. Under the guiding principles of the National Response Framework, the local, state and federal response must be well integrated both horizontally and vertically. It is well understood in response planning that the local, state and immediate regional capabilities will bear the full burden of a disaster for the first 48 to 72 hours before federal assets begin to arrive in significant strength. It is therefore necessary that the NG response be rapid, robust and be structured to serve as the nucleus upon which to build follow on military medical assets. To accomplish this, the National Guard must organize and employ its medical capabilities using more current and efficient doctrinal techniques.

RESEARCH OBJECTIVES

- 1) How can the establishment of the National Guard JFHQ-State in each state be leveraged to improve medical synergies with key domestic medical response partners?
- 2) In the continuum of disaster medical care, what medical missions is the National Guard (NG) best postured to support?
- 3) What are the critical interagency and intergovernmental “gaps and seams” that would preclude a successful rapid integration?
 - a) What are the critical impediments to a rapid NG medical response?

RESEARCH METHODOLOGY

A review of the public literature, government documents and military doctrine as well as several personal interviews with key individuals will be conducted. The most current items published will be reviewed

INTEGRATION OF NATIONAL GUARD MEDICAL CAPABILITIES DURING DOMESTIC DISASTERS: DEVELOPING THE SYNERGIES

Introduction

In September of 2007, the Department of Homeland Security released the newest iteration of the National Preparedness Guidelines¹. Although there have been some adjustments and changes since the first issue several years ago, one aspect has not changed. The National Planning Scenarios depict the broad range of natural and man-made threats facing our nation. They range from local disasters to catastrophic events such as major earthquake, the detonation of an Improvised Nuclear Device or the intentional release of a biological weapon. Two scenarios would constitute global events: the release of a contagious aerosolized biological weapon and an influenza pandemic. Our recent experience with Hurricane Katrina helped serve as a pointed reminder of the need for a more integrated response plan. However, in as much as hurricanes are events that require preparation, they may be among the easiest for which to prepare. We know when hurricane season begins and ends and we have several days advanced warning prior to landfall². In recent US history, hurricanes have not been responsible for the generation of massive numbers of injuries or loss of life. The events that are of most concern are those for which there is no advance warning. These types of events preclude evacuation, taking shelter or the pre-positioning personnel and equipment.

A major earthquake along the New Madrid fault³ or the urban detonation of a Nuclear weapon would be devastating not only in its injuries and loss of life, but also in the destruction caused to the surrounding infrastructure⁴. These no notice events are the most difficult to prepare for, and therefore the most worthy of national planning attention. To borrow from the traditional military decision making process, planners must always consider, at a minimum, the most likely and the most dangerous potential events.

Several of the aforementioned disasters or catastrophic events would severely overwhelm any healthcare system; the US health care system is no exception. In an effort to reduce overall costs of care, hospitals and emergency medical services have

eliminated any excess capacity. The average wait time to see a physician in a busy urban emergency room is over three hours for individuals with non-life threatening injuries⁵. A recent study by the American Hospital Association concluded that the majority of urban hospitals routinely divert patients due to a lack of available bed space⁶. The growing shortfall of medical professionals will compound this problem in the years to come.⁶ It is this environment in which we must prepare for potential disasters. In the event of a large, no notice disaster the ability to rapidly respond with critical medical capabilities will save lives and reduce human suffering.

Adequate preparedness can only be achieved via a comprehensive approach that connects local, state, and federal government entities, private sector organizations (especially NGO's) and community capabilities. The National Response Framework (NRF) clearly identifies the key response principles of engaged partnership, tiered response, scalability, flexibility, adaptability and unity of effort⁷.

The National Guard has a long and honorable history of responding to the nation's call to duty for service both at home and abroad. Historically, the Guard responds to domestic emergencies and disasters as part of a Governor's first responder force. Today's National Guard conducts domestic disaster response and assistance missions on a daily basis. Of the ~65,000 military personnel that responded to Hurricane Katrina, over 50,000 were National Guardsmen from all over the country, employed under their home state Governors' authorities⁸. In addition to the Guard's Homeland Security mission, the National Guard also supports the federal Homeland Defense mission by providing soldiers and airmen for deployment overseas. With approximately 3000 armories located around the country and territories, the Guard is always close at hand. Former House Speaker Tip O'Neil is credited with observing that, "*all politics is local.*" Those remarks have been appropriately modified to say; *that like politics, all disasters are local, or at least they start that way.* In that regard, as America's hometown "911" military force, the Guard will respond to the call for assistance.

The National Guard Force

*“When there is a disaster, be it natural or manmade,
The Guard is the backbone of our ability to respond”.*

Governor Edward G. Rendell testimony before the U.S. House
Committee on Government Reform, October 2005

The National Guard consists of the Army and Air National Guard. The National Guard is a constitutionally unique organization⁹. The National Guard operates under the Command of the state or territorial Governor while in either State Active Duty status or, as codified under Title 32 of the United States Code¹⁰. However, if circumstances warrant, the National Guard may also be called forth by the President under Article II Section II⁹ of the Constitution as part of the federalized military. This authority is codified under Title 10 USC¹⁰. This has permitted the greatest flexibility of the employment of the Guard both domestically and abroad.

As required by the Dick Act of 1906 and the National Defense Act of 1916¹¹, the organizational structure the Guard service components conforms to their regular army counterparts. The National Guard trains to the same standards and uses the same types of equipment as their Regular Army and Air Force counterparts. However, until very recently, the Guard was considered a strategic reserve of the Department of Defense. As a strategic reserve, “*the National Guard was habitually neglected*¹²” and never fully funded or resourced. This has created equipment, training and personnel shortfalls which have impacted readiness. With the passage of the National Defense Authorization Act for 2008 and the very recent DoD Directive, Managing the Reserve Components as an Operational Force¹³, these shortfalls will abate over the next several years.

Types and Capabilities of National Guard Medical Assets

The National Guard medical force structure and therefore its medical assets are designed to support DoD’s war fighting mission. However over the past several years the Guard has developed several capabilities which were envisioned with domestic disaster preparedness and homeland security responsibilities in mind. The 55 Weapons of Mass Destruction-Civil Support Teams (WMD-CST) and the 17 Chemical

Biological, Radiological, Nuclear and/or Explosives (CBRNE) Enhanced Force Response (CERF) teams are two of the better known additions. The majority of the medical assets are traditional military medical units which can be also used in support of civil authorities.

Army National Guard

The basic medical unit in the Army National Guard (ARNG) is the Medical Company (Table 1). Generally speaking, they are between 75-85 person units. There are two different types of ground medical companies, Brigade Support and Area Support. They have more in common in their architecture than they have differences. Under the taxonomy of care (Figure 1) delineated in DoD Joint Staff Publication for Health Service Support (JP4-02)¹⁴ medical companies provide First Responder and Forward Resuscitative Care^a. They are authorized three physicians, three Physicians Assistants, a Dental officer, an RN, and approximately 30 Combat Medics, the Army equivalent to civilian EMT's.

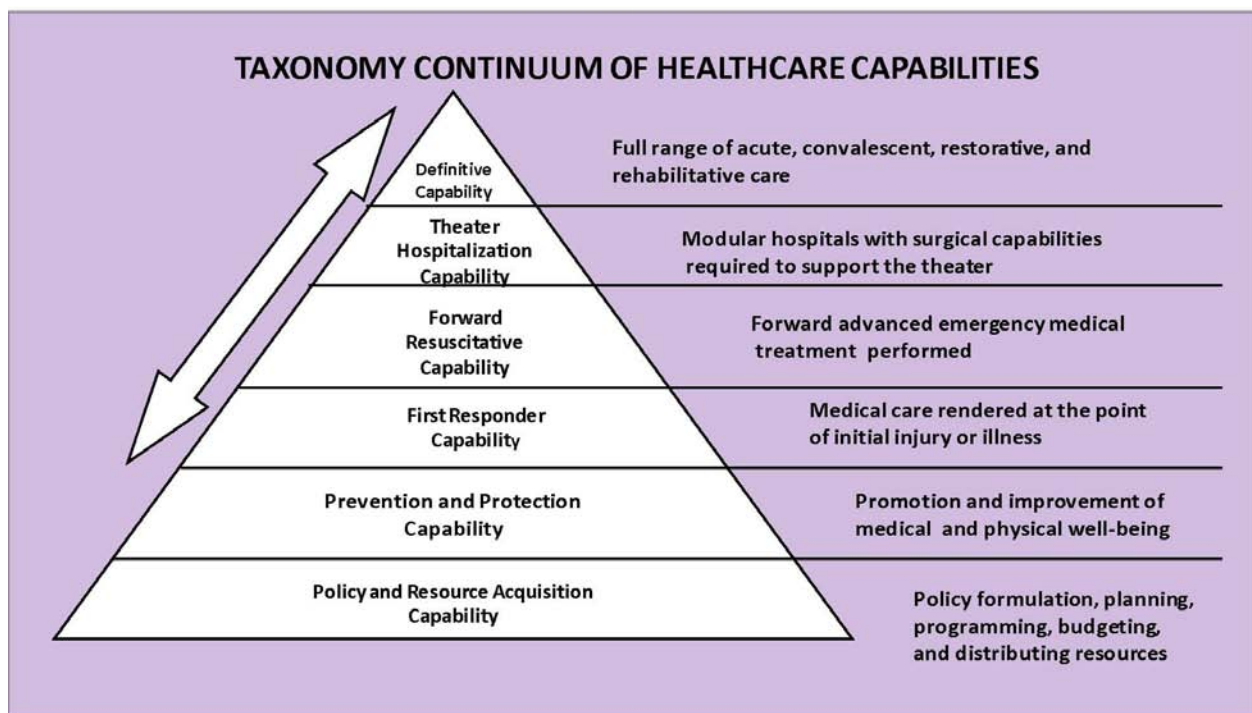


Figure 1 Taxonomy Continuum of Health Care¹⁴

^a Under the previous echelons of care system, this would constitute level I and II+ care

Additionally, they have the requisite administrative support, ancillary and allied health personnel to function independently. The typical Medical Company can provide 40 temporary holding cots, two advanced trauma management teams, and 8 four litter wheeled ambulances. It has limited dental, diagnostic lab, respiratory, pharmacy and x-ray capabilities. The unit is 100% mobile using its own organic vehicles and therefore is fully ground mobile. In many ways, the Ground Medical Company functions like a civilian emergency department. The EMTs' transport patients to the facility where they are triaged, treated and prepared for transportation to more definite care. And, much like a civilian ER, the patients normally only remain for short periods of time until their disposition is established to maintain patient throughput. In addition to ground Medical Companies, the ARNG also has Air and Ground Ambulance Companies. These units provide rotary and wheeled ambulances for short distance evacuation of patients and transportation of critical medical supplies. However, the true strength of a ground medical company is its Combat Medics. It is the Medic who locates, provides the initial treatment and evacuates the injured to a higher level of care. The medic provides the company the ability quickly clear large numbers of injured from a geographic area. The ARNG force structure does not contain Combat Support Hospitals, Theater Hospitalization or Forward Surgical teams. Those capabilities reside in the Regular Army and the Army Reserve. The ARNG force structure is geared to support the Brigade based combat maneuver units. Given the nature and potential fluidity of modern kinetic warfare, it is then understandable that the ARNG medical components are small, modular and highly ground mobile. Clearly, it is a force that is oriented towards the provision of health care from the Point of Injury (POI) to transfer to a definitive care facility such as hospital or a Point of Embarkation (POE)

Air National Guard

Over the past several years, the Air National Guard (ANG) Medical Service has worked hard to improve its capabilities to respond to domestic disasters. Air National Guard medical capabilities are first and foremost committed to the flying wings to ensure that the ANG flight crews and support personnel can fly their assigned missions. However, in order to respond better to domestic events, the ANG has developed the capability to

employ a number of Expeditionary Medical Support (EMEDS)¹⁵ units (See table 2) . EMEDS is comprised of modular, scalable, rapid response medical packages that can be used for humanitarian relief, wartime contingencies and disaster response. EMEDS facilities provide 24 hour emergency medical care plus the following capabilities: Preventive medicine, primary care, force medical protection, trauma resuscitation and stabilization, limited surgery, and primary care, aeromedical evacuation coordination, aerospace medicine, urgent care, dental, and limited ancillary services. EMEDS can deploy as a modular building blocks system based on the number of beds required:

- EMEDS Basic (four beds)
- EMEDS+10 (ten beds)
- EMEDS+25 (twenty five beds) packages.

The ANG is currently fielding a total of 10 EMEDS+25 with the basis of allocation of one per FEMA region. Unlike ARNG Medical Companies which provide a high throughput of patients but only temporary cots for holding, EMEDS can provide true short term hospital level medical care to include some critical care services. The provision of surgical services would be very limited due to a shortage of anesthesiologists, surgeons and surgical nurses The ANG does not have any ground ambulances or rotary lift ambulances. Patients must therefore be brought to an ANG medical care location. As the system is designed to support airbase operations, EMEDS are fully air transportable via fixed wing aircraft. Upon landing at an airhead, an EMEDS hospital requires 18 to 24 hours with engineer support to become fully mission capable after arrival. EMEDS units do not have any organic ground transportation, therefore ground movements away from the airhead require outside transportation support.

The Air National force structure contains 10 Aeromedical Evacuation (AE) Squadrons¹⁶. These AE units consist of a Mobile Air Staging Facility (MASF), Air Evacuation Liaison Teams (AELT) as well as the equipment and medical personnel to provide in flight medical care to most types adult patients, except those who are in need of Critical Care Air Transport Team Support (CCATT). Coordination of patient movement from an airhead or airport is accomplished by uploading the patient movement requirements to

the National Disaster Medical System (NDMS) to identify receiving hospital bed type and locations^b.

Type of ARNG Medical Unit	Number Authorized	Core Mission
Multifunctional Medical Battalion HQ (MMB-HQ) FM 4-02.12	7	Provides command, control and communications for 6 to 8 company sized units. Provides planning support and operational Command (C2) to all assigned or attached units
Area Support Medical Company (ASMC) FM 4-04.24	24	Provides triage, emergency medical care, temporary holding, and evacuation, dental and preventive medical with assigned area. Fully ground mobile with organic trucks and ambulances. Authorized 8 all terrain wheeled ambulances per company. ASMC's have organic food service and vehicular maintenance elements
Brigade Support Medical Company FM 4-02.6	32	Organic to the Brigade Sustainment Battalion (AKA: Forward Support Battalion, pre modular conversion) Provides triage, emergency medical care, temporary holding, evacuation, dental and preventative medical care to parent Brigade and within assigned area of operations. Fully ground mobile with organic trucks and ambulances. Authorized 8 all terrain wheeled ambulances per company.
Evacuation Company (Air Ambulance) FM 4-02.2	16	Provides short range MEDEVAC Fifteen helicopters per company
Evacuation Company (Ground ambulance) FM 4-02.2	6	Provides ground patient evacuation. Twenty four all terrain wheeled ambulances per company
Battalion Aid Station FM 4-02.4	Organic component of parent unit	Pre-hospital Care only. No holding capability. Provides first aid and limited emergency care to soldiers assigned to parent unit
Medical Detachment(s)	varies	Various small mobile Mental Health, Preventive Medicine Contact teams

Table 1 Types of Army Guard Medical Units

^b A full discussion of patient movement and regulating during domestic disasters in CONUS is beyond the scope of this article. The process of moving and tracking patients is currently a complicated process involving the Incident Command Structure, Medical facilities, NDMS, DHHS, USTRANSCOM, ANG and ANG.

ANG Medical Unit	Number Authorized	Core Domestic Response Mission
EMEDS+25 (25 Beds)	10	Provides emergency medical care plus the following capabilities: Preventive medicine, primary care, force health protection, trauma resuscitation and stabilization, limited surgery, and primary care, aeromedical evacuation coordination, aerospace medicine, urgent care, dental, and limited ancillary services. EMEDS can deploy as a modular building blocks system based on the number of beds required Basic, +10, +25
Aeromedical Evacuation (AE) Squadron: <ul style="list-style-type: none"> • Aeromedical Evac Teams (AET) • MASF • AELT 	10	<p><u>AET</u>: Provide in-flight supportive nursing care, 1 per 50 patients. Ensures aircraft is properly configured and loaded for aeromedical evacuation.</p> <p><u>MASF</u>: Provides 25-50, 4-6 hr temporary cots for patients awaiting AE evacuation Aircraft. Prepares Patient manifest and assist in configuring aircraft for patients.</p> <p><u>AELT</u>: Provides a direct HF radio communications link and immediate coordination between the user requesting aeromedical evacuation and the AECC.</p>
Medical Specialty Support Teams	Variable number of small teams	Provide a variety of supporting services such as Public Health, Bioenvironmental engineering, Preventative medicine, Mental Health, Fatality Recovery Team, Lab services, etc
CERF team (Draft CERFP CONOPS)	17	Responds to a Chemical, Biological, Radiological, Nuclear, or high yield Explosive (CBRNE) incidents and supports local, state, and federal agencies managing the consequences of the event by providing capabilities to conduct casualty/patient decontamination, medical support, and casualty search and extraction ¹⁷ . Uses a slice element of EMEDS.

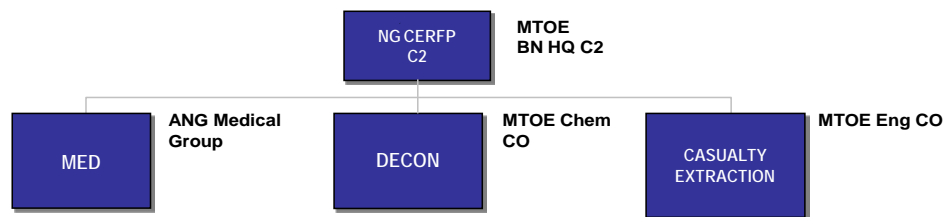
Table 2 Air National Guard Medical Units

National Guard CBRNE Enhanced Response Force (NG CERF)¹⁸

In 2004, LTG H Steven Blum, then Chief of the National Guard Bureau, realized that the Guard needed to improve its ability to respond rapidly to a domestic CBRNE event. The National Guard Bureau in conjunction with the States established 17 CBRNE quick reaction units. These units are comprised of traditional National Guardsmen who, in addition to the regular military equipment and training, receive additional equipment and undergo additional training to allow them to respond to domestic CBRNE events in support of Civil Authorities. The CERF- TF is composed of Headquarters, Decontamination, Extraction and Medical elements (Table 3).



CERF-P Organization



Dual mission and modular

- Units provided additional **specialized** equipment and training to perform operations in a WMD environment
- **14 additional days per year** over the 39 days of statutory training
- Receive search and extraction training and meet **NFPA certification** to operate in confined space collapsed structure
- Specialized equipment meets **NIOSH/OSHA standards**
- Units **trained to operate** under NIMS
- HAZMAT trained IAW NFPA 472 standards

Table 3 CERF Organizational chart^c

The teams are trained and equipped in accordance with all the applicable National Institute for Occupational Safety and Health (NIOSH), Occupational Health and Safety Administration (OSHA) and National Fire Protection Association (NFPA) standards to allow the team to rapidly and safely integrate with their civilian response counterparts.

^c National Guard Bureau J-3 CERFP briefing, January 2008

Under the initial concept of operations (CONOPS) the ANG was the force provider for the medical element. The current build consists of a 47 person medical element which is “dual hatted” from existing ANG medical units. Exercises, external evaluations and ongoing conceptual development have shown that the current build is inadequately configured and sized to meet the mission requirements. Efforts are currently underway to incorporate an ARNG ground medical company to work in conjunction with the ANG medical element. This would provide the additional manpower, organic ground evacuation and transportation as well as combat medics that would be required to provide the patient throughput and evacuation rates required.

National Guard Medical Assets in the Continuum of Healthcare

In the continuum of healthcare from Point of injury (POI) to definitive medical care the National Guard’s focus is clearly weighted towards the pre-hospital and Emergency Department levels of care. Hospitalization is limited to the ten 25 bed EMEDS units. There are no Combat Support Hospitals in the Guard and resuscitative surgery care is very limited. One of the cornerstone principles of modern trauma and emergency medical care is the rapid provision of basic and advanced life support techniques^{19, 20, 21} with the prompt evacuation to higher levels of care of those patients who need more advanced levels of care.^{21, 22} The ARNG currently has on hand approximately 950 wheeled^d, 4 litter (M-997 HMMWV) all terrain, environmentally controlled ambulances^e, 200 Medical evacuation Helicopters (UH-60 MEDEVAC)^f distributed in 68 medical companies. Additionally, the ARNG has over 10,500 Emergency Medical Technicians (EMT-B), 800 Physicians, 800 PA’s and 680

^d The ARNG is authorized approximately 1500 M997 Ambulances. The current shortfall will worsen over time based on the current consumption rates.

^e The M997, M997A1, and M997A2 are 4-litter ambulances (Maxi-Ambulances) with light armor protection for the crew and patients. The ambulances are capable of transporting up to four litter patients, eight ambulatory patients. The ambulance are heated and air conditioned. For operation in an NBC environment the M-997 is equipped with a Gas- Particulate Filter Unit capable of supporting up to seven personnel equipped with either M25 series protective masks or M13 series patient protective masks.

^f It provides medical evacuation of injured soldiers and the assistance of civilian population in time of crisis. It features 6 patient litters, on-board oxygen generators, and a medical suction system

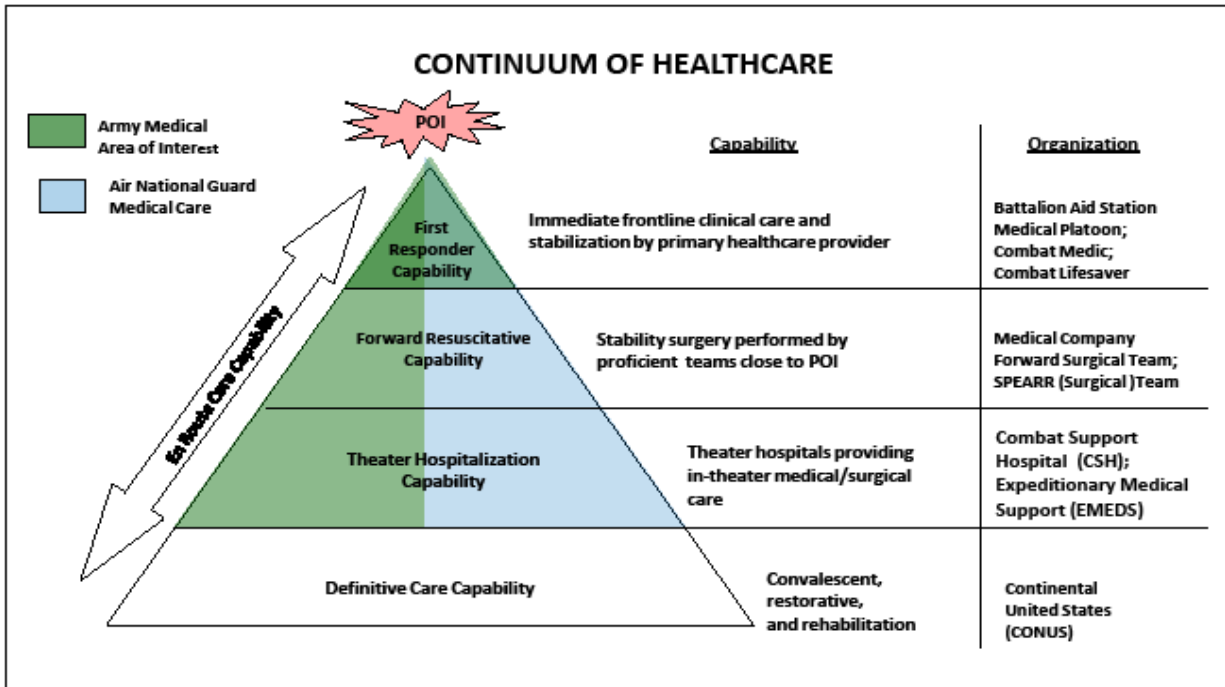


Figure 2 Continuum of Medical Care^g

Registered Nurses (See table 4). Most have experience in providing medical care in a combat zone. The ANG clinical medical complement consists of 2200 EMT's, 450 Physicians, 125 PA's and 780 Registered Nurses (See table 5). By the conclusion of calendar year 2008, the ANG will have acquired and placed in 3 regional depots a total of 10 EMEDS+25 equipment sets. Additionally, the ANG had 10 Aeromedical Evacuation Squadrons^h available to respond. The NG CERF-TF medical element is purely pre hospital oriented. The assigned medical personnel are trained to support the Extraction and Decon elements and to "triage, treat and make ready for transportation"¹⁸. The patient holding capability is limited to cots and is currently drawn from solely ANG medical assets, there are no ambulances organic to the CERF-TF. However, the medical personnel are NFPA extraction certifiedⁱ, they are capable of safely providing direct support to search and rescue teams working in collapsed structure environments.

^gMedical Evacuation FM 4-02.2, Headquarters, Department of the Army, May 2007

^h An Aeromedical Evacuation Squadron (AES) consists of the Mobile Air Staging Facility (MASF), the AE Medical crews and the Aeromedical evacuation Liaison Team (AELT).

ⁱ CERF medical providers are required to complete a 60hr course for certification under NFPA Code 472

Branch	Actual Inventory FY-08
Physicians	549
Dental Corps	164
Veterinarian Corps	14
Physicians Assistants	661
Nurses	652
Medical Service Corps	1457
EMT's (MOS 68 series)	10530
TOTAL	14027

Table 3 ARNG Medical Personnel

Air National Guard Medical Personnel	
Branch	Actual Inventory FY -08
Physicians	459
Dentists	152
Physician Assistants	123
Registered Nurses	786
Emergency Medical Technicians	2200
Allied Health	663
Medical Service Corps	885
TOTAL	5268

Table 4 Air National Guard Medical Personnel

Although these are not large numbers compared to the number of civilian medical providers, they do offer capabilities which does not reside to any extent in the civilian medical community. Such as, collapsed structure certified medical providers and all

terrain CBRNE protected ambulances. This provides the capability to evacuate patients from locations and circumstances which may not be otherwise possible.^j Combined with the ability to rapidly establish a mobile emergency care away from “the hospital” can provide the civilian Incident commander a critical capability he cannot obtain elsewhere. The ANG EMEDS and AE units can be readily located at the Airhead to rapidly establish the air staging facility and APOD. ARNG ground and rotary lift ambulances can provide short haul medical lift in support of the overall patient evacuation plan. During a large scale event, the local hospital emergency room will be heavily burdened by patients of all levels of acuity.

Joint Force Headquarters-State (JFHQ-State)

As part of an ongoing effort, to align with current DoD organizational doctrine, promote joint operations and to better respond in support civil authorities, the legacy State Area Commands (STARC) have been converting to Joint Force Headquarters-State (JFHQ-State). The process will continue over the next several years. The basic organizational construct of the JFHQ-State’s are similar in function, but due to the large variation in the size of the states and territories, their actual structures will vary.

The Joint Force Headquarters-State (JFHQ-State) provides command and control of all National Guard forces in the state or territory for the Governor^k. It acts as a channel for the flow of information to the Governor, the Incident Commander, National Guard Bureau and Combatant Commander. The JFHQ-State also coordinates any additional support required, such as mobilization of extra forces, or providing other logistical support.

The JFHQ-State assumes tactical control of all assigned military units ordered to support contingency operations, and is responsible for providing joint reception, staging, onward movement, and integration (JRSOI) of all inbound forces. It coordinates situational awareness and resource requirements with combatant commanders. The JFHQ-ST is also responsible for providing situational awareness information to national

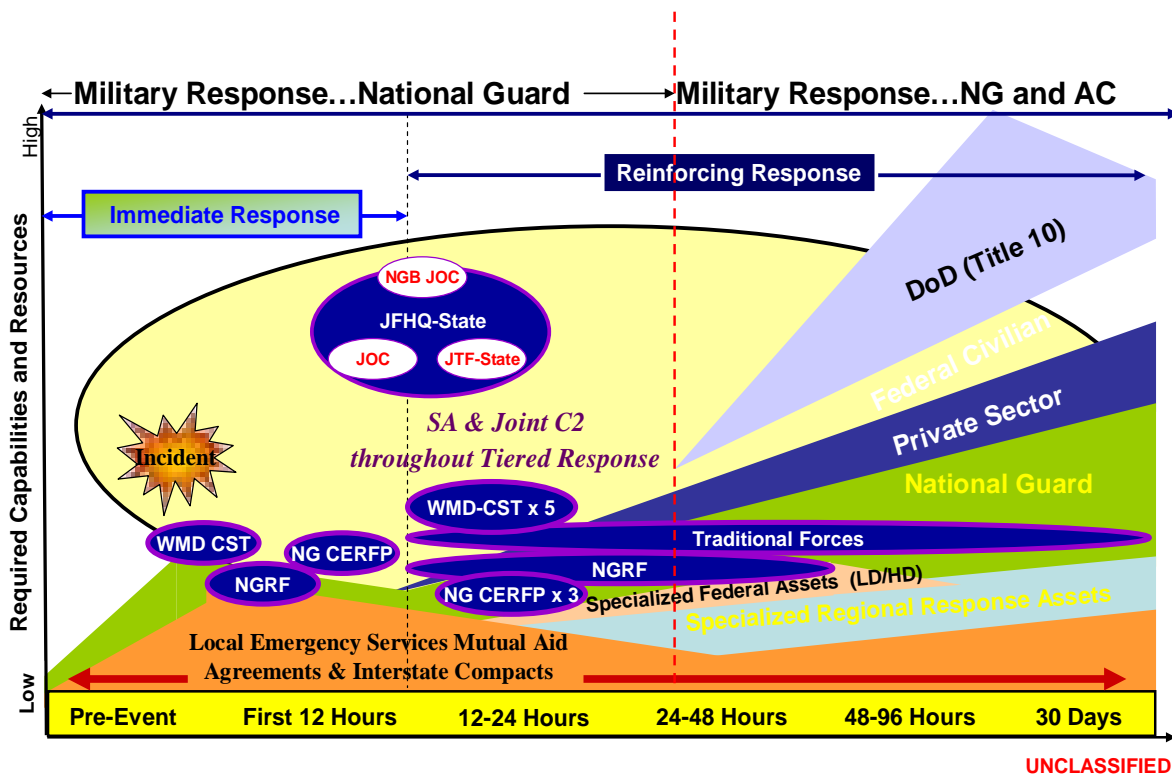
^j The Author’s personal experience during the January 1996 Blizzard. The 2 snowstorms dropped over 34” of snow in the Baltimore-Washington Region. The National Guard provided M-997 Ambulances and drivers to support City and County EMS response.

^k In the case of the District of Columbia, the Secretary of the Army

level headquarters before and during contingency operations²³. During an event, a subordinate Joint Task Force-State (JTF-State) may be established to unify command and control (C²) of National Guard or other military units, if assigned, arriving into the Area of Responsibility (AOR). Depending on the nature and scale of event, more than one “JTF-State” may be established. Subordinate Task Forces may be established as needed. The role of the JTF-HQ will be particularly critical in the first hours and days of

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Response Spectrum



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Figure 3 Initial Response Timelines¹

any event prior to the arrival of significant outside assistance. (See figure 3) For most disasters, the local and State assets with assistance via mutual aid agreements and the

¹ Slide provided by Office of Chief, NGB January 2008

Emergency Management Assistance Compacts^m (EMAC)²⁴. Federal assistance via Robert T. Stafford Disaster Relief and Emergency Assistance Act²⁵ (42 USC 5121) or other instrumentsⁿ cannot be expected to arrive in significant numbers for 48 to 96 hours. (Figure 3) During hurricane Katrina, DoD assets did not arrive in significant numbers for 7 days after landfall^{26, 27}. Saving lives and relieving human suffering will depend on how well the local, state and the regional response system are organized and how well they can synchronize their response efforts.

Analysis and Recommendations

The National Strategy for Homeland Security²⁸ recognizes that responding to domestic emergencies is historically and by constitutional intent⁸ primarily the purview of local and State governments. However, throughout the homeland security paradigm, one feature most has endured: Homeland security is a shared responsibility built upon a foundation of partnerships. Federal, State and local governments, the private and non-profit sectors, communities, and individual citizens all share common goals and responsibilities^{28, 29}. A fundamental principle in Civil Engineering is that without a solid foundation and secure footing, no structure can be built. The National Response Framework identifies 5 key principles to the Response Doctrine. A tiered, scalable, flexible, adaptable response via engaged partnerships among local, state and federal assets is the best way to achieve unity of effort. The fundamental principles of how a community response to a blizzard with a power outage should be the essentially the same as how it responds to a large disaster. The problems may change, but the fundamentals do not. The population still needs the provision of essential services, food, shelter, water and healthcare. In the case of an Influenza Pandemic, DHHS Secretary Michael Levitt has publically stated that the strategic center of gravity for response planning is the local and state levels^{30, 31}. The medical preparation for, and

^m The EMAC mutual aid agreement is a partnership between member states to provide direct assistance during all forms of natural and manmade disasters. Currently, all 50 states are signatory to the compact. EMAC allows Governors to share a wide variety of state resources directly, to include their National Guard assets.

ⁿ Under DoDD 3025.15 DoD a DoD Component or military commander may take immediate action to save lives, prevent human suffering, or mitigate great property damage under imminently serious conditions respond.

response to disasters requires significant logistical support - medical supplies, pharmaceuticals, transportation, medical evacuation, etc. This cannot be accomplished without integrated advance planning and coordination.

Under the current state National Guard force structure, each state has an Army and Air Surgeon. The role and responsibilities of the Guard State service Surgeons is very much similar to their active duty counterparts. The mission of office of the State Army or Air Surgeon is to; promote, sustain and enhance health, recruit, train and develop the medical force to support full spectrum operations, and to ensure that our soldiers, airmen and their families receive the highest quality healthcare available. Given that the office of the State Surgeon generally consists of 2 or 3 full time staff, with nearly constant mobilizations and de-mobilizations, this is a monumental undertaking. It should be well noted that neither the Army nor Air Surgeon is tasked to plan for domestic disasters. Neither office is organized, equipped or manned with the personnel with the required skills and training to engage in contingency planning³². As a result, medical participation in the planning process is severely affected. Critical gaps and seams remain open. Key linkages and pre event coordination does not occur with any degree of consistency. Operational synergies among response partners cannot be envisioned or war gamed in advance.

Current US Army policy³³ regarding the stockpiling of medical material by ARNG medical units precludes the storage of pharmaceuticals (potency and dated items) outside of the 2 week annual training cycle. The intent of this regulation is to ensure that unused medical supplies are returned and not left to expire on the shelf. The unintended consequence of this regulation is that ARNG medical units would not have access to critical medications and supplies for more than 2 days³⁴ even under ideal conditions. This is unacceptable during a disaster response. Medical units must arrive fully mission capable, or fall in on their pharmaceutical supplies at the Joint Reception, Staging, Onward Movement, and Integration (JRSOI) site. In the confused and critical hours after a large disaster, medical units arriving “empty handed” will not be an asset of utility to the Incident Commander. Additionally, military medical equipment sets and supplies are geared towards the management of adults. We have yet to resolve the how we intend to

care for the patients at the ends of the population demographic, the very young³⁵ and the very old³⁶.

It was well noted by the Federal Response to Hurricane Katrina Lessons Learned that medical care and evacuation suffered from a lack of advance preparations, inadequate communications, and difficulties coordinating efforts.²⁶ We can ill afford to allow ourselves to believe that we may be that lucky the next time. As illustrated by the Homeland Security Council 15 National Planning Scenarios, Hurricanes remain at the lower end of the spectrum to cause serious injury, loss of life and long term destruction of infrastructure. A truly catastrophic, no notice event may cause hundreds of thousands of injuries and deaths, and destroy the very infrastructure needed to respond. For example, a major earthquake on the New Madrid fault in the Mississippi Valley could severely impact 15 States³⁷. For events such as these, we cannot expect that somehow, by sheer mass alone, the right resource get to where it is needed. As impressive as the National Guard's response to Katrina was, the herculean effort would have even more rewarding had units been immediately matched to specific needs⁸. In October 2002, Georgia Emergency Management Agency with the support of the Rand Corporation conducted Bioterrorism Medical Emergency Response Planning Exercise²⁷ with Smallpox as the bioweapon. The after action reports from the TOPOFF series of exercises as well as Ardent Sentry-Vigilant Guard exercise conducted in May 2007 involving a the detonation of a 10 KT IND uniformly share the same conclusions.

- Comprehensive all hazard medical threat assessments were not done.
- Significant gaps and a lack of knowledge of each other's capabilities persist across the spectrum of health care providers^{38, 39}.
- Regional threats did not get regional solutions
- There is no Joint Medical Common Operating Picture (JCOP) therefore situational awareness is lacking at every level⁴⁰
- Local medical assets (hospitals, EMS, public health) are promptly overwhelmed⁸
- Under current polices, critical medical supplies for NG units would not be available when needed³⁹
- Military Field Medical Equipment sets are not equipped to treat the civilian population demographic.

- Fragmented medical command structure potentiates poor coordination of medical assets⁴⁰
- The planning process fails to include all stakeholders from community organizations, government agencies and NGO's⁴¹
- Response plans lack adaptability, flexibility and agility⁴⁰. A cardinal rule of planning is frequently broken: adapt, improvise and overcome.

Medical disaster planning cannot begin after the event occurs.

It is no longer fair to refer to these as lessons learned. They have become lessons confirmed⁴⁰. If we fail to take corrective action and fix the deficiencies that have been identified on numerous occasions, then undoubtedly lives will be lost that could have been saved.

1. How can the establishment of the National Guard JFHQ-State in each state be leveraged to improve medical synergies with key domestic medical response partners?

Recommendation:

- a. The National Guard should establish JFHQ Surgeons office subordinate to the JFHQ-State. The State Joint Staff Surgeon (State JSG) should be assigned as Special Staff to The Adjutant General (TAG). The primary mission of the State JSG would to plan and coordinate the Homeland Security mission. The office would be responsible to the TAG for the planning, integration, coordination and synchronization of the National Guard medical response to disasters. The State JSG will actively engage with the contiguous states to promote regionalization of threat analysis and response plans. He/she develops and matures the critical interagency and intergovernmental relationships that are required to effectively support the Governor's response plans. The State JSG would serve as the single point of contact for all military medical issues. He/she would be responsible for providing medical situational awareness to all entities that require it. During normal operations, the State-JSG will have no assigned or attached medical

units. Upon the establishment JTF-State, if medically indicated a Medical Joint Task Force (JTF-Med) will be established subordinate to the JTF-State. The State JSG will assume command of the JTF-Med and all assigned or attached medical units as ordered. As the State-JSG is envisioned to be an austere planning cell (See Appendix 1), it will be necessary to augment the capabilities upon activation of JTF-Med. A Multifunctional Medical Battalion HQ (MMB-HQ) would provide the ideal operational command and control capability. A notional JTF-Med construct and capability is illustrated in Appendix 2. There are currently 8 MMB-HQ's in the ARNG. It is recommended that that number be increased to 10 and the basis of allocation be one per FEMA region.

- b. The Guard and Reserve medical leadership must explore new and innovative collaborative partnerships and develop new operational concepts. No single entity or level of government has all the capabilities required. Consider the following example: What capability would be created if the following medical assets were collocated? A NDMS-DMAT team with a Federal Medical Shelter, a Red Cross Sheltering Center, an EMEDS+25, 2 Medical Companies all linked to a Aeromedical Evacuation Squadron via a Ground and Air Ambulance Companies. These types of interagency and intergovernmental operational synergies must be explored

2. In the continuum of disaster medical care, what medical missions is the National Guard (NG) best postured to support? What are the obstacles to performing this mission?

Recommendation:

Based on the existing force structure, the Guard medical capabilities are clearly weighted towards the pre-hospital and emergency department level care. The National Guard has significant ability to acquire patients at the Point of Injury (POI), provide initial emergency care and transportation (ground or air) to a Medical company, an EMEDS or a civilian hospital. However, given the modest

number of EMEDS beds, the best use of the capability would be to maintain a short evacuation policy and promote through put as transportation assets allow.

The National Guard must:

- a. Allocate resources to correct current significant medical equipment shortfalls (wheeled ambulances, medical Equipment sets, immediately available medical supplies). These medical supplies are truly “dual use items” that can be used both at home and abroad.
- b. Convert all 10 EMEDS+25’s to the Humanitarian Relief Operations Operational Capability Package^o (HUMRO-OCP). This variant is equipped to care for pediatric, OB/GYN and the elderly.
- c. Establish prepositioned, preconfigured medication push packages of sufficient quantities to support 10 Medical Companies with 7 days of supply (DOS). The goal should be an “order to delivery” time of not more than 12 hours^p. Supplies can be rotated to fixed facilities to prevent wastage.

3. What are the critical interagency and intergovernmental “gaps and seams” that would preclude a successful rapid integration?

Recommendation:

Almost all National Guard medical professionals are also civilian healthcare providers. They live and work in both worlds. No cohort of military medical providers understands civilian healthcare better. This makes the National Guard the idea bridge between the local and state civilian response agencies and the Federal ESF-8 partners. The Guard should continue to work hard to establish and mature the critical linkages. The best way to build a better understanding for how we can best work together is to train and exercise together. The civilian leadership must have a clear understanding of what capabilities are available and how to obtain them. The National Guard must have

^o The HUMRO OCP variant is a stand-alone, self-sufficient "off-the-shelf" package designed for quick deployment anywhere in the area of operations, whether an air base is located close by or not. The stand alone hospital includes a complete diagnostic and surgical capability in a 25-bed facility with all required base-operating support built in. The estimated number of people to run the facility is 90 medical staff and 150 support Airmen to include security forces, civil engineers, base services and others.

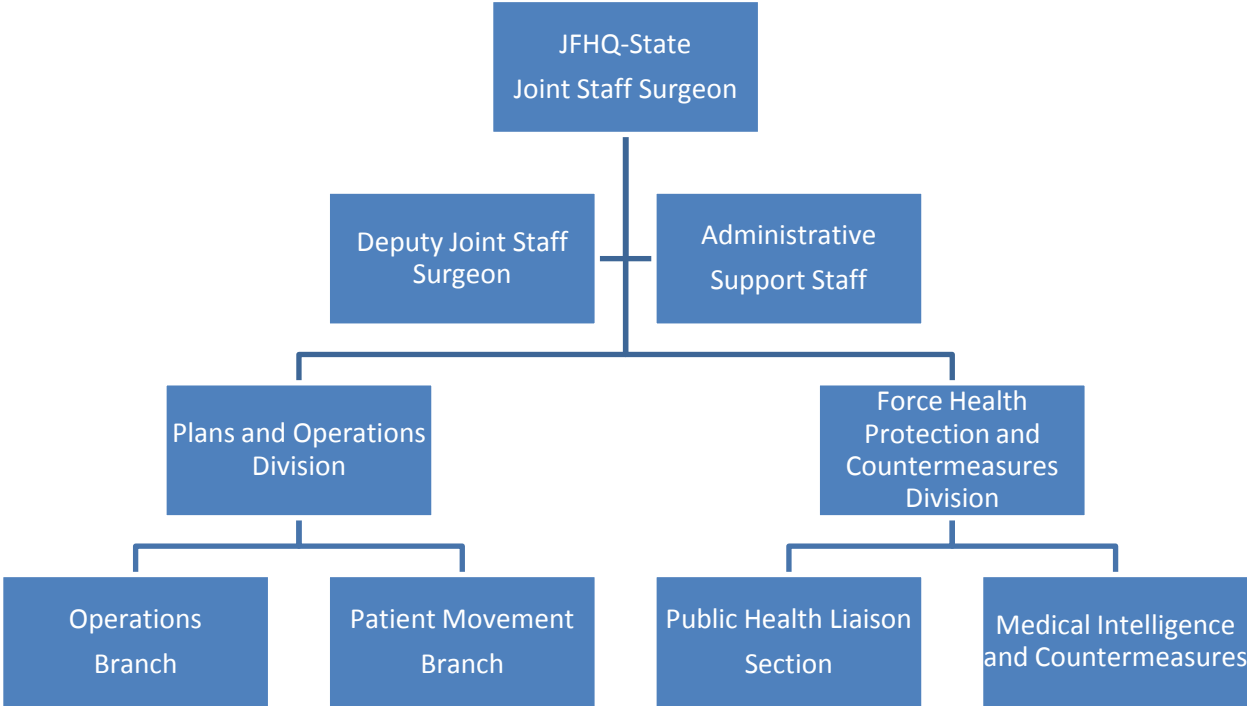
^p This “order to delivery” is consistent with performance metrics of the Strategic National Stockpile

a clear understanding of the civilian capabilities and be able to forecast the needs of the healthcare system. The process must be simple, direct and widely known.

Conclusion

The National Guard role in domestic response is grounded in well over 300 years of history and well codified under the constitution. For the Governors of the states and territories, their National Guard constitutes the backbone of the militaries' support to civil authorities. In November of 2008 Defense Secretary Robert M. Gates clearly indicated that his department will make the vast majority of the changes recommended by the Commission on the Guard and Reserves to fully operationalize the National Guard and "remove the remaining obstacles to full integration with their active duty counterparts"¹³. The Guard has made tremendous changes and improvements over the past 8 years in the areas of CBRNE detection, interoperable communications and Command and Control. We must now take on the challenge of doing the same for our medical capability. We must develop new collaborative partnerships and discover better ways to synchronize our efforts before we have the medical equivalent of "9/11/01". In order to accomplish this we need to make the necessary organizational and operational changes. We must provide our medical units with the equipment needed to save lives and relieve human suffering.

APPENDIX 1: JFHQ-STATE OFFICE OF THE JOINT STAFF SURGEON
(RECOMMENDED CONSTRUCT)



APPENDIX 2: NATIONAL GUARD JOINT MEDICAL TASK FORCE

NOTIONAL

- Multifunctional Medical Battalion Headquarters (Command and Control)
 - EMEDS+25 (25 bed hospital)
 - 2 Area Support Medical Companies
 - Brigade Support Medical Company
 - 2 Air Ambulance Companies
 - Ground Ambulance Company
 - Aeromedical Evacuation Squadron
 - Air Evacuation Teams (AET)
 - Mobile Air Staging Facility (MASF)
 - Aeromedical Liaison teams (AELT)
 - Critical Incident Stress Management Teams (CISM)
 - Force Health Protection Teams (Prev Med, Field Sanitation, Public Health, etc)

- This notional Task Force structure would generate:
 - ✓ 25 bed modular EMEDS Hospital
 - ✓ 3 mobile emergency rooms (Med Companies)
 - ✓ 120 Temporary Holding Cots
 - ✓ 36 Ground Ambulances (M-997 Maxi ambulance)
 - ✓ 17 Rotary Lift Air Ambulances (UH-60 Blackhawk)
 - ✓ Establish an APOD using the MASF, AET and AELT

REFERENCES

1. Department of Homeland Security. National Preparedness Guidelines. 2007. Available at: http://www.dhs.gov/xlibrary/assets/National_Preparedness_Guidelines.pdf.
2. HURRICANE FORECASTING IN THE UNITED STATES. *Bulletin of the American Meteorological Society*. 2007;88(6):950-953.
3. Elnashai A, Cleveland L, Jefferson T. Impact of Earthquakes on the Central USA. *Ideals at UIUC College of Engineering*. 2008. Available at: <https://www.ideals.uiuc.edu/handle/2142/8971> [Accessed November 30, 2008].
4. Dallas CE, Bell WC. Prediction modeling to determine the adequacy of medical response to urban nuclear attack. *Disaster Med Public Health Prep*. 2007;1(2):80-89.
5. Kaji AH, Koenig KL, Lewis RJ. Current hospital disaster preparedness. *JAMA*. 2007;298(18):2188-2190.
6. American Hospital Association. AHA Policy Research 2006. Available at: <http://www.aha.org/aha/research-and-trends/AHA-policy-research/2006.html> [Accessed November 10, 2008].
7. Department of Homeland Security. *National Response Framework*. Washington, D.C: U.S. Dept. of Homeland Security; 2008:82.
8. Davis LJ, Rough J, Cecchine G. *Hurricane Katrina: Lessons for Army Planning and Operations*. Rand Corporation; 2007. Available at: <http://www.rand.org/> [Accessed November 10, 2008].
9. United States. Congress. House of Representatives. Office of the Chief Administrative Officer. House Information Resources. Information Management. Web Systems Branch. US House of Representatives Educational Resources. Available at: <http://www.house.gov/house/Educate.shtml> [Accessed November 11, 2008].
10. Office of the Law Revision Counsel (U. S. House of Representatives). United States Code. 1994. Available at: <http://www.gpoaccess.gov/uscode/index.html> [Accessed November 11, 2008].
11. Wiener FB. The Militia Clause of the Constitution. *Harvard Law Review*. 1940;54(2):181-220.
12. Gates R. Comments from Secretary of Defense Robert Gates. 2008. Available at: <http://www.defenselink.mil/releases/release.aspx?releaseid=12358>.

13. Department of Defense. *DoDD 1200.17 Managing the Reserve Components as an Operational Force.*; 2008:1-8. Available at: <http://www.dtic.mil/whs/directives/corres/pdf/120017p.pdf> [Accessed November 11, 2008].
14. Chairmen of the Joint Chiefs of Staff. Joint Publication 4-02 Health Service Support. 2006. Available at: http://www.dtic.mil/doctrine/jel/new_pubs/jp4_02.pdf [Accessed November 12, 2008].
15. Skelton PA, Droege L, Carlisle MT. EMEDs and SPEARR teams: United States Air Force ready responders. *Crit Care Nurs Clin North Am.* 2003;15(2):201-212.
16. Pierce PF, Evers KG. Global presence: USAF aeromedical evacuation and critical care air transport. *Crit Care Nurs Clin North Am.* 2003;15(2):221-231.
17. The National Guard's Role in Homeland Defense. Available at: <http://www.ngb.army.mil/features/HomelandDefense/emeds/factsheet.html> [Accessed November 12, 2008].
18. Public Affairs Office N. The National Guard's Role in Homeland Defense. Available at: <http://www.ngb.army.mil/features/HomelandDefense/cerfp/factsheet.html> [Accessed November 13, 2008].
19. Werman HA, Nelson RN, Campbell JE, Fowler RL, Gandy P. Basic trauma life support. *Ann Emerg Med.* 1987;16(11):1240-1243.
20. Kortbeek JB, Al Turki SA, Ali J, et al. Advanced trauma life support, 8th edition, the evidence for change. *J Trauma.* 2008;64(6):1638-1650.
21. Diamond LM. Cardiopulmonary resuscitation and acute cardiovascular life support--a protocol review of the updated guidelines. *Crit Care Clin.* 2007;23(4):873.
22. Award-winning program slashes sepsis mortalities. *ED Manag.* 2008;20(6):64-67.
23. Indiana National Guard J. Joint force headquarters State: Overview and Mission. Available at: <http://www.campatterbury.in.ng.mil/vigilantguard/1JFHQState.pdf> [Accessed November 13, 2008].
24. Emergency Management Assistance Compact. *EMAC.* Available at: <http://www.emacweb.org/> [Accessed November 20, 2008].
25. Bea K. Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding RL 33053. 2005. Available at: <http://www.fas.org/sgp/crs/homsec/RL33053.pdf> [Accessed November 21, 2008].

26. Landy M. A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina/The Federal Response to Hurricane Katrina Lessons Learned. *Publius*. 2008;38(1):152-165.
27. Cecchine G, Michael Wermuth, Molander R. Triage for Civil Support. Using Military Medical Assets to Respond to Terrorist Attacks. 2004. Available at: <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA440971&Location=U2&doc=GetTRDoc.pdf>.
28. The White House Homeland Security Council. National Strategy for Homeland Security. 2007. Available at: <http://www.whitehouse.gov/infocus/homeland/nshs/2007/index.html> [Accessed November 20, 2008]
29. Schoch-Spana M, Franco C, Nuzzo JB, Usenza C. Community engagement: leadership tool for catastrophic health events. *Biosecur Bioterror*. 2007;5(1):8-25.
30. MICHAEL O. LEAVITT, SECRETARY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES. PREPARING FOR PANDEMIC FLU. *FDCH Congressional Testimony*. Available at: <http://mutex.gmu.edu:3793/login.aspx?direct=true&db=mth&AN=32Y1222995479&site=ehost-live> [Accessed November 21, 2008].
31. PandemicFlu.gov. PandemicFlu.gov. Available at: <http://www.pandemicflu.gov/index.html> [Accessed November 21, 2008].
32. NGB JSG- FAC. NGB Joint Surgeon's Functional Advisory Council Teleconference . 2008.
33. Schoomaker P. US Army Medical Logistics Policies AR-40-61. 2005. Available at: http://www.army.mil/USAPA/epubs/pdf/r40_61.pdf.
34. Department of the Army Supply Bulletin SB 8-75-S10. 2001. Available at: <http://stinet.dtic.mil/cgi-bin/GetTRDoc?AD=A406229&Location=U2&doc=GetTRDoc.pdf> [Accessed November 23, 2008].
35. Shirm S, Liggin R, Dick R, Graham J. Prehospital preparedness for pediatric mass-casualty events. *Pediatrics*. 2007;120(4):e756-61.
36. Sharma AJ, Weiss EC, Young SL, et al. Chronic disease and related conditions at emergency treatment facilities in the New Orleans area after Hurricane Katrina.[see comment]. *Disaster Medicine & Public Health Preparedness*. 2008;2(1):27-32.
37. Tuttle MP, Schweig ES, Sims JD, et al. The Earthquake Potential of the New Madrid Seismic Zone. *Bulletin of the Seismological Society of America*. 2002;92(6):2080-2089.

38. Bonnett CJ, Schock TR, McVaney KE, Colwell CB, Depass C. Task force St. Bernard: operational issues and medical management of a National Guard disaster response operation. *Prehosp Disaster Med.* 2007;22(5):440-447.
39. National Guard Bureau J-7 Joint Exercise Branch. Vigilant Guard-Ardent Sentry 07 Exercise After Action Report 9 -17 May 2007. 2007. Available at: [Accessed November 21, 2008].
40. United States. Congress. House. Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina. A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina. 2006:569.
41. Waugh WL, Streib G. Collaboration and Leadership for Effective Emergency Management. *Public Administration Review.* 2006;66:131-140.
42. The Commission on the National Guard and Reserves. Available at: <http://www.cngr.gov/> [Accessed December 1, 2008].

