

The Use of Deployable Military Hospitals after Hurricanes: Lessons from the Hurricane Marilyn Response

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Deployable military hospitals are frequently requested to supplement surviving local health care capabilities after disasters. Although some authors have advocated their use after mass casualty events such as earthquakes, previous reports have questioned the appropriateness of deploying these hospitals after destructive storms. These hospitals are relatively slow moving, expensive, and may require the diversion of local resources to support. After Hurricane Marilyn in 1995, a military hospital was deployed to the U.S. Virgin Islands. For a variety of reasons, the local health care community declined to use the facility once it was operational. This report is based on interviews with disaster managers and local health officials involved in the Hurricane Marilyn response. Recommendations include improving communications while requesting resources, broadening the range of available health assets to increase flexibility, positioning resources regionally or in the civilian sector, and creating clear indications for full-scale deployable hospitals when they are required.

Introduction

On the evening of September 15, 1995, a powerful Caribbean storm struck the island of St. Thomas in the United States Territory of the U.S. Virgin Islands (USVI). The next morning, the St. Thomians found their island in ruins, with 92% of their homes damaged or destroyed.¹ Many other structures, including the island's only acute care hospital, were severely damaged. The disaster response that followed would be called the "best-run operation" ever conducted by the federal response system.² Like all such operations, however, some mistakes were made, and these provide lessons for future response efforts. That first morning after the storm, local health care and political leaders requested a federal deployable military hospital. A reconfigured 132-bed combat support hospital (CSH) was deployed and operational on the island 17 days later. The local medical community, however, declined to use the facility, and redeployment began the day after it became operational. An after-action workshop of the health and medical leadership involved in the response reported that decision making was hurt by "incomplete and inaccurate information" and recommended "better communications between Department of Defense and other [health and medical] partners."³ This report is an attempt to describe the events behind this after-action finding in a way that will benefit future military and civilian disaster managers.

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Methods

This report was partly extracted from a case study that was based on a series of 24 interviews conducted with leaders and participants involved in the response to Hurricane Marilyn and previous Caribbean storms. Although some interviews were conducted by telephone, the majority (15 of 24) were conducted in person, both in the USVI and in the continental United States. Although unpublished, this case study does appear on the Regional Center for Disaster Information World Wide Web site sponsored by the Pan American Health Organization.⁴

Background

The U.S. armed forces have been involved in domestic disaster response activities since the end of the Civil War, and the reasons for using the military during these operations, including the resources and organization to respond quickly, have not changed greatly since those early years.⁵ The defined role of deployable military hospitals also has not changed greatly. These are principally surgical hospitals directed toward the care of healthy young males who have been injured. In the modern defense forces, these soldier-patients have been fully immunized and medically screened. Because the objective is to either return the patient to active duty or evacuate him or her out of the theater of operations, the only definitive care provided is general medical care.⁶ These medical facilities do not stock the medications needed for disaster-affected populations.⁷

As a result of the emphasis on trauma, a distinction has been made between the use of deployable military hospitals after earthquakes and after other types of disasters.^{8,9} In addition to large numbers of deaths, earthquakes in populated areas result in many seriously injured survivors. Earthquake damage to structures has resulted in the loss of large numbers of hospital beds and physicians' offices, and many health care workers have themselves been killed or injured in the collapse of these facilities. After the Mexico City earthquake in September 1985, it was estimated that more than 25% of the deaths occurred within collapsed health care facilities,¹⁰ with one hospital alone accounting for 561 deaths. These victims included 100 physicians as well as other health professionals, students, and patients.^{11,12} Under these circumstances, it is often not possible to evacuate all those who would benefit, and the ability to move surgical beds and health care providers into the area of operations may become important. To significantly affect mortality, however, trauma surgery must be available within minutes or hours, and overall surgical needs after an earthquake fall off sharply after the initial 72 hours.¹³

Although causing severe damage to health care facility structures, recent hurricanes in the United States have not resulted in large numbers of deaths and serious injuries.^{12,14} This is

primarily attributable to improved forecasting and evacuation planning.¹⁵ Health care services needed after the initial 48 hours after a hurricane include providing primary medical care, refilling prescriptions, and treating minor injuries sustained during clean-up activities.¹⁶⁻¹⁸ Military health care providers are not equipped to provide primary care⁶ or to manage chronic medical conditions.⁷ Although these providers are trained in certain illness prevention activities, such as vector control and outbreak investigation, the limited military emphasis on public health assistance¹⁹ and the limited ability to implement humanitarian assistance programs⁷ have compromised the usefulness of military units in long-term disaster roles. It has also been reported that military units have not been effective at coordinating activities with local leaders and community physicians to facilitate sustainable redevelopment.⁷

In the aftermath of a cyclone that severely damaged the Batticoola Hospital in Sri Lanka in 1978, disaster managers' resisted numerous local requests that a military hospital be deployed with personnel and supplies.²⁰ Finding the hospital staff intact and the hospital salvageable, responders concentrated on repairs, clean-up activities, and installing a generator. Their published conclusion was that "there is a strong tendency for medical personnel to rush into disaster areas and generate more difficulties in terms of support than they actually contribute to the care of the ill and injured."²⁰ This report was cited in a 1994 disaster publication that concluded that "simply sending military clinics and hospitals will rarely provide the appropriate medical support."⁷ When Hurricane Marilyn struck the next year, Virgin Islanders were more aware of the local events that had followed Hurricane Hugo in 1989 than of the latest literature in disaster science.

Previous Hurricane Responses: Hurricanes Hugo and Andrew

Hurricane Hugo devastated the island of St. Croix, USVI, before moving on toward Charleston, South Carolina, in September 1989, and was the first major storm in the lifetime of today's Virgin Islanders. The Territorial Lieutenant Governor, who resides on St. Croix, was away from the islands at the time of the storm, and the Governor, 40 miles away on St. Thomas, later said that he did not know the extent of the damage.²¹ The initial federal response was a large force of armed soldiers and was made without the specific request of the Governor and in response to reports of widespread looting.²² There was resentment among local residents that the federal government would respond to a disaster within the United States with armed force instead of relief assistance.²³ A component of the later response was the deployable 109th Evacuation Hospital from the Alabama Army National Guard. Operational 12 days after the storm²⁴ the hospital was initially staffed with volunteers from the National Disaster Medical System, and the National Guard Operations Plan specified that "the 109th Evac Hosp will leave the equipment with a small caretaker staff on site for approximately nine months."²⁵ This time allowed the island hospital, which had been condemned and was eventually torn down, to move into modular units. It took more than 5 years to reopen a permanent hospital facility after Hugo. There was a precedent for leaving the hospital to be operated by a local health team.

After an earthquake in Nicaragua in 1972, three US field hospitals were left for the Nicaraguans to operate.²⁶

A small portion of the delays after Hurricane Hugo were the result of military decision making. For example, when the Department of Defense (DoD) directed that a deployable hospital be sent, the Air Force initially refused to load the Army facility onto an Air Force aircraft because it had not received 15 days notice.²⁷ This type of delay was brief and rapidly corrected, and most critical delays came from the civilian sector. Delays in requesting outside assistance became an issue in the subsequent (1994) territorial election, with the challenger and victor, a physician who had served as the Territorial Health Commissioner, promising that he would do better. On the federal level, dissatisfaction with the response resulted in the development of today's Federal Response Plan.²⁸ The plan is an outline for the coordination of the nation's resources, including the Department of Defense, into the support functions needed to respond to catastrophic disasters.²⁹ The health and medical response is identified as Emergency Support Function (ESF) #8. The plan was published in April 1992, just 4 months before Hurricane Andrew struck South Florida.

Hurricane Andrew left 250,000 people without homes, and the first days after the storm were marked by confusion and inactivity.^{30,31} Although the hurricane left nearly 2 million people without medical care in an area within the continental United States,³² it took 7 days to mobilize a deployable Army hospital that had been hours away by truck when the storm struck. Once in operation, it was found that the military medical facilities did not stock the medications needed for disaster-affected populations, and a medical logistics battalion had to sort through shipments of donated medical supplies to find the geriatric and pediatric medications not on the military stock lists.³³ A review of this operation the next year by the U.S. General Accounting Office recommended that the Federal Emergency Management Agency (FEMA) be stripped of its disaster response role, stating that its lack of "credibility" required "leadership external to FEMA."³⁴

By 1995, disaster managers from many sectors were eager for success. The government's own auditors had called the competence of FEMA into question, and the agency risked losing its leadership role in disaster response. Despite all its efforts to support civilian needs, the Army had been criticized harshly after Hurricanes Hugo and Andrew. A new DoD Directive of Support for Civil Authorities was published in 1993,³⁵ and a manual outlining the operational aspects of the support function and the military's role within the Federal Response Plan was released the next year.³⁶ In early 1995, a physician, both interested in disaster response and having staked part of his political reputation on it, was sworn in as Governor of the Virgin Islands Territory.

Hurricane Marilyn and St. Thomas Hospital

At approximately 11:00 p.m. on Friday, September 15, 1995, Hurricane Marilyn struck the island of St. Thomas. The Territorial Governor had telephoned the President on Thursday, the day before the storm, and requested federal assistance.^{37,38} The next day, on the morning before the evening of the storm, the Secretary of the Army released an executive order authorizing DoD support.³⁹

Following the Virgin Islands Territorial Emergency Operations Plan, the St. Thomas Fire Department deployed its vehicles, equipment, and personnel to the protected parking area beneath the island's only acute care hospital. The hospital generator's protective building had blown apart early in the storm, but the generator kept working, providing emergency lighting and power to mechanical ventilators. Family members were taught to use a bag-valve device to breathe for their loved ones in case the power failed. The nurse in charge of pediatrics, just months out of nursing school, improvised an evacuation plan and moved sick children to a cardiology laboratory shortly before the pediatrics top-floor unit blew apart.⁴⁰ Firefighters came upstairs in protective gear to lead patients past an open wall of lost windows as a medical unit was evacuated. They would return during the eye of the storm to board up the windows. All night long, staff and family members mopped accumulating water to protect equipment. Two nurses spent much of the night wrapping 10 dialysis machines in protective material and moving them to dry areas.

This entire effort is attributed to both a determination to save the hospital and a memory of the St. Croix Hospital, lost mainly to severe water damage after Hurricane Hugo 6 years before. Despite these efforts, the appearance of the hospital structure the morning after the storm was one of devastation. Without structural engineers to perform an assessment, hospital Chief Executive Officer (CEO) Evelyn McLaughlin was not certain that she could avoid a complete evacuation. Hospital Medical Staff Director Dr. Boniface Abba was concerned about the operating rooms. "The O.R. was badly damaged," he stated, "we didn't know how long it (continuing to use the damaged facility) was going to last. There are some cases you have to do right away." That morning, CEO McLaughlin, the Territorial Health Commissioner, and the Territorial Governor all determined that a federal deployable military hospital was needed. Recalling the 109th Evacuation Hospital used on St. Croix for nearly a year after Hurricane Hugo, Kirk Grybowski, Director of the Virgin Islands Emergency Management Agency at the time Marilyn struck, put the island leadership's view in perspective. "Lacking immediate engineering input," he states, "we went for a known backup to get it moving so we wouldn't get caught with nothing if the hospital went down."

Federal Response Activities

Hours after the Governor requested what was described as a "mobile hospital to handle emergency cases,"^{38,41} and hours before the Federal Coordinating Officer (FCO) and his team would leave the staging area to arrive at the disaster site, FEMA had processed a Statement of Work to "provide a military field treatment facility to work jointly with PHS [Public Health Service] and DoD to assume function of existing hospital that was rendered inoperable by Hurricane Marilyn," and had delivered the request to the Director of Military Support, the coordinator of military disaster response.⁴² On that first day after the storm, the Secretary of the Army had assured the Director of FEMA that "whatever you want, we'll give it to you."⁴³ At this same time, temporary repairs were already under way in the hospital operating rooms, and patients were being treated by the Emergency Department staff. No dialysis patient missed treatment after the hurricane. The details of the request procedure that brought a

deployable military hospital to the island are discussed elsewhere.⁴ What is important to the content presented here is the difficulty in stopping these large assets once they begin to move.

The U.S. Army 28th CSH received the first notification of a possible deployment on Monday, September 18 (response day 3).⁴⁴ Two other hospitals were considered, including a National Guard mobile hospital from Puerto Rico. The hospital on Puerto Rico was a training unit, and there were mixed opinions about whether it could do the job.⁴³ This same day, the FCO gave his initial assessment, reporting that "the hospital was coming back up on St. Thomas and (the field) hospital would not be required."⁴³ Although the FCO is responsible for all federal assistance within the disaster zone, Atlantic Command Operations, whose unified (all-service) command includes the USVI, sent a reply to the field stating "don't second guess."⁴³ After this exchange, the Commander of the First Continental U.S. Army, with regional responsibility for the USVI, asked the FCO's military counterpart, the Defense Coordinating Officer (DCO), to verify what the real needs were. It is within the job description of the DCO to ensure that requests for assistance are based on mission requirements and are not requests for specific assets.³⁶

The next morning (day 4), the DCO reported that the "hospital on St. Thomas only had roof damage and is operational."⁴³ The 28th CSH was notified of a partial stand-down, an indication that it might not be required.⁴⁴ That afternoon, the DoD liaison to FEMA National reported to the Director of Military Support that "the hospital is on,"⁴³ and Colonel Virgil Deal, Commander of the CSH, recalls that "things were on again later that day."⁴⁴

Other federal health resources were already deploying in the disaster area. A push-pack of medications requested by the Health Commissioner before the storm arrived on Sunday evening, response day 2. The next day, the first volunteer Disaster Medical Assistance Teams reached the island. Coordinated by the National Disaster Medical System, an organization based on an agreement of cooperation between civilian and military agencies, these units were treating patients within hours of their arrival. The Veterans Administration (VA) restocked and operated the pharmacy at the St. Thomas Hospital.⁴⁵ VA nurses provided outreach care at FEMA relief distribution centers,⁴⁶ and additional VA nurses were assigned to the island hospital, where nurses on temporary contracts leaving the island had seriously affected staffing levels. Later in the response, a VA physician, physician assistant, nurse, and emergency manager on a HMMWV (high mobility multipurpose wheeled vehicle) would go door to door in rural St. Thomas to make sure that people who could not get out did not need health care.

The CSH Commander, Colonel Deal, and the Brigade Commander of the U.S. Army 44th Medical Brigade, Brigadier General Harold Timboe, deployed on Wednesday, September 20 (day 5). Dr. Frank Young, head of the Federal Health and Medical Response (ESF#8) and Director of the Public Health Service Office of Emergency Preparedness, stated that he and General Timboe made a final attempt to stop the CSH in a meeting that day between the federal ESF#8 leadership and the Governor. At one point during the meeting, recalls VA Office of Emergency Preparedness Director Joseph Gray, the Governor called the White House by satellite phone. "He was very forceful," he states, "the Governor was the one who called the final shots."

"Once the Governor made his determination," states Director Gray, "it was up to Dr. Young, myself, and General Timboe to do it properly and quickly." A part of this mission was to develop a well-defined exit plan. Because the principal role of the DoD is the defense of the nation, disengagement from humanitarian support activities is a particular concern for its military commanders.³⁶ "The DoD wanted to get (the CSH) out," states Dr. Young, "once they knew that this is what I was working on I had full support from DoD." The Governor agreed to a plan in which the field hospital could redeploy when all departments and units of the St. Thomas Hospital were operationally "marginal but adequate." In fact, Dr. Young had already been working with the DCO to make the island hospital operational. With the agreement of First Army, a priority change was implemented to transport two 750-kW generators that could power the entire hospital, including operating rooms and air conditioning. The generators would arrive on Saturday, September 23 (day 8), and were installed and operational on Monday, September 25 (day 10). This was the day before the containers holding the 28th CSH would arrive by ship at the St. Thomas docks. The Army hospital could not be flown directly to St. Thomas because of airfield limitations: it was transported first to Puerto Rico. An empty cargo ship, the *Maerks Constellation*, was found in Puerto Rico to take the CSH to St. Thomas at one-third the cost of an additional air transport.

With no working lights at the island port facilities and dock workers able to work only during daylight hours, it took 48 hours to complete the unloading. After erecting the 28th CSH in the parking lot behind the St. Thomas Hospital building, an open house was held for the St. Thomas Hospital staff on Saturday, September 30 (day 15).

The hospital configuration deployed was a reflection of specific requests from the island government and did not include the entire CSH 296-bed capacity. In addition to intermediate care (medical-surgical) wards, intensive care units, and operating rooms, the Army was asked to send a neonatal ward, a delivery room, and an obstetric capacity. FEMA reported that "a 150-bed tent hospital" had been erected,⁴⁷ but the number appears to have been closer to 132, including five 20-bed wards, two 12-bed intensive care units, and an 8-bed emergency treatment area.⁴⁴ This configuration also required central medical supplies, pharmacy supplies, dispensary, hospital laundry, radiology unit, as well as nutrition, communications, biomedical maintenance, vehicle maintenance, and power distribution components.

Combat Support Hospital Deactivation

On Tuesday, September 26, the day of the evening on which the *Maerks Constellation* was to dock at St. Thomas, FEMA reported that "the Governor expressed his appreciation that the St. Thomas Hospital is back in service."⁴⁸ "However," the report continues, "the hospital will begin removing the patients to a tent hospital. . . so that the building can be repaired." In the end, there was no single reason why the St. Thomas Hospital was never evacuated into the tents of the 28th CSH. Certainly, the overall damage was not as great as what had occurred at the hospital on St. Croix after Hurricane Hugo 6 years before, but many people interviewed also felt that a lack of immediate salvage efforts on the part of the hospital staff contributed to that

facility eventually being condemned. In part, it was the memory of Hurricane Hugo that made many of the hospital staff determined after Marilyn that they would not spend years without their hospital building, and they did all they could to not fall so behind in clean up and repairs that the hospital could not function as a health provider. The dialysis nurses, for their part, did not want to be sent off the island with their patients, and away from their families, as had happened to their counterparts on St. Croix.

The Director of the St. Thomas Hospital Medical Staff had been concerned about the ability to rely on uninterrupted use of the operating rooms after the storm. If the CSH had been ready before the engineering assessment of the hospital, he may have supported using the facility. With power restored and temporary repairs made, this was no longer a major concern. What the hospital medical staff believed at the time was that they would not be paid for their services if their patients were transferred to a federal hospital. Most hospital staff members had sustained major damage to their own homes, and after the large increases in premiums that followed Hurricane Hugo, it was estimated that more than half of them had no homeowner's insurance. "Our doctors could not go for 6 to 8 months working on federal property (with no income)," stated the Medical Staff Director. Federal regulation does prohibit the federal Medicare program to pay for services provided by federal facilities, including military hospitals and hospitals deployed by FEMA.⁴⁹ A current interpretation by the Health Care Financing Administration, however, is that nonfederal providers would be eligible for reimbursement for professional services provided within these facilities if they independently billed for these services (personal communication, Division of Integrated Delivery Systems, Health Care Finance Administration). The Staff Director noted that some island physicians were eventually reimbursed for care provided to the few patients admitted to the CSH.

What damage was done to the St. Thomas Hospital after Hurricane Hugo was repaired promptly using money authorized by FEMA. The hospital was uninsured at the time, and a condition of the aid received was that the institution obtain insurance. Once insured, "we had to wait in line to get our share," stated CEO McLaughlin. Damage to the hospital was estimated at \$7 million dollars after Marilyn, she stated, and explained that even if the hospital had evacuated the patients to the Army hospital, it would not have been able to afford the needed repairs. The first claims payment to the island of the FEMA-sponsored insurance went to the hospital. The amount was \$3 million, and the payment was made in July 1996. For a damaged hospital struggling to remain operational, admitted patients represented much-needed revenue for both operational expenses and the costs of repairs in the months after the storm. Transfer of patients to the CSH or overtriage of patients to remote facilities would have drained the local health system of needed revenue.

Another fear of the local hospital administration was risk of litigation. The CSH was deployed onto St. Thomas Hospital property. On the third day of the response effort, a Disaster Medical Assistance Team set up its tents on the front lawn of the island hospital to provide much-needed emergency care. Like military field hospitals, one of the missions of these teams is to "assist in the transfer of seriously ill or injured to hospitals

outside of the impacted area."¹⁶ The hospital CEO felt that some patients who were airlifted off the island could have been cared for locally. The hospital administration's concern regarding its legal responsibility for these patients was confirmed when the hospital was later involved in a lawsuit. After a patient had been taken to the St. Thomas Hospital, the hospital staff was unable to locate the patient for the family. The family was later notified that the patient had died in Puerto Rico, where the patient had been transferred by the federal team. Like U.S. military responders, personnel from these teams are federalized and are protected from legal action by federal law.⁵⁰ The hospital, however, on whose property the care was provided, has no such protection from litigation. Faced with a lawsuit, the hospital realized that there was no medical record, indeed no documentation of any kind, pertaining to the patients care.

The three operating rooms of the 28th CSH functioned for 1 day, October 2, and three operations were performed. According to the CSH Commander, the Governor ordered the St. Thomas surgical suites closed for that day.⁴⁴ Then-CEO McLaughlin recalled, "We requested it prematurely. Once it was here, the Governor insisted that we use it." The next day, the order was given to disengage the CSH.³⁷

Priorities and Combat Readiness

Some authors have opposed a noncombat role for the military⁵¹⁻⁵³ because of concerns regarding military involvement in civilian operations and because of a possible harmful effect on combat readiness. Others, both civilian and military, have advocated an active role for the armed forces in disaster response,⁵⁴⁻⁵⁹ and the U.S. General Accounting Office has concluded that only the DoD possesses the resources necessary to mount effective domestic response operations.^{28,34} The DoD has developed a directive defining the role of the military in support of civil authorities.³⁵ Directive 3025.1 and the accompanying Manual for Civil Emergencies provides rapid cooperation in support of all reasonable requests from the civilian sector but stipulates that "military resources will not be . . . developed solely to provide assistance to civil authorities during emergencies."³⁶ The availability of military assets is contingent on the absence of higher-priority needs. Combat operations take priority over military operations conducted to prevent or contain military conflict, and both are of higher priority than assistance to civil authorities.^{36,60}

Combat readiness requires prudent use of military resources for all operations, and this is particularly true when such resources are required for purposes other than warfighting. Although the opportunity to deploy assets and bring mobile hospital units to operational readiness may be a valuable training experience, planning is better served if such exercises are scheduled beforehand and in coordination with other asset-availability and mission requirements. Disengagement from these activities is not always rapid, and once the unit is deployed, the value of the training experience is passed. By the time that the attached medical group begins patient care activities after hurricanes, the epidemiology of illness and injury has returned to community-hospital values,¹⁶⁻¹⁸ and little additional training value exists for these health care providers. For these

reasons, the extended use of troops and key personnel in non-defense activities is something that few commanders would allow.⁶¹

Asset Development

There was never any misconception on St. Thomas that a military field hospital would arrive in time to treat the injuries of storm victims. The concern on the island was that the only hospital would need to be evacuated and that the 48,000 island residents would be without an acute care facility. Aside from the effect on local health care, including the inability to perform emergency surgery, the rebuilding of an economy based on tourism requires that visitors feel secure that their health care needs can be met.⁶² This unacceptable situation prompted the island's health leadership to request the same assets that they had become familiar with after the previous hurricane. Without engineering resources being available, planning was made for a "worst-case scenario."

If deployable military hospitals are not optimum resources for these responses, then we should consider if more appropriate assets could be developed either in the civilian sector or in the military sector with applications to the warfighting mission. Recommendations to quickly deploy a "far-forward" surgical capability nearer to battle zones⁶³ and to stabilize trauma patients in the initial hour after their injuries seem to express a need for assets similar to what the medical staff on St. Thomas was seeking in the aftermath on Hurricane Marilyn: a rapidly deployable operating room capability. Such resources would be even more useful after mass casualty events such as earthquakes.

Those who possess deployable medical facilities have made attempts to configure those assets to meet this need. The U.S. Army 42nd Field Hospital at Fort Knox developed both an Emergency Medical Treatment (EMT) Team and an Operating Room-Central Medical Supply (OR-CMS) Team. The EMT Team could be in transport within 60 minutes of activation and could be operational within 30 minutes of arrival at a disaster site. The follow-on OR-CMS Team could deploy in 48 to 72 hours.⁵⁸ The 42nd Field Hospital was deactivated in 1996. The U.S. Army and U.S. Marine Corps have collaborated in the development of a compact, rapidly deployable surgical facility called the Advanced Surgical Suite for Trauma Casualties (ASSTC). Developed at the Oak Ridge Centers for Manufacturing Technology,⁶⁴ the ASSTC is designed for trauma management and resuscitative surgery. It is contained in a single 5 X 5 X 10 foot transit package and can be carried by aircraft, ship, or towed behind a truck or light tactical vehicle such as a HMMWV.⁶⁵ It can be air delivered by parachute where no runways exist, and it can be made operational within 18 to 30 minutes of arrival. The U.S. Marine Corps, which has redesignated the ASSTC the Multipurpose Health Services Facility, field tested the unit prototype for the first time in January 1998.⁶⁶

The usefulness of an asset is dependent on how close it is to the disaster site at the time of the disaster. This is particularly true in the health sector, in which decreased morbidity and the saving of lives requires the immediate care of injured victims. For the seriously injured, only local and regional resources will arrive on time. The development of these assets would allow for both rapid deployment and significant cost savings, because the

major costs of moving remote deployable facilities include transportation and accompanying personnel. Just as damaged hospitals need their patients to remain fiscally sound, skilled hospital workers need their jobs. Hospital workers are often victims as well, with damage to their own homes. Developing regional assets, such as the National Guard mobile hospital on Puerto Rico, would provide a physical structure for local staff to do their work. In the case of the Hurricane Marilyn response, the ability to deploy a regional hospital through a National Guard compact (mutual-aid) agreement may have made it possible to avoid federalization, thus mitigating the concerns of the local medical staff. The 201st National Guard hospital unit has been deactivated, and as of the end of fiscal year 1998 all National Guard hospitals have been deactivated or transferred to the U.S. Army Reserves.

Conclusions

In the discharge of their duties, elected officials may request emergency resources in the aftermath of a disaster while the federal response structure is still being assembled. These initial requests will focus early response efforts. Although requests for military resources existing outside of the FCO-DCO relationship will be necessary early in the response, these communications will cause confusion and potentially critical delays if kept hidden from the FCO and his or her response team.

Large and relatively slow-moving military resources, such as deployable military hospitals, will not arrive in time to treat the injured victims of destructive storms. Defined indications for the utilization of these expensive assets after disasters would aid in decision making and may prevent unnecessary requests and diversion of resources. Once begun, it may become difficult to reverse a deployment.

The DoD policy of basing validation on mission requirements and the ability to achieve a defined objective is a reasonable criterion. Assistance requests based on local needs and capabilities. Limitations, rather than requests for specific unit types, would facilitate this validation process and enable it to respond with the most appropriate combination of available resources. There is little debate that the immediate delivery of hospital beds and trained staff to the site of an urban earthquake would be useful. After hurricanes, emergency medical resources will be needed if isolated hospitals are destroyed and evacuation is unavailable, and deployable hospitals may be useful temporarily during hospital repairs if they can be operated by local health care personnel and if the funds for permanent facility repair are available. If not needed, the diversion of resources such as port facilities and the interruption of repairs to existing structures can make these facilities an obstacle to recovery. The Pan American Health Organization has recommended that field hospitals be used only if they can be operational within 24 hours of the disaster and can provide services at a level appropriate within the context of the local health care capabilities.⁶⁷

Local and regional resources may be rapidly used and cost effective and are vital for the immediate care of disaster victims. Most important to trauma patients will be an operational surgical capacity. These resources could be developed in the civilian sector within either the emergency management agency or the local trauma system. National Guard units could also support assets, and these could be located regionally with state National

Guard compact (mutual-aid) agreements to provide for their shared use. Other local assets, such as local capacity for engineering assessment and health facility planning, could be developed within National Guard units or contracted in advance with civilian professionals. Inclusion of these personnel in pre-disaster mitigation projects would familiarize them with the health facilities they would be responsible for assessing during the response phase.

Although there exists some ambivalence within the DoD community concerning the disaster response mission, it seems clear that the armed forces will continue to play a vital role into the foreseeable future. Civilian and military disaster managers should agree on the appropriate indications for the use of deployable hospitals during civil emergencies. These large assets, whose deployment also involves the diversion of aircraft and personnel their combat readiness mission, should be used only when required by the evolving medical need within the disaster site.

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