Joint Medical Support:

Medical transport aircraft at Ramstein.

U.S. Air Force (Chris U. Putman)

Are We Asleep at the Switch?

By ARTHUR M. SMITH

The terrorist bombing of the Marine barracks at Beirut airport in 1983 prompted a detailed evaluation of the medical structure available to support similar incidents as well as a conflict in Europe. Some of the medical capabilities probed were command and control, casualty evacuation, regulating procedures, facilities capabilities, the transition from routine peacetime to contingency operations, and efficacy of readiness planning. While no life was lost that could have been saved, if the ratio of killed to wounded had been reversed, with more than 200 in need of treatment rather than only half that number, the system might have failed. Has the intervening period enabled us to assess such shortcomings, adapt to a new security environment, and offer prompt, consistent care?

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Analyses of the Beirut bombing revealed deficiencies in readiness caused by shortages in personnel, evacuation assets, and materiel, as well as lack of joint planning for their wartime use.[1] Such deficiencies were attributable to the low priority that medical readiness is given in planning, programming, and budgeting. Recommendations included greater investments in basic readiness resources and refinement of mechanisms for effecting command and control over wartime support and operating those assets. A worldwide reassessment of contingency medical capabilities ensued, and a template of principles for implementing joint support of combat operations evolved.[2] Then Operation Desert Storm provided an opportunity to reassess progress in meeting readiness goals in contrast to the medical support provided in response to the Beirut tragedy.

Deployment

After Iraqi forces invaded Kuwait on August 2, 1990, Saudi Arabia requested assistance and U.S. Central Command (CENTCOM) tasked the services to provide specific medical support. By most accounts, units that were deployed provided adequate care. In the eyes of analysts from Capitol Hill, however, if the war had started earlier or lasted longer, or if the number of casualties had matched the predictions, the care would have been grossly inadequate.[3]

many medical personnel had limited training in their military specialties

While the Navy sent the units requested, casualty predictions were double what they were intended to handle. For instance, hospital ships designed to receive up to 100 casualties per day for a sustained period were told to anticipate between 200 and 300; and combat zone fleet hospitals capable of receiving 80 casualties per day were actually expecting 200. Under those projections, there would have been shortages in Navy and Air Force units, although they were staffed to their authorized levels. Critical shortages would have occurred among general and orthopedic surgeons, anesthesiologists, nurse anesthetists, operating room nurses, and non-medical support personnel.

Within Navy fleet hospitals and Air Force air transportable hospitals, noncombat medical needs in support of a continuous flow of sick call patients put a heavy demand on medical services. Females, for example, comprised 6 percent of deployed naval personnel, yet only one gynecologist was assigned to the deployed hospitals, and no space or examination table was allocated in the fleet hospitals for gynecologic examination. Similarly, there were insufficient Air Force gynecologists. Also lacking during the buildup phase were sufficient orthopedic specialists, since members of all services incurred bone, joint, ligament, and tendon injuries which required specialized care. While medical units had some sick call supplies and equipment, their inventories could not accommodate the demand. Thus some patients were evacuated to distant facilities, often for long periods.

Prior to ground operations, hospital ships and fleet hospitals were told to expect that up to 15 percent of casualties would be contaminated. No service had units designed or staffed to handle large numbers of such casualties. Fleet hospitals did not even have decontamination stations.

Training

To support combat operations medical training is focused on teaching individual skills and preparing units to perform wartime tasks. Individuals must manifest not only medical expertise but basic combat skills. Likewise, medical units must train to perform fundamental military activities as units rather than as individuals with varied skills. Units must also perform "militarily unique" medical roles in combat. In an echeloned medical support structure, for example, surgical care of wounds must be done incrementally, at differing facility levels, instead of total care at one hospital. This would mean having extensive personnel and logistic resources in forward combat areas which is not feasible.

Realistic field training with wartime equipment is critical for preparing medical personnel to fulfill their mission in a no-warning situation. Yet the DOD inspector general believes the services have failed to provide it.[4] Following the Gulf War, GAO revealed that many medical personnel had limited training in their military specialties or coping with a new environment. Individuals in deploying units were often unaware

of their wartime assignments, particularly junior officers and enlisted personnel. Poor oversight of compliance with mandatory basic training requirements for officers caused deployment delays until those requirements were met.

Many naval medical personnel lacked basic military skills in the Gulf and were adjudged as ill-prepared to serve in the fleet hospitals, hospital ships, and Fleet Marine Force hospital facilities. Those stationed on *Mercy* and *Comfort*, for example, cited training deficiencies in shipboard skills such as firefighting, damage control, mass casualty evacuation, abandon ship procedures, and chemical, biological, and radiological defense. Prior to deployment, fewer than half were trained in those areas, and three quarters had no prior shipboard experience. Furthermore, less than a fifth of the active duty personnel with the First Fleet Hospital were trained to construct and operate a fleet hospital, much less practice medicine under field conditions.

Unlike hospital ships with state-of-the-art equipment, fleet hospitals had technology from the 1970s and early 1980s. Thus, most of their personnel had not trained with the aged equipment before arriving in-theater, contributing to a pervasive belief that care would be inadequate. Moreover, many personnel had never, or not recently, treated trauma patients, and a majority had not completed training in combat casualty care.[5] In addition, few fleet hospital and hospital ship personnel were trained in patient decontamination and treating chemically contaminated casualties. The Navy estimated that less than 10 percent of its physicians being deployed could treat such casualties, but luckily the buildup allowed them to complete an acceptable level of medical and operational training.

In the aftermath of the Gulf War, the DOD inspector general noted that: "The First Marine Expeditionary Force surgeon expressed concern over the training of Navy medical forces that were deployed to the Fleet Marine Force (FMF). The surgeon said that Navy corpsmen, doctors, and nurses who augmented FMF did not have the operational training to be immediately effective. As he stated, 'Thank goodness we had five to six weeks to get everyone trained prior to the war's beginning.'"[6] Indeed, not all corpsmen, physicians, and nurses who augmented FMF were Field Medical Service School (FMSS) trained. In addition, some corpsmen certified as field medical technicians had never served with FMF. Thus their familiarity with Marine operations was limited. A Navy physician with a Marine tank battalion stated that his battalion aid station (BAS) personnel had limited experience in the transport, assembly, and disassembly of the station in the field. "The most valuable lesson that I learned," he indicated, "is that we must be willing to train during times of peace as we will operate during times of conflict."[7]

Many Army medical personnel were also adjudged unfamiliar with equipment and facilities used by field hospitals and units. Due to inaccessibility of field equipment, they had not trained on deployable medical systems which they would use in contingencies. Following Desert Storm, the CENTCOM surgeon remarked, "The . . . overwhelming emphasis on peacetime health care conflicted with the training and readiness of Army clinical personnel to provide the best medical care to large numbers of casualties in the combat zone."[8] Moreover, air transportable hospitals in the Gulf were supplied with older generations of equipment. Consequently, extensive training on the hospital gear was conducted for Air Force personnel in-theater.

Mobility

During the 1970s and early 1980s various studies and joint exercises confirmed the need for standardized deployable facilities. As developed, the deployable medical systems (DEPMEDS) consist of standardized unit modules (operating rooms, laboratories, radiology suites, etc.) that can be transported and configured into field hospitals. Although DEPMEDS modules now comprise a large portion of DOD war reserve equipment, there remain problems with their mobility, support equipment, and policy guidance.

While DEPMEDS strategic mobility is paramount to all services, each has differing tactical requirements. The Army needs a considerable amount of tactical mobility since its field hospitals support advancing combat forces. To move a 60-bed mobile army surgical hospital (MASH), for example, requires organic transport to haul 63 containers configured in fifty 40-foot truckloads.

Many hospitals lacked trucks and handling equipment for such a move, which meant that only part of the bed capacity and surgical capability of a MASH could go forward as the ground war began. As a result—due to the speed of the battle—more than 40 percent of bed capacity was left behind in order to allow MASH units to be positioned to provide surgical support early. Furthermore, some units were not fully mobile even when there were adequate trucks because the fifty 40-foot vehicles could not keep up with the combat forces and had to wait until the engineers built roads.[9]

Communication

Shortfalls in communication during the Gulf War degraded the casualty receiving mission, compromised personnel and patient safety, and hampered contact between treatment facilities and control elements. These problems were primarily related to divergent capabilities and limitations at the inter- and intra-service levels. Medical units could not communicate with control elements, one another, supported combat units, or supporting logistics units. While moving into Iraq, some field hospitals had no method of communicating with combat and evacuation units for several days.

patient regulating systems did not provide effective oversight of casualties

Dialogue between medical units and between the different levels of care (for example, from aeromedical evacuation units to field hospitals) was difficult due to the mix of radio equipment and the use of commercial and tactical telephone systems. Without communication capability, Army field hospitals and some Air Force facilities frequently had no forewarning of the number or type of casualties. The only warning some hospitals had was when aeromedical evacuation helicopters landed with patients. Helicopters and hospitals could not communicate with each other; the former had FM radios with a range of only 20 miles and the latter had AM radios with only line-of-sight capability that when used near a battlefield could be traced by the enemy.

Similar communication problems were identified during Urgent Fury and Just Cause, and in subsequent joint exercises such as Proud Eagle, Reforger, and Team Spirit. Although DOD has tried to field interoperative and reliable equipment for combat units, no comparable effort was made for medical units. In 1986 the Secretary of Defense issued a policy for fully equipping the first to fight (deploy) regardless of component. While both XVIII and VII Corps met the criteria, those medical units were not equipped with adequate communication equipment.

When Desert Shield began in August 1990 the communication equipment was inadequate. The services had not identified or subsequently resourced their requirements. For example, tables of organization and equipment for Army contingency hospitals cited a need for AM and FM radios. While FM radios were listed, hospitals had a lower priority than combat units and rarely received them. Moreover, the services have acquired communication equipment that is not interoperable. These problems will continue until the commitment is made to a joint, interoperable communication system that includes medical units.[10]

Evacuation

Prompt and well-planned casualty evacuation requires matching patient needs and treatment facilities. It assures that hospitals are not over- or underutilized, which is essential when numerous facilities are available. In the Persian Gulf War patient regulating systems did not provide effective oversight of casualties. Communications problems were the greatest limitation. Troops could not talk to ambulances. Radios used by medical regulators had operating ranges of 15 miles in a corps area 250 miles deep and 100 miles wide. Therefore ambulance crews, using similar equipment, could not communicate with most evacuation regulators or hospitals and took patients to facilities whose locations they knew, not to those best suited to the needs of patients.

One air ambulance crew reported flying directly to a hospital over enemy tanks and infantry after picking up casualties. If it had been a shooting war the aircraft and its crew might have been lost for want of directions.[11] To overcome communication problems, both VII and XVIII Corps had air ambulances making repeated round trips between a designated forward collection

point and a drop-off area in the rear near hospitals. As a medical officer with a Marine tank battalion noted, "The locations of higher echelon field medical facilities were not even available at the battalion or division level!"[12]

In the Gulf War, the Air Force—as lead service for joint theater medical regulating—was to provide the communications system to regulate the movement of patients to appropriate facilities. A report by the Air Mobility Command stated that communications problems resulted in 43 percent of patients landing at the wrong airport which required their rerouting.[13] In sum, the inability of regulators to manage evacuation could have led to underusing some hospitals and overwhelming others, a tragedy if the casualties had met projections. Even automated systems were not standard, interoperable, or available in all theaters and could not track individual patients. Each service had its own system, and the incompatibility of systems severely limited interservice communication.

Moving patients under medical supervision to or between treatment facilities by military or military chartered transport is known as medical evacuation. While all the services maintain tactical and strategic aircraft for combat and combat support, the Army and Marines provide most tactical ground and helicopter lift for medical evacuation. The primary Air Force medical mission is in-theater fixed wing aeromedical intra- and intertheater evacuation. Problems arose in Desert Storm with ground ambulances and helicopters in tactical evacuation of patients. Ground ambulances often could not be used because of rugged terrain, lack of navigational equipment, and distances between hospitals and front lines. Even for air evacuation units long distances required refueling. Air ambulances landed near ground vehicles to request fuel or directions to fuel supplies.

Lacking organic aeromedical evacuation assets, the Navy depends on returning (retrograde) aircraft that are primarily assigned combat support missions other than medical as transportation of opportunity for moving casualties to hospital ships and fleet hospitals. But such aircraft may be scarce, and the ability of ships to receive and treat casualties can be limited by transport difficulties. Indeed, Army and Marine medical officials noted the inadequacy of short range helicopters in the Gulf. This shortfall was partly due to the fact that Navy aeromedical needs were never previously levied on the Army and Marine Corps, so the services did not program for them. As noted by the Navy, "Lack of dedicated tactical aeromedical evacuation capability in naval services would have created difficulties had the theater matured as expected. . . ."[14]

Patients brought to underway hospital ships must be transported by helicopter. Due to ship design, access by sea is not considered reliable. In rough seas, ship-to-ship patient transfers can be unsafe. Helicopter transport to hospital ships was problematic in the Persian Gulf because each ship had only one landing pad, helicopter capacities were limited, and the ships had to stay out of harm's way. As a result the distance and travel time would have increased. Hospital ships might not have been fully used to treat mass casualties, therefore, even if combat had continued.

Further shortfalls in Air Force aeromedical evacuation assets could have affected patient care as well. One after-action report stated that because of insufficient aircraft, the predicted flow of casualties would have overwhelmed the system. Furthermore, even if aircraft were identified, shortfalls existed in crews and in-flight equipment. As the Air Force surgeon general noted, "We were fortunate that the medical evacuation system was not taxed in Desert Shield/Desert Storm." Substantial shortages in strategic and tactical aeromedical evacuation would have materialized.[15]

Shortfalls in aeromedical evacuation assets were not new. They were identified in Reforger '87 and Wintex '88 and '89. During Wintex in Europe, lack of dedicated aeromedical evacuation paralyzed the entire combat zone until 3,000 casualties could be moved.[16] Furthermore, while the Air Force was responsible for evacuating casualties, most hospitals lacked sufficient personnel and equipment for patient care during flights. Under an Air Force requirement, a hospital unit sending a patient needing constant attention had to provide an in-flight medical attendant and specialized equipment

existing medical mobilization plans lacked a substantial joint perspective

MASH surgery during Provide Promise.

Combat Camera Imagery (James Bowman)

Caring for injured Marine in Beirut.

U.S. Marine Corps

USNS Comfort **during Desert Storm.**

U.S. Navy (Joe Gawlowicz)

such as ventilators or cardiac monitors. The Air Force required service medical units to have equipment and supplies to last five days for each patient evacuated, as well as monitoring personnel. In addition, two fleet hospitals were to care for patients at evacuation staging sites. These requirements were not anticipated by Navy units; consequently, they were never included in the fleet hospital and hospital ship authorization levels. Finally, had the casualty rates approached predicted levels, the inventory of ventilators, intravenous fluids, medications, blankets, litters, and other items would have been rapidly exhausted.

Logistics

One opinion held in the Gulf was that prepositioned medical packs were not appropriately managed and updated. An air transportable hospital, for example, ordered to relocate after being established, set up a second time using a different prepositioned package. While the first package had been in place only two years, equipment was missing, batteries had exceeded their storage life, critical chemicals for lab areas were missing, and medicines and other supplies were outdated. The second package, although newer, lacked ventilators, cardiac monitors, and microscopes. Another hospital spent $1.5 million on local purchases to replace articles in its prepositioned package.

Navy control of medical equipment and supplies prior to and during Desert Storm/Desert Shield was also inadequate and medical units had incompatible supplies. For example, cartridges did not fit surgical guns and film did not match x-ray machines. Equipment and supplies in fleet hospitals were often not packed according to the manifest, making field assembly time-consuming. Materiel from different functional areas was packed together, and in one case materiel that belonged in one or two containers was dispersed among thirty. Short shelf-life items such as intravenous fluids and sterile and pharmaceutical supplies were either expired or in limited supply.

Air Force hospitals found that lab chemicals in some prepositioned packs could not be used with available equipment. Some dated back to the 1950s, others were missing. A critical shortage of aeromedical evacuation kits would have hindered patient movement had casualties been heavy. Furthermore, some critical items had not been properly maintained and were not based on current equipment lists. A report described the program at one location as "a major medical disaster."[17]

The inspector general reported that contingency medical logistics support was hampered by trouble with the single integrated medical logistics manager (SIMLM) system.

Under this concept, one service is responsible for primary medical logistics support to all DOD customers in a specified geographic area. In the Gulf, Army medical supply and ophthalmic maintenance (MEDSOM) units—the basic logistics structure for the SIMLM mission—did not possess adequate personnel or material handling equipment and mobility for the support requirements.[18]

Army MEDSOM units, for example, did not carry sufficient supplies of service-unique items including various non-standard, state-of-the-art items used by hospital ships. Fleet hospitals and even a Marine tank unit BAS also experienced shortages. Authorized medical resupply cans routinely arrived partly filled or empty.[19] Inadequate communications and incompatibility between the Navy and Army supply systems further rendered Army SIMLM supply support insufficient for naval needs which resulted in increased order and shipping times. Consequently, the Navy got only half of its supplies through SIMLM.

The reasons for the SIMLM failure included poor planning, misunderstood requirements, and an inadequate support structure. A CENTCOM report noted that "Without a clearly defined task organization that is concurred with by all components, and a concept of standard operational doctrine, the MEDSOM (used as the quasi-SIMLM) will remain a haphazard organization requiring coordination and compromise with the components each and every time deployed. In a rapidly developing theater, the valuable time and effort to do this cannot be afforded."[20]

Policy and Planning

A general lack of joint medical planning can hamper resource sharing and create confusion over responsibilities. In 1984, for example, the Zimble report noted that no joint comprehensive plan for service assets existed. The service plans were described as "stovepipe documents" which bore little relation to each other. This resulted from a tendency of each component's medical service to support personnel of its own line units in a vacuum, as well as a lack of joint command medical staffing to arbitrate. There was no mechanism for cross-service sharing in peacetime, coordinating service operations in wartime, nor resolving inconsistencies among the components' plans.

The DOD inspector general reported in mid-1993 that existing medical mobilization plans did not generally reflect changes in planning scenarios, force structure, or medical support policies. It further alleged that the plans were dated, lacked a substantial joint perspective, and went largely untested and unvalidated. Medical personnel requirements likewise did not reflect changes arising from Desert Storm (for example, newer operational doctrine and the continuation of the peacetime health care mission in contingencies). The report predicted problems if the Joint Staff and unified commands do not ensure that all components can realistically fulfill medical support requirements. Insufficient oversight has led to inaccurate data, incomplete readiness information, and unrealistic plans (many pre-dating changes in the threat). But the report acknowledged that such deficiencies did not lead to degradation of medical support in Desert Storm, no doubt because of the substantial time between mobilization and the start of offensive operations.[21]

The report further noted that operational planning had not promoted efficient use or sharing of medical assets. CENTCOM, EUCOM, and PACOM did not plan for integrated medical support but instead tasked service components to care for their own personnel. CENTCOM and EUCOM plans even tasked the services to provide their own patient evacuation. These inconsistencies have persisted largely because of poor testing of medical systems during joint exercises and inadequate service oversight of mobilization plans for contingency hospitals and medical treatment facilities.

Joint exercises generally provide realistic combat training and evaluation of fighting forces. According to the inspector general these exercises tend to include only token medical participation and cannot validate readiness. Although medical units have periodic in-house training, large-scale interservice exercises do not exist. Limited participation leaves commanders without independent validation of medical unit capabilities, readiness, or risks. Unless the medical community is more active in joint exercises, planners will remain unable to assess readiness and train-

ing requirements. They will also have little foundation for making tradeoffs when an operational demand arises.[22]

Joint planning and contingency utilization of triservice medical assets takes practice. In the final analysis the Armed Forces must ensure more realistic medical unit participation in exercises. This should include interservice medical participation, interaction with combat and support units, communication with control of supported and supporting units, and enough patients to validate patient care and movement concepts.

Professional medical personnel must also meet basic and field training requirements, which is usually left to medical treatment facility commanders. Being responsible for in-house patient care and staff readiness—including field training—these commanders may not always comply with operational training requirements. Since hospitals receive resources based on their annual output (commonly known as medical care credit units), commanders have a substantial incentive to keep credit units high and the cost of Champus low by retaining their medical staffs in-house.

How have we done since the Beirut disaster? History will ultimately adjudge whether we have been asleep at the switch, but the cost of medical readiness remains an unpopular issue among those who seek peacetime budget cuts. Medical preparation and training for combat, however, are akin to an insurance policy. When not needed, it seems to be a formidable expense; but if needed, one wonders why the coverage was not greater. The Armed Forces expect and deserve adequate medical care, especially in combat. The certainty of it has motivated troops to victory; its lack has reduced their will to fight and created the potential for disaster on the battlefield. JFQ

NOTES

[1] U.S. Department of Defense Medical Readiness Review Group,"Medical Readiness Planning in the U.S. European Command" [Zimble report] (Washington: Government Printing Office, April 18, 1984). For an examination of the bombing of the Marine barracks, see U.S. Department of Defense, "Report of the DOD Commission on Beirut International Airport Terrorist Act" (Washington: Government Printing Office, December 20, 1983).

[2] U.S. Department of Defense, Medical Readiness Review Group, "Medical Readiness Status in the United States Pacific Command" (Washington: Government Printing Office, June 1, 1984); "Capabilities of U.S. Forces to Provide Medical Care and Evacuation in the European Theater," DOD IG audit report 87-048, November 17, 1986.

[3] U.S. General Accounting Office, "Operation Desert Storm: Full Army Capability Not Achieved," GAO/T-NSIAD-92-8, GAO/NSIAD-92-175; "Operation Desert Storm: Improvements Required in the Navy's Wartime Medical Care Program," GAO/NSIAD-93-189; "Operation Desert Storm: Problems with Air Force Medical Readiness," GAO/NSIAD-94-58; "Medical Readiness Training: Limited Participation by Army Medical Personnel," GAO/NSIAD-93-205.

[4] U.S. Department of Defense, "Medical Mobilization Planning and Execution," DOD IG report 93-Ins-13.

[5] Erwin F. Hirsch, "Were Naval Medical Forces Prepared?" *U.S. Naval Institute Proceedings*, vol. 118, no. 7 (July 1992), pp. 93–95; Donald Trunkey, "Lessons Learned," *Archives of Surgery*, vol. 128 (March 1993), pp. 261–64.

[6] DOD IG report 93-Ins-13, p. 71.

[7] R.J. Burke, "Medical Support for U.S. Marine Corps Armored Battalion: Problems Encountered During Operation Desert Shield/Storm/Cease Fire and Some of Their Solutions," paper presented at the Seventh Conference on Military Medicine, "The Spectrum of Medical Support to Operation Desert Shield/Storm," April 13–15, 1992.

[8] D.G. Tsoulos, "Preparing the Theater Army Medical System for War," paper presented at the Seventh Conference on Military Medicine.

[9] GAO/NSIAD 92-175, p. 40.

[10] DOD IG report 93-Ins-13, pp. 119–26; GAO/NSIAD 92-175, pp. 46–47.

[11] GAO/NSIAD 92-175, p. 47.

[12] Burke, "Medical Support."

[13] GAO/NSIAD 94-58, p. 10.

[14] DOD IG report 93-Ins-13, p. 150.

[15] Ibid., p. 151.

[16] Ibid., p. 148.

[17] GAO/NSIAD 94-58, p. 6.

[18] U.S. General Accounting Office, "Operation Desert Storm: Army Medical Supply Issues," GAO/NSIAD-93-206; "Desert Shield/Storm Logistics: Observations by U.S. Military Personnel," GAO/NSIAD-92-26; GAO/NSIAD 92-175; DOD IG report 93-Ins-13, p. 127.

[19] Burke, "Medical Support."

[20] DOD IG report 93-Ins-13, p. 130.

[21] DOD IG report 93-Ins-13.

[22] Ibid.; U.S. General Accounting Office, "Joint Military Operations: DOD's Renewed Emphasis on Interoperability Is Important but not Adequate," GAO/NSIAD-94-47; "Operation Desert Storm: War Offers Important Insights into Army and Marine Corps Training Needs," GAO/NSIAD-92-240; "Operation Desert Storm: Army Had Difficulty Providing Adequate Active and Reserve Support Forces," GAO/NSIAD-92-67.