

NAVAL WAR COLLEGE
Newport, RI

Medical Support Issues of Relevance to Military Operations

by

Brian Lewis
LCDR, NC, USN

High Speed, Low Drag, 720 DPI master copy

Signature: _____

13 February 1998

DTIC QUALITY INSPECTED 1

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

19980709 060

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): MEDICAL SUPPORT ISSUES OF RELEVANCE TO MILITARY OPERATIONS (UNCLASSIFIED)			
9. Personal Authors: BRIAN J. LEWIS, LCDR, NC, USN			
10. Type of Report: FINAL		11. Date of Report: 13 FEBRUARY 1998	
12. Page Count: 30			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: OPERATIONAL MEDICINE, HEALTH SERVICE SUPPORT, MEDICAL, EVACUATION, HOSPITAL, DISEASE, DNBI			
15. Abstract: Military medicine is often a hotly debated topic among a majority who believe that its primary mission is peacetime healthcare for an enormous dependent, retired, and active duty beneficiary population. The reality is that support to the warfighter is the medical health care system's raison d'être. Paradoxically, however, the subject of medical support in military operations is often lost on operational commanders and planners whose focus is directed to more glamorous concerns. Further, it is largely de-emphasized by the physician dominated military medical monolith whose interest lies in civilian styled, (managed) clinical care. New and evolving operational doctrines will require radical changes in the practice and delivery of Health Service Support (HSS). In order to ensure that HSS keeps pace with these changes, today's operational commander must have an understanding of health threats and medical capabilities, as well as the operational link between them. Moreover, he must understand his role in impacting these threats at the command level. Other major areas of strategic/operational concern involve deployment and employment of large, poorly mobile, medical assets (Hospital Ships; DepMEDS), and inadequacies in our tactical and strategic evacuation systems. Solutions to many of the most pressing problems of operational medical support can best be effected at the JCS/CINC level.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

NAVAL WAR COLLEGE
Newport, RI

Medical Support Issues of Relevance to Military Operations

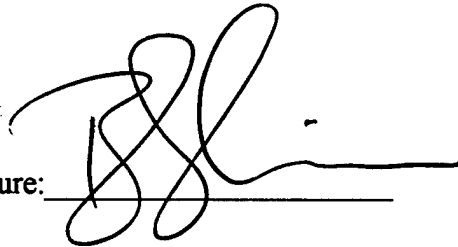
by

Brian Lewis
LCDR, NC, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy

Signature: _____

A handwritten signature in dark ink, consisting of a large, stylized 'B' followed by a horizontal line.

13 February 1998

Medical Support Issues of Relevance to Military Operations

Abstract

Military medicine is often a hotly debated topic among a majority who believe that its primary mission is peacetime health care for an enormous dependent, retired, and active duty beneficiary population. The reality is that support to the war fighter is the medical health care system's *raison d'être*. Paradoxically, however, the subject of medical support in military operations is often lost on operational commanders and planners whose focus is directed to more glamorous concerns. Further, it is largely de-emphasized by the physician dominated military medical monolith whose interest lies in civilian styled, (managed) clinical care. New and evolving operational doctrines will require radical changes in the practice and delivery of Health Service Support (HSS). In order to ensure that HSS keeps pace with these changes, today's operational commander must have an understanding of health threats and medical capabilities, as well as the operational link between them. Moreover, he must understand his role in impacting these threats at the command level. Other major areas of strategic/operational concern involve deployment and employment of large, poorly mobile, medical assets (Hospital Ships, DepMEDS), and inadequacies in our tactical and strategic evacuation systems. Solutions to many of the most pressing problems of operational medical support can best be effected at the JCS/CINC level.

Table of Contents

Backdrop	3
The Military Health Care Monolith	3
Futurewar	5
Joint Trends	6
Who's in Charge?	7
Commander's Impact	7
Disease Non-Battle Injuries	8
World War II	8
The Bad	9
The Good	9
The Ugly	10
Vietnam	11
ODS/DS	11
Afghanistan	12
Solutions, Problems, and more Questions	12
Hospital Ships and other Big Medical Things	14
Mixed Blessings	14
I'm sick, can I go home now?	17
Conclusions	19
Endnotes	18
Bibliography	20

Medical Support Issues of Relevance to Military Operations

"A corps of medical officers was not established solely for the purpose of attending the sick and wounded....the labors of medical officers cover a more extended field. The leading idea, which should be constantly kept in view, is to strengthen the hands of the Commanding General by keeping his army in the most vigorous health, thus rendering it, in the highest degree, efficient for enduring fatigue and privation, and for fighting. In this view, the duties of the corps are of vital importance to the success of an army, and commanders seldom appreciate the full effect of their proper fulfillment"

**Major Jonathan Letterman (1824-1872)
Medical Director of the Army of the Potomac**

Backdrop

For his erudition, today's operational commander may choose from literally hundreds of papers written on such subjects as revolutions in military affairs, dominant maneuver, precision engagement, and other popular phrases from the Joint Vision 2010 (JV 2010) lexicon. All of these topics relate directly to the success or failure of military operations and are of more than passing interest to present and future leaders. Lost in the discussion of these issues, however, is the topic of medical support, among many other less glamorous topics which have enormous impact on the outcome of military operations. To be sure, some medical issues are encompassed within the framework of another JV2010 phrase - "focused logistics", but there is more to consider than even this large area of concern touches on. From the impact of disease and non-battle injuries, to the employment of sophisticated new technologies in combat, to the peacetime issues of organization and mission focus, and other hotly debated topics, one thing is clear - there is much food for thought, and the consequence of inattention to medical support aspects of military operations may well be failure to achieve national objectives. This paper will attempt to illuminate

some of the causative factors of impaired medical support capabilities, as well as provide some historical perspective on the impact of illness on operations, and the commander's role in mitigating against health obstacles. A brief treatment of present and future needs as regards theater medical assets and evacuation system priorities will round out the discussion.

The Military Health Care Monolith

Ironically, the military health care system is not optimized to support military operations. The system was intended to support just one mission, i.e. "to minimize the effects of wounds, injuries, and disease on unit effectiveness, readiness, and morale."¹ The importance of keeping the players on the field cannot be overstated, and, as implied above, Health Service Support (HSS) provides a mental cushion for warfighters of every ilk. Troops in combat (or MOOTW) believe that when illness or injury occurs, they will be attended to by the very best that military medicine has to offer. Often, however, the best an American serviceman can expect in this regard is the application of non-combat focused, general medical principles, learned in the care of a largely geriatric, pregnant, or pediatric population by a practitioner who can best be described as a civilian professional in uniform, operating in an environment which is probably alien to him.* The reason for this is clear. Over the last four decades, military medicine has all but abandoned operational imperatives in deference to the more profitable avenues of retired and dependent health care. Health care professionals spend a minuscule amount of their time training for operational application of

*This statement, in a nutshell, defines the need for the continued existence and expansion of the Uniformed Services University of Health Sciences (USUHS) which, despite its cost, is the only program in the nation which provides a thorough operational medical education to medical students. USUHS trained physicians comprise only about 20% of the services' total.

their skills, and for most, an understanding of the operational art employed by the line personnel they support is scant to non-existent.² In short, the services have bought off on a \$15 billion/year medical delivery monolith that did not downsize with the rest of the armed forces, and which allocates a sizable portion of its resources to dependent and retiree care which have come to be seen as an entitlement by its beneficiaries.^{3,4} As a result of this fixation on civilian style (managed) health care delivery, that is exactly the capability we now have. What we don't have is an HSS community that is optimized to support military operations.

Futurewar

More than ever, operational commanders must demand that health care providers "train as they'll fight", and that military medical planners/commanders possess a knowledge of operational art which provides a mind set that is responsive to the challenges of practice in rapidly changing, high threat environments. If our armed forces are truly undergoing a revolution in military affairs, it will require changes in the way HSS is delivered as well. One good example of this is the advent of Operational Maneuver From The Sea (OMFTS). This Marine Corps concept of future warfare involves the movement of forces from the sea to an objective which may be 200 or more miles inland. With its focus on maneuver, speed, and deception, this style of war fighting imposes demands on HSS that cannot be met by current means. In particular, the modern medical battalion, with its 2.4 million pounds of gear, requiring 311,000 cubic feet of load space, is neither mobile, or flexible enough to keep pace with the thoroughly modern Marine.⁵ This could force the Casualty Receiving and

Treatment Ships (CRTS) to absorb casualties back hauled from the battle zone. This is a less than ideal solution which would require transport assets better used elsewhere.

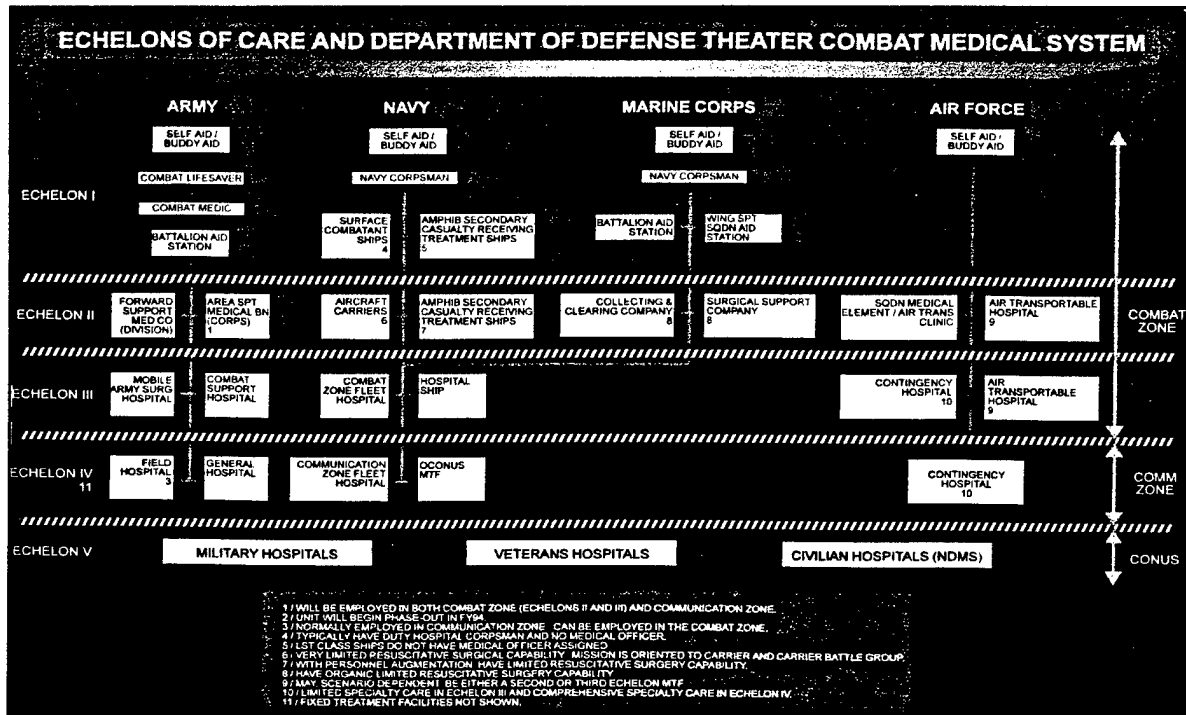


Figure 1 The linear model of HSS. From Joint Pub 4-02

Additionally, the distances involved may preclude transportation of critically wounded troops to resuscitative facilities within the vital first “golden hour” after trauma occurs. Finally, the sixty or so members of the embarked Fleet Surgical Team (FST) could be charged with caring for as many as 600 patients. We often tout the 600 bed capability of the modern LHD and LHA, but many don’t realize how hypothetical this capability is. If a CRTS were tasked with combat, refugee, NEO, or other potentially patient rich missions, the FST would be hard pressed to provide even the most rudimentary care. To put this patient load in perspective, the Navy’s largest medical center typically cares for an inpatient census of less than 350 - yet has about 4,000 personnel on staff.

Joint Trends

Nor are the marines the only forward thinking warfighters on the block. The Army is becoming leaner and more flexible, and its future "*Force XXI*" doctrine will place a greater emphasis on maneuver warfare which is much less linear than current doctrine. But while Army and Air Force logisticians have been hard at work developing concepts and capabilities to match the more direct-to-objective future warfare envisioned by its operational planners, the Army Medical Department (AMEDD), like its sister services, remains entrenched in its soon to be outmoded linear concept of combat casualty care and evacuation (see figure 1). Experience at the National Training Center, and other army training centers is showing an increasing mismatch between combat unit and HSS mobility. Additionally, once in the field, medics and other first providers have demonstrated an unsettling inability to perform even basic medical functions such as triage, evacuation, and post-stabilization care due to their lack of training and readiness.⁶

Who's in Charge?

Compounding the problem is the nature of medical leadership. Physicians often occupy key leadership positions in operational medical settings due to a long held and dangerously incorrect notion that clinical competence in the hospital setting translates to military leadership ability in the field. Unfortunately, their dearth of military leadership experience leaves them unprepared for those duties, as was reflected in the relief for cause of three senior Army medical commanders during Operation Desert Shield/Desert Storm (ODS/DS).⁷ Solutions to these problems have been proposed, but are no doubt painful, and are unlikely to be effected by the medical community, with its vested interest in civilian style

practice, graduate medical education programs, and "one size fits all" leadership mentality.

They will likely have to be imposed by the line leadership, acting in the best interests of the services.

Commander's Impact

"Good doctors are of no use without good discipline. More than half the battle against disease is not fought by doctors, but by regimental officers. It is they who see that the daily dose of mepacrine [antimalarial drug used in WWII] is taken, that shorts are never worn, that shirts are put on and sleeves turned down before sunset, that minor abrasions are treated before, not after, they go septic, that bodily cleanliness is enforced....if mepacrine was not taken, I sacked the commander. I only had to sack three; by then the rest had got my meaning."

Field Marshall Sir William Slim

Disease Non-Battle Injuries

In the world of operational medicine, the unsung heroes are the members of the preventive medicine team, whether they be trained technicians, general medics, or just the soldier, sailor, or marine who digs latrines in the field. Their efforts do more to provide for operational readiness than most of U.S. know. But preventive medicine teams can't do the job alone. It takes a concerted effort by everyone in leadership positions to foster the mission of disease prevention, and the effort must start at the top. Several historic examples will serve to underscore the point here.

World War II

World War II was the first war in modern times to reverse the historical trend of disease as the leading cause of mortality in combat operations. During that war, 75.2% of all deaths were caused by battle injuries, 19.7% by non-battle injuries and only 5.1% from

disease. But battlefield deaths are not the major medical concern for operational commanders. Despite the (now) low mortality from disease non-battle injuries (DNBI), the morbidity picture is entirely different. "During World War II, disease was the major cause of disability in the Army. The number of hospital admissions for disease was more than five times greater than that for battle casualties and non-battle injuries".⁸ Statistics from that war show that commanders varied greatly in their attention to, and management of the disease threat, with clear consequences .

The Bad

During the North Africa campaign the commanders' focus on disease was critical. Field Marshall Erwin Rommel lost a force equal to twice his average strength - through disease alone. The major culprits were dysentery, hepatitis, malaria, and skin diseases - all largely preventable through simple but effective measures. At the same time, soldiers of the British 8th Army fighting in the same hostile, disease threat environment were 2.3 times less likely to become combat ineffective secondary to disease. Rommel's neglect in this regard is documented in a British report, which stated:

"Enemy defensive localities are obvious from the amount of faeces lying on the surface of the ground...This contempt for hygiene became such a menace to the enemy as to affect from 40-50 percent of his front-line troops, as interrogation of captured medical officers revealed...the enemy appears to have no conception of the most elementary sanitary measures, and has a dysentery rate so very much higher than ours that [it] is believed that the poor physical condition of these troops played a great part in the recent victory at El Alamein."⁹

Interestingly, Rommel was evacuated to Germany twice for hepatitis, and lost a number of his staff to disease, but either failed to make the connection, or just didn't care.¹⁰

The Good

General Slim, commander of the British Fourteenth Army arrayed along the Indo-Burmese border, graphically illustrated the commander's impact on DNBI's, reversing a trend that was sapping his combat personnel at the rate of twelve per thousand per day. His novel Malaria Forward Treatment Units reduced the time his troops were out of action from more than five months to approximately three weeks. This also reduced the secondary gain incentives for troops who would rather get malaria (and thus be evacuated out of the theater, often never to return), than fight. Following General Slim's arrival and institution of these and other measures, the sick rate fell to one per thousand per day.¹¹

The Ugly

At the same time, in the same region, U.S. Army General Joseph Stillwell, commanding the U.S. Army Forces China-Burma-India Theater provided his subordinate, Brigadier General Frank Merrill with casualty estimates, and sound medical advice for his unit, the 5307th Composite Unit (Provisional), otherwise known as Merrill's Marauders. After completing the first two of three phased operations, the well reputed Marauders were evacuated, in their entirety, to medical installations for treatment and rest "thus ingloriously ending the third phase of the marauders campaign".¹² Merrill and his commanders failed to enforce proper sanitary and disease prevention measures, despite the fact that training during the unit's preparatory period had been halted on several occasions due to dysentery and malaria. Of the 2830 soldiers he began with, 424 were killed, wounded, or missing in action, but 1,970 were lost (permanently evacuated) to malaria, amoebic dysentery, scrub typhus, psychoneurosis, and other DNBI's.¹³ A telling feature of his inattention to disease

prevention is one anecdote of his unit's arrival at their third objective. By this time, intestinal disease was so prevalent that "one platoon had cut open the seats of its trousers so as to be handicapped as little as possible by dysentery in any combat emergency".¹⁴ The marauders inflicted ten times as many battle casualties on the enemy as they received, "but in the end , amoeba, plasmodia, bacteria, and rickettsia, rather than Japanese soldiers, vanquished Merrill's Marauders."¹⁵

Vietnam

In Vietnam, DNBI's were once again the greatest drain on combat effectiveness. They accounted for about 70% of all hospital admissions from 1965-1969.¹⁶ But there is another side to this story. It is the story of successful HSS. In Vietnam, as in World War II and Korea, the major source of highly trained replacements was ill, injured, and wounded soldiers returning to duty. But the impact of this was often lost on small unit commanders who perceived the effect as more of a trickle than the major manpower pool that it really was. Given that, preventive medical measures tended to lapse, which was the case prior to LTG Julian Ewell's assumption of command of the Army's 9th Division. After taking the reins, General Ewell discovered that half of his infantry battalions were ineffective due to paddy foot. He soon gave command attention to the problem with gratifying results.¹⁷

"This was a real medical feat because it was the first time that a unit in difficult tropical conditions had been able to operate without having horrendous casualties from climate and the indigenous diseases...of course there were lots of other things like malaria pills, hepatitis, etc. But this made it possible to conduct prolonged operations in the Delta...I think you could say honestly that we really broke the V.C. in the Northern Delta, really broke them. I think this [the medical success with paddy foot] was the main contribution..."¹⁸

ODS/DS

In the Persian Gulf, heavy command emphasis was placed on disease prevention before deploying to the Kuwaiti Theater of Operations (KTO). Troops were educated regarding the medical threats in the KTO, including hostile environment, water discipline, infectious disease, hygiene, and chem/bio protective measures. The consequence was a disease rate 40% lower than in Vietnam, and 85% lower than the HQDA planning factor.¹⁹

Afghanistan

The Soviet experience in Afghanistan demonstrated the devastating effects of disease due to non-existent or half-hearted command emphasis on preventive medicine and field sanitation. Of the 620,000 Soviets who served in theater, 67% required hospitalization for a serious illness. This included 115,308 cases of infectious hepatitis, 31,080 cases of typhoid fever, and another 233,554 cases split between plague, malaria, cholera, diphtheria, meningitis, heart disease, dysentery, heat stroke, pneumonia, typhus, paratyphus, and rheumatism. At times, entire divisions were rendered combat ineffective. The Soviets had come to the war prepared for combat casualties or injuries (which numbered 53,753, or 11.44% of all hospitalizations), but lacked sufficient medical support to handle the massive DNBI load. During the 1988 relief operations in Armenia, the Soviet Army succumbed to mass illness once again, which necessitated rescuing many of the rescuers. It is likely that, in the future, the U.S. will participate in coalition operations with forces whose record of disease prevention and field sanitation may be akin to that of the Soviets. When that happens, our parochial view of HSS may need to be discarded in anticipation of epidemic sized threats.²⁰

Solutions, Problems, and more Questions

Operational commanders must insist on, then ensure compliance with, the best preventive measures possible in order to hedge our bets against even the most unpredictable odds and worst case scenarios. This includes advances not only in disease prevention measures (such as the new anthrax and hepatitis vaccines), but also new technologies to prevent battle and non-battle injuries - such as improved body armor, jump injury protection, improved Chemical/biological warfare defenses, etc.²¹ Furthermore, Commanders/planners must be able to recognize deficiencies in Health Service Support as relates to their operational perspective. In point of fact, medical planners may not even be aware of unique operational problems for which they might provide solutions, such as the effects of sleep deprivation and exhaustion resulting from sustained operations over extended periods (i.e. now that we "own the night", when do we rest?).²² Operators should be able to provide input to, and predict the impact of proposed solutions such as the Marines recent organization of Shock/Trauma Platoons (STP's) which are light, highly mobile medical assets with specialized resuscitative resources (e.g. two emergency medicine physicians) capable of providing initial stabilization in forward areas.²³ This is the kind of organizational adaptation that is vital to future HSS success.

Ideally, the forthcoming RMA (Revolution in Military Affairs) should spur a concomitant Revolution in Medical Affairs. This cannot be accomplished simply by throwing new medical technologies into the mix. An example of this is telemedicine. Touted as a medical "force multiplier" the suite includes a digital teleradiology setup, the latest computers, high definition televisions and video cameras, telemicroscopes, etc.

What's not included is an operational concept and/or organizational adaptation to effectively employ this new technology in a way which fundamentally alters the character and conduct of operational medicine.²⁴ There certainly appear to be possibilities in this technology, but buying it today and defining its use later is like building an SSBN before you know if anyone else has the bomb. As the intended recipient of this technology's benefits, the operational commander should ask what the "value added" will be, particularly since it may compete with other operational resources (e.g. bandwidth, maintenance, funding, etc.), and increase workloads in some areas.

Hospital Ships and other Big Medical Things

As previously noted in figure 1, hospital ships, combat zone fleet hospitals, MASH units, combat support hospitals, contingency hospitals and air transportable hospitals are all echelon III facilities which provide resuscitation, initial wound therapy, and post operative treatment. They are all enormous facilities which (except for the hospital ships) take a very long time (90-120 days) to transport, using a considerable amount of lift assets. They typically provide for the treatment of between 300 to 1,000 patients of all types. Their employment sends two clear strategic/operational messages to the enemy - one, that we are prepared for the worst, and two, that we'll be around for a while. Due to space limitations, a discussion of each platform's capabilities, benefits, and drawbacks is impossible. However, due to their unique operating considerations, the hospital ships in particular merit a brief review.

Mixed Blessings*

We have two hospital ships in our inventory, the USNS Mercy (TAH-19), and USNS Comfort (TAH-20). Both were converted from 90,000 dwt San Clemente class tankers and measure 895 feet in length with a beam of 106 feet and a draft of 33 feet. After our aircraft carriers they are America's biggest naval vessels (see figure 2). Operated by the Military Sealift Command (MSC), each has a cruising speed of 17.5 knots and an endurance of 13,000+ miles. They are layberthed in reduced operating status five (ROS 5) at San Diego and Baltimore respectively, cared for by a skeleton crew, and maintained at an approximate cost of \$1 million/month. The ships are essentially strategic assets, with the CNO responsible for funding and coordination, but staffing provided for by the Bureau of Medicine and Surgery (BUMED). The 1,000 bed facility includes 12 operating rooms and 80 intensive care beds, and when fully staffed embarks approximately 850 medical personnel, which generally empties one of the three major Naval Medical Centers, requiring a backfill by reservists.

Despite the impressive capabilities afforded by these enormous assets, there are several actual or potential drawbacks to their employment. First, they make very large targets for over the horizon missile systems and enemy torpedoes. For those who think this prospect unlikely, it will serve to note that several hospital ships were sunk during World War II, including a Japanese hospital ship sunk by the USS NAUTILUS (SS-168). The ships must operate under restrictions imposed by the Geneva Convention, including the

*A thorough treatment of this topic is provided in CDR Burke's excellent paper, from which the bulk of this section is derived. Darlene M. Burke, The Hospital Ship: A Mixed Blessing for the Operational Commander, (U.S. Naval War College, Newport, RI, 1995)

requirement to notify the enemy of its employment, and position; and prohibitions against active defensive measures and crypto (including secure comms), the use of non-medical aircraft (the ship has no organic air assets either), and the return of casualties directly to the field. Additionally, they are subject to visit and search, and may even be legally detained by the enemy for up to seven days, during which he may control ship's communications, order it

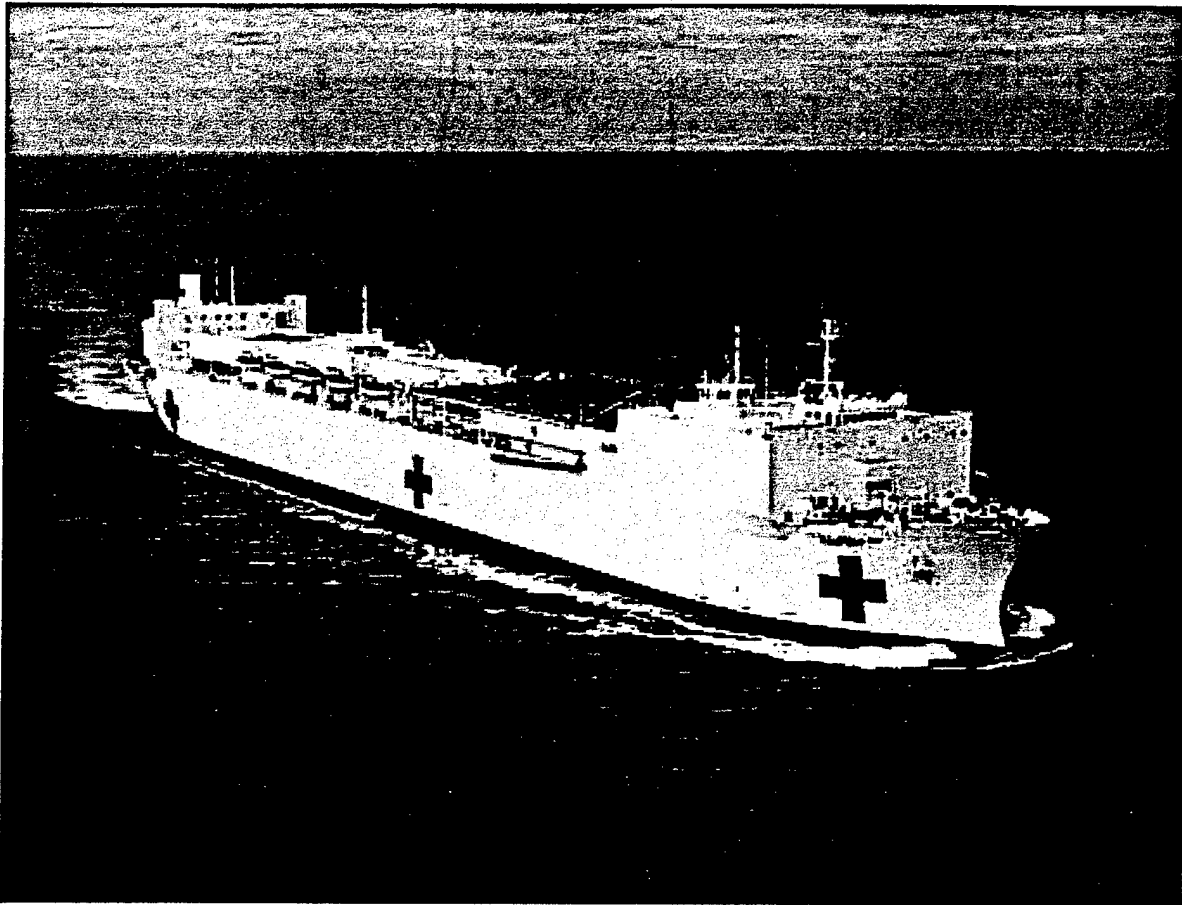


Figure 2 The USNS MERCY (TAH-19) underway off the California coast.

to depart, make it take a particular course, or refuse assistance. In addition to obvious concerns, the Convention makes the hospital ship an easy target for terrorists, and great consideration must be given to the way in which it will be employed as a result.

In addition to the Geneva Convention limitations, the ship has several operating barriers as well. First, it was designed with helicopter evacuation as its only means of patient transfer. As it can only accommodate one helo at a time, the implications for mass transfer are obvious. Second, it has little or no isolation capability, thus limiting its usefulness in providing care for infectious diseases. When the ships were employed during ODS/DS, the requirement to remain outside of shore based missile threats placed them outside effective helo range. The report by CENTCOM regarding their employment was less than favorable as it stated the ships: 1) were not mobile, flexible, or rapidly responsive, 2) did not extend operations off a hostile beachhead or provide an aviation facility for casualty evacuation once hostilities commenced, and 3) as a result of the aforementioned limitations, could not provide acute medical and surgical care to U.S. and allied armed forces. The Comfort did not fare much better during Haitian refugee operations in 1994 hampered as it was by lack of ship-ship transfer capability, security for the large number of migrants, medical supplies to provide routine care, and isolation spaces for TB patients.

I'm sick, can I go home now?

Well, maybe. The fact is, we may have serious troubles with both tactical and strategic medical evacuation, particularly in larger operations (MRC's). Tactical evacuation (Corps to theater) is an amazingly complex affair involving an alphabet soup of interlocking regulators, liaison teams, control centers, et al. Relying heavily on Air Force tactical airlift assets, the system has been described by one three star who is familiar with its workings as a "system designed for failure".²⁵ Among other requirements, airevac (essentially back haul

using various tactical aircraft) must coordinate the movement of aircraft so that patients land at airfields which are in close proximity to appropriate treatment facilities, ensure that those aircraft can be used to transport the various types of patients, that appropriate providers are available for escort, that timely ground transport is available, etc. The process flies in the face of well established logistical principles such as simplicity, timeliness, responsiveness, and unity of command. Coordination of medical and evacuation assets is essential to de-conflicting and optimizing the evacuation process. A well planned schedule, developed in advance of a campaign, can help to smooth out problems with the request and response facets of tactical airevac operations. Alternatives to tactical airevac are reliant on host nation support, forward placement of third echelon HSS, increased strategic evacuation, or combinations of these. Unfortunately, strategic airevac is hampered by major deficiencies which have yet to be resolved. Specifically, there is a shortfall of Civil Reserve Air Fleet (CRAF) Aeromedical Evacuation (AE) aircraft and Aeromedical Evacuation Ship Sets (AESS). The CRAF/AESS requirements call for 44 Boeing 767 aircraft with associated equipment (AESS) for patient transport conversion. Currently there are 34 Ship Sets, and only 19 aircraft on contract, of which the Air Mobility Command (AMC) can only convert four to meet full certification. Additionally, the program has several other weaknesses including problems in patient on/off loading, oxygen systems, and validation requirements to name a few.²⁶ You can't blame the medical folks for the system's failures - they don't own it. Solutions to this longstanding problem should be orchestrated by the major supporting command (CINCTrans), in conjunction with the supported commander and knowledgeable medical advisors. Our evacuation problems are by no means insurmountable, but will

nonetheless require considerable foresight and effort on the part of operational planners.

Conclusions and recommendations

Tomorrow's weapons will have a greater wounding affinity than ever before. The reasons (and consequences) for this are well known to military operators. Combined with this changing mechanical threat will be the specter of chemical and biological weapons. As evidenced in the Persian Gulf conflict, however, casualty estimation models may be less reliable than ever before. This, and other uncertainties inherent in modern military operations require that Health Service Support - like all other support services, is rigorously planned and trained for. Operational commanders and planners can not afford the luxury of letting "Doc work out all the medical details". Current and future battlefields will require medical expertise to be integrated with the evolving operational doctrine for which few medical personnel are educated or trained. Proof of this statement can be found at any Command/Staff/War College, where the number of Medical Officers attending (if any) is no more than one or two per year. Military medicine, with its over-riding agenda to provide hospital centered, civilian styled managed care to a largely non active duty beneficiary base, is unlikely to provide solutions to the tough operational medical problems we will face in the future. The CINC's and Service Chiefs should not wait for a major HSS failure to re-evaluate the adequacy of the current structure's organization and mission. Over the last four decades there have been a number of studies and panels which have evaluated proposals to reorganize and re-orient the Military Health Services System (MHSS). All have been discarded by the Service Chiefs, after consultation with their respective Surgeons General. This is the medical version of asking the fox his opinion on reorganization of the hen house.

Service Chiefs should divorce themselves from both military medical parochialism, and the emotional fervor of comprehensive peacetime health care, and insist on sound, impartial guidance which is mission oriented and in keeping with the needs of the Armed Services. Change is not only necessary, but inevitable.

The commander's impact on various aspects of medical support, ranging from disease prevention and care provision, to tactical and strategic evacuation, should not be underestimated. History provides conspicuous evidence of the rewards of attention and consequences of inattention to these and other medical support issues. Better liaison is indicated between operational and HSS planners, with special attention given to those areas in which medical planners lack sufficient education and insight to accomplish mission objectives. Furthermore, it is time to make some hard decisions regarding the future of the hospital ships, and our reliance on the large, heavy, echelon III Deployable Medical Systems (DepMEDS) such as fleet hospitals. Scrapping one or both ships now, and focusing funding and doctrine on smaller, more capable, and more forward assets should be strongly considered. Finally, changes in the medical evacuation system have been ongoing for years, but significant improvement remains elusive. Geographic CINC's should solidify contingency plans, and research, then allocate sufficient dedicated intra-theater (tactical) evacuation assets - the payoff will be in higher return to duty rates. CINCTrans must fix the CRAF/AESS deficiencies. Our present HSS and evacuation systems are the best in the world. Making the right changes now, will ensure that it remains so for decades to come.

NOTES

1. Joint Chiefs of Staff Joint Pub 4-02, Doctrine for Health Service Support in Joint Operations. (Washington, D.C), I-1.
2. Bartone, Paul, and Britt, Thomas. Quick Look Study of Medical Readiness. Walter Reed Army Institute of Research Technical Report 95-0025, Washington, D.C.: Walter Reed Army Institute of Research, January 1995, 1
3. U.S. General Accounting Office. Wartime Medical Care - Personnel Requirements Still Not Resolved. Report to Congress [GAO/NSIAD-96-173], Washington: 1996, 1
4. Wehrly, David J. Military Medicine Focused for Joint Warfighting. (Carlisle Barracks, PA), U.S.Army War College, 1993, 5-8
5. Need, James T. Operational Medicine from the Sea - A Revolution in Medical Affairs. Newport, RI: Naval War College, Jun 1997, 7
6. Duong Nguyen, "Mass Casualties on the Modern Battlefield: Problems and Proposed Solutions," Military Medicine 155: 186
7. Wehrly, 12
8. Thompson, Robert J., Jr. Commanders Impact on Preventing Disease During Military Conflicts. Fort Leavenworth, KS: Army Command and General Staff College, June 1992, 35
9. H.S Gear, "Hygiene Aspects of the El Alamein Victory", British Medical Journal (March 1944), 384
10. Ronald F. Bellamy and Craig H. Llewellyn, "Preventable Casualties: Rommel's Flaw, Slim's Edge" Army (May 1990), 54
11. Viscount Slim, Defeat into Victory (London: Papermac, 1986) 169, 177-180
12. Thompson, 47
13. James H. Stone, "The Marauders and the Microbes," Infantry Journal 44 (March 1949), 10

14. Charlton Ogburn Jr., The Marauders (New York: Harper and Brothers, 1959), 248
15. James H Stone, Crisis Fleeting. Washington: Office of the Surgeon General, 1969
16. Thompson, 51
17. James B. Peake, Message to Warfighters: Historical Perspective on Combat Medicine. (Carlisle Barracks, PA: U.S. Army War College, 1988), 15
18. LTG Julian J. Ewell, Transcription of an oral history interview conducted by Robert Crowley and Norman Bissell, Oral History, Senior Leader Series (Carlisle Barracks: Military History Institute, 1979), 65
19. Thompson, 61
20. Lester W. Grau, and William A. Jorgensen, Medical Support in a Counter-Guerilla War: Epidemiological Lessons Learned in the Soviet-Afghan War. (Fort Leavenworth, KS: Foreign Military Studies Office, 1995), 2, 17, 21-22
21. A thorough treatise on the subject of futuristic operational medical technologies is provided in - National Research Council. STAR 21 Strategic Technologies for the Army of the Twenty-First Century: Health and Medical Systems. (Washington: 1993)
22. Anderson addresses the concepts of Continuous and Sustained Operations (CONOPS/ SUSOPS) and the effects thereof. Clinton T. Anderson, Sleep Deprivation and its Effect on Combat Effectiveness. (Fort Leavenworth, KS: 1988, School of Advanced Military Studies, United States Army Command and General Staff College)
23. CDR James T. Need, CO 2nd Med BN, Camp LeJeune, NC, telephone conversation with author, 27 January 1988
24. As adapted from Andrew F. Krepinevich, "Calvary to Computer: The Pattern of Military Revolutions," The National Interest, Fall 1994, 30-42
25. Ian L. Natkin, The Role of Health Services in Support of the Theater Campaign Plan. (Carlisle Barracks, PA: U.S. Army War College, 1989), 19
26. Donald R. Wilhite, USAF Civil Reserve Air Fleet Aeromedical Evacuation Airlift Capability. (Wright Patterson AFB, OH: Air Force Institute of Technology, May 1996), 1-4

Bibliography

- Amoroso, P.J., Hoin, F.A., Swartz, W.G., and Yore, M.M. Total Army Injury and Health Outcomes Database: Description and Capabilities. Natick, MA: Army Research Institute of Environmental Medicine, February 1997
- Amoroso, P., and Bell, N. The Haddon Matrix: Application to the Prevention of Airborne Injuries. Natick, MA: Army Research Institute of Environmental Medicine, December 1994
- Anderson, Clinton T. Sleep Deprivation and its Effect on Combat Effectiveness. Fort Leavenworth, KS: 1988, School of Advanced Military Studies, United States Army Command and General Staff College
- Bartone, Paul, and Britt, Thomas. Quick Look Study of Medical Readiness. Walter Reed Army Institute of Research Technical Report 95-0025, Washington, D.C.: Walter Reed Army Institute of Research, January 1995
- Bellamy, Ronald F. and Llewellyn, Craig H. "Preventable Casualties: Rommel's Flaw, Slim's Edge" Army, May 1990
- Birkmire, Deborah. Telemedicine Evaluation - Human Factors. Aberdeen Proving Ground, MD: Army Research Laboratory, October 1996
- Blood, Christopher and Anderson, M. E. The Battle for Hue: Casualty and Disease Rates During Urban Warfare. Naval Health Research Center Report no. 93-16, San Diego, CA: Naval Health Research Center, 1993
- Blood, C.G., Odowick, M.S., and Jolly, R.T. An Analysis of Shipboard Casualty Incidence During Naval Combat Operations. NHRC report; no. 95-13, San Diego, CA: Naval Health Research Center, 1995
- Blood, C.G., Griffith, D.K., Nirona, C.B., and Pugh, W.M. Navy Medical Resource Planning: Rates of Illness for Various Operational Theaters. NHRC report; no. 88-42, San Diego, CA: Naval Health Research Center, 1989
- Blood, C.G., Marks, J.S., and Odowick, M.S. Shipboard Casualty Forecasting: Adjustments to Ship Hit Probabilities. NHRC report; no. 96-25, San Diego, CA: Naval Health Research Center, 1996
- Blood, C.G., Matheny, S.E., and Sundstrom, S.C. The Optimal Placement of Casualty Evacuation Assets: A Linear Programming Model. NHRC report; no. 95-39, San Diego, CA: Naval Health Research Center, 1995

- Blood, C.G., Griffith, D.K., and Nirona, C.B. Medical Resource Allocation: Injury and Disease Incidence Among Marines in Vietnam. NHRC report; no. 89-36, San Diego, CA: Naval Health Research Center, 1989
- Blood, Christopher G. Shipboard and Ground Troop Casualty Rates Among Navy and Marine Personnel during World War II Operations. Report no. 90-16, San Diego, CA: Naval Research Center, 1990
- Burke, Darlene M. The Hospital Ship: A mixed blessing for the Operational Commander. U.S. Naval War College, Newport, RI, 1995
- Burns, A.D., Graham, A.E. Preparations for Casualty Regulating and CONUS Care During Operation Desert Storm. Alexandria, VA: Center for Naval Analyses, Operation and Support Division, October 1991
- Center for Army Lessons Learned. Commander's CASEVAC System. Fort Leavenworth, KS, November 1989
- Clodfelter, Michael. Warfare and Armed Conflicts: a Statistical Reference to Casualty and Other Figures, 1618-1991. Jefferson, NC: McFarland, 1992
- Colby, P.B., Feldhake, M.J., Nielson, C.A., and Wadsworth, C.D. Is the MEDEVAC System Broke?. Quantico, VA: Communication Officers School, March 1992
- Craigsmiles, Raymond G. Telemedicine Strategic Planning and Implementation Issues in the Navy Medical Department. Monterey, CA: Naval Postgraduate School, September 1995
- Escamilla, J., Hanson, K., Hyams, K., Oldfield, E.C., and Wignall, F.S. "The Impact of Infectious Diseases on the Health of U.S. Troops Deployed to the Persian Gulf During Operations Desert Shield and Desert Storm" Clinical Infectious Diseases 1995 1497-1504
- Ertono, S., Hudoyo, H., Mascola, J., Porter, K., and Soeprapto, W. "HIV and Peacekeeping Operations in Cambodia" Lancet 1995 1304-1305
- Evans, Sandra R. Personal Protective Techniques Against Insects and Other Arthropods of Military Significance. Aberdeen Proving Ground, MD: Army Environmental Hygiene Agency, June 1991
- Ezzell, John W., Jr. Anthrax - Pasteur to the Present Fort Detrick, MD: Army Medical Research Institute of Infectious Diseases, Bacteriology Division, 1987

- Felder, Allie C., III. Can We Get Back from There? Theater Casualty Evacuation in the Northern Flank. Newport, RI: Naval War College, February 1988
- Gabriel, Richard A., and Metz, Karen S. A History of Military Medicine, Volume II: From the Renaissance through Modern Times. New York: Greenwood Press, 1992
- Gauker, E., Pearsall, D., and Pugh, W. Preliminary Evaluation of Selected Telecommunications Technologies for Medical Care Aboard Navy Ships. San Diego, CA: Naval Health Research Center, December 1995
- Gear, H.S. "Hygiene Aspects of the El Alamein Victory." British Medical Journal (March 1944)
- Glick, Jeffrey. Mass Casualty Disasters: A Survey. Fort McNair, Washington, D.C.: Industrial College of the Armed Forces, National Defense University, 1995
- Goddard, J., McHugh, C. "Impact of a Severe Tick Infestation at Little Rock AFB, Arkansas on Volant Scorpion Military Training." Military Medicine 1990 277-280
- Grau, L.W., and Jorgensen, W.A. Medical Support in a Counter-Guerilla War: Epidemiological Lessons Learned in the Soviet-Afghan War. Fort Leavenworth, KS: Foreign Military Studies Office, 1995
- Hamilton, Patrick J. Managing the Navy's Infectious Medical Waste. Austin, TX: University of Texas, Department of Civil Engineering, 1993
- Hibbs, Richard G. "NAMRU-3: Forty-Six Years of Infectious Disease Research." Military Medicine 1993 484-488
- Historical Evaluation and Research Organization, Average Casualty Rates for War Games, Based on Historical Combat Data. Washington, D.C.: 1967
- Hobson, Alan D. Casualty Reporting on the Modern Battlefield: Can It Be Accurate and Timely?. Carlisle Barracks, PA: U.S. Army War College, 1984
- Hoffman, S.L., Miller, L.D. Perspectives on Malaria Vaccine Development. NMRI-96-08 Bethesda, MD: Naval Medical Research Institute, 1996
- Howard, Tracy L. An Analytical Model for the Treatment and Evacuation of Casualties in a Low-Intensity Conflict. Monterey, CA: Naval Postgraduate School, March 1993
- Jenkins, Gary L. Civil Reserve Air Fleet B-767 Aeromedical Evacuation Shipset (CRAF AESS). Test Plan, Fort Dix, NJ: 33rd Flight Test Squadron, May 1997

- Kasperik, Donald J. Telemedicine Technology: Will It Enhance Combat Casualty Care on the 21st Century Battlefield? Carlisle Barracks, PA: Army War College, April 1997
- Lewis, Harland G., Jr. Casualty of Peace: The Army Medical Department in 2003. Washington, D.C.: Industrial College of the Armed Forces, April 1993
- National Research Council. STAR 21 Strategic Technologies for the Army of the Twenty- First Century: Health and Medical Systems. Washington: 1993
- Natkin, Ian L. The Role of Health Services in Support of the Theater Campaign Plan. Carlisle Barracks, PA: U.S. Army War College, 1989
- Need, James T. Operational Medicine from the Sea - A Revolution in Medical Affairs. Newport, RI: Naval War College, Jun 1997
- Need, James T. CO 2nd Med BN, Camp LeJeune, NC, telephone conversation with author, 27 January 1988
- Nguyen Duong. "Mass Casualties on the Modern Battlefield: Problems and Proposed Solutions," Military Medicine. 155
- Ninas, Larry E. The Current Status of Russian/ CIS Communication Satellites. Monterey, CA: Naval Postgraduate School, September 1994
- Ogburn, Charlton, Jr., The Marauders. New York: Harper and Brothers, 1959
- Peake, James B. Message to Warfighters: Historical Perspective on Combat Medicine. Carlisle Barracks, PA: U.S. Army War College, 1988
- Shaffer, Richard A. The Epidemiology of Illness, Injury and Attrition Among Select U.S. Military Female Populations. NHRC report; no. 95-30, San Diego, CA: Naval Health Research Center, 1996
- Sharon, Danny J. Development of Disease and Non-Battle Injury Casualty Rates for the U.S. Air Force. Brooks AFB, TX: Armstrong Lab - Human Systems Program Office, Jan 1995
- Slim, Viscount. Defeat into Victory London: Papermac, 1986
- Stone, James H. "The Marauders and the Microbes," Infantry Journal 44, March 1949
- Stone, James H. Crisis Fleeting. Washington: Office of the Surgeon General, 1969

- Syverson, Robert L. A Computer Simulation and Analysis of the Forward Surgical Team. Monterey, CA: Naval Postgraduate School, September 1995
- Taliaferro, William H. Medicine and The War. Chicago: The University of Chicago Press, 1942
- Thompson, Robert J., Jr. Commanders Impact on Preventing Disease During Military Conflicts. Fort Leavenworth, KS: Army Command and General Staff College, June 1992
- U.S. Adjutant-General's Office. Operations Report Lessons Learned: Report 2-68, Medical Lessons Learned. Washington, D.C., 1968
- U.S. Army Soldier Support Center, Variation of Historical Casualty Rates with Battle Dates. Final Report. Fort Benjamin Harrison, NJ, 1990
- U.S. Army Concepts Analysis Agency, Improved Casualty Estimation and Evacuation System (ICEES). Study Report; CAA-SR-84-16, Bethesda, MD, 1984
- U.S. Army Medical Research and Development Command. Sustaining Soldier Health and Performance in the Former Republic of Yugoslavia: Guidance for Small Unit Leaders. Fort Detrick, MD, 1993
- U.S. General Accounting Office. Wartime Medical Care - Personnel Requirements Still Not Resolved. Report to Congress [GAO/NSIAD-96-173], Washington: 1996
- U.S. Joint Chiefs of Staff Joint Pub 4-02, Doctrine for Health Service Support in Joint Operations. Washington, D.C.: 1995
- U.S. Marine Corps. Combat and Field Medical Practice. (FMFRP 12-19) Washington, D.C.: 1989
- U.S. Marine Corps. Health Service Support. (FMFM 4-50) Washington, D.C.: 1990
- Wehrly, David J. Military Medicine Focused for Joint Warfighting. Carlisle Barracks, PA: U.S. Army War College, 1993
- Wilcox, Walter W. Field Testing of the Combat Casualty Care Medical Information System (CCC/MIS). NHRC report; no. 84-4, San Diego, CA: Naval Health Research Center, 1984
- Wilcox, W.W. A System for Tracking Patients at Forward Medical Treatment Facilities. NHRC report; no. 94-35, San Diego, CA: Naval Health Research Center, 1996

Wilhite, Donald R. USAF Civil Reserve Air Fleet Aeromedical Evacuation Airlift Capability.
Wright Patterson AFB, OH: Air Force Institute of Technology, May 1996