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**MEDICAL TRENDS: AN EVALUATION OF MEDICAL CARE GIVEN  
IN VIETNAM, GRENADA, PANAMA, AND DESERT STORM**

**BY**

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## ABSTRACT

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Meeting today's medical mission demands in a resource austere environment requires an active analysis of medical support given to soldiers and civilians in previous conflicts. This paper reviews medical support given in four previous conflicts. Analysis includes predeployment, logistics, communication, patient evacuation, preventive medicine, veterinary services, civilian assistance and post-deployment. Courses of action are developed to improve medical care given in a war time environment.



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## **MEDICAL TRENDS: AN EVALUATION OF MEDICAL CARE GIVEN IN VIETNAM, GRENADA, PANAMA, AND DESERT STORM**

The ability to analyze our previous actions and adjust accordingly for future operations may very well identify the standard that separates us from other animals on the evolutionary tree. Fortunately, the Army Medical Department (AMEDD) has a long history of evaluating lessons learned. In the Civil War, the Surgeon General tasked his regimental surgeons to support what is now known as the Armed Forces of Institute of Pathology. The purpose was to provide for the evaluation of medical treatment given to soldiers during wartime<sup>1</sup>. This same approach was summarized 80 years later by Dr. E.D. Churchill, who was a surgical consultant, Mediterranean Theater, World War II<sup>2</sup>

"(The surgical consultants) were searching for surgical evidence by direct observation and discussion....It was an experimental laboratory not only for surgery but also for medicine as a whole; for ordinance; for equipment....It was vital that wound surgery be carried on within a framework of inquiry for this theatre was the proving ground for the greater task that was to come<sup>3</sup>.

The results of these activities are startling. The following table shows a definite decrease in soldier mortality and morbidity as a result of this intent.

MORBIDITY AND MORTALITY OF US SOLDIERS IN WW II, KOREA, AND VIETNAM <sup>4</sup> .			
CONFLICT	AMPUTATIONS	WIA/KIA	HOSPITALIZED MOR
WW II	73.0%	3:1	3.3%
KOREA	18%	4:1	2.4%
VIETNAM	12%	6:1	1.81%

Table 1

Unfortunately, as good as the procedure was for critical self-evaluation, there were many lessons lost that cost hundreds if not thousands of lives. For example, World War I was significant in the advancement of treatment of shock. The concept that shock was related to low venous pressure was truly revolutionary. It laid the groundwork for the use of central venous pressure in determining fluid volume resuscitation procedures in Vietnam. Unfortunately this concept was forgotten from 1918-1965<sup>5</sup>.

The purpose of this paper is to evaluate medical care given to soldiers in Vietnam, Grenada, Panama, and Southwest Asia, identify positive and negative trends, and propose courses of action that will have minimal impact on scarce resources. This paper will not deal with the actual scientific advancements in the practice of medicine. This is owing to the fact that such an analysis would be extremely detailed and cumbersome. In addition this sort of analysis has been going on in military

medicine for over 100 years. Rather evaluation will focus on the medical activities that are unique to the military. Those activities include the following: predeployment and the ability of the military to field an army that is medically fit. Communication abilities of medical units to convey information about mission requirements in a wartime environment. Logistic support will be analyzed to include site selection, medical supply and maintenance. Patient evacuation and the increasing reliance on air ambulances will be evaluated. The role preventive medicine plays in reducing non-battle field injuries. Veterinary services and food inspection as well as coordination with civilian medical assistance programs. Finally, redeployment of soldiers out of the war zone and follow up medical care.

## **VIETNAM**

**Predeployment.** This conflict was one of gradual buildup in terms of medical support.<sup>6</sup> All soldiers, Medical and non-medical arriving in Vietnam were given a six week period to adjust and acclimate to the new environment. Medical commanders insured that this time was spent wisely and used this window of opportunity to train their new soldiers to live and survive in the field.<sup>7</sup> During this time, new health care professionals were also given the opportunity to enhance their skills for preparation for their mission.<sup>8</sup> This is not to say that medical

preparation could not have been improved upon, but rather that it was not viewed as a problem in this particular scenario. Pre-deployment was not viewed as a "war stopper" issue owing to the longer period of time that was available for the nation to react to international conflict. This lack of recognition should not in any way diminish the analysis of efforts done at this time. Rather it should be recognized that attempts to improve upon past performance is in itself an evolutionary phenomena that will also show gradual improvement as it becomes integrated into mission requirements.

**Logistics.** Every after action and debriefing report reviewed for this paper showed dissatisfaction with the supply system in some form or another. The challenges here seemed to center around lack of supply and coordination. For example, perishable medical supplies were initially treated in the same manner as non-perishables. This resulted in the loss of needed medical supplies because an SOP was not developed regarding the handling of these special medications.<sup>9</sup> There was a pronounced shortage of trained personnel to maintain and repair not only medical equipment, but a lack of skilled technicians needed to repair generators, vehicles, and other pieces of equipment needed for day to day existence.<sup>10</sup> The supply system also had a fill or kill policy. If, for example, a unit requested 100 different line items of supply, and the supporting organization

lacked just one of those supply items, then the whole order was killed. To add insult to injury, it was reported that random inspections showed that many orders that were killed, could have been filled because the material requested was present.<sup>11</sup>

This problem became so intense that according to BG Spurgeon Neel, by 1965, the whole medical supply system was close to breakdown.<sup>12</sup> The Defense Supply agency alone was completely out of stock on roughly 25% of the items needed just for first aid. Only through the direct intervention of the Surgeon General and the Vice Chief of staff was a workable medical depot system established in the Ryukyu Islands, and with it the establishment of accountability.<sup>13</sup> Conventional wisdom at that time was that the medical supply system needed to be separated from other forms of supply. However, the establishment of accountability is the critical factor and not who owns what. Interestingly, another report noted that later in the conflict (1968), customer satisfaction with logistics was high with a fill rate of 85%.<sup>14</sup> How the fill rate was defined however, was not explained.

Customer units in the field were also to blame for this problem. Often times small dispensaries would have to go to a supply organization many kilometers away when the hospital that was next to them had the supplies needed by the dispensary.<sup>15</sup> Had command placed emphasis on teamwork rather than hoarding, it

would have taken little effort to use the field hospitals to supply satellite dispensaries. The end result would have been an elimination of redundant personnel and the assignment of these surplus people to critical missions that needed their specialty skills.

The most restrictive of all logistics factors, however, was the physical location of the medical units. Medical support units depend on being located in areas that have easy access, secure and dependable lines of communication, absence of enemy air, and the presence of security. This was not the case in Vietnam. The supply was often through a push-pull air package since there was insufficient infrastructure in the country to depend on ground routes.<sup>16</sup> In addition, the guerilla nature of the war required a passive defense and protection of medical installations because of frequent rocket attacks. This usually meant "armoring hospitals" with sandbags or oil drums filled with sand to protect the staff and patients.<sup>17</sup> While this did not stop the medical support mission, it certainly hindered it.

Finally, a critical question must be asked at this point. What effect did these shortages have on the ability to accomplish the mission? There was, and remains a lack of objective data on this issue. Subjectively it was reported that some units were forced to reuse needles, and that many patients died who could have otherwise been saved owing to a lack of

manpower and supplies.<sup>18</sup> While it is important to recognize this complaint, in order for it to be meaningful, objective quantitative data must be present. For example, if there was a shortage of penicillin, how many sexually transmitted diseases were left untreated or had relapse secondary to substandard treatment? The only way to resource properly for a mission is to demonstrate with objective data a causal relationship between shortages and mission impairment. This was not done.

**Communication.** As an army must be able to "shoot, move and communicate", medical support must be able to move, heal and communicate. Increased lines of communication mandates increased dependence on communications. The main problem other than actual possession of radios centered on a satisfactory SOP. It was not until June of 1963 that medical helicopters even had a call sign (Dust Off).<sup>19</sup> There were of course, additional problems, such as obtaining special high frequency radios to communicate over hills and long distances. This was not accomplished until 1967.<sup>20</sup> It also proved difficult to obtain a dedicated net for evacuation. While a dedicated net did eventually become available later in the conflict, this was a lesson that was forgotten in subsequent wars.<sup>21</sup>

Serious problems emerged involving communications necessary to procure and keep track of logistical needs. The Army paper trail simply was not able to work well enough to allow units to

obtain needed Class VIII. The problem was never completely resolved, but one change of procedure that helped significantly with this problem was the adoption of a computerized IBM tracking system.<sup>22</sup> The establishment of telephone and teletype communications systems also played a vital role in allowing the logistics system to meet supply requirements.<sup>23</sup>

**Evacuation.** Vietnam presented unique challenges as an area of conflict. The infrastructure of the country was poor. This problem was compounded as a result of the intense guerilla warfare that took place on the ground. Due to an inadequate in-country infrastructure, medical evacuation of patients by ground was not a satisfactory means of transport. The use of helicopters for air ambulance transport dramatically increased. During the Korean conflict, over 17,000 patients were evacuated by helicopter. In Vietnam, that number increased to over 900,000.<sup>24</sup> Air ambulance services were not new in Vietnam having been used there by the French as early as 1953.<sup>25</sup> As with any new system, there were challenges both predictable and unpredictable that had to be met. There was also a serious problem with inventory specifically parts. There were minimal replacement parts and a severe shortage of technicians to do maintenance.<sup>26</sup> These equipment and personnel shortages were blamed for the inability of air ambulances to meet all requests for emergency evacuation.<sup>27</sup>

Again, we see a failure in the after action process. This piece of data was not quantified, and was not brought fourth in any after action report given to Department of the Army or Congress. Rather it was mentioned in a book by Dorland in his publication in 1982. There was the usual rivalry with the line regarding which operation took priority. It was not unusual for an attack helicopter unit to "commandeer parts" at the expense of the medical mission.<sup>28</sup> More importantly, there was a lack of doctrine and there was initially no mission statement for these units. Fortunately, Regulation 59-1 was introduced in 1963, which defined mission and doctrine.<sup>29</sup> Even with this however, there was still the medical problem of defining triage terms such as urgent, routine, and priority.<sup>30</sup> Also, there were still problems with the evacuation of dead, something that was not authorized by 59-1, but was often done at gunpoint.<sup>31</sup>

Coordination between United States units was also frustrating. Getting needed gun ship support for evacuation in hot areas was dicey at best.<sup>32</sup> Part of the problem involved accountability. As of 1965, the medical evacuation system had been separated from other army air units.<sup>33</sup> With the medical command unable to provide gun ship support air ambulance companies became dependent upon other units that had not been formally tasked to provide coverage.

The majority of accidents and deaths involving air ambulance support did not occur from enemy fire, but rather from the fact that the helicopters used for evacuation purposes did not come equipped with night instruments.<sup>34</sup> This coupled with the lack of experience by new pilots led to some serious accidents involving a loss of materiel and men. As a result, night flying was authorized on an emergent basis only.<sup>35</sup>

Coordination with Vietnamese units was difficult at best. Originally the plan was that the Vietnamese, after receiving materiel and training, would pick up the aerovac mission for at least the Vietnamese nationals. This never happened.<sup>36</sup> And as will be discussed later under civilian care, there never was clear doctrine regarding the responsibilities of the medical air ambulances for the Vietnamese.<sup>37</sup> With our increasing dependence upon coalitions for future operations, this shortcoming must always be considered and overcome.

With over 90% of all evacuations done by air,<sup>38</sup> additional organization was needed to manage this patient flow. This caused the medical regulating office to require augmentation. The medical regulating office was required to track patients. It also tells the aerovac units where to send these patients in order to maximize health care and conserve resources. Since these offices were staffed with administrators acting without clinical guidance, there were a number of times that the patient

was flown a long distance to receive an intensity of care that was not warranted.<sup>39</sup> This resulted in a soldier being lost to a unit for longer than was necessary.

**Preventive medicine.** The first preventive medicine units were deployed into Vietnam in 1965.<sup>40</sup> This was a wise decision. While it is easy to envision all medical problems being related to battle, over 85% of all medical cases were related to disease and non-battle field injuries (DNBI). Only 15% of all medical cases were actually injuries because of hostile action (IRHA).<sup>41</sup>

The most serious of all diseases in Vietnam was malaria. A full 10% of all hospitalizations was due to this disease.<sup>42</sup> Ironically, it was in Vietnam that strains of malaria resistant to conventional therapy were discovered. This resulted in the formulation of additional prophylactic medications for protection of the troops. Some of these medicines are still being used to this day. The true problem with malaria rested with the unwillingness of some troops to take the medications. While this problem was reduced after the preventive medicine units in Vietnam developed a urinalysis test for prophylactic compliance,<sup>43</sup> the rate still remained unacceptably high. This was felt to be due to the unit commanders failing to enforce necessary standards of hygiene.<sup>44</sup> In addition to medication, there was also enforcement of uniform standards (sleeves down) and use of insecticides that were not being followed.<sup>45</sup> It was reported that

when commanders were interested in the prevention of malaria and would enforce standards, then the incidence of disease was lower.<sup>46</sup> Again however, there are two serious shortcomings, which will be found repeatedly through out all conflicts analyzed: the absence of objective quantifiable data, and poor communication between the medical and line side of the house.

Another major challenge that was never fully overcome because of lack of cooperation by the line was the incidence of gastric-intestinal disease. The majority of these cases came from consumption of contaminated ice usually bought from a commercial vendor that did not properly chlorinate his water supply.<sup>47</sup> An intensive effort was made by preventive medicine to improve field sanitation. Ice was not allowed to be purchased from a local vendor unless testing showed that the water had been chlorinated to at least five parts per million.<sup>48</sup> However, like malaria prophylaxis, success or lack of success was dependent upon the unit commander.

Waste burn out procedures and oxidation ponds were established to minimize exposure to human feces.<sup>49</sup> Mess kit sanitation was replaced with the use of throwaway trays and plates.<sup>50</sup> In addition, soldiers were periodically given injections of gamma globulin to prevent infection from hepatitis a.<sup>51</sup>

One of the big surprises in this research was the high incidence and debilitating number of dermatological diseases. The incidence rate for hospitalization was 30 per 1000 per year in 1968. This problem was analyzed and a program of hygiene and prophylactic medication was started which resulted in a decrease to 20 per 1000 per year by 1970.<sup>52</sup>

The prevention of sexually transmitted disease was not successful. Incidence stayed at 200-260/1000/year despite and intensive education program recommending either abstinence or the use of condoms.<sup>53</sup> To further complicate matters, drug resistant strains of gonorrhea demanded the introduction of additional therapies with more potential side effects. Contact tracing was always attempted but rarely successful.<sup>54</sup> This failure is not due to shortcomings in preventive medicine, but rather, no specialty depends on patient compliance for success as heavily as preventive medicine. If the patient does not wish to follow guidelines, and the command will not support, then there is nothing more that can be done for the patient.

There were considerable additional successes for preventive medicine. For example, vaccines and more potent medicines for the treatment of infectious disease to include cholera, plague, fevers of unknown origin, filariasis, and schistosomiasis were successfully implemented.<sup>55</sup> These studies were cornerstone efforts, the results of which are still being used today.

**Veterinary Services (VS).** This form of medical support played a key role in the prevention of animal borne and human borne disease. Veterinarian services were primarily responsible for food inspections. Again, there was considerable sickness owing to the consumption of food from local unapproved vendors by soldiers. None the less, it was felt veterinary services played a key role in the preservation of health through food and water inspections.<sup>56</sup> In addition, veterinary services were critical in the control of animal borne disease through animal vaccinations and rabies control. Over 25,000 animals a year received vaccinations which resulted an increased health of the command.<sup>57</sup>

**Civilian medical assistance programs.** The easy part of war is oftentimes winning the battle. It is much more difficult to know when the war is over, and what to do after the war is over. In the case of Vietnam, a good deal of thought went into the creation of multiple programs all designed to help the Vietnamese people during the conflict, and then slowly turn over accountability for health care to the Vietnam government after the war was over. Unfortunately, the Vietnam government was never ready or willing to accept this responsibility.

Volunteerism by US civilian health care providers was substantial.<sup>58</sup> These unpaid volunteers provided outstanding health care considering the circumstances. These professionals left the comforts of their home to help the truly needy. There

seemed to have been minimal coordination by the military with the Department of State regarding the role of these individuals. Their mission was not defined and the State Department did little to help these volunteers practice medicine. For example, there was no indoctrination to the culture of the country, nor were there any attempts to teach Vietnamese to the physicians or even attempts to find a competent interpreter.<sup>59</sup> Once these professionals hit the ground they were on their own. Procuring needed medical supplies was a random event. Often times the local Vietnamese that were tasked with providing supplies sold them on the black market.<sup>60</sup> As a result, a good part of the logistics support came from military sources. This represented an expansion of mission without augmentation of resources. As noted, medical supply was a weak point in medical support. There seemed to be minimal efforts in placing the right specialty in the right mission. One author noted that as a psychiatrist he was a "subject matter expert" for pediatrics, internal medicine and surgery to the point of doing unassisted amputations.<sup>61</sup> Fortunately, there seemed to be no restrictions on who would be treated by these volunteers. This meant that the Viet Cong were considered legitimate patients.<sup>62</sup> Restrictions on this treatment would have definitely raised some ethical questions in light of the Hippocratic oath.

In addition to volunteer civilians, the military itself routinely provided health care for the Vietnamese. This was a successful program. The true intent, however, was to train and augment Vietnamese health personnel to upgrade their health programs.<sup>63</sup> Again there was a significant problem with the stealing and selling of supplies on the black market.<sup>64</sup> None the less, direct contact afforded almost 15,000 outpatient contacts a month with over 17,000 immunizations a month.<sup>65</sup> In addition, there was almost a thousand hospital admissions a month to military hospitals for Vietnamese civilians.<sup>66</sup> The important lesson to learn here is the need to understand a nation's culture and not provide a disincentive to accept responsibility.

**Post-Deployment.** There was no mention of medical problems U.S. soldiers developed after the conflict had ended in any after action report. This is not surprising. Post deployment like deployment was gradual and did not receive significant media attention. Previous wars did not recognize or address the physical or mental health problems a soldier might have as a result of this conflict. Unlike previous conflicts, the US did not emerge victorious. The antagonism between the government and the news media coupled with the public's loss of faith in their government created a tinderbox for media attention regarding the potential plight of Vietnam veterans. Ominously, BG Spurgeon Neel recognized that Post Traumatic Stress disorder and Drug

Dependency could be a problem later in life for returning soldiers.<sup>67</sup>

### **GRENADA (URGENT FURY)**

Several incidents occurred to improve medical care between the time of Vietnam and Grenada. The military became an all recruited force. Medical care had to improve to be a competitive benefit that would attract and retain soldiers. The Department of Defense established a military medical school, the Uniformed Services University of the Health Sciences. This school augmented civilian medical education with military training and almost doubled the commitment time for medical students entering this program (seven years of active duty instead of four). Pay and bonuses were significantly increased for health care professionals. Despite this, little emphasis was placed on the readiness of the military health care system to meet a wartime mission. As a result, the incursion into Grenada revealed numerous medical related problems.

**Pre-Deployment.** Grenada, unlike Vietnam, was a rapid deployment mission of limited duration. This meant the use of forces already predisposed to go into conflict. Consequently, pre-deployment centered more on planning than the actual readying of the forces. This phase of the mission demonstrated one of the most glaring weaknesses of military operations: lack of communication within and between the chain of command.<sup>68</sup> Couple

this with the lack of time to plan due to the nature of the mission (in this case, just four days)<sup>69</sup>, and there is definitely the potential for adverse consequences.

First, the rapidly formed coalition of forces had no synchronized medical support.<sup>70</sup> Matters were further complicated by the CINCLANT who planned to use Navy Medical facilities to minimize the number of ground medical assets.<sup>71</sup> This was a mission that the Navy was not able to fulfill.<sup>72</sup> In addition, there are no records to indicate that the Army and Navy had ever done any joint training in this area. If the dogma "train as you will fight" is to be accepted at face value, then there is another glaring opportunity for failure should complications arise. While the enlisted personnel that were assigned to the medical support units were at a high state of readiness, the PROFIS physicians, although fully qualified physicians, had not even attended the AMEDD's Combat Casualty Care Course (C4).<sup>73</sup> Fortunately, since Desert Storm, the AMEDD has considerably improved both the PROFIS system and field training.

**Logistics.** Since the senior leadership failed to plan and communicate with subordinate medical commanders, it is no surprise that serious logistic complications developed. Medical support was extremely limited. The advanced element of Company C, 307<sup>th</sup> Medical Battalion consisting of an orthopedic surgeon, one LPN, and four aidmen had nothing more than the essential

basic life saving equipment for stabilizing patients.<sup>74</sup> The dilemma was further complicated when MG Trobaugh, decided to send more combat and combat service elements at the expense of medical support.<sup>75</sup> Consequently, the full contingent of an already austere medical support plan did not start to arrive in Grenada until 48 hours into what was only a 96-hour operation. The full contingency did not arrive until 72 hours into the operation.<sup>76</sup> Again, the Navy showed no better insight into the matter of medical support. Of the two ships tasked with providing medical support, only one had a surgeon and neither had a full medical staff.<sup>77</sup> Fortuitously, this conflict was merciful in that there were only 19 Americans killed and 152 wounded. Had the conflict been more intense, there is no doubt that the medical support would have been insufficient.

**Communications.** Much has already been said about the inability of the services to communicate with each other during Urgent Fury. The same, unfortunately was true for medical support. It was noted multiple times that the inability to communicate to other medical support units and sister services hindered operations.<sup>78</sup>

**Evacuation.** This operation brought the worst of all possible scenarios. There were not enough medical tactical vehicles and the ones that were available were sent to areas that had limited conflict. Consequently, ground evacuation for

patient generally used nonmedical tactical vehicles.<sup>79</sup> Further more, since medical air ambulances did not arrive until about 72 hours into the operation, cargo planes had to be used instead.<sup>80</sup> Fortunately the senior medical staff was able to coordinate with the United States Air Force to rapidly evacuate the more seriously injured soldiers to a fixed medical facility instead of depending on the ineffective Naval Medical support program.<sup>81</sup> It was a tribute to the versatility and flexibility of the individual doctors, nurses, corpsman, and administrators that a bad situation did not turn into a disastrous event. Whatever medical success achieved in this operation was in spite of and not due to the actions of the senior leadership of the services. Overall the senior leadership showed a lack of planning and inattention to medical needs.

**Preventive Medicine and Veterinary Services.** Since these specialties were not included in the Grenada expedition, there was a serious preventive medicine problem. Tactical leaders ignored field sanitation completely.<sup>82</sup> Water consumption was not enforced and heat stress casualties were subjectively described as high.<sup>83</sup> Had this operation lasted longer than 96 hours, medical casualties would have increased because of the failure to plan for these problems.

**Civilian Medical Assistance.** No plan for this contingency was noted anywhere. This is another serious shortcoming. The US

does well at militarily winning wars, but that is only part of the process. As the nation transitions from armed to unarmed conflict there arises a need for the Department of Defense and the Department of State to coordinate with each other to "hand off the football". Medical assistance plans are a small but important part of this process.

**Post-Deployment.** Of all the conflicts analyzed, this one had the largest dearth of information regarding after action analysis. There is to date only one publication that covers medical support in Grenada in depth, which is by Major Thomas Boyles. His thesis was written four years after Grenada and ironically, over 40% of his written sources are from popular journals and not from a technical military publication.<sup>84</sup> These conflicts must be studied, analyzed, and critiqued. They need to become part of the curricula in every officers education program to include the Army War College.

### **PANAMA (JUST CAUSE)**

**Predeployment.** Like Grenada, this operation was also a limited contingency operation. Unlike Grenada, this operation took place in a country that had a relatively superior infrastructure and the presence of American medical support in the form of a major hospital. Otherwise, the challenges facing the military medical community were almost identical. Again, since contingency units were used for this operation, soldiers

were individually at a high state of readiness. Operations Security (OPSEC) precluded the medical subordinate commanders from planning for this operation.<sup>85</sup> Because of the AMEDD's policy of Medical Corp Officers taking command during wartime, there was confusion regarding command and control. Fortunately, this policy has since changed to a branch immaterial command policy. Unlike Grenada, there were rehearsals by subordinate units before the actual operation, which include the participation of sister services. It was noted that this allowed many problems to be solved before the operation actually began.<sup>86</sup>

The professional filler system (PROFIS) continued to be a problem. Unfortunately, the leadership of the hospital attempted to skirt its responsibilities by placing residents (physicians in training) in PROFIS slots.<sup>87</sup> This forced at least one unit to deploy without its authorized number of physicians for a war time environment. There is also another side to this problem. If a hospital sends a large portion of its physicians off to war, who meets the mission requirements in the hospital? Backfill to date has never been successful. On a positive note, the physicians that did deploy had an extensive history of training with their units, which greatly enhanced their effectiveness.<sup>88</sup>

**Logistics.** Again, the failure to involve the medical units early in planning compromised the quality of medical care given to the troops. Consequently, there was insufficient class VIII

and insufficient logistics personnel to manage supply. This problem was compounded when the 44<sup>th</sup> Medical Brigade was redeployed to the US without having an alternate resupply system.<sup>89</sup> Fortunately, Gorgas Army Hospital in Panama was able to provide Class VIII to overcome Corps shortfalls.<sup>90</sup> Again, we see a situation where mission was met in spite of the lack of senior leadership instead of because of it. Again, there was little if any planning to include medical issues in the operation by the senior leadership.

**Communications.** As always, there was a recurring problem with communication. Because of distance and terrain, long distance communication was facilitated only through the use of a satellite communication radio (SATCOM).<sup>91</sup> Use of communication equipment was not coordinated and medical planners were not afforded the opportunity to participate in building a communications SOP.<sup>92</sup>

**Evacuation.** Like Grenada, command intended for there to be a zero day evacuation policy owing to the uncertainty of loyalties of local nationals employed at Gorgas Army Hospital.<sup>93</sup> As a result, all casualties were to be evacuated back to CONUS using the Air Force. There were only three MEDEVAC helicopters in Panama that were considered mission capable.<sup>94</sup> This necessitated the use of non-medical vehicles for evacuation.

Fortunately the situation did not arise requiring a decision between tactical or medical use of these vehicles.

Patient accountability as a result of evacuation was inadequate. Again, medical planners were not included in the original "need to know" group. As a result, there was no medical regulating authority directing and reporting on the flow of patients.<sup>95</sup> This led to problems regarding the handling, accountability, required treatment, and movement of patients.<sup>96</sup>

Finally, although the services had trained together in wartime exercises, there was no provision for the placement of a liaison team by the Army at Wilford Hall Medical Center, a USAF medical support facility located in San Antonio, Texas. This reduced flow of information and brought about many soldier and family issues that required resolution by a special liaison team from Fort Sam Houston.<sup>97</sup> It is important to note here that keeping families informed about soldiers, while not tactically important, is strategically important. For a foreign war that does not excite the American people, it doesn't take too many teary eyed family members on TV complaining about medical care before there is a demand to withdraw from that conflict by the American electorate.

**Preventive medicine and veterinary services.** As with Grenada, there was an appalling lack of command emphasis regarding field hygiene. This resulted in numerous dehydration

injuries that fortunately were minimized through the Combat Lifesaver Program.<sup>98</sup> Fortuitously the operation was short enough in duration that the inadequate attention paid to human waste and water supplies was not a factor in overall incidence of illness.

Similar to previous conflicts, unit commanders were unable or unwilling to dissuade troops from buying food from local vendors, many of whom had deplorable sanitation.<sup>99</sup> Again, the short duration of this conflict allowed this problem to be minimized however, this could be a combat divider should we enter this environment again for an extended period of time.

Veterinary care for military animals was compromised. Several dog handlers failed to coordinate with the veterinarian at Gorgas. As a result: "dogs were improperly kenneled, worked 12 hour shifts, and suffered numerous injuries. At least one dog died of heat stroke while being staked out with no kennel available."<sup>100</sup> This may very have happened in previous conflicts, but it was not addressed in an after-action report. This is yet another demonstration of the need to define what should be in an after-action report before a conflict even starts.

**Civilian medical assistance.** There was a failure to plan for the extent of this mission in the predeployment phase. The OPLAN initially anticipated a 24-hour operation and did not consider support to the local population, which should never happen.<sup>101</sup> One battalion aid station reported treating over 140

trauma casualties in 24 hours with the vast majority being civilian.<sup>102</sup> As a result, the Class VIII supply system which was already insufficient was given another unresourced mission. War planners must understand that no matter what directions are given, most health care providers will not turn away a patient. Civilians in a war zone will always need medical care. Indeed, FM8-55, planning for Health Service Support requires planning considerations for local civilians. Once again, there needs to be a "hand off" with the Department of State as we go from wartime to peacetime conflict.

**Post-deployment.** Being a contingency operation, post-deployment operations were not significant. There was some mental health issues involving post traumatic stress issues.<sup>103</sup> These issues need to be resolved early, and probably would have had minimal impact if a mental health team had deployed with the force to Panama. A formal debriefing session or process was not established and should have been.

### **SAUDI ARABIA (DESERT SHIELD/STORM)**

**Predeployment.** Operation Desert Storm had the largest deployed medical force since World War II.<sup>104</sup> While medical support did not fail in its mission, the numbers of casualties were too small to test the system. Still a number of weaknesses were observed during the predeployment phase.

The PROFIS system again failed to meet the needs of the military. Some units followed SOP regarding PROFIS Medical Corps Officers commanding TOE units without prior experience, some units such as the XVIII Airborne Corps did not.<sup>105</sup> It is not known to this day if there was any difference in the quality of command of these two branches. Since AMEDD policy is now branch immaterial, this issue is academic. More importantly, the PROFIS system again failed to provide the needed number of physicians in the needed specialties.<sup>106</sup> In addition, it was found that once again, the PROFIS system was deploying partially trained residents instead of staff physicians.<sup>107</sup> It was also noted that some units and MEDDACS had failed to update their PROFIS rosters for up to five years.<sup>108</sup> This was further compounded by the fact that many PROFIS health care providers had not acquired the skills necessary to survive and accomplish mission on the battlefield. There was a significant deficiency in preparedness to function in an NBC environment. This necessitated Aberdeen Proving Grounds sending out a chemical casualty care team for first time training for over 1,400 physicians and nurses.<sup>109</sup> On a positive note, the readiness of organic TOE personnel was high.

Line units also had problems with non-deployable soldiers. There was no tracking mechanism to determine the number of non-deployable soldiers secondary to health reasons.<sup>110</sup> Significant problems were noted with reserve component soldiers. Up to 33%

of the soldiers in some National Guard Units could not deploy because of Health readiness issues. Over 42% of active duty medical personnel were non-deployable, and up to 23% of the assigned strength of some Army Reserve units were medically ineligible for deployment.<sup>111</sup> Part of the reason for this high percentage lies with the process used determining medical fitness standards for soldiers. Profiling, evaluating and boarding a medically unfit soldier is a long and tortuous process.<sup>112</sup> If this problem is to be resolved a joint effort between the line and the AMEDD must be made to simplify this system without hurting the individual in the process and what truly constitutes a non-deployable soldier.

Planning was also a problem for medical commanders. Again one perpetual complaint centered on the inability of medical planners to integrate into the command and control system.<sup>113</sup> In addition, there were considerable rivalries within Medical Units that degraded planning even further, as well as the inability of line and medical units to communicate at any level.<sup>114</sup>

**Logistics.** Class VIII supply was again a nightmare for all concerned. Obtaining workable sites for medical facilities, as in Vietnam was a major problem.<sup>115</sup> Logistic planners had not examined blood requirements for a unit since the Korean War.<sup>116</sup> Fortunately a theatre unit blood policy was devised by Major Charles Bolan, which is still used to this day.<sup>117</sup> There was

also, a lack of intelligent planning regarding fluid and oxygen requirements. Packing lists for sets, kits and outfits also had to be updated.<sup>118</sup>

Hospital personnel lacked supply discipline. Line items for some units more than doubled secondary to a need for "exotic" medications to treat individuals with relatively rare diseases (e.g. Parkinson's disease).<sup>119</sup> Because the supply system was unable to provide the perceived needs of units on a timely basis, the inevitable hoarding then took place.<sup>120</sup> This extra materiel then added to that load a unit had to carry when it moved and further stressed out an already overburdened transportation system. As with Vietnam, if the supply system could not meet every requirement requested, then the entire order would be killed (fill or kill). This served to heighten inefficiency and frustration.

It took over two months after medical units began to arrive in Saudi, for a fully operational supply center to develop.<sup>121</sup> Further complicating matters was the additional tasking the army received to be the supply manager for the Navy and the Air Force.<sup>122</sup> As with every other conflict, there was a recognized shortage of supply personnel, means of transportation, and automation problems.<sup>123</sup> To the credit of GAO this data was backed with objective evidence. Our leaders must decide if they are

willing to spend the extra resources to stock needed materiel, or if they are going to continue with a calculated risk.

The mobility of the medical units themselves must be examined. It is no secret that the deployability and mobility of major medical systems was deficient. Because of the advancements made in medicine, there is more equipment and an increased lift requirement for deployment. This obviously increases the demand for vehicles or a subsequent decrease in mobility. By the end of the ground war, there was only one MASH that was operational.<sup>124</sup> To further complicate matters, there were not enough ground assets in Desert Storm to move the medical systems. Vehicles sent for the purpose of accomplishing this mission were reallocated upon arrival to theatre.<sup>125</sup> Even if vehicles had been present to meet mission, the units would not have kept up with the line.

With these facts in mind coupled with a resource austere environment, it makes more sense to rely more on air for transporting the wounded to the medical system. Such a move will not require more resources in the front line, but will mandate additional trauma training for the battalion surgeon and physician assistant. It will accomplish little to spend time, money and effort in improving the mobility of medical systems that can't keep up with the line and that will become only larger and more fragile secondary to improvements in medicine.

**Communication.** The long lines of communication in Desert Storm coupled with the absolute dependence on air ambulance service necessitated the need for a good communications system. This did not happen. Ground ambulances were severely limited because radio communication. If an ambulance even had a radio, the range was limited to 15 miles or less even though lines of communication were ten times that distance. Often times, pilots would fly to known medical locations even though this meant flying over Iraqi tanks and infantry.<sup>126</sup> Air ambulances were no better off being equipped with FM radios that had an effective range of only 15 miles also while a Corps area was 250 miles deep and 100 miles wide.<sup>127</sup> Due to lack of high frequency radios, the management of evacuated patients was non-existent. This would have led to significant sustainability problems had this war developed into an intense, casualty high conflict.

Communications deficiencies were not limited to patient transport. It was found medical units at all levels lacked the quality and quantity of radio communications required to accomplish the mission.<sup>128</sup> It was noted that some corps medical support battalions had a communications system on par with some line unit companies that resulted in a delay of receipt of missions.<sup>129</sup> The Theater Army Medical Management Information System, a key system for logistics requires the AN/GRC 193A Improved High Frequency Radio and ancillary equipment to meet

mission standards. This equipment is not authorized in most medical units.<sup>130</sup>

**Evacuation.** There were over two hundred Army air ambulance helicopters sent to Saudi Arabia to support mission.<sup>131</sup>

Limitations of these aircraft made their support inadequate, particularly during nighttime operations. The Army had both UH-1 (Huey) and UH-60 (Blackhawk) air ambulances. The UH-1 could not perform day or nighttime missions in bad weather owing to a lack of navigational and nighttime vision equipment.<sup>132</sup> The extremely long distances hindered both systems secondary to fuel requirements. Subsequently assistance was provided by the Air Force through C-130's to evacuate patients in a satisfactory manner.<sup>133</sup>

Ground evacuation was even more inadequate. Lack of communications has already been discussed, and to further complicate matters, the ground vehicles lacked navigational aids (to include a compass) which effectively nullified their ability to accomplish almost any mission.<sup>134</sup>

**Preventive Medicine and Veterinary Services.**

Unfortunately, this is a subject that did not bear much discussion in any after-action report. There were no major epidemics owing to bad field hygiene or otherwise. Because of this, it must be assumed that policies implemented by local commanders were sufficient.

**Civilian Medical Assistance.** Again, there was no guidance regarding the level of civilian care. This was unfortunate. Many units had treated large numbers of wounded civilians during Desert Storm.<sup>135</sup> Again, like Panama and Grenada, civilians presented to units requiring medical assistance that was beyond the ability of many units to properly give (obstetrics, pediatrics etc.). Confusion and conflict was created with some units providing support and some units refusing to give support.<sup>136</sup> FM 8-55 is not a regulation and does not give clear guidance to this matter. Further staff work and implementation of a workable policy is needed regarding this topic. An interesting topic, care of civilian and contract employees working with the military in the desert was never addressed.

**Post-deployment.** There was coordination with the Department of the State. The fact that Saddam Hussein did not formally surrender made military medical assistance difficult after the conflict. The Kurds received post conflict medical care, largely in an effort to destabilize the Baath party. The AMEDD while not anticipating the possibility of a "Persian Gulf War Syndrome" speedily implemented a policy of exit physicals for future conflicts as well as an exhaustive survey of all Gulf War participants. Medical evaluation is available to all persons that were in the war to evaluate for disease processes.

## CONCLUSION

**Overview.** The ability to self evaluate is critical. It is imperative that before any conflict soldiers understand the need to be able to participate in an objective after action report. Topics to be discussed should be known before a soldier goes into battle. It must also be emphasized that the concepts to be discussed are a minimum, and if additional subjects develop, these too can be discussed. To be most effective, all of this must be done in an environment of non-attribution. A criterion for measuring success and failure needs consideration. It serves no purpose for a soldier to say that mission was met; yet more resources, people, or money are required. All that is heard is that mission was met and more resources are not required. Participants must be willing and able to say that certain missions were not accomplished or accomplished improperly because of shortages. Objective based outcome is the only way to insure proper allocation of resources in the future.

It must also be remembered that in a resource austere environment there are few solutions, only tradeoffs. Providing resources to solve problem a, will deprive another section of resources which may start problem b. Intelligent team oriented choices must be made to minimize the impact of resource shortages.

Finally, the lessons learned from previous conflicts must be readily available to all U.S. military leaders. A secure lessons learned web site needs to be created that is centrally managed. The data from these reports needs to be taught at every level of leadership in the military. Additional problems and solutions will be addressed in the areas of predeployment, Logistics, communication, evacuation, preventive medicine, veterinary services, and civilian medical assistance.

**Predeployment.** The most significant problem at this time is the number of non-deployable soldiers. The evaluation system for boarding soldiers simply does not work. A fair and expeditious system needs to be developed. If a system to eliminate medically unfit soldiers quickly and fairly could be developed, resources could be conserved. Eliminating medically unfit soldiers as quickly and fairly as possible will increase the fighting strength without an increase in resource consumption. An additional benefit will be the reduction in needed class VIII in a war time scenario. Careful selection and elimination of the medically unfit will dramatically reduce strain on logistics for special medications. This will need to be a total army effort and apply to the army reserve and National Guard units.

To its credit, the AMEDD has had considerable success training its TDA health care providers on basic soldier skills

necessary for survival in conflict. PROFIS positions are being more closely tracked and health care providers identified with line units are now training with those units on exercises such as the National Training Center. Because of issues such as pregnancy, and high turnover, it is unlikely that this program will ever be completely fixed, but what is present now is superior to the past and will work.

A topic not covered in any after action report that needs to be considered is medical intelligence. This would need to include threat as well as useable host nation resources. If quantities of class VIII can be purchased safely in the host nation, that knowledge can help relieve the burden on logistics.

If the dogma "train as you fight" is accepted, then medical planning needs help. Commanders must be given timely information and be able to share that information with their staff. If they can't do that, then there is no reason to have a staff. This must be emphasized at all levels of command from the Office of the Surgeon General down. The consequences of failure to do this must be made plain the unit command, and personnel must be held accountable. The past three conflicts have not met with considerable opposition and that could easily change.

**Logistics.** All stages of planning need to involve logisticians. The ability to provide and maintain class VIII is critical to success. All stages of planning need to involve

logisticians. Instead of making medical systems more mobile, an ever-increasing challenge, an evacuation process needs to be developed to quickly transport patients over great distances. Utilization of host nation support needs to be carefully considered. Medical facility site selection needs to be based on what is needed to maintain and conserve scarce resources, rather than as a secondary mission. The Surgeon Generals Office needs to take the lead in working with senior line commanders in this issue.

**Communication.** The TMMIS needs to be developed and supported with appropriate communication systems. Equipping medical units with modern radio equipment to include high frequency radios that can interface with automatic data systems such as TMMIS is an important means by which the Medical Corps will accomplish its mission in the next conflict.

**Evacuation.** Medical regulation and tracking of patients is strategically important. There must be adequately trained staff for this mission, and there must be a communications system that allows them to disseminate information to the division level.

As lines of communication increase and the ability to project into the battlefield increases, there will be a need to transport patients over long distances. Doctrine will need to be re-evaluated with the Air Force for the transportation of patients.

All ground ambulances should have navigation and night vision capabilities to augment their chances for success. If this is not possible, further emphasis to air ambulances is critical.

The conversion to Black Hawk helicopters needs to continue. Fortunately, as the troops become more dispersed in the battlefield of the twenty first century, there will be fewer potential battlefield casualties and the United States should have air superiority for some time to come. Unfortunately, as the lethality of the battlefield increases, the injuries those casualties sustain will be more intense. Personnel providing care for the soldiers at the front will need training augmentation for trauma to handle those cases where there is a delay in the air ambulance service.

**Preventive Medicine and Veterinary Services.** These services have established a record of success. This must be continued. Recommend that all pre-command courses have time allotted to provide instruction regarding the need for field sanitation and food inspection. This course should specifically include military failures in history secondary to the impact of poor methods of sanitation. Commanders must understand the importance of hygiene and food inspection if these programs are to succeed. The AMEDD must put only first rate people in these positions in order to maintain credibility.

**Civilian Medical Assistance.** There must be a workable plan regarding care for civilian refugees. It is inappropriate to destroy the infrastructure of a country and then refuse medical care. Besides, no dedicated health care provider is going to refuse to help a patient. The Command needs to be aware of this and plan accordingly and develop a realistic, supportable and compassionate policy.

Department of Defense needs to coordinate a "hand off" with Department of State as conflict transitions from violent to non-violent. What resources will State need, and what medical assets will have to remain in country while the peace mission is being accomplished. Medical personnel need to know that they may stay in country longer than unit soldiers simply because of the need for medical support.

**Post-Deployment.** The AMEDD has done well in recognizing the need for care after the war. Its conduct regarding the Persian Gulf Syndrome has been exemplary and the lessons learned in this arena have carried on into other missions such as Somalia and Bosnia. Mental health support needs to be present for soldiers on the battlefield and it is.



## ENDNOTES

- <sup>1</sup> Hardaway, Robert M. M.D. Care of the wounded in Vietnam (Manhattan: Sunflower University Press, 1988), 139.
- <sup>2</sup> Ibid., 140.
- <sup>3</sup> Ibid., 140.
- <sup>4</sup> Neel, Spurgeon M.D. Medical Support of the US Army in Vietnam (Dept of Army: Vietnam Studies, 1973), 27 ,41 ,58.
- <sup>5</sup> Hardaway, 4.
- <sup>6</sup> Neel, 10-17.
- <sup>7</sup> Neel, 177.
- <sup>8</sup> Neel, 50.
- <sup>9</sup> Operations Report-Lessons Learned 2-68: Medical Lessons Learned, Department of Army Report, 16 April 1968, 28.
- <sup>10</sup> Ibid.,26-27.
- <sup>11</sup> Ibid.,27.
- <sup>12</sup> Neel, 81.
- <sup>13</sup> Ibid., 83.
- <sup>14</sup> Senior Officer Debriefing Program: Report of Brigadier General Glenn J. Collins, Department of Army report, 16 October 1968, F-2.
- <sup>15</sup> Operations Report-Lessons Learned 2-68, 26.
- <sup>16</sup> Senior Officer Debriefing Program, D1-D3.
- <sup>17</sup> Ibid., D2.
- <sup>18</sup> Richie, LTC Sharon I., "Echoes From the Past...Lessons for the Future A Vietnam Oral History." U.S. Army War College, Carlisle Barracks, Pa., 1988, 21.
- <sup>19</sup> Ibid., 29.
- <sup>20</sup> Ibid., 66.
- <sup>21</sup> Ibid., 118.
- <sup>22</sup> Neel, 84.
- <sup>23</sup> Operations Report Lessons Learned 2-68, 28.
- <sup>24</sup> Dorland, 118.
- <sup>25</sup> Ibid., 3.
- <sup>26</sup> Ibid., 25-26.
- <sup>27</sup> Ibid., 80.
- <sup>28</sup> Ibid., 26.
- <sup>29</sup> Ibid., 116.
- <sup>30</sup> Ibid., 120.
- <sup>31</sup> Dorland, 80.
- <sup>32</sup> Ibid., 31.

- <sup>33</sup> Ibid., 49.
- <sup>34</sup> Ibid., 69.
- <sup>35</sup> Ibid., 40.
- <sup>36</sup> Ibid., 100.
- <sup>37</sup> Ibid., 53.
- <sup>38</sup> Hardaway, 28
- <sup>39</sup> Operations Report Lessons learned report 2-68, 21.
- <sup>40</sup> Neel, 108.
- <sup>41</sup> Senior Officer Debriefing program: Report of BG Glenn J. Collins, G-2.
- <sup>42</sup> Hardaway, 17.
- <sup>43</sup> Neel, 109.
- <sup>44</sup> Senior Officer Debriefing Program: Report of BG Glenn J. Collins, E-2.
- <sup>45</sup> Operation Report Lessons Learned Report 2-68, 14.
- <sup>46</sup> Senior Officer Debriefing Program: Report of BG Glenn J. Collins, E-2.
- <sup>47</sup> Ibid., E-4.
- <sup>48</sup> Neel, 111-112.
- <sup>49</sup> Ibid., 112.
- <sup>50</sup> Ibid., 112.
- <sup>51</sup> Ibid., 109.
- <sup>52</sup> Ibid., 42
- <sup>53</sup> Senior Officer Debriefing Program: Report of BG Glenn J. Collins, E-6.
- <sup>54</sup> Ibid., E-6.
- <sup>55</sup> Neel, 131.
- <sup>56</sup> Ibid., 150.
- <sup>57</sup> Ibid., 158.
- <sup>58</sup> Gene Schulze The Third Face of War (The Pemberton Press: New York, 1970), 4-8.
- <sup>59</sup> Ibid., 36-40.
- <sup>60</sup> F.C. Brown, Delta Advisor The War at the Rice Roots Level Chau Doc, Vietnam, 1969-70 (Merriam Press, 218 Beech Street, Bennington, VT 1990). 17.
- <sup>61</sup> Schulze, 23-29.
- <sup>62</sup> Ibid., 231-242.
- <sup>63</sup> Operations Report Lessons Learned Report 2-68, 39.
- <sup>64</sup> Brown, 17.
- <sup>65</sup> Operations Report Lessons Learned Report 2-68, 39.
- <sup>66</sup> Ibid., B-1.
- <sup>67</sup> Neel, 131, 47-48.

<sup>68</sup> Thomas E. Broyles, A Comparative Analysis of the Medical Support in the Combat Operations in the Falklands Campaign and the Grenada Expedition (Defense Technical Information Center, Alexandria, Virginia 22304-6145) 94.

<sup>69</sup> Ibid., 83.

<sup>70</sup> Ibid., 91.

<sup>71</sup> Ibid., 92.

<sup>72</sup> Ibid., 97.

<sup>73</sup> Ibid., 92.

<sup>74</sup> Ibid., 96.

<sup>75</sup> Ibid., 96.

<sup>76</sup> Ibid., 98.

<sup>77</sup> Ibid., 97.

<sup>78</sup> Ibid., 103.

<sup>79</sup> Ibid., 98.

<sup>80</sup> Ibid., 99.

<sup>81</sup> Ibid., 101.

<sup>82</sup> Ibid., 103.

<sup>83</sup> Ibid., 106.

<sup>84</sup> Ibid., 146.

<sup>85</sup> "Lessons learned in Just Cause," Center for Army Lessons learned, available from <http://www.139.161.168.16/lessons/ctc/mtp/tacsops/justcause/b.htm>; Internet, accessed 2 Dec 1998.

<sup>86</sup> Ibid., 3.

<sup>87</sup> Ibid., 2.

<sup>88</sup> Ibid., 3.

<sup>89</sup> Ibid., b.htm, 3.

<sup>90</sup> Ibid., b.htm, 3.

<sup>91</sup> Ibid., c.htm, 2.

<sup>92</sup> Ibid., c.htm, 2.

<sup>93</sup> Ibid., c.htm, 1.

<sup>94</sup> Ibid., c.htm, 1.

<sup>95</sup> Ibid., h.htm, 1.

<sup>96</sup> Ibid., h.htm, 1.

<sup>97</sup> Ibid., h.htm, 4.

<sup>98</sup> Ibid., d.htm, 4.

<sup>99</sup> Ibid., f.htm, 1.

<sup>100</sup> Ibid., f.htm, 1.

<sup>101</sup> Ibid., b.htm, 4.

<sup>102</sup> Ibid., b.htm, 4.

<sup>103</sup> Ibid., i.htm, 1.

<sup>104</sup> Medical Support, Available from Center for Army Lessons learned (CALL), <http://www.call.army.mil.>, accessed 2 December 1998.

<sup>105</sup> Ibid., III-5F-9.

<sup>106</sup> Ibid., 21.

<sup>107</sup> Ibid., 20-24.

<sup>108</sup> "Operation Desert Storm-Full Army Capability Not Achieved, 22.

<sup>109</sup> Medical Support, III-5F-14.

<sup>110</sup> "Operation Desert Storm-War highlights need to address problem of Nondeployable Personnel," United States General Accounting Office Report to the Chairman, Subcommittee on Readiness, Committee on Armed Services, House of Representatives, August 1992, 3.

<sup>111</sup> Ibid., 3.

<sup>112</sup> Christine J. Wortzel, "Medical Fitness Standards and Medical Examination Policies Operation Desert Shield and Operation Desert Storm," USAWC Military Studies Program Paper, U.S. Army War College, Carlisle Barracks, PA 17013-5050, 1993, 2-16.

<sup>113</sup> Medical Support, III-5F-9.

<sup>114</sup> Gerber, 156.

<sup>115</sup> Ibid., 139.

<sup>116</sup> Ibid., 122.

<sup>117</sup> Ibid., 122.

<sup>118</sup> Ibid., 126-127.

<sup>119</sup> Ibid., 131-134.

<sup>120</sup> Ibid., 31.

<sup>121</sup> Ibid., 34.

<sup>122</sup> Ibid., 34.

<sup>123</sup> Ibid., 37.

<sup>124</sup> Medical Support, III-5F-6.

<sup>125</sup> Operation Desert Storm Full Army Medical Capability Not Achieved, 41.

<sup>126</sup> Ibid., 46.

<sup>127</sup> Ibid., 46.

<sup>128</sup> Medical Support, III-5F-8.

<sup>129</sup> Ibid., III-5F-8.

<sup>130</sup> Ibid., III-5F-8.

<sup>131</sup> Ibid., III-5F-11.

<sup>132</sup> Operation Desert Storm, Full Army Capability Not Achieved 46.

<sup>133</sup> Medical Support, III-5F-11.

<sup>134</sup> Operation Desert Storm Full Army Medical Capability Not  
Achieved, 45.

<sup>135</sup> Gerber, 177.

<sup>136</sup> Gerber, 178.



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