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Army Medical Department Transformation

Executive Summary of Five Workshops

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Summary

Background and Purpose

The Army has been transforming itself into what it calls the Future Force, which relies on a combination of rapid operations, dispersed forces, and superior information to enable a medium-weight force to fight with the punch of heavy conventional forces. These new concepts pose considerable challenges for the organizations that support the combat forces on the battlefield, and the challenge is particularly great for medical forces, which must find, stabilize, and evacuate casualties that are spread across a dispersed battlefield. To determine what the new concepts mean for providing medical support to the fighting units, the Army Medical Department (AMEDD) conducted five Transformation Workshops (ATWs) from 2002 to 2004 to identify the challenges the new concepts posed to providing battlefield medical support and to explore what those challenges might imply for medical force structure.

The workshops all employed a technique based on *"The Day After . . ."* format, which was developed at the RAND Corporation as a way of dealing with issues related to nuclear proliferation policy. The workshops used data provided to their designers by the U.S. Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC) drawn from approved Army scenarios and simulations to generate casualties, which were then tracked independently by teams of subject matter experts. Scenarios and simulations used appear in Table S.1. We note that the small number of scenarios and simula-

Table S.1
Scenarios and Simulations Used in the ATWs

Workshop	Scenario	Simulation
ATWs I and III	Objective Force Concept of Operation: A Notional Combat Battalion Engagement (TRAD-F-TC-01-006)	Interactive Distributed Engineering Evaluation and Analysis Simulation (IDEEAS)
ATW IV	Caspian 2.0 scenario[a]	JANUS
ATW V	Caspian 2.0 scenario[a]	Vector in Command (VIC)

[a] This scenario is approved by the Defense Planning Guidance.

tions used constitute an important methodological limitation and that the insights derived from the workshops are sensitive to this limitation. The scenarios determined the force structure, equipment, how forces were arrayed on the battlefield, and so forth, and the simulations determined the number and nature of combat results (vehicles destroyed or damaged, individuals killed or wounded). The subject matter experts then converted the nature of the kill (e.g., catastrophic kill[1]) into specific medical conditions.[2] Casualties were then tracked through the Health Service Support (HSS) system posited for the scenario.

The purpose of tracking the individual casualties was to see what happened to the HSS system set up as part of the workshop to treat the casualties. The first three workshops largely were a baseline effort that focused on a battalion-sized Unit of Action (UA) that fought for eight hours. They were a baseline effort in the sense that they validated the methodology and procedures, the composition of the teams of subject matter experts, and the casualty tracking process. Subsequent workshops employed the methodologies and procedures of the

[1] A catastrophic kill renders a vehicle both unusable and unrepairable. Typically a catastrophic kill ignites any fuel the vehicle may be carrying and detonates its ammunition. It does not preclude the survival of the vehicle's crew.

[2] The wound conditions were described by treatment briefs that were specific enough to enable the subject matter experts to make judgments about evacuation and treatment, e.g., "wound, face and neck, open, lacerated, contused without fractures, severe, with airway obstructions and/or major vessel involvement."

first three. The ensuing workshops considered larger UAs (brigade size), longer battles, and larger battlefields. The overarching purpose of the workshops was to answer two questions. First, what medical risk do Army Future Force operations pose? Second, what can the AMEDD do to mitigate that risk? The HSS system posited in the workshops was the one designed to support units like those employed in the scenarios, except that it was comparatively generous for the first three workshops and it did not degrade during the scenarios. That is, neither personnel nor equipment became a combat loss. The medical structure available to treat the wounded was designed to be a best case. Thus, the ATW outcomes would represent the best performance the HSS system can be expected to deliver for scenarios like the ones used here.

Results and Implications

Although the workshops used different scenarios and simulations, the results were remarkably consistent. Below we summarize the conclusions and the most significant issues that emerged from the five workshops.

Based on the data gathered during the five workshops, RAND analysts concluded that the distances envisioned for the Future Force battlefield present knotty problems for medical support. The dispersion creates a situation in which it will be unlikely that a medic will be nearby when a soldier is wounded and in which ground evacuation of casualties will be difficult. Given the challenges posed by these scenarios, it also appears that the medical echelons above the UA could expect a substantial patient load. Finally, the analysts concluded that better simulations are needed to help the AMEDD explore questions of medical force structure in more detail.

Significant issues included the following.

Combat Lifesavers and Combat Medics

Fast-paced operations on a dispersed battlefield make it difficult to provide a soldier immediate medical care when wounded because a

combat medic may not be nearby. In the scenarios for the ATWs, typical distances between a combat medic and a wounded soldier were a kilometer or greater. The AMEDD dealt with this problem by imbuing the combat lifesavers—combat soldiers with additional training in medical skills—with a high level of medical skill, seen by some players as approaching those of a combat medic. The subject matter experts who participated in the workshops were skeptical that combat soldiers could be trained to the level suggested by the scenario, or, if they could be trained that well, the experts doubted that such skills could be sustained.

After reviewing the outputs of the five workshops, RAND Arroyo Center researchers concluded that the most straightforward options all carry major drawbacks. The Army could accept the fact that the first responders would be combat lifesavers and train them to near-medic levels. This approach would present a substantial training challenge (it takes 16 weeks to train a combat medic as opposed to three days for a combat lifesaver), as would sustaining these skills, which tend to atrophy quickly without frequent hands-on practice. Even if the additional training for a combat lifesaver did not take as long as that of a combat medic, the extra skills would still be an additional training burden, which would inevitably compete with a soldier's proficiency in his primary military skill. Alternatively, the Army could choose to increase the number of combat medics in the UA. This step would have force structure, recruiting, and training implications. Or the Army could modify its doctrine and operate with units closer together. While this might get a wounded soldier medical care faster, it might also increase the vulnerability of units and would require the Army to accept a major change to its Future Force doctrine. Finally, the Army could simply choose to accept the medical risk created by the current HSS structure and dispersed operations. Based on the results of the workshops, the potential consequence of this decision would be seriously wounded soldiers dying or not receiving timely medical attention.

Surgical Force Structure and Evacuation Capabilities

Even if the Army and AMEDD managed to provide skilled first responders, they would still have to deal with the casualty treatment problem. The first responder simply stabilizes a wounded soldier so that he can be evacuated to a surgical treatment facility. But the workshops showed that, given the scenarios and simulations used, the forward surgical teams were at or near full capacity, especially the surgical capability. The subject matter experts who participated in the workshops carefully managed the surgical queue, ensuring that the most severely wounded soldiers got treatment first. But this meant that other wounded had to wait for surgery, and this might explain the increased number of patients who lost limbs. Even with this careful management, the time between injury and treatment averaged between 2.7 hours in ATW IV and 7.5 hours in ATW V. Medical outcomes often can be expected to get worse as the time to initial surgical treatment lengthens, but this project did not determine the likely effects of the treatment delays or identify maximum treatment delay standards for different types of patients. In the last two workshops, surgery could be performed in the UA or casualties could be stabilized and transported to higher echelons for surgery. The results of ATWs IV and V indicate that the UA's residual load of casualties requiring surgery and additional treatment will create a heavy demand for an echelons-above-UA HSS system. Of course, some of these casualties could be evacuated to the medical facilities of other services if available.

Again, RAND researchers analyzing the results of the five workshops conclude that the straightforward options for ensuring appropriately prompt treatment for all patients also carry drawbacks. The Army and AMEDD could opt to increase the surgical capacity of the UA, either by adding more forward surgical teams or by increasing the capability of the current teams by adding more personnel and equipment. Either choice would have important force structure implications. Alternatively, the Army could decide to increase the air evacuation capabilities in the UA, although some patients would still require surgical stabilization before being shipped. The medevac helicopters available during the workshop scenarios were typically used to

capacity, so if the decision were to ship casualties outside of the UA, more medevac helicopters would have to be provided. This assumes that the evacuation distances are not too great. If the distances approach hundreds of kilometers, as they did at times during the workshops, the problem remains.

Advanced Technologies

Throughout the five workshops, participants had 21 advanced medical technologies available to treat battlefield casualties. The purpose of the workshop was not to evaluate these technologies individually, but analysis of workshop results show that two were especially important: the Warfighter Physiological Status Monitor (WPSM), a networked array of physiological monitors embedded in a soldier's combat uniform, and advanced hemostatic agents such as spray-on bandages and hemostatic drugs that enhance the body's natural clotting function. The WPSM provided critical location information, enabled remote triage, and facilitated allocation of evacuation assets. The hemostatic agents helped control bleeding, which prevented fatal hemorrhage while severely wounded casualties were en route to treatment at the forward surgical team. This was important given the evacuation distances. The implication is that had these two technologies not been available, the medical outcomes of the workshops would have been decidedly worse than described here.

Army-Level Issues

Two issues cropped up during the workshops that fall outside the Army Medical Command's purview but are important enough to warrant attention from the Army. One has to do with unsecured lines of communication. As the battle progressed, the lines of communication lengthened steadily and were largely unsecured as the combat units pressed on to their objectives. The forward surgical teams had so many casualties to deal with that they could not displace forward to keep pace with the maneuver units. The upshot of this situation was that ground medical evacuation vehicles had to move independently to casualty locations, casualty collection points, aerial medical evacuation landing zones, and so forth, across a battlefield that was

neither cleared nor secured. This implies that the forward surgical team and casualty collectors would require additional security.

A second issue involves unit cohesion and morale. As we pointed out above, the workshops showed that it was difficult for a combat medic to reach a casualty, and combat lifesavers had to plug the gap. In past contingencies, when a wounded soldier needed a medic, one appeared. Furthermore, in the scenarios the distance between the place where a soldier was wounded and where he received surgical care gradually lengthened, with the result that it took longer and longer to get soldiers to a forward surgical team. This situation would reverse the historical trend, which began in Korea when the Army started using helicopters to evacuate soldiers rapidly: The time from sustaining a wound to arrival in surgery has generally gone down. The dispersion called for in the Future Force doctrine causes the time from becoming wounded to arriving in surgery to lengthen. These two factors—(1) either no available medics or ones who arrive after a substantial delay and (2) lengthening evacuation times over the course of battle—could contribute to feelings of being abandoned and adversely affect morale.

In sum, then, the workshops showed that a robust HSS system that did not lose any of its capability during the battles was at or near its capacity in the scenarios employing the Future Force structure. This state of being at capacity occurred despite some highly favorable (and some would argue unrealistic) assumptions about the level of care provided by the first responder and the availability and effectiveness of advanced medical technologies. Ensuring that all patients are treated within an appropriate timeframe may pose challenges, because all options carry unwelcome aspects. But the Army must either accept some force structure, training, or doctrinal changes, or be willing to assume a degree of medical risk that it has been unwilling to bear in the past.