

# Army Medical Strategy



*Issues for the Future*

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## OVERVIEW

The medical department of the U.S. Army has two primary missions: (1) It must be ready to project medical forces in *operations*, both for war and for peacetime deployments, and (2) it must care for the health of *beneficiaries*, such as military members, their families, and retirees, in clinics and hospitals during both peacetime and wartime.

These different objectives create a tension: The beneficiary demand is visible and often gets immediate attention when shortfalls arise. But operational demands are less visible, more uncertain, and sometimes far in the future. Moreover, operational demands involve medical skills and resources that are often quite different from those required for beneficiary care. It is quite possible, therefore, that decisionmakers, pressed by day-to-day demands of beneficiary care, could lose sight of important developments for future needs on the operational side.

Concerned about this possibility, the Army Medical Department (AMEDD) asked RAND to assess its operational posture and to highlight issues requiring further consideration or analysis.<sup>1</sup> The request raised several questions: What may lie ahead? What factors may affect the Army's needs in operational medicine, given trends in the Army and in larger environments? Do Army planning processes meet those needs? If doubts exist, what issues need to be resolved, and how can analysis help to resolve them?

To identify the most-critical issues, RAND researchers interviewed AMEDD officials, participat-

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<sup>1</sup>This research was sponsored by AMEDD and was conducted jointly by RAND's Arroyo Center and Center for Military Health Policy Research.



ed in and reviewed the results of wargames and workshops, and analyzed the literature and reports of significant post-Cold War operations. These efforts identified four issues:

1. **Planned medical structure.** Is the planned structure appropriate? Our review suggests that some factors could drive casualties higher than assumed in official planning processes. But at the same time, changes in strategy or medical policies could reduce overall medical demand.
2. **Personnel fill.** Does AMEDD have an adequate complement of personnel? In recent years AMEDD has filled only 70 percent of required positions for reserve physicians, and the apparent trend is downward.
3. **Future operational concepts.** Can AMEDD support the Army's long-term plans? Those plans envision a very demanding early-entry campaign in a combat theater, perhaps exceeding medical force capability.
4. **Near-term operational planning.** Do theater commanders get appropriate medical input? Recent experience suggests that joint commanders receive such input only indirectly.

For each of these issues, RAND researchers found reasons for concern with the Army's future ability to project and field the right medical forces. This paper begins with a brief review of background influences that shape medical planning. It then considers each of the four issues in turn, explaining reasons for uncertainty and steps that could be taken to reduce or resolve them.



## BACKGROUND

### The Demand Environment: Operations

Like the rest of the Army, the AMEDD force structure must maintain readiness to fight potential wars throughout the world. In recent years, that posture reflected a strategy under which the United States maintained a capability to fight two major theater wars (MTWs) in overlapping time frames. These requirements, central to all defense planning, are embodied in the official National Security Strategy and National Military Strategy and have been in place since the end of the Cold War.

While maintaining readiness to fight two wars is itself challenging, it is further complicated by the frequency of recent deployments, embedded in the nation's overall policy of global engagement. Engagement has involved a wide spectrum of operations, from humanitarian missions to peacekeeping operations and other "small-scale contingencies" (SSCs). Recent operations in Somalia, the Sinai peninsula, Haiti, Bosnia, and Kosovo, among others, have been challenging for an Army that is organized, trained, and equipped for war but is operating in different environments. Indeed, SSC missions have occasionally diminished the ability of participating units to maintain warfighting readiness.<sup>2</sup>

Concerns about operational readiness have become a central theme of policymakers, as evident during the 2000 presidential campaign. Although a

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<sup>2</sup>L. M. Davis et al., *Army Medical Support for Peace Operations and Humanitarian Assistance*, Santa Monica, Calif.: RAND, MR-773-A, 1996; Congressional Budget Office (CBO), *Making Peace While Staying Ready for War: The Challenges of U.S. Military Participation in Peace Operations*, Washington, D.C.: CBO, December 1999.



relatively small fraction of the total force has been committed to SSCs, the frequency of these deployments has increased markedly. The more frequent the deployment rotations, the larger the ripple effect throughout the Army, which makes the increased operational tempo difficult to manage.<sup>3</sup> Recent RAND research indicates that deployments stress both the Army's warfighting organization and its personnel system in ways that go well beyond what would be expected from the size of the deployments.<sup>4</sup>

Some recent Army actions will help to counter these challenges. For example, in 1994 the Army Surgeon General initiated a medical reengineering program to address problems such as:

- Medical equipment sets not designed for SSCs.
- Difficulties in placing AMEDD units in official deployment plans.
- Lack of true early-entry medical units, needed at the outset of operations in new theaters (e.g., command and control, hospital, area support, preventive medicine, and logistics units).
- Shortfalls in medical command and control for 24-hour and split-based operations.
- Emergence of more widespread threats from weapons of mass destruction (chemical, biological, and nuclear weapons) in the hands of potential adversaries.<sup>5</sup>

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<sup>3</sup>S. T. Hosmer et al., *Bettering the Balance: Large Wars and Small Contingencies*, Santa Monica, Calif.: RAND, IP-167, 1997; R. E. Sortor, *Army Forces for Operations Other than War*, Santa Monica, Calif.: RAND, MR-852, 1997.

<sup>4</sup>T. McNaughton et al., *Agility by a Different Measure: Creating a More Flexible U.S. Army*, Santa Monica, Calif.: RAND, IP-195, 2000; J. M. Polich et al., *Small Deployments, Big Problems*, Santa Monica, Calif.: RAND, IP-197, 2000.

<sup>5</sup>Office of the Surgeon General, U.S. Army, briefing, "Medical Reengineering Initiative: Combat Health Support of Force XXI," April 14, 1999.



Some progress has been made on these fronts. For example, under this reengineering plan, AMEDD is moving toward smaller hospital modules that will be more suitable for supporting quickly deployable contingency forces.

We recognize that some of these specific problems could recede over the long term. For example, the national strategies could be amended from the current two-MTW focus to any number of possibilities, but it is unclear how such a change could affect medical demand. In any case, many such challenges will remain, even if U.S. strategic choices change (e.g., global engagement at some level is likely to continue as an element of national strategy as long as the United States remains a superpower).

### **The Demand Environment: Peacetime Health Care**

In addition to its operational mission, AMEDD also has a unique mission—to “manage and promote the health of the soldier and the military family by providing a continuum of accessible, cost-effective, quality care to support the health care needs of eligible beneficiaries.”<sup>6</sup> Since the end of the Cold War, it has been Army policy that the military’s treatment facilities will continue to provide beneficiary care even during major deployments. That policy was maintained even during the Gulf War, when many professionals at military clinics and hospitals had to deploy on short notice.

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<sup>6</sup>Office of the Surgeon General, U.S. Army, *Army Medicine Strategic Plan, 1999–2005*, at <http://www.armymedicine.army.mil>; emphasis from the original has been removed. Active-duty military personnel and their families are eligible to use medical treatment facilities. Retired military personnel and their dependents can also use these facilities on a space-available basis.





To sustain this mission, AMEDD employs a structure that is essentially bipartite but linked by necessity. The vast majority of the Army's active-component physicians and other health care professionals are assigned to brick-and-mortar military treatment facilities (MTFs) that treat soldiers and beneficiaries. The Army also counts on those same professionals to staff operational medical units, which can be called on to deploy and are embedded within the Army's force structure. This arrangement was developed because health care professionals must maintain their skills in peacetime by treating patients.<sup>7</sup>

The Army's deployable operational units and its fixed treatment facilities are linked by a personnel mechanism known as the Professional Filler System (PROFIS). When contingencies arise, active-component health care professionals move from MTFs to operational units. The PROFIS program then replaces these losses to the extent possible by calling in health care professionals from the reserve components. In some cases, reserve personnel themselves deploy to participate in contingency missions. In principle, demands for peacetime care that are not met by the augmented MTFs can be met by civilian providers contracted by the Department of Defense (DoD).<sup>8</sup> However, the PROFIS system is routinely used to provide medical personnel for operations

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<sup>7</sup>Ideally, the case mix and volume of patients during peacetime would be related to their wartime missions. This is usually not the case, however. See Congressional Budget Office, *Restructuring Military Medical Care*, Washington, D.C.: CBO, July 1995.

<sup>8</sup>The contract program is administered by the TRICARE Management Activity under the Assistant Secretary of Defense (Health Affairs). It offers both managed-care and fee-for-service options to military beneficiaries. TRICARE managed-care providers include the MTFs and a network of civilian providers administered through regional contracts with civilian managed-care organizations.



while also avoiding an interruption of beneficiary health care services—that is, without relying on the contracted resources as a proxy backfill mechanism.

Nevertheless, a consistent theme in our AMEDD interviews was that the PROFIS system produces a complex and compounding effect that has been difficult to manage. Indeed, a recent Army Surgeon General has testified to the challenge in “sustaining these complex missions without loss or interruption of service to our soldiers, families, and retirees.”<sup>9</sup> Some of this challenge is a result of the policy to backfill MTFs; this discretionary policy could alternatively allow for the allocation of constrained resources to alleviate some of the overall demand burden. Many interviewees suggested that reliance on reserve medical personnel to replace active deployees or to participate in deployments themselves has caused significant problems in reserve recruiting and retention.

### **The Resource Environment: The Military Health System**

Many of the issues we raise below imply concern that the Army medical structure may not be large enough or appropriately structured for anticipated operational missions. However, it should be noted that high-level reviews of the entire defense health establishment during the 1990s produced a debate—yet to be resolved—about whether the overall defense medical structure, inherited from a Cold War planning environment, may have been larger than requirements anticipated at the time.

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<sup>9</sup>Testimony of Lieutenant General Ronald R. Blanck before the U.S. Senate Appropriations Committee, “FY01 DoD Medical Programs: Hearings Before the Subcommittee on Defense,” 106th Congress, 2nd session, March 8, 2000.



This debate concerns not just the Army but the entire Military Health System (MHS).<sup>10</sup> Decisions about the overall size of the MHS profoundly affect Army medical posture. For example, the Army's allocation within the program is determined by several factors, including the size of the active-duty population and demands from dependents and retirees. Operational readiness and training are add-ons to this methodology, which is fundamentally based on the peacetime patient population.

Resourcing and capabilities of the MHS have received considerable attention in recent years. After the Gulf War, a General Accounting Office report questioned the capability of AMEDD to provide adequate medical care had the ground war started earlier, lasted longer, or resulted in the predicted number of casualties.<sup>11</sup> About the same time, the debate about the MHS's overall composition (and by extension, capability) was influenced by Section 733 of the National Defense Authorization Act for 1992 and 1993. In that section, Congress required studies of

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<sup>10</sup>The Assistant Secretary of Defense for Health Affairs oversees the Defense Health Program, an element in the DoD program and budget that includes the operations and maintenance funds for medical activities. DoD Directive 5136.1 assigns considerable authority to the Assistant Secretary as the program manager for all medical resources, including establishing policies, procedures, and standards for DoD medical programs; preparing a unified medical program and budget with funding for all accounts except military personnel; and presenting and justifying the medical program and budget to DoD and Congress. Not all medical activities are included in this program element, however, and some resources for the included activities are in other program elements. To avoid confusion, we refer to the collection of all DoD medical activities as the MHS.

<sup>11</sup>General Accounting Office (GAO), *Operation Desert Storm: Full Army Medical Capability Not Achieved*, GAO/NSIAD-92-175, Washington D.C.: GAO, August 1992. The report asserted that information systems used to assign personnel to medical units contained outdated and incomplete information and that some medical personnel had not trained during peacetime to perform their wartime missions.



military health care to determine the size and composition of the MHS needed during war and to identify ways of improving the cost-effectiveness of peacetime medical care.

The resulting study, known as the “733 study,” was completed in 1994. It estimated that about 50 percent of the 12,600 MHS active-duty physicians then projected for 1999 were needed to treat casualties that could result from a two-MTW scenario. The results of this classified study were contested by each of the services’ medical departments. In the ensuing debate, it became clear that the study’s results differed from war plans prepared by the regional Commanders-in-Chief (CINCs), in part because of differing casualty assumptions.<sup>12</sup> Partly for these reasons, DoD offices were directed to update the study’s physician manpower estimates to reflect changes in forces and planning from the original analysis.

The “733 update study,” which used the force structure from the 1997 Quadrennial Defense Review, was published in 1999. It provided for a larger physician component in the MHS than the original study, concluding that 72 percent of active-duty physician strength was required to meet military missions and peacetime and training needs. In disseminating the report, the responsible DoD official noted that “the numerical results of the analysis are dependent on the particular force structure and scenarios used in the analysis,” and “the importance of the study lies in the analytical methods developed to

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<sup>12</sup>General Accounting Office, *Wartime Medical Care: Aligning Sound Requirements with New Combat Care Approaches Is Key to Restructuring Force*, GAO/T-NSIAD-95-129, Washington, D.C.: GAO, March 30, 1995. The GAO argued that the study methodology was reasonable and the results were credible, given the assumptions.



evaluate medical requirements . . . .”<sup>13</sup> This implied that the 72-percent estimate could be highly sensitive to assumptions.<sup>14</sup>

We review this history to emphasize that, to date, the defense establishment has yet to reach consensus on what medical resources are required for the combination of operational missions, wartime readiness, and peacetime health care. Views of requirements, of course, can be derived from many sources, not only official planning scenarios but also requests from regional CINCs and the experience of recent deployments. At the core of the debate is uncertainty in determining the demand for medical resources, both in peacetime and war. It is beyond our scope to enter the debate headlong, but the uncertainty clearly colors many of the issues we describe. To resolve these underlying differences, recognition of variability in possible demands and sensitivity analysis of what could happen under widely varying assumptions are needed. Although official planning processes have found it difficult to take such an approach, the more fluid environment of the future will probably demand it. The four issues that we identify below illustrate how fluid and uncertain this environment may be.

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<sup>13</sup>Robert R. Soule, Director, Program Analysis and Evaluation, *Memorandum: 733 Update—Final Report*, DoD, May 10, 1999.

<sup>14</sup>In addition, the Congressional Budget Office had also entered the debate in 1995, suggesting the MHS could reduce its physical capacity. Congressional Budget Office, *Restructuring Military Medical Care*, Washington, D.C.: CBO, July 1995.



## **ISSUE ONE: DOES THE PROCESS FOR DETERMINING THE MEDICAL FORCE YIELD AN APPROPRIATE OPERATIONAL FORCE STRUCTURE?**

The Army employs an elaborate process to design and resource its forces. It first designs the combat forces it thinks are needed to carry out the National Military Strategy and then decides how many of those forces it can afford. Next it determines the types and quantities of support forces, including medical units, that are needed to complement the combat forces. These resource requirements are identified through a process called Total Army Analysis (TAA), commencing every other year. During the TAA process, the combat forces defined by the official Defense Planning Guidance are run through models of two nearly simultaneous MTWs to determine the support they would require. The resulting TAA force structure drives the development of the Army's Program Objective Memorandum (POM), that is, the force the Army plans to field in the final year of the six-year DoD Future Years Defense Plan.

### **The TAA Process**

TAA models include assumptions about the expected conditions for MTW campaigns and project requirements for support forces based on the campaign simulations of the combat forces. The medical support requirements are generally expressed as the number of deployable hospitals required to treat anticipated casualties that result from modeled campaign conditions. The number of hospitals is calculated through a series of models that use databases to



estimate the amount of care and evacuation required for particular casualty types.

The TAA process includes considerable medical input. For example, AMEDD provides a model for determining how specific types of casualties will flow through the medical system, be treated, and be evacuated or returned to duty with combat forces. Within the model, the larger proportion of casualties does not arise from combat, but rather occurs as a result of diseases and non-battle injuries (DNBI). The Army Office of the Surgeon General employs a methodology for estimating DNBI rates by country, echelon of military forces deployed, and phases of a campaign, based largely on historic data. This methodology generates workload data to determine how many and what type of medical resources and skills are needed, including the number of hospitals and whether these hospitals are deployed to the theater or patients are evacuated to hospitals outside the theater. The theater workload also includes consideration of some non-Army patients (e.g., enemy prisoners of war, U.S. contractor personnel, and U.S. noncombatant evacuees).<sup>15</sup>

The models, which are essential to the TAA process and the determination of required medical resources, are sensitive to the assumptions built into them. Some of these assumptions are combat-related and dictated by the Defense Planning Guidance; these often have significant implications for the size and shape of the medical force required to support modeled battles. Other assumptions pertain primarily to

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<sup>15</sup>Stanley Miller, briefing, "Casualty Estimation and Disposition Process," U.S. Army Center for Army Analysis, December 16, 1999. Other patients are not included, such as those of coalition partners, other U.S. services, or refugees, many of whom would have to be cared for by the Army in at least some cases.



medical support decisions. For example, the theater evacuation policy has a strong effect on the number of in-theater hospitals required; a rapid evacuation policy (e.g., evacuating anyone who would require more than 15 days of hospitalization) requires fewer in-theater hospitals, whereas a longer policy (e.g., 30 days) requires more hospitals because more casualties would remain in theater. It would seem that—for the assumed short and intense conflicts—a rapid theater evacuation policy makes sense. A longer evacuation policy could be more appropriate for protracted conflicts to ensure an optimal rate of casualties returning to combat units, but such conflicts are not part of the assumption set. Moreover, some conditions, such as enemy use of biological weapons, could preclude or slow evacuation, effectively lengthening the evacuation policy and requiring more in-theater care.

### **The Risk: Underestimating Wartime Demand for Medical Resources**

The assumptions about combat conditions and threats raise some concerns about the output of the TAA process. The analysis of combat operations for the MTWs outlined in defense guidance follows quite closely the scheme of operations analyzed under a “linear battlefield” construct that was assumed during the Cold War. However, the threat faced by U.S. forces could be much different. The following are some examples.

**Urban conflict.** The Army Surgeon General has described a number of scenarios that AMEDD has





analyzed.<sup>16</sup> These scenarios include urban warfare in megacities and SSCs occurring simultaneously with and independently of the combat operation. It is easy to imagine how such scenarios could unfold in the near future, yet they have not been part of recent TAA processes. Armed conflict in large urban centers tends to produce more combat casualties than the rates used in TAA. In addition, the types of casualties incurred during urban combat are likely to be different from those expected elsewhere, potentially altering the characteristics of the required medical resources. Combat in and around large urban centers can also result in a large number of displaced persons and refugee casualties, some of whom the Army may have to treat.

**Unconventional weapons.** The Army's official process also does not account for significant use of unconventional weapons, although the most recent TAA, unlike previous versions, did assume some limited enemy use of chemical weapons. By contrast, in his testimony to Congress, the Commander of U.S. Forces Korea warned that "a large number of North Korean chemical weapons threatens both our military forces and civilian population centers."<sup>17</sup> He assessed North Korea's stockpile as holding up to 5,000 metric tons of several types of chemical agents; he also believes North Korea has the capability to develop, produce, and weaponize biological warfare agents. It is widely believed that similar situations

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<sup>16</sup>Lieutenant General Ronald R. Blanck, The [Army] Surgeon General Update #30, February 20, 2000, at <http://www.armymedicine.army.mil>.

<sup>17</sup>General Thomas A. Schwartz, "Statement of Commander in Chief, United Nations Command/Combined Forces Command and Commander, United States Forces Korea," before the Senate Armed Services Committee, March 7, 2000.



exist in other parts of the world, (e.g., Southwest Asia). Accordingly, the 1997 Quadrennial Defense Review urged that U.S. forces be prepared to encounter chemical weapons. Similarly, the Army has recognized the threat of biological weapons such as anthrax, immunizing its forces as a preventive measure. Nevertheless, the TAA process to determine medical support requirements for the two-MTW scenario does not include enemy use of such weapons.

**Implications for conduct of an overall military campaign.** Changes in the assumptions used in the model might affect not only the numbers and types of casualties, but also fundamental features of the campaign itself. For example, enemy use of biological or chemical weapons may change the medical workload; in addition, it could significantly affect evacuation policies and insertion of combat forces into the theater. Notably, early evacuation could be implausible in the event of a contagious biological attack, since quarantines may need to be established. Moreover, the evacuation of biological warfare casualties back to the United States could prove to be contentious.<sup>18</sup> A more obvious challenge could be made to the assumption that DNBI casualties will dominate casualty rates, which have declined by approximately 50 percent in the last decade. This relationship did not hold true in Army wargames in 1998 and 1999, and it may prove to be implausible in a theater such as Korea or any theater with a likely chemical or biological warfare threat.

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<sup>18</sup>Indeed, even casualties that do not present symptoms of a biological warfare agent may have to be held in theater for days longer because they could be incubating an agent. Medical holding sites might have to be prepared and monitored to protect these patients from further infection and to ensure they are not infectious before reintegrating them with Army units or evacuating them back to the United States.



**Casualty timing.** Added to these prospective risks are those already incorporated into the models themselves. For example, the workload model smooths casualty levels over three days; the severity of one day of mass casualties might be dampened as a result. Medical treatment and evacuation capabilities have to be in place to deal with peaks and surges in casualty flow as well as overall expected casualty levels.

### **An Alternative Risk: Overestimating Demand for Medical Resources**

If the planning environment were not resource-constrained, each of the preceding examples could be analyzed in a worst-case scenario to arrive at a plan that ensures medical forces are available to manage nearly any casualty scenario. Of course, the planning environment is constrained, and it is important that demands such as those above be balanced with the costs of responding to them. For example, overestimating wartime demands would create an opportunity cost in personnel allocation; if all worst-case casualty scenarios were accepted in the planning process, the resulting requirements would include a substantial number of medical personnel. Within the overall personnel allocation for the Army, meeting such a requirement would necessarily reduce the personnel allocations for nonmedical specialties. Therefore, in order to arrive at the most appropriate overall Army structure, it is important to consider the probability that various casualty-producing scenarios will occur and to examine the likely consequences and alternative approaches to ameliorating those consequences.



## Need for Expanded Risk Analyses

In short, the process by which medical requirements are determined lacks a complete assessment of the threats and conditions likely to be faced in future warfare. As the GAO found in its 1999 assessment of the Army's force requirement allocation, "the full extent of the Army's risk is not known because the Army has not performed all of the analyses needed to assess and quantify risk."<sup>19</sup> It appears that the adverse conditions stipulated in defense guidance and modeled during TAA are not as challenging as those that could potentially occur. It also seems that the process does not fully account for how DoD plans to conduct joint operations and does not include coordination with other medical assets (e.g., hospital ships), which may reduce risk.

We suggest that future analyses to determine support forces, including medical forces, be extended to determine what happens when these key assumptions are changed. For example, excursions could include an enemy's widespread use of unconventional weapons and fighting in urban areas with high numbers of displaced persons and refugee casualties. While decisions to allocate resources based on a best-case scenario may have merit because of other considerations, it would be worthwhile to understand more completely the requirements to support less-than-best-case scenarios as well. It may also be important to understand the consequences when several different assumptions are violated at the same time. The Army currently does not have a process to predict or ameliorate the greater risk of failures that

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<sup>19</sup>General Accounting Office, *Force Structure: Opportunities for the Army to Reduce Risk in Executing the Military Strategy*, GAO/NSIAD-99-47, Washington, D.C.: GAO, March 1999.



may exist when several such unexpected events occur simultaneously.

Furthermore, current practices in determining and fielding the medical structure could exacerbate these risks. Near-term budget decisions could have long-term implications that are difficult to reverse or adjust. AMEDD acquires and trains the majority of its medical officers rather than acquiring professionally qualified personnel. A potential problem occurs with this practice when it becomes necessary to add skills that take a long time to produce. We suggest that strategies be considered to address these potential problems when interpreting the results of future analyses. Specifically, determining the range of requirements that would occur along the continuum of worst-case to best-case scenarios could indicate how flexible and responsive AMEDD needs to be in shaping and manning its force. If a large range exists and substantial changes in requirements could occur from one TAA cycle to the next, then strategies to rapidly fill an increased requirement are needed. Altering the process to acquire and train medical personnel is one such strategy that warrants investigation.

One possible step toward more-complete knowledge would be to periodically convene panels of experts—military and civilian—to assess medical requirements for specific conditions and threats. The output of these panels could include databases similar to those that are now used to develop theater medical workloads, but that are more relevant to specific adverse conditions that might be encountered and tied to changes in the size or shape of the theater workload.



## ISSUE TWO: IS THE ARMY SUCCESSFUL IN FILLING ITS MEDICAL AUTHORIZATIONS?

### Evidence of Personnel Shortfalls

The Army has decided to resource 38 of the 49 field hospitals that the TAA process indicates are needed, indicating a decision by Army leadership to accept a shortfall in the required medical capability. However, AMEDD appears to be facing a manning shortfall in filling even these authorizations. Approximately 65 percent of the Army's medical forces are in the Reserve Components (RC). AMEDD is having difficulty recruiting and retaining sufficient numbers of personnel in certain medical specialties (including physicians, dentists, physician assistants, and nurse anesthetists) to meet RC authorizations. Many AMEDD respondents in our interviews suggested that the severity of the manning shortfall is such that it will hamper AMEDD's ability to support two nearly simultaneous MTWs while also providing peacetime care. In our brief assessment to determine if this issue is significant enough to warrant further examination, we focused on physician shortages, partly because AMEDD has developed improvement plans based on empirical data specific to physicians.

Table 1 shows that overall AMEDD is short approximately 30 percent of its authorized RC physicians.<sup>20</sup>

Fill rates are even lower in certain areas of concentration that are critical to operational medicine. For

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<sup>20</sup>Data from briefing slides, Office of the Surgeon General (Reserve Affairs), "SERMC 2000: One Team One Future," Southeast Regional Medical Command Readiness Conference, March 18, 2000.



Entity/Personnel Category	Authori- zation	Fill	Short- fall	Fill (%)
U.S. Army Reserve Deployable Medical Units	1,162	813	349	70
Embedded Medical Units (in Divisions)	567	307	260	54
Army National Guard Deployable Medical Units	105	57	48	54
TDA Medical Units*	990	1,023	0	103
Individual Mobilization Augmentees	954	400	554	42
<b>Total</b>	<b>3,778</b>	<b>2,600</b>	<b>1,211</b>	<b>69</b>

\*TDA (Table of Distribution and Allowances) units are generally brick and mortar facilities, such as MTFs, and do not deploy with personnel and equipment as a unit.

**Table 1: RC Physician Authorizations and Fill Rates**

example, AMEDD is short 142 of 262 orthopedic surgeons (46-percent fill) after mobilizing the inactive ready reserve and retirees—categories whose “deployability status . . . is not well known.”<sup>21</sup>

Some within AMEDD are concerned that personnel shortages will worsen unless action is taken to recruit and retain physicians in the RC. Figure 1 shows the recent fill status of RC physicians and includes AMEDD’s future projections.

### Initiatives to Ameliorate Shortfalls

AMEDD believes these shortfalls are persistent problems and has developed a set of initiatives to counter them. These initiatives focus on addressing deployment concerns, providing financial incentives, and improving recruiting programs.

<sup>21</sup>Ibid. See footnote 20.

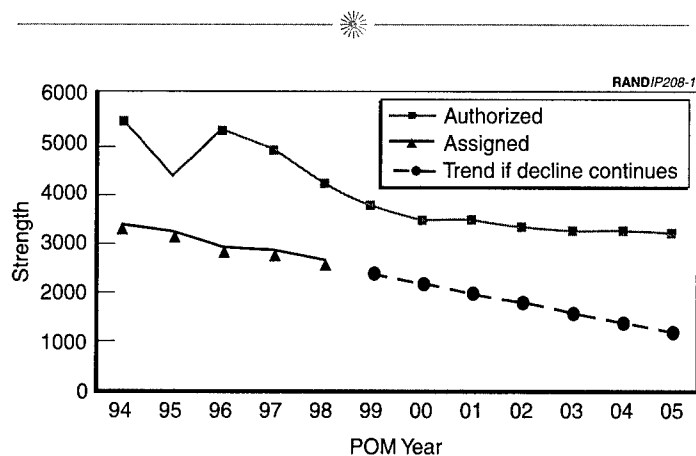


Figure 1: Recent Physician RC Fill with AMEDD Projections<sup>22</sup>

AMEDD has surmised that the primary obstacles to retaining RC physicians are the increasing prevalence of peacetime deployments and financial concerns about civilian employment and mobilization. Those factors were identified based largely on a 1996 survey conducted for the U.S. Army Reserve by AmerInd, Inc. The survey was designed to identify factors that influenced physicians in their decisions to join and stay in the RC and to identify changes needed to improve RC physician recruitment and retention.<sup>23</sup> We believe that survey results alone do not provide optimal evidence to inform policy decisions; further, the results of this survey may be equivocal, and the evidence that prompted the new initiatives is ambiguous.

<sup>22</sup>Ibid. See footnote 20.

<sup>23</sup>AmerInd, Inc., *Results from the Survey of USAR Physicians*, Contract: MDA-906-92-C0144, 1996. There were 2,318 potential survey participants, including physicians in Troop Program Unit or Individual Mobilization Augmentee programs but not the Inactive Ready Reserve. A sample group of 1,570 RC physicians, randomly selected from 20 areas of concentration, was selected to receive surveys, representing 68 percent of the population. 1,414 surveys were delivered (156 post office returns) and 835 were completed (59 percent).





The AmerInd survey report indicated that nearly one-half of the respondents were either planning to leave the RC before retirement or were undecided about staying. The top four reasons influencing their decision to leave the RC before retirement were the financial impact of mobilization, civilian practice/employment demands, family demands, and the potential for future mobilizations. About one-half of the respondents had deployed in the previous six years.

In 1996 the Army used the results of this survey in response to a DoD Inspector General Report on the effectiveness of physician recruitment and retention in the Army's Selected Reserve. The Army's summation of the survey results highlighted the apparent effect of mobilization on the propensity of physicians to serve in the RC.<sup>24</sup> The Inspector General report itself also commented on mobilization:

The perception that a Reservist would be mobilized only for a major conflict has been replaced with the realization of greater Reserve Component participation in peacekeeping missions. For physicians, the greater participation in peacetime missions equates to a greater risk of extended active duty, income loss, and business loss, and this adversely affects recruitment and retention in the Reserves.<sup>25</sup>

These concerns were echoed by the Army Surgeon General in testimony to Congress in 2000: "From late

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<sup>24</sup>Letter, Office of the Deputy Chief of Staff for Personnel, DAPE-MPA (SAAG-PMF-E/17 Sep 96)(36-2b), 1st END, Lieutenant Colonel Youngquist, Subject: "Evaluation Report on Physician Recruitment and Retention in the Army Selected Reserve," October 10, 1996; in DoD Inspector General, *Physician Recruitment and Retention in the Army Selected Reserve*, Report No. 97-033, November 26, 1996.

<sup>25</sup>DoD Inspector General, *Physician Recruitment and Retention in the Army Selected Reserve*, Report No. 97-033, November 26, 1996.



1995 to early 1998, the Army Reserve lost 34.2 percent of physicians assigned to units sent to the Balkans. Two physicians departed for every new one recruited.”<sup>26</sup>

These concerns and the survey results led to policies designed to ameliorate physician recruiting and retention. Health Professional Loan Repayment maximums were increased from \$20,000 to \$50,000 in 1999. Other financial incentives, such as bonuses and Specialized Training and Assistance Programs for medical and dental students, are being proposed. Concerns about the effect of mobilization on RC physician retention also led AMEDD to advocate a policy that limits involuntary mobilization to 90 days for operations other than MTWs.

### **Ambiguities in the Evidence**

While these plans may affect reserve physician supply in coming years, the evidence that prompted these decisions has some ambiguities. For example, while a 34-percent loss of physicians assigned to units sent to the Balkans seems significant, it is difficult to appreciate the actual significance of this attrition outside the context of overall physician attrition now and in the past. There is little doubt that operating tempo has increased since the end of the Cold War; even conservative estimates place the increase in total deployments at 60 percent between 1988 and 1998.<sup>27</sup> However, an assumption that increased deployments

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<sup>26</sup>Testimony of Lieutenant General Ronald R. Blanck before the U.S. Senate Appropriations Committee, “FY01 DoD Medical Programs: Hearings Before the Subcommittee on Defense,” 106th Congress, 2nd session, March 8, 2000.

<sup>27</sup>General Accounting Office, *Military Personnel: Perspectives of Surveyed Service Members in Retention of Critical Specialties*, briefing report to congressional requesters, GAO/NSAID-99-197BR, Washington, D.C.: GAO, August 1999.



result in decreased retention is not necessarily appropriate. Other factors have also changed. In the civilian sector, for example, the growth of group health practices may provide physicians with flexible work environments and an ability to deploy more often, which is at odds with the survey results.<sup>28</sup>

Aggregate models of military personnel behavior indicate that deployments can either increase or reduce retention rates, depending on their length and frequency and whether they involve theaters that are subject to hostile fire.<sup>29</sup> Changes in retention rates could be the result of several causes. For example, deployments may reduce retention among some soldiers, but other career-minded soldiers may seek deployments. Or, recently deployed soldiers may assume that their likelihood of future deployment is low and therefore choose to remain in the Army. It is certainly possible that RC officers behave differently from the personnel whose behavior was modeled and that physicians—especially RC physicians—are an exceptional case. This possibility deserves further examination beyond a single set of survey data, which represent what RC physicians *think* and *say* in a survey, but may not predict their actual behavior.

In addition, the data are open to varying interpretations. For example, the policy of limiting mobilizations to 90 days for operations other than MTWs

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<sup>28</sup>On the other hand, a recent DoD Reserve Affairs survey indicates that 55 percent of civilian employers (not exclusively medical) would prefer their employees not volunteer for RC duty beyond training and national emergencies.

<sup>29</sup>These complex effects, based on data for enlisted personnel, are documented in J. Hosek and M. Totten, *Does PERSTEMPO Hurt Reenlistment? The Effect of Long or Hostile Perstempo on Reenlistment*, Santa Monica, Calif.: RAND, MR-990-OSD, 1998. Similar studies of officers have not been published.



may not markedly improve recruitment and retention if the results of the 1996 survey are representative of the entire Medical Corps population. The question in the AmerInd survey that addressed the effects of deployment on physicians' practices was: "What is the optimal length of time you could be mobilized without seriously impacting your practice?" There were 8 possible responses, ranging from 30 days or less up to more than 120 days. Only 17 percent of the respondents indicated that they could serve up to 90 days without serious impact. Most (41 percent) believed they could only serve up to 30 days, while 22 percent said they could mobilize for 60 days or less. Given these data, the chosen mobilization policy may respond to a problem that is an issue only for a minority of the RC physicians (those who feel they could serve 90 days or longer).

### **Issues to Resolve**

The fill rate for RC physicians deserves further examination in the broader context of its history and implications. Is the problem truly getting worse in recent years because of increased operating tempo or is it perhaps due to other factors? Is it worse in the context of a smaller Army? Do the survey data that undergird policies accurately reflect recent and probable actions of physicians? How would continued RC physician shortfalls affect key missions? The actual effects of the shortages on mission accomplishment are not transparent; the shortages could affect combat operations, the conduct of SSCs, or the provision of peacetime care. While all such effects may pose serious issues, their severities—and potential remedies—are arguably different. Shortfalls in MTW or SSC support might suggest alternative force



structure strategies, such as the utilization of active versus reserve forces, while shortfalls in peacetime care might suggest other strategies, such as alternative backfill policies for MTFs. To choose among these or other possible actions—and to know how much action is warranted—the Army needs a better understanding of the severity, causes, and implications of personnel shortfalls.

In particular, we suggest that further analysis assess whether the 90-day deployment policy and other recruitment/retention initiatives will adequately address the recruitment and retention of RC physicians and members of other critical medical specialties. If they do not—and the downward trend in critical RC medical personnel fill is projected to continue—then the Army will need to investigate alternative strategies to fix the problem. Moreover, even if current initiatives work, AMEDD believes it will take a long time to resolve its shortfalls: ten years for physicians, eight years for dentists, and four years for physician assistants and nurse anesthetists. This long lead time raises the question of whether the Army should risk waiting ten years to rectify the shortfalls. Given current operational and budgetary trends, AMEDD should develop metrics to assess the success of its initiatives and map out alternative strategies in the event they are not as successful as planned. Finally, the Army may need to reassess whether it can continue to mobilize RC medical personnel for peacetime missions if such a policy does in fact drive them out. That in turn could necessitate revisiting the active-reserve force mix.



### ISSUE THREE: CAN AMEDD SUPPORT OPERATIONAL CONCEPTS OF THE FUTURE?

Thus far, we have discussed issues that are salient in the near- and mid-term (i.e., 5–15 years). In the longer-term (20–25 years), AMEDD also faces some challenges in supporting future operational concepts. RAND has been involved in providing analytical support to a series of Army wargames and related workshops, most of which are related to the long-term planning function known previously as the Army After Next (AAN) and currently as the Objective Force of the Army transformation effort.<sup>30</sup> These games examined future Army operational concepts, organizations, and technologies.

#### The Demanding Character of Future Operational Concepts

The operational concept employed during the wargames was termed Advanced Full Dimensional Operations (AFDO). At the heart of this concept is the notion that

Rapid, simultaneous, continuous, and dynamic application of integrated Joint military capability, centered on the complementary and exploitative application of joint *interdiction* and *maneuver*, achieves such dominance across all military dimensions that an opponent is unable to set or maintain conditions favorable to accomplishment of his strategic, operational or tactical goals.

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<sup>30</sup>These activities included support of the 1999 AAN Game, the 2000 Army Transformation Game, the AMEDD After Next “franchise” games (part of the overall AAN series), and the AMEDD Technology Workshop.



This overwhelming situation places an opponent at such a disadvantage that he concedes, disintegrates or is set up for failure in the face of follow-on forces or continued decisive operations.<sup>31</sup>

The AFDO concept explicitly promises to end conflicts rapidly and, therefore, implies lower U.S. casualties. The notional organizations that executed the concept in these games were designed to be highly deployable, lethal, agile, and survivable. They also were designed for highly dispersed and distributed operations. This design had significant implications for medical support.

The operational focus during the games was to project overwhelming combat power into the theater as rapidly as possible to dislocate the enemy before he could establish a strong position. Consequently, the early-entry forces were structured to maximize combat power, resulting in much smaller logistical components (including medical) than more-conventional planning has dictated in the past. Additionally, combat operations commenced immediately upon the arrival of U.S. forces in theater, without even a modest build-up phase.

During the games, it appeared that the AFDO concept would present some significant challenges for AMEDD, and these were voiced particularly by participants of the “AMEDD After Next” game in early

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<sup>31</sup>U.S. Army Training and Doctrine Command, “A Bolt from the Blue: Advanced Full Dimensional Operations . . . A Concept for Joint Warfare in 2025 (Concept Overview as of 04/13/00),” U.S. Army Training and Doctrine Command, Fort Monroe, Va., 2000; emphasis is in the original. See also Department of Defense, *Annual Report to the President and the Congress*, by William S. Cohen, Secretary of Defense, 1999, at <http://www.dtic.mil/execsec/adr1999/chap11.html>, where AFDO is further discussed in the context of Navy, Marine, and Air Force future operational concepts.



2000.<sup>32</sup> Many of the medical operators found that the concept was inherently difficult to support medically and observed the same problem during the previous Army game (on which the AMEDD game was based). Several aspects of the scenarios presented difficulties: Primary among them was the plan to project combat forces rapidly into the area of operations to achieve a correlation of forces adequate to defeat the enemy. Casualties among early-entry U.S. forces were higher than expected and occurred early in the conflict, before the maturation of U.S. medical capabilities in theater.

Given the wide dispersion among units (early-entry “battleforce platoons” occupied 16 square km with four vehicles and one medic), clearing casualties from the battlefield was particularly challenging. The medical concepts developed by AMEDD during the AMEDD franchise game following the 1999 AAN game were structured to provide medical support based on the AAN notion of an air mobile battle force. The new concept relied on forward stabilization and resuscitation within field units and aerial evacuation over long distances to corps and echelon-above-corps hospitals. The medical concept also relied heavily on the availability of numerous breakthrough technologies to enable the patients’ survival until they reached definitive care. Such technologies included biostasis “pods,” artificial blood, and multivalent vaccines. Essential nonmedical technologies

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<sup>32</sup>The AMEDD franchise games that followed the Army’s 1998 and 1999 AAN games highlighted challenges in supporting the AAN operational concepts. See U.S. Army Medical Department, Center for Healthcare Education and Studies, U.S. Army Medical Department Center and School, *Final Report: AMEDD After Next Wargame ’98*, July 1999, and *Final Report: AMEDD After Next Joint Medical Wargame 2000*, Fort Sam Houston, Tex.: August 2000.





were also posited, such as battlefield information systems and air and ground vehicles adapted for medical use. In short, technology was called upon to bridge the gap between medical capabilities and force structure, on the one hand, and the demands generated by the new operational concept, on the other hand. The availability and affordability of these technologies are absolutely critical to the success of such future concepts of operation. However, realizing some of these technologies would depend on other DoD programs; the feasibility of some of them can be questioned because of budgetary, scientific, or political concerns.<sup>33</sup>

### **Demands Imposed by Enemy Response and Civilian Casualties**

In addition to the challenges inherent in the AFDO concept, the wargames showed that enemy forces could employ long-range systems, both conventional and unconventional, that would put U.S. forces (including medical forces) at risk throughout the theater. The combination of high combat casualties, a small medical footprint in the operational theater, attacks on airports and seaports where troops embark and disembark, and enemy use of unconventional weapons further complicated the medical support challenges. Furthermore, civilian casualties were high in the games, particularly during operations in urban terrain. In both AMEDD After Next games, U.S. medical units had to treat large numbers of civilian casualties, refugees, internally displaced

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<sup>33</sup>For further discussion, see Cecchine et al., *Army Medical Support to Army After Next: Issues and Insights from the Medical Technology Workshop*, Santa Monica, Calif.: RAND, MR-1270-A, 2001.



persons, and prisoners of war; the volume of these casualties vastly exceeded the capacity of U.S., host nation, and nongovernmental medical resources.

The conditions and threats postulated for these games also form a sharp contrast with TAA assumptions currently used to determine medical support requirements. The divergence is likely due in some part to the difference between the TAA and wargame timeframes (near- versus far-term), or it may arise from different bases for calculating key parameters that characterize battlefield conditions, threat, and numbers of casualties. This divergence raises the question of how far in the future such conditions and threats actually are.

### **Risks and Possible Hedges**

Implied in these differences is an assumption of risk by the Army leadership. Supporting operations on a widely dispersed battlefield presents both tactical and political obstacles because clearing this battlefield of casualties is at best difficult and is made more difficult by the use of unconventional weapons. As a result, casualty rates could be high and a large number of wounded could die while awaiting collection and evacuation. The results of the games created situations in which the in-theater medical support system could not have provided the levels of care that the Army has traditionally expected to provide. The AMEDD wargame of 2000 revealed that the AFDO concept could be supported only with extensive pre-positioning of medical materiel and personnel well before hostilities began—a risky solution given that some conflicts may occur without significant advanced warning and because these resources could become early targets.



Furthermore, as the ability to clear the battlefield and treat casualties diminishes, it is likely that unit cohesion and combat effectiveness will decline. For instance, more effort will be required of combat forces to evacuate their own casualties, and a perception that medical treatment is unavailable can reduce the willingness to fight. In the small combat units employed by AAN, modest casualty rates may result in a relatively large redirection of effort to treatment and evacuation at the expense of maneuver and firepower. Thus, reduced medical support could imply decreased combat capability.

It is also clear that the futures currently used to determine near-term operational medical requirements and those used for far-future conceptual planning differ. It stands to reason that at some point, these differing futures should converge. Therefore, the Army would benefit by analyzing the assumptions and models that postulate these futures, and by examining the feasibility of technological innovation strategies to prepare for them.

#### **ISSUE FOUR: CAN AMEDD BECOME MORE EFFECTIVE IN CURRENT OPERATIONAL PLANNING?**

**I**n addition to near- and far-future requirements for medical support, AMEDD currently supports Army missions around the world through operational planning in unified command headquarters. RAND visited most of these headquarters to determine what issues exist in current operational planning. Military contingency operations in the post-Cold War era have become increasingly diverse and complex—and more frequent. Many of these contin-



gencies have significant medical dimensions that require sophisticated planning to provide a tailored medical force package that can meet the demands of the contingency.<sup>34</sup> These medical demands are made more complex by the broad operational scope of recent and likely future contingencies, in which the spectrum of operations can range from humanitarian assistance to active combat within any given contingency.

The focal points for most of this planning are unified command headquarters (i.e., the joint commands, each commanded by a four-star CINC who has responsibility for operations in a specific geographic theater). The Army's Forces Command (FORSCOM) also plays an important role. Each of these CINCs has a command surgeon and a medical staff, although there is wide variation in whom the surgeon reports to within the commands and the assignment of medical staff officers. In all the unified command headquarters where the surgeon is an Army officer (and FORSCOM), the surgeon is a colonel (grade O-6). In the two locations where the surgeon is a Navy officer (U.S. Joint Forces Command and Pacific Command), the surgeon is a flag officer (grade O-7 or O-8). In most cases, the Army surgeon does not work directly for the CINC, but instead reports through a primary staff officer, Deputy CINC, or the chief of staff.

During this study, we interviewed command surgeons and their staffs in unified and major command headquarters about their experiences with planning processes. In the headquarters where the surgeon is

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<sup>34</sup>See, for example, L. M. Davis et al., *Army Medical Support for Peace Operations and Humanitarian Assistance*, Santa Monica, Calif.: RAND, MR-773-A, 1996.



an Army colonel, medical advice is filtered through nonmedical staff officers before being considered by the CINC. Direct access to the CINC by the surgeon is most often in the role of personal physician. In a number of the commands, the medical staff officers were assigned to the various staffs in the headquarters, usually the J-3 (operations) or J-4 (logistics). These officers did not officially report to the surgeon, and some felt that the ability to do effective and centrally coordinated medical planning was diminished as a result.

Additionally, interviewees noted that the medical aspects of operational planning are often treated as a component of logistics, not as an independent “combat multiplier” that requires special knowledge to optimize planning. Consequently, the medical function is frequently monitored and filtered by another staff section (e.g., J-4), and the surgeon often does not have direct access to the CINC. As long as this situation exists, the influence of medical advice in operational planning will be constrained and the full combat potential of medical support could be compromised. Such advice could include instances in which medical criteria might significantly affect combat operations. Managing biological weapons casualties or determining specific requirements for the unique casualties and evacuation challenges of urban warfare are examples in which expert medical advice—clinical and operational—could be beneficial for CINC decisionmaking.

In the commands where the surgeon was a flag officer, the situation was very different. In those instances, the surgeon “had a seat at the table” and did not report through another staff officer. The CINC heard medical advice from his surgeon, and the surgeon was able to state the medical viewpoint



and concerns in the presence of principals, rather than through intermediaries who do not possess expert medical knowledge and may be preoccupied by other considerations. This possibility suggests that the medical community should revisit analyses of the medical staffing requirements for the headquarters of the unified commands and FORSCOM, and should examine the possibility of assigning medical flag officers to such headquarters.

## CONCLUSION

In this paper we have identified four issues that imply uncertainties about AMEDD's ability to project and field the most effective medical forces and support future operational concepts. We recommended several actions to reduce these uncertainties:

1. **Planned medical structure.** The Army process to determine required medical support forces is sensitive to a set of assumptions about the nature of warfare and the numbers, types, and timing of resulting casualties. If those assumptions do not hold, casualties could rise far higher than assumed in official planning estimates; and the Army would also risk underestimating the wartime demand for medical resources. On the other hand, overestimating this demand would create an unnecessarily large medical structure and reduce the number of nonmedical personnel the Army could contain. To address these issues, the Army needs a process of expanded risk analyses to determine medical resource demand when key assumptions are changed.



2. **Personnel fill.** AMEDD appears to be facing a manning shortfall in some critical specialties, particularly in the RCs. AMEDD has developed initiatives to ameliorate the problem, but these initiatives are based on assumptions that may not accurately reflect the underlying causes. This issue deserves further examination to shed light on the causes of the problem and to analyze current and alternative strategies for dealing with them.
3. **Future operational concepts.** The Army's ambitious "transformation" effort embodies operational concepts that AMEDD has found inherently challenging to support medically. The medical support requirements suggested by future-oriented wargames indicate that these challenges, including high numbers of casualties and dispersed forces, may represent a significant risk for far-future operational concepts. Plans for dealing with this risk rest largely on far-future medical technologies, however, their attainment is questionable. The Army needs to analyze the assumptions and models that support these futures and to examine the feasibility of technological innovation to prepare for them.
4. **Near-term operational planning.** Interviews with AMEDD leadership, CINC surgeons, and their staffs—from all services—indicate that both the structure of some CINC staffs and the rank of Army CINC surgeons inhibit communication of medical planning requirements and concepts to the CINC. The military medical community should consider revisiting medical staffing requirements for these headquarters.



Each of the issues we have highlighted has the potential to compromise the Army's ability to support the nation's military strategy. Obviously, in the military medical community, someone is aware of each of the issues we have described in this report and many of them are being addressed to some degree. However, the issues are situated within an interdependent system where the importance of any single problem or shortfall may be underestimated unless an overarching analysis is available. Moreover, systemic problems—which these issues represent—may not yield to piecemeal solutions. What is needed is sharper formulation of the problems and closer analysis of the risks they may imply overall for the Army, with sensitivity analyses to recognize the variability in requirements and capabilities under widely varying assumptions.