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STREAMLINING THE MEDICAL
MATERIEL ACQUISITION PROCESS:
CENTRAL DIRECTION, BETTER
REQUIREMENTS

VOLUME 1
Report AR806R1

January 1990
(Republished August 1990)

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Prepared pursuant to Department of Defense Contract MDA903-85-C-0139
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PREFACE

This report is Volume 1 of a three-volume report on the medical acquisition process. In this report, we present the results of our analysis and our recommendations on requirements identification methodologies and acquisition process management.

Volume 2 describes the life-cycle system activities leading to the critical acquisition strategy decision, and presents our recommendations on that decision to proceed to new development or to use an off-the-shelf, or nondevelopmental item. In Volume 3, we address characteristics – *proven qualities* – and relationships – *roles and responsibilities* – that mark a successful acquisition management structure, and we recommend an organizational alignment that establishes the relationships necessary for the streamlining actions. For a more thorough understanding of the medical materiel acquisition process and the changes needed to complete its streamlining, we suggest reading Volumes 2 and 3 as well as this volume.

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Executive Summary

STREAMLINING THE MEDICAL MATERIEL ACQUISITION PROCESS: CENTRAL DIRECTION, BETTER REQUIREMENTS

The Army Medical Department (AMEDD) wants to improve the performance of the medical acquisition process – to field operationally suitable medical materiel in less time, at less cost, and more frequently than it now does. How to accomplish such a goal, however, draws widely divergent opinion within the Army medical community. Some would simplify the process by eliminating certain steps, others would consolidate organizations, and many would acquire only off-the-shelf, nondevelopmental items. We believe all three approaches have value, but before taking any actions, the AMEDD needs to consolidate its acquisition authority so that it can make more-informed decisions on better materiel requirements. Currently, the AMEDD designates managers for all the parts of the acquisition process, but it does not have an overall acquisition manager to apply the pressure needed to meet objectives, resolve requirements questions, and hold to scheduled milestones.

To streamline the medical materiel acquisition process, we recommend the following critical first steps:

- The Surgeon General should designate a Deputy Surgeon General for Acquisition [DSG(A)] and assign the DSG(A) the responsibility for managing the medical materiel acquisition process. That position would be the AMEDD's highest level of central direction and supervision of acquisition functions (other than The Surgeon General). This responsibility should not be delegated. To do so would counteract the centralized oversight intended.
- The DSG(A) should direct the coordinated revision of Army Regulation 40-60, *Policies and Procedures for the Acquisition of Medical Materiel* and the *Medical Materiel Acquisition Management Handbook* to incorporate, at a minimum, the following:
 - ▶ AMEDD acquisition objectives
 - ▶ Criteria for designating programs for the DSG(A)'s direct oversight and control

- Strategic guidance with regard to medical technology and medical unit modernization
- Policy on integrating cross-appropriation financial planning, programming, and management
- Essential user testing and certification guidance.
- The DSG(A) should develop a single procedure for identifying AMEDD materiel requirements, and that procedure should be published and personnel trained in its use. No current requirement identification methodology by itself meets AMEDD needs; collectively, the methods have the potential to meet those needs. What the AMEDD needs is a consolidated requirements identification methodology that is widely understood, enhances objective analyses, requires early identification and review of concepts of operations and associated trade-offs, establishes an AMEDD quick-evaluation/testing capability, and provides useful feedback.
- The DSG(A) should develop acquisition management career paths for military and civilian personnel and develop and coordinate appropriate assignment and promotion policies. The importance of high quality medical acquisition management personnel to acquisition performance cannot be overemphasized. The DSG(A) should specify the prerequisite acquisition training and experience needed for future DSG(A) designees and other critical acquisition managers.

We believe that implementation of our recommendations is the key to achieving improved understanding, better teamwork, and closer management of the system; implementation of these recommendations will result in better decisions, better requirements and move to timely, less-expensive, and more-frequent deliveries of medical materiel that meets the user's needs.

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CHAPTER 1

INTRODUCTION

PERSPECTIVE

During testimony before the Senate Armed Services Committee in July 1988, David Packard, Chairman of the Board of the Hewlett-Packard Company and former Deputy Secretary of Defense, indicated that during the decade of the 1980s, the United States spent about \$2.5 trillion on Defense. He suggested that, had only 5 percent of that amount been saved through improved acquisition practices, our Federal budget deficit would have been \$125 billion lower or, in other words, nearly eliminated.[1]

Although his testimony mostly concerned new major weapon systems programs and the military strategy that drives them, he indicated that many inefficiencies are to be found in the vast number of low-level procurement transactions and, even though they are not large in comparison with those in the major programs, they must be dealt with. Acquisition reform of a cultural nature as recommended by his Commission, he felt, is essential for the security and economic health of our nation.[2]

We believe that streamlining the medical materiel acquisition management system is a step that supports Mr. Packard's intentions. Our analysis suggests that nearly everyone close to the field medical acquisition system agrees that something must be done to make it more responsive, efficient, and effective. A streamlined system would respond promptly in acquiring nonmajor field medical systems, improve the efficiency of dollar expenditures, provide more effective support of the health care mission, and increase the capabilities of field medical units.

PURPOSE

This report examines the medical materiel acquisition process and recommends ways to streamline it. We use requirements identification as our entry into the acquisition process and the management of those requirements to guide us through it. In doing so, we deal with important organizational responsibilities. Our discussions of combat and materiel development roles, missions, management

effectiveness, and other sensitive issues will likely spark some defensiveness and challenge by participants in the acquisition process. Nevertheless, since the establishment of requirements begins the acquisition process, improved management of the requirements should benefit the entire process.

THE DoD ACQUISITION SYSTEM DEFINED

DoD Directive 5000.1 defines the acquisition "system" as follows:

A single uniform system whereby all equipment, facilities, and services are planned, designed, developed, acquired, maintained, and disposed of within the Department of Defense. The system entails establishing policies and practices that govern acquisitions, determining and prioritizing resource requirements, directing and controlling the process, contracting, and reporting to Congress.[3]

The Defense Systems Management College offers the following less formal definition:

The DoD acquisition management system is a system of people and organizations, the purpose of which is to support national strategy by (a) determining what materiel should be in the hands of the Armed Forces at specific times in the future, so they may optimally fight against foreseeable forces, and (b) providing that materiel in a cost-effective mix, properly supported, at a cost the country can afford.[4]

REPORT ORGANIZATION

The Army Medical Department (AMEDD) wants to "have in its hands" at specific times in the future all items needed to perform its mission optimally. Since requirements are derived from the mission, we first discuss the nature of the Army's health care mission in peacetime and wartime and the implications of that dual mission on the requirements provided to the acquisition process (Chapter 2). In the remainder of the report we

- Review the current acquisition process and discuss what it is supposed to do, how it should be managed, the organizations responsible for managing parts of it, how it performs, and some of the requirements-related problems it has experienced (Chapter 3)
- Discuss the nature of requirements and highlight the need for consensus so as to provide a clear objective for the acquisition process (Chapter 4)
- Detail the methodologies used by the AMEDD to identify requirements, compare them with procedures used elsewhere in the acquisition

community, and identify the strengths and weaknesses of the AMEDD procedures (Chapter 5)

- Conclude that the medical materiel acquisition process needs to identify and manage requirements better (Chapter 6) and recommend changes to streamline the process (Chapter 7).

A glossary of terms and a list of references are provided at the end of this report. A criterion for evaluating recommendations on changes to the acquisition system – developed by the Defense Systems Management College – is provided in Appendix A. We report our analysis of the requirements identification methodologies in Appendix B.

CHAPTER 2

HEALTH CARE MISSION

The AMEDD has a dual mission: (1) to maintain the health of the Army in peacetime, and (2) to attend the sick and wounded in time of war.^[5] Regardless of whether it is being performed in peacetime or wartime, the mission cannot be performed without medical materiel. During peacetime, supplies and equipment are needed every day to treat patients at Army medical facilities. Similarly, during war, even the best of clinicians¹ would not be effective without essential supplies and equipment. Thus, the AMEDD mission is the source of, and reason for, requirements for medical materiel.

The specific nature of the supplies and equipment needed depends on where and when they are to be used. For example, in a wartime, field environment, it is necessary to provide protective shipping/storage containers for sensitive medical equipment that might be moved by off-road transportation; in a peacetime, fixed-facility environment such expensive containers would never be needed. Therefore, in addition to being the source of requirements, the mission can have a significant influence on the requirement for an item and its specific design. Thus, if the acquisition process is to be effective, its personnel must "understand" – perceive and comprehend the nature and significance of – the health care mission and be responsive to its variations.

In this chapter, we discuss variations in the health care mission and the associated impact on the acquisition process. In the next chapter, we deal with the need for health care mission personnel to understand the acquisition process.

¹In the AMEDD, a need to differentiate people according to their training frequently arises. At one time, physicians, dentists, and nurses were referred to as "professionals." Those in positions of authority within the AMEDD objected to this differentiation, feeling that all AMEDD soldiers were professionals. This gave rise to the term "clinicians." In use, even "clinicians" has taken on a broader meaning. It often refers to other disciplines – pharmacists, physician assistants, laboratory officers, dental hygienists, and others with a direct patient care role – as well as to the physicians, dentists, and nurses.

THE HEALTH CARE MISSION IN PEACETIME

Mission Description

In peacetime, the Army health care mission has two separable components. (In wartime, the two components form a continuum.) The two components — those units organized under a Table of Distribution and Allowance (TDA) and those units organized under a Table of Organization and Equipment (TOE) — are different in many ways. They use different kinds of facilities resulting in different levels of care; requirements for their staffs and equipment are planned and developed differently; they have different organizational structures; types and amounts of workload are radically different; they train differently and on different subjects; and the acquisition process that supports them is different. These differences provide the distinctive characteristics of the peacetime mission.

The peacetime health of the active duty force (and other authorized beneficiaries) is generally cared for in hospital buildings and clinics designed and permanently constructed for the purpose. Those buildings and clinics are referred to as fixed or as "brick and mortar" facilities. Some have been built in the past several years and incorporate state-of-the-art features rivaling the most advanced civilian hospitals in the country. They can efficiently provide the highest quality of patient care. In such fixed facilities, standards of care are typically those established by such bodies as the Joint Commission on the Accreditation of Hospitals (JCAH). Those are the same standards as the ones used in civilian health care facilities.

Fixed facilities are staffed and equipped according to TDAs, which prescribe the organizational structure, personnel, and equipment necessary to perform a specific mission for which no appropriate TOE has been promulgated. The TDA offers a great deal of flexibility in meeting mission needs. Given sufficient resources, it effectively supports maintenance of a health care capability at or near the leading edge of medical technology and state of the art.

The workload in TDA facilities consists of patients who require treatment ranging from outpatient services for minor illnesses to major surgery. Quantitatively, the large populations of military retirees, dependents, and other authorized beneficiaries impose a workload that exceeds the health care service's capacity by a large amount. That excessive workload requires that patients often be referred to outside sources of care. Because of the large number of patients, it is

sometimes said that the TDA medical system is "at war everyday." Indeed, in this sense, wartime missions and tasks are practiced every day in peacetime (albeit without the reality and chaos that would be found on a modern battlefield). Nevertheless, patients in the Army's fixed hospitals and clinics give medical personnel the opportunity to maintain their patient care skills and manage a hospital under very demanding and hectic circumstances. Additionally, the staffs of these hospitals participate in continuing medical education programs to ensure that they are abreast of the latest developments in their health care disciplines.

Field exercises familiarize these medical personnel with the field environment and equipment they may encounter in wartime. During peacetime, TOE hospital units configured for wartime and wartime logistic support are used for training exercises. Since human lives are involved, however, these field exercises seldom include actual patients needing more than "sick call" treatment. The field hospital's capability is often limited and higher quality care can be provided in a fixed hospital that is usually nearby. It is not prudent to artificially constrain the quality of care delivered to a patient merely for the sake of training realism. On the other hand, the realism of training that does not involve patients can be challenged as being insufficient to adequately prepare the clinician for a wartime environment. It is this divergence in training and the fact that the peacetime patient care workload requires the full-time attention of most active duty AMEDD clinicians (preventing frequent and extensive training in wartime roles) that begins to divide the health care system into its TDA and TOE components. That division coupled with the size and complex nature of the acquisition process itself can create misunderstandings about the requirements for medical equipment. It, indeed, has caused the development of two AMEDD equipment acquisition processes – one to be used for acquiring the equipment in its peacetime mission and one for that used in its wartime mission.

Acquisition Process for TDA Units

The acquisition process supporting the peacetime mission is used to identify and approve requirements, obtain funding, and purchase additional and replacement equipment in TDA facilities. Except for perhaps the large amount of expensive war reserve inventories commingled with the peacetime inventory for rotation purposes, the acquisition process used to support the peacetime mission strongly resembles that used by civilian hospitals throughout the country to purchase, distribute, and store the commercially available supplies and equipment they need. Some believe that the

process supporting the peacetime mission could be effective during wartime if the volume of throughput were increased to handle a larger patient load. Upholding that belief are cases in which the process has been used to purchase equipment rapidly for deployed TOE units in emergency situations.

The process supporting the peacetime mission is designed to be quick and efficient in responding to the needs of the clinicians who deal with patients every day. In the process, maintenance records are used to identify equipment that may have to be replaced because of wear. The clinician can also use the process to order new equipment items that incorporate the latest technology and that save work or provide increased capability. In either case, replacement or acquisition of a new item, the clinician seeks approval and funding for the purchase. The approval process permits requirements to be double checked to ensure coordination with facility engineers, maintenance personnel, and other necessary offices. That coordination permits the application of the principles of logistic support analysis (LSA) and integrated logistic support (ILS), two important features of any acquisition system.

The approval level and funding source is determined by the estimated purchase price of the needed item. Typically, items with an estimated price of less than \$15,000 can be approved and funded from Operations and Maintenance (O&M) funds by the hospital commander. Items whose estimated cost is more than \$15,000 must be funded with Other Procurement, Army (OPA) funds. Those funds are centrally controlled and allocated by the Office of The Surgeon General (OTSG) and administered by the U.S. Army Medical Materiel Agency (USAMMA) in coordination with major medical commands such as the Health Services Command (HSC). Therefore, when a local facility has an equipment requirement estimated to cost more than \$15,000, it requests funding from USAMMA. If the requirement has been appropriately approved (at the hospital, medical command, or even Department of the Army or DoD level), USAMMA provides the necessary funding.

The process described above has proven very responsive to clinicians' needs. It has also been judged efficient and effective by various audits and inspections. In essence, personnel in the process understand the peacetime health care mission and needs and vice-versa. They are responsive to one another's needs. The keys to success have been that the clinician who will use the equipment identifies the need; approval is managed on an exception basis and is therefore quickly obtained or denied; The Surgeon General's consultants are frequently used in the approval

process — that use essentially constitutes a peer review mechanism with respect to equipment, the types of care delivered, and missions performed; funding has been adequate; and procurement, installation, and deliveries have been expeditious because of the small quantities involved with an individual requirement. Indeed, the obvious success of the acquisition process supporting the TDA peacetime medical mission has made the lack of success of the acquisition process supporting the TOE wartime medical mission more apparent.

We now turn our attention to the wartime health care system, the one in need of improved acquisition support.

THE HEALTH CARE MISSION IN WARTIME

Mission Description

In wartime, the health service support mission is based on the principle of far forward treatment and can be viewed as a continuum of care from that provided at the point of injury in a combat zone to that provided in the hospitals and medical centers in the United States.[6,7] At each succeeding level through which a patient is evacuated, the Army offers increased medical capability. That capability is increased by the availability of the specific professional skills of clinicians, specialized facilities, sophisticated equipment, or some combination of all three. Ideally, the health care process is optimized to return soldiers/patients to duty as soon as possible or, if that cannot be done within specified time periods, to quickly evacuate them to a higher level of health service.

The wartime health care system includes (1) the fixed TDA units that provide peacetime health care, (2) the TOE field medical units (both active and reserve) in, and deployed to, theater combat and communication zones and those employed in CONUS to augment existing capabilities, and (3) other civilian and Governmental fixed facilities with whom agreements exist or can be negotiated both in the United States and in host countries. In wartime, all of those health care assets will be counted on as part of the continuum of care, to provide medical services for the projected volume of casualties and evacuees. Many alternatives to providing critical medical service support are considered when formulating wartime medical support plans. Such planning implies a level of care somewhat lower than that provided in the present JCAH-approved peacetime system. That implication arises from the belief that medical service resources will be scarce during wartime and that economy

of the medical force is therefore needed. The need for mobility in a hostile, off-road, field environment and the opinion that some care is better than none also support planning for an austere but adequate – but not necessarily JCAH-approved – capability.

Acquisition Process for TOE Units

The acquisition process for support of the wartime mission that is used to identify and approve requirements, obtain funding, and purchase additional and replacement medical (and nonmedical) equipment in TOE units is vastly different from its counterpart TDA medical acquisition system. It is based on the same principles, milestones, and management concepts that the Army uses to acquire howitzers, trucks, and attack helicopters. The TOE medical equipment acquisition process is discussed in greater detail in Chapters 3, 4, and 5.

COMPARISON OF TDA AND TOE ACQUISITION PROCESSES

The brief description of the wartime health care mission suggests a degree of planning ambiguity. The TOE acquisition process seems to be defined and designed in great and standardized detail, certainly more so than the TDA process. However, as we compared the processes, uncertainty and lack of clarity associated with the acquisition process for support of the TOE wartime mission become more apparent.

We compared the fixed peacetime health care facilities with the evolving and opportunistic definition and design of wartime health care facilities. At present, the AMEDD inventory has at least four different configurations of TOE hospital unit equipment sets despite extraordinary attempts to standardize on one configuration. Included in the four different configurations are those referred to as conventional units, meaning those that use general-purpose canvas tentage as a shelter system. The inventory also includes Medical Unit Self-Contained, Transportable (MUST) units with their unique, inflatable, expandable shelters and turbine-powered utilities source. The third configuration is the new Deployable Medical Systems (DEPMEDS) using International Standards Organization (ISO) expandable shelters and tubular frame synthetic fabric tents. Finally, hybrids of those three configurations can be found associated with wartime plans calling for their use in conjunction with buildings of opportunity such as schools, gymnasiums, hotels, or airplane hangars. When reduced to key factors of infrastructure, utilities, and operation, the variation in the configurations of TOE facilities is more significant than that encountered in

the TDA facilities, even though the TDA facilities give the appearance of varying significantly among themselves.

The TDA that prescribes organizational structure, personnel, and equipment needed to perform the unit's mission provides sufficient flexibility to keep up with technological change. However, the unit design and authorization process that provides organizational structure, personnel, and equipment requirements for TOE units is less flexible. A complete cycle of the TOE process can require 2 or more years and in most cases does so. Modernization of TOE units is a highly complex and integrated process. Providing new equipment to a TOE unit imposes many ancillary requirements, such as training, testing, resourcing, and providing facilities and supply and maintenance support, to name a few. Because of the high degree of integration and large number of ancillary requirements, proposed changes in the types or amounts of equipment and/or personnel listed in a TOE require extensive coordination. A major change to a TOE can require coordination with over 100 different offices.

As project management literature suggests, such extensive coordination can create communication and supervision problems. Productivity falls off above a certain group size because the number of information links that tie a group together increases faster than the number of individuals working on the job increases. In general, if an individual is added to a group of n members, n new links are added to the information net. Thus, an n -person team, has $n(n-1)/2$ information links. For example, with three individuals we have $3(2)/2$ or 3 information links and with four individuals we have $4(3)/2$ or 6 information links, an increase of three. Ignoring economies associated with organizational hierarchy, a TOE coordination process involving 100 offices could yield $100(99)/2$ or 4,950 information links.[8] Even if only a few of the offices have the capability to delay (let alone disapprove) a proposed TOE change, the project schedule can slip significantly and frequently does. That, in turn, can disconnect the project from numerous associated, closely coordinated, and highly interdependent plans such as those for funding, testing, and production.[9]

Another key issue is that the authorization process time cycle for the wartime TOE health care support is different than that for the peacetime TDA support and that difference has implications concerning the ability of the wartime acquisition process to modernize and remain technologically current. The large degree of integration between the authorization and purchasing subprocess of the acquisition

process is to ensure the standardization that, in turn, facilitates justification and defense of resources. Standardization, however, especially when 2 or more years is required to achieve it, can impose roadblocks in attaining state-of-the-art capability and the desired degree of coordination and compatibility between the equipment and the clinician's training, or it can preclude such capabilities entirely.

Another dramatic difference between TDA and TOE units during peacetime is the nature of their workloads and, consequently, the staff assigned and available to accomplish the workload. First, the majority of TOE hospitals are reserve units constrained to 30 or less unit-training days each year. Secondly, TOE hospital units do not use their organic equipment to treat patients except in the most limited cases and usually during field training exercises. Typically, the duty time of personnel at those units is spent in training on soldier skills, preventive maintenance, and other administrative functions. Most TOE units have resource-sharing agreements with nearby TDA units under which the TDA unit will train enlisted personnel in the military occupational specialties (MOSs) required at the TOE hospital. There are times, though, when the TDA unit's patient care workload reaches levels that leave no time for training the TOE unit's enlisted personnel. The CONUS TDA unit's highest priority is the patient care workload. This may result in reducing the TOE unit's training time in the TDA facility. The other significant issue in TDA and TOE staffing involves the TDA unit's clinicians. The active force TOE units count on those same clinicians to become a part of their organizations in wartime. Because of the TDA workload requirements, those clinicians are seldom, if ever, available for training in the TOE unit's wartime configuration. The reserve force TOE units have their own clinicians who participate in peacetime training and provide the medical staff capability in wartime.

The confluence of assigned clinical personnel and organic equipment with quality training time and realistic patient play occurs so infrequently that it is not surprising to find that modernizing TOE unit equipment and improving the acquisition process that delivers it has a low priority. Personnel spend much of their field training time dealing with the novelty of administrative, housekeeping, maintenance, and other chores necessary for surviving in the field. Certainly, the clinicians spend less time in identifying requirements and seeking approval and funding for field medical equipment than they do in the peacetime facility in which they practice medicine. Even if they were zealously interested in changing the TOE

unit's equipment, the complexity and bureaucracy of the TOE acquisition process would likely tame them in short order.

DUAL MISSION IMPACT ON ACQUISITION

We opened this chapter by describing the AMEDD's health care mission as one of maintaining the health of the active duty force and authorized beneficiaries in peacetime while simultaneously preparing to attend the sick and wounded in time of war. That mission is the source of equipment requirements and has a direct influence on the design of the equipment. Our discussion indicates that, despite the fact that the AMEDD health care system is intended to be a single continuum of care even in peacetime, it actually operates as two separate systems in peacetime, and trade-offs between the two systems are seldom made except perhaps at the installation level where TDA and TOE medical units share resources in an agreed upon manner. In our review of each system, we noted differences and similarities in facilities, workloads, levels of care, authorization processes and standardization, staffing, funding, training, equipment configurations, and acquisition support.

We are not the first to suggest this TDA-TOE "duality." In 1979, the Defense Resource Management Study by Donald B. Rice, stated as its fundamental premise that "the military health care system has two legitimate objectives or missions." The study identified the two missions as the readiness mission (our TOE, or wartime, mission) and the benefits mission (our TDA, or peacetime, mission). The report also said that "the two are interrelated and mutually supportive in some ways but conflicting in others." The report suggested that the "two missions can pull the health care system in different directions." It is not likely that either of the mission taskings will be withdrawn; they simply must be recognized, understood, and appropriately managed.

We believe that, with respect to acquisition, the AMEDD has been pulled in different directions to the detriment of TOE acquisition process performance. The dual mission of the AMEDD is sufficiently divisive and confusing as to adversely affect the development, processing, and affordability of equipment requirements and therefore the performance of the acquisition process used to field medical equipment to TOE medical units. In sum, the two missions are neither correctly understood nor appropriately managed. They result in the priority of leadership attention being given to the TDA mission, a lack of balance in acquisition training and resource

allocation, confusion with respect to how the overall process is supposed to work and therefore where the management control points are, and, finally, a lack of cultural commitment to making the hard strategic choices arising from the dual missions and limited resources. Until these deficiencies are resolved, the acquisition process will continue to perform in a marginal or unacceptable manner for the resources invested.

Even if the problems in the acquisition process are inherent in the process itself, the dual nature of the health care mission adds a degree of management complexity. As the complexity increases, so must the "overhead" staffing that can increase paperwork. Added complexity significantly increases acquisition training and experience requirements, obscures acquisition objectives, and reduces the likelihood of acceptable acquisition support. We feel that the medical TOE acquisition process also suffers from many of the same problems that afflict major weapon system acquisitions.

The next chapter discusses the AMEDD acquisition process and indicates how the TDA and TOE components' processes are similar in terms of desired results and management philosophy but are very different in terms of acquisition responsibilities, management procedures, and process performance. It describes the impacts of AMEDD having two missions and where and how those impacts occur, particularly in the identification of requirements for field TOE medical equipment.

CHAPTER 3

MEDICAL ACQUISITION PROCESS

We define the DoD acquisition process in Chapter 1 and indicate that the AMEDD process for acquiring equipment for TOE units is conceptually no different than that the Army uses for cannons, helicopters, and trucks.

In Chapter 2, we discuss the two acquisition processes at work in the AMEDD; the TDA process is generally considered as suitably responsive, efficient, and effective. The TOE process is usually characterized as complex, slow, and possibly wrong for the wartime health care mission capability. We believe that the source of those differences is rooted in the dual nature of the AMEDD mission.

In this chapter, we analyze the AMEDD acquisition process and describe how we found it to work. We pay particular attention to process management, responsibilities, and performance. We also describe several acquisition problems that typify the result when those who participate in planning the AMEDD mission do not understand the acquisition process.

DESIRED ACQUISITION RESULTS

Having suggested that the TDA acquisition process is performing acceptably while that of TOE units is not, it is necessary to define acceptable performance. Although the health care mission is the source of medical materiel requirements, underlying successful mission execution are the proper materiel means to perform the mission. Whether in peacetime or wartime, every item of equipment must possess the following fundamental qualities:

- Its designed purpose must contribute to accomplishing the health care mission.
- It must be effective, alone or in combination with other materiel, in accomplishing its designed purpose.
- It must be available when needed.

- It must remain available as long as it is needed and require only minimal maintenance.
- It must provide substantially more value than its cost of purchase and operation.
- It must be affordable.
- It must be easily understood, maintained, and used by trained personnel under operating conditions at or near to those for which it was designed.

The objective of the acquisition program should be to provide only items with those qualities.[4] In fact, the format of requirements documents attempts to ensure that each of those qualities is addressed. Additionally, the qualities provide a goal for both the TDA and TOE acquisition processes, i.e., to supply items that satisfy the following conditions:

- Meet the users' needs
- Are delivered on schedule and at planned cost
- Are ready when needed
- Are supportable with ease
- Are affordable through their life cycles
- Are compatible with other equipment and systems.

ACQUISITION MANAGEMENT PHILOSOPHY

To help achieve the objective described above, DoD Instruction (DoDI) 5000.2, *Major System Acquisition Procedures*, provides guidance for the management of acquisition programs and describes in general terms how they should work. The DoDI gives the OSD review and milestone decision authority for selected major programs, thereby ensuring, by direct oversight, that the guidance is followed and programs work as they should. (Designation as *major* indicates that the program is critical to fulfilling the mission, meets certain resource thresholds, or otherwise warrants special management attention.)

Program Management

Even though many programs are not reviewed at the OSD level, DoD guidance applies to all programs, including those that are less-than-major programs. Medical acquisition programs, universally designated as in-process review (IPR) programs,

are not major programs.¹ Nevertheless, milestone and other decision authority exercised by voting IPR members should accomplish the same end as OSD major system reviews – to ensure medical programs achieve their objectives and are managed efficiently and effectively.

Specifically, the AMEDD acquisition programs for both TOE and TDA units should be managed so that they conform with DoD guidance as implemented by the Army. While management details can be altered to meet Army and AMEDD needs, all medical acquisition programs should meet the following conditions:

- Support operational objectives in a timely, efficient, and effective manner.
- Use a streamlined command structure.
- Normally be divided into well-defined phases, with decision points (milestones) marking the transition points between phases. For each program, however, the activity in each phase should be individually tailored to minimize acquisition time and life-cycle costs, consistent with appropriate treatment of program risk, urgency, and test results.
- Cause continuous analysis and review of assigned mission areas to identify deficiencies and recommend more effective ways of performing assigned tasks, particularly by reducing the identified deficiencies, establishing new capabilities, and reducing the costs of ownership and operation of equipment systems.
- Validate the need for the proposed items and show that the need can or cannot be satisfied by better use of existing or modified items or commercially available ones or by cooperative development programs.
- Thoroughly investigate the possibility of satisfying emergent requirements through common-use (joint) solutions and programs.
- Consider affordability, in terms of cost, priority, and the probable availability of fiscal and manpower resources, at every program decision point and annually in the DoD Planning, Programming, and Budgeting System (PPBS). A new program should not start unless sufficient resources can be programmed to permit its rational accomplishment.
- Minimize changes to program funding and requirements to promote stable program planning and efficient execution.

¹Although medical programs normally do not meet the major program criteria, the Defense Health Council, established under DoD Directive 5136.8, may provide DoD level oversight of selective acquisitions.

- Tailor the acquisition strategy of each product to minimize delivery time, consistent with common sense and sound business practice.
- Explicitly consider the short- and long-term implications of the program on the viability of the defense industrial base.
- Seek appropriate opportunities to promote the highest practicable level of standardization and interoperability.

Neither DoD guidance nor the above acquisition management philosophy differentiate between TDA and TOE acquisition processes; they are equally applicable to both. AMEDD acquisition guidance implementing the objectives and philosophy above is published primarily in three documents: Army Regulation (AR) 40-60, *Policies and Procedures for the Acquisition of Medical Materiel*; AR 40-61, *Medical Logistics Policies and Procedures*; and the *United States Army Medical Department Medical Materiel Acquisition Management Handbook*.

Those publications supplement the basic Army policies and procedures found in a host of regulations. They also establish basic AMEDD policies and procedures to develop, acquire, and field medical materiel to the Army. Since AMEDD acquisition programs are IPR programs, the principal members at each IPR should ensure that the program is being managed in a manner consistent with acquisition process objectives and management philosophy described above and implemented in the AMEDD guidance.

Project Management

Successful completion of AMEDD programs involves effective project management and negotiation/tailoring of the life-cycle systems management model (LCSMM).² Effective project management usually entails taking the following basic steps:

- Creating a project planning group
- Stating the objectives of the project
- Enumerating everything that must be done to achieve project objectives

²The LCSMM is a technique for planning and controlling acquisition projects. It identifies and schedules the steps necessary to reach an acquisition objective such as the materiel fielding date. It includes milestone decision points that ensure delivery schedules are maintained, costs remain within budget, and unit capabilities are achieved. An AMEDD project can be for a single product, e.g., a field oxygen generating unit, or a family of products, e.g., malaria vaccines.

- Sequencing the activities enumerated above
- Allocating resources, such as manpower, to each of the project's activities on a first-pass basis that is acknowledged to be subject to later revision
- Estimating the time and cost required to complete each activity and to achieve the objectives of the project
- Revising the plan until an acceptable total plan evolves
- Developing an organization that can implement, monitor, and control the project plan.

ACQUISITION RESPONSIBILITIES AND PERFORMANCE

In addition to providing guidance to AMEDD organizations, the three documents mentioned above (AR 40-60, AR 40-61, and the *Medical Materiel Acquisition Management Handbook*) describe and assign acquisition responsibilities. Myriad organizations, both internal and external to the AMEDD, have responsibilities that affect the achievement of AMEDD acquisition objectives. That so many organizations are involved is due to the extreme degree of specialization required to field increasingly complex materiel systems through a very complex force modernization and integration process. Despite the number of participants in the acquisition process, only two basic responsibilities are at the core of the acquisition system: those of the combat developer and those of the materiel developer or, in an even simpler model, those of the user and those of the supplier.

The combat developer formulates concepts, doctrine, organization, and materiel requirements and represents the user community in the materiel acquisition process. The materiel developer conducts research, development, and production and supports validation of systems that fill approved materiel requirements. Fundamentally, then, the combat developer defines what is needed and the materiel developer delivers it.

The TDA acquisition process approximates that simplicity. It has no combat developer to represent the user; the user is self-represented, except in a limited number of special cases (for example, OTSG centrally directed acquisitions). The user describes what is required to the supply support office, usually in performance or "brand name or equal" terms, on a form that is then submitted for approval and funding. Upon approval and funding, requisitioning or contracting action is initiated

and the item is delivered and installed. The entire process typically takes less than 9 months. In emergency situations, delivery has been made in days or weeks.

The time spent in consolidating these kinds of requirements from several different facilities in order to procure large quantities and receive lower per unit costs has generally delayed deliveries by substantial amounts of time. A program known as CENPROME, or Centralized Procurement of Medical Equipment, is an attempt to standardize and consolidate requirements from TDA facilities; at its inception, that program delayed delivery of needed equipment.

In the TOE acquisition process, the roles of the combat developer and the materiel developer quickly become clouded. The Training and Doctrine Command (TRADOC) is the Army's principal combat developer. The AMEDD combat developer is the HSC, which discharges its responsibility through its principal agent for combat development, the Academy of Health Sciences (AHS). AHS, in turn, has a memorandum of understanding with TRADOC to define their respective responsibilities.

Similarly, the role of the AMEDD materiel developer differs from the Army model. The Army Materiel Command (AMC) is the Army's principal materiel developer, and the AMC commander has command authority over the subordinate activities performing the materiel development function. The Surgeon General (TSG), a special staff officer in Headquarters, Department of the Army (HQDA), is the medical materiel developer. TSG has delegated materiel development authority to the Medical Research and Development Command (MRDC) and has also designated the U.S. Army Medical Materiel Agency (USAMMA) as TSG's mission assignee and logistician with management responsibility associated with medical sets, kits and outfits, and nondevelopmental items (NDI). Those delegations essentially divide medical materiel development responsibilities between developmental and nondevelopmental (off-the-shelf) items. They also divide programming and budgeting responsibilities for Research, Development, Test and Evaluation (RDT&E) and Other Procurement, Army (OPA), which is used to purchase medical investment items. Responsibilities are further divided when the role of the Defense Personnel Support Center (DPSC) is considered. At AMC, the Army provides its own contracting support; on the other hand, DPSC provides contracting services for the military medical departments even though MRDC has an

organic contracting activity.³ This division of materiel development duties is not well understood by those in the Army who are familiar with the simple model but are outside of the medical acquisition process. This difference in the AMEDD system has at times proven frustrating to those who control the allocation of dollars within the Army.

As far as performance of the TOE acquisition process is concerned, we found a less-than-satisfied clientele. In one small detailed study of eight items of field medical equipment, including developmental items and NDI, an average of 12.5 years had passed from the date of approval of the original requirements document and yet none of the items were within 2 years of significant deliveries.[10] We found that although not all requirements have aged to this extent, performance is sufficiently lengthy and sporadic as to make commitment of resources to a given agenda of requirements somewhat hazardous.[11]

ACQUISITION PROBLEMS

A broad range of literature on DoD acquisition management reform consistently identifies problems related to funding, requirements, and planning. We found them to be applicable to medical programs as well.

Funding-Related Problems

Historically, instability in acquisition programs has driven up costs and delayed fielding. In the funding area, instability occurs when fund availability is scheduled and then withdrawn. In the case of "on-and-off" funding, the frequent deferral or stretching out of production of major weapon systems increases the costs because of uneconomical production quantities and inflation. Funding deferrals associated with increased per unit prices usually are not a major problem in the AMEDD, for even though they do exist, the AMEDD does not adhere to strict line-item accounting in its planning, programming, and budgeting across all involved appropriations. As a result affordability cannot be assessed with any high degree of management assurance. In the early stages of executing the DEPMEDS program, funding in successive years of the program slipped, accelerated, and then slipped again. This "programmatic nervousness" cannot be directly blamed for increased

³The U.S. Army Medical Research Acquisition Activity performs contracting functions for both MRDC and Fort Detrick.

fundamental question has significant bearing on the equipment developed and fielded to meet the requirement.

Planning-Related Problems

Inadequate acquisition planning is another common problem contributing to unnecessary health care materiel acquisition costs and schedule slippage. This problem is clearly evident in the AMEDD. Effective project management entails following a set of basic steps. We would not rate the AMEDD's performance in project management very high overall and would rate it as poor in some steps. Although the AMEDD attempts to follow the basic project management steps, we found no evidence to indicate that it completes the steps in a manner that leads to successful project completion when success is measured against the acquisition objectives. Some specific examples are:

- Project planning groups involve a rotating cast of characters that meet infrequently or only through correspondence.
- Project management schedule targets, particularly Initial Operating Capability (IOC) and First Unit Equipped (FUE) dates, are either unrealistically short or cannot be justified or supported objectively.
- Disagreements over requirements and items that meet the requirements, frequent changes in item characteristics, and nonintegration of configuration changes detract from the clarity of the project objective.
- Acquisition process participants are reluctant to commit themselves and their organizations to anything but a recipe process.
- Acquisition planning is typically accomplished without the continuous and beneficial participation of the contracting officer who is ultimately responsible for awarding the production contract.
- Financial plans are not integrated routinely [although the U.S. Army Medical Materiel Development Activity (USAMMDA) has taken significant steps to improve cost estimating].
- Product life cycle programing is lacking and no audit trail from that baseline estimate to execution exists.
- Project activities are not sequenced with any degree of discipline.

A basic precept of project, program, and acquisition management is that concurrent performance of tasks is needed to meet time standards. However, success is a function of the quality of performance, and that is not apt to occur unless enough

of the right level of management becomes involved. Resources are controlled by a diverse number of organizations and those organizations are unlikely to apply the resources coherently to any given project following consistent priorities. Finally, and perhaps most importantly, no one in the AMEDD constantly monitors and manages overall acquisition program performance. Although DoD continues to press for a single, high-placed, powerful acquisition executive for overall management, AMEDD has a committee management structure for its acquisition process, and no member of the committee holds the authority to drive a project or program to completion.

Finally, acquisition programs – and particularly AMEDD – use too many inexperienced personnel. Non-AMEDD project managers are required to have a minimum of 12-years of acquisition experience. Although those who would reform the acquisition system feel that logistics duty in troop units should not apply to the 12-year requirement, credit is given. In the case of the AMEDD few personnel currently serving in a key acquisition position meet education and experience requirements that the Army requires for non-AMEDD projects. Even the senior logisticians among those individuals have a preponderance of time at the retail rather than wholesale level of acquisition management.

SUMMARY

We believe four factors correlate highly with AMEDD acquisition system performance: (a) the role of the user – the combat developer – and the materiel developer in defining requirements and making tradeoff decisions throughout the acquisition process, (b) the simplicity and decisiveness of the acquisition organization, (c) the quantity of the materiel acquired, and (d) the quality of acquisition planning. We also believe the personnel throughout the AMEDD acquisition process must understand the medical mission and the influence of its dual nature – TDA and TOE components – in order to be responsive. Those who generate requirements must also appreciate the capabilities of the acquisition process in order to make valid trade-offs. It is from those trade-offs that clarity of requirements can occur earlier in the acquisition process. In the next chapter we examine the nature of requirements further and the areas where the potential for trade-offs exist.

CHAPTER 4

THE NATURE OF REQUIREMENTS

In Chapter 4, we examine the nature of requirements and the trade-offs and other influences that bear on them, particularly as they apply to medical material acquisition. To distinguish between a valid requirement and an unrealistic and/or unstable requirement, one must appreciate the fundamental considerations that went into the requirement's initial development. Without that appreciation, the evaluation of methodologies used to identify requirements is difficult. The acquisition system and the strategy developed for successful acquisition exist in a realm of trade-offs.

REQUIREMENTS, DEFICIENCIES, AND NEEDS

Some analysts of the acquisition process suggest that meeting a requirement means getting the right materiel to the right place at the right time. Those who monitor the implementation of the Defense Reorganization Act recommended by the Packard Commission and directed by the subsequent Goldwater-Nichols legislation suggest that this definition is too simple. They also believe that the word "requirements" introduces an inflexibility into the acquisition system because it implies — to take the concept to an extreme — that it would be better for an item to cost 10 times as much than to have it fall short of a single specification by 1 percent. Advocates of the term "requirements" feel that the process for identifying the requirement is sufficiently rigorous to support the contention that the right item is the right item and only the right item will do regardless of cost. Those who challenge using "requirements" believe that trade-offs between cost and performance and among different aspects of performance (including the time necessary to develop the new item and deliver it to the field) must be considered in meeting any military need or filling any deficiency. In fact, they prefer — and we concur with that preference — to use the terms "need" and "deficiency" over requirements.[12]

The term "requirements" must be used with care in medical materiel acquisition. Otherwise it can have (and has had) the undesired effect of increasing per unit acquisition costs. An arrogant or autocratic attitude or an unjustifiable or

unrealistic statement of requirements does little for effective communication among members of the acquisition team. However, for the sake of readability, we have used the terms "need," "deficiency", and "requirements" interchangeably. We intend no loss of flexibility in the acquisition system with that usage. We found a similar interchangeable interpretation broadly in use. Those involved in, or close to, contracting efforts were most sensitive to the need for negotiating flexible requirements. Occasionally, mostly at lower organizational levels, we noted a less flexible use of the term "requirements."

The authors of both the Packard Commission report and the Goldwater-Nichols legislation recognized that requirements have pervasive effects on the acquisition of weapons, on military strategy, on force planning and budgeting, and on military operations. The requirements are, in turn, affected by those activities. They concluded — and again we concur — that the current procedures through which requirements are established can be improved.

Just as with weapon systems, medical materiel requirements strongly affect the acquisition system and the health care support provided. We believe the methodologies used to establish medical equipment requirements can be improved. However, before we discuss the specific procedures used by the AMEDD to identify requirements, we elaborate on those requirements by examining some of the trade-offs and other influences that bear on them.

TRADE-OFFS AND INFLUENCES

The primary requirement document used in the acquisition system is called a Required Operational Capability (ROC). The Army defines it as a document that concisely states the minimum essential operational, technical, logistic, and cost information necessary to initiate full-scale development or procurement of an item or system. That definition, by its formality, tends to discourage discussion, compromise, and, possibly, improvement. The exhaustive coordination needed to make even a small change in a ROC, makes it easy to see why flexible, responsive acquisition is not enhanced by such a definition. Extensive coordination, in even minor cases, is frequently necessitated by excessively detailed or unsupported definitions of requirements, a need for extreme control, or the lack of trust among members of the acquisition team. Failure to coordinate can lead to finger-pointing when attempting to account for and control time or dollars expended.

Such behavior cannot be justified and should not be accepted. It arises from differing or parochial views of the acquisition objectives, it leads to program instability, and it degrades acquisition process performance. Many events associated with the requirement, e.g., production and use, will occur in the future. Neither the minimum requirements nor the essential ones can be known with certainty until much more is known of those future events. If facts or circumstances change, the minimal requirements may have to be redefined or adjusted. Changes in threat, projected workload, and/or technology are known to be highly volatile – sometimes for political or budgetary purposes. That volatility is, in turn, known to cause instability and changes in acquisition program funding or, more likely in the medical case, in materiel requirements.

On the other hand, if change is controlled, progress can be achieved toward delivery of needed materiel. An argument sometimes used to support state-of-the-art changes is that delivery of a system should be planned so that it is ready when the threat or workload that necessitated it materializes. The argument against that approach holds that if a system is intended to increase operational effectiveness or reduce costs, early fielding increases the return and is more important than marginal improvements. In any case, the planned fielding time should be explicitly stated, justified, and used to control acquisition system planning and execution. All acquisition team members should recognize the requirement as a statement of an intent or plan to accomplish a mission beyond current capability. Acquisition managers should view the requirement as a forecast – a capability that will be available in the future provided all necessary decisions are identified and made. High management levels should control any changes. A requirement should be changed only after the top manager has been convinced to do so by the trade-off analysis supporting the change. To do otherwise, especially repeatedly, suggests a lack of commitment to acquisition and a permissiveness associated with program delay.

While a fixed delivery date is necessary for project management control, unrealistic adherence to a delivery date can cause members of the acquisition team to perform in ways that the project manager and senior leaders should not support. Acquisition management experience is essential in differentiating legitimate delay from that which can and should be overcome.

Although acquisition managers cannot catalog and discuss every decision that may have to be made in a given acquisition project, they should be aware of critical factors that affect key acquisition decisions. We have identified those factors and discuss them in the following subsections. We discuss those factors separately as they relate to the performance of the acquisition system but they frequently relate to one another and to the decision-making process in diabolical combinations.

Mission

We discussed the influence of the mission on requirements in detail in Chapter 1. We indicated there that the TDA and TOE missions suggest different standards of care, and that, in turn, suggests the need or lack of one for selected items of equipment. The computer-assisted tomography (CAT) scanner is an example. Five years ago, for practical reasons, the Army did not assign a TOE Mobile Army Surgical Hospital (MASH) a mission capability requiring a CAT scanner although that equipment was available in many TDA facilities. The mission of the MASH, as its name indicates, requires it to be highly mobile. It needs to keep up with the movement of the troops it supports, and its mobility would have been severely limited if equipped with a CAT scanner of the size, weight, and support requirements available and in use in the TDA facilities at the time. The discussion at that time clearly involved a trade-off between mobility needed for mission performance and the capability to provide a given standard of care. Fortunately, at this time, advances in diagnostic imaging technology, the materials used in construction or shielding, and the means of storing and transporting may eliminate the need for that trade-off and permit a peacetime level of care to be available in the MASH without compromising its design level of mobility.

We have described the health care mission as being performed in a continuum from the forward line of troops to the CONUS treatment facility. Materiel used in that mission should be usable for the entire length of the continuum if possible. Ideally, no trade-offs are necessary. Many medical supplies and equipment fall in this category. Those products are predominantly commercial items used in peacetime hospitals and equally usable on the battlefield. Clearly, the Army should acquire those NDIs. In those cases, the product defines the requirement. In other cases, commercial products may require changes in packaging or other adjustments to provide the desired capability and contribute to mission performance. Acquisition

decisions are also easy in those cases if a number of suppliers exist who are willing to accommodate such changes.

In some few cases, however, trade-offs with mission capabilities, may be necessary across the broad range of possible missions; the CAT scanner cited earlier is such an example. Some trade-offs affect TOE design and unit capabilities as well as materiel requirements and the acquisition process. Some trade-offs may require decisions involving extremely complex, difficult to measure, and "mushy," "cloudy," or "delicate" issues. To enhance understanding and facilitate decision making, those issues should be objectively quantified wherever possible. The effects of alternative trade-offs on unit capability should be assessed in making these most difficult trade-off decisions.

The difficulty of these decisions is exacerbated because the views of various users (combat developers) differ as do the opinions of those who would supply the user (materiel developers). Those various points of view must be reconciled, but reconciliation does not mean capitulation to a dominant party. Rather, it means that both parties must agree to trade-offs so that each satisfies some constraint without affecting the fielding date of the materiel. Complete consensus is not necessary before initiating acquisition. It is simply necessary that all members of the acquisition team and their leaders (and any experts who support them) clearly understand the requirement and the acquisition strategy intended to meet it. They all do not have to agree with it. They (or the process) must, however, be able to subordinate differing viewpoints at critical junctures if stability of the requirement, and therefore reasonable acquisition process performance, is to be expected.

Furthermore, the trade-off decision and the reasoning behind it should be widely disseminated. In fact, the trade-off rationale should be a training topic for those who will likely use the equipment when it is fielded. The trade-off has influenced the capability of their unit and represents a limitation that they should understand. Such understanding may prevent complaints, improve understanding, and enhance operations. In the requirements identification and approval system, these trade-offs must be pointed out explicitly, formally quantified and assessed, published as a decision, and reflected in training as a known limit in the TOE unit's capability.

The discussion on mission trade-offs relates to all units of a specific design/TOE. Unit-unique trade-offs are usually resolved in the operations plans of the specific unit. The mission is closely related to threat and workload as well as operational environments. These influences on requirements are discussed in the following subsections.

Threat/Workload

The military threat imposed by a potential enemy has a significant effect on the medical materiel requirements. If, for example, that threat was chemical or biological weapons, the Army would need many of the pharmaceutical and biological products currently being developed in the medical acquisition process. If defensive means such as protective clothing, body armor, or avoidance cannot effectively defend against such weapons, medical treatment of the patients likely to result will be necessary. This example is consistent with the definition of the medical threat as the events that could cause casualties.

Preventing casualties has two obvious benefits – the soldier remains available to perform the mission and requirements for medical care are reduced. The threat, then, calls for a preventive medicine workload as well as a patient care workload. The AMEDD can meet such a workload only if it has materiel of sufficient capacity, capability, and design. Systems analysis and industrial engineering techniques can be used to identify some of the requirements necessary to process or treat the projected number of threat-induced casualties. Casualty rates and patient treatment simulations such as the task, time, treater system used by the AHS can aid in developing workload data with which to size various equipment capacities.

Thus, we see that the threat of enemy weapons and the associated preventive medicine and casualty workload influence medical materiel requirements. Through these requirements they also influence the medical acquisition system and the design and size of the medical force. Since the sources of requirements are present throughout the entire medical system, the acquisition process must recognize critical interfaces and their implications for resources.

Operational Environment

The specific nature of an equipment requirement depends to a great degree on where the equipment is to be used. For example, equipment to be used in far-forward

sectors of the combat zone requiring off-road transportation could require protective containers or packaging. The requirements document identifies that possibility and results in the procurement contract specifying that the equipment item, when packed, withstand drop and other rough-handling tests described in military standards. Similarly, specifications might include hardening against chemical agents, decontaminants, and electromagnetic pulse and protection from heat, cold, salt air, dust, fungus, and other elements of the operational environment.

Since most medical equipment is commercial and designed for use in civilian health care facilities, it may fail to meet these rough-handling, hardening, and environmental protection specifications. Those factors were simply not considered in its commercial design and appropriately so. Items meeting such specifications are often not available on the commercial market, and if a manufacturer is found, the costs to purchase such military-unique items are unaffordable or extremely high. Recognizing these consequences provides a different perspective on operational environment type requirements. For example, is the benefit to be gained worth the increased cost associated with the rough-handling specifications? Would it be better to purchase a larger quantity of commercial items and use the extra ones as "loaners" while damaged ones are repaired? Exactly what benefit is to be gained, less damage in transit? How much less? Are there cheaper ways to avoid or repair the damage? Can organizational concepts and employment concepts be changed to avoid the need for hardening?

Some feel that asking such questions indicates a reluctance to make the AMEDD a part of the field Army. Many suggest that "if you've been there" you know what the benefit is, what it is worth, and even challenge the need to justify or answer such questions. Frustration and annoyance are likely to be in evidence and strongly expressed when questions about operational environment requirements are raised.

Of relevance is that the operational environment in which a product is to be used has considerable influence on acquisition costs, availability (and hence delivery time), supportability, and overall acquisition process performance. With price and delivery as acquisition process objectives, cost and benefit studies are necessary. The time required to complete a study for needed acquisition data causes a corresponding slip in the delivery date. Expressions of frustration with the need to address these

kinds of issues are diametrically opposed to expressions of frustration with acquisition process performance.

Strategy

Many of the acquisition reform readings listed in the bibliography suggest that the most important and the least understood means for improving the acquisition system performance is development of an acquisition strategy. Strategy is the science of planning and conducting large-scale operations, and the AMEDD acquisition process is a large-scale operation. We believe strategic AMEDD decisions are important to the medical acquisition process.

A possible AMEDD strategy for controlling the performance of the medical acquisition process is one that causes each management level to sequentially consider cost/benefit relationships (effectiveness), balance (optimizes) high-quality peacetime health-care operations against the preparation and readiness for wartime operations, and provide technology advances for the peacetime mission and continuous modernization of wartime capabilities. An alternative strategy is one that focuses decisions at tiers or levels:

- The high-order decisions are those concerned with balancing resources between expanding peacetime capabilities for technological advantage and modernizing wartime capabilities.
- The mid-order decisions are those concerned with balancing the type of units in the medical force – TDA and TOE – for the maximum health care capability.
- The low-order decisions are those concerned with balancing solutions to capability deficiencies within the existing configuration of a unit or group of units.

Key management concepts in both strategies are that the acquisition process is expected to produce results; a manager makes the decisions; and the process does not change direction, reallocate resources, or adjust from time targets without the manager's approval. In the case of the tier strategy, the top manager's decision is made after hearing the impact of the proposed change on the tiers above and below the one directly affected.

A typical issue related to an acquisition strategy might be how to allocate dollar and manpower resources (or, at least, how to program them in a balanced fashion) to

each of four major parts — current peacetime capability, forecast wartime capability, technology advance, and modernization. How this allocation is done reflects an investment strategy, an implied determination of priorities, and a capital budgeting process. For example, in the past several years restrictions were imposed on filling prescriptions at TDA hospital pharmacies; those restrictions were publicized in ways unfavorable to the AMEDD's image. At the same time, in other AMEDD appropriation accounts, under pressure to achieve high obligation rates to preserve future budget levels, AMEDD was procuring unnecessary or lower priority materiel or services. Subsequently, fund reprogramming eased the restrictions on prescriptions, but the damage was done, the unfavorable publicity had occurred, and the soldier's confidence in the peacetime health care system was shaken.

Another acquisition issue requiring a strategic plan is the determination of the number of medical units/hospitals in the force structure that should be equipped. All TOE hospital units of the wartime health care system are in the process of being equipped to improve readiness. The DEPMEDS program to equip these TOE hospitals is estimated to cost \$2 billion.¹ The Medical Care Support Equipment (MEDCASE) program, which purchases medical capital investment items for TDA facilities, is forecast at an average of \$60 million per year for the period 1988 to 1992.² We could find no analysis to determine whether these programs purchased a cost-effective mix of materiel.

In developing a strategic plan, those programs should be analyzed to assess cost-effectiveness and to determine the effectiveness of the strategy of purchasing and pre-positioning a large amount of equipment (an entire force structure's worth) that is subject to technological obsolescence. The analysis, based on known or estimated procurement and production leadtimes, might indicate that AMEDD should fully equip only those hospitals that would be needed sooner than emergency procurement leadtimes could support. Funds not used could be spent for higher priority needs or for measures that would enhance production and reduce leadtimes. Such measures would improve management flexibility to respond to alternative requirements for resources. Buying fewer hospitals based on a strategy of quick-response procurement

¹Cost includes medical materiel sets, medical associated support items of equipment, other support equipment, and related fielding expenses.

²Program planning data provided by LTC Larry E. Primeaux, Logistics Division, Office of the Surgeon General

clearly affects the acquisition process and its performance. Similar strategic choices appear to exist in AMEDD R&D and O&M accounts.

Availability

Our discussion of the effect of operational environment influences on design requirements mentions availability as an acquisition process issue. An item that meets all known specifications but that will not be available for several years is often bypassed in favor of an immediately obtained, simpler item. The simpler item then is substituted for the sophisticated item, in whole or in part, to provide at least some capability. In such circumstances questions about minimum essential needs arise and require a thoughtful answer. The familiar allegation that requirements are "gold-plated" is not an adequate response or rationale. The real issue is capability. The saying about "the best being the enemy of good enough" is appropriate but misleading. In such cases, "good enough" represents a capability level greater than that currently on hand but with the realization that a part of the requirement is yet unmet. Availability influences requirements and vice-versa and must be considered when formulating an acquisition strategy. It is perhaps the key issue in the decision to develop an item or use an NDI. Available, commercial items or combinations of available, commercial items that provide improved but not full capabilities should not be discounted out of hand and, according to Army policy, are to be preferred over all other acquisition alternatives other than improvement of products currently on hand.

Time

Time and availability are closely related. The need to have a capability quickly indicates an urgent requirement and can drastically limit acquisition alternatives. Failure to accept the acquisition consequences of urgent, high-priority requirements is unreasonable and risks incurring unnecessary costs. While the process, ideally, should produce a highly acceptable product in a reasonably short time, it does not do so with regularity or without many hours of hard work. The process has numerous checks and balances that serve to avoid fraud, waste, and abuse but do little to cause quicker materiel delivery. On the other hand, allowing too much time for an acquisition effort leads to invocation of Parkinson's law — work expands to fill the time available. Specifying realistic but challenging delivery dates is essential to effective acquisition system management and performance.

Another consideration involving time is the age of equipment on hand. That measure indicates the degree that innovation has been adopted and incorporated into AMEDD units. Thus, it influences acquisition workload. To increase innovation, industry sets goals for the sales generated by products introduced in the past few years. For example, 3M requires its divisions to generate 25 percent of their sales from products introduced within the past 5 years, and Hewlett-Packard measures revenue by age of its products. Those kinds of goals force innovation. A similar measure in the AMEDD – the average age of a type of equipment – can be used to influence the acquisition process by indicating items that may have to be replaced and the amount of money needed to maintain a reasonably innovative inventory of equipment. The average age of medical equipment on the property books of TDA units is considered when programming or defending MEDCASE resources. Adoption of a similar goal for TOE line items and components of its sets, kits, and outfits could support a continuous modernization effort.

Affordability

To determine the affordability of an item, the AMEDD needs accurate cost estimates, effective financial management, and a stable equipping strategy. Under the present accounting system, the AMEDD is unable to routinely determine whether an item proposed for acquisition is affordable. The answer to the question, "Can we afford it?" is usually, "It depends." What affordability depends on is the quantity to be purchased, the unit price or prices at which it will be purchased, the time over which it will be purchased, the type of funds or "color of the monies" needed, other known demands for the available funds over the same horizon, the relative priority of those demands, and the amount of funds available over the same time. The amount of funds available includes those from deobligations associated with an inability to procure items previously ordered, those reserved for adjustments by financial managers, and any that may become available from reprogramming action. The AMEDD is not capable of conveniently determining the answers to the numerous "what if" questions presented by a financial situation that is dependent on numerous assumptions and/or definitions. At best affordability determinations are extremely rough estimates, usually made on a scratch pad using many unstated assumptions that can, and frequently do, change. An item that is not affordable in a specified quantity and configuration, while it may be cataloged as a requirement (but not approved) just in case the resource picture changes, is not apt to be one for which

procurement contracts are awarded. Affordability, then, clearly influences the time it takes for requirements to become deliverable medical materiel.

Manpower

Medical manpower, a resource perhaps more scarce than dollars, influences requirements in several ways. It is needed to operate and maintain the delivered equipment; it influences equipment design and defines the man-machine interface; and it can limit equipment capabilities and increase their costs by adding requirements for features to assure safety and avoidance of health hazards. Obviously, life-cycle costs of the equipment are increased if more or differently trained operator and maintenance personnel are required. In this way manpower affects equipment affordability.

Availability of acquisition manpower can also influence requirements. In most cases increased manpower can be made available provided a high enough priority is assigned. However, increased numbers of untrained personnel to work an acquisition program is unlikely to improve performance of the process. Adequate numbers of skilled persons can achieve scheduled delivery dates.

The experience and training of available acquisition personnel is a major issue. Those who analyze the system are unanimous in their opinions that improving the quality of acquisition personnel is the single most important step to improved acquisition management and performance. Although technical skills as well as operational or user experience are necessary for effective acquisition project management, business skills and project management experience equivalent to that available to successful contractors are the highest priority need. Most analysts feel that the needed skills and experience are only obtained through the establishment of a separate acquisition management career path that avoids the loss of continuity associated with rotational assignments of military personnel.

Degree of Standardization

The degree of standardization in medical equipment is an issue very much like that of the dual mission that results in two health care systems, one characterized by TDA hospitals and the other by TOE hospitals. As stated earlier, TDA hospitals have the flexibility to be equipped and staffed specifically for a particular mission and circumstances. TOE hospitals, on the other hand, although they can be modified, are

not as flexible. They are equipped and staffed for doctrinal, notional, normal, or planned missions anywhere in the world using standard products whose quality is by definition average but acceptable. History suggests that because of their design for such missions, medical technology advances occurring faster than the equipping process, and a desire to perform in a better than average manner, TOE hospitals begin to requisition up-to-date equipment that is typically nonstandard. This requisitioning occurs almost immediately upon arrival in a theater of operations as their workload becomes more clearly defined and patients arrive. The re-equipping of hospitals deploying to Vietnam began en masse and continued as their staffs and consultants changed or out-of-country specialists made liaison visits. A similar situation occurs in peacetime with TOE hospitals such as the one deployed to Honduras in support of a special training mission or any of the several sent on disaster relief missions over the past years. In essence, a TOE hospital and even smaller medical units deployed and performing a medical care mission begin to take on the appearance, behavior, and design of its TDA unit counterpart as the patient workload is received. This phenomenon is graphically portrayed in Figure 4-1.

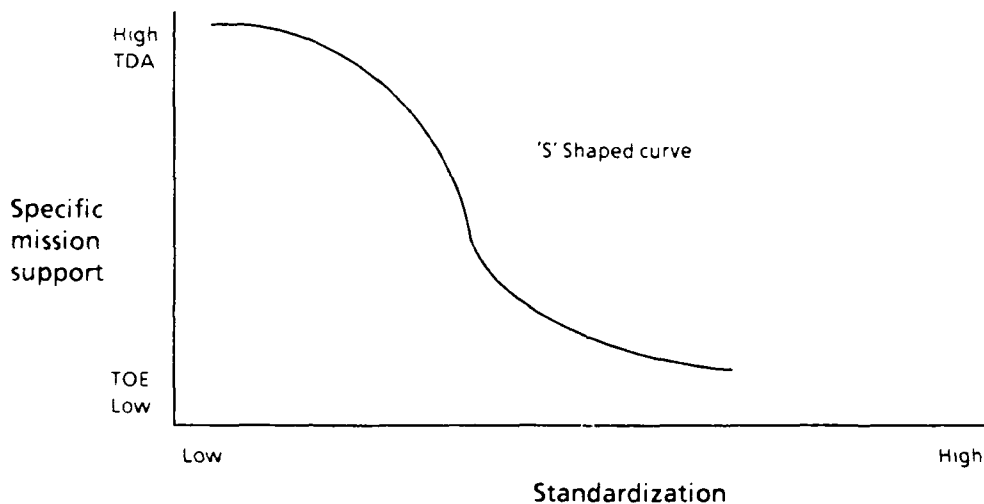


FIG. 4-1. SPECIFIC MISSION SUPPORT AND STANDARDIZATION

The AMEDD has attempted to standardize TOE unit supplies and equipment, including medical materiel throughout the Army. Furthermore, DEPMEDS is a program to standardize deployable hospitals throughout the DoD. One stated purpose is to provide an adequate but austere capability in the combat zone. To

deviate from the standardized DEPMEDS modules, a military service must obtain approval from the office of the Assistant Secretary of Defense for Health Affairs.

The DEPMEDS standardization is executed through a series of committees who meet under the auspices of the Defense Medical Standardization Board (DMSB). Those committees review and make recommendations or direct changes to the components of DEPMEDS equipment sets. That kind of activity has the effect of combat development. In discussing the mission and operational environment, we suggested that numerous, interrelated trade-offs can and do exist in TOE design. The need for these trade-offs to be made in two different forums [the Army modernization and TOE design forum and the DMSB/Clinical Review Group (CRG) forum] may be redundant and may weaken AMEDD management responsibility and accountability for the configuration of its TOE deployable hospitals. Among the questions that arise to address this issue are the following:

- Should AMEDD managers be accountable for decisions made by vote of the CRG?
- Who is the Army representative to the CRG?
- What are his/her acquisition credentials?
- What coordination between the CRG and the Combat Developer is required in order to formulate a staffed and coordinated Army position for the CRG?

Our research gave us answers to these questions. The answers indicate the two different forums do not support effective acquisition management. We believe that making difficult and delicate trade-off decisions for purposes of unit design carries an associated responsibility to "explain and train," and the CRG forum does not do so. Further the Army CRG representative usually is not equipped to perform his/her function in a fully coordinated manner. We also believe that the process developed to ensure standardization of field hospitals throughout the DoD could represent a false economy. Because of the numerous difficult trade-offs involved and the relative lack of accountability of the CRG, hard trade-off decisions have, in the aggregate, unknowingly been avoided. One of the CRG's main purposes in standardization is to produce DEPMEDS units that are adequate and austere. The CRG may, in fact, have missed that purpose for its existence.

Standardization, then, is a concept with both long- and short-term costs. In the short term, standardization can save money by increasing acquisition quantities and

permitting longer production runs and lower per unit costs. If, however, the standardized item does not meet the clinician's needs and will have to be replaced by a different item as the medical workload arrives, any short-term savings represents false economy and waste in the longer term. Standardization should be evaluated on a cost-effectiveness, user-acceptability basis and pursued in purchasing a force structure's worth of equipment when the assessment produces a favorable result.

Understanding of Support

Better knowledge of how support works leads to the establishment of realistic requirements. That knowledge manifests itself in such areas as reliability, availability, and maintainability. Those kinds of requirements are closely related to the ones described in our discussion of the operational environment. However, understanding how support works requires more of an understanding of how the process works. Knowing how the process works facilitates effective force development and modernization.

The 1980-1982 Department of the Army (DA) Inspector General (IG) report on modernization indicated a widespread lack of knowledge in how the Army runs and that lack of knowledge led to deficiencies in force development. Force development is "the process of determining Army materiel, organizational, and doctrinal requirements, and translating them into programs and structure within allocated resources to accomplish assigned missions and functions." It has input from the Concepts Based Requirements System, and includes the establishment of requirements priorities (within the AMEDD and Army-wide but not necessarily DoD wide) and the application of resources to requirements. It results in an integrated plan that manages change within the Army. That plan is called force integration.

Force integration is the "systematic management of change which includes the introduction, incorporation, and sustainment of doctrine, new organization, and/or equipment into the current force without reducing readiness." Force integration requires a focus on units, not equipment, in introducing structure, equipment, and doctrine. It includes responsibilities to coordinate changes in units, review acquisition and fielding of materiel, update the force accounting system (FAS) and the structure and composition system (SACS), provide the Army Authorization Documentation System (TAADS) guidance to major commands, coordinate approval of TOEs and ensure that TAADS and FAS agree. The TAADS and FAS are further

integrated with other automated systems that among other things support war gaming and operational planning and support equipment inventory management and distribution within the Army.

An understanding of support also requires a basic understanding of how supply and maintenance support is requested and provided, especially in the environment in which the proposed medical materiel will be used. Failure to appreciate such an environment may violate the principle of responsiveness to user needs. Finally, a basic appreciation of the procurement function and its socio-economic aspects is also needed if an effective sense of balance and realism is to be achieved when developing acquisition strategies and plans and setting acquisition process delivery dates.

Force development and integration is the way the Army runs its modernization programs. Those concepts represent essential actions that must be accomplished in order to field equipment. Knowing the steps to fielding is bound to facilitate timely delivery while not knowing them is likely to cause confusion and delay. That does not mean that each and every detail must be accomplished in its fullest sense; tailoring of the process is encouraged.

Force development and integration recognize that modernization is complex. Management of that complexity has given rise to the "living TOE" process. A living TOE is a series of documents consisting of a base TOE, intermediate TOEs including one or more incremental change packages (a grouping of personnel and equipment changes that is applied to a base or intermediate TOE) and an objective TOE. That series of documents portrays a unit's modernization transition steps toward the fully modernized objective design capability (documented in the objective TOE) in an incremental fashion.

SUMMARY

In this chapter we explore trade-offs and other influences on AMEDD materiel requirements. We review the effects of mission, threat and workload, operational environment, strategy, availability, time, affordability, manpower, degree of standardization, and understanding of support. Other influences exist but are of less concern. All are variables in the acquisition process and all are interrelated, coming into play in varying degrees for each equipment requirement. The set of functions that defines the AMEDD process of acquisition is extraordinarily complex. It requires extraordinary management experience and leadership to effectively execute.

Having presented the insight into what influences a requirement, we now turn to an examination of the procedures for identifying the requirements, needs, or deficiencies and consider concurrently the trade-offs, influences, and decisions, implied or explicit, discussed above.

CHAPTER 5

IDENTIFICATION OF REQUIREMENTS

Our discussion thus far has examined the relationship between a requirement and its context – the things it influences and the things that influence it. They can never be completely separated. To do so renders any preparatory, in-process or after-the-fact review less than comprehensive and likely to lead to incorrect conclusions.

Even as a shortfall in combat capability is being recognized, it begins to be modified and shaped by changes in the how-to-fight concept, acquisition process performance, the dynamics of the influences, and the differing views of acquisition team members and the expert advisors.

The AMEDD uses several procedures and methodologies to identify requirements in its how-to-support concept. Although unconstrained in their initial development, those requirements are subjected to forces for change almost immediately and continuously throughout their life.

In this chapter, we look at four procedures and methodologies used by AMEDD to identify medical materiel requirements: (1) the Concepts Based Requirements System (CBRS), (2) technology push, (3) consultant input, and (4) user pull. We discuss what each is, how it works, and how well it supports the medical materiel acquisition process.

CONCEPTS BASED REQUIREMENTS SYSTEM

Toward the end of Chapter 4 we discussed the need for understanding how support works and the processes of force development, force integration, and resource allocation because of the way they influence requirements. That discussion suggests that only a comprehensive approach will produce equipment that meshes with force structure, training, and doctrine. In addition to comprehensiveness of approach, a close partnership between the combat developer, materiel developer, and resource programmer is also needed to sow the right technological seeds for the future and still

shorten the time required to field equipment. CBRS is intended to provide this comprehensiveness and forge the necessary partnerships.

CBRS is an evolutionary system that helps the Army prepare for war and plan for the future. It considers the current and future environments, national objectives, Army missions, worldwide threat, technological forecasts, and historical experience; it is used to identify and set priorities for Army warfighting requirements for doctrine, training, leadership development, organizations, and materiel; it supports programming and provides an approach to improving Army capabilities; it strives for a balance among readiness, modernization, sustainability, and force design; it is supposed to focus research and development and drive fielding of materiel; and consists of both continuous and cyclic events that support timely fielding of products such as doctrinal publications, training literature and materials, organizational designs (TOEs), and materiel including weapon systems and support systems. In February 1989, the Army circulated for staffing and comment a draft regulation modernizing CBRS.

CBRS is used by the Army's principal combat developer, TRADOC, to perform its mission. TRADOC receives input to CBRS from branch proponents and integrating centers. The AHS is the proponent for the AMEDD, and the Logistics Center integrates medical issues and solution sets with those from other combat service support (CSS) elements such as transportation and maintenance. The AHS is responsible for developing medical operational concepts to support operational and organizational plans; projecting the medical threat; conducting AMEDD planning and analyses; identifying capability issues and categorizing them into their doctrinal, training, leadership development, organizational, and materiel domains; proposing sets of solutions to these issues; developing requirements documents; and ensuring continuous coordination with the medical materiel developer throughout the process. The integrating center analyzes competing alternatives, identifies and makes trade-offs, and develops Battlefield Functional Mission Area (BFMA) modernization plans. TRADOC headquarters then integrates the BFMA modernization plans (eight such plans exist, including CSS) into an Army Modernization Memorandum (AMM) that is submitted to DA for use in the Planning, Programming, Budgeting and Execution System (PPBES) and long-term research development and acquisition planning. In this way, CBRS provides an integrated and comprehensive strategy for the cost-effective application and investment of

resources that should result in the Army of the future having the necessary capabilities to accomplish its mission.

Having gained an insight into CBRS, we now consider how the AHS develops its inputs to the integrating center and TRADOC. Our discussion addresses CBRS as currently implemented but attempts to anticipate what it will be like when it is modernized.

Concept Analysis

Preventive medicine, first aid, patient evacuation, and patient hospitalization are some of the medical capabilities needed to provide the continuum of care necessary to accomplish the AMEDD mission. The ability of current and future medical forces to perform these and other missions under varying conditions is the subject of continuous analysis and planning by the AHS. The analyses and planning are developed to improve mission performance in one of three ways: (1) by identifying a better (more efficient and/or more effective) concept of operations or method of performing the mission; (2) by identifying and eliminating deficiencies in the design and operation of the units currently performing the mission, in the training and development of their people and leaders, and/or in the capabilities of their equipment; and (3) any combination of the above.

TRADOC, the Logistics Center, and OTSG provide guidance to AHS in its planning and analysis. That guidance includes warfighting concepts such as Air Land Battle, Future. With an insight into these warfighting concepts, CSS branches and proponents can develop concepts of how to support the warfighting effort. Development of the medical support concept can lead to entirely new approaches to mission accomplishment or to simple revisions or incremental improvements to existing concepts of support. Planning and analysis is key to the development of support concepts and strategies to modernize the medical force.

The planning and analysis procedure involves separating mission performance into essential tasks. The tasks are first identified broadly, similar to those in an Army Training and Evaluation Plan (ARTEP). Those tasks include, for example, receiving patients or performing vehicle maintenance. Tasks are then subdivided to encompass the requirements for operating in any number of possible environments; for example, nuclear, biological, or chemical (NBC). The Directorate of Combat

Developments (DCD), AHS – the combat developer – then assesses the ability to perform these tasks under conditions expected to be encountered.

Capability Analysis

The DCD assessment is conducted by comparing the unit's ability to perform identified tasks and subtasks with predefined measures of effectiveness. If the unit's performance falls short, the combat developer has identified a deficiency or capability issue. Solutions and solution sets that correct identified deficiencies are then developed. Any constraints that limit possible solutions are also identified and analyzed. Constraints may include funding limitations, numbers and skill levels of personnel, time available to meet the threat/workload, or the absence of essential technology and/or equipment. These constraints involve many of the trade-offs and influences discussed in Chapter 4.

In the case of missing technology and equipment, the materiel developer plays an important role by identifying technological limitations and opportunities. The combat developer decides whether to accept some or all of the identified constraints and attempt to overcome them or to accept an alternative technology or capability.

The acceptance of or elimination of constraints, where feasible, begins to set the stage for identifying solutions that meet the new concept or reduce deficiencies. Changes in organization, doctrine, training, identification of a materiel requirement, or combinations of any of these changes comprise the possible solutions. Solutions involving more than one domain are referred to as solution sets. If the solutions or solution sets are determined to require materiel, an Operational and Organizational (O&O) plan is prepared, staffed, and approved.

Managing Solutions

As specified by the acquisition life cycle systems management model, an O&O plan is approved prior to a milestone zero decision and authorizes concept exploration activities to begin. Included in the concept exploration activities are market investigations and the development of an acquisition strategy. From the concept exploration activities the IPR members decide whether to pursue an NDI or a development acquisition strategy (or some innovative or competitive combination of the two frequently supported by testing of prototypes). In either case, a procurement

description of the materiel requirement eventually is prepared and the contracting procedure begins.

The contracting effort frequently includes requests for waivers to, or deviation from, the procurement description. Typically, requests for waiver or deviation are due to differences involving the trade-offs and influences discussed in Chapter 4. The requests provide feedback and a commercial perspective on those issues. Contract deliveries are ultimately made, and the materiel is fielded in accordance with agreements reached between the fielding and the gaining commands. Feedback to all members of the acquisition team throughout the contracting and fielding process is essential to improved future acquisition efforts. Contracting and fielding provide two key, real-world, tests of the acquisition planning up to this point — the market place test and the receiving unit test. The final phases of the acquisition process sustain the equipment in operational use and begin the process of planning for its replacement (using CBRS or its alternates), redistribution, and ultimate disposal.

Solutions to deficiencies or capability issues generally have a cost whether the solution is purely materiel or not. For example, changes in organization could require more people, and those people must be paid; a training solution might require new or different training aids; and doctrine changes need to be published increasing printing costs. Many solutions and solution sets that correct many deficiencies stem from branch/proponent planning and analysis, and each solutions and solution sets have a cost.

In most cases, the cost of all the solutions and solution sets on the list exceeds the funding available, usually by dramatic amounts. The scarcity of funds relative to the demand for them necessitates that each of the solutions and solution sets be assigned a priority. High-priority solutions have earlier claims on limited resources than lower priority ones. The Mission Area Materiel Plan (MAMP) is used to assign priorities within the AMEDD; however, it has only recently begun to approach the issue of affordability, a key determinant in assigning priority.

The AHS submits the AMEDD list of solutions and their priorities to the integrating center where they compete for priority with similar lists of solutions from other proponents in the Army. Once the priorities have been established and approved at TRADOC, they become part of the AMM. Those priorities can be used when building the Army Program Objective Memorandum (POM) and developing

and executing Army budgets. Integrating center and TRADOC priorities are important in the competition for limited resources. In a zero sum budget competition, the higher priority solution is selected over lower priority ones. This method of setting priorities is relatively new. The AMEDD should closely monitor its input to the process by closely coordinating the efforts of its combat developer, materiel developer, and resource programmers to effectively state its resource needs and compete with the myriad other requirements.

Conclusion

We believe that CBRS is *conceptually* an acceptable system. As designed, it is a capable framework for identifying the AMEDD's general requirements and to do so in an integrated way. As implemented, however, it is not finite enough for AMEDD purposes. It deals with relatively large tasks and gross measures of performance in identifying deficiencies that require major system solutions. As a result it cannot manage the necessary details that lay down definitive requirements. That inability is attributable to the lack of finely tuned measures of medical effectiveness, computer-aided analysis and system engineering tools, the integrated financial planning necessary to determine affordability, and adequate manpower both in terms of quantity and experience.

TECHNOLOGY PUSH

Technology push is a second method of identifying AMEDD materiel requirements. CBRS identifies deficiencies and then seeks solutions; technology push, on the other hand, matches solutions with heretofore unknown deficiencies. It is an opportunistic methodology that takes advantage of equipment, supplies, and new concepts of operation born of someone else's research, development, or discovery. It takes the proposed new item, starting at the end of the acquisition system, and works backward toward the beginning. It validates that the new item is needed and would have been "invented here" had the need been recognized earlier. The key management points regarding the technology push method of identifying materiel requirements are early evaluation, decisiveness, and feedback.

New technology has two sources: those inside the AMEDD, principally the MRDC, and those outside the AMEDD including other Services, industry, academic

institutions, and foreign sources both military and commercial. Sometimes, the source of new technology can be completely unrelated to medical endeavors.

The medical acquisition process needs to take advantage of the new technology it defines. MRDC research contributes new technology primarily in the areas of pharmaceuticals and biologicals. Materiel solutions to medical threats have included chemical decontamination kits and vaccines for immunization against diseases of military significance. With regard to new equipment, MRDC expends considerably less effort on the research of new technology than on locating and adapting technology developed elsewhere. MRDC performs research at in-house laboratories and contracts for other research.

Normally, basic research work at MRDC should be performed in response to requirements identified by CBRs. Recall that one purpose of CBRs is to focus and drive R&D efforts. However, MRDC research has historically included projects that were not driven by the combat developer but instead by the MRDC researchers themselves. MRDC initiates projects principally because its research staff has more in-depth technical knowledge than the combat developer. Additionally, the difference in capability provided by the new item is sometimes so significant that the researcher becomes, in effect, both the combat and materiel developer. In those situations the DCD, AHS, becomes a support organization for MRDC and ensures that the requirements documents are completed, staffed, and approved; the logistical aspects of the requirement are dealt with properly; and the necessary input is provided to TRADOC. This AHS-MRDC relationship is not unique. Similar relationships exist between AMC research elements and TRADOC combat developers. However, if not correctly understood, the relationship can become one of competition rather than cooperation and will ultimately lead to a communication breakdown and a lack of teamwork.

To enhance the relationship between the medical combat developer and the medical materiel developer, R&D efforts must be focused on AMEDD mission support and properly aligned in terms of priority and return on investment. The USAMMDA, an MRDC subordinate unit, was created to ensure an orderly transition of products from the laboratory to production. Just as in technology base research, USAMMDA conducts both in-house and contractor development efforts to fulfill its responsibilities. It simultaneously tries to match requirements with appropriate

technology and pull promising technology from the laboratories to take advantage of the opportunity by initiating requirements.

In a large number of cases, sources of new technology, particularly equipment, are found outside the AMEDD, mostly within the medical industry. Again, the Army Medical acquisition community is not unique in this regard. Army acquisition policy indicates that commercial products should be used whenever they meet the Army's needs. Market surveys and investigations are required before initiating any full-scale development because the medical industry offers the following:

- Its own version of new technology
- Some old technology in new packaging or with added features and refinements
- Two or more old technologies combined into a multicapability package or in a new application.

The challenge from the medical industry source is that the AMEDD be able to systematically identify and separate the new technology from new packaging or new features, determine in sufficient detail its potential value to the AMEDD, standardize it, and introduce it into the acquisition process and the supply system quickly. Experience shows that the TDA medical units frequently justify, purchase, and place the medical industry products into use before centralized TOE unit requirements identification and acquisition systems recognize the capability and start the process that ends in procurement and fielding.

The equipment in TDA medical facilities offers an insight into the medical equipment marketplace, but we found no effective and systematic procedures that aggressively locate technological opportunities in other Services, other industries, academic institutions, or foreign military and commercial sources and channel them into the TOE acquisition process. More common were the frequent unsolicited proposals recommending medical equipment products or medical practices with which the proposers were familiar but which they had not objectively (in accordance with Army acquisition standards) evaluated or tested. Many persons who we interviewed believe those proposals and recommendations are often nonproductive, not supportable, and a destabilizing influence on requirements for which the proposers are not accountable.

For example, in calculating the cost of a new technology, the project manager must consider more than its purchase price; he/she must also consider the costs of redistributing the old equipment (if it will continue in use) or disposing of it (if it is completely obsolete). To minimize total costs, AMEDD may have to carry both the new and old equipment in the operational inventory at the same time. Of course, those considerations are part of an overall modernization policy and a normal part of developing the acquisition strategy for a new requirement. Those who propose new items often fail to consider and document these and many other factors.

Inappropriate proposals, ones that are not immediately recognizable as nonproductive or nonsupportable, require investigation lest a good idea is lost. The more prestigious the person making the proposal, the greater the likelihood of a time-consuming evaluation. Any shortcuts in the evaluation or a negative response often causes the proposer to feel that the system is incapable of recognizing a good idea. In reality, the acquisition process has difficulty dealing with unexpected proposals, management information and workload.

New technologies and unsolicited proposals may not be appropriate or cost-effective. The acquisition process is a series of phases intended to ensure that only the best, most cost-effective equipment is acquired and that only minimum amounts of money are spent determining which items are best and most cost-effective. A substantial effort is needed to make such determinations. Unsolicited proposals impose a significant effort on acquisition managers in their attempt to determine the value of the item. That effort may disrupt a well reasoned work schedule and delay other high-priority work. Had the proposal entered the project management system at the appropriate place, it would enter the workload queue and subsequently be evaluated. If this is satisfactory to the proposer, such arrangements are made. In some case, however, it is the acquisition queue that the proposer is attempting to circumvent and so the system solution is unacceptable.

The DMSB has a procedure for soliciting new item presentations. Its process is somewhat passive and was originally developed to provide suppliers with a point of contact for the introduction of their medical wares. During that introduction, the suppliers are asked for cost and technical information that assists in the evaluation of products offered. That information also permits the DMSB to define products generically, thus defining the requirement. With the expanding role of the DMSB in the development and management of DEPMEDS medical equipment sets, that

procedure becomes a method for identifying requirements by reviewing new technology proposed for sale. In the procedure, the AMEDD evaluates proposals made by the DMSB in much the same manner as other proposals. However, should the AMEDD decide not to adopt and use the DMSB-proposed item, it must justify that decision. Thus, by making frequent proposals, DMSB can impose acquisition process workload on the medical materiel and combat developers and testers. Those DMSB proposals, just as those from Army personnel, can seriously disrupt existing priorities and workflow.

CONSULTANT INPUT

Army health care, as with health care in general, is by virtue of specialization divided into many parts. The AMEDD alone has six corps, and each corps encompasses a series of MOSs each related to a specific aspect of health care. Usually the most knowledgeable or senior specialist in many of these disciplines is designated as a consultant to The Surgeon General.

Consultants assist The Surgeon General in exercising technical control over the delivery of health services within the Army. They stay abreast of developments in their fields and serve as experts in the practice of their particular specialties. Included among their responsibilities is a requirement to review and approve the purchase of certain equipment used in the practice of their specialties at TDA hospitals. Their review determines the appropriateness or propriety of the planned purchase in view of the mission of the hospital and the qualifications of its staff. It affords a measure of control over the equipment used at patient care facilities and lends expert authority to the approval or disapproval of the procurement proposal.

A consultant's role in the approval or disapproval of the purchase is very narrow. It is limited to the use of the equipment in the practice of a specialty and is only indirectly concerned with such procurement issues as life-cycle costs, logistical supportability, and environmental impact. A consultant's approval is not contingent upon whether the purchase is the best use of limited funds nor whether the many trade-offs and influences we have discussed earlier have been considered. A consultant assumes that those issues have been resolved in favor of the proposed purchase; in fact, most of the administrative and operational hurdles involving the requirement should have been resolved at lower organizational levels before a consultant's review since the requirement identification and justification are

decentralized to the treatment facility cognizant of the administrative and operational details.

The role of the consultant in the approval of peacetime health care equipment requirements is not duplicated for field medical equipment. O&O plans and other requirements documents may be coordinated with them, but the combat developer, materiel developer, and other organizations involved in the acquisition of field medical equipment do not use consultants in an approval/disapproval role. Rather, they use nearby technical specialists on an as-required basis. For example, the combat developer frequently seeks support from the faculty at the Medical Field Service School (MFSS). On the other hand, consultants are frequently brought in on issues involving where, when, and how their specialty will be doctrinally practiced during wartime. Consultants represent a ready source of knowledge and information on equipment performance requirements and trade-offs and can provide systematic support on market availability. Their use in those roles would take advantage of a ready source of knowledge and information and could expedite acquisition actions.

A systematic review on the part of consultants serves to familiarize them with the acquisition system and how their expertise is needed in making often difficult and critical equipment design trade-offs. Consultants are in an ideal position to deal with the NDI versus development decision as long as they are aware of the intricacies of the other related trade-offs and influences.

Senior leaders have at least as great an influence on near-term requirements as experts, and their influence is even more direct. Most participants in the acquisition system are sensitive to quick-reaction requirements, directed by those senior leaders, that dramatically limit alternatives and obviate trade-offs. Typically those kinds of demands are handled in two parts. The first part involves satisfaction of an immediate need, often with an available substitute item. The available item is typically of commercial design or an aged item drawn from war reserve inventories, e.g., oxygen monitors used in the DEPMEDs sets.

The second part of the requirement includes acknowledgment that the short-term solution is only an expedient and that the real solution lies in a long-term plan or project. In these cases, the long term solution enters the acquisition process as high level guidance that often dissipates as the intensity of the short-term requirement recedes in time. Nevertheless, short-term "streamlining" of the

acquisition process occurs. In any case, the identification of field medical materiel requirements by TSG consultants and senior leaders exists within the acquisition system with varying influence on delivery objectives.

USER PULL

User "pull" is a requirements identification methodology that, like consultant input, can make a vital contribution if it is systematized. It currently can identify requirements but not in a way that is efficient and effective or that carries the weight of either CBRS or consultant input. CBRS requires that branches continuously evaluate mission performance to find deficiencies that must be corrected. One method of conducting these evaluations is to maintain close contact with units in the field.¹ In this way, users "pull" corrective actions – including materiel solutions – for deficiencies in their capability. The duality of the health care mission tends to become separate health care missions insofar as requirements identified through user pull are concerned. Most of the clinicians are not assigned to field units nor do they practice medicine at those units. They are, instead, deeply involved in patient care in brick and mortar TDA facilities. Command and staff officers and senior enlisted personnel in TOE units in the field are concerned with other than hands-on patient care issues – issues such as their latest readiness report, maintenance inspection, or military justice action.

Army Regulation (AR) 40-61, *Medical Logistics Policies and Procedures*, provides a method for Army units, activities, and personnel (which presumably includes users) to recommend new or improved medical supplies and equipment by sending letters. If the user classifies the equipment as TOE materiel the letter is sent to the combat developer. If, on the other hand, the user designates the materiel as nontype-classified materiel – a term we believe likely to be misunderstood at the DA level and certainly frustrating to the user – the letter is to be sent to the Logistics Division, OTSG. The AR gives no indication of where to send the letter if the item qualifies for both TOE and TDA use (as is the case with most items) although it does specify ten information elements that must be included in the letter.

¹As prescribed in AR 40-61, USAMMA operates a logistics assistance program. This program and the medical materiel complaint system are oriented to quality assurance issues rather than to requirements identification.

AR 40-60, *Policies and Procedures for the Acquisition of Medical Materiel*, does not have a similar provision for users to identify, suggest, or recommend, new medical materiel. Neither AR 40-60 nor AR 40-61, both of which have the word "procedures" in their title, indicates how a manufacturer would propose a new item of TOE equipment. AR 40-61 states that vendors may make item presentations to the DMSB but does not specify further events. As previously mentioned, the DMSB, discharging its responsibilities on DEPMEDS, often proposes items offered by suppliers for inclusion in medical materiel sets or unit TOEs. In this manner, the combat developer is made aware of an item that may or may not involve new technology or provide other operational or economic advantages.

Users have other avenues to identify requirements and provide input to the acquisition system, but those avenues, too, are neither well known, frequently used, nor effective. Training in Army schools often involves the hands on use of equipment. During training, then, both students and instructors have the opportunity to identify operational techniques and equipment design features that would be useful in satisfying mission performance deficiencies. They also have the further opportunity to use the training setting for limited materiel evaluation providing, perhaps, additional testing resources. Even though the combat developer and the instructional staff of the MFSS are both part of AHS, we could find no evidence of a systematic process for soliciting or harvesting such ideas or evaluations.

Finally, we saw no systematic feedback of equipment needs or deficiencies from TOE field medical units during field training exercises, deployments, or inspections. Such feedback could have been most useful, particularly if clinicians from TDA facilities participated in the exercises. The unit readiness reporting system is not designed to input new requirements as standard format information. Comprehensive information on lessons learned is difficult to obtain and, therefore, is not used in the formulation of solution sets or materiel requirements. We conclude that, if a user, most of whom are in TDA facilities, or the combat developer's staff do not take the initiative to actively provide or obtain feedback to the acquisition process, none will be received. Such limited communication might explain the lack of familiarity with the acquisition process, frustration with its operation and results, and a lack of knowledge about its capabilities and products. Similar confusion does not seem to exist in the TDA acquisition system.

SUMMARY

Four methodologies are used to identify AMEDD materiel requirements:

- The sophisticated CBRS, which lays down the how-to-fight concept for the AMEDD to use in developing its how-to-support concept and the resulting shortfalls between current and forecast capability
- The technology push, which can put a commercial item in a unit without sufficient regard for how well it can be integrated or find solutions to capability shortfalls in ways not apparent to the combat developer
- The consultant input, which can force feed the latest item of specialty equipment displayed at a trade show or push the need for the most preferred item currently in service at the TDA hospitals
- The user pull, which can offer the nearest and clearest expression of a capability deficiency but the most difficult to put into the requirements process and the one likely to provide the most short-lived solution.

Each methodology has good features worthy of incorporating, and collectively the four methodologies have the potential for conveying a better requirement to an acquisition executive for a decision to introduce into the acquisition process or to firmly and politely reject.

In Chapter 6 and Appendix B, we expand the evaluations of the requirements identification methodologies and provide our conclusions about how well they support the acquisition system and the AMEDD and help meet the acquisition objectives.

CHAPTER 6

CONCLUSIONS

In the preceding chapters we describe the dual health care mission that is the source of acquisition process requirements; discuss the acquisition process and the problems it has repeatedly encountered, suggest that a requirement is not an unchallengeable statement of need but rather a forecast of a capability that is to be satisfied by a product reflecting numerous trade-offs and influences; and, examine the various methodologies used to identify materiel requirements and the features of each.

Thus, we have set the stage for our conclusions on the operation of the current acquisition process. In setting the stage, we want to improve understanding of the acquisition process at various management levels so that the managers and decision makers recognize problems and the conclusions become apparent. Improved understanding motivates management action and benefits the process. When the process is well understood by those who manage and operate it, its performance improves, and more products with a bearing on mission performance and readiness are identified and delivered in a timely and cost-effective manner. The current process in the AMEDD is not well enough understood by most participants to do that with regularity.

REQUIREMENTS, SYSTEM MANAGEMENT, AND STREAMLINING

We believe that successful streamlining of the medical acquisition process starts with the identification of clear, achievable materiel requirements and is the product of aggressive management of the materiel requirements through a highly disciplined yet flexible acquisition support structure.

What is a good way to identify requirements? How would we recognize it? What are the characteristics of a good requirement? What style of management is best suited to directing the materiel requirements through the acquisition system? This Socratic approach suggests that one cannot successfully control a process unless it is clear what the process should do, and when, where, why, and how it should do it. We found many and varied opinions on the quality of the methodologies for

identifying requirements as well as how those requirements should be managed through the process. We did not find a focal point responsible for addressing such questions or committed to establishing requisite control mechanisms for the acquisition process.

We believe successful acquisition management requires particular expertise to make the process do what it is supposed to do. Management must be able to measure process performance to know whether corrective action is necessary, and to prudently direct the flow of resources to the process. The acquisition process needs intensive management if it is to achieve its desired results. Intensive management is more than "ensuring that all the blocks are checked." It is making certain that the right blocks are checked for the requirements going through the process and doing so on a targeted schedule, and directed by a resolute manager. Contrary to some beliefs, the acquisition process is not designed to defeat a good acquisition effort. In fact, its inherent tools of flexibility and control are supportive of a good acquisition management effort. Although the details might seem to impede those trying to execute the process, poorly identified requirements and fragmented system management are the culprits that defeat most acquisition efforts.

THE ACQUISITION CHALLENGE

A good medical materiel requirement is one that meets the AMEDD acquisition challenge — achieving a mission capability that enhances medical care while, at the same time, accommodating or optimizing the many trade-offs and influences involved in the acquisition process. A good methodology for identifying requirements produces requirements with that general characteristic. Good identification system performance is measured by the number and age of capability issues that are produced by mission analyses. If mission analyses produce few issues, either the analyses are defective or most of the identified issues have been resolved. If most issues are new, the acquisition process has done a good job in rapidly satisfying those that did exist, preventing them from aging.

Based upon our review of AMEDD capability issues and the actions taken to resolve them, we conclude that AMEDD is not meeting the acquisition challenge. Many requirements do not reflect thorough analysis and do not adequately address trade-offs. Some requirements have existed as issues in one form or another for decades. In part, the challenge is not being met because the requirements

identification methodologies are not comprehensive, are poorly understood and managed, or both. As a consequence medical TOE mission capabilities are probably not all they can be or should be.

Requirements Identification Methodologies

We conclude that none of the requirements identification methodologies we described is in itself comprehensive enough to identify the full range of AMEDD requirements. On the other hand, the existing methodologies are sufficient collectively to identify AMEDD requirements provided they are more closely integrated and managed than at present. Further, to be of maximum value, all requirements identification methodologies should increase the early use of objective analyses, testing, and prototyping to identify trade-offs between and among cost and affordability, performance, and fielding time. The AMEDD must effectively communicate the rationale involved in these trade-offs to all members of the acquisition team, and those members must support it. It should not be used to cast the requirement in concrete but rather to make the proposed requirement more detailed. Without the commitment of acquisition team members, successful acquisitions are not likely since it is probably impossible to define the perfect requirement in all cases.

Imprecision in requirements identification leaves a vacuum the experts fill with well-intentioned but meddlesome input that the combat and materiel developers must process. Additionally, vague requirements precipitate continuous change in project management plans as those same experts reappear at each milestone IPR with more proposals for change. This creates constantly changing specifications and configurations that lead to instability in financial programs as well. Clear requirements gain early commitment of the acquisition team and assure valid financial plans and early and meaningful testing or prototyping.

Acquisition Program Management

We conclude that more effective medical materiel acquisition management requires the identification or establishment of an individual, preferably at the OTSG level, who is primarily responsible for the oversight of the process – a medical acquisition "czar." That manager should define the necessary acquisition process performance indicators and develop the necessary management and decision support systems. The management and decision support systems must be able to develop and

assess integrated multiappropriation financial plans. The manager should also be vitally concerned with the quality of acquisition system decisions, should be very experienced in acquisition matters, and should embody The Surgeon General's concern for quality of the acquisition process performance.

Acquisition System Managers

We conclude that a primary reason that requirements identification methodologies are poorly managed even though they collectively seem to "muddle through" is inexperience in acquisition and lack of understanding of the process throughout the AMEDD. That conclusion is not novel nor does it lend itself to an easy solution. The solution rests in defining acquisition career paths and revising personnel assignment policy to conform to that path. It also involves raising the level of acquisition literacy of AMEDD personnel even if they are not part of the immediate acquisition team. Most will serve in units whose capability has been shaped by the acquisition process. For that reason, AMEDD leaders should want to know the process and how it works. Additionally, a widespread understanding of the acquisition process aids in overcoming the fear held by many officers in highly technical fields that they are jeopardizing promotion potential because of the promotion board members' insensitivity to the importance and complexity of their acquisition assignments.

CHAPTER 7

RECOMMENDATIONS

In this chapter we present recommendations for improving the medical materiel requirements formulation process. We used a number of criteria to evaluate the recommendations. Those criteria are presented in Appendix A. The criteria are applied to ensure that, when implemented, our recommendations will increase the likelihood of achieving acquisition process objectives.

We believe the acquisition process is purposely designed to be highly integrated. Integration ensures that events and progress occur in a certain sequence and with predictable results. It permits us to detect failures or delays and permits the system manager to adjust future events. It also requires that changes be considered in the context of the whole system. With an integrated process, a small and seemingly inconsequential change in one part of the process can lead to difficulties or unexpected effects in another part of the system. Thus, we consider our recommendations as the first element in an overall strategy of medical acquisition reform. Requirements identification is but one part and other changes are needed; if those other changes are not forthcoming, true streamlining will not occur.

To improve requirements identification in AMEDD it is necessary to take actions that make the acquisition process perform better. Obviously, AMEDD should not make changes that enhance the identification of requirements but increase the overall time or cost of the acquisition process. From the very beginning of our research, we noted the medical acquisition process operated without clearly stated objectives. Furthermore, the process appears to be pervaded with acquiescence to, or acceptance of, ineffective performance and results. When pressure is applied for timely delivery, allegations that important technical details are being ignored are made. High costs are sometimes justified with statements such as "you get what you pay for." Simply, the acquisition system had no target. It seems to follow the command, "Ready! Fire! Aim!"

Given a clear, achievable requirement for medical materiel, the acquisition process must be directed from the highest level of responsibility to achieve an

acquisition process that meets the qualities and objectives essential to providing the right materiel to meet the Army's health care mission.

REQUIREMENTS IDENTIFICATION METHODOLOGIES

We recommend that AMEDD simplify and consolidate the procedures used to identify medical materiel requirements for Army units and educate AMEDD personnel in the use of those procedures.

The single AMEDD requirements identification system must be able to rapidly evaluate (to include testing, demonstrations, evaluations, examinations, and other suitability determinations similar to those described in AR 40-61) numerous proposals (from all possible sources but especially from CBRs, technology push, consultant input, and user pull). It must also be able to articulate the results of these evaluations in simple terms and provide quick feedback to those who made the proposal. Proposals should be viewed as part of the overall analysis of the medical mission area. If they are accepted, they serve as input to CBRs and begin the formal process concluding in resourcing and acquisition. This can be accomplished as follows:

- Change AR 40-60, AR 40-61, the *Medical Materiel Acquisition Management Handbook*, and other literature to clearly reflect that anyone (enlisted personnel and officers, civilians, vendors, researchers, experts, etc.) can make recommendations for improvements in medical doctrine, training, leadership development, organization, and/or materiel. The publications should indicate a single point at which proposals should be sent for evaluation. Submitters should be told what information they must provide in the proposal, when they can expect a response, and what that response is likely to be. Conceptually, the process would be administered like a beneficial suggestion program.
- Proposals should be submitted to the Directorate for Combat Developments. All proposals should be evaluated by the appropriate Division within the Directorate for Combat Developments (i.e., Concepts, Organization, Materiel, etc.), the appropriate consultant to The Surgeon General, and MRDC, as a minimum. Other offices or agencies would be provided referrals when appropriate (i.e., USAMMA in the case of medical maintenance equipment). The MEDCASE program currently uses such a procedure to route MEDCASE requirements to consultants for propriety review and approval/disapproval. DMSB correspondence is coordinated in a similar way. All evaluators should examine the proposal for both TOE and TDA unit application.

- If a proposal has no merit, the proposer should be so advised. Advising him/her offers an opportunity to help the submitter to better understand the acquisition process. A proposal with merit should receive consideration in higher level CBRS mission area analyses, and if it is determined to be acceptable, the proposal should be incorporated, in original or modified form, in a CBRS capability issue and corresponding solution set.
- To be effective, such a procedure must receive a high degree of leader support and must include a large amount of verbal communication with those who make proposals. If the procedure is installed but evaluations, approvals, and/or disapprovals are based on other than objective factors, the procedure will quickly lose credibility and will not be used. Similar results will occur if insufficient staffing and management emphasis are provided. (We do not anticipate staffing to be a significant problem.) When conducting evaluations, legal matters involving contracts should be carefully considered.
- This procedure continues to rely on CBRS, and CBRS is being modified. The modifications provide for very complex trade-offs at integrating centers and TRADOC headquarters. The new CBRS should concern the AMEDD for two reasons:
 - CBRS integrates requirements from all Army schools. AMEDD must ensure that its requirements survive that competition in a manner that will enable AMEDD to attain its strategic goals. TRADOC Long Range Research, Development, and Acquisition Planning (LRRDAP) and Extended Planning Annex values may be used as checkpoints during POM-building activities. It is important that input to the LRRDAP and the POM be coordinated.
 - The coordination of programs within the LRRDAP begins to jeopardize OTSG control of its programs, control that had been achieved by centralized programming. A degree of control is sacrificed to achieve better coordination at the Army school level.

ACQUISITION SYSTEM PERFORMANCE OBJECTIVES

We recommend AMEDD establish and publish its acquisition process performance objectives.

The time and costs required to field items should be measured by item and in the aggregate. What must AMEDD have by way of delivery date? How much can it afford? Without answers to these kinds of questions it is difficult for the system to field the right item at the right place at the right time.

The appropriate mechanisms to implement such objectives would be AR 40-60 and then the *Medical Materiel Acquisition Management Handbook*. Performance objectives have little value without a high-level decision maker exercising oversight of the system.

DEPUTY SURGEON GENERAL (ACQUISITION)

We recommend that overall responsibility for medical acquisition management be assigned to a Deputy Surgeon General for Acquisition [DSG(A)]. We also recommend that the DSG(A) direct the revision of AR 40-60 and the *Medical Materiel Acquisition Management Handbook* to incorporate the following:

- AMEDD acquisition system performance objectives.
- Criteria for designating programs for the DSG(A)'s direct oversight and control. At the time an O&O plan is prepared, the criteria would be applied and those items requiring it would be briefed to, and approved by, the DSG(A). The DSG(A) would chair all future IPRs for that item and approve any justification for other than an NDI acquisition strategy or changes from the initial requirement affecting a published milestone completion date.
- Strategic guidance with regard to medical technology and medical unit modernization. To stay the course laid out in the strategic guidance, the DSG(A) should publish biannually the near-term plan for the modernization of medical units.
- Policy on integrating cross-appropriation financial planning, programming, and management. The DSG(A)'s biannual plan should consider affordability of ongoing programs, and affordability decisions should be integrated into near-term budget revisions.

The current organization of the acquisition process does not allow management and supervision of medical acquisition functions to come together below the level of the Defense Department. This is because the Defense Logistics Agency (DLA) and its field activity, the DPSC, are responsible for managing the medical commodity at the DoD level. Similarly, the combat development mission, of which medical is a part, culminates at TRADOC headquarters. In order to more effectively coordinate the myriad medical acquisition actions in this diffuse environment, the highest possible level of AMEDD management involvement is needed. Should AMEDD determine that more involvement and more effective coordination are insufficient to improve acquisition performance, it should seek solutions in reorganization. Until then, AMEDD should manage its acquisition function at its highest level to control and

integrate its resources most effectively across the medical mission. The support of the Assistant Secretary of Defense for Health Affairs, ASD(HA) would reduce the likelihood of unplanned change with its concomitant loss of stability in the acquisition system.

ACQUISITION MANAGEMENT PERSONNEL

We recommend that the AMEDD develop acquisition management career paths for military and civilian personnel and that it also develop and coordinate appropriate assignment and promotion policies. The need for the highest quality acquisition management personnel cannot be overemphasized. Prerequisite acquisition training and experience for future DSG(A) designees and other critical acquisition management positions should be specified.

CONCLUSION

Our recommendations involve major shifts in policy, procedure, and top-level organization. We do not assert that they are easily implemented, but we believe they are fundamentally important first changes for streamlining acquisition and for achieving an acquisition process that meets the qualities and objectives essential to providing the right materiel for the medical mission.

We also believe that implementation of our recommendations is the key to achieving improved understanding, better teamwork, and closer management of the system and will result in better decisions and requirements leading to more timely, less expensive, and more frequent deliveries of medical materiel that meets the user's needs.

GLOSSARY

AHS	=	Academy of Health Sciences
AMC	=	Army Materiel Command
AMEDD	=	Army Medical Department
AMM	=	Army Modernization Memorandum
ASD(HA)	=	Assistant Secretary of Defense for Health Affairs
CAT	=	Computer Assisted Tomography
CBRS	=	Concepts Based Requirements System
CONUS	=	Continental United States
CRG	=	Clinical Review Group
DA	=	Department of the Army
DCD	=	Directorate of Combat Developments
DEPMEDS	=	Deployable Medical Systems
DMSB	=	Defense Medical Standardization Board
DoD	=	Department of Defense
DoDI	=	Department of Defense Instruction
DSG	=	Deputy Surgeon General
DSG(A)	=	Deputy Surgeon General for Acquisition
DSMC	=	Defense Systems Management College
FAS	=	Force Accounting System
HSC	=	Health Services Command
IG	=	Inspector General
ILS	=	Integrated Logistics Support
IPR	=	In-Process Review

ISO	=	International Standards Organization
JCAH	=	Joint Commission on the Accreditation of Hospitals
LSA	=	Logistics Support Analysis
MASH	=	Mobile Army Surgical Hospital
MEDCASE	=	Medical Care Support Equipment
MOS	=	Military Occupational Specialty
MRDC	=	Medical Research and Development Command
MUST	=	Medical Unit Self-Contained, Transportable
NDI	=	Nondevelopmental Item
O&M	=	Operations and Maintenance
O&O	=	Operational and Organizational
OTSG	=	Office of the Surgeon General
OPA	=	Other Procurement, Army
R&D	=	Research and Development
ROC	=	Required Operational Capability
SACS	=	Structure and Composition Systems
TAADS	=	The Army Authorization Documentation System
TDA	=	Table of Distribution and Allowance
TOE	=	Table of Organization and Equipment
USAMMA	=	United States Army Medical Materiel Agency
USAMMDA	=	United States Army Medical Materiel Development Activity

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APPENDIX A

RECOMMENDATION EVALUATION CRITERIA

The criteria¹ presented here are management decision-making standards against which we measure proposed changes to the acquisition process and solutions to any problems that might be experienced. We present the criteria in the form of questions about proposed changes and acquisition problems. Ideally, meeting these criteria increases the likelihood that acquisition process objectives will be met, mistakes avoided, and time, resources, and effort will be best spent. Each criterion is followed by a brief discussion applicable to our recommendations for the medical acquisition process.

- *Will the recommendation improve acquisition performance by improving the capability to match system requirements with the anticipated threat?*

We have recommended that the four loosely related systems used by the Army Medical Department (AMEDD) to identify requirements be rationalized and made applicable to both the peacetime and wartime health care missions. If a medical threat is defined as anything that produces a casualty, rationalization can include analysis of the effects of a proposed change on the throughput of patients. We believe our recommendations meet this criterion.

- *Will the recommendation improve acquisition performance by reducing mismatches between resources and requirements?*

We have pointed out that resources available to AMEDD are not used in a coordinated way. As a result, mismatches do occur and acquisition personnel have no idea of affordability to guide them. We have recommended development of a program to integrate financial planning across appropriations to permit identification of trade-offs. Our recommendations satisfy this criterion.

¹Adapted from the Defense Systems Management College report, *Outcomes, Principles, and Criteria: A Framework for Assessing Changes to the Defense Acquisition System*, Jan 1989.

- *Will the recommendation improve acquisition performance by reducing duplication of effort and acquisition redundancy?*

This criterion can bear on the nondevelopmental item (NDI) versus developmental item decision and the contracting effort, among others. In these issues, opportunities for duplication exist. In pursuing an NDI acquisition strategy, it is possible to duplicate capability required for development. Contracting capability at the Defense Personnel Support Center and the Medical Research and Development Command carries similar risk of duplication. Our recommendations increase centralized oversight of acquisition functions and decrease the likelihood that duplication will occur. The criterion, we believe, is satisfied.

- *Will the recommendation improve acquisition performance in the following ways?*

- ▶ *By reducing ambiguity in the chain of authority and its control of required resources?*

This criterion is the key point behind our recommendations to designate a Deputy Surgeon General for Acquisition [DSG(A)], establish acquisition objectives, and integrate financial planning. These recommendations are intended to improve control by eliminating ambiguity or providing the means to eliminate it. Some aspects of ambiguity will not be resolved even if the recommendations are implemented. The role of the Assistant Secretary of Defense (Health Affairs) [ASD(HA)] and the Defense Medical Standardization Board in combat developments may still prove contentious. The mission of the Defense Logistics Agency (DLA) with respect to contracting may create uncertainty. The centralization of oversight, however, should allow quick identification and resolution of any impasse caused by ambiguity. Our recommendations are responsive to the criterion.

- ▶ *By reducing unnecessary organizational layering?*

We do not recommend another organizational layer. We recommend, effectively, an adjustment in the priorities of one level, the DSG. As the Packard Commission suggested, a change in "culture" is needed. The medical acquisition environment is organizationally quite complex. Before seeking acquisition performance improvements in reorganization, we have recommended that the acquisition culture be adjusted. We feel our recommendations do not add organizational layers or result in increased duplication of effort.

- *Will the recommendation improve acquisition performance by efficiently reducing fraud, waste, and abuse?*

Our recommendation will dramatically reduce waste and abuse by improving control of those factors that lead to it — factors such as unstable requirements, funding, and mismanagement. We found no evidence of fraud in our review. Nevertheless, improved control will reduce the probability of its occurrence. Centralized and more intensive management will lead to improved planning and overall project management. We have made recommendations that fulfill this criterion.

- *Will the recommendation improve acquisition performance by reducing non-value-added reporting, reviews, and audits?*

None of our recommendations involves additional reporting, reviewing, and auditing. We raise some In-Process Review (IPR) programs to the DSG(A) level. We feel that intensified management and planning will lead to more thorough acquisition strategies and to the earlier identification and elimination of unnecessary acquisition steps through tailoring. This would replace the rather methodical and plodding process orientation that is pervasive today. Again, the criterion is met or likely to be met.

- *Will the recommendations improve acquisition performance by enhancing the technological and industrial bases?*

Our recommendations will enhance management effectiveness. In turn, actions or issues that significantly help or hinder these bases will receive attention more quickly and at higher levels. Our recommendations do not change fundamental relationships and, as such, do not adversely affect technological and industrial bases.

- *Will the recommendations improve acquisition performance by enhancing training opportunities for the workforce?*

We have made recommendations targeted directly at improving the quality of the military and civilian acquisition work force. Improved business management skills and greater acquisition and project management experience are goals to be pursued. Our recommendations meet this criterion.

- *Will the recommendations improve acquisition performance by reducing excessive turnover in program personnel?*

The comments immediately above regarding experience apply. This issue is a particularly difficult one because of military rotational assignments. Acquisition

management requires specialists, not generalists. Our recommendations meet this criterion.

- *Will the recommendations improve acquisition performance by enhancing the selection of competent, qualified personnel?*

AMEDD has not defined the discipline of medical acquisition management in all of its aspects. In some cases, additional skill identifiers are obtained by individuals who attend courses to become combat- and materiel-development qualified. Most assignments, however, depend on availability, personal preference, or some other factor rather than on aggressive management of the most valuable of acquisition resources. We believe closer oversight of the acquisition function will lead to improvements in assignment of personnel. Our recommendations do not hinder such an effort.

- *Will the recommendations improve acquisition performance by reducing instability in planned top line funding?*

In many ways top line funding for AMEDD has been well supported by the Army and ASD(HA). In the past, such funding has not presented insurmountable difficulties. However, as resources become tighter, it will play an increasing role in affordability and associated trade-offs. Our recommendations provide the opportunity to integrate the financial planning essential for coping with top line funding instability.

- *Will the recommendations improve acquisition performance by reducing instability in internal funding allocations?*

Again, our recommendations support improved management, which should permit better justification of needs and better articulation of the impact of proposed cuts. When successfully implemented, improved financial contingency planning can be accomplished.

- *Will the recommendations improve acquisition performance by improving the cost and budget estimation process?*

Again, our recommendations are responsive because they lead to more effective and more integrated planning, programming, and budgeting.

- *Will the recommendations improve acquisition performance by enhancing the initial definition and stability of the program baseline?*

For acquisition management purposes, AMEDD has no program baseline except perhaps last year's funded program or force structure. Configuration and design of hospitals can influence an acquisition baseline. Our recommendations would support such an effort and might result in determinations affecting the packaging of medical capabilities. Our recommendations support this criterion.

A scan of the criteria and associated comments indicates that our recommendations are either completely responsive or, at worst, neutral. None of our recommendations is contraindicated on the basis of any individual criterion.

APPENDIX B

ANALYSIS OF REQUIREMENTS IDENTIFICATION METHODOLOGIES

In Chapter 5, we introduce the various procedures or methodologies available to the Army Medical Department (AMEDD) for identifying requirements. This appendix expands our evaluation.

Our review indicated four techniques to identify medical items to be acquired for use in medical units:

- Concepts Based Requirements System (CBRS)
- Technology push
- Consultant input
- User pull.

These procedures are neither mutually exclusive nor interdependent. They are the ways that ideas for new materiel enter the acquisition system. They form a loose framework that accounts for most of the materiel requirements currently in process in the acquisition system. This unstructured situation leads to confusion and prevents efficient introduction and evaluation of new equipment.

CONCEPTS BASED REQUIREMENTS SYSTEM

The CBRS provides an opportunity for detailed mission analysis, but because the medical threat/workload is not articulated, at present it does not perform at a low enough level of detail to adequately identify essential performance characteristics of needed medical equipment. Objective analyses that adequately support system requirements are simply not performed. Furthermore, the combat developer – the Academy of Health Sciences (AHS) – may not truly represent the user. The principal wartime users of medical materiel are to be found in the peacetime Army medical facilities or civilian hospitals (reserve physicians and nurses) and not in Table of Organization and Equipment (TOE) medical units nor in acquisition management jobs.

CBRS is the official Army requirements identification system. However, it has been part of the problem rather than part of the solution. The Training and Doctrine Command (TRADOC) Inspector General (IG), in an inspection conducted during 1986 and 1987, found that CBRS – although conceptually an excellent methodology – had been stagnant since its inception in 1980 and had not achieved its potential. It was found to be poorly understood, infrequently used, and, when used, poorly disciplined. While the IG findings did not specifically charge the medical implementation of CBRS, our review concludes that the findings apply. CBRS, while it has potential, has not contributed significantly to the identification of Army or AMEDD materiel requirements for the following reasons:

- No threat document for the medical mission area has been published. Such a document is essential for effective planning of R&D activity.
- Mission area analyses have not been adequate. They have neither been documented nor coordinated. They do not reflect the consensus of the AMEDD leadership and that of the acquisition community. Execution of acquisition programs, therefore, lacks commitment and clear focus.
- Without detailed analysis, CBRS cannot achieve the resolution necessary to identify essential medical equipment characteristics and to justify and support a procurement effort. This shortcoming results in failure to adequately define deficiencies and opportunities, which in turn leads to ambiguous acquisition objectives and subsequent poor delivery performance.
- Input to CBRS by those intended to use the products of the system is minimal and not coordinated.

We believe that the task breakdown and performance assessment at the AHS are insufficient to produce analyses that objectively define medical equipment deficiencies and needs. The analyses do not produce adequate data on improvements in patient care such as the ability to handle more patients, improve the quality of care, reduce operating costs, or identify appropriate trade-offs. Analyses produced are frequently only indirectly related to medical issues. For example, the requirements for air conditioning the Deployable Medical Systems (DEPMEDS) shelters are subject to detailed technical analysis by a mix of both administrative and professional experts to support the margin of benefit to the patients and the materiel inside the shelter. On the other hand, the impact of nonavailability of a blood-gas apparatus or the need for an ultrasound unit in a TOE hospital can be left to the opinion of a single consultant. In many cases, measures of effectiveness are not available, especially for medical procedures. Without those measures, analyses

concentrate on nonmedical-workload operations such as maintenance and property accounting that can be measured. Improved measures of effectiveness and better computer models and simulations would be useful analytical tools.

The lack of definition of tasks and the associated equipment requirements are aggravated by the displacement of most medical supply and equipment determinations to the Defense Medical Standardization Board (DMSB) Clinical Review Group (CRG).

The establishment of the CRG under the auspices of the DMSB is an effort to improve the resolution of the CBRS. Unfortunately, the DMSB possesses even less objective analytical ability than the AHS combat developer. The combat developer uses an analytical system known as the task, time, treater file, but that file may or may not be coordinated with concepts being developed elsewhere. The CRG consists of personnel unfamiliar with CBRS and the AMEDD acquisition system. The DMSB replaces analysis with the authority of "experts." Those experts are not necessarily the same as the experts employed as consultants to The Surgeon General.

We are also concerned about the implications of the CBRS process for setting priorities. The AMEDD defines its priorities in broad terms, e.g., inadequate resuscitative capability. Appropriations are not well integrated in terms of priority. Procurement dollars to buy certain items may have high priority while Operations and Maintenance (O&M) dollars to supply and maintain the item may have low priority. These situations are not conducive to effective management. Too much time is lost purifying data rather than making difficult but effective resource decisions. Closer coordination and teamwork among acquisition team players – the kind that an acquisition executive or a program executive would demand – are needed.

The type of analysis conducted in the CBRS can be used to review both Table of Distribution and Allowance (TDA) unit and TOE unit operations. Typically, however, the combat developer does not integrate these two missions. In many cases planning, concepts of operations, and equipment employed in one environment are not viewed as opportunities or solutions in the other.

TECHNOLOGY PUSH

The technology push system consists specifically of the intra- and extra-mural efforts of the Medical Research and Development Command (MRDC) and the medical industry in general. In the area of pharmaceuticals and biologicals, we believe that MRDC is, in fact, the combat and materiel developer because of its overwhelming technical skills. Provided that sufficient coordination is accomplished, affordability and resource priorities are adequately addressed, and MRDC keeps an open mind about requirements being identified by other organizations, we believe that the technology push system is sufficient for pharmaceuticals and biologicals.

In the equipment area, the technology push system of requirements identification currently seems to satisfy many TDA unit requirements and some high visibility TOE unit needs. However, it is too passive for routinely identifying AMEDD TOE unit needs in ever-changing threat and technology environments. Technology push is, nonetheless, a valuable source of information that should remain part of the overall acquisition process. Procedures for its use should be institutionalized and publicized.

CONSULTANT INPUT

As indicated in Chapter 5, consultants identify and approve requirements predominantly for the TDA establishment. Their involvement in TOE unit requirements is limited to providing an opinion on a specific item of materiel but not on the whole of the medical mission capability. At the March 1989 Mission Area Materiel Plan (MAMP) meeting, the Commandant, AHS – expressing concern for his role as the combat developer – pointed out that he was trying to set the future medical concept without having the “medical professors” as members of his staff. He went on to say that the Commandant of the Armor School, for example, had the experts in armor unit missions and requirements at his right hand but the experts in medical missions and requirements were in the MRDC, the hospitals, and OTSG.¹

The researchers, the consultants, and the hospitals' senior clinicians – MG LaNoue's medical professors – have much to offer the TOE unit requirements identification methodology and CBRS overall. Their knowledge of the

¹MG Alcide LaNoue, Commandant, AHS, in remarks to attendees, medical MAMP meeting sponsored by MRDC, 23 March 1989, Germantown, Maryland.

interrelationship of various patient care disciplines, the medical specialties, and trends in current versus projected state-of-the-art can make significant contributions in the areas of doctrine, training, organization, and materiel. They are already involved to varying degrees in organization, integration of new capabilities, and planning for training as part of their position responsibility. The challenge is to bring them into the requirements identification process and to capitalize on their knowledge. Their participation in the materiel area can be increased by involving them earlier and more deeply in performance requirement identification, market investigations, and testing issues. Their expertise should be required in making those difficult choices in trade-off situations of the centralized TOE acquisition process. Their early involvement enhances the credibility of the requirements identification process, dampens unsupported proposals, provides a specialty channel for the circulation and dissemination of requirements information and for acquisition training, and more closely links TDA and TOE medical systems at the real user level. It also makes available a valuable source of insight to the commercial market for products of their specialty.

The consultant requirements identification methodology has much to commend it. Were it employed in concert with CBRS, its value would be dramatically enhanced. Alone it is of limited value, for it fails to achieve a productive integration of expert opinion and acquisition process. If a principal weakness of the TOE unit's materiel acquisition process is lack of experience and understanding, the AMEDD has no excuse for not involving experts early and often, even though they may not fully understand the details of complex procurements.

USER PULL

The user pull system of requirements identification has much to commend it as well. The user is the purpose of the system, and without the user the system would be unnecessary. It is essential to take advantage of good ideas that can constantly flow from the field. However, the user does not have access to a full range of acquisition information so necessary in the complex acquisition environment. Without that information, what seems like a good idea may not be so good. On the other hand, the benefits of involving the user are greater if the method involves a joint TOE-TDA arrangement in which each party provides a value-added analysis. The resulting input to the requirement then reflects an integration of thought and a fundamental level of configuration management; i.e., the requirement is considered in relation to

already existing capability and constraints — by the unit level members who have the ultimate burden of using the capability in the performance of the medical mission.

Two improvements can be made so that it can play its role more effectively in the system of requirements identification methodologies. The user needs to be more clearly defined. Just who is the customer or market of the acquisition system? Is it a homogeneous or highly segmented market? How are its customers sold? The answers to these questions can also point to others who might be more involved in the acquisition process.

The second improvement is essentially administrative. Communications channels need to be adequately defined for those with an idea for improved TOE materiel. If these improvements are made, user pull can be a valuable part of the overall requirements identification system or process.

The user pull system, of itself, is not expected to be the sole source of requirements for TOE medical equipment. If user input is not accepted, those soldiers presenting ideas should be thanked for their interest and given an explanation as to why they were or were not accepted. The extra effort in doing so encourages the users to continue participating in the requirements process.

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT "A" Approved for public release; distribution unlimited.		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) LMI-AR806R1			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION Logistics Management Institute		6b. OFFICE SYMBOL (if applicable)		7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) 6400 Goldsboro Road Bethesda, Maryland 20817-5886			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION HQ, USA Medical R&D Command		8b. OFFICE SYMBOL (if applicable) SGRD-Z		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MDA903-85-C-0139	
8c. ADDRESS (City, State, and ZIP Code) Fort Detrick Frederick, MD 20710-5000			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO	PROJECT NO	TASK NO.
			WORK UNIT ACCESSION NO		
11. TITLE (Include Security Classification) Streamlining the Medical Materiel Acquisition Process: Central Direction, Better Requirements					
12. PERSONAL AUTHOR(S) George L. Slyman, Gilbert L. Goldman					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM _____ TO _____		14. DATE OF REPORT (Year, Month, Day) January 1990 (Republished Aug 90)	
				15. PAGE COUNT 88	
16. SUPPLEMENTARY NOTATION Volume 1 of 3 - Volume Report. For a thorough understanding of the medical materiel acquisition process and the changes needed to complete its streamlining, we suggest reading all three volumes					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Acquisition Management, Materiel Requirements Identification, Medical Materiel Requirements Management, Medical Materiel Development		
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The Army Medical Department (AMEDD) wants to improve the performance of the medical acquisition process - to field operationally suitable medical materiel in less time, at less cost, and more frequently than it now does. Currently the AMEDD designates managers for all parts of the acquisition process and they have widely divergent opinions on how to accomplish such a goal. However, the AMEDD does not have an overall acquisition manager to apply the pressure needed to meet objectives, resolve requirements questions, and hold to scheduled milestones. To streamline the medical materiel acquisition process, we recommend the following critical first steps: • The Surgeon General should designate a Deputy Surgeon General for Acquisition (DSG (A)) and assign the DSG(A) the responsibility for managing the medical materiel acquisition process. This responsibility should not be delegated. • The DSG(A) should direct the coordinated revision of Army Regulation 40-60, Policies and Procedures for the Acquisition of Medical Materiel and the <i>Medical Materiel Acquisition Management Handbook</i>, to incorporate acquisition objectives, criteria for designating DSG(A) direct control programs, strategic guidance on technology and unit modernization, policy on integrated resource management, and user testing and certification guidance					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS				21. ABSTRACT SECURITY CLASSIFICATION	
22a. NAME OF RESPONSIBLE INDIVIDUAL				22b. TELEPHONE (Include Area Code)	
				22c. OFFICE SYMBOL	

19. Abstracts (continued)

- The DSG(A) should develop a single procedure for identifying AMEDD materiel requirements that incorporates the best features of the four methods currently used.
- The DSG(A) should develop acquisition management career paths for military and civilian personnel.

Implementing these recommendations is the key to improved understanding and closer management of the acquisition process. The results are better decisions, better requirements, and more timely, less expensive, and more frequent deliveries of medical materiel that meets the user's needs.