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What the Army Needs to Know to Align Its Operational and Institutional Activities

Frank Camm, Cynthia R. Cook, Ralph Masi, Anny Wong

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Preface

This monograph is the product of a project called Adapting the Institutional Army to the Emerging Operating Force for the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS, G-3). It presents a way to define the expectations of the U.S. Army leadership about future performance in the institutional Army.

This project is the final product of an unusually long series of discussions with senior Army leaders. These discussions began in March 2004, when GEN George W. Casey, Jr., then–Vice Chief of Staff of the Army, asked the RAND Corporation to help him understand what outputs the institutional Army produced and how all the resources and activities in the institutional Army could be associated with these outputs. Transformation of the Army’s operating force was well under way. A plan for major change would become public when the Army Campaign Plan (ACP) was published in May 2004. General Casey believed that a better understanding of the institutional Army would help the leadership determine how it would have to change to support the ongoing and anticipated changes in the operating force.

RAND’s discussion with General Casey led, following his departure for Iraq, to an extended series of discussions, through the summer of 2004, with LTG James J. Lovelace, then–Director of the Army Staff. General Lovelace was working with members of the Army Science Board on specific ways to reorganize the institutional Army and hoped that RAND could support that effort and the Office of Institutional Army Adaptation (OIAA) that would stand up shortly under his leadership. RAND’s discussions with General Lovelace led to a focus on

institutional “functions” that specifically support the operating force. General Lovelace asked RAND to determine what these functions should look like when the changes contemplated in the Army Campaign Plan were complete. RAND proposed to develop a method that Headquarters, Department of the Army (HQDA) could use to choose high-level performance metrics that specify what the major commands responsible for institutional activities should emphasize in their change efforts.

After long discussion within HQDA, the responsibility for overseeing the adaptation of the institutional Army to the emerging operating force and, as part of that, the new OIAA fell to MG David C. Ralston, Director of Force Management in ODCSOPS, G-3. In November 2004, General Ralston initiated the study that led to this monograph. He asked RAND to (1) develop a system of choosing performance metrics that senior Army leaders could use to specify what level of performance institutional activities should provide at any future point in time and to (2) focus on institutional activities of greatest and most immediate importance to the operating force. For specificity, we agreed to focus on performance in the year at the end of the Program Objective Memorandum cycle then in play, 2013. General Ralston asked RAND to work closely with the OIAA as this work went forward. As the OIAA narrowed its focus to a set of initiatives to offer as near-term changes in the ACP during the winter and spring of 2005, General Ralston asked RAND to maintain its broader, longer-term view of the institutional Army. This monograph maintains that broader view, illustrating how the Army could develop performance metrics for all the institutional activities highlighted in the ACP with examples focused on three of them.

This long path to choosing a specific set of questions for RAND to answer illustrates the profound challenge that the Army leadership faces in its ongoing efforts to improve the alignment of the operational and institutional portions of the Army. Choosing the right question to ask is often a significant step toward developing an answer that will yield useful policy outcomes. The leadership took such a long time to clarify its question to RAND precisely because it has had so little expe-

rience making specific decisions about links between the operational and institutional parts of the Army.

This work should interest policy analysts and decisionmakers concerned with (1) the relationship between the institutional activities—the tail—of a military organization and its operational activities—its teeth—and (2) how performance metrics for institutional activities can clarify expectations in that relationship. These metrics help clarify that the institutional activities of a military organization are critical to the success of its operational activities and cannot be viewed, as they so often are, simply as a bill payer for changes to enhance operational capability. More generally, this work should interest those who seek to link the outcomes of public policies to the resources used to produce these outputs through families of internally consistent metrics. The well-known balanced scorecard is an example of one way to do this. This document uses a closely related method that describes high-level processes in the value chains that deliver outputs from institutional activities to operational activities. The value chains described here help clarify the challenges involved with this kind of effort.

A summary of this document is available separately as Frank Camm, Cynthia R. Cook, Ralph Masi, and Anny Wong, *What the Army Needs to Know to Align Its Operational and Institutional Activities: Executive Summary*, MG-530/1-A.

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Summary

As the U.S. Army transforms its combat force, inevitably the institutional Army—the “generating force” that fills and sustains the Army’s combat units—must change as well. Stabilizing soldiers at posts and in units demands different personnel and training routines from those that supported the Army’s long-standing “individual replacement” system. Developing and fielding an integrated “system of systems” and delivering it in sets to units entering the force-generation cycle likewise call for generating force activities markedly different from those mastered in years past. And, of course, a whole series of supporting organizations must adapt to the global deployments of an Army that will be based largely in the United States rather than overseas. Transformation of the institutional Army is surely as dramatic as the transformation of the Army’s combat force.

Yet, it is far less well understood. Over many years, the Army has developed an array of metrics to assess the performance of its combat units. Not surprisingly, the current Army Campaign Plan (ACP) and Army Posture Statement (APS) offer clear and fairly succinct visions for this part of the force: The Army seeks a more joint-oriented, expeditionary, modular, rebalanced, stabilized, and brigade-based operating force. When these documents turn to the institutional Army, by contrast, they tell us, repeatedly, that the Army will use fewer resources to provide better support to the warfighter. Although an appealing thought, such a concept raises a huge array of questions about how the institutional Army should change to provide that support. It also overlooks the possibility that some parts of the generating force may

need more, rather than fewer, resources to perform crucial new tasks optimally.

The potential danger in this relative lack of keen understanding is that laudable efforts to enforce efficiency on the institutional Army will “improve” deeply ingrained but now misdirected processes or will reach elegant but suboptimal local solutions in terms of the Army’s overall transformational goals. Needed is a method for aligning the operational and institutional portions of the Army for transformational purposes. This project, launched by then–Vice Chief of Staff GEN George Casey and sponsored by the Army’s ODCSOPS, G-3, explains how to evaluate value chains to develop information that can promote such alignment. And it formally evaluates value chains to develop illustrative high-level performance metrics relevant to the alignment of institutional medical, enlisted accessioning, and short-term acquisition services to the operating force.

What Effective Alignment Means

The ACP and the APS summarize senior leadership views of how the operational and institutional parts of the Army should change to implement transformation. In phrasing that echoes similar documents from years past, they direct the Army to increase its operational capabilities by (1) shifting resources from institutional to operational activities and, at the same time, (2) changing its institutional activities in ways that improve their support of operational forces. To understand what such “realignment” means in a bit more detail, it helps to present the resource environment in which the Army’s institutional activities support its operating forces. The institutional Army includes a wide variety of activities that, roughly speaking, all fall into one of four categories:

- *creation, integration, and oversight* of the Army as a whole, including the operating forces
- accessing, training, and sustainment of *personnel assets*
- design, procurement, and sustainment of *materiel and information assets*

- *direct, global* delivery of logistics, medical, installation, mobilization, and information *support services* to users inside and outside the institutional Army, including operational forces.

Each institutional activity converts inputs, in the form of dollars and personnel services, into outputs that the institutional Army then delivers to the operational Army and to a number of nonoperational users, including dependents, retirees, civil works, and local communities. In this setting, “outputs” are goods and services that can be explicitly defined in terms that are relevant to user priorities. For example, institutional medical activities do not deliver vaccinations or surgeries to the operating force; rather, they deliver well soldiers.¹ Within fixed constraints on the Army’s dollar budget and its military end strength, any realignment must change how institutional activities use dollars and personnel to support operational and nonoperational users.

In effect, realignment changes the balance of interests among two kinds of stakeholders outside the institutional Army:

- representatives of various operational and nonoperational user priorities
- resource stewards that allocate fixed numbers of dollars and personnel hours among competing efforts to (1) produce outputs from existing processes in institutional activities or (2) invest in changing these processes.

Several resource stewards in the Department of Army (DA) play key roles. The Office of the Deputy Chief of Staff for Programs (G-8) and the Comptroller are, of course, responsible for the allocation of the Army’s dollar budget, both in the near term and over the planning period. The Army’s G-3 oversees the Army’s allocation of its military end-strength ceiling. And a more diffuse set of players attempts to protect dollars and personnel from the demands of immediate priori-

¹ Vaccinations and surgeries are two among many tasks that institutional activities perform to generate well soldiers. Operators do not care about the details of these tasks; they care about soldiers’ readiness for military service. Therefore, we define the outputs of institutional medical activities as soldiers who are well enough to perform their military duties.

ties so that the Army can apply them to improve processes in the operational and institutional parts of the Army. In effect, these resource stewards are responsible for the resources under their control and must release them to any institutional or operational activities as an integral part of alignment.

High-level Army guidance is not specific about what operational user priorities are relevant to realignment between the operational and institutional Army. The Army currently thinks about operational capability, for example, in four qualitatively different ways:

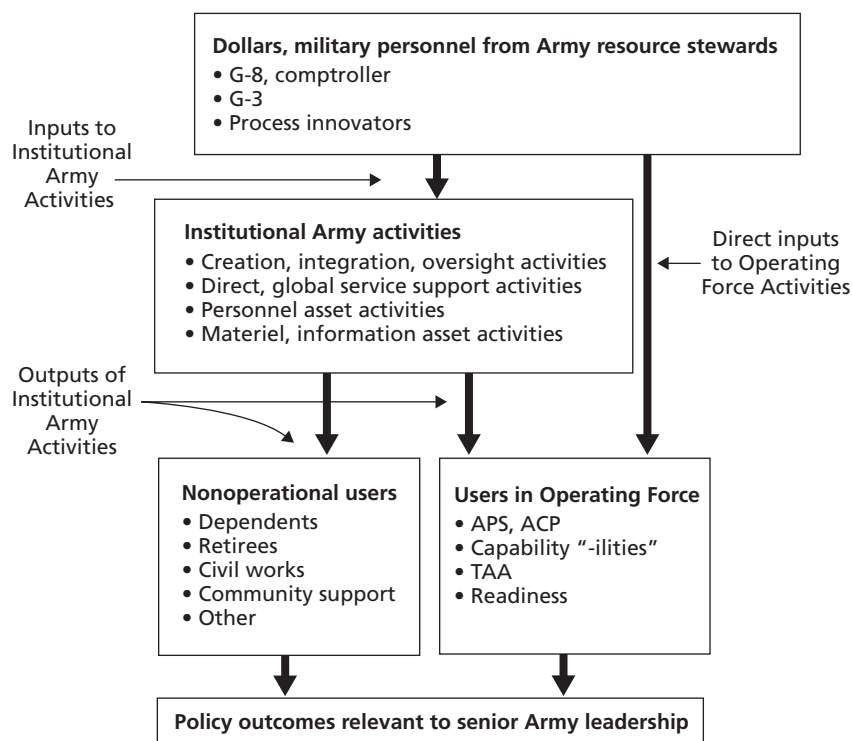
- At a high policy level, the APS and ACP speak of jointness, modularity, force balance, expeditionary capability, and brigade focus.
- In broad conceptual terms, Army planners and analysts speak of the lethality, deployability, survivability, agility, sustainability, and so on, of a deployed force.
- In force planning, through the Total Army Analysis process, the Army leadership speaks of the level of risk associated with the Army's ability to execute the missions assigned to it in the Joint Program Guidance.
- In operations, commanders speak of the readiness of their personnel, materiel, and information assets relative to stated requirements.

Each perspective offers a potential entry point for explaining how a change in the institutional Army might improve operational capability. High-level Army guidance does not explicitly state that increasing the level of certain institutional activities that provide direct support to the operating force is likely the best way to rebalance the priorities of the stakeholders outside the institutional Army that are relevant to the institutional Army in ways that increase operational capability. This is one way of emphasizing that the senior leadership's desire to reduce the size of the institutional Army does not lead to a reduction in all institutional activities. In fact, when we change the balance of priorities among relevant stakeholders outside the institutional Army, it is impossible to look at individual institutional activities in isolation. Realignment will succeed only if the Army leadership learns how to

link each institutional activity to the broader context in which it allocates its limited resources across the Army. Effective alignment of the institutional and operational portions of the Army means specifying this link in terms that are specific and concrete enough to guide specific resource changes within the institutional Army.

Figure S.1 brings together in a single diagram the points discussed previously. The “stewards” box summarizes the kinds of Army organizations that allocate authorizations for dollars and military personnel. The “institutional” box lists four qualitatively different kinds of activities that occur in the institutional Army. The “operational” box highlights four different ways to talk about operational priorities

Figure S.1
Relationships Relevant to the Alignment of Institutional Activities

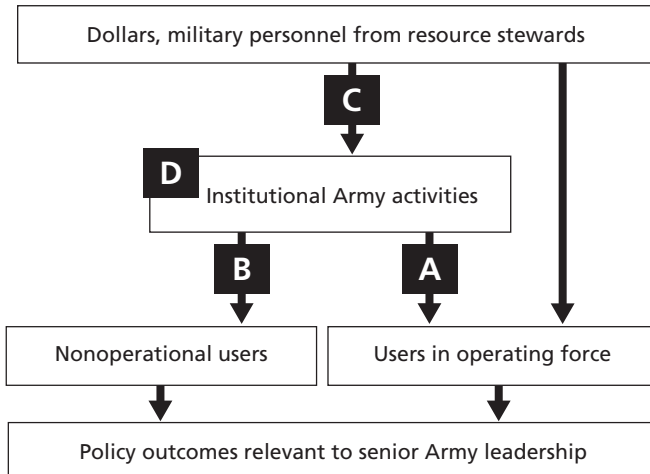


relevant to institutional activities. The “nonoperational” box highlights the users other than the operating force that the institutional Army supports. The flow from resource inputs through institutional activities to institutional outputs and policy outcomes ties these boxes together. Authorizations for dollars and military personnel flow into the Army, where DA-level resource stewards allocate these inputs to operational and institutional portions of the Army. The activities in the institutional Army convert the resource inputs they receive into institutional outputs that they then deliver to external operational and nonoperational users. These users apply the institutional outputs they receive in ways that affect policy outcomes relevant to the senior leadership of the Army. The contents of the boxes highlight topics that this monograph addresses in greater detail. Effective alignment of institutional and operational portions of the Army “appropriately balances” the priorities of the resource stewards that allocate dollar and personnel authorizations with the priorities of operational and nonoperational users of outputs from institutional activities. Resource stewards and users of institutional outputs seek to balance their priorities in ways that promote policy outcomes desired by the senior Army leadership.

The Information Requirements of Effective Alignment

Ongoing efforts to transform the Army presumably seek to change the balance among the interests of the stakeholders described above in ways that promote outcomes that senior Army leaders seek to achieve in the new, ever-unfolding political-military environment in which it operates. What information does the Army leadership need to coordinate this change? In our setting, information about where institutional activities touch the rest of the Army is important. Figure S.2 highlights four “touch points” where institutional activities (A) deliver outputs to operational activities, (B) deliver outputs to nonoperational activities, (C) draw resources from Army-wide resource stewards, and (D) change their internal processes in ways that could impose transitional effects at one of the other three touch points. Information likely

Figure S.2
Information Requirements of Effective Alignment



- A. Attributes of institutional outputs and how they affect the operating force
- B. Attributes of institutional outputs and how they affect other users
- C. Institutional resource requirements to achieve stated operational outcomes
- D. Characteristics of initiatives to improve institutional processes

RAND MG530-S.2

to be relevant at each touch point includes answers to the following kinds of questions:

- A. What outputs does each institutional activity produce and deliver to the operating force? What attributes of these outputs are relevant to operational capability? How does a change in each attribute affect operational capability?
- B. What are the answers to these questions for institutional outputs delivered to users outside the operational Army?
- C. Given the dollars and military personnel the Army has available to allocate over its planning period, what level of operational capability can it realistically expect to achieve by the end of that planning horizon? What allocation of dollars and military personnel does this entail between the operational and institutional parts of the Army?

- D. What process changes can each institutional activity make to enhance the attributes of its outputs that increase operational capability? What operational improvements will each of these institutional process changes effect? When? How much will each change cost? What allocation of dollars and military personnel does this entail between using institutional processes to produce current output and improving these processes?

The leadership's understanding of the answers to these questions may depend on professional military judgment or on detailed empirical data. Without such an understanding, the Army leadership cannot predict how reallocating the resources available to it will affect operational capability. It can observe the level of operational capability it achieves at any point in time. But it cannot know whether it can do better with the resources at hand or how it might do better. The sounder the information the leadership has to develop answers to the questions above, the more effective it can be at aligning institutional activities to the operating force in ways that improve operational capability. Our analysis strongly suggests that evaluation of value chains can provide the kinds of information Army leaders need to make the most informed decisions possible.

Evaluating Value Chains to Support Effective Alignment

Formal evaluation of value chains links policy *outcomes* to the government *resources* needed to produce them. It develops a consensus set of qualitative beliefs about how a value chain converts the *resources* that an agency consumes into agency *outputs* and then converts these outputs into policy *outcomes*. In our setting, evaluating value chains can use qualitative beliefs about the value chain to relate dollars and military personnel to the outputs of an institutional activity and then relate these outputs into operational capability outcomes. Some of the resources consumed directly produce current institutional outputs. Others are invested in process improvement to increase the institutional activity's ability to produce outputs in the future. The more precise beliefs are

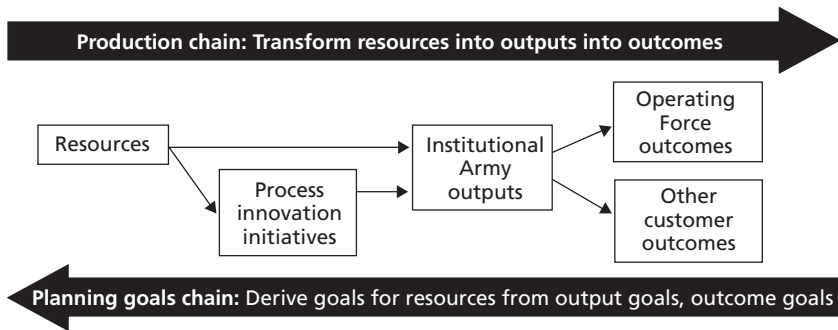
and the more carefully they are validated against real-world experience, the better. But the relationships in question are so complex that the Army must be prepared to start with simple sets of shared beliefs. As it learns where better information will add the most value, it can collect and analyze data to sharpen and validate these beliefs.

This basic approach provides a simple architecture for developing metrics that the Army can use to answer the four sets of questions above. Using shared beliefs about relationships among inputs, outputs, and outcomes as a guide, it first clarifies goals for operational capabilities and then uses them to derive goals for institutional outputs and finally goals for resource inputs. These cascaded goals provide the basis for choosing metrics that the leadership can use to coordinate change. Figure S.3 summarizes these points. The flow diagram in the middle illustrates a “production chain” derived from subjective beliefs about the relationships shown in Figure S.1. This production chain provides the basis for defining a corresponding “planning goals chain.” Transforming goals for outcomes, outputs, and resources into terms that the Army can measure and track defines a set of performance metrics the Army can use to clarify the leadership’s expectations about the alignment of its operational and institutional activities.

In particular, when assessing any specific institutional activity, our evaluation of the relevant value chains seeks the answers to four kinds of questions:

1. Who are the specific *stakeholders* outside the institutional Army that must agree on a plan that balances outcomes for users with inputs consumed by the institutional Army? What do they care about?
2. What specific *attributes of institutional outputs* do they care about? What metrics can the Army use to measure these attributes in a way that all relevant stakeholders understand?
3. What specific *improvements in attributes* of institutional outputs are feasible to pursue? How long will they take? What will they cost?

Figure S.3
Generic Value Chain That Aligns the Operating Force and Institutional Army



RAND MG530-S.3

4. What specific *resources*—numbers of dollars and military personnel—must the Army allocate to the institutional Army to achieve any desired level of institutional output attributes?

Formal evaluation of a value chain offers a rigorous, disciplined way to develop metrics that the Army can use to discuss these questions, reach high-level agreement on them, and track progress relative to any set of answers agreed to. This monograph applies value chain evaluation to develop illustrative sets of metrics relevant to three of the four categories of institutional Army activities described above—personnel assets; materiel and information assets; and global, end-to-end service support.

To illustrate here how we developed and applied answers to the four sets of questions above, we present the elements of the model of the value chain we developed for activities related to materiel and information assets, based on short-term acquisition. This is the simplest of the three models of value chains that we developed here.

Short-term acquisition rapidly meets new materiel challenges and addresses technological challenges that emerge during a deployment. It uses high-level focus and integration to accelerate existing acquisition processes and to develop solutions to problems in an operational setting. Consider the four sets of questions in turn.

Who are the relevant *stakeholders*? Three sets of Army stakeholders outside the institutional Army are important to short-term acquisition:²

- *Unit commanders and soldiers.* Unit commanders care about the ability of their soldiers to function effectively. The soldiers want to avoid buying mission-related items that the Army can get for them through short-term acquisition.
- *Resource stewards.* G-3 monitors the requirements for military personnel generated by short-term acquisition. G-8 and the Comptroller monitor the requirements for dollars.
- *Others.* The Vice Chief of Staff uses his personal authority to make short-term acquisition work and justifies that application of his limited leadership resources by verifying that the activity has sufficient demonstrable effects on deployed force capability. The Secretary and Chief of Staff of the Army monitor short-term acquisition for ideas about how to transform acquisition as a whole.

What *output attributes* do these stakeholders care about? Each stakeholder can benefit from metrics that assess how well short-term acquisition operates relative to their goals. Their goals can be framed in terms of output attributes, such as the following: speed or responsiveness of acquisition, effect on operational mission performance, effect on risk to the mission or soldier, effect on soldier purchases of mission-related materiel, cost-effectiveness of the acquisition process itself, and degree to which new ideas migrate from short-term acquisition to other acquisition activities. Metrics can be developed for each of these. Speed and responsiveness, for example, can be measured, in this context, in a variety of ways, including the following: percent of a unit's

² Of course, other stakeholders exist outside the Army, including civilian and military leaders of the Department of Defense (DoD) who oversee the Army and integrate it into a joint force, the Office of Management and Budget, and members of Congress. Even as DoD moves toward greater joint integration, design and oversight of Army institutional activities remain responsibilities of the Army leadership. In their roles as stakeholders in short-term acquisition, the Army leaders named here bring to bear the interests of other stakeholders external to the Army.

kit filled when it deploys, the percent of kit available at some stated last acceptable date, or number of days required to provide newly identified items.

Looking across all institutional activities, stakeholders outside the institutional Army tend to emphasize specific elements of four types of attributes of an institutional output: throughput capacity, quality, speed or responsiveness, and resource costs. Throughput measures the rate at which an institutional activity can deliver output—for example, number of battalions mobilized, number of individuals trained, or number of tons transported per period of time.

Quality rises when the match improves between what the operating force wants and what an institutional activity delivers when it delivers an output. Quality rises, for example, as the match between skills demanded and skills delivered increases, reliability of repair increases, or the match increases between the schedule demanded for delivery and the schedule met in delivery. Speed and responsiveness are elements of quality that receive so much attention today that we have broken them out. Speed increases as the time between an operational request and an institutional delivery falls. Responsiveness increases as an institutional activity's ability to change direction in the face of new operational priorities increases—in terms of calendar time or match between new requirements and delivered capabilities.

Costs increase as the operating force must commit more of its own resources to accept an output from an institutional activity. For example, if an institutional logistics activity improves how it packages items shipped to theater, operational units can cut their costs by using fewer man-hours to accept, sort, and deliver the items to recipients in theater. If a working capital fund institutional activity reduces the price it charges for items it delivers to the operating force, the operating force faces lower costs, because a given operations and maintenance budget can now buy more from the institutional Army.

What *process improvements* could affect output attributes relevant to these stakeholders? A variety of process changes could potentially improve the performance of short-term acquisition relative to attributes that its stakeholders care about. For example, the use of Web pages could simplify the process of choosing candidate items to acquire rap-

idly, affecting mission performance and soldiers' need to buy their own equipment. Selection of prequalified sources could speed execution of materiel and research and development services, improve the quality of services delivered, and reduce costs. The standard metrics used in current acquisition programs can be used to measure and track progress toward goals on performance (i.e., how an improvement changes an attribute relevant to a stakeholder), schedule, and cost.

What *resources* does the activity consume? Short-term acquisition consumes very few military personnel but large sums of money. The Rapid Fielding Initiative, for example, spent \$991 million in FY 2005. Some of these dollars and personnel are consumed in clearly identified activities and can be fairly easily tracked. The institutional Army consumes other dollars and personnel in supporting activities—for example, installation, logistics, information, personnel, and business—that do not charge short-term acquisition activities for their services. The dollars and personnel consumed in these activities should be allocated to the institutional outputs that they support. Doing this in the Rapid Equipping Force, another element of short-term acquisition, is a special challenge because so much of this activity involves expediting and integrating materiel testing and procurement activities in Army activities not primarily identified with short-term acquisition. The dollars and personnel consumed in these expedited and integrated activities should be allocated to short-term acquisition.

Similar resource issues arise in any institutional activity the Army wants to align to the operating force. The Army currently has a very limited ability to associate military dollar and personnel costs with specific institutional outputs. When an activity produces more than one important output—for example, training of military doctors and direct medical support of a deployed force—the Army has no well-defined way to allocate the resources that the institutional activity consumes directly among these outputs. When institutional activity A—for example, a combat training center—receives inputs from institutional activity B—for example, acquisition of weapon systems—without paying for them, the Army has no well-defined way to allocate the resources that activity B consumes to the outputs that activity A delivers to the operating force. If the Army were to shift spe-

cific training responsibilities from institutional schoolhouses to operational units, the Army could not easily predict the effect of the change on institutional or operational demands for dollars or military billets (much less the real readiness of operational units).

The Way Forward for Policy

Using metrics to improve the performance of the institutional Army is not a new idea. It is closely related to two other Army initiatives currently under way. But the way we derive metrics from a set of shared subjective beliefs about a value chain provides a way to move beyond these initiatives in important ways.

Expand the Strategic Management System to Capture Alignment Targets

The Army Strategic Management System (SMS) is developing a hierarchical suite of metrics that, as it is implemented and used to support decisionmaking, could help align policy and resource decisions throughout the Army with the priorities of the leadership. As a version of balanced scorecard, that is what the SMS is supposed to do. Elements of the approach to evaluating value chains above closely parallel the four perspectives highlighted in a balanced scorecard: operating force performance is one *user* perspective; delivery of institutional outputs is an *internal process* perspective; institutional process improvement is a *growth and learning* perspective; and institutional resource requirements constitute a *resource* perspective. The metrics relevant to the alignment of the operational and institutional portions of the Army could, in effect, comprise the portion of a balanced scorecard that looks forward to a desired future level of performance. As the SMS expands its focus from current readiness to planning, the metrics described here could become an integral part of the SMS. For now, because they focus on the benefits and costs of process change, the metrics described here differ qualitatively from those in the current SMS, which mainly focus on the performance of existing Army processes relative to current performance targets.

Place Institutional Lean Six Sigma Initiatives in a Broader Operational Context

Lean Six Sigma initiatives throughout the Army are developing ways to make individual processes better, faster, and cheaper. Because these initiatives are designed and implemented locally, they tend to focus on performance metrics relevant to individual local processes. For example, a depot-level maintenance initiative might release resources to the operating force by increasing the utilization rate of depot maintenance assets. Such an initiative could also inadvertently reduce overall support to deployed forces by increasing customer wait times—a performance factor potentially beyond the scope of the local depot initiative. By explicitly cascading performance priorities from the operating force, the approach to evaluating value chains described above seeks a system view that would discourage such dysfunctional local process “improvements.” In effect, the evaluation of value chains can provide a higher-level context in which to frame Lean Six Sigma initiatives, which can then pursue Army-wide goals at the local level. Value chain evaluation also generates higher-level information that the Army leadership can use to understand how parts of the institutional Army fit together and hence how reallocations of resources among local institutional processes might affect operational capability. Lean Six Sigma tends to focus inside local processes and is not typically used to improve allocation of resources across separable processes.

Develop Better, Empirically Based Information Relevant to Alignment

Because the approach to evaluating value chains described above looks beyond current Army initiatives, it underscores the desirability of additional, empirically based information that existing Army methods and processes currently cannot generate. Some examples of particular importance include the following:

- *The total dollars and military personnel that the institutional Army requires to produce specific levels of institutional outputs with specific attributes.* Formal evaluation of value chains could frame the

application of activity-based costing to ensure that it addresses the questions relevant to alignment.

- *Specific operational goals beyond the first few years of the Future Years Defense Program that can be used to motivate and prioritize investment in specific initiatives to improve processes within institutional activities.* Currently, individual institutional initiatives typically do not flow from specific future desired operational outcomes that the Army leadership could use to compare them, choose among them, and maintain accountability for results.
- *Broadly understood qualitative assessment of the quality of specific institutional outputs delivered to the operating force.* The Army currently lacks a broadly shared qualitative language that operators and institutional leaders could use to characterize goals for quality and to sustain accountability against these goals.
- *Well-defined information on how changes in specific attributes of institutional outputs affect specific aspects of operational capability.* Today, the Army typically relies much more heavily on professional military judgment than on empirical evidence to assess the likely operational usefulness of specific changes in institutional outputs.
- *Broad agreement on how the versions of operational capability described above—the four that focus on high-level policy, broad performance concept, mission risk, and readiness—relate to one another and so how to trade off among institutional outputs whose effects on the operating force the senior leaders understand in terms of different versions of operational capability.* If leaders use, say, personnel readiness to characterize the operational effects on one institutional change (e.g., the number of accessions delivered per period) and, say, mission risk to characterize the operational effects of another institutional change (e.g., the personal characteristics of recruits or the content of the training that recruits receive), but do not agree on how personnel readiness relates to mission risk, then it becomes hard to align goals within the operating force, much less goals in the operational and institutional parts of the Army.

As noted previously, the Army can continue to rely on professional military judgment to provide the information it needs to reallocate resources in ways that improve the alignment of the operating and institutional parts of the Army. But the better the information described in the bullet points above, the better able the Army will be to reallocate resources in ways that promote the long-term goals of operational transformation. The leadership must decide how much it wants to invest in improving this kind of information. Formal evaluation of value chains can help the Army determine where it is likely to be cost-effective to invest in methods and processes that can generate better, empirically based metrics. Alignment should improve as the information used to frame it improves. But the Army clearly has to weigh the value of refined alignment against the costs of collecting the information required to allow such refinement.

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Abbreviations

ABM	activity-based management
ACP	Army Campaign Plan
AFPMB	Armed Forces Pest Management Board
AFQT	Armed Forces Qualifying Test
AMC	Army Materiel Command
AMEDD	Army Medical Department
APS	Army Posture Statement
AR-MEDCOM	Army Reserve Medical Command
ARFORGEN	Army Force Generation [model]
ARNG	Army National Guard
AROC	Army Requirements Oversight Council
ASBPO	Armed Services Blood Program Office
ASCC	Army Service Component Command
ASD/HA	Assistant Secretary of Defense for Health Affairs
ASOS	Army support to other services
ASPG	Army Strategic Planning Guidance
ASVAB	Armed Services Vocational Aptitude Battery

ATRRS	Army Training Requirements and Resources System
AUGTDA	Augmentation Table of Distribution and Allowances
BCT	brigade combat team
BMIS-T	Battlefield Medical Information System–Telemedicine
BRAC	Base Realignment and Closure
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CHCS II	Composite Health Care System II
CHCS II-T	Composite Health Care System II—theater version
CONUS	continental United States
COTS	commercial off-the-shelf
CSA	Chief of Staff of the Army
CSH	combat support hospital
DA	Department of the Army
DEP	Delayed Entry Program
DHP	Defense Health Program
DMSS	Defense Medical Surveillance System
DNBI	disease and non-battle injury
DoD	Department of Defense
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel, and facilities
EA	executive agency

FCS	Future Combat System
FORSCOM	U.S. Army Forces Command
FST	forward surgical team
FY	fiscal year
FYDP	Future Years Defense Program
GEIS	Global Emerging Infections Surveillance and Response System
GOTS	government off-the-shelf
HMMWV	high-mobility multipurpose wheeled vehicle
HQDA	Headquarters, Department of the Army
IA	institutional Army
IGPBS	Integrated Global Presence and Basing Strategy
JDES	joint deployment, employment, and sustainment
MACOM	major command
MBCT	modular brigade combat team
MEDCOM	Medical Command
MEDEVAC	medical evacuation
MEPS	military entrance processing station
MHO	medical holdover
MIDRP	Military Infectious Disease Research Program
MILVAX	Military Vaccine [Agency], formerly Anthrax Vaccination Immunization Program
MODS	Medical Operational Data System
MOS	military occupational specialty

MPT	manpower, personnel, and training
MRI	Medical Re-engineering Initiative
MSC	major subordinate command
MTF	medical treatment facility
MTOE	Modified Table of Organization and Equipment
NAAD	National AMEDD Augmentation Detachment
NATO	North Atlantic Treaty Organization
NMS	national military strategy
NSS	national security strategy
NTE	not to exceed
O&M	operations and maintenance
OCAR	Office of the Chief, Army Reserve
OF	operating force
OIAA	Office of Institutional Army Adaptation
ONS	operational needs statement
OOTW	operations other than war
OpSD	operating strength deviation
ODCSOPS	Office of the Chief of Staff for Operations and Plans
OSD	Office of the Secretary of Defense
OTSG	Office of the Surgeon General
PMAD	Personnel Manning Authorization Document
POM	Program Objective Memorandum
PROFIS	Professional Officer Filler System

R&D	research and development
RCC	regional combatant command
RDT&E	research, development, test, and evaluation
REF	Rapid Equipping Force
RFI	Rapid Fielding Initiative
RMC	Regional Medical Command
SBCT	Stryker Brigade Combat Team
SMDR	Structure Manning Decision Review
SOFA	Status of Forces Agreement
SORTS	Status of Resources and Training System
SASO	stability and support operations
SMS	Strategic Management System
SRP	soldier readiness processing
SRC	standard requirements code
SRS	Strategic Readiness System
SUA	support unit of action
TAA	Total Army Analysis
TDA	Table of Distribution and Allowances
TOE	Table of Organization and Equipment
TRADOC	Training and Doctrine Command
TRAP	Training Arbitration Panel
TSG	The [Army] Surgeon General
TSM	TRADOC System Manager
TTHS	trainee, transient, holdee, and student

UA	unit of action
UE	unit of employment
USAREC	U.S. Army Recruiting Command
USAREUR	U.S. Army Europe
USARPAC	U.S. Army Pacific
USASOC	U.S. Army Special Operations Command
VCSA	Vice Chief of Staff of the Army

Introduction

The U.S. Army is in the middle of the largest effort to restructure itself since the end of World War II. The broad outlines of the effort are well known.¹ The Army is modularizing its operating force, making it easier to custom-tailor forces to a combatant commander's new deployment requirements in a joint setting. It is seeking to rebalance the light and heavy Army forces available for deployment and to rebalance the forces maintained in the active and reserve components that support these deployments. It is seeking to stabilize personnel in more regular training and deployment cycles to increase the effectiveness of the forces deployed and reduce the costs of repeated deployments on them and their families. It wants to bring more of its forces home and support deployments with more units permanently based in the United States rather than overseas.²

The most visible effects of these changes, and the ones most discussed in the general and Army media, occur in the Army's operating force itself. But these changes have profound implications, still being worked out, for the institutional Army that sustains current doctrine, trains and equips troops, conducts research and development (R&D) and acquisition activities, and houses and supports all these activities, among many other things. As the operational force changes in structure and size, the institutional activities that support operational units

¹ For a useful, recent summary, see LTG James J. Lovelace, "The Army Modular Force," *Assembly (Association of Graduates, U.S. Military Academy)*, July/August 2005.

² Appendix A provides some additional detail relevant to discussions that follow.

most directly must change to make the new operational structures possible. And somebody has to pay for all this change. In the absence of increased congressional funding and higher military end-strength constraints, institutional activities must give up resources—dollars and military personnel—to pay for the new operational priorities. Institutional activities can do this by shrinking and providing lower levels of service or by increasing their productivity so that they can support the new operating force with fewer dollars and military personnel.³

This monograph addresses the challenge of how the Army leadership can coordinate, at a high level, the range of changes that must occur in institutional activities to make the ongoing and anticipated changes in the operating force possible. It addresses one specific aspect of that challenge—how the leadership can tell the major commands (MACOMs) that provide institutional activities how it wants them to change those activities and then work with them in a coherent, well-informed manner to ensure that the change occurs as intended. As an integral part of this aspect of the challenge, the document also asks how the MACOMs can communicate to the leadership what resources they will need to provide the levels of institutional performance demanded and negotiate with the leadership in a open and well-informed way to formulate realistic plans for change.

This monograph proposes that a set of performance metrics can help the Army leadership and MACOMs work together to coordinate coherent changes in institutional activities that support ongoing changes in the operating force. It uses formal evaluation of value chains to translate high-level goals in the operating force into actionable goals in specific institutional activities and, finally, into goals for the resources that will be available to these activities to achieve the goals proposed. These goals, in turn, provide the basis for developing metrics that the

³ For useful ideas on how to change the institutional Army to reflect operational concepts that have been emerging over the last decade, see Headquarters, Department of the Army, Pamphlet 100-1, *Operations: Force XXI Institutional Army Redesign*, Washington, D.C., 1998; Henry A. Leonard et al., *How Will AAN Change the Institutional Army? A Framework for Assessing the Issues*, unpublished RAND research, 1999; and William Michael Hix et al., *Breaking the Phalanx: Implications for the Institutional Army*, unpublished RAND research, 2002.

leadership can use to make the goals as concrete as possible without actually telling the MACOMs how to meet the goals.

Some Important Words

This document uses a number of simple words in ways that readers from different backgrounds might understand in different ways. We attempt to use these words in ways that are compatible with usage in standard process analysis of integrated value chains. For clarity, here is a quick overview of how we use a number of key words in our analysis. The chapters that follow will explain in greater detail why we have chosen to use these definitions and how that choice affects our analysis.

- *Activity*. An activity is an entity that executes some specified task. To do this, it applies one or more processes to convert inputs to the activity into outputs from the activity. It often transcends organizational boundaries. In this document, we focus on “institutional activities”—that is, tasks that occur inside the institutional Army. Analogous activities occur in the operating force and elsewhere. (Example: Accessioning enlisted personnel.)
- *Input*. We give special attention to inputs to institutional activities. We focus on two resources that the Army manages subject to a variety of Army-wide constraints: dollars and the services of military personnel. In our approach, institutional activities “convert” these into outputs that the institutional Army can deliver to external users.⁴ (Example: Number of dollars.)
- *Process*. A process is the central object of observation in process analysis. It is one or more steps that, taken together, receive and manipulate physical, information, or other inputs, converting them into physical, information, or other outputs. One process can feed another process; one process can contain several sub-

⁴ Standard process analysis normally speaks of processes that *transform* inputs into outputs. Because *transformation* has a substantive policy meaning in our context that is quite different from this process interpretation, we speak throughout of processes that *convert* inputs into outputs.

processes. Processes lie within activities, but they often transcend organizational boundaries.⁵ When we speak of changes in institutional activities, we normally characterize them as changes in the processes that lie within these activities. (Example: Assessment of aptitude for occupational tasks relevant to military service.)

- *Resource stewards.* These stewards are the Army organizations that allocate dollars and military personnel among activities in ways that are compatible with Army-wide constraints. (Examples: Army Comptroller, G-3.)
- *Outputs.* Outputs can be any product of a process. We focus our attention on one set of outputs—the products that institutional activities deliver to external users. (Example: Cohorts of enlisted personnel delivered to operational units.)
- *Users.* Users are the individuals or organizations that receive and use the outputs of a process. We focus our attention on users outside the institutional Army that receive outputs from the institutional Army. (Example: Deployed military commanders.)
- *Attributes.* Attributes are characteristics of outputs that users value. We choose them explicitly to describe outputs in ways that allow users to highlight what they expect from an output. We try to choose them explicitly *not* to reflect characteristics that are relevant only to the activities that produce them. One way to clarify our focus is to say that we seek attributes that focus on *what* added value an output might generate for a user, not on *how* a process owner created the output in an institutional activity. (Example: Quality of the match between the capabilities military commanders need and capabilities provided by a cohort, not number of graduates of a specific training program.)
- *Outcomes.* Outcomes are the ultimate products of an end-to-end chain of processes that are relevant to high-level policy. In our setting, institutional activities can influence outcomes rele-

⁵ We maintain this distinction everywhere but in Chapter Three, which discusses Army efforts to change the institutional Army. Because these efforts typically do not distinguish processes from the activities in which they reside, we do not attempt to sustain the distinction when discussing these efforts in Chapter Three.

vant to Army leaders by delivering outputs to external users that promote certain outcomes. But processes beyond the control of institutional activities—processes that external users control—determine the ultimate effects that institutional outputs have on policy outcomes. (Example: Degree of success in achieving an operational commander's intent.)

- *Stakeholders.* In our analysis, we focus on stakeholders outside the institutional Army with a stake in what happens inside the institutional Army. We give special attention to users of institutional outputs and resource stewards for inputs to institutional activities. We view efforts to change the institutional Army as efforts to balance the priorities of the stakeholders that use institutional outputs and provide inputs to institutional activities. In selected circumstances, when other organizations are relevant to this balance, we include their interests in the analysis. (Examples: Army Comptroller, military commanders.)
- *Goals.* The Army can set goals for the inputs and outputs associated with every process or activity that contributes to a policy outcome. We focus on a select set of goals that are relevant to the stakeholders outside the institutional Army that seek to shape change inside institutional activities. Goals for policy outcomes describe what the Army leadership seeks to achieve by some stated future date. Our analysis uses qualitative models of relevant activities and processes within them to structure an ongoing discussion within the Army that translates goals for policy outcomes into goals for the attributes of institutional outputs and the levels of inputs the Army must commit to institutional activities over time. (Example: Match between needed and provided capabilities good enough to allow an operational force to achieve its commander's intent.)
- *Performance metrics.* Metrics are observable factors that the Army can measure, qualitatively or quantitative. In our analysis, they define key dimensions relevant to goals. Our analysis of performance metrics focuses on the characteristics of inputs to institutional activities and outputs from institutional activities that are relevant to stakeholders outside the institutional Army. These

stakeholders state their goals for these characteristics in terms of target levels or standards for specific performance metrics. (Example: Percent fill rate against stated operational requirements.)

- *Alignment.* The senior Army leadership's clearly stated intent is to improve the alignment of the institutional and operational portions of the Army. We effectively argue that alignment improves when the balance among the interests of stakeholders external to the institutional Army improves. That means that transformation of institutional activities changes flows of inputs and outputs in ways that advance the interests of one stakeholder without harming the interests of the others. (Example: The operational capability of military commanders improves without increasing resource requirements in institutional activities or degrading institutional outputs delivered to nonoperational users.)

Road Map

Chapters Two through Four explain our basic approach. Chapter Two provides some basic context for developing such metrics by explaining briefly what activities comprise the institutional Army, how they fit together, how they support the operating force, and what else they do. Chapter Three then reviews high-level statements of the Secretary of the Army and Chief of Staff of the Army and uses them, in conjunction with the objectives enumerated in the Army Campaign Plan (ACP), to clarify their high-level priorities for transformation. It clarifies where these priorities are likely to be most relevant to the institutional activities identified in Chapter Two. We focus our attention on these activities. Chapter Four provides basic background on the evaluation of value chains and explains how it can help the Army translate the high-level priorities of the Secretary and Chief into specific goals for institutional activities. It also relates our effort to a related system of metrics based on the balanced scorecard, the Army's Strategic Management System (SMS). In effect, Chapter Four explains that we seek a

longer-term version of the kinds of links between high-level goals and resources that the SMS provides for current operations.⁶

Chapters Five through Seven present examples of high-level performance metrics relevant to leadership expectations about future performance for three institutional activities—medical services, accession of new enlisted personnel, and accelerated acquisition of materiel relevant to a deployed force. We highlight these three institutional activities for three reasons.

First, each is a useful example of a broader group of institutional activities identified in Chapter Three. As explained in Chapter Five, medical services share many important attributes relevant to metrics with logistics, base support, and information services that the institutional Army provides for operating units. Accessions is the first activity in a complex web of institutional activities that generate the mix of personnel skills and experience required to staff operating units; Chapter Six explains where accessions fits in this broader web of activities and how they affect the metrics relevant to accessions. And accelerated acquisition of materiel is the portion of the Army's requirements development and acquisition system that is closest to the warfighter. As Chapter Seven explains, the metrics for accelerated acquisition can tell us about this specific activity; they also reveal useful insights into how the Army's broader requirements development and acquisition system might look in the future.

Second, each of these institutional activities is of particular importance to the Army leadership in its own right. Medical services address the immediate support of troops in theater and of wounded soldiers when they return from theater; both receive broad attention in

⁶ In more formal terms, organizational analysts might say that this approach seeks to translate the “cathetic” guidance that the Secretary and Chief of Staff provide into “cognitive” goals that high-level decisionmakers in Headquarters Department of the Army and the major commands of the institutional Army can negotiate about and act on. Cathetic guidance is designed to motivate participants and help “overcome opposition and garner resources from the environment.” More precise cognitive goals are required to allow decisionmakers to generate and select among alternative courses of action or to “provide directions for and constraints on decision making and action.” For a more formal discussion of the challenge addressed here, see W. Richard Scott, *Organizations: Rational, Natural, and Open Systems*, 5th edition, Upper Saddle River, N.J.: Prentice Hall, 2003, pp. 292–304.

the general media's coverage of the war in Iraq and Afghanistan today. The challenge to Army accession activities has been unprecedented in recent years. At the very time that the Army might want to expand the size of the enlisted force to support its current and projected missions, it is having difficulty attracting the number of young people it needs now to support the current-sized force. And accelerated acquisition is so important to the Army leadership that the leadership has created special new organizations to help break down the barriers to speed in existing acquisition processes and placed one such activity, the Rapid Equipping Force, under the direct oversight of the Vice Chief of Staff to ensure that barriers come down. Joint policy is emulating Army policy on accelerated acquisition.

Third, each of these institutional activities illustrates important principles likely to be important in the development of metrics for other institutional activities. Medical services are easily the largest and most complex of the three and may be the most complex activity in the institutional Army. It must be clarified that institutional activities do other important things besides support the operating force—medical services support military dependents and retirees as well—and the Army must balance these other goals with goals linked to the operating force. Medical services illustrate the challenge of drawing a bright line between operational and institutional activities in an integrated, global end-to-end support system. And they illustrate the importance of coordinating Army goals, metrics, and planning with their counterparts outside the Army—in this case, in the Defense Health Program, which the Army helps staff but has only limited control over. Accessioning activities illustrate the challenges that arise when one institutional activity is closely integrated with another. It is easy to say that everything is connected to everything else in the Army's manpower, personnel, and training (MPT) systems. It is hard to break them apart to make the development of metrics manageable while still maintaining the link between the operating force and the resources committed to accessioning and each of the other MPT activities. Accelerated acquisition illustrates the challenge of planning for an activity that is inherently unstable. Historically, this activity has come and gone as the demand has arisen in wartime. What its future role will be in an

extended global war on terrorism is hard to pin down. And even when the activity is active, the way that demand from the operator tends to drive the activity means that the level and content of the activity continually changes. Accelerated acquisition brings institutional activities as close to the operating force as they can come without changing sides and subjects institutional activities to a level of uncertainty and high priority closely comparable to those in the operating force itself in many ways.

Chapter Eight revisits the basic problem of aligning the operating force and the institutional Army, outlines a strategic approach to doing this, and explains the promise and challenges associated with evaluating value chains, as one tool in this strategic approach, to develop a high-level vision based on performance targets.

Six appendixes provide additional information on selected topics. Appendix A offers more detail on how the operational Army is transforming and how manpower, personnel, and training activities fit together in the emerging Army. Appendix B documents the economic assumptions underlying the input-output model of the Army discussed in Chapter Three. Appendix C lists the major objectives of the Army Campaign Plan that we used to give more concrete form to the Army's transformation goals. Appendix D provides background on our analytic approach to mapping value chains that link operational and institutional parts of the Army and relates this approach to formal logic modeling. Appendix E provides additional detail on medical services and how the Army intends to transform them. Appendix F describes the Army's Strategic Management System and explains how it relates to a balanced scorecard and to the metrics we propose in this monograph.

The Institutional Army and Its Place in the U.S. Army

What exactly is the institutional Army? And how does it relate to the operating force? This chapter addresses these questions. It starts by briefly reviewing three different ways of defining the institutional Army and suggests that, for our purposes here, what they have in common is more important than how they differ. It uses these definitions to examine where the Army places its senior leadership. It presents a high-level overview of institutional outputs, the activities that produce them, and how they relate to one another. Given these outputs and activities, it offers a high-level look at how efforts to expand the Army's operational capability within tight resource constraints is likely to affect different parts of the institutional Army. Taken together, these high-level snapshots provide a broad context for the discussions that follow.

Alternative Definitions of the Institutional Army

At least three ways exist to decide whether an activity should be treated as part of the institutional Army. Table 2.1 summarizes them. In the context of the 2004 Army Campaign Plan, HQDA (Headquarters, Department of the Army) has focused on activities identified in Title 10 of the U.S. Code. HQDA has treated functions assigned to the Secretary of the Army in Section 3013(b) as, by definition, *institutional*.

They include the following:

- (1) Recruiting.
- (2) Organizing.
- (3) Supplying.
- (4) Equipping (including research and development).
- (5) Training.
- (6) Servicing.
- (7) Mobilizing.
- (8) Demobilizing.
- (9) Administering (including the morale and welfare of personnel).
- (10) Maintaining.
- (11) The construction, outfitting, and repair of military equipment.
- (12) The construction, maintenance, and repair of buildings, structures, and utilities and the acquisition of real property and interests in real property necessary to carry out the responsibilities specified in this section.¹

¹ United States Code, Title 10, Armed Forces, Chapter 303, Department of the Army, Section 3013, Secretary of the Army, January 19, 2004. This is the actual language underlying the idea, associated with the Goldwater-Nichols Act, that the Army is responsible for “organizing, training, and equipping” the force (Public Law 99-433, Goldwater-Nichols Department of Defense Reorganization Act of 1986, 99th Congress, October 1, 1986, Sec. 501). That is, it is more appropriate to think of 10 U.S.C. 3013(b) as distinguishing the responsibilities of the Department of the Army and the combatant commanders than those of the operational and institutional portions of the Army itself.

Table 2.1
Different Ways to Distinguish Operational from Institutional Activities

Option	Operating Force	Institutional Army
Roles and responsibilities identified in Title 10	Forces the Army maintains for combatant commanders to use in contingencies	Organizes, trains, and equips forces maintained for combatant commanders to use in contingencies
Type of manpower document used	Modified Table of Organization and Equipment (MTOE)	Table of Distribution and Allowances (TDA)
Treatment in Total Army Analysis (TAA)	Operating Force	Generating Force

Title 10 assigns other responsibilities to the Secretary, but HQDA normally focuses on these 12 in its discussions of the institutional Army. For example, the Office of Institutional Army Adaptation built its working group structure to reflect these categories closely. Practical application of this language requires users to recognize that substantial responsibilities for supplying, training, servicing, maintaining, and so forth, the operational force in fact lie within the operational force. So Section 3013, by itself, is not sufficient to yield a usable definition of the institutional Army.

One very simple way to decide whether an activity is operational or institutional is to ask whether the organization that conducts the activity is defined by an MTOE or a TDA document. MTOEs define the mission and structure of organizations staffed solely by military personnel and derived from a standard Table of Organization and Equipment (TOE) that allows quick integration of these military units with other military units into a cohesive, deployable military force that can meet the stated needs of a combatant commander. TDAs, on the other hand, define organizations staffed by military and government civilian personnel that are tailored to the needs of a particular fixed location. Although they can be and occasionally are deployed, TDA organizations usually stay in one place and, over time, customize themselves to the needs of that locale. These characteristics suggest that the collection of all MTOE organizations in the Army could comprise the operational Army and that the collection of

all TDA organizations could comprise the institutional Army.²

A slight variation on this approach would associate (1) combat or operating activities with the operating force and (2) support or generating forces with the institutional Army. Viewed in this way, for example, the Army Force Management School would place the following “generating force” organizations, with 207,000 active and reserve military billets, in the institutional Army:³

- Army staff
- U.S. Army Forces Command (FORSCOM) headquarters
- Training and Doctrine Command (TRADOC)
- Army Materiel Command (AMC)
- Corps of Engineers
- Medical Command (MEDCOM)
- Military District of Washington
- Intelligence and Security Command
- Criminal Investigation Command
- Surface Deployment and Distribution Command
- Space and Missile Command
- U.S. Military Academy.

The school would place the following “operating force” organizations, with 788,000 military billets, in the operational Army:

- Army headquarters and Army supporting component commands
- Corps
- Active and reserve divisions
- Special operations forces.

² Augmentation TDAs (AUGTDAs) complicate this picture a bit. Organizations defined by these documents use military, government civilian, and/or contractor capabilities to support TOE organizations in ways that help the TOE organizations perform peacetime missions separable from the formal wartime requirements listed in their TOE documents. Despite their close association with the TOE Army, AUGTDA organizations usually fit more comfortably in the institutional than in the operational Army. Because they account for such a small fraction of the total force, we do not consider them in any detail.

³ LTG Richard G. Trefry (Ret.), “Preface to the Foxhole,” briefing, Army Force Management School, Ft. Belvoir, Va., April 2004.

The TAA process divides the Army in a very similar way but defines the generating force from a functional rather than an organizational perspective. The TAA-11 cycle of the TAA, for example, viewed the generating force—and by inference here, the institutional Army—in terms of the functions identified in Table 2.2.⁴

These three perspectives differ for two reasons. First, they use different factors to slice the Army in two, inevitably leading to somewhat different slices. The Title 10 approach, as it is normally applied, focuses on roles and responsibilities. The document approach focuses on how the manpower community approaches a particular activity. The TAA approach splits the Army by functional skill. A variation on the TAA approach splits it along organizational lines. These splits inevitably lead to differences. Fortunately, because the splits are trying to do very similar things, the differences are small. These differences do create some tension at the margins between these perspectives. Why, for example, are military bands and honor guards housed in MTOE activities even when they are attached to fixed locations and tend to support nonoperational activities? Why are engineering and logistics activities in TDA organizations deployed forward during contingency operations? Reasonable answers can be offered in each case, but they do not seem to settle differences of opinion. The local circumstances that create these unusual circumstances are the second reason for differences. The three perspectives accommodate these local differences in different ways, often at apparent odds with the central organizing principles of the perspectives.

These differences are important to the manpower community responsible for improving the administration of the Army. They are not important to us. Looking to the future, the senior Army leadership

⁴ The numbers in the chart are pre-decisional requirement levels in use in August 2003. We avoid using more recent numbers, since they might be currently pre-decisional. The qualitative patterns shown in the table have not changed. The Generating Force also makes heavy use of contractor manpower. No one knows for sure how Army use of contractor manpower is distributed across functions or what total level of contractor manpower the Army uses. Estimates around 240,000 are considered reasonable.

Table 2.2
Government Manpower Required in Generating Force

Activity	Total (thousands)	Military (thousands)	DA civilian (thousands)	% Military
Training	133	99	33	74
Medical	63	35	29	56
Army management headquarters	60	41	19	68
Installations	45	6	39	13
Sustainment	40	4	36	10
Acquisition and fielding of systems	26	3	23	12
Personnel management	23	16	8	70
Security	15	5	10	33
Readiness and mobilization	13	7	6	54
Information management	10	2	8	20
Intelligence	9	5	4	56
Total	437	223	214	51

NOTE: The numbers in the table are requirements at the beginning of the TAA-11 review of the Generating Force, August 2003. Department of the Army (DA) civilians are Army civilian government employees. Contractors play a key role here; no reliable counts of contract employees are available. Typical total counts of contract manpower equivalents lie in the range of 240,000 to 270,000. No reliable breakdowns are available by activity.

is concerned with the organization of the institutional Army as a whole. The perspectives above agree almost entirely on what activities the senior leadership should include in its oversight of the institutional Army. Differences will always exist, but they are of second-order importance when the Army looks forward to the end of the Program Objective Memorandum (POM) and beyond.

We take a pragmatic approach to defining the institutional Army here, using whichever of these definitions facilitates the use of available data. If we must choose, we tend to prefer the document approach for its simplicity. An activity is in the institutional Army if it occurs in an

organization staffed according to a TDA document. The broad simplicity and clarity of this approach outweigh any difficulties that arise when we look at eaches. At the level of the analysis presented here, difficulties associated with eaches are irrelevant. More important, a key lesson we have learned in executing this analysis has been to appreciate the connections between the operating force and the institutional Army, however these parts of the Army are defined. Seeing the connections and continuities is far more important than refining any definition of how they differ.⁵

Military Leadership and the Institutional Army

How much attention does the senior active military Army leadership give the Army's institutional activities? One way to answer this question is to look at where the Army commits its executive, active military leadership.⁶ Table 2.3 displays where Army active general officer billets existed in May 2004.⁷ This qualitative pattern is fairly stable over time. Forty-nine percent of active general officer billets in the Army lie in the institutional Army, compared with only 24 percent in the operating force.⁸ Even if we focus on general officer personnel and assign all double- and triple-hatted generals toward the operating force

⁵ For further information on the content of the institutional Army and changes in it over time, see John R. Brinkerhoff, *Army Personnel by Defense Mission Categories, FY1962–FY2000*, Alexandria, Va.: Institute for Defense Analyses, D-2563, 2001, and John R. Brinkerhoff, *Institutional Army, FY1962–FY2002*, Alexandria, Va.: Institute for Defense Analyses, D-2695, 2002. We thank Glenn Gotz for bringing these studies to our attention.

⁶ A broader view of the Army's executive leadership would include political appointees and senior executive staff, all of whom reside in the institutional Army. We focus on military leaders to drive home the importance of their current role in nonoperational activities, despite the long-time emphasis of Army doctrine on operational activities.

⁷ Nathan Tranquilli compiled this information from the Army General Officer Roster, May 2004.

⁸ The residual, 27 percent, comprises general officer billets in defense agencies, joint activities, and other assignments outside the Army. Which of these are filled by Army generals changes over time; the share of Army generals serving in billets outside the Army does not change much.

and away from the institutional Army, 47 percent of Army generals serve in the institutional Army and 27 percent serve in the operating force. When we observe that the Army allocates almost half its active military executives to lead the institutional Army, it is striking that TAA-11, completed in 2004, represented HQDA's first serious attempt to review resource requirements in the institutional Army. What the institutional Army actually produces and how it actually works remain a mystery to the active military Army leadership in HQDA.⁹

Table 2.3
Where the Army Places Its Executive Military Leadership

Location	GEN	LTG	MG	BG	Total
Total general officer billets	11	49	133	192	385
Outside the Army	5	10	43	45	103
Army operating force	1	11	29	53	94
Institutional Army	5	28	61	95	189
Headquarters, Department of the Army	2	11	13	20	46
Training and Doctrine Command	1	5	10	21	37
Forces Command	1	6	7	9	23
Army Materiel Command	1	1	8	12	22
Field operating agencies		1	5	10	16
Medical Command		1	5	7	13
Corps of Engineers		1	4	7	12

⁹ *How the Army Runs* and the Army Force Management School's ongoing efforts to educate Army leaders about how the key processes in the institutional Army are invaluable guides, and we have benefited from multiple discussions with LTG Richard G. Trefry, the director of the school, and his MPRI staff (U.S. Army War College, *How the Army Runs, 2003–2004*, 24th edition, Carlisle Barracks, Pa., last updated July 2005.). But even their considerable expertise focuses on how specific institutional processes and procedures work. This unquestionably valuable information is not enough to allow the leadership to identify exactly what output the institutional Army produces, who exactly benefits from that output, how they benefit, and what resources the institutional Army expends to provide these outputs. Until

Table 2.3—Continued

Location	GEN	LTG	MG	BG	Total
Human Resources Command		1	1	5	7
Army Space and Missile Defense Commands		1	1	1	3
Surface Deployment and Distribution Command			1	1	2
Installation Management Agency			1	1	2
Army Security and Intelligence Command			1	1	2
Others			4		4
Double, triple-hatted assignments	1	7	13	14	35
Outside the Army and in the operating force	1	2	4	3	10
Outside the Army and in the institutional Army			4	3	7
In the operating force and the institutional Army		5	3	6	14
Within the institutional Army			1		1
In all three (outside the Army, in the operating force, and in the institutional Army)			1	2	3
Total general officer personnel	10	42	120	178	350

Production Relationships in the U.S. Army

One way to think about the relationship between the institutional Army and operating force is to ask what products the institutional Army generates and which of these products the operating force consumes.¹⁰

it can understand the institutional Army at this level, the senior leadership does not have the information it needs to balance priorities and drive improvements in the institutional Army in a way that reflects its priorities.

¹⁰ A broader view would place this relationship in a DoD setting, where (1) DoD-wide guidance defines the Army's mission and allocates resources to the Army, and (2) assets and

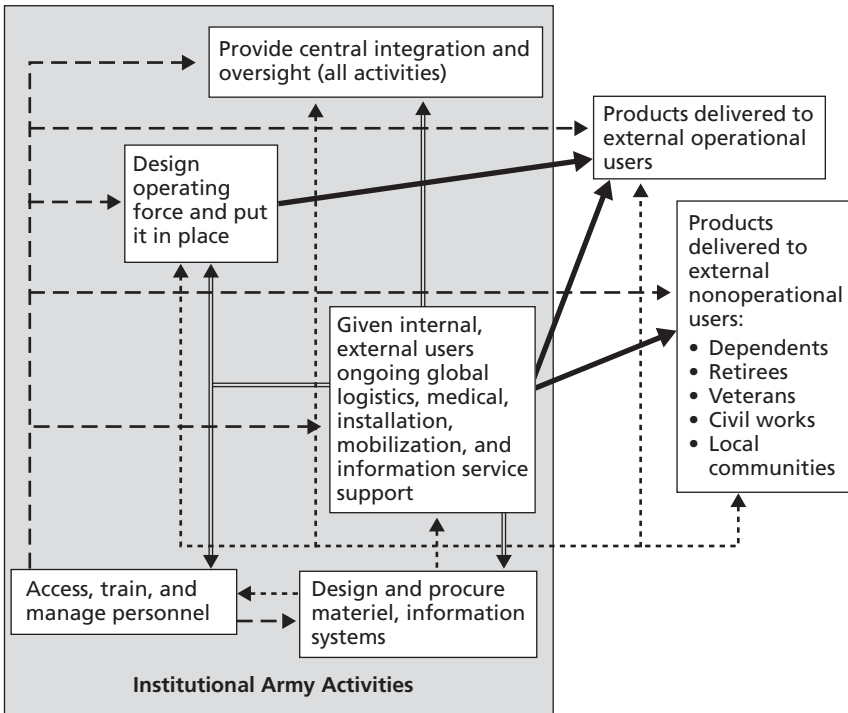
Figure 2.1 provides a simplified map of high-level institutional activities and the products they generate¹¹ for consumption inside and outside the institutional Army.¹² The solid black arrows represent the primary places where the institutional Army delivers products to external users. The solid arrows open in the middle represent the primary places where institutional portions of Army global support activities deliver products to other users within the institutional Army. The dashed and dotted arrows represent, respectively, flows of personnel and materiel or information assets. Most of the dashed and dotted flows occur within the institutional Army, but when necessary, some can flow directly to external users. Although our primary interest lies in the flows denoted by the solid arrows, we must keep all flows in mind as we proceed.

support services flow in and out of the Army, to and from other components of DoD. We focus on an Army setting because, under current policy, the Army has the responsibility for creating and operating the institutional activities in the Army, even when they rely on or support activities outside the Army. In particular, the institutional activity associated with integration and oversight of the Army as a whole plays a central role in sustaining the Army's relationship with the civilian and military leadership of DoD, the Office of Management and Budget, Congress, and the general public. Our approach envisions that such external actors affect institutional Army activities through the Army leadership activity that integrates and oversees the Army as a whole.

¹¹ For example, the operating force itself is a product of the institutional Army. Activities in the institutional Army design all aspects of the operating force and then assemble all the assets required to create each organization in the operating force. The "product" in this case is the operating force as a whole; the relevant institutional activities include the portions of the value chain that decide what individual military units look like, what their missions are, how they related to one another, and so on. These activities also include portions of the value chain that field specific units with specific authorizations for personnel, materiel, and information assets. Each box within the broader "Institutional Army Activities" box includes activities that generate products that flow from them along the arrows shown.

¹² *How the Army Runs* groups Army activities into three "subsystems" that mirror the break-out in Figure 2.1 in broad terms. The "production subsystem" corresponds roughly to the activities in the three bottom boxes on the left in Figure 2.1. The "integration subsystem" corresponds roughly to the top box on the left. The "combat subsystem" includes all the activities in the operating force that receive institutional outputs. But *How the Army Runs* places many other support activities in its "combat subsystem." From our perspective, the similarities are more important than the differences. Both approaches recognize the importance of complex networks of activities that must work together to generate the institutional outputs that the operating force consumes. (U.S. Army War College, 2005, paragraphs 3-3 to 3-8.)

Figure 2.1
High-Level Activities and Products of the Institutional Army



RAND MG530-2.1

Note that the institutional Army generates multiple products for a variety of “users.” It starts by creating the operating force itself—defining its structure and doctrine; choosing the weapon systems and other technology to use in it; choosing the skills it will need to use weapons and technology to execute its doctrine; procuring and creating the systems and skills it will need; sustaining these systems and skills; and continually refreshing these outputs as changes in the Army’s threat, budget, and technology environment warrant changes. To create this output, the institutional Army essentially exists before the operating force and always anticipates what it will look like in the future.

The institutional Army then supports operational forces wherever they are employed in a defense-related mission, whether deployed in

combat or peacekeeping, maintaining forward presence as part of the national military strategy, providing homeland defense at home, or sustaining the readiness of strategic reserve assets maintained for immediate application as needed. The institutional Army provides integration, logistics, medical, installation, mobilization, and information services for such employed operational forces.

These are the two outputs of the institutional Army most important to the operating force. Other outputs are important as well. The institutional Army budgets for and administers support of military dependents and retirees and provides important services to veterans. Through the Army Corps of Engineers, the institutional Army maintains a large-scale, ongoing design, construction, and management activity for water resources in the United States. And the institutional Army maintains museums, natural resources, and historical sites for the benefit of the broader public.

Institutional outputs for external users that do not support the operating force can potentially be viewed as complementary to those that directly support the operating force. Many of these other outputs are a direct outgrowth of the operational mission or exist at least in part to sustain support for the operational mission. For example, current support to dependents, retirees, and veterans is an integral part of the compensation package that the Army used to attract and retain the personnel who staffed the operating force in the past. And it is a tangible demonstration of the services that current military members in the operating force can expect in the future in return for their service today. Military engineers learn complex project management skills in their civil works assignments that prepare them for analogous work as combat engineers in the operating force. Opening museums and historical sites to local communities provides useful outreach to help sustain public support for the Army; sustaining the natural habitats in areas that the Army uses for training is required by public law and offers another way to reach out a broader public for its support. These actions enhance the Army's ability to execute its core operational mission over the longer term.

That said, these nonoperational outputs compete for resources with the immediate operational mission. For example, a constant tension

exists between institutional medical outputs that support the readiness of the deployed military force and those that provide effective compensation for the force by serving dependents.¹³ Funding for civil works projects that train military engineers in complex program management competes with that which exercises their skills at formal combat training centers. Army forces committed to emergency response lose training opportunities. Retirees and veterans often receive benefits well in excess of anything they might reasonably have expected during their years in the Army. And every dollar paid for retiree medical care is a dollar that cannot be applied to future Army weapon systems. Funding for museums and historical sites on Army installations competes with funding for basic installation services that support the quality of life there and therefore morale and retention in the current force. And each nonoperational institutional output has a political constituency with interests quite separable from those of the Army's current operating force.

If the senior leadership focuses only on the operating force when asking how to set goals for the institutional Army, it will soon discover that it can increase institutional support to the operating force by reducing its commitment to other outputs without suffering any noticeable losses. That may be appropriate in the threat and budget environment that the Army faces today. But the Army leadership can be sure only by weighing the relative importance of institutional outputs aimed at operational and nonoperational beneficiaries. By design, at the sponsor's direction, this study focuses almost entirely on institutional outputs for operational use. A more balanced assessment of aligning institutional activities to their external users would address operational and nonoperational users.

A second point to notice in Figure 2.1 is that a great deal of what one part of the institutional Army produces is consumed by some other part of the institutional Army. Many analogous activities occur in almost any large, global enterprise. Benchmarking of these activities, across the institutional Army and against exemplars outside the Army,

¹³ For a useful discussion of such tension, see Donald B. Rice, *Defense Resource Management Study: Final Report*, Washington, D.C.: Government Printing Office, 1979, pp. 79–112.

must be part of any serious effort to change the performance of the institutional Army. But the operational Army has no substantial interest in the products of these activities until these products directly affect institutional products delivered to the operating force. Improving activities that generate products consumed within the institutional Army can substantially improve the throughput production rates, levels of quality, and resource costs associated with institutional products delivered to the operating force. But the senior leadership does not need to know how this occurs to improve the alignment of the operating force and institutional Army. Rather, it needs to know how to drive change from the institutional activities that deliver products to the operating force back through the activities deeper in the institutional Army.

A third point to notice in Figure 2.1 is that the total ownership cost to the Army of the institutional outputs delivered to the operating force depends on resource costs in all the activities included in the top three boxes. The Army today simply has no capability to parse the relationships among these activities in ways that would allow planners to predict how a 1 percent change in the level of any attribute for an institutional output delivered to the operating force would affect total cost in the Army, in one year, or over any planning horizon. The Army cannot do this for dollar costs or for number of military personnel in the presence of a military end-strength constraint. Without this capability, Army planners cannot attach policy-relevant resource costs to institutional outputs delivered to the operating force and use these costs to help assess the net value to the Army of increasing any particular output at the expense of any other. Senior leaders need such information to improve the alignment of the institutional and operational portions of the Army. To give them that information, Army planners need to improve the current state of knowledge of how institutional activities relate to one another and to the final outputs delivered to the operating force. This is true even though senior Army leaders seeking to improve the alignment of the operating force and institutional Army have no direct need to understand the inner details of these relationships. The practical importance of this point will become apparent when we get into the details of choosing performance metrics rel-

evant to the leadership's expectations about operational-institutional alignment.

How Changes in Priorities Could Affect Institutional Activities

Another way to think about the relationship between the operating force and the institutional Army is to ask how an expansion of the operating force would affect activities in the institutional Army. Participants in the current policy debate about how to align the institutional Army to the emerging operating force tend to focus on one of three major points:

- *Institutional activities must change to accommodate the coming changes in the operational force.* In general, this perspective recognizes the intimate bond between many parts of the institutional Army and the operating force.
- *Institutional activities must give up resources they do not need so that the Army can use these resources where they are needed.* This perspective can be seen as a view, implicitly held by many Army officials, that operational activities are “teeth” and support activities are “tail.” Therefore, moving resources from tail to teeth increases military capability. It also perpetuates the long pronounced, but seldom demonstrated, self-evident “truth” that waste, fraud, and abuse are rampant in government agencies and easy to extract.
- *Institutional activities must receive resources to make investments in process improvement so that they can more effectively accommodate the emerging operating force and, at the same time, find resource savings that the Army can apply where it needs them the most.*

A more realistic view of the relationship between the operating force and institutional Army, especially over the next few years, would expect only limited changes in basic institutional processes and little success in finding pockets of waste to exploit. Let us take this as a starting point. Then suppose a new external threat environment increases

the importance of creating and sustaining an operational Army that can respond effectively to the new threat. And suppose Congress and the Office of the Secretary of Defense (OSD) will not give the Army enough additional resources, measured in dollars and military personnel, to meet this new threat without diverting internal priorities to favor the operating force at the expense of the institutional Army. At a high level, that is one way to look at what the Army has experienced over the past three years and what it expects to experience for the foreseeable future.¹⁴ How would such a change affect different activities in the institutional Army?

A quick answer would suggest that the Army would move dollars and military personnel from the institutional Army to the operating force, and the institutional Army would have to improve its processes enough to release the resources needed. A somewhat more considered answer would suggest that the institutional Army must release resources, but it may not be possible to improve fast enough to accommodate this shift in priorities. As a result, the institutional Army should be prepared to reduce its production of some outputs, presumably the outputs of least importance to the currently deployed operating force. A bit more thought would reveal that, if the operating force needs more resources, the institutional Army must produce these, and, to do so, the portions of the institutional Army that do this must grow with the operating force. The rest of the institutional Army must release enough resources to allow growth in the operating force *and* the portions of the institutional Army most closely linked to the currently deployed operating force.

Table 2.4 summarizes the results of a simple simulation designed to estimate what such a pattern of changes might look like.¹⁵ This simulation divides the Army into three sectors—current operational activities, institutional activities that directly support these opera-

¹⁴ Details of the Army's current circumstances are obviously far more subtle and complex than this. This simple scenario distills the details to get to the heart of the Army's current resource challenge, which the scenario interprets to be how the Army can generate additional current operational capability within tight constraints on available dollars and military end strength.

¹⁵ Appendix B provides details on the simulation.

tional activities, and all other institutional activities. The text box on page 29 summarizes the allocation of activities into these three sectors. The scenario depicted is calibrated to an annual Army budget of \$100 billion in FY 2005 dollars. It uses appropriations for FY 2005 to determine shares for the three sectors above and the military personnel, DA civilian personnel, and other resources that each sector uses.¹⁶ The scenario excludes supplemental funding to simulate how the Army might react, in its longer-term planning and programming, to an expectation that the global war on terrorism will demand higher utilization of operational Army capabilities but that OSD and Congress will not give the Army additional dollars and military personnel to provide this capability.

The definition of current operational activities should be fairly transparent. The resources associated with them are meant to capture, very roughly, the variable costs of current operations. The resources associated with the institutional activities that directly support these operational activities are similarly meant to capture, again very roughly, the variable costs of institutional activities that provide direct support to operations. The resources associated with all other institutional activities, then, seek to capture all fixed costs in the institutional Army and all activities that do not contribute directly to the support of the current operational force. Such activities would include those that ultimately contribute to the production of institutional outputs delivered to nonoperational users. They would also include the costs of conducting most research and system acquisition, keeping administrative headquarters and installations open, doing normal housekeeping in doctrine updating, performing most military construction, conducting chemical demilitarization, and so on. As the discussion associated with Figure 2.1 should make clear, the information required to assign resources to sectors in this way with high confidence simply does not exist. This simulation simply seeks to illustrate what the rough magnitudes of specific changes in the institutional Army might be if we made

¹⁶ \$100 billion is very close to the Army budget offered for FY 2005. It does not include the supplemental funds added later to support operations in Iraq and Afghanistan.

Table 2.4
Effects of Shifting Priority Toward the Operating Force (\$ billions)

Binding Constraints	Pre-Shift Baseline	Post-Shift	
	Budget	Budget	Budget, End Strength
Scenario/column	(1)	(2)	(3)
Current operational activities			
Military	30.88	35.36	31.92
DA civilian	0.79	0.90	0.97
Other resources	9.73	11.14	11.96
Sector budget	41.40	47.40	44.85
Directly supporting institutional activities			
Military	4.49	5.14	4.64
DA civilian	5.61	6.43	6.91
Other resources	12.02	13.76	14.78
Sector budget	22.12	25.33	26.33
Other institutional activities			
Military	3.61	2.70	2.44
DA civilian	5.95	4.45	4.78
Other resources	26.94	20.15	21.64
Sector budget	36.50	27.30	28.86
All Army activities			
Total Army budget	100.00	100.00	100.00

NOTE: The Budget allocation in column 1 is based on FY 2005 appropriation data for the Army shown in Exhibit O-1A and related materials submitted with FY 2006 President's Budget. By design, the military end-strength constraint binds at any total Army demand for military manpower above that shown in column 1).

Allocation of Activities in Simulation

Current operations

80 percent of military personnel

Land forces operations and maintenance (O&M) funds (divisions, corps combat, corps support, echelons-above-corps [EAC] support, operations support) (\$7.7 billion)

Procurement of missiles munitions (\$2.9 billion)

Supporting institutional

All military personnel in sustainment, mobilization; some in training (75 percent), personnel (35 percent), installations (50 percent), security (17 percent), and medical (70 percent) activities

Land forces readiness O&M (operations support, systems readiness, depot maintenance) (\$4.2 billion)

Training and recruiting O&M (\$3.3 billion)

Procurement of aircraft; wheeled, tracked, and combat vehicles; other (\$10.2 billion)

Other institutional

All military personnel in HQDA, acquisition, information services, central intelligence; some in training (25 percent), personnel (65 percent), installations (50 percent), security (83 percent), medical (30 percent) services

Land forces readiness support (base operating support; sustainment, restoration, and modernization; headquarters; unified commands; other) (\$9.9 billion)

Mobility (strategic mobility, prepositioned stocks, industrial preparedness) (\$0.4 billion)

Administration and servicewide activities O&M (\$6.4 billion)

Research, development, test, and evaluation (RDT&E) (\$10.5 billion)

Military construction (\$2.9 billion)

Family housing (\$1.6 billion)

Environmental (\$0.4 billion)

Base Realignment and Closure (BRAC) (\$0.1 billion)

Chemical demilitarization (\$1.4 billion)

reasonable but gross assumptions about how institutional resource use varies with the size of the current operational force.

Column 1 in Table 2.4 shows the allocation of resources reflected in the actual appropriations for FY 2005. Rows report resource levels in billions of FY 2005 dollars. Column 1 is the baseline for the analysis.¹⁷ Column 2 displays what the Army would like to do if it could adjust all its resources, within a fixed budget, to expand the capability of the current operating force by about 15 percent. Column 3 displays how the Army's inability to increase its military end strength would limit the success of this effort. The table distinguishes the separate effects of the dollar and end-strength constraints that shape its actions; we will focus our attention here on the joint effects of these constraints by comparing the pattern in column 3 with that in the baseline, column 1. Column 2 is included to help highlight how important the military end-strength constraint is to the results discussed below.

First, the shift in priority induces the Army to expand spending on current operational activities by a bit more than 8 percent, from \$41.4 billion to \$44.9 billion, and expand use of operational military billets in them by a little more than 3 percent, changing spending on military personnel from \$30.9 billion to \$31.9 billion. Spending on operations rises more than spending on military personnel because the Army's military end-strength limits how many military personnel it can use. As a result, to respond to the new threat, the Army increases (1) spending on government civilians, contractors, and other resources used in operations a great deal more than it increases (2) spending on military personnel. This effect is compatible with the Army's increased reliance on contractors to support operations in Iraq and Afghanistan.

Second, spending on directly supporting institutional activities rises about 19 percent, from \$22.1 billion to \$26.3 billion, while use of military billets in them rises a bit more than 3 percent, from \$4.5 billion to \$4.6 billion. Again, total spending rises faster than spending

¹⁷ As Appendix B explains, the simulation uses a "production function"—a numerical relationship between military, DA civilian, and other inputs and an output—to represent each sector. It then uses another production function to represent the relationship between the outputs of these three sectors and the output of the Army as a whole.

on military personnel because of constraints on the Army's military end strength. But why would the Army expand institutional capability more than current operational capability when its priorities have shifted toward operational capabilities? The operational force makes intensive use of military personnel, and the end-strength constraint prevents the Army from adding military billets across the force. The shift in priority toward operations increases the scarcity value ("shadow price") of military billets, effectively increasing the real cost of activities that make intense use of military billets relative to activities that do not. Institutional activities that directly support operational activities fall in cost relative to current operational activities, encouraging the Army to rely more heavily on these directly supportive activities wherever possible. The result is a marked shift in dollar resources toward these institutional activities. This result is consistent with Army plans to rely more on reachback in all support services as a way to reduce the deployed military footprint.

Third, spending on other institutional activities falls 21 percent, from \$36.5 billion to \$28.9 billion, and the use of military billets in them falls 32 percent, from \$3.6 billion to \$2.4 billion. That is, the sector that initially accounts for about 36 percent of total Army programmed spending cuts the value of its products to release enough resources to pay for the expansion of the operating force and the rest of the institutional Army. A 21 percent cut here opens the way for an 8 percent increase in spending on current operational capability. As noted above, this cut can most easily be understood as a set of cuts in outputs to nonoperational users and in outputs relevant to the operating force, but not to the current operating force—outputs relevant to the capability of the future operating force. This result is compatible with current high-level Army guidance to accept less risk for the current force than for the future force when allocating resources.

Running the simulation with different assumptions predictably yields different numerical outcomes. But these general, qualitative patterns persist across alternative sets of assumptions.¹⁸ These results tell us that current Army efforts to realign the institutional Army to reflect

¹⁸ See Appendix B for more detail.

an increased priority on operational capability is likely to have very different effects on different parts of the institutional Army. Understanding the basis for these differences will be important to ongoing efforts to change expectations about the performance of different parts of the institutional Army.

The results of the simulation help us put the three points of argument that opened this section in perspective by illustrating what can happen under the fairly conservative assumption that little substantive process change occurs for a long time in the institutional Army. Even if little substantive process change occurs for a long time, the Army can significantly expand its current operational capability, many institutional activities are likely to grow even more than operational activities do to achieve this, and other institutional activities can yield the resources needed to allow these changes—not by suddenly discovering the gross waste in their midst or magically reengineering themselves, but simply by cutting back their production levels. If any of the changes highlighted in the three bulleted arguments above are realized—if institutional processes do change to accommodate the emerging operating force, large amounts of waste can be discovered and carved out, or radical reengineering can succeed quickly, things get easier, presumably allowing the Army to expand its current operational capability even more than suggested in the simulation without additional resources.

Summary

Different observers think about the dividing line between the operating force and the institutional Army in different ways. But, at a high level, these different perspectives assign most Army activities to the operating side or the institutional side of the Army in the same way. Standardized military activities, which are organized according to MTOE documents and can be delivered to a combatant commander, tend to reside in the operating force. Activities tailored to specific locations in a TDA document and not designed for easy deployment under a combatant commander tend to reside in the institutional Army. The insti-

tutional Army effectively comprises all the activities that commercial process mapping would encompass in a complex organization except the direct delivery of the final product itself. That said, the connections between all these activities and the delivery of that final product are more important than definitional distinctions drawn between them.

Although leaders in HQDA know very little about what the institutional Army produces or how it produces its outputs, the Army assigns about half its military executives to the direct leadership of institutional activities, confirming the importance of the institutional Army to the Army as a whole. The Army assigns only a quarter of its military executives to lead what is presumably its core activity—the Army operating force itself.

The Army currently faces the prospect of increasing its operational capabilities in the face of daunting dollar and military end-strength constraints. To do this, the Army is likely to expand portions of the institutional Army that provide direct support to current operating forces and markedly to cut back on portions of the institutional Army that produce nonoperational outputs or support the future operating force. The Army will have more success increasing its operational capability as it reengineers processes throughout the institutional Army, but significant reengineering always takes time.

Leadership Views on Change in the Institutional Army

The Secretary and the Chief of Staff of the Army (CSA) have made it clear that they want the institutional Army to change. They are especially focused on realizing plans for a new operating force and have emphasized changes in the institutional Army that support the new operating force. Changes in disparate parts of the institutional Army are more likely to complement one another if we can trace each one back to these high-level priorities. This chapter takes first steps in that direction.

It starts by using the Army Posture Statement to summarize the priorities of the Secretary and CSA.¹ Both have made many public statements in many settings that elaborate the views presented in the Posture Statement. But the statement summarizes their views well; it is the logical place to start. The nature of guidance in the Posture Statement is meant to motivate change, not to specify what change should look like. The Army Campaign Plan offers more detail on what change should look like. Our next step walks us through the Campaign Plan

¹ The Army operates in a broader setting that dictates that the Army's mission is to "fight and win the Nation's wars and execute the national security strategy (NSS) and national military strategy (NMS)" (U.S. Army War College, para. 1-3b). High-level civilian guidance flows to the Army from the NSS through the NMS and then the Joint Strategic Planning System and Planning, Programming, Budgeting and Execution process. The Army participates actively in the development of DoD-wide guidance in these processes and then receives its own guidance from these processes. For more information, see U.S. Army War College (2005, chapter 4). As noted above, we focus our attention on decisions within the Army. Within the Army, strategic guidance flows from the Secretary and Chief of Staff.

and collects all the pointers relevant to change in the institutional Army.

As we shall see, most of the major objectives listed in the Campaign Plan have some implications for changing the institutional Army. Our final step in this chapter uses the high-level guidance of the Secretary and CSA to bundle these objectives in ways that highlight which institutional activities need to change together to (1) support the Secretary and CSA's goals of changing the organizations, personnel, and materiel in the operating force and (2) release dollars and military personnel from institutional activities to pay for these changes.

High-Level Priorities Reflected in the Army Posture Statement

The annual statement that the Secretary and CSA make to Congress on the posture of the Army is a useful summary of current high-level priorities in the Army.² The February 2005 Posture Statement listed four “overarching and interrelated strategies” for the current and future forces and business processes (p. i):

- Provide relevant and ready land power to support combatant commanders.
- Train and equip soldiers to serve as warriors and growing, adaptive leaders.
- Attain an appropriate quality of life and well-being for Army military and civilian personnel.
- Provide infrastructure to enable the force to fulfill its strategic roles and missions.

² Francis J. Harvey and GEN Peter J. Schoemaker, Office of the Chief of Staff, U.S. Army, Executive Office of the Headquarters Staff Group, “A Statement on the Posture of the United States Army 2005,” presentation to First Session, 109th Congress, February 6, 2005. Army discussions of change in the institutional Army do not typically distinguish activities from the processes in them. The Army refers to both as processes. In this chapter, we tend to follow the Army lead unless doing so leads to some important misunderstanding.

Ongoing transformation of the Army focuses on four major changes that advance these strategies:

- *Modularity.* Restructure the operational Army from a division-based to a brigade-based, modular force of self-sufficient standardized, brigade combat teams.
- *Rebalance.* Rebalance the active and reserve components of the Army to create the skills required in the new modular operating force.
- *Stabilization.* Stabilize soldiers in units for longer periods to increase combat readiness and cohesion, reduce turnover, and reduce training requirements.
- *Institutional support.* Improve business, force generation, and training functions to support a wartime Army and the other armed services. Divest institutional functions no longer relevant. Improve institutional effectiveness and develop efficiencies that will free human and financial resources to better support operational requirements.

From this high-level perspective, the principal elements of transformation relevant to the institutional Army reside in the fourth bullet above, *institutional support*. But, of course, improving institutional support for a wartime Army is possible only if institutional business, force generation, and training functions adjust to reflect the new modular, rebalanced, and stabilized operational force.

The Army pursues these general strategies and more specific changes in a resource-constrained environment, which forces the Army to accept risk and to balance the risk it faces among these high-level priorities. The Posture Statement explains the Army's view of risk in terms of four components:³

- *Operational.* Create modular units, field Stryker brigade combat teams, restructure Army aviation, establish a reset program, and

³ These four components of risk were highlighted and described in the 2001 Quadrennial Defense Review (Department of Defense, *Quadrennial Defense Review Report*, Washington, D.C., September 30, 2001, pp. 57–65).

initiate rapid fielding and rapid equipping programs to reduce risk here.

- *Force management.* Establish a larger pool of rotational forces through modularity, rebalance active and reserve components of the Army, eliminate redundant capabilities, execute military-to-civilian conversions, stabilize the force, add recruiters and special incentives, and increase the personnel strength of the operating force to reduce risk here.
- *Future.* Spiral high pay-off technologies into the current force to shift risk from the current force to the future force. But also continue to develop and field the future force to limit risks to future Army capability.
- *Institutional.* Refine resourcing processes to make them more agile and responsive to the immediate requirements of combatant commanders and to prepare the Army for future challenges. Invest in LandWarNet.

These changes seek to reduce risks in parts of the institutional Army most likely to affect the operating force and to accept risk instead in other parts of the institutional Army.

These points are broadly compatible with public statements by the Secretary and CSA over the past few years.⁴ They provide a fairly focused set of priorities that planners and managers should consider as they allocate resources. They provide some guidance on how to trade off among priorities at a high level, but they do not provide the specifics required to set targets for change and build actions plans to achieve these targets.

⁴ A comparison of the 2004 and 2005 Army Posture Statements, for example, verifies the high degree of continuity in the priorities set by two successive secretaries. See R. L. Brownlee and GEN Peter J. Schoomaker, Office of the Chief of Staff, U.S. Army, Executive Office of the Headquarters Staff Group, "A Statement on the Posture of the United States Army 2004," presentation to Second Session, 108th Congress, February 5, 2004.

Priorities in the Army Campaign Plan

The Army Campaign Plan provides an additional degree of specificity with which to pursue the priorities reflected in the Army Posture Statement.⁵ “The ACP directs the planning, preparation, and execution of Army operations and Army transformation within the context of Current to Future Force. The ACP provides direction for detailed planning, preparation, and execution of a full range of tasks necessary to create and sustain a campaign capable, joint and expeditionary Army” (par. 1.a). The plan is both a document and an HQDA process. At any point in time, the document provides a conformed version of the plan the Army is currently executing. The process coordinates interaction throughout the Army to keep the plan current as the Army’s security and resource environment changes.

The ACP continues to evolve from the following statement of the intent of the acting Secretary and CSA in place when it was first published (par. 3.a [1]):

Over the next six years, the Army will: provide trained and ready forces to Combatant Commanders to sustain global operations; adapt Army force structure and force management processes to build more ready, agile, and versatile formations and headquarters optimized for joint operations, increase the density of high-demand units, and balance capabilities between active and reserve components; determine the role of the reserve components and modernize mobilization policies and procedures; streamline the Army’s overseas footprint; remain focused on a vision of a Future Force embodied in Future Combat System–equipped units of action; adapt the institutional Army to meet the needs of the Future Force; develop a joint, interdependent end-to-end logis-

⁵ Office of the Deputy Chief of Staff, G-3, Department of the Army, “Army Campaign Plan, Coordinating Draft,” memorandum (government publication; not releasable to the general public), March 22, 2004. When work on this project started, the draft was the version of the ACP in place. The plan has moved on, but not in any qualitative ways that change the basic content of the plan. To maintain consistency and to avoid any difficulties associated with using currently predecisional material, this report draws on the March 2004 version of the plan throughout.

tics structure that integrates a responsive civil-military sustaining base with a deployable capability to meet the operational requirements of a joint and expeditionary Army; and instill the warrior ethos in every Soldier and sustain the quality of the force.

The plan seeks to execute change consistent with this intent in terms of the eight “campaign objectives” listed in the text box below. Each of these campaign objectives has more detailed “major objectives” assigned to “supported major command (MACOM) commanders or HQDA

Major Objectives of the Army Campaign Plan (par. 3.a. [1][b])

For the ACP, campaign objectives are clearly defined, decisive, and attainable goals which enable the Army to achieve its core competencies. . . . The eight campaign objectives are:

1. Support global operations: Organize, train, equip, and sustain a campaign capable joint and expeditionary Army in order to provide relevant and ready landpower to the combatant commander and the joint team.
2. Adapt and improve total Army capabilities: Reorganize Army forces into modular, capabilities-based unit designs in order to enable capacity for rapid packaging and responsive, sustained employment.
3. Optimize reserve component contributions: Transform reserve component force structure and concept of service paradigms in order to optimize reserve component capabilities and provide relevant and ready forces and individuals to the combatant commander and joint team.
4. Sustain the right all-volunteer force: Recruit and retain competent, adaptive, and confident Soldiers and civilians to meet immediate and long-range multi-component personnel and family readiness requirements.
5. Adjust the global footprint: Adjust Army stationing and support infrastructure in accordance with Integrated Global Presence and Basing Strategy (IGPBS) to execute the National Defense Strategy and support operational deployments and sustained operational rotations.
6. Build the future force: Develop future force capabilities in order to meet landpower requirements of the combatant commander and the joint team.
7. Adapt the institutional Army: Transform institutional Army and associated processes to responsively execute Title 10 responsibilities to sustain a campaign capable joint and expeditionary Army.
8. Develop a joint, interdependent logistics structure: Create an integrated logistics capability that is singularly responsible, responsive, and adaptive for end-to-end sustainment to a joint force commander across the spectrum of conflict.

staff principals” for execution. The named supported commander or HQDA staff principal has primary responsibility for all aspects of mission accomplishment for each major objective. The plan lists 69 major objectives in all.⁶

A first reading of the campaign objectives might suggest that only Campaign Objective 7 is relevant to the institutional Army. In fact, each of the campaign objectives has important implications for the institutional Army for one or more of the following three reasons:

- *An institutional activity will provide the new capability listed in an objective.* For example, the Rapid Equipping Force relevant to “supporting global operations” lies in the institutional Army. The Army Capabilities Integration and Development System that must align itself with the corresponding joint process to “adapt and improve total Army capabilities” lies in the institutional Army.
- *The desired end-to-end process addressed in the Campaign Plan includes institutional elements as integral parts.* For example, institutional activities are integral parts of the joint logistics, strategic mobility, Global Information Grid, and medical processes envisioned as parts of the campaign objective to “build the future force.”
- *The Campaign Plan explicitly targets institutional activities as places to “divest nonessential functions, remove unnecessary layering and duplication and consolidate functions” as part of the campaign objective to “adapt the Institutional Army.”*

Institutional activities could potentially change in one of four ways to help the Army implement the major objectives of the Campaign Plan:⁷

⁶ Appendix C lists these major objectives, with their supported commanders or staff principals, and relates them to key Title 10 responsibilities and institutional processes.

⁷ These are not mutually exclusive or exhaustive. They are meant to illustrate the different levels at which change can occur and the latitude for change at different levels. Change is simpler and less complete if it affects local objectives and priorities than if it affects organizational boundaries and reporting relationships. We use this simple taxonomy to help us focus

- *Local objectives or priorities.* The institutional activities could use existing organizations, processes, procedures, and practices to produce a new kind of service or item. For example, TRADOC could use its standard methods to design and offer a new course. AMC could use existing methods to determine the appropriate forward-positioned inventories under a new set of assumptions.
- *Procedures and practices.* TRADOC could include new organizations or personnel in the process used to coordinate development of a new course. AMC could use a new optimization algorithm to determine the appropriate content of forward-positioned inventories.
- *Processes.* TRADOC could send training teams forward to operational units or set up a new Internet Web site to teach material that had previously been taught in a TRADOC classroom. Operating units could move away from a push logistics system to a pull system, obviating the need to forward-position large chunks of inventory.
- *Organizations.* Responsibility for training could be assigned to a new organization closer to operations and farther from doctrine development to speed the absorption of operational lessons learned into training for new personnel. Responsibility for inventory development could be assigned to a joint or defense activity with responsibility to build inventories for all armed services at the same time.

The change in each bullet above is more difficult to implement and likely to have broader effects than the change in the preceding bullet. So it is natural, when asking how best to implement the changes called for in a major objective, to consider changes in local objectives and priorities first, then changes in practices and procedures, then in processes, and only as a last resort in organizations. Looked at another way, changing a practice or procedure normally makes sense if an outcome cannot be achieved by changing the local objectives and pri-

on changes that are likely to require more adjustment (costly investment) and, in exchange, to open up more opportunities (potential benefits).

orities applied in existing practices and procedures. A process change makes sense only if changing the practices and procedures used in the existing process will not achieve the desired outcome. And organizational change normally makes sense only if changing processes brings together players that the current organizational structure simply cannot align to optimize the new processes. Viewed in this way, this sequence provides a rough indicator of how much change we might reasonably expect each major objective to lead to in institutional activities.

Table 3.1 summarizes the most demanding type of change that each major objective of the ACP might induce in the institutional

Table 3.1
Institutional Change Likely to Result from the Army Campaign Plan

Campaign Objective	Objectives Likely to Change the Institutional Army					Total
	Total Objectives	Local Objectives, Priorities	Practices, Procedures	Processes	Organization	
Support global operations	13	3		2		5
Adapt, improve total Army capabilities	12	6	1	2	1	10
Optimize reserve component contributions	5	1		4		5
Sustain the all-volunteer force	6	1	2	3		6
Adjust global footprint	8	1	2	4	1	8
Build the future force	10	1		7		8
Adapt the institutional Army	9		1	5	3	9
Develop joint, interdependent logistics structure	6		1	4	1	6
Total	69	13	7	31	6	57

Army.⁸ The numbers in the table indicate that almost all the major objectives call for some kind of change in the institutional Army but that those changes are usually unlikely to require any organizational change. Almost half the major objectives call for process change; this is likely to be the type of change that requires the most attention. If process changes are large enough, they could lead to a misalignment of players unless organizational lines shift. So some of the process changes could easily lead to organizational change as well, increasing the importance of organizational change somewhat.

What to Emphasize in the Institutional Army

When viewed together, the major objectives in the ACP provide a coherent picture of where the senior leadership wants change to occur, even if they are not always clear on what change should look like. If we look at each objective through the eyes of the ultimate users of the institutional outputs it will affect, many objectives fall together as ideas that complement each other in a common goal; when this occurs, it is useful to look at the objectives together.

Think, for example, about the global, end-to-end logistics process that supports combatant commanders. Various major objectives emphasize different aspects of that process:

- Make it more joint and interdependent (Major Objective 6-4).
- Promote the combatant commander's goals for inter- and intra-theater mobility (6-6).
- Ensure that generating force infrastructure supports a joint, expeditionary, modular Army (7-1).
- Consolidate maintenance, depot, and materiel development facilities (7-7).
- Align the Army's theater logistics structure to the combatant commander's organization (8-1).

⁸ Appendix C assigns each major objective to one of the four bulleted change categories.

- Embed expeditionary theater logistics in a joint, end-to-end distribution process (8-2).
- Develop theater opening and sustainment capability to support a modular joint or coalition force (8-3).
- Make the logistics enterprise architecture joint and interoperable (8-4).
- Develop a strategy that relies on global, joint deployment and support of a modular, expeditionary force (8-6).

These objectives simply are not separable. In some places, they bleed into one another; one cannot occur if the other does not occur. In other places, one objective will clearly be easier to achieve if the other is achieved. In still others, these objectives compete with one another within a single global end-to-end logistics process; in the end, the Army must set priorities among these objectives to choose the single logistics process that best captures the intent of all objectives taken together. It is far more useful to address these logistics-related objectives in an integrated way that captures these relationships than to seek to align the institutional Army and operating force one major objective at a time.

The ACP contains more objectives about logistics that are relevant to the institutional Army than about any other capability. But similar bundles of objectives exist across the institutional Army. Table 3.2 compiles these into a master list of 16 “broad objectives.” The first column of the table names these objectives. The second column lists the major objectives where significant changes would have to occur in the institutional Army to achieve each of these broad objectives.

Table 3.2 also bundles these broad objectives into four groups, each concerned with a different aspect of the operating force:

- Change end-to-end, global support processes to improve support to the new operating force now being implemented. From our perspective, relevant changes affect the portions of these processes that lie in the institutional Army.
- Change the complex of personnel-related processes, which lie primarily in institutional activities, to create and sustain personnel

Table 3.2
What to Emphasize in the Institutional Army

Broad Objective	Relevant Major Objectives
To support organizational changes in the operating force	
Enhance end-to-end logistics process for operating force	6-4, 6-6, 7-1, 7-7, 8-1 to 8-4, 8-6
Enhance end-to-end medical services process for operating force	6-10, 7-1
Enhance base support for modular forces	2-7, 5-5, 5-8, 6-4, 7-1, 7-6
Enhance end-to-end information services processes linking operating force and institutional Army	6-7, 6-8, 7-1, 8-4
Enhance mobilization and demobilization processes	3-1, 3-2, 7-1
To support personnel changes in the operating force	
Adjust recruiting to meet new needs	4-3
Adjust training to meet new needs	3-4, 3-5, 7-3, 7-4, 7-5
Adjust career management to meet new needs	4-2, 5-6
Adjust retention to meet new needs	4-4
Enhance reserve component policies and processes	3-3
Pursue National Security Personnel System, Senior Army Workforce, and military-to-civilian conversion	4-6
Create new human resources management information systems	4-5
To support materiel changes in the operating force	
Coordinate Army, joint concept, capability, and requirements processes; science and technology processes	2-10, 6-3, 7-8
Accelerate short-term acquisition processes	1-11, 2-12, 6-1
Accelerate long-term acquisition processes	7-8
To free resources to use in operating force	
Generate new resources for modularity, future force, and other operating force transformation	2-1 to 2-5, 7-2

with the mix of skills and attitudes needed to support the new operating force being introduced.

- Change the complex of concept, capability, requirements, and acquisition processes, which lie primarily in institutional activities, to create, equip, and sustain a new operating force that is compatible with increasingly joint perspectives in the Department of Defense (DoD).
- Cut resource consumption, primarily in institutional activities, to fund the changes above and more direct changes in the operating force itself.

These bundles provide a natural way for us to organize our own analysis. In the chapters that follow, we will use an exemplar activity from each of the first three bundles above to illustrate the types of issues likely to arise in aligning any institutional activity in that bundle to operational priorities. The fourth bundle is relevant to all activities in the institutional Army; we address this bullet in the context of each exemplar below.

Summary

The Secretary and CSA want to improve operating force capabilities available to the regional combatant commanders, provide the infrastructure required to ensure these capabilities, train and equip effective soldiers and leaders, and provide suitable compensation and well-being for Army personnel. To do this, they give special emphasis to creating a new modular operating force, rebalancing the active and reserve components, stabilizing the force, and making the institutional Army more cost-effective. They know they must pursue these goals in a resource-constrained environment and, where they must, choose to take more risk farther from the operational force and, in particular, farther from the current operating force.

Properly interpreted, the major objectives of the ACP provide additional insight into what these priorities mean for the institutional Army. The lion's share of major objectives call for some change in the

institutional Army. These changes are most likely to complement one another if we bundle these major objectives into 16 broader objectives, each associated with an identifiable cluster of activities in the institutional Army as shown in Table 3.3. These clusters themselves naturally fall together in support of changes in the new characteristics of organization, personnel, and materiel demanded in the operating force and efforts to extract resources from the institutional Army to pay for these changes.

Chapter Four explains a method that the Army can use to describe what the Army leadership should expect from each of the 15 broad objectives here that support new operational organization, personnel, and materiel. Chapters Five through Seven will illustrate this method in broad objectives relevant to operational organization, personnel, and materiel changes, respectively.

Translating Leadership Priorities into Metrics

As the Army leadership seeks to induce changes in the institutional Army that support ongoing change efforts in the operating force, two key issues arise. First, how can the Army plan the kind of change that is needed centrally while delegating responsibility for execution? Second, how can the Army leadership verify that change is being executed in a way that is compatible with the central plan, especially as the Army's threat, budget, and technological environments continue to change and as the change process itself reveals information that the leadership can use to adjust its central plan? This chapter argues that it is natural to continue the process of refining the leadership's priorities by moving from high-level guidance, through the major objectives of the Army Campaign Plan, to performance metrics that the Army leadership can use to define what kind of performance it expects from the institutional activities that must change to realize the broad objectives discussed in the last chapter. What outputs does it expect from each activity? What attributes does it care about for each output? What relevant priority does it place on different attributes? Clear answers to these questions can help the Army leadership promote coherent change across the institutional Army; performance metrics can help the Army leadership give clear answers to these questions.

This chapter starts by describing the roles that high-level performance metrics that clarify the leadership's expectations about the future can play in broad-scale, pervasive change management. It then describes how the Army can evaluate value chains to develop relevant metrics. It compares the metrics relevant to such a change manage-

ment effort with those that the Army is already developing in its Strategic Management System.

Roles of Metrics in the Alignment of the Institutional Army

Performance metrics can help inform three key elements of a formal Army change management program to align the institutional and operational parts of the Army:

- *Define what the Army leadership expects the institutional Army to do.* What level of support should it seek to provide to the operating force in terms of throughput capacity, quality, speed, and cost of institutional support activities? How many dollars and military personnel should the institutional Army use to provide these support activities? What level of resources should institutional support activities release to help fund higher priority activities in the Army?
- *Define what initiatives must occur in the institutional Army to achieve the goals in the first bullet.* What resources should the Army expect to commit to achieve the goals in the bullet above? How long will it take to do so?
- *Coordinate the efforts of relevant parts of the Army to set the goals above, create the initiatives required to achieve them, update the goals as Army priorities change over time, and monitor progress toward final goals relative to plans to achieve those goals.* At any point in time, are the goals still realistic? If not, what goals would be realistic? How likely is the Army to achieve realistic goals?

In sum, as an integral part of a formal change management program, metrics can provide a common vocabulary that various Army communities can use to coordinate their mutual efforts to change the institutional Army over the long term to support the Army leadership's broader expectations about the capabilities of the operating force and other strategic considerations. In this study, we focus on the metrics

relevant to HQDA and its relationships with the MACOMs responsible for defining and implementing specific changes in institutional Army processes.

Answers to seven sets of questions are relevant to developing metrics to inform a formal change management program:

1. What aspects of performance in the operating force would a change in the institutional Army affect?
2. What outputs of the institutional Army affect performance in the operating force?
3. Which stakeholders outside the institutional Army care about these outputs?
4. What attributes of institutional outputs relevant to the operating force do these stakeholders care about?
5. What subprocesses in the institutional Army affect current delivery of goods and services to the operating force?
6. What initiatives in the institutional Army can improve the future performance of these subprocesses in ways that enhance operating force performance?
7. How many dollars and military personnel will the institutional Army consume (1) to deliver goods and services to the operating force at the end of the planning horizon (e.g., the end of the POM) and (2) to execute improvement initiatives between now and then that change the outputs that the institutional Army delivers at the end of the planning horizon?

Figure 4.1 summarizes these questions and illustrates their relationships. Operational performance provides the basis for asking which institutional outputs to examine. Outputs identify relevant external stakeholders, which in turn identify relevant output attributes. Attributes identify relevant subprocesses and initiatives to improve these subprocesses. Subprocesses and initiatives identify relevant resources. In effect, value flows down the chain from operational performance through the solid arrows to resources. The dotted arrows illustrate how relevant stakeholders clarify which attributes to focus on. The arrows with white centers point the way to metrics that can potentially help

the Army leadership align the flow of value from operational performance to resources. The relevance of the letters in the “metrics” boxes will become apparent in the discussion of Table 4.1, later in this chapter. The remainder of this chapter discusses how to develop such metrics. It starts with a brief discussion of the contents of each of the seven boxes in Figure 4.1.

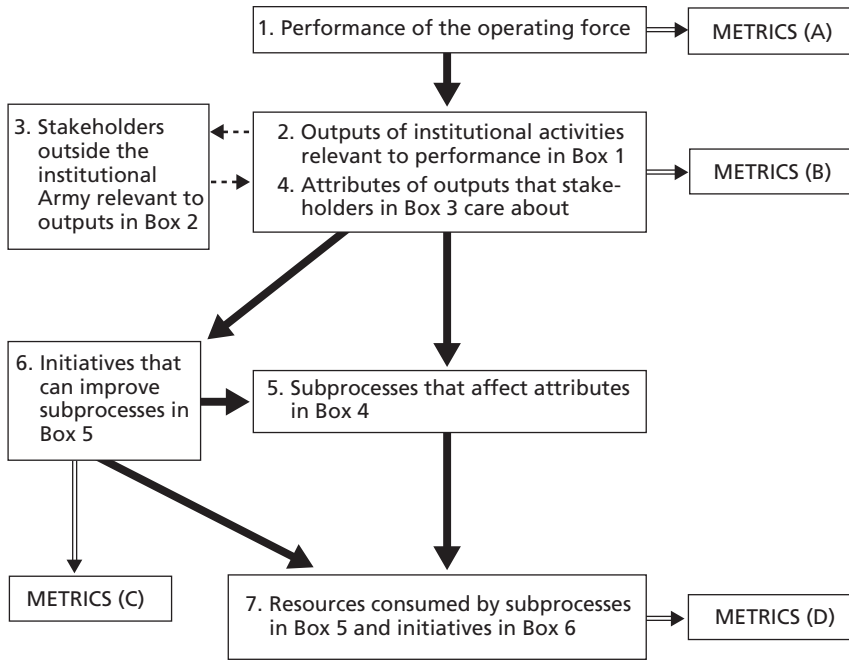
1. Performance of the Operating Force

To assess the relevance of changes in institutional activities that affect operational activities, the Army needs to understand how these changes affect operational performance. The Army can approach the performance of the operating force in three different ways.

First, can the operating force execute the missions that it is responsible for with acceptable risk? The Total Army Analysis uses this approach. It posits a set of missions the Army should be prepared to execute simultaneously and then asks how close the Army can get to manning such missions within its military end-strength and budgetary constraints. Changes in the institutional Army can improve the performance of the operating force by reducing the level of risk associated with the Army’s ability to execute the missions in its “simultaneity stack” of missions. TAA does not currently examine institutional Army activities in these terms.

Second, does the operating force have the assets judged necessary to achieve the missions of the key organizations in the operating force? The Status of Resources and Training System (SORTS) system uses this approach. It lists the key assets that each TOE unit must have to achieve the authorized level of organization associated with its MTOE. Changes in the institutional Army can improve the performance of the operating force by increasing the number of key assets available for the operating force to apply against the requirements in its MTOE documents. The Army does not currently use SORTS to evaluate the institutional Army in this way.

Figure 4.1
Seven Factors Relevant to Alignment



RAND MG530-4.1

Third, does the operating force perform at an acceptable level of lethality, agility, deployability, versatility, survivability, sustainability, robustness, jointness, and so on? These are all fairly standard elements of military capability often used to evaluate force structures and operational concepts.¹ The Army does not have definitions of these elements of capability that are precise enough to measure their levels in specific operational force structures. Perhaps as a result, it has no standards or

¹ See, for example, Headquarters, Department of the Army, Field Manual 3-0, *Operations*, Washington, D.C., June 2001, and John Matsumura, Randell Steeb, Thomas Herbert, Scot Eisenhard, John Gordon, Mark Lees, and Gail Halverson, *Army After Next: Exploring New Concepts and Technologies for the Light Force*, Santa Monica, Calif.: RAND Corporation, DB-258-A, 1999.

targets that state how much of any of these elements of capability is enough in any specific setting.

In purely practical terms, none of these views of operational performance provides a universal perspective for comparing the value of all changes in the institutional Army. Rather, each provides a shared vocabulary that planners can potentially use to characterize the effects of changes in the institutional Army. Simply forcing the discussion of the effects of such changes on operational performance should help sharpen the justification of proposals for institutional change and of the comparison of such proposals within the senior leadership.

2. Outputs of the Institutional Army

Two types of outputs from the institutional Army are relevant to the operating force. The most common type is a tangible product, which might be an organization, personnel, materiel, information, or a service. For example, the mobilization activity produces both whole organizations, ready for deployment, and individual personnel that the operating force can use to fill specific holes. The logistics activity can produce materiel at a given place and time. It can provide a repair or transportation service for materiel from the operating force. And it can give the operating force information on when and where to expect future materiel deliveries.

The second type of output is a level of performance in the operating force. For example, medical activities can produce a level of immunity from specific diseases or a level of health in the deployed force or the operating force as a whole. Logistics activities can produce a level of materiel readiness or availability in theater or in the operating force as a whole. Communication and information activities can provide a level of bandwidth between operating forces and institutional support activities.

The operating force typically cares more about the level of performance than a specific tangible product and will generally prefer to judge the performance of the institutional Army on the basis of performance. Institutional activities, on the other hand, historically

prefer definitions of outputs over which they have strong or even complete control. Because they cannot control all factors relevant to performance in theater, they prefer to focus on outputs they control. For that reason, a logistics activity will prefer a definition of output based on delivery of specific materiel items to theater to one based on the status of those items or, even worse, the systems that depend on them in theater.

3. Stakeholders Who Care About the Outputs of the Institutional Army

Three types of stakeholders outside the institutional Army are typically relevant to the outputs the institutional Army delivers to the operating force, no matter how we define the outputs. The first type comprises those who benefit directly from the outputs. For our purposes, these are usually the military units that receive or rely on the outputs. The ultimate user for the outputs in question may be thought of as a combatant commander. Institutional activities also aim some outputs directly at military personnel in the operating force. For example, medical services seek to sustain the health of personnel; personnel management services directly support the needs of personnel. In some cases, it is useful to identify operational personnel as stakeholders separate from military units. For example, because one goal of the Rapid Equipping Initiative is to reduce the need for troops to spend their own money on equipment they believe they need in theater, it is useful to highlight them as a stakeholder in the output of short-term acquisition activities.

The second type of stakeholders comprises the activities in the Army that finance or manage the resources that institutional activities use to deliver outputs to the operating force. With few exceptions, the operating force does not pay anything for the outputs that institutional activities deliver to it. Rather, the Office of the Deputy Chief of Staff for Programs (G-8), makes judgments about the relative value of resources going to different institutional activities. The ODCSOPS, G-3 (Operations and Plans), makes judgments about the relative value

of military personnel allocated to billets in different institutional activities. The readiness of nondeployed elements of the reserve components reacts immediately to mobilization decisions that determine which reserve units and personnel will be activated. The managers of scarce information, security, and installation services are affected when operating units demand such services from institutional providers that are responsible for the cost-effectiveness of the services they provide.

The third type of stakeholders comprises the activities that benefit if an institutional activity can find ways to continue to produce the same level of outputs while consuming fewer inputs or, equivalently, use the same level of inputs to produce a higher level of outputs. When an activity can do this, it can release resources for use elsewhere without imposing a cost on the two groups of stakeholders above. For example, the leadership of the Army sees a strategic need to generate additional dollar and military personnel resources within its current budgetary and military end-strength constraints. The leadership needs additional dollars to pay for additional brigades in the operational force and for continued progress on the Future Combat System (FCS). The leadership needs additional military personnel to staff the billets being created in the new brigades and the operational forces that support them.

In sum, the stakeholders outside the institutional Army that are most relevant to any institutional output are (1) those who directly benefit from them in the operating force—typically military units and soldiers; (2) those who provide the resources they consume—in terms of dollars, military personnel, or some support capability in limited supply to the Army; and (3) those who benefit from process improvements that free up dollars and military personnel.

4. Attributes of Institutional Army Outputs Relevant to Stakeholders

Suppose the stakeholders outside the institutional Army relevant to institutional outputs wanted to reach performance agreements with the activities that produced these outputs. How would they express their

priorities? They would choose the attributes of the outputs that they value. Stakeholders that directly benefit from the outputs in the operating force would, in all likelihood, value three kinds of attributes:

- *Throughput rate.* At what rate can the institutional activity deliver output—for example, how many organizations, people, items, and so forth, per time period?
- *Quality.* (1) How well does the output match what the operating force needs? Do people have the right experience and functional skills? Are materiel items delivered in the right configuration to the right place at the right time? Does the availability rate for communication or materiel systems meet the promised level? (2) How fast is the output delivered? How long must the operating force wait for fulfillment of a request? How fast can the institutional Army react to a change in a request? (3) How much variation occurs in performance? How well can the operating force rely on receiving a standard level of performance?
- *Operational resource consumption.* What level of its own resources must the operating force commit to get and use outputs from institutional providers? Is there a formal monetary internal transfer price? If so, how much of its O&M funding will the operating force have to commit to get access to institutional Army services? How much personnel effort is required in the operating force to convert the institutional output into a form the operating force can use? What level of operating force bandwidth, force protection, subsistence services, and so forth, must the operating force commit from its own resources to access and use the institutional output?

Stakeholders that provide the inputs that an institutional activity uses to provide outputs value efficient production of the outputs:

- *Dollars per unit of output.* Does the activity manage its production process to achieve the expected dollar cost of producing a given package of throughput rate, quality, and operational resource consumption?

- *Military personnel per unit of output.* Does the activity manage its production process to use the expected number of military billets to produce a given package of throughput rate, quality, and operational resource consumption?
- *Other major inputs per unit of output.* Does the activity manage its production process to use the expected level of information services, installation services, and other support services to produce a given package of throughput rate, quality, and operational resource consumption?

Stakeholders that benefit from process improvements that free up dollars and military personnel value improvement initiatives that generate such resources. Process improvements, of course, require an investment of dollars and military personnel effort. We highlight the costs and benefits of these investments as attributes relevant to these stakeholders.

5. Key Subprocesses of an Institutional Army Activity That Help Generate a Flow of Output Today

By definition, we can conceive of any output that the institutional Army delivers to the operating force as the product of a process, which in turn we can typically conceive of in terms of multiple subprocesses that, by combining their efforts, ultimately produce institutional output. A trained individual, for example, emerges from an institutional process that includes at least the following subprocesses:

- Updating of training goals, curriculum, and training materials
- Contingent on performance of retention and accession programs and on operating force needs, setting requirements for training and training schedules to achieve these requirements
- Selection of individuals for training
- Life support of individuals during training
- Execution of training, testing, retraining, and final qualification.

Each of these subprocesses relies on previous investments in training technology, training facilities, and so on, to translate current consumption of dollar resources and military personnel into a training activity. Each of these subprocesses produces its own outputs of various kinds. When the institutional Army combines these outputs effectively, the subprocesses place specific individuals in training, support them, inculcate them with specific skills, and validate these skills so that institutional training can offer these embodied skills as outputs for employment in the operating force. Together, these subprocesses effectively translate resource consumption in the operational Army into outputs that the operating force can use.

Viewed in this way, many processes in the institutional Army interact. Institutional retention and accession activities are complex in themselves; each includes important subprocesses of its own. Activities that integrate manpower requirements and personnel management bring the outputs of retention and accessions activities together and use them as inputs to training activities. Training activities coordinate their schedules with mobilization activities. None of these institutional activities can deliver outputs to the operating force without the others. Each of these integrates important subprocesses to produce intermediate outputs; working together, these activities convert these intermediate outputs into the final outputs of the institutional Army as a whole that the operating force needs.

Subprocesses interest us precisely because they embody the place where institutional resources produce outputs for the operating force. Put another way, they tell us where to look to discover what resources—dollars and military personnel—the institutional Army must consume to produce any specific set of outputs for the operating force. They also interest us because any effort to improve performance in the institutional Army must occur in these subprocesses. From the point of view of aligning the operating force and the institutional Army, these subprocesses are of little intrinsic interest to the leadership of the Army. But the leadership needs enough detail on subprocesses to test the realism of statements about (1) what resources the institutional Army will require to produce future outputs for the operating force or (2) how initiatives to change institutional processes are likely to affect the link

between institutional resources and institutional outputs the operating force can use.

Given this perspective, the type of metrics that interests us most about institutional subprocesses is one that tells us how a change in an institutional output attribute affects the level of resource consumption in a key subprocess: in training, for example, to produce 100 people who can be validated as having a specific level of a certain skill.

- How many calendar days of military personnel time, for trainers and trainees, should the Army expect to consume?
- What percentage of the available time for these military personnel, for trainers and trainees, will this training consume during this calendar period?
- How much money should the Army expect to spend during this calendar period to provide all inputs relevant to the training?

The discussion above implicitly emphasizes institutional subprocesses that contribute directly to current delivery of outputs to the operating force. But, as noted above, each subprocess can operate cost-effectively only if the Army continues to make the routine, ongoing investments required to maintain the subprocess's capability, in any year, to deliver output to the operating force. Subprocesses replace worn-out capital assets. They refresh the knowledge of personnel with on-the-job training and upgrading. They upgrade procedures and routines as part of their normal efforts to remain well coordinated with other parts of the Army. Training activities adjust the content of their curriculum to reflect new requirements. Medical activities introduce new drugs and surgical procedures as they become available. Administrative activities introduce new information technologies as they become available. And so on. The key subprocesses discussed above assume that such investment will occur; such investment consumes resources that institutional activities must plan and account for in the same way that they plan and account for the resources they consume to produce specific outputs for the operating force in any year.

6. Formal Initiatives to Improve the Performance of Institutional Army Activities

Another form of investment changes how the institutional Army produces output for the operating force and invests in a routine, ongoing way so that it can continue to produce output. This other form of investment does this by making significant changes in the processes that the institutional Army uses to produce output. For example, such an initiative may change a process from (1) predicting the output that the operating force will need and producing output consistent with this expectation (a “push” approach to production) to (2) waiting for demands to materialize from the operating force and filling whatever demands occur as quickly as possible (a “pull” approach to production). A training activity may use realistic computer simulations to displace time in the field in order to teach unit tactics. A training activity may send trainers to operational units and train individuals just before they are ready to do something in the unit rather than bringing the individuals to a schoolhouse and giving them all the individual training they need at once. Everyone involved with mobilization may move from (1) using their own information systems to manage their individual pieces of the mobilization activity to (2) using the same shared information system.

Such significant process changes inevitably require up-front investments to design, test, and implement. They require up-front training to prepare the people who will use them for the change. They often require up-front investments in qualitatively new information systems. Each process change presents its own challenges; they all share at least one thing in common: Any significant process change initiative benefits from program management similar to that which the Army normally applies to significant system acquisitions. Such program management (1) develops performance expectations, (2) links them to expectations of about time and program cost, and (3) updates all these expectations as the program proceeds. Investment in process change benefits from the three types of traditional metrics associated with program management.

First, *performance*. Ideally, a process change initiative would seek to determine how the change would affect the performance of the operating force. As explained above, it will usually be unrealistic to expect this. Rather, any initiative should seek to determine how process change would affect the attributes of institutional outputs delivered to the operating force. For example, will the change improve the (1) throughput rate of the institutional activity, (2) match between what the institutional activity produces and what the operating force needs, (3) time it takes the institutional activity to respond to a new operational demand, (4) reliability of the institutional activity's ability to deliver output to the operating force, or perhaps (5) resources that the operating force must consume to use output from the institutional Army? The dimensions of the attributes of institutional output discussed above are all relevant here as well; they frame the performance goals of any process change initiative.

Second, *schedule*. How long will it take for the Army to complete the initiative? Because we focus here on institutional capabilities at the end of the POM, a key question is what portion of an initiative the Army can expect to complete by that date. Interim milestones leading up to the end of the POM can provide opportunities to check progress against the baseline plan in the program and update the baseline as needed.

Third, *cost*. What will the Army have to spend, in dollars and military personnel, to achieve the performance goals of the program? When?

7. Key Inputs to an Institutional Army Activity

Institutional activities consume (1) money; (2) military personnel; and (3) information, installation, and other institutional support services that themselves cost money and consume military personnel. Any program to improve the alignment of an institutional activity with the operating force expends resources on three kinds of things:

- *Variable costs of current operations.* Given any level of attributes in the institutional outputs produced by the key subprocesses discussed above, the institutional Army can reasonably expect some level of bill stated in terms of dollars and military personnel. These resources support direct production of institutional outputs for the operating force today.
- *Capital costs of current operations.* To sustain any level of output attributes discussed above, the Army will also have to invest on an ongoing basis in capital replacement, updates in product content, and so on, in relevant subprocesses. The institutional Army can expect such investment to generate a bill for the institutional activity in question and support activities to provide inputs to it without charging for them, in terms of dollars and military personnel.
- *Transitional costs of changing how current operations work.* Given any set of plans for initiatives to change institutional subprocesses, the institutional Army can reasonably expect yet another bill, direct (within each initiative) and indirect (for activities that support the initiatives without charging for the support), stated in terms of dollars and military personnel.

To be complete, any program to improve the alignment of an institutional activity with the operating force needs a resource plan to ensure that the program is internally consistent and, therefore, feasible. A final accounting of all resource demands associated with the three elements of the program called out above allows the Army to map institutional output levels over time into resource consumption over time, and vice versa. Such a mapping can translate targets for attributes of institutional outputs into targets for the resources the Army must commit to these outputs. In principle, although in practice this is much harder to do, it can also translate targets for the resources the Army expects to have available over time into realistic targets for the levels of institutional outputs it can generate for the operating force.²

² Once output levels are specified, the Army can use simple input-output factors and analogous rules to translate these into resource requirements in a fairly mechanical way. If resource

This set of metrics tracks the total institutional resource levels relevant to such mappings.

Coordinate the efforts of relevant parts of the Army to set the goals above, create the initiatives required to achieve them, update the goals as Army priorities change over time, and monitor progress toward final goals relative to plans to achieve those goals. At any point in time, are the goals still realistic? If not, what goals would be realistic? How likely is the Army to achieve realistic goals?

From Questions to Metrics

The discussion of the seven sets of questions above suggests the types of metrics likely to help the Army develop actionable answers to these questions.³ Table 4.1 summarizes this discussion.

The first row of Table 4.1 walks through the first steps in Figure 4.1 that lead directly to metrics; the letters in the columns of Table 4.1 refer to the letters in the “metrics” boxes in Figure 4.1. This row outlines the “production” chain required to move from resource inputs (D), through the production of institutional outputs (B) and investment in improving the processes that generate institutional outputs (C), to operational performance (A).

levels are specified, on the other hand, the Army can apply these resources to produce many different mixes and levels of outputs. Deciding how to do so requires a great deal of discretion and professional judgment that cannot be captured in simple analytic terms. For a useful discussion of this asymmetry, see James H. Bigelow, Thomas Martin, and Robert Petruschell, *Performance-Oriented Logistics Assessment (POLA), Relating Logistics Functional Capacities to Resources and Costs*, Santa Monica, Calif.: RAND Corporation, N-3354-A, 1992.

³ We drew the basic structure of the argument below from formal logic modeling. We do not use logic modeling as it is normally applied in program evaluation. In particular, we are not seeking the basic information that logic modeling uses to support evaluation of an existing program. But we do take advantage of some useful ideas from logic modeling that help us (1) translate the elements of a value chain into planning goals and (2) choose metrics that inform these planning goals. Appendix D provides more information. We thank Victoria Greenfield and Valerie Williams for helping us understand logic modeling—both the elements of it that we benefit from here and the reasons formal logic modeling is quite different from the approach we ultimately chose.

**Table 4.1
Production Activities, High-Level Planning Goals, and Metrics Relevant to Aligning the Institutional Army
and Operating Force**

	OF Performance (A)	Attributes of IA Outputs (Production) (B)	Initiatives to Improve IA Subprocesses (Investment) (C)	Resource Inputs to IA (D)
Production	Operational outcomes enabled by IA outputs	Throughput capacity Quality Speed Cost to operating force	Improvement expected in output attributes Initiative cost Initiative schedule	Military billets Dollars
Planning, goals	Operational plans that Army can support Capability fill against specified plans Plan for specific capabilities (lethality, survivability, etc.)	Goals for each activity Bundles of activities likely to state goals similarly Global, end-to-end support Personnel acquisition, development, sustainment Materiel, information asset development, acquisition	Planned status of each characteristic above in 2013 Milestones from now to 2013 to achieve planned status	Number of military billets compatible with plan Dollars compatible with plan
Metrics	Metrics used to project goals for operational capability planned in 2013	Quantified planning goals, by activity output attribute, for 2013	Standard program management metrics for 2013, interim milestones that are appropriate for complexity of initiative	Activity-based, Army-wide counts of authorized billets, dollars required to achieve output attributes in plan

NOTE: IA = institutional Army; OF = operating force.

To develop metrics relevant to this production chain, we think about a set of planning goals that might be used to coordinate the four cells of the production chain. These goals appear in the second row of Table 4.1, which outlines a “planning goal” chain derived from the production chain above it. This row asks (A) what type of goals the Army should set for operational performance, (B) what type of goals should be set for the attributes of institutional outputs to achieve the goals for operational performance, (C) what type of goals should be set for investments in improving the subprocesses that produce institutional outputs to ensure that the Army can achieve its goals for institutional outputs, and (D) what type of goals should be set for flows of dollars and military personnel services to ensure that all the preceding goals can be achieved. Taken together, this set of goals is internally consistent in the sense that the goals in question seek to describe a realistic, resource constrained program of improvement to achieve any set of operational goals.

The third row of Table 4.1 identifies the specific quantitative and qualitative measures and targets that the Army can use to define and track progress against the goals in the second row.

A. Operational performance. The Army might use the “simultaneity stack” of missions developed in the Total Army Analysis to define a set of missions it will service in the year 2013 and set goals to achieve specific fill rates against specific personnel, materiel, and information assets that it expects to need to service the missions in the “simultaneity stack.” Metrics in column A would then be fill rates, by key asset category, projected to 2013; specific goals could be stated in terms of targets for fill rates in each asset category.

B. Attributes of institutional outputs. Goals in column B would address the attributes of the outputs that institutional activities would have to achieve to service the fill rate targets in column A. Key attributes might include how many new soldiers the institutional Army can deliver to operational units each month and a match between skills the operational force needs and skills the institutional Army develops. Metrics relevant to goals for the attributes of outputs that contribute to

this final delivery might include accession rates, institutional training capacity measured as effectively trained personnel delivered per month, and percentage fill in specific operational units by type skill type in 2013. Specific goals in column B could then be stated as target levels for each of these metrics.

C. Initiatives to improve institutional subprocesses. Goals in column C would address the initiatives chosen to close any gaps between the performance of institutional subprocesses today and that required to achieve the goals for institutional outputs in 2013. In particular, these goals would address flows of investments into these initiatives and flows of progress within these initiatives over time. For example, for an initiative to expand training capacity, these goals would address how much expansion would affect operational goals if the expansion were achieved and what investments over time would be required to achieve this expansion by 2013. Relevant metrics for these goals could track expected expansion of capacity, measured as effectively trained personnel delivered per month, by 2013, and flows of dollars and military personnel services expected through 2013. Specific goals in column C could then be stated as target levels for each of these metrics.

D. Resource inputs into institutional activities. Goals would address flows of dollars and military personnel into (1) ongoing production of institutional outputs and (2) investment in improving institutional subprocesses that are compatible with the targets set for institutional outputs in 2013. Goals involve dollars and military personnel used directly in each institutional activity in question and dollars and military personnel required to resource these activities from other sources. Metrics could count total, Army-wide dollars and military personnel by fiscal year. Specific goals in Column D would be stated as target levels for each of these metrics.

Table 4.1 excludes one important step reflected in Figure 4.1: detail on the subprocesses that operate inside any institutional activity. If we think of the Army's mobilization activity, for example, the senior Army leadership is concerned with its ability to deliver whole units, critical parts of units required in task-organized forces, or individuals

to a combatant commander as required while maintaining the integrity of the reserve component units that these units and individuals came from.⁴ To do this, the institutional Army uses subprocesses that

- Plan for mobilization and demobilization against potential contingencies.
- Train and support training prior to alert.
- Execute mobilization at home station (alert soldiers, notify employers, recall key personnel, prepare orders, screen, execute soldier readiness processing [SRP], check equipment, accelerate maintenance, cross-level personnel and equipment, attach personnel, muster units, load for movement, send advance parties to mobilization stations).
- Execute activities at mobilization station (move to mobilization station and in-process, complete and validate SRP, complete training, complete cross-leveling, conduct Medical Examination Board and Physical Evaluation Board actions, conduct pre-combat checks, process nondeployable personnel, load for deployment).
- Execute demobilization.

The institutional Army needs to be able to perform each of these activities predictably and in coordination with the others to deliver the units and individuals that the combatant commander wants. But the senior Army leadership does not need to know how the institutional Army will do all these things or establish and monitor goals for any of these subprocesses. The leadership may want an ability to drill into institutional plans to verify that these plans are complete and realistic enough to associate reliable numbers of dollars and military personnel with different goals for the delivery of units and individuals to a combatant commander. Put another way, the senior Army leadership cannot afford to negotiate and monitor goals on all the outputs that institutional subprocesses generate to achieve any broad objective for the institutional Army. But the senior Army leadership does care about

⁴ This discussion draws on David Kassing, "Review of Army Mobilization Process," unpublished RAND research, 2005.

the numbers of dollars and military personnel it must commit to institutional activities to achieve the outputs it expects the institutional Army to deliver to the operating force. And activities in the institutional Army should have detail on key subprocesses like those listed above to satisfy senior leadership concerns when they arise.

Chapters Five through Seven use the framework shown in Figure 4.1 and Table 4.1 to develop high-level performance metrics relevant to the senior leadership's expectations about institutional medical services, enlisted accessions, and accelerated acquisition, respectively. Each chapter, in effect, "walks" through Table 4.1, from left to right. In the process of developing the material relevant to Table 4.1, we discovered a fair amount of information relevant to subprocesses that are not directly relevant to senior Army leaders. Because this information should help institutional activities understand what types of metrics need to back up the metrics they negotiate with the senior leadership, each chapter also reports what we have learned that might be relevant to subprocesses in each of these institutional activities.

In the course of examining these three areas and others not documented here, we found that the qualitative nature of the metrics relevant to inputs did not vary from one activity to another. Rather than repeat them in each chapter, we list them here once:

- Resources used directly in each activity examined:
 - Dollars (O&M, RDT&E, full military personnel costs, procurement, military construction, and so on, that can be attributed directly to the activity)
 - Military personnel that can be attributed directly to the activity.
- Resources consumed by other parts of the institutional Army that provide services to each activity examined without charging for them in budgets or authorization documents (e.g., installation services, generic business services, information services):
 - Dollars (O&M, RDT&E, full military personnel costs, procurement, military construction, etc., that can be attributed to all the institutional activities that support the activity examined, directly or indirectly)

- Military personnel that can be attributed to all the institutional activities that support the activity examined, directly or indirectly.

The Army leadership needs this information for the level of resources consumed to (1) generate and deliver outputs to the operating force in the last year of the planning horizon—in our case, the last year of the POM—and (2) sustain any formal improvement initiatives undertaken between now and then to achieve the capacity to generate and deliver these outputs.

Developing these data will be a serious challenge. The Army can identify military and government civilian billets directly authorized to an activity. It can use established cost factors to link total dollar costs to these billets. It cannot easily link contract services or their dollar costs with the activities supported directly or indirectly. Linking other O&M, RDT&E, procurement, and military construction dollars to specific activities directly supported will be easy in some cases and difficult in others; no standard methods exist to do this today. Difficulty multiplies dramatically when we consider dollars and military personnel provided, directly or indirectly, for free to any specific activity. As explained in Chapter Two, the Army simply does not have the understanding of linkages within the institutional Army required to estimate such resource costs. We identify these resource metrics, then, as a challenge that the Army can address in the future if the senior leadership would like to associate these resource costs with institutional outputs to support studies of trade-offs among institutional alternatives.

Applying These Metrics to Support Formal Change Management

Table 4.2 summarizes the roles that a set of metrics compatible with the relationships in Figure 4.1 and Table 4.1 could play in a formal Army change management program to align institutional activities

Table 4.2
Roles of Metrics in Three Elements of a Formal Change Management Program

Role of Metric	Metric				
	Attributes of OF Performance (A)	Attributes of IA Outputs (B)	Characteristics of IA Subprocess	Characteristics of Initiatives to Improve IA (C)	Requirements for inputs to IA (D)
What the Army wants the IA to do	Requirements for IA output attributes derive from these metrics	Primary role of IA output attributes			
What improvement initiatives must occur in IA		Requirements for IA improvement initiatives derive from these metrics	Requirements for characteristics of IA change initiatives derive from these metrics	Provide information to support decisions to invest in change	
What the Army must coordinate, update to maintain realistic OF-IA alignment program	Level of OF performance consistent with resources available to IA	Attributes of IA output consistent with resources available	Characteristics of IA subprocess performance consistent with resources available	Characteristics of IA process improvement investments consistent with resources available	Resources available to IA activities within fiscal policy guidance

with the operating force. Different types of metrics appear in different columns. The letter in parentheses in each column corresponds to the letter in the appropriate “metric” box in Figure 4.1. Each row addresses one of the three elements of a formal change management program listed at the beginning of this section. Cells in the table summarize the role that each type of metric could play in each element of change management.

Defining what the Army leadership expects the institutional Army to do. Two types of metrics are relevant. Metrics on operational performance frame any change in policy. They define the *attributes of operational performance* that institutional activities should seek to enhance through their own outputs. Metrics on operational performance provide the basis for choosing the *attributes of institutional activity outputs*. This is where efforts to align the institutional Army with the operating force must start. Given the Army’s best judgment today about how institutional outputs affect operational performance, the targets it sets for the attributes of institutional activity outputs will define what the Army wants the institutional Army to do at the end of the POM.

Defining what initiatives must occur in the institutional Army to achieve operational performance goals. Given targets developed in the first row, three types of metrics are relevant to defining improvement initiatives in the institutional Army. Most initiatives that improve alignment are likely to act by affecting the Army’s use of resources in fairly specific institutional activity subprocesses. This is where the Army currently thinks about resource use. As a result, the *characteristics of subprocesses* are relevant to include in any design or assessment of improvement initiatives. That said, these initiatives should not seek improvement of the characteristics of these subprocesses for their own sake. Rather, they should seek to improve the *attributes of the outputs* that any institutional activity delivers to the operating force. So any initiative starts with the goal of improving the attributes of institutional outputs. Because the initiative occurs in specific subprocesses, it seeks to change these subprocesses in ways that have the desired effects. Metrics on institutional outputs and the subprocesses that contribute to their production therefore frame any effort or design or assess an

improvement initiative. And any design or assessment of an improvement initiative will define that initiative in terms of a set of discrete *characteristics*, including the level and mix of resources that the Army should expect the initiative itself to consume to achieve the improvements envisioned. In sum, the attributes of institutional outputs are critical to setting design goals for improvement initiatives. The characteristics of institutional subprocesses are critical to verifying the connection between a change initiative and the institutional outputs it seeks to affect.

Coordinating the efforts of relevant parts of the Army to design and implement a specific program of alignment. All the metrics in Table 4.1 are relevant to the third element of formal change management, which achieves and sustains a closed loop between performance in the operating force and the institutional resources required to achieve it. In any change management program, this element tests the goals of the program to verify that the Army should be able to achieve the goals if it has the resources expected. If goals associated with the attributes of institutional outputs change, this element traces the implications of the change to resources required; if the availability of resources changes, this element traces implications to the attributes reasonable to expect in the outputs that the institutional Army delivers to the operating force. As above, the leap from institutional output to operational performance is likely to be difficult to make. To be practical and actionable, this element of a change management program will probably have to focus on closing the loop between institutional outputs and institutional resources. The table includes metrics in the first column to emphasize that any effort to close the program management loop in this way must always be cognizant that the intent of the program is to improve operational performance.

Relationship of Value Chain Approach to the Strategic Management System

In March 2002, the Chief of Staff of the Army directed the development of an Army-wide balanced scorecard that would be called the

Strategic Readiness System (SRS) and is now known as the Strategic Management System.⁵ A balanced scorecard is a widely used tool for aligning the resource decisions throughout an organization with high-level strategic priorities in large, complex organizations. It develops a strategy map that links outcomes for external users and resource consumption to performance in activities inside the organization and investments in future organizational capabilities. In large organizations, it first creates a strategic map that captures a consensus view of the organization's senior leadership on how the organization works. It then "cascades" this map down through the organization, developing comparable maps in each part of the organization that (1) reflect the maps above them in the organization and (2) show the consensus of relevant leaders at each level on how the organization works at that level. These maps become increasingly detailed and focused on local issues as they cascade down through the organization. Taken together, these maps then serve as a basis for developing metrics relevant to leaders at each level that help them (1) monitor activity at each level to verify that the underlying map for that level is compatible with current performance of the organization at that level and (2) choose or create and then implement opportunities to improve the performance of the organization at each level. A scorecard seeks to develop 20 to 30 metrics that leaders can use to focus their discussions on high-priority decisions at each level.

The SMS, as currently structured, is a preliminary start in this direction. It is a process that has generated strategy maps and corresponding metrics for the Army as a whole, for each Deputy Chief of Staff, for each MACOM, and for each division. These maps seek to align themselves to one another, often drawing on common data sources or drilling into one another to define the values of metrics associated with them. The maps also seek to align with relevant maps devel-

⁵ This discussion draws on Frank Camm, Rick Eden, and Eric Peltz, *A Candidate Framework for Assessing the Health of the Logistics System*, unpublished RAND research, 2003. Broader discussion and details on many details about designing, implementing, and managing against balanced scorecards are available from the Balanced Scorecard Collaborative, homepage, undated, online at <http://www.bscol.com> (as of August 17, 2005). For simplicity, we will use the term "SMS" to refer to all balanced scorecard-related activities in the Army.

oped in defense agencies and joint activities. The quality, completeness, and maturity of the maps vary dramatically across the Army. The maps usually do not have enough underlying structure to allow the leaders they are designed to support to use them to test their images of how the Army actually works. Rather, the Army has more typically used these maps to choose clusters of metrics that these leaders can track without worrying about how the metrics relate to one another. That is, to the extent that the SMS affects Army decisionmaking, it does so by giving Army leaders shorter, more focused lists of better-motivated metrics to monitor.

The Army's experience with the SMS raises two important questions relevant to the metrics we propose here:

- Do the metrics we seek already exist as part of the SMS? Has the Army already done, in the SMS, what we say should be done to help the Army leadership improve the alignment of the emerging operating force and the institutional activities that create and sustain this force?
- If the Army has not done this, why not? Given how much effort the Army has devoted to the SMS over the past four years, if the Army has chosen not to develop metrics like those we propose here, why should we believe that the Army needs such metrics?

The simple answer to the first question is that the Army SMS has not developed the metrics that we seek. As we say this, we must reiterate that the status of the SMS varies dramatically across the Army, and we have had an opportunity to examine only portions of the SMS. In places, the Army has developed a capability to collect data that would be relevant to many of the metrics we discuss. So the SMS is an obvious place to look for data that the Army can use to implement many of the metrics we propose. But our focus differs from the focus in the SMS in important ways that help explain why the SMS generally seeks metrics quite different from those we propose.

For example, as its original name (Strategic Readiness System) implied, the SMS tends to focus on the current *readiness* of the Army rather than on future capabilities. That was not the Army's intention

when it first began to develop the SMS. But as the challenges of implementation became increasingly apparent, groups around the Army increasingly focused on current status, not future capability. Efforts are under way in various places to develop predictive metrics—metrics that can use historical data to predict what the status of the Army will likely be. These efforts remain incomplete.

Second, because the SMS tends to focus on the present, it tends to take current capabilities as targets and ask the extent to which the Army has the resources to achieve currently planned capabilities. So, for example, instead of asking how fast the Army can open an unprepared theater, deploy into that theater, and employ a brigade combat team in specified contingency operations, the SMS tends to ask whether the Army mobility system has all the resources required to achieve current target deployment and employment times and whether the units that would be employed have the personnel and equipment required to achieve these target times. Where the SMS measures status in terms of resources—percent of equipment required that is currently available—or throughout—how many tons of materiel the Army can move within a target planning horizon—we have a tendency to be more interested in speed and quality—how fast can a brigade unit of action be employed by the end of the POM and how responsive is the unit to surprises that will surely arise. The result is that the qualitative character of the metrics we examine is often quite different from the qualitative character of the metrics in the current SMS.

Third, the SMS is a work in progress. It began at a time when the Army's vision of the future was quite different from its current vision. Over the course of its development, the interest of the senior Army leadership in the SMS waned until the new secretary arrived, and has waxed since then. But the new secretary has brought new priorities, prompting a redefinition of the SMS that has required fresh starts on many issues. We have recommended to ODCSOPS, G-3, apparently with some success, that the ACP actively seek to adjust the content of the SMS, as the plan evolves, to ensure that Army Transformation initiatives affect the metrics that leaders throughout the Army see if they apply the SMS in their decisionmaking. In principle, such an approach

could bring many of the metrics we propose here into the SMS as the ACP identifies specific new change initiatives.

Fourth, parts of the Army maintain much more complete and complex balanced scorecards than the scorecards they have developed for the SMS. The clearest example of this that we have encountered is the scorecard that the Surgeon General used for the internal management of the Army Medical Department (AMEDD). It is far more detailed than the medical scorecard provided to the SMS effort. And because the Surgeon General had actively supported its development and use, the scorecard appears to have had broader effects on decision-making within AMEDD than the SMS has had more broadly in the Army. Judging existing Army metrics by focusing on the SMS does not always capture the depth and quality of metrics already available.

If the Army SMS has not already selected the metrics we propose here, then, does the Army need these metrics? If senior support for the SMS continues and the SMS survives in something like its current form, the metrics suggested here should help the Army refine the SMS over time as it comes to support a longer-term planning perspective rather than “simply” monitoring current readiness status. If the SMS does not survive, the alignment issues that motivated this study will remain, and the metrics proposed here can still help the Army address these. But recent Army experience with the SMS yields sobering lessons about the difficulty of developing and implementing metrics of the kind we propose here. At a minimum, the SMS experience to date warns us that any effort to develop and implement metrics of the kind proposed here will be challenging.

Summary

The Army leadership can use a linked set of performance metrics to help coordinate activities throughout the institutional Army more effectively with the new, emerging operating force. Metrics can help in three ways. They can help (1) define what kind of outputs the leadership wants the institutional Army to deliver to the operating force, (2) define what performance improvements will be required in insti-

tutional subprocesses to deliver such outputs and estimate what it will cost and how long it will take to achieve these improvements, and (3) support an ongoing discussion between the leadership and the institutional activities seeking to change that verifies that change is proceeding as planned, or adjusts plans for change to reflect changes in the Army's environment and challenges identified within the change process itself. In all three roles, metrics basically provide a common vocabulary that the leadership and the institutional Army can use to coordinate their mutual planning and execution of change.

The Army can develop metrics to serve these roles by asking a set of specific questions about any institutional activity under examination and the outputs it generates for delivery to the operating force: (1) What attributes of operational performance does this institutional activity seek to improve through the outputs it provides? (2) What outputs are these, which stakeholders care about them, and what attributes of these outputs do the stakeholders especially care about? (3) What institutional subprocesses generate these outputs? How do they consume dollars and the services of military personnel to generate these outputs? (4) What improvement initiatives will be required to change these subprocesses in ways that allow them to generate the level and type of outputs the new operating force will need? What will these initiatives cost, in dollars and military personnel? How long will the initiatives take to complete? (5) What resources will the institutional activity consume to provide the outputs that the operating force needs from it?

The Army can evaluate value chains to structure these questions in a way that (1) traces the conversion of dollars and personnel into outcomes in the operating force, (2) links specific goals to key steps along the path of this trace, and (3) develops metrics that the Army can use to monitor performance relative to each key goal. The senior leadership needs a subset of the metrics developed to structure and manage its expectations with institutional MACOMs. The MACOMs need additional metrics to support the metrics they use to coordinate their relationships with the senior leadership.

In principle, we might expect the Army's ongoing SMS initiative to develop the metrics relevant to improving the alignment of the

operating force and institutional Army. This may occur over the longer term, and the metrics proposed in the chapters that follow could support such adaptation of the SMS. For now, the SMS tends to focus on the current readiness of Army activities, defined in many diverse ways in different parts of the Army. The metrics we propose focus on the nature of institutional outputs at the end of the POM and initiatives required to achieve these outputs. As a result, the metrics we propose tend to differ qualitative from those currently emphasized in the SMS. That said, the data sources that the SMS uses offer valuable sources of information that the Army could potentially use to implement the metrics we propose here.

Medical Services

This chapter discusses how to develop a set of performance metrics that the Army leadership could use to define what it expects for the outputs of institutional medical services in the Army at the end of the POM. No clear definition of “institutional medical services” exists, because AMEDD provides direct medical services to Active and Reserve Component Army personnel, military families, and retirees inside and outside the United States, as well as performs institutional elements of an integrated, end-on-end medical support service for the operating force, which includes operational medical elements. It also works closely with the DoD-wide TRICARE program that covers all eligible Army medical beneficiaries, allowing them to access medical services from contract nonmilitary medical service providers.¹ To promote our focus on institutional performance, this chapter uses some simple rules to distinguish institutional and operational parts of AMEDD. The reader, however, should always remember the basic integration of operational and institutional activities within AMEDD and the way this integration promotes effective institutional support of the operating force.

This chapter has four sections. The first presents our definition of the institutional Army portion of Army medicine. The second presents our methodology for clarifying medical outputs of the institutional Army for the operating force, and their metrics. The third section presents our analysis of the medical outputs of the institutional Army for the operating force and their metrics. The final section describes

¹ Appendix E describes the scope and content of these activities in more detail.

insights gained from this analysis of institutional Army medical outputs for other functional areas of the Army.

The Institutional Army Portion of AMEDD

To understand the institutional portion of AMEDD, it is useful first to summarize the total value chain for Army medical services and then look at the role of institutional activities in it. The Army medical service supports all soldiers, whether they are deployed or not. It also supports their dependents, as well as retirees. Some of this support comes from TRICARE contract sources; we focus here on the support that AMEDD provides from its own internal sources. The Army medical service also supports nonmilitary personnel in theater as directed by the combatant commander. All this medical service comes from standing organizations manned with qualified personnel and equipped with the materiel and information these organizations require to execute their missions. The Army medical service accesses and trains these personnel and manages them through their careers in military medicine, as part of the active or reserve force. The Army medical service also designs and procures the materiel and information assets its organizations require and manages the medical logistics system that supports these organizations on an ongoing basis. And the Army medical service ultimately creates and sustains its own design and the design of the organizations in it and their relationships to one another. This complex set of activities and their associated outputs makes the Army medical service a microcosm of the Army as a whole and the institutional portion of Army medical service a microcosm of the institutional Army as a whole.

Within this Army-wide medical system, institutional medical activities

- maintain doctrine on the provision of medical services; coordinate it with relevant doctrine elsewhere in the Army as it continues to evolve

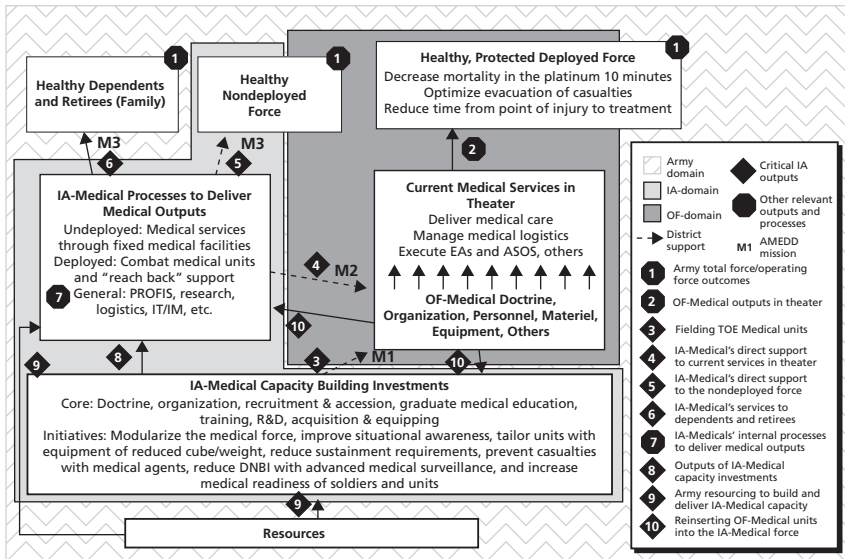
- design and allocate dollar and military authorizations to the medical system as a whole and each of the organizations within it
- deliver direct medical care to nondeployed soldiers, dependents, and retirees
- provide back-office procurement, logistics, diagnostic and laboratory, information management, remote advisory, and other support services to the institutional and operational activities that deliver medical care directly to these users, deployed soldiers, and other users, as directed by a combatant commander
- access, train, and manage military and civilian medical personnel
- design and/or procure military materiel and information assets
- prepare the battlefield with ongoing assessment of medical threats, development of mitigations to the risks that these threats present, and instantiation of these mitigations in the activities above.

Figure 5.1 offers a graphical overview of Army medical services and the institutional activities within them. It focuses on flows of outputs and outcomes relevant to an Army-wide view of medical services. As will become more apparent as we proceed, the senior Army leadership can use information about the flows marked by a diamond to define how it expects institutional medical activities to perform. Octagons mark flows of less immediate importance to the senior leadership's direct oversight of institutional activities but critical to understanding how the Army's end-to-end approach to medical support works together as a system.

The octagons labeled "1" provide a natural place to initiate a walk through the figure. These are the final outcomes that Army medical services attempt to affect: the health status of any deployed force, of nondeployed forces that support or will ultimately replace the deployed force, and of military dependents and retirees.² Medical

² We derived these from the Army Medical Department, "Army Medical Department Mission Statement," undated(c); Department of the Army, *Army Posture Statement*, Washington, D.C., February 6, 2005; and Army Medical Department, *Army Medicine White Paper: Transforming Medical Support to a Modular Army*, Washington, D.C., February 25, 2005.

Figure 5.1
Value Chain for Army Medical Services



NOTE: ASOS = Army support to other services.

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activities in the operating force have primary responsibility for promoting the health of a deployed force (octagon 2). Institutional medical activities promote the health status of the nondeployed force (diamond 5) and military dependents and retirees (diamond 6). Institutional medical activities also support the operational medical activities to support deployed force in two very different ways. First, they essentially create the doctrine, organizations, skills, and materiel that together comprise operational medical activities (diamond 3). That is, the Army's operational capability does not even exist until its institutional medical activities create this capability. Second, other institutional activities provide continuing support to any operational medical activities currently supporting the operating force (diamond 4). Two different aspects of institutional medical activities are important to us in this regard. The first are the subprocesses that generate current support to operational medical services, nondeployed forces, dependents,

and retirees (inside the box with octagon 7).³ Because leaders of institutional activities are well prepared to determine *how* to organize and execute these subprocesses once the senior leadership has told them *what* outputs it expects them to deliver to external users, we do not focus attention here. The second are (1) the capacity-building activities that create the doctrine, organizations, skills, and materiel that comprise the Army medical system, and (2) the ongoing initiatives to improve these subprocesses (diamond 8) so that they can deliver higher-quality or cheaper services to their immediate users (diamonds 3, 4, 5, and 6). We focus here to shape improvement initiatives in ways that promote the outcomes at the top of the chart. The Army commits new resources, in the form of military personnel and dollars, to these institutional activities (diamond 9). The Army also relies on a regular flow of military personnel back, from its operational medical activities, to its institutional medical activities (diamond 10) to refresh the institutional Army's understanding of medical needs and priorities in the operating force. This is an integral part of the institutional Army's responsibility for managing medical personnel; we highlight it because it requires close coordination with an activity external to the institutional Army.

Note that Army medical services seek to affect outcomes not only for the operating force but also for the rest of the military personnel in the Army, military dependent, and retirees. So we must be cautious in focusing only on how institutional Army medical services affect the performance of the operating force. Even if we must focus on this link, as the mandate underlying this monograph requires, we must remain aware that institutional medical activities have other important priorities that would be compromised if we sought only to use scarce institutional resources available to the Army to improve operational performance.

³ In the approach to process analysis that we apply, processes occur in activities; subprocesses are components of processes that typically convert outputs from another subprocess earlier in the value chain into outputs that subprocesses later in the value chain can use. So when we refer to subprocesses here, we are speaking of pieces of the high-level processes that produce the outputs the medical system delivers to external users.

Note also how intimately the institutional and operational aspects of Army medical activities are related. The medical system as a whole overlaps any boundary between the operating force and institutional Army. And the Army has no declared position on where IA-Medical begins and ends vis-à-vis the operating force portion of AMEDD (OF-Medical). Our examination of AMEDD led us to use three criteria in determining whether personnel, organizations, activities, outputs, and outcomes belong to the institutional Army or operating force portion of AMEDD. These criteria are presented below in the form of questions:

1. Is the Army medical organization defined by a TDA or TOE?
2. Does the Army medical unit deliver medical care at a fixed facility or at a mobile unit in a theater of operation?
3. Does the activity provide non-direct or direct support to the operating force?

On the first question or criterion, TDA organizations are usually in IA-Medical. Personnel in TDA organizations report to AMEDD or the Army Surgeon General (TSG). By comparison, TOE units or combat medical units are usually part of the operating force, because they report directly to a regional combat command (RCC) in theater and are under the command of FORSCOM when not deployed.⁴ The TDA organizations work within IA-Medical's medical treatment facilities (MTFs), administrative offices, schools, and research organizations, and with housing doctors, nurses, medical technicians, researchers, administrators, information specialists, instructors, and so forth. They also facilitate international security cooperation activities (e.g., meeting with foreign military medical leaders and providing medical training to foreign military medical personnel).

Second, fixed medical facilities, such as MTFs, are usually part of IA-Medical. These are the locations at which IA-Medical provides

⁴ Exceptions are when TOE unit personnel are placed to work at MTFs because they are not needed in a theater. Nevertheless, RCCs retain command and control of these TOE unit personnel and can recall them to serve in their assigned combat medical units during war and contingencies.

medical services to the nondeployed force, military dependents, and retirees. These are also the locations at which medical R&D activities are conducted, medical training is hosted, medical materiel is developed and stored, and medical databases are managed. TDA medical organizations at these facilities develop the Army's medical capacities and deliver medical and health-related services to the entire Army and DoD. By comparison, combat medical units deployed in theater, as well as mobile units in theater, are part of the OF-Medical force. These deployed combat medical units support RCCs in a theater of operation.

Third, non-direct support medical activities for a theater of operation are generally part of IA-Medical, whereas direct support medical activities can be a part of either IA-Medical or OF-Medical. An example of a non-direct medical support activity of IA-Medical is an AMEDD disease surveillance team sent to collect data on environmental threats in a theater of operation. These are typically TDA organizations that are not assigned a unit identification code to receive support in theater. They do not belong to a TOE unit and are not under the authority of the RCC in theater. Direct support activities that are part of IA-Medical include execution of various executive agency (EA) responsibilities. Individuals in active and reserve TDA organizations might also be sent to augment combat medical units because they have particular required medical skills.

Applying these rules to the medical activities in Figure 5.1, we place IA-Medical on the left side (the gray section) of the figure and OF-Medical is in the right side (the checkered section). Both are part of the Army, which is represented by the finely dotted region.

Thus, according to the criteria stated above, TDA organizations, fixed Army medical hospitals (e.g., MTFs), AMEDD schools and R&D facilities are all part of the IA-Medical force. AMEDD offices that develop policy and organizations, execute EA and ASOS, and provide other forms of direct support to the operating force are also part of the IA-Medical force. By comparison, all that lies in the checkered section of Figure 5.1 is part of the operating force, in general, and OF-Medical, in particular. These activities include the deployed combat medical units that support the delivery of medical services in theater.

The deployed combat medical units might also be involved in generating and utilizing direct support provided by the IA-Medical force. For example, OF-Medical personnel have to indicate to the IA-Medical force its requirements for medical logistics to provide current medical services in theater. Thus, actions of OF-Medical personnel, along with direct support from IA-Medical, help to maintain a healthy and protected deployed force. In addition, medical care provided through MTFs and the TRICARE program maintains a healthy nondeployed force at a high level of individual medical readiness for the force's next mobilization.

Dividing the Army medical system in this way, we can now state that the institutional portion of that system has three key missions (M1, M2, and M3 in Figure 5.1):

- *M1.* Generate a trained and equipped medical force that can be placed in deployable medical units. Doctrine and organization defined by IA-Medical help to put together the combat medical units and equip them for operation in theater. The combat medical units are available to be assigned directly to regional combatant commanders.
- *M2.* Provide ongoing, direct support to these deployable units and, through them, to the soldiers in the operating force as a whole.
- *M3.* Manage care of the soldier, military dependents, and retirees through IA-Medical's MTFs, medical centers, and the TRICARE program.

A Map of IA-Medical Activities That Links Their Performance to Operational Goals

Having defined a dividing line between the institutional and operational portions of the Army medical force, the next task in linking institutional performance to operational capabilities is to determine outputs of the IA-Medical force that support the operating force and performance metrics relevant to these outputs. As the preceding sec-

tion shows, the IA-Medical force designs and resources the TOE medical units in the operating force that will work under RCCs in a theater of operation. When these operational TOE units deploy under RCCs, it delivers direct support to current medical services to these units in a theater of operation. Finally, it provides medical services to nondeployed soldiers in operational units to ensure a high level of individual medical readiness for deployment.

These outputs of the IA-Medical force are products of a series of linked activities. This section uses the approach to evaluating value chains described in Chapter Four to describe this series of linked activities and develop performance metrics that clarify the Army leadership's expectations about institutional medical services.

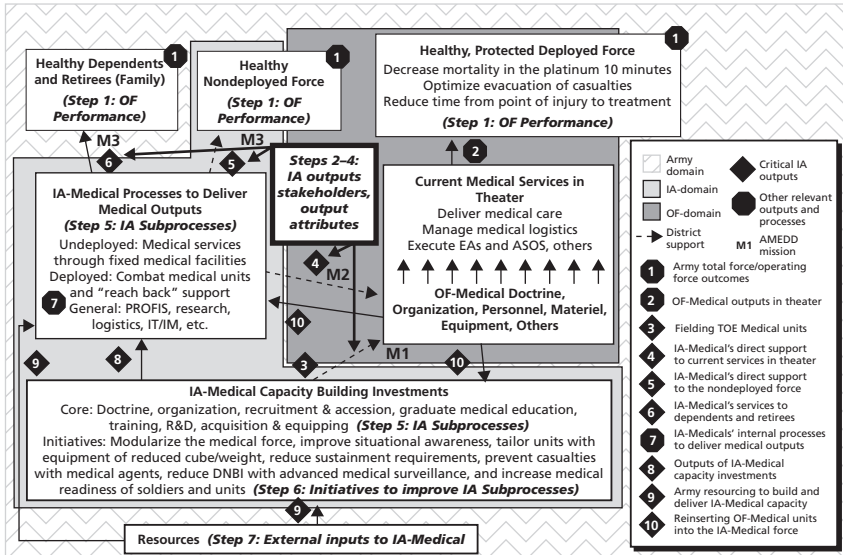
A Map

The approach to evaluating value chains described in Chapter Four can be described as a series of seven steps:

1. Highlight key elements of operational performance that the Army institutional medical system can affect.
2. Highlight key outputs that the institutional Army produces to affect operational performance.
3. Highlight key stakeholders external to the institutional Army that care about these outputs.
4. Highlight key attributes of these outputs that these stakeholders care about most.
5. Highlight key institutional Army subprocesses that produce these outputs.
6. Highlight key initiatives that the institutional Army can pursue to improve these subprocesses in ways that improve operational performance.
7. Estimate numbers of dollars and military personnel the institutional Army requires to produce any set of output attributes for outputs delivered to the operating force.

Figure 5.2 highlights the elements of the Army medical system, as depicted in Figure 5.1, that are relevant to these steps.

Figure 5.2
Where Seven Steps of Value Chain Analysis in Chapter Four Lie in the Army Medical Service



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Walking through Figure 5.2, from the outcomes in octagons 1 to the final resources in diamond 9, is equivalent to walking through the seven steps, which give us the planning perspective we apply in our approach. The tables on the preceding pages walk through these steps in the same manner.

- Table 5.1, on desired operational outcomes, corresponds the octagons 1 and step 1 in Figure 5.2.
- Table 5.2, on the outputs that the operational portion of Army medical services deliver to the operating force, corresponds to octagon 2 in Figure 5.2. Because these outputs do not directly concern the institutional Army, there is no parallel for this step in our general discussion of evaluating value chains.

- Tables 5.3 through 5.6, on the outputs of the institutional Army itself, correspond to diamonds 3 through 6 and Steps 2 through 4 in Figure 5.2. They cover, respectively, outputs that create the operational medical force (5.3), directly support the operational medical force on an ongoing basis (5.4), directly support non-deployed institutional and operational soldiers (5.5), and directly support military dependents and retirees (5.6).
- Table 5.7, on subprocesses that produce the outputs in the institutional Army, corresponds to diamond 7 and step 5 in Figure 5.2.
- Table 5.8, on initiatives to improve the subprocesses to produce institutional outputs, corresponds to diamond 8 and step 6 in Figure 5.2.
- Table 5.9, on resource inputs to institutional medical services, corresponds to diamond 9 and step 7 in Figure 5.2.
- Table 5.10, on flows of skills from the operating force to institutional medical services, corresponds to diamond 10 in Figure 5.2. There is no corresponding step for this in our general approach to evaluating value chains.

Because this study is intended to support Army senior leadership in assessing institutional Army support to the operating force, we use the planning view of our approach to evaluating value chains to frame our analysis.

Critical Outputs and Relevant Stakeholders

Figures 5.1 and 5.2 show that the institutional Army produces many outputs, but not all outputs are critical to the Army leadership. We focus here on institutional outputs the leadership should set goals for and track; activities within the institutional Army can track other institutional outputs to ensure that they can achieve the leadership's goals.

Roles, responsibilities, and interests can differ among stakeholders. Those who produce outputs that are used by others later in the value chain might have little notion of the desired outcomes. Even when they are aware of the desired outcomes, producers in the tail end of a long and complex value chain are more likely driven by the requirement defined by immediate recipients of their outputs. Producers might also

be driven by the demands of their sponsors, who might not be users or final beneficiaries of their outputs. Indeed, the presence of multiple perspectives, interests, and voices can greatly complicate efforts to determine critical outputs and define their attributes and metrics.

The analysis in this chapter emphasizes the perspectives of three types of stakeholders outside the institutional Army: operational users, direct recipients of medical attention, and resource stewards. *Operational users* are defined as those who have an interest in the desired operational outcome, typically because it will help them to achieve other goals. For example, unit commanders are not interested in the health of soldiers as an end in itself. To them, healthy soldiers are a means to victory in the battlefield. This perspective interests the senior leadership because it directly captures the Army's mission as primary provider of land power. Deployed and nondeployed soldiers, dependents, and retirees, as patients, are *direct recipients* of Army medical services. This perspective interests the senior leadership because the self-perceived well-being of soldiers, their families, and retirees is essential to force morale and so to the Army's ability to project and sustain effective land power. As elsewhere in this monograph, *resource stewards* manage inputs to institutional medical activities. G-3 is the resource steward for military personnel, and G-8 for dollars committed to institutional provision of medical services. This perspective interests the senior leadership because it must create, project, and sustain land power within tight constraints on military end strength and dollars.

Selecting Metrics

Our metrics reflect the perspectives and interests of relevant users and resource stewards. They seek to measure what is meaningful to monitor, rather than simply what can be measured. Clarifying the attributes of outputs that matter to stakeholders helps to refine metrics. For example, individual medical readiness of soldiers, as measured by the percentage of deploying soldiers that fail to meet medical readiness requirements, is of immediate interest to operational commanders.

As indicated in Chapter Four, three generic types of attributes are likely to interest the stakeholders identified here: throughput rate, quality (including speed and responsiveness), and operational resource

consumption. These types of attributes appear repeatedly below. Unless otherwise indicated, the metrics we associate with them come in two parts. One attempts to capture a measure of a central tendency of each attribute, such as its average or median value. The second attempts to capture an extreme acceptable level—for example, the 95th percentile of a distribution of observed measures for an attribute. This second metric attempts to induce “process control” by limiting the extent to which any extreme levels will be tolerated.

Critical IA-Medical Outputs and Associated Metrics

Consider the ten elements highlighted above in turn. We summarize each in a table and discuss its contents briefly.

Total Force/Operating Force Outcomes Relevant to Medical Services (Octagon 1)

Table 5.1 summarizes this issue. Medical services affect the total force in two qualitatively different ways.⁵ First, they act as an integral part of the compensation package that the Army offers its personnel. Higher-quality medical services for personnel and their dependents should improve accession and retention rates. Second, and more directly, better medical services should improve the health of the member in the force and their dependents. Having a healthy and protected deployed force and a healthy nondeployed force are desired force health outcomes of primary interest to the operating force and the Army as a whole. Healthy soldiers in deployed and nondeployed units are needed to execute their duties, and one replaces the other as units rotate between deployed and nondeployed service. Having healthy dependents and retirees is also important. Their well-being can directly and indirectly affect the medical readiness of soldiers. For example, worries about the health of their family can be an emotional burden for soldiers.

⁵ Rice (1979, pp. 79–111) provides a useful discussion of these competing priorities and their implications for institutional medical services.

Table 5.1
Total Force/Operating Force Outcomes Relevant to Medical Services

Outcomes	Attributes of Outcomes	Metrics for Outcomes
Available total personnel force	Medical benefit attracts, retains appropriate personnel	% of total force manpower requirements filled
Healthy, protected deployed force	Medically ready deployed force to execute duties	% of soldiers in theater medically ready and available for duty
Healthy non-deployed force	Nondeployed force medically ready for current training and other responsibilities and future deployment	% of soldiers meeting individual medical readiness requirements Failure rate in predeployment medical exams
Healthy dependents and retirees	Well-being for soldiers Incidence rates of contagious diseases from dependents to soldiers	Customer (patient) satisfaction rates
Medical footprint	Number of medical personnel in theater Weight and cube of medical materiel and equipment in theater	% of medical personnel as part of total force in theater % of medical materiel and equipment as part of total force in theater
Medical resource costs in military personnel and dollars for the Army	Appropriate and adequate allocation of resources to produce the required medical service outputs	Number of medical personnel per brigade combat team (BCT) Medical dollars spent per BCT

Dependents might also carry contagious diseases that could infect soldiers and compromise their health and readiness.

Apart from desired force health outcomes, the Army as a whole has two other desired outcomes. The first is to reduce the medical footprint in theater to eliminate nonessential medical assets and allow essential medical and nonmedical assets to be brought in and sustained. Army G-3 (for military personnel), G-8 (for Army dollars), and the Army Service Component Command (ASCC), as the steward of the RCC's priorities in the Army, are the three main stakeholders in this desired outcome that are external to the institutional Army.

The second is to ensure cost-effective resource use—that is, making certain that appropriate resources are allocated to achieve the

desired force health outcomes. G-3 and G-8 are the major relevant stakeholders in this desired outcome.⁶

On metrics for these desired outcomes, the percentage of soldiers in theater who are medically ready and available for duty is the single most important indicator for the deployed force. For the nondeployed force, knowing the percentage of soldiers that meet individual medical readiness requirements will ensure a force that is medically fit for deployment. The fail rate in predeployment medical exams offers an additional metric of medical readiness at deployment. For direct recipients (e.g., dependents and retirees), the most important metric is customer satisfaction rates. As for reducing the medical footprint in theater, an estimate of the size of this footprint as a proportion of the total force in theater is the key metric. This is represented by the percentage of medical personnel, materiel, and equipment in theater as part of the total force. Finally, medical resource costs are assessed by the number of medical personnel and dollars expended on materiel and equipment per brigade combat team (BCT). The emphasis is not on a simple tally of how many military personnel, number of medical personnel, or medical dollars are expended. The Army leadership is interested in achieving the desired force health outcomes with the resources that have been authorized and allocated. If the desired health outcomes were achieved, then resources are well spent. If the desired outcomes were not achieved, then questions might be raised about whether resources are insufficient or inappropriately allocated.

OF-Medical Outputs to the Operating Force (Octagon 2)

Table 5.2 summarizes this issue. Production of medical service outputs to realize the desired force health outcomes depends significantly on the OF-Medical force. Figure 5.1 shows that current medical services in theater—medical care, medical logistics, and EA responsibilities—are implemented by the OF-Medical force. Although the IA-Medical force organizes, educates, trains, and equips the units in the OF-Medical force (corresponding to diamond 3) and the IA-Medical force provides additional direct support to the OF-Medical

⁶ For more on Army resources for medical services, see Table 5.9.

Table 5.2
OF-Medical Outputs to the Operating Force

OF-Medical Outputs	Attributes of Outputs	Metrics for Outputs
Effective provision of medical services to the deployed Army	Decrease mortality and morbidity rates overall Decrease mortality in “platinum 10 minutes” Decrease mortality in the “golden hour” Optimize evacuation of casualties Reduce time from point of injury to treatment Reduce disease and non-battle injury (DNBI) rates	Mortality and morbidity rates overall Mortality rates in platinum 10 minutes Mortality rates in the golden hour In-theater evacuation time to OF-Medical facilities Throughput rates of OF-Medical facilities DNBI rates Customer (patient) satisfaction rates

force in theater (corresponding to diamond 4), the actual delivery of medical services to the wounded and sick in theater is done by the OF-Medical force.

IA-Medical has no command and control over how the OF-Medical force performs in theater, so it cannot reasonably be held accountable for the latter’s effectiveness in providing medical services in theater. If, however, the effectiveness of the OF-Medical force is compromised because of shortfalls on the part of IA-Medical—for example, not having developed doctrine to organize combat medical units or demonstrating poor quality of direct support—remedial actions are necessary within the IA-Medical domain so that the OF-Medical force will have the necessary capacity to provide medical care to the deployed force.

Because the main external stakeholder in the effectiveness of the OF-Medical force is the ASCC, medical outputs, their attributes, and metrics in Table 5.2 are articulated from the ASCC’s perspective. The main output in this stage is the effective provision of medical services by OF-Medical. The key medical output attributes and metrics emphasize how well the OF-Medical force performs to treat casualties and prevent disease and non-battle injuries. Hence, the focus is on mortality rates overall, as well as mortality rates in the “platinum 10 minutes,” during which immediate care to stop blood loss and stabilize a severe injury,

for example, could mean life or death for a wounded soldier.⁷ Mortality and morbidity rates in the “golden hour” are important for similar reasons.⁸ To ensure medical care in the platinum 10 minutes and the golden hour, well-trained, well-equipped, and well-placed combat medics or combat lifesavers are essential to emergency care at the point of injury. A new concept to improve care in the golden hour is the forward surgical team (FST). These highly mobile teams of 20 medical personnel are trained and equipped to treat major chest and abdominal wounds, severe shock, hemorrhage, and other serious injuries.⁹ Other essentials are rapid evacuation to a higher level of treatment in theater (e.g., combat support hospitals [CSHs]) and the quality of care at these OF-Medical facilities. All the above can significantly affect medical results for the wounded and ill.

The primary external stakeholders at this stage, as in the previous section, are the Army G-3, G-8, and ASCCs. Thus, the metrics selected are also intended to provide a high-level aggregated view of how well the OF-Medical force performs. All except one of these metrics correspond to the attributes listed. The last one, customer satisfaction rates of patients, will reflect the experiences of individual soldiers who have received medical care from the OF-Medical force and presumably affect their morale and willingness to stay in the force.

⁷ The *platinum 10 minutes* are those critical moments immediately after a severe injury or illness occurs. In this brief period, emergency medical personnel must determine whether the injured is critical or unstable, assess life-threatening wounds or symptoms, and administer treatment. Emergency medical personnel might also extricate and immobilize the wounded and arrange for timely transfer to a medical facility. Sending early alerts to the receiving facilities also helps to secure priority access to the necessary medical resources available.

⁸ The term *golden hour* was coined by Dr. Adam Crowley, founder of trauma care. It refers to the first hour following severe injuries. Studies have shown that patients who receive surgical intervention for their injuries in that time frame have improved results. See Brian Dale, “The Energy Within: Mechanisms of Injury and the EMD,” *National Journal of Energy Dispatch*, undated.

⁹ FSTs are equipped with two surgical tables and can provide up to six hours of postoperative care for up to eight patients at a time. FSTs are also built for attachment to combat support hospitals to provide additional surgical capability. See description of FST by MAJ GEN Joseph Webb, Jr., Deputy Army Surgeon General and Chief of Staff of MEDCOM, in an interview reported in *Military Medical Technology*, Vol. 9, No. 4, July 5, 2005.

Generating TOE Medical Units (Diamond 3)

Table 5.3 brings together information relevant to the creation of TOE medical units. As explained in Table 5.2, achievement of the desired force health outcomes in theater depends on the performance of the OF-Medical force. Although the regional combatant commander has the authority to decide how the OF-Medical force is used in theater, the inherent capacity of the OF-Medical force is determined by outputs of the institutional portion of AMEDD. IA-Medical produces the doctrine that defines the organization, personnel, and equipping of combat medical units. IA-Medical also organizes these units and staffs them with medical personnel it has recruited, educated, and trained. Finally, it equips them for deployment.

Doctrine, the first output in this category, has three main attributes. First, it must be internally consistent with the Army's vision of a modular force for the future and the Army Force Generation (ARFORGEN) model.¹⁰ The Army's fighting force will become a modular one and battlefields are expected to be large and dispersed. The OF-Medical force's ability to improve medical outcomes in the 10 platinum minutes and the golden hour will be tied to how well it will be organized and equipped to support warfighters in this new military structure and battle environment. Absence of combat medics or combat lifesavers in the units of action, lack of medical evacuation assets in theater, and shortage of medical staff and facilities in theater can all negatively affect the medical outcomes of the sick and injured in theater.¹¹ Second, doctrine must integrate lessons or insights from recent deployments or rotations so that OF-Medical units can be

¹⁰ More on ARFORGEN and its implications for institutional Army medical outputs to the operating force appears in a section on major ongoing transformational challenges in Army medicine in Appendix E.

¹¹ Air evacuation, in particular, was found to be critical for the efficient and timely evacuation of casualties in future battlefields that are expected to be widely dispersed and where only the most critical medical assets will be deployed in theater. The role of combat medics and combat lifesavers were also examined in a RAND workshop on AMEDD Transformation. See David E. Johnson and Gary Cecchine, *Medical Risk in the Future Unit of Action: Results of the Army Medical Department Transformation Workshop IV*, Santa Monica, Calif.: RAND Corporation, TR-253-A, 2005.

Table 5.3
Generating TOE Medical Units

Outputs	Attributes of Outputs	Goals for Attributes	Metrics for Outputs
Doctrine	Doctrine is internally consistent with Army vision of a modular force and the Army Force Generation (ARFORGEN) model Doctrine integrates lessons/ insights from recent deployments or rotations Speed in designing and validating new OF-Medical organization	Support Army Transformation Doctrine is supportive of realities on the ground Rapid creation of new TOEs for medical units	% of OF-Medical units using established, well-defined doctrine Age of doctrine Number of new TOEs created in a year Time it takes to create TOEs
Organization	Organization is consistent with AMEDD doctrine and Army's vision of a modular force and ARFORGEN Speed in creating TOE medical units Size and mix of Army medical personnel, materiel, and equipment	Support Army Transformation OF-Medical units meet medical needs of deployed force Rapid fielding of new combat medical units	Number of new TOE medical units in theater Time it takes to field new TOE medical units
Personnel	Number and skill mix of OF-Medical force Time it takes to staff OF-Medical units for deployment in ARFORGEN	Support Army Transformation Have number and skill mix necessary to support medical needs of deployed force Rapid transfer of medical personnel to TOE medical units	% of medical personnel available vis-à-vis requirements % of medical skills available vis-à-vis requirements Time it takes to fill personnel requirement
Materiel and Equipment	Type and quality of materiel and equipment Cube and weight of materiel and equipment Time it takes to move them to deploying units	Support Army Transformation Have the right quantity to meet medical care needs of deployed force Have the right cube and weight to meet medical care needs of deployed force	% of materiel and equipment available vis-à-vis requirement Cube and weight of materiel and equipment per BCT Time it takes to move materiel and equipment to support BCT

appropriately modified to respond to unexpected or emerging health threats. In this connection, speed in designing and validating new OF-Medical organizations is the third main attribute. Knowing what needs to be changed, and not changing it quickly because of bureaucratic delays, will handicap the OF-Medical force's ability effectively to deliver medical care to the deployed force.

Organization is the second output in this category. It must be consistent with doctrine that IA-Medical formulates and the Army's vision of a modular force and ARFORGEN. Speed in designing new TOE medical units is another important attribute.

Personnel and materiel and equipment are the third and fourth outputs in this category. Combat medical units must have the right size and mix of Army medical personnel in knowledge and skills, materiel, and equipment to deliver effective medical service in theater. While the first two critical outputs in this category define combat medical units, these latter ones involve the key assets used in these units. Consequently, attributes for personnel emphasize the number and mix of medical skills and how long it takes to staff them in combat medical units. Attributes for materiel and equipment emphasize their type and quality, as well as cube and weight, and how long it takes to move them into deploying combat medical units.

For each of these outputs, the goal is to support Army Transformation and to enable effective delivery of medical care by the OF-Medical force in theater. Having the right type, quality, and quantity of outputs, and speed in their delivery to the OF-Medical force are all important to meeting medical needs in theater. Consequently, metrics for the outputs in this category concentrate on assessing how much of selected attributes are available and how long it takes to produce them. For materiel and equipment, metrics assess the percentage of materiel and equipment available vis-à-vis requirements, the cube and weight of materiel and equipment per BCT, and the time it takes to move materiel and equipment to BCTs.

Ongoing Support for TOE Medical Units (Diamond 4)

Table 5.4 summarizes this issue. In addition to organizing, staffing, and equipping combat medical units for deployment to serve in the

OF-Medical force, IA-Medical provides real-time direct support to current medical services in theater. Although medical personnel in the OF-Medical force are in the front line of delivering medical care to the deployed force, they might not always have all the expertise or resources necessary. In such instances, the OF-Medical force can ask for direct support from the IA-Medical force—for example, “reaching back” for medical expertise or sending casualties in need of a higher level of medical care to a MTF in the IA-Medical domain. Furthermore, AMEDD, as described in a preceding section, carries numerous medical-related executive agent responsibilities for the Army and conducts ASOS for RCCs.

A very important point to underscore here is that how well the IA-Medical force performs to deliver direct support to current medical services in the operating force can be significantly affected by performance of the OF-Medical force. The IA-Medical force’s outputs to the OF-Medical force in this instance are a variety of “support” services. The OF-Medical force needs to define clearly what it requires from the IA-Medical force—how many, how much, and how quickly it is needed. In addition, the OF-Medical force must be ready to receive and use the support that the IA-Medical force provides to make a positive difference in the health of the deployed force. For example, not having refrigerated storage ready to receive vaccines sent to the theater by the IA-Medical force would result in spoilage and inability to immunize soldiers in theater. For its part, the IA-Medical force has to acquire and sustain the organizational, human, and materiel capacity necessary to deliver direct support to the OF-Medical force. This interactive dynamic was taken into consideration in our definition of attributes and metrics for this category of critical outputs.

The four items listed in column one are the major IA-Medical outputs in this category. For medical logistics, resources available *in theater* is a major attribute because definition of medical logistics requirements in need of IA-Medical support is generated in theater by the OF-Medical force. The other major attribute is the quality of medical logistics support by the IA-Medical force. Metrics for this output focus on the performance of both the OF-Medical force and the IA-Medical force. For the OF-Medical force, there are two metrics.

Table 5.4
Ongoing Support for TOE Medical Units

Outputs	Attributes of Outputs	Goals for Attributes	Metrics for Outputs
Medical logistics support	Resources available in theater to support medical logistics Quality of medical logistics support by IA-Medical	Deliver quality and timely medical logistics support	% of billets filled for medical logistics personnel in the OF-Medical force % of medical logistics requirements filled Time it takes to fill medical logistics requirements User satisfaction rates
“Reachback” support	Quality of reachback support available Quantity of reachback support available Speed in providing reachback support	Provide OF-Medical with the necessary expertise and skills in the shortest time possible	% of reachback requests filled Time it takes to fill reachback requests User satisfaction rates
Higher-level care and rehabilitation for casualties at MTFs and other Army medical facilities	Capacity in terms of medical skills, facilities, and resources to provide treatment and rehabilitation	Reduce mortality rates Improve medical treatment outcomes Reduce time before return to duty	Mortality rates Customer (patient) satisfaction rates Time it takes to move casualties from theater an Army medical facility
Executive agencies/ Army support to other services	Resources available to support EA/ASOS responsibilities Quality of EA/ASOS support Speed in EA/ASOS support	Meet requirements in EA and ASOS activities Provide EA and ASOS support in a timely manner	% of EA and ASOS requests filled Time it took to fill EA and ASOS requests User satisfaction rates

The first gauges whether manpower is available to manage medical logistics; the second captures user satisfaction. Since OF-Medical force is the user of medical logistics support from IA-Medical, its assessment of the quality and timeliness of this IA-Medical output is an important one. For IA-Medical, the two metrics are the percentage of medical logistics requirements filled and the time it takes to fill them. Taking these four metrics together will inform Army leaders of whether prob-

lems in medical logistic support by IA-Medical might be due to causes in the OF-Medical domain, or where gaps might exist between expectations and practice between OF-Medical and IA-Medical.

For reachback support, the main attributes are the quality, quantity, and speed of this IA-Medical output. These are the essential attributes because they will help the OF-Medical force to deliver effective medical care to the deployed force. The percentage of reachback requests filled is one metric. The time it takes to fill reachback requests emphasizes how quickly IA-Medical force staff work to connect the OF-Medical force to the necessary expertise in the IA-Medical force, and not how long it takes a particular IA-Medical expert to provide professional assistance. That expert assistance might take longer or shorter to deliver because of the nature of the medical questions involved. The second metric is user satisfaction rates. The OF-Medical force, as the user, is in the best position to judge whether the reachback support provided is of the right quality, quantity, and speed.

For higher-level care and rehabilitation, attributes emphasize the capacity of Army medical facilities to provide that care. Given limited medical infrastructure in theater, casualties in need of a higher level of care and rehabilitation are typically moved to an Army medical facility outside the theater. Reducing the mortality rates, improving medical treatment outcomes, and reducing time before return to duty are therefore the goals of these attributes. The proposed metrics in this case are mortality rates, customer satisfaction rates for direct recipients (gauging medical treatment outcomes from the perspective of patients), and the time it takes to move casualties from the theater to an Army medical facility. While the first two metrics focus strictly on IA-Medical performance, the last metric highlights the handover between OF-Medical and IA-Medical. This is important because RCC controls movement of medical evacuation assets in theater. It has the authority to hasten or delay a medical evacuation to an Army medical facility, which can significantly affect medical outcome for a patient, despite the best effort by the IA-Medical force.

The last IA-Medical output in this category relates to obligations tied to EA and ASOS. Key attributes are the resources available to support EA and ASOS activities within IA-Medical and OF-Medical,

the quality of EA and ASOS support, and the speed in EA and ASOS support. The metrics try to reflect the different perspectives of the IA-Medical force and the operating force. The first metric, the percentage of EA and ASOS requests filled, reflects the perspective of the IA-Medical force. The second metric, the time it takes to fill EA and ASOS requests, reflects more the perspective of the operating force. The third metric applies user feedback to determine the “right” quality, quantity, and timing in the delivery of these outputs.

IA-Medical Direct Support of the Nondeployed Force (Diamond 5)

Table 5.5 summarizes this issue. The outputs in this category emphasize the main services of IA-Medical to the nondeployed force. First, IA-Medical provides medical treatment to soldiers in the nondeployed force. Whenever necessary, they can seek medical care for injuries and ailments.¹² Second, the IA-Medical force gives predeployment health assessments to ensure medical readiness. Deploying soldiers are also given vaccinations and other medical protections. Third, the IA-Medical force conducts postdeployment health assessments to ensure that soldiers are medically ready for their transition back to the non-deployed force.¹³ Fourth, the IA-Medical force provides rehabilitative care to soldiers to return them to duty. This might involve physical therapy over the course of several months to regain full use of a limb. Finally, the IA-Medical force helps to sustain a medically ready non-deployed force through regular health maintenance assessments. Vaccinations are updated, health is monitored, and

¹² Medical services through the TRICARE program are not emphasized here because these facilities are managed and manned by entities outside the Army medical department. Also, oversight authority for the TRICARE program lies with the Office of the Assistant Secretary of Defense for Health Affairs.

¹³ Reserve medical units, known as medical support units, typically conduct pre- and post-deployment health assessments at processing stations for unit mobilization and demobilization. These RC medical units work as part of the IA-Medical force under policy and guidance defined by the IA-Medical force. Soldiers determined to be nondeployable because of medical problems can access care at MTFs.

Table 5.5
IA-Medical's Direct Support to Nondeployed Forces

Outputs	Attributes of Outputs	Goals for Attributes	Metrics for Outputs
Effective inpatient and outpatient care at MTFs	Quality of medical care Throughput of Army medical facilities	Effective medical care for the non-deployed force	Customer (patient) satisfaction rates
Predeployment health assessments		Maintain a nondeployed force that is medically ready for current duties and future deployment to theater	Time it takes to complete pre-deployment health assessments for a unit
Postdeployment health assessments			Time it takes to complete post-deployment health assessments for a unit
Rehabilitation to return to duty			Customer (patient) satisfaction rates
Medical readiness	% of nondeployed units medically ready for deployment	A nondeployed force that can deploy on schedule	% of nondeployed force on schedule with regular health maintenance assessments

undetected medical problems are identified and treated.¹⁴ Undetected medical problems that are identified only at predeployment health assessments can hinder unit deployment.

The main attributes for the first four outputs are the quality of care and throughput of Army medical facilities, and the goals for these attributes are to deliver effective medical treatment and maintain a

¹⁴ It is known formally as Soldier Readiness Processing (SRP). Soldiers are evaluated to ensure that they are medically and dentally ready to deploy. Soldiers must have the required immunizations, be medically healthy, and have dental readiness classification of 1 or 2. Personal medical equipment (e.g., earplugs, eyeglasses, and protective mask inserts) are also checked and updated. Active duty units participate in SRP on a regular basis and are constantly maintained in a deployable status. Reserve units have a limited amount of time to participate in SRPs. As a result, their medical status is not generally on par with active duty units (LTG James B. Peake, testimony before the Defense Subcommittee Hearing on Medical Programs, Senate Appropriations Committee [Defense], Second Session of the 108th Congress, April 28, 2004b).

healthy, nondeployed force for their responsibilities when not deployed. The attribute for the fifth output emphasizes the percentage of nondeployed units that are medically ready for deployment.

Metrics here emphasize the interests of direct recipients (patients, specifically the nondeployed soldiers) and Army commanders of nondeployed units. Patients' assessment of the medical care they received will indicate whether the IA-Medical force provides a sufficient quality of medical care and within a period of time that does not cause undue physical or emotional stress on the patient. By comparison, Army commanders of the nondeployed units want a medically ready force to execute their responsibilities and be ready for deployment. Toward this end, Army commanders would want to ensure that medical care is effective and prompt so that performance of their subordinates at their home stations is not compromised by health problems or time expended waiting for treatment.

IA-Medical's Services to Dependents and Retirees (Diamond 6)

Table 5.6 summarizes this issue. Although the focus of this study is on the institutional Army's support to the operating force, analysis in preceding sections made clear why the IA-Medical force's provision of medical care to dependents and retirees is important to the operating force. First, as described previously, healthy dependents and retirees improve the well-being of soldiers. Knowing that their families are receiving effective medical care and in a timely manner eases the emotional burden of soldiers, whether they are serving in the deployed or nondeployed force. Second, effective care for retirees today presumably helps encourage soldiers to stay with the Army long enough to enjoy these medical benefits during their own retirement. Higher retention rates mean that the Army can get more out of its investment in recruitment and training. Higher retention rates might also improve unit stability and cohesion.

The main output of concern to the relevant stakeholders (Army personnel managers and the dependents and retirees themselves) is effective in- and outpatient care for military dependents and retirees

at Army medical facilities.¹⁵ The key attributes for this output are the quality of care and the throughput capacity of Army medical facilities. Quality of care would indicate whether the right type of physicians and other medical professionals, as well as medical equipment and materiel, are available to provide effective medical solutions when they arise. The throughput of Army medical facilities would indicate whether *quantities* of these inputs are available to meet demands when they occur without undue backlogs.

As in Table 5.5, the goals for these attributes are closely tied to the desired outcome of healthy dependents and retirees. In this instance, it is to ensure that dependents and retirees receive effective medical treatment and with a minimum of physical and emotional distress due to long wait times. The single most important metric for this IA-Medical output is how satisfied these direct recipients (patients) are with the care they received. Their assessment of the quality of care and wait time, and perhaps other attributes, would best indicate whether the IA-Medical force is delivering medical services that meet the needs and expectations of this population. Such metrics could be benchmarked against the performance of private health maintenance organizations serving similar populations.

Table 5.6
IA-Medical's Services to Dependents and Retirees

Output	Attributes of Output	Goals for Attributes	Metrics for Outputs
Effective in- and outpatient care at MTFs	Quality of care Throughput of Army medical facilities	Effective treatment of medical problems Avoid physical and emotional distress due to long wait times	Customer (patient) satisfaction rates

¹⁵ As in the previous section, TRICARE is not covered here for the same reasons. Dependents and retirees are major consumers of the TRICARE program. Active duty soldiers have priority access at MTFs; dependents and retirees can access medical services at MTFs on a space-available basis (Office of the Assistant Secretary of Defense, TRICARE Web site, 2006).

IA-Medical Subprocesses to Deliver Medical Outputs (Octagon 7)

Table 5.7 summarizes this issue. The main emphasis here is to understand whether medical service subprocesses are in place and how well they work to transition medical capacities generated by Army investments into medical outputs that benefit the deployed force, the non-deployed force, and dependents and retirees.

Direct recipients (patients) in the deployed force, the nondeployed force, and dependents and retirees are the ultimate beneficiaries of these medical outputs, and the OF-Medical force is a user. Other external stakeholders—e.g., G-3, G-8, and commanders of deployed and nondeployed units—also communicate their expectations to the IA-Medical force. Yet all these groups are mainly interested in knowing the right quality and quantity of medical outputs will be available at the right time and place. They are less interested in the institutional

Table 5.7
IA-Medical’s Internal Subprocesses to Deliver Medical Outputs

Processes	Characteristics of Processes	Goals for Processes	Metrics for Processes
Assigning non-deployed Army medical personnel to deployed OF-Medical units	Efficient and effective identification of the required medical expertise within IA-Medical force to fill OF-Medical units	Meet OF-Medical unit personnel requirements	% of combat medical units that meet 100% of personnel requirements Time it takes to deploy TDA medical personnel to combat medical units Time it takes to return TOE/ Professional Filler System (PROFIS) medical personnel to assigned combat medical units
Managing “reachback” assets within the IA-Medical force	Efficient and effective identification of reachback assets within the IA-Medical force that is needed by the OF-Medical force	Support OF-Medical “reachback” requests	% of reachback requests filled Time it takes to fill a reachback request

Table 5.7—Continued

Processes	Characteristics of Processes	Goals for Processes	Metrics for Processes
Managing evacuation from theater and assigning casualties to MTFs	Effective and efficient use of IA-Medical resources to support evacuation from theater Effective assignment of casualties to Army medical facilities	Reduce the time it takes to complete evacuation of casualties from combat support hospital (CSH) to MTF Match casualties and MTFs to ensure that necessary medical services are available	Time it takes to complete evacuation of casualties from CSH to MTF % of casualties that had to be moved to a second MTF for medical treatment
Managing in- and outpatient care at MTFs	Effective delivery of medical services at MTFs	Authorize the right number and mix of medical skills and materiel and equipment requirements for MTFs Fill authorizations of military billets for medical personnel and materiel and equipment requirements at MTFs Cost-effective delivery of medical services at MTFs	Match between medical skills available and case loads % of military billets and materiel and equipment requirements not filled at MTFs Costs compared with benchmarks for comparable facilities and analogous medical services among MTFs, across the services, and with the private sector

subprocesses that generate these medical outputs. These subprocesses are internal to IA-Medical, and IA-Medical exercises authority to define and monitor their performance. The five processes highlighted in Table 5.7 were chosen for illustration because they are tied to the desired force health outcomes listed in Table 5.1. We derived relevant characteristics, goals, and metrics for these processes from outputs that IA-Medical delivers to its stakeholders in Tables 5.3, 5.4, 5.5, and 5.6. The first process coordinates TDA and TOE medical activities at home station to (1) support deployment of individuals assigned simultaneously to TDA and TOE billets and (2) backfill now-vacant TDA billets while their occupants are deployed. The second and third processes

are tied to direct support to current medical services in theater. The last process supports the provision of medical services at Army medical facilities for nondeployed units, dependents, and retirees.

The major characteristics associated with these processes are related to the effectiveness and efficiency in meeting requirements dictated by doctrine and organization, as well as requests from the OF-Medical force. The goals of these processes are to deliver IA-Medical outputs listed in Tables 5.3, 5.4, 5.5, and 5.6. Metrics for these processes are tied to the goals of these processes. For example, two metrics relevant to success in managing reachback assets within the IA-Medical force to meet the goal of providing direct support to the OF-Medical force could be (1) the percentage of reach back requests filled and (2) how long it takes to fill these requests.

Outputs of IA-Medical's Capacity-Building Investments (Diamond 8)

Table 5.8 summarizes this issue. As shown in Figure 5.1, IA-Medical invests in a range of medical capacity-building activities. These activities are divided into two broad categories. The first are the core investments that occur on an ongoing basis to sustain the overall capacity of the Army medical force to meet the Army's long-term medical needs. They cover activities defined by Title 10 of the U.S. Code. Maintenance of appropriate doctrine and organizational design keep medical capabilities aligned with broader Army goals. Recruitment and accession ensure a stable supply of Army medical personnel; graduate medical education and training ensure the availability of military medical knowledge and skills; R&D sustains the Army's scientific and technological capacity in military health matters; and acquisition and equipping ensures the right quality and quantity of medical technology, materiel, and equipment to help deliver medical services to deployed and nondeployed forces.¹⁶ The second are the initiatives that are set up

¹⁶ For examples of advanced medical technologies deemed by the Army Medical Research Command as feasible and available for fielding in 2015, see Appendix D in Johnson and Cecchine (2005). These advanced future technologies include liquid tourniquet, universal freeze-dried plasma, and warfighter physiological status monitor. Application of these advanced technologies is expected to improve medical outcomes and affect how medical services in theater and in MTFs work jointly to deliver medical care.

to build new Army medical capacity where none had existed or to leapfrog to a higher level than would be possible under core investments.

Since the outputs of these medical capacity investments are critical to the delivery of medical services to the deployed and nondeployed force, the main concern for the Army is that a sufficient quantity and quality of these outputs are available and within a specific period of time to meet the Army's medical service needs. There are five key core outputs in this category.

The first is maintenance of doctrine and organizational designs that are consistent with broad Army goals and with the best medical capabilities currently available to the Army. In the new dynamic threat environment, these must adjust quickly to reflect new RCC priorities as they become apparent.

The second is provision of Army medical personnel. The Army needs a certain number of physicians, dentists, and nurses, and a certain skill mix to meet the force health protection requirements of the deployed and nondeployed forces. Hence, the metrics are the percentage of military billets filled and the recruitment, accession, and retention rates. Knowing the overall numbers would be important. In addition, the Army might also want to identify priority specialty areas, or areas of concentration, where demand is anticipated to increase because of emerging health threats or where certain essential expertise is diminishing within the Army medical corps.

The third critical output is Army medical science and technology. R&D activities produce new knowledge to improve force health protection—for example, through new protection equipment, improved situational awareness, and advanced medical surveillance technology. Medical technology innovations can also help to reduce the cube and weight of combat medical units. The outputs of Army medical R&D support Army medical transformation. Counting the number of publications and citations in peer-reviewed journals, scientific awards, and patents are often used metrics for research and development activities.

Table 5.8
Outputs of IA-Medical Capacity Investments

Outputs	Attributes of Outputs	Goals for Attributes	Metrics for Outputs
Generating doctrine and organizations for the OF-Medical force	Rapid response to RCC requirements and medical conditions in updating doctrine and organization	Rapid response to medical demands for combat medical units	Time it takes to update doctrine Time it takes to create new TOE medical units
Army medical personnel	Number of the Army medical force Skill mix of the Army medical force	Have the right number and quality Army medical personnel to meet the force health protection requirements of deployed and non-deployed Army units	% of military billets filled overall and for priority specialty areas Recruitment and accession rates overall and for priority specialty areas Retention rates overall and for priority specialty areas
Army medical science and technology	New concepts New analytical understanding New scientific findings New research tools New data	Use new knowledge to –improve force health protection materiel and equipment –develop new agents for emerging health threats –improve situational awareness –develop advanced medical surveillance methodology and technology	Match between RCC priorities and AMEDD R&D portfolio % of Army medical research—by project numbers and/or funds committed—that focus on priority areas are high risk with potential to produce groundbreaking results

Table 5.8—Continued

Outputs	Attributes of Outputs	Goals for Attributes	Metrics for Outputs
Army medical materiel and equipment	Quality Quantity Dissemination	Equip soldiers with world-class medical protection Meet Army medical protection requirements Reduce cube and weight of combat medical units	Time it takes to acquire medical innovations % of combat medical units equipped with new medical protection requirements % of Army combat units equipped with new medical protection requirements % of reduction in cube and weight for combat medical units User satisfaction rates Customer (patient) satisfaction rates
Medical databases and information technologies	Type Quality Quantity Accessibility Commonality	Support Army medical informational needs	% of OF-Medical units that have access to Army medical databases that support the delivery of medical care in theater User satisfaction rates
Modularized Army medical force	Doctrine Organization Personnel Materiel and equipment Resources	Build a modular Army medical force to support the modular Army of the future and ARFORGEN	Cost, schedule to design and implement new modularized medical system. % of all medical organizations—deployed and non-deployed—that are on schedule in their transformation and have met their modularity goals

For AMEDD, knowledge products also include training and testing packages.¹⁷ However, such knowledge products do not always do well to tie outputs to the desired outcomes, because it is the application of knowledge in products and services that will generate the desired outcomes.

Hence, the two selected metrics aim to indicate whether research is being done to address urgent problems (the priorities) and to produce advanced technology and innovations that will *significantly* improve force health protection. The distinction between the two kinds of research is not between basic or applied research. Instead, it is whether the Army leadership or RCC has explicitly designated a problem as a priority. Priority research might be part of the core medical capacity investment portfolio or a new initiative. By comparison, high-risk research need not be tied to a particular problem or articulated priority. Failure rates can be high (as is to be expected of high-risk research), but potential payoffs are high, too, when successful. High-risk research aims to produce results that are not simply incremental to the existing knowledge base. Rather, they can be catalysts for a dramatic sea change in how problems are understood and addressed. Such research and their results will ensure that the Army stays in the international forefront of military medicine, while building a reservoir of knowledge to develop future technologies.

The fourth output in this category is medical materiel and equipment. AMEDD is responsible for Army medical materiel development. Army medical R&D and acquisition are key enablers of AMEDD transformation and the desired force health outcomes. Rapid acquisition and integration of materiel and equipment is necessary to enable Army medical personnel to have state-of-the-art capability to provide the best medical treatment. Dissemination is the most important attribute in this instance. Having the right type, quality, and quantity of a health protection device would not help to improve force health protec-

¹⁷ For example, the Special Medical Augmentation Response Team training package sends a small number of highly skilled medical specialists to evaluate a situation, provide medical advice to local authorities, and organize military resources to support responses to disasters or terrorist acts. Other examples are a chemical, biological, radiological, nuclear, and explosive mass-casualty exercise program for MTFs and proficiency testing materials.

tion unless they are disseminated to the OF-Medical force and soldiers. Stakeholders typically want timely acquisition and delivery of medical innovations so that soldiers can use them and benefit from them.

The output metrics reflect the goals listed. The first metric indicates how long it takes to acquire a medical innovation. The second and third metrics gauge how far the Army has come in equipping soldiers for combat and combat medical units with new medical protection requirements. The fourth metric indicates progress in further reducing the Army medical footprint in theater. The fifth metric indicates how satisfied Army medical personnel are with the medical materiel and equipment they are supplied with and suggests where improvements might be necessary. The last metric indicates how satisfied soldiers (as patients) are with the combat health protection materiel and equipment they receive—for example, in terms of utility, effectiveness, and ease of use.

The last core output in this category is maintenance of medical databases and information technologies. Again, building capacity and producing outputs in this area are crucial to Army medical transformation and direct support from the IA-Medical force to the operating force. Examples of major Army medical data systems are the Defense Medical Surveillance System (DMSS), the Medical Occupational Data System (MODS), the Battlefield Medical Information System—Telemedicine (BMIS-T), and the Composite Health Care System II (CHCS II) and its theater version (CHCS II-T).¹⁸

¹⁸ DMSS contains data from health assessments before and after major deployments and represent the digital longitudinal health records of the armed forces. DMSS contains over 250 million records on 7.4 million service members who have served on active duty since January 1990. The records include data on hospital admission, outpatient visits, immunizations, and military deployments and assignments. DMSS data helps the Service medical forces to study patterns of illness and injury in the active-duty population. See LTG James B. Peake, Surgeon General of the U.S. Army, testimony before the Subcommittee on Total Force, House Armed Services Committee, U.S. House of Representatives, regarding Defense Programs, March 18, 2004a. MODS contains human resource information, e.g., name, rank, series, social security numbers, TDA assignments, and salary. The active Army, the Army Reserve, the National Guard, and Army civilian employees use MODS for a variety of purposes, including readiness, manpower generation, and special pay. PROFIS, the Army Authorization Documents System, and the Army Civilian Personnel System, and the Standard Installation Division Personnel System are all integrated into MODS. See

The attributes are type, quality, quantity, accessibility, and commonality. The first three relate to having the right kind of data, maintaining a high level of accuracy, and having a quantity that can make them useful. Yet, having all this is not sufficient to make useful databases. Users have to be able to access them, and standard data structures and types are vital to the integrity of databases. There are two metrics for this output. The first is the percentage of the OF-Medical force who have access to Army medical databases that will support the delivery of medical care in theater. The second is the level of user satisfaction with databases and information technologies to assess strengths and weaknesses of the five attributes.

The last output noted in Table 5.8 is a modularized Army medical force. This is a comprehensive effort to improve the performance of processes throughout the Army medical system that support the operating force. This effort, known as the Medical Re-engineering Initiative (MRI), will employ every output in this category—doctrine, organization, technology, materiel, and information technology. Modular units in every functional area at echelon-above-division and echelon-above-corps deployable medical units will be created.¹⁹ Deployable medical units and personnel in active and reserve units

Gilda A. Herrera, "Medical Occupational Data System Assists AMEDD," *Stripe*, June 12, 1996. BMIS-T is a handheld computer with special programs to assist deployed medical personnel with diagnosis and treatment. See Webb (2005). CHCS II is the primary automated military health record system of the Department of Defense. It is one of the largest medical information systems in the world. When completed in 2006, CHCS II is expected to document all outpatient care. The CHCS II-T version is being developed to support field medics and medical personnel in CSH and battalion aid stations in theater. CHCS II-T will capture information on injuries and document treatment records in theater to improve continuity of care across echelons, or levels, of care in theater and continuing over to MTFs. See Bob Brewin, "DoD's Medical Transformation: The Military's Health Care System Is Becoming More Efficient Using Technology," *Federal Computing Weekly*, February 21, 2005.

¹⁹ These are units that provide levels of battlefield medical care above the Battle Aid Station and Division-level medical companies. MRI supports AMEDD's transformation of its combat medical units into standardized, modular medical structures. MRI will focus on split-based operations, improving tactical mobility, reducing the medical footprint, improving communications, exploiting IT, enhancing mobility, deployability, and tailorability of combat medical units. See Army Medical Department (2005b).

will become integrated.²⁰ The attributes reflect the inputs necessary to create this output. The creation of a modular Army medical force is crucial to providing medical support to the modularized Army of the future. Thus, the proposed metrics allow the leadership to coordinate the investments required to realize modularization and to track their implementation. Because modularization is such an integral part of Army Transformation, the metrics do not attempt to assess the effects of these investments on operational capability. Rather, they simply ask how far the Army has moved in the medical arena toward its broader goal of modularization.

Resources Required to Produce IA-Medical Outputs (Diamond 9)

Table 5.9 summarizes this issue. All the activities in the institutional Army generate demands on military personnel and dollars. We are concerned here with estimating how many military personnel and dollars are required, throughout the institutional Army, to generate the outputs discussed in Tables 5.3 through 5.6. Put another way, what is the total number of military personnel and dollars required throughout the institutional Army to resource the activities described in Tables 5.7 and 5.8? We are concerned with the military personnel and dollars directly consumed within these activities and consumed indirectly in other institutional activities that support these activities in ways that allow them to produce the final outputs demanded of the institutional Army.

The first column of Table 5.9 summarizes the major institutional medical activities we have discussed and the outputs associated with each one. The first row lists services the institutional Army delivers on an ongoing basis. The second row lists assets the institutional Army procures or creates. Some of these assets comprise the operating force; others will ultimately allow the Army to continue generating the services listed in the first row. The third row covers major initiatives to improve the activities that generate the outputs listed in the first two rows. The last row compiles “deltas” between what resources Army

²⁰ LTG Kevin C. Kiley, “Preparing AMEDD for Ethics, 21st Century War,” *U.S. Medicine: The Voice of Federal Medicine*, January 2005.

Table 5.9
Resources Required to Produce IA-Medical Outputs

Institutional Medical Activities and Their Major Outputs	Metrics: Institutional Resources Required
IA-Medical subprocesses to deliver medical outputs Medical logistics support “Reach-back” support Higher level care and rehabilitation in support of deployed force Executive agency, Army support to other services (ASOS) Inpatient, outpatient care for nondeployed force Inpatient, outpatient care for dependents, retirees Pre-, postdeployment health assessments Rehabilitation to return to duty	Military personnel Direct Indirect Dollars Direct Indirect
Core IA-Medical capacity building investments Development and sustainment of medical doctrine Development and sustainment of medical organizational design Accessions of medical personnel Training of medical personnel Medical science and technology Development of materiel, equipment Procurement of materiel, equipment Development and sustainment of medical databases	Military personnel Direct Indirect Dollars Direct Indirect
Major initiatives to improve IA-Medical subprocesses, core capability building, for example, –initiatives to reduce cube and weight of Army medical materiel and equipment –modularization of the Army medical system	Military personnel Direct Indirect Dollars Direct Indirect
Resources that institutional Army medical activities above can release for use elsewhere in the Army	Military personnel Direct Indirect Dollars Direct Indirect

institutional medical activities would have required without process changes and what the Army projects will be required. The summation of these deltas estimates how many military personnel and dollars the Army can expect to extract from institutional Army activities for use elsewhere in the Army—to buy additional operational brigades, to fund the FCS, or whatever.

The Army faces two major challenges in compiling the metrics listed in the second column of Table 5.9. First, the Army currently

has no reliable way to estimate the number of military personnel and dollars in activities that support institutional medical services. Until the Army develops such methods, it will be feasible only to estimate direct resource requirements. Second, the Army has no standard way to allocate the resources consumed by its institutional medical activities among the outputs they produce. Until the Army implements a standard form of activity-based costing that can do this, it will be feasible only to estimate the total requirement requirements of its institutional activities, not the requirements associated with specific institutional outputs.

Reinserting OF-Medical Units into the IA-Medical Force (Diamond 10)

Table 5.10 summarizes this issue. Combat medical units returning to the IA-Medical force after completion of a rotation in a theater and TOE medical units assigned to work in MTFs provide an additional resource to the IA-Medical force. Returning combat medical units can also contribute to current and near-term medical service in the operating force. For example, their new knowledge, experience, and skills gained in theater can strengthen IA-Medical's capacity to provide reachback support to the operating force programs at Army medical schools and centers to respond to new health threats. Their recent experience in theater might also help to implement new medical protections for deploying soldiers, modify doctrine and organization of subsequent combat medical units, identify emerging military medical research and surveillance needs, and fortify teaching curricula and training

As for TOE medical units that are assigned to work in MTF, their medical personnel are designated as "professional officer fillers" under PROFIS. These deployable medical units working in PROFIS at MTFs make up about 39 percent of the Army's total medical force.²¹

AMEDD uses these medical professionals to serve nondeployed units, dependents, and retirees. Nevertheless, the operating force benefits as well: TOE medical units working in MTFs can maintain their clinical skills and sustain a high level of individual readiness for

²¹ Army Medical Department (2005b).

Table 5.10
Reinserting OF-Medical Units into the IA-Medical Force

Outputs	Attributes of Outputs	Goals for Attributes	Output Metrics
Placement of TOE medical units in MTFs	Clinical skill	Sustain clinical skills until combat medical unit is called back by RCC	% of TOE medical units in PROFIS/at MTFs (vis-à-vis total number of deployable combat medical units)
Placement of post-deployment OF-Medical units in MTFs	Clinical skill	Sustain clinical skills through service in MTFs until the next deployment	% of returning OF-Medical units (vis-à-vis total number TDA medical units) assigned to MTFs % of returning OF-Medical units identified as reachback asset for direct support in medical consultation to OF-Medical
Placement of post-deployment OF-medical units in the Office of the Surgeon General (OTSG)	Medical knowledge, skill, and insights from recent deployment	Inject knowledge, skill, and insights gained from deployment into OTSG activities	% of returning OF-Medical units assigned to in OTSG % of returning OF-Medical units identified as reachback asset for direct support in OTSG-supported activities to OF-Medical
Placement of postdeployment OF-Medical units in IA-Medical capacity-building activities	Medical knowledge, skill, and insights from recent deployment	Inject knowledge, skill, and insights gained from deployment into IA-Medical capacity-building activities	% of returning OF-Medical units (vis-à-vis total number of TDA units) assigned to teach, conduct research, or receive training at AMEDD facilities % of returning OF-Medical units identified as reachback asset for direct support in R&D, medical surveillance, etc., for OF-Medical

service in the OF-Medical force whenever necessary.²² During mobilization or a contingency operation, PROFIS personnel—who are active component medical personnel—are pulled out of MTFs to rejoin their assigned combat medical units in theater.

Since all military billets belong to the Army, the outputs and attributes in Table 5.10 represent investments (or a resource) that the Army is making toward the goals listed. However, knowing the percentages will only indicate how much of this resource is used to grow future Army medical capacity, as well as to meet current medical service needs in the operating force. Further analysis might be necessary for the Army leadership to specify targets that will optimize use of returning combat medical units and TOE medical units to grow future Army medical capacity and support current medical services.

Insights for Evaluation of Value Chains Relevant to Other Army Functions

Recall that we focused on medical services as an example of an institutional activity that will likely have to change to reflect the emerging operating force primarily to reflect the new organization of the operating force. As the Army becomes more expeditionary; becomes more modular, lighter on the ground, and more agile in theater; and relies more on reachback to support projected force, the nature of the Army's global, end-to-end medical support system—including its institutional elements—will have to change. Something similar can be said about the Army's other global, end-to-end support activities with substantial institutional elements: logistics, installation, and information services. This analysis of Army medicine produced six major insights relevant to aligning other parts of the institutional Army with the operating force, especially the parts that produce logistics, installation, and information services.

²² See Lois M. Davis, Susan D. Hosek, Michael G. Tate, Mark Perry, Gerard Hepler, and Paul S. Steinberg, *Army Medical Support for Peace Operations and Humanitarian Assistance*, Santa Monica, Calif.: RAND Corporation, MR-773-A. 1996.

First, the institutional Army is an enabler. The institutional portion of AMEDD provides outputs and manages processes that are critical to the delivery of medical services in the operating force. The IA-Medical force is responsible for realizing requirements in manning, equipping, and supporting the OF-Medical force. However, achieving the desired force health outcomes in the operating force depends on effective application of those IA-Medical outputs and utility of IA-Medical direct support by the OF-Medical force. As shown in Figures 5.1 and 5.2, current direct medical services for the deployed force lies entirely in the OF-Medical domain. In short, many institutional Army organizations provide specific tools to achieve specific ends, but effective use of those tools to achieve the ends depends on the operating force.

Second, in this connection, both IA-Medical and OF-Medical are part of the larger institutional Army and operating force, respectively, and both are supporting and supported organizations. Their success in executing their responsibilities could be affected by other Army, joint, or DoD organizations. For example, AMEDD through its IA-Medical and OF-Medical units sustains a healthy, nondeployed peacetime force and protects the health of soldiers in war; at the same time, both IA-Medical and OF-Medical units depend on Army and joint logistics and transportation systems to support medical supply distribution. Therefore, how well other organizations support the IA-Medical and OF-Medical forces individually and jointly as circumstances dictate could significantly influence how well each part of AMEDD executes its responsibilities and achieves the goals of the operating force and the Army. Again, this characteristic of being supporting and supported organizations is not entirely unique to AMEDD. Although stovepipes exist, organizations throughout the Army interact with each other because they have to. Whether required by law, policy, or practical need to leverage the resources of other organizations to advance their own objectives and larger Army goals, Army organizations are linked to each other. Of course, these linkages can also be a liability; if the supporting organization fails to perform, the supported organization itself might not be able to perform to the expectations of its own stakeholders.

Third, linkages are important. Figures 5.1 and 5.2 show the linkages within and between the IA-Medical and OF-Medical domains. These linkages make explicit the relationships between different components in the value chain and call attention to what is expected in that relationship—for example, the delivery of a product or services. Such an explicit value chain helps both senior Army leaders and managers within an activity to monitor and assess performance in the organization. The former focus on achievement of the activity outputs they expect. The leaders participate in the development of the definition of expected outputs and the choice of target levels of each output attribute. Organizational managers then ensure that processes under their control are designed and managed to deliver the medical outputs, and ultimately the outcomes, that senior leaders expect.

In the case of Army medicine, our maps of activities in Figures 5.1 and 5.2 illustrate the relationship between different central activities within and between the IA-Medical and OF-Medical domains. Such simplified maps can help senior managers grasp the big picture and ask the big questions with a focus on the desired outcomes. Managers responsible for what happens in each of the boxes in the Army medicine services value chain in Figure 5.2, as well as the processes that link these boxes, will likely need a more detailed picture that identifies the specific organizations and processes that are present within their scope of responsibilities.

Fourth, although achieving the desired force health outcomes in the operating force is determined significantly by performance of the OF-Medical force and the IA-Medical force, it has limited influence on health outcomes in the operating force, it is difficult to draw that bright line between the two domains. There is simply no clean hand-off between the IA-Medical and OF-Medical, or between the larger institutional Army and operating force they belong to.

The two parts are connected, forming and supporting an integrated global end-to-end system in Army medicine. The IA-Medical force staffs and equips combat medical units, which is made possible by investments in recruitment, retention, R&D, acquisition, and so forth. The IA-Medical force also provides various forms of real-time direct support to the operating force, as well as providing a place for

TOE medical units that either have completed their rotation or are not needed in theater to sustain their clinical skills.

Fifth, the time factor cannot be ignored. Figures 5.1 and 5.2 show the value chain for activities that lead to the desired force health outcomes. These activities do not occur in the same moment. In fact, investments in some activities can take years to build the capacity needed to produce outputs critical to the operating force. Addressing the major challenges described is intimately tied to the time factor. Manpower shortage today and failure to address it will severely reduce AMEDD capacity in the future. IA-Medical will have difficulty staffing TDA and TOE medical units, equipping them, and providing other medical services for missions at home and overseas. Without the necessary capacity and capability to provide medical services, Army medical readiness—and the health of the operating force, both deployed and nondeployed—will deteriorate over time. Decisions that focus resources on current medical readiness at the expense of building capacity for future medical readiness will further exacerbate the deterioration of medical readiness in the future, and any effort to catch up will be much harder and likely more costly as more of the AMEDD capacity base erodes. The time factor underscores the importance of maintaining a stable level of investment in recurrent activities as well as new initiatives so that the IA-Medical force of the future will have something to push out to the operating force, or vice versa, for the operating force to reach back and find the medical support it needs.

Sixth, metrics must be sensitive to complexities, drive improvements, and be coherent. As described early in this chapter, different goals, interests, and perspectives frequently prevail in a given situation. Sometimes people use the same words but in different ways and with different interpretations behind them. Metrics need to be sensitive to such differences to truly be able to support communication. Metrics must also drive improvements. Good systems of metrics highlight the right things, set realistic targets for performance, and communicate actual and target levels of performance to those who can affect change. They monitor and assess progress toward achieving clearly defined goals, rather than amassing information simply because it can be done. Finally, metrics should be coherent and not redundant across the dif-

ferent levels or parts of a model of a value chain. As one activity or element in a value chain has a clear linkage to another, so should metrics to support communication and cooperation among organizations and interests relevant to the achievement of the strategic goals.

Enlisted Personnel Accessioning

As noted previously, training and equipping soldiers to serve as warriors and as growing adaptive leaders are integral parts of the Army leadership's vision for achieving improved operational capability. Accessioning is where the institutional Army starts acquiring such soldiers, and enlisted accessioning is at the heart of this broader activity.¹ This chapter explains how to link accessioning to these leadership goals. It focuses on how the institutional Army affects the availability of personnel assets that the operating force can apply against the requirements of its MTOE documents. It emphasizes

- the *match* between available and required personnel
- the *timeliness* of the provision of those personnel assets to force structure
- the *quality* and *retainability* of those assets.

It starts by explaining where enlisted accessioning sits in the broader institutional structure for recruiting, training, managing, and retaining personnel. It then uses a simple model of a value chain to develop metrics the Army leadership can use to set goals for improved design and execution of accessioning by the end of the POM.

¹ This chapter addresses accessioning personnel for both the active and the reserve components. We tend to draw examples from the largest enlisted accessioning activity, however, which services the active force.

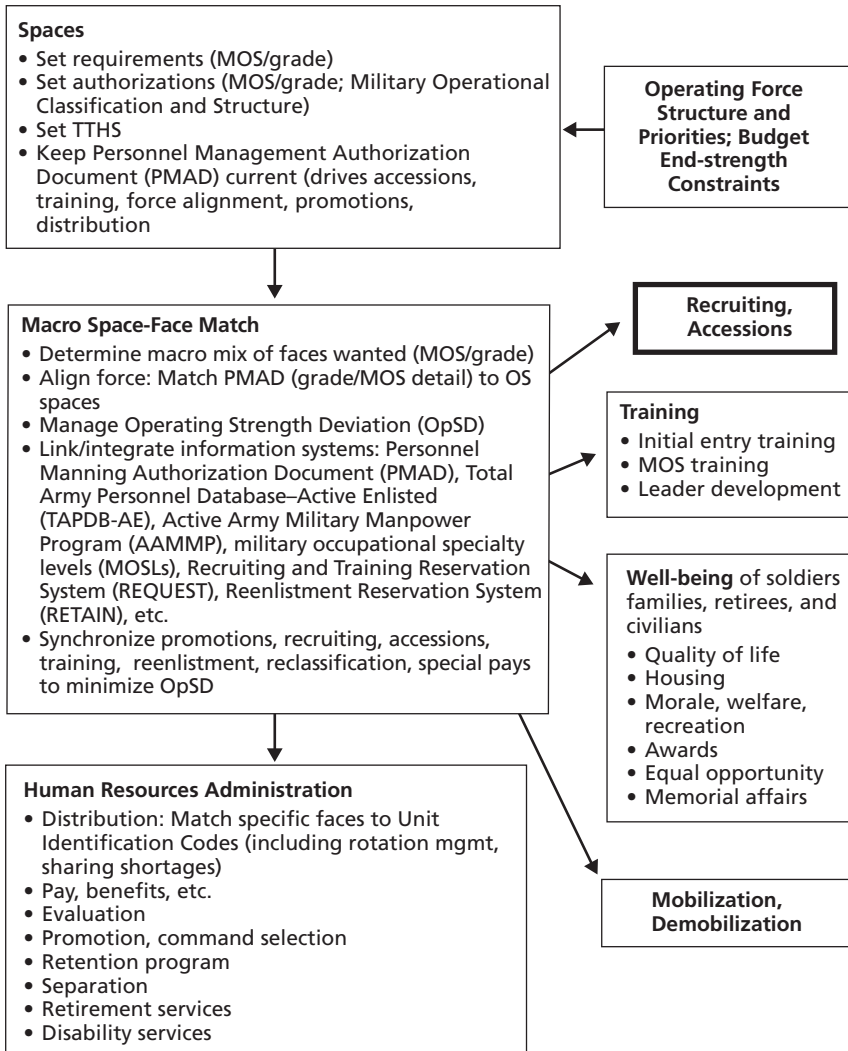
Where Accessioning Fits in Institutional Personnel Activities

Enlisted accessioning is part of a broader set of institutional personnel management activities that work together to match enlisted personnel to demands of the operating force.² Figure 6.1 displays the key activities involved. Broadly speaking, these activities estimate manpower requirements for the total force and then allocate authorized military end-strength against these requirements, effectively defining what billets are to be filled by military occupational specialty (MOS), grade, and organization. In the course of doing this, the Army must simultaneously consider military personnel in the force today, forecast retention and related (e.g., promotion) rates if policy does not change, and determine where personnel need to be added to (accessed into) the force, by specialty, to fill these authorized billets. This combination of actions effectively aligns targets for promotion and retention rates and for accessing and training new personnel with manpower requirements. Enlisted accessioning is an integral part of this broader activity, then; the activities recapped here generate demands for accessions, and the accessioning activity maintains the capability to service these demands.

At the heart of this whole activity is the “operating strength deviation” metric, or “OpSD.” OpSD measures how much actual, assigned, unit-level personnel deviates from force structure allowance, or “spaces” articulated in structure documents (e.g., Personnel Management Authorization Documents [PMADs] for the active force), in the process signaling how much force structure can realistically be manned—and how much is *actually* manned at a given point in time. It is computed by subtracting the force structure allowance from the operating strength—the latter computed by subtracting trainee, transient, holdee, and student (TTHS) strength from *total* strength.

² This discussion draws on U.S. Army War College (2005, chap. 13); Beth J. Asch and James R. Hosek, “Looking to the Future: What Does Transformation Mean for Military Manpower and Personnel Policy?” Santa Monica, Calif.: RAND Corporation, OP-108-OSD, 2004.

Figure 6.1
Institutional Activities Relevant to Military Personnel Management



SOURCE: U.S. Army War College (2005).

Deviations, in turn, occur during surges and lags in accessions/retention, when force structure is activated/inactivated, or when TTHS policy (e.g., school length; other professional development considerations) takes personnel away from units. Accurate projection of these figures, along with retention, is central to the articulation of the military manpower requirements of each component.³

In the course of aiming to minimize OpSD, then, accession, retention, and promotion targets are refined for each component—by officer, warrant officer, and enlisted personnel. Combined with PMAD authorizations and skills/grade inventory information obtained via Total Army Personnel Databases, training requirements for various specialties are next projected. These feed the Army Training Requirements and Resources System (ATRRS) in turn tied to the Recruiting and Training Reservation System (REQUEST) and the Reenlistment Reservation System (RETAIN). The Army Recruiting Command (USAREC) then applies those requirements for specialization to individual enlistment contracts—i.e., by MOS. Specifically, ATRRS data become visible to USAREC (e.g., class schedules; MOS-level requirements), and this is ultimately used to enlist soldiers to required targets (quantity; MOS).

Subsequently, training requirements are presented at the Structure Manning Decision Review—SMDR—for resourcing and subsequent approval by HQDA. Each SMDR builds training programs three years beyond the “budget” year; for example, the FY 2006 SMDR—to be held Fall 2005—will lock training requirements and resources for FY 2008, build a tentative program for FY 2009, and conduct planning sessions (with “unconstrained” training requirements) for the final year of the SMDR period, currently FY 2010. Current metrics take training programs built at SMDR time and compare them with Training Arbitration Panel (TRAP) positions—or changes—at the end of the year. Such TRAPs are held to adjust training base schedules, based on changes to force structure, accessioning, retention, and other variables (e.g., budget). In 2005 alone, some 45 TRAPs were held through June,

³ U.S. Army War College (2005).

compared with typical yearly averages of 15 to 20, based on enlisted accession mission shortfalls.⁴

Looking forward to the end of the POM, the Army wants this complex network of institutional activities to work together more reliably, to generate and sustain the mix of personnel the operating force (and the rest of the Army) needs to achieve its mission. Accessioning cannot operate in isolation from the rest of this complex. Of necessity, we focus on enlisted accessioning here; a broader Army effort to set goals for institutional performance at the end of the POM would, of course, coordinate such goals with the goals set for the other institutional personnel management activities named here.

Setting High-Level Performance Goals for Enlisted Accessioning

HQDA can use a short list of high-level performance goals to specify what it expects from the enlisted accessioning activities in the institutional Army. What follows uses the principles of evaluating a value chain, explained in Chapter Four, to develop a set of metrics that HQDA could use for this purpose. This effort starts by asking what performance goals in the operating force are relevant to the accessioning activities in the institutional Army. It then identifies the stakeholders in the operating force and elsewhere in the Army who have an interest in how accessioning activities perform in the future. These are shown in Table 6.1. Table 6.2 clarifies the attributes of the outputs of accessioning activities in the institutional Army that interest these stakeholders, goals relevant to these attributes, and metrics that could define performance relative to each goal. Table 6.3 clarifies the key sub-processes that accessioning activities use to produce the outputs that interest these stakeholders, again with illustrative goals and associated metrics. Table 6.4 clarifies the kinds of initiatives that accessioning activities might use to improve the outputs that interest relevant stake-

⁴ COL Jeffrey Redmond, Chief, Training Division, Office of the Deputy Chief of Staff for Personnel, G-1, author interview, July 7, 2005.

holders and presents the kinds of goals and metrics that the Army could use to monitor such initiatives. Taken together, this material comprises the essential elements of our model of the relevant value chains. The summary of this chapter pulls this material together and explains how it develops the metrics that HQDA might use to define and track its expectations for future improvements in the Army's enlisted accessioning activities.

Operating Force Performance Goals

Ongoing transformation efforts speak of four kinds of changes in the operating force relevant to enlisted accessioning:

- The size of the operating force is increasing, from 33 to 44 combat brigades in the active force and from 15 to 22 in the reserve components, presumably with a corresponding increase in the number of supporting units of action.
- The importance of a warrior ethos in that force is growing, with important implications for the age structure of the force and potentially for attitudes of entering personnel.⁵
- The mix of activities is changing in the active and reserve components, affecting 100,000 military billets, with implications for the training and experience commitments that can be made to entering personnel.
- Increased emphasis on stabilization and regular rotation in the operating force could affect where training occurs and how much flexibility the accessioning activity has to bring new entrants into this regular, stabilized process.

⁵ No optimal "age range" for an Army transforming while at war has been evolved, even though experts call for younger soldiers. For example, MG (Ret.) Robert Scales, former Commandant, U.S. Army War College holds that 28 to 32 is the right age range for soldiers (Interview with LTC [Ret.] Richard Ayer, Director, USAREC Program Analysis and Evaluation, May 2, 2005). Meanwhile, DoD actually wants to raise the maximum enlistment age to 42, according to a July 19, 2005, Defense Department request, conveyed to the House Armed Service Military Personnel Subcommittee.

The simplest way to relate enlisted accessioning to the performance outcomes in the operating force that it affects is to monitor (1) the skill, experience, and age mix for the enlisted personnel that the operating force requires, and (2) the status of stabilization and rotation efforts and their implications for when the operating force needs new personnel.

Enlisted Accessioning Outputs and Stakeholders Who Care About Them

The outputs of the enlisted accessioning activity are the individuals inducted into the Army. We will say more about the attributes that the external stakeholders for enlisted accessioning care about in a moment. Three types of stakeholders outside the institutional Army have special interests (identified in Table 6.1). The final users are, of course, the units in the operating force. But they do not take delivery of personnel directly from accessions. From accessioning, new personnel pass to a proximate user—TRADOC—to be trained. Trainers want trainees with specific characteristics to fit the training regimen in place. And to coordinate their training resources effectively, trainers schedule training with specified numbers of seats for training. Some flexibility exists, but trainers prefer new personnel to fill scheduled courses to make

Table 6.1
External Stakeholders for Enlisted Accessioning

Stakeholder Type	Stakeholder	Interest
Final user	Units in the operating force	Quality of accessions affects quality of personnel delivered to units
Proximate users	Trainers in TRADOC	Want personnel characteristics conducive to planned training; want to fill scheduled training seats
	G-1	Staffs stabilized units; monitors demographic representativeness
Resource steward	G-3	Provides military billets for accessioning activities
	G-8, Comptroller	Provides dollars for accessioning activities

the training establishment as cost-effective at its own tasks as possible. G-1 monitors and coordinates the broader set of institutional personnel management activities. When training is complete and new personnel are qualified in appropriate skills, G-1 assigns specific trained individuals to specific operational units. It is the last institutional hand to touch personnel as they pass into the operational force; it yields the institutional face that operating units see as they assess the match between their manpower requirements and personnel made available to them.

Users “demand” newly accessed personnel; resource stewards provide the resources required to “supply” accessions. G-3 allocates available military manpower among all tasks in the Army, including accessioning. G-3 is thus interested in how many military billets accessioning activities are required to achieve their mission. Similarly, G-8 and the Comptroller allocate available budget dollars among all tasks in the Army, including accessioning. Hence, they are interested in how much it costs for the accessioning activity to achieve its mission.

Output Attributes Relevant to Key External Stakeholders

Table 6.2 summarizes the attributes of accessed personnel most likely to concern the stakeholders above and suggests goals and metrics that could be used to represent these stakeholders’ interests in the performance of the Army accessioning activity at the end of the POM. The success of Army accessioning activities also depends heavily on things that the accessioning community *cannot* control, including (1) the current availability of education and employment alternatives in the youth labor market, (2) the demographics of the youth market, (3) the propensity for military service in that market, (4) the environment in which accessed individuals will work once they have joined up, and (5) the terms available to Army recruiters for writing recruiting contracts. The goals and metrics in the table directly reflect these outside influences. In effect, the Army must make projections about these outside influences to appreciate what level of performance is reasonable to expect in its accessioning activities.

The most obvious attribute of interest here is the total rate at which the Army can access new enlisted personnel. And this attribute suggests appropriate goals and metrics immediately. More difficult,

Table 6.2
Relevant Output Attributes and Associated Goals and Metrics

Output Attributes Relevant to Stakeholders	Goals for Specific Attributes	Metrics
Number of individual enlisted accessions (T)	Capacity to achieve total number of accessions sought, subject to youth labor market	Number of accessions that can be achieved per period in the projected setting
Quality of individual accessions (Q)	Capacity to attract high-quality personnel, subject to youth labor market: Mental agility; multifunctionality Need for remedial schooling Physical fitness Affinity with "Warrior Ethos" Retainability	Share of accessions that are high-school graduates Shares of accessions with specified test scores "First-time pass rate" on individual events in basic combat training
Mix of MOSs for which people accessed have a propensity (T, Q)	MOS pattern for recruits that matches pattern cascaded from operating force requirements Recruits with characteristics that match the MOS to which they are assigned	Forecast versus actual demand in operating force by recruit category Number of billets covered by TRAPS MOS match with respect to qualification among recruits
Compatibility of enlistment lengths contracted with stabilization needs (Q)	Contracts that support stabilization	Match between demands of stabilization cycle and contract types
Demographic mix demanded—gender, race, region, etc. (Q)	Demographic pattern for recruits that matches G-1 goals	Match between demographic pattern and G-1 goals
Number of military billets committed to recruiting (R)	Fewer military recruiting billets required to achieve goals above	Total dollar cost to the Army per <i>high-quality</i> billet
Total cost to the Army of contracts signed (R)	Lower dollar cost of achieving goals above	Total military billet cost to the Army per <i>high-quality</i> billet

NOTE: T = throughput issue; Q = quality issue; R = resource issue.

though, is talking about “how good” these accessions are—and how successful they will be in the Army. The bulleted items in the “Goals” column of Table 6.2 clarify such quality attributes; currently these are of great interest to the Army. The metrics that the Army currently uses are only rough proxies of quality relevant to these goals. That said, the Army sets standards for these metrics that currently exceed relevant DoD standards shown here:

- At least 90 percent should be high school graduates.
- At least 60 percent should be in the top half of the Armed Forces Qualification Test (AFQT) portion of the Armed Services Vocational Aptitude Battery (ASVAB) test (Test Score Category I–IIIA).
- No more than 4 percent should be in the bottom quartile of the AFQT portion of the ASVAB (Category IV).

Still, improved metrics are needed. One to consider is “first-time pass rate” (over individual events) in basic combat training (currently in the 70 percent range). It potentially offers a more useful way to measure basic adaptability and retainability. It is also potentially more relevant to the total cost—in dollars and military personnel—of delivering a trained and qualified person to an operating unit.

The MOS mix raises two very different issues. The first is how responsive the assignment of MOSs to new accessions is to the operating force’s actual needs. “Friction” in the network of institutional management activities shown in Figure 6.1 can lead to differences. For example, rapid change in authorization documents (e.g., from one issuance to the next, or across several) can cause mismatches. In turn, some amount of variation in demand—based on timeliness of accessioning, accessioning change, and training—will go unfulfilled. How to measure this—and consistently articulate and project it in a way to make sense to policymakers (e.g., in terms of trade-offs)—continues to pose a major challenge. An “indirect” metric, the number and scope of TRAPs held throughout a given period as noted earlier, is one surrogate for this “friction” metric and is useful in its own right. The leadership can seek to drive down mismatches and track its progress by using

a metric more closely associated with TRAPs and what these impart to the force, then.

The second issue is how well the MOS assigned to a new accession matches that person's personal characteristics. Does an individual have the physical strength and stamina to serve in the infantry or artillery? Does the individual have the mental acuity to work on signal tasks or to maintain or operate complex equipment? Do scores on MOS-specific tests verify that the personnel matched to an MOS meet the baseline aptitudinal requirements for that MOS? Clearly, mismatches are likely to increase as accession goals become more demanding. Because mismatches could easily affect the quality of the final product delivered to the operating force and the total cost of creating that product in the institutional army, a metric that examines mismatches is important to several of the stakeholders identified above. An operational version of such a metric must be able to determine the effective "distance" between any set of personal characteristics and an MOS assignment.

Compatibility between goals and outcomes for contract lengths and demographic representation are straightforward and easy to define metrics for. As noted in Chapter Two, defining the total cost of any institutional output, in terms of dollars or military personnel, is not currently possible.

Key Subprocesses Relevant to Enlisted Accessioning

The Army accessioning activity uses a process that is itself a complex combination of subprocesses. Because these subprocesses represent where the Army actually places and consumes resources to generate accessions, these subprocesses are easier to relate to dollar and military personnel resources than are the output attributes in Table 6.2. Table 6.3 lists six key subprocesses, with many of the high-level issues and decisions that they address, in the left column.⁶ For each subprocess, it clarifies high-level goals and then suggests selective metrics. The senior

⁶ This discussion draws on James N. Dertouzos and Steven Garber, *Human Resource Management and Army Recruiting: Analysis of Policy Options*, unpublished RAND research, 2004; see also U.S. Army War College (2005, Chapter 13).

Army leadership does not need detail on goals and metrics at this level to specify what it expects of accession activities by the end of the POM. But the kinds of goals and metrics shown could be helpful in discussions between HQDA and relevant institutional activities to ensure that expectations (on either side, about the dollar and military personnel resources associated with these subprocesses) are compatible with the high-level performance these subprocesses will generate together as integral parts of the accessioning process. Put another way, projections of the resources that will be required to produce specific accessioning outputs for the operating force involve assumptions, implicit or explicit, about how each of these subprocesses will perform to help produce these outputs. The subprocess goals and metrics shown here should help relevant participants clarify what assumptions are associated with any projection to verify that the assumptions and projections are realistic.

As explained here, the coordination of activities pictured in Figure 6.1 generates an accessioning tasking that these subprocesses take on as a goal. The first task within the accessioning activity is to allocate this target to specific recruiting activities by assigning “missions”—i.e., recruiting unit- and component-specific targets—to them. Each recruiting unit and its stations then execute the face-to-face marketing effort required to find interested prospects. This effort involves a complex set of resource issues associated with the organization of each station and the motivation of the recruiters in it. Once prospects sign contracts, a third subprocess then processes them into the Army. Meanwhile, three “back-office” subprocesses are at work. One works with military personnel specialists throughout DoD to design appropriate contracts and customize them to particular circumstances in the Army. The table clarifies the basic contract characteristics that contract design often affects. Another designs and executes an advertising campaign. The last manages information relevant to accessioning policy and management. This information subprocess is in fact an integral part of a broader objective discussed in Chapter Three—an Army-wide, integrated human resources management information system. The last subprocess in Table 6.3, then, shows where the accession objective interfaces with the information system objective.

Table 6.3
Key Subprocesses and Associated Goals and Metrics

Key Subprocesses Relevant to Current Production of Accessions	Goals for Subprocesses	Metrics
Assignment of recruiting missions: Market-based Optimized by battalion, company	Recruiting goals, stated as number of contracts for active, reserve, National Guard enlisted. Delayed Entry Program (DEP) goals Cost-effective distribution of workload across recruiting stations	Recruiting yield realized relative to mission Dollars spent in recruiting, per high-quality recruit, by recruit category, by station Recruiting military billet cost per high-quality recruit, by recruit category, station
Recruiting stations (forecasting, selection, training, assignment, performance measurement, incentives, career management)	Cost-effective size, structure, location of each recruiting station Cost-effective recruiter incentives Good recruiters properly recognized by Army career managers	Satisfaction of good recruiters with post-recruiting assignments
Handling of new recruits Matching individuals to required billets Military entrance processing stations (MEPSs) (testing, physicals, induction)	Best match possible between Army billets and recruits Cost-effective provision of testing, physicals, induction services	Satisfaction of recruits with assignments, by recruit type MEPS dollars per recruit inducted for testing, physicals, induction services Rate of significant errors per recruit inducted for testing, physicals, induction services
Contract design (training guarantees, assignment guarantees, stabilization guarantees, pay and benefits, education opportunities, length of service by option, MOS)	Contracts compatible with demands of potential recruits Contracts that yield recruits compatible with Army goals	MOS fill rate relative to current state of youth labor market Quality of accessions relative to current state of youth labor market
Advertising	Cost-effective advertising	Flow rate of total and high-quality recruits per advertising dollar, by recruit category
Supporting information infrastructure	Reliable, timely data Common data easily accessible to all	Accuracy/timeliness of information % of data available from a common source

The center column in Table 6.3 lists a set of high-level goals that help us visualize what kind of performance the Army should expect each to pursue. Many goals point to “cost-effectiveness,” which is a short way of saying that a subprocess should balance the output it creates with the resources it consumes to generate that output. This relationship between effectiveness and resource cost points to the desirability of certain planning factors: If a subprocess performs in a cost-effective manner at the end of the POM, how much should the Army expect it to cost to produce a particular output? In this case, the output is typically a *high-quality* recruit. With a set of mutually accepted planning factors and definitions of outputs, HQDA and relevant accessioning activities can translate high-level output targets into resource projections in a fairly transparent way. The primary goal of the information in Table 6.3, then, is to support such an effort.

Initiatives to Change Processes Related to Accessioning

Suppose the output targets in Table 6.2 or planning factors associated with Table 6.3 are not consistent with current empirical experience in the Army. An explanation is then required. If the explanation points to process improvement, evidence of a plan for process improvement is needed. A plan implies a choice of a goal and particulars on what will be required to achieve the goal and how long it will take. That is, any major change initiative could be managed like a formal program. Goals would address how an initiative would seek to affect the accessioning outputs listed in Table 6.2. The program would estimate requirements for dollar and military personnel input over time, culminating in the date at which the expected improvement would actually affect outputs relevant to the operating force, the training community, G-1, or the stewards of Army dollars and military personnel.

Table 6.4 lists three kinds of initiatives the Army might use to make improvements between now and the end of the POM. The first could revisit the basic process the Army currently uses to create recruiting missions and execute against them. For example, it could revisit the question of how realistic a mission should be to achieve the best result in accessions realized. How should missions be assigned—by station, by recruiter, or in some other way? How should recruiters be rewarded

Table 6.4
Potential Initiatives to Improve Accessioning Outputs

Initiative	Goals of Each Initiative	Metrics for Monitoring Each Initiative
Upgrade Army Enlisted Production System methods, metrics (e.g., enlistment standards; structure of, goals for DEP)	Improve one or more high-level attributes of accessioning output, as defined in Table 6.2	Actual versus planned: Induced improvement in high-level attributes of accession outputs
Restructure enlistment contracts	Manage initiative to achieve improvement goal within cost, on schedule	Initiative cost Initiative schedule
Other recruiting research (e.g., advertising)		

for their performance relative to a mission? For example, are individual incentives or station incentives more effective? How should the Delayed Entry Program (DEP), which seeks agreements from prospects “today” to join the Army at some future date, be adjusted to reflect the new requirements of stabilization and rotation planning? For example, should the target average number of months in queue (from signing an agreement to entering the Army) change? What is an acceptable DEP loss rate in the Army’s new threat environment? Should the Army choose to pay more in some way (see below) to attract individuals with specific, desirable skills (e.g., language skills), or simply pay to give new recruits these skills through formal Army training after they enter the Army? How should the Army react to changes in the pattern of “Qualified, Not Enlisted” (the percentage of qualified potential recruits who decide not to enlist after going through the military entrance processing stations) over time or by regions? Whatever specific questions such an initiative addressed, the goal should be definable in terms of the attributes listed in Table 6.2—number and quality of accessions, compatibility to specific high-level goals, or the resource cost of recruiting itself.

The second initiative could revisit a question asked many times in the past, but address it in the context of the newly stabilized, rotational, warrior-oriented operating force and the characteristics of the current youth labor market: How well do different contract terms affect acces-

sion success? Do high-quality prospects value signing bonuses, educational benefits, or tax-sheltered savings accounts that can be tapped for any large purchase when an individual leaves the Army? Does information about which alternative a prospective recruit prefers provide insight into the personal qualities, relevant to the Army, of that prospective recruit? Are some incentives more effective than others to fill particular high-interest MOSs? How does contract length affect how much the Army must pay to attract high-quality prospects? Careful assessment of these questions could help develop metrics that the Army could use to better track its success, relative to the current state of youth labor market, in attracting high-quality accessions that match its MOS priorities, as suggested in Table 6.3. Like past assessment of such issues, this kind of initiative would seek, primarily, an empirically sound basis for the Army to choose which contract alternatives to offer prospects. But the decision to undertake an initiative should also state clearly what the initiative is expected to yield in terms of accession outputs (like those listed in Table 6.2), what it will cost, and how long it will take.

The third initiative is simply a more general variation on the second. For example, it might ask how different approaches to advertising compare with one another and with other alternatives, like new forms of contracts, in terms of cost effectiveness. The goal of such an initiative would be an empirically based comparison of alternatives; the issue of interest to us here is the question of how such an initiative might improve access outputs, how much the initiative would cost, and how long it would take to realize the improvements. The point here is that a broad range of accessioning-related process improvement initiatives could be managed in a very similar way.

Summary

Accessioning is only one element in a much broader network of institutional activities that, working together, provide soldiers in the operating force with an appropriate warrior capability and the ability to grow and adapt as leaders. Accessioning should be oriented to better serve

the operating force's priorities for this type of personnel, but it should be recognized that it cannot achieve these priorities by itself. At a minimum, it must continue to deliver the personnel that it identifies to the institutional training community while treating that community as "proximate user" that will also play an integral role in producing institutional outputs for the operating force.

In that context, the future performance of accessioning could be captured at a high level, in terms of a short list of attributes relevant to the external stakeholders who care about its performance most: The number and quality of accessions, the demographic makeup of these accessions, the MOSs covered by these accessions, the compatibility of enlistment contracts with stabilization plans, and the total cost of operating the accessioning activity, expressed in dollars and military personnel. Performance against these targets depends on a variety of environmental factors beyond the accessioning activity's control, including the state of the youth labor market, the propensity for military service in that market, the experience accessed personnel can expect after they enter the Army, and the nature of contracts allowed by DoD policy. Given these factors, if the targets for these attributes are more challenging than those in place today, then HQDA will need information on the initiatives the accessioning activity will use to achieve these new targets. For each initiative, HQDA needs information on the improvement it is expected to provide in one or more of the high-level attributes listed above, how much the Army will have to spend to achieve this improvement, and how long it will take to achieve this improvement. Taken together, information on (1) the targets for these high-level attributes and (2) the performance improvement, cost, and schedule targets for each major initiative comprise the high-level metrics that HQDA needs to better coordinate movement toward these targets in the institutional Army.

This chapter has also discussed goals and metrics associated with the key subprocesses that the accessioning activity coordinates to produce outputs for the operating force: assignment of missions, design and operation of recruiting stations, handling of new recruits, contract design, advertising, and management of accessioning information as part of a broader human resources information system. HQDA

does not necessarily need specific information on these subprocesses to frame the future performance of the accessioning activity as a whole. But information on these subprocesses may prove useful to test the realism of assumptions about targets for the attributes listed above. In particular, they can help the accessioning community verify that targets for numbers and quality of accessions are compatible with targets for the resource cost of the accessioning community stated in terms of dollars and military personnel. And such verification efforts can help the accessioning community make its case to HQDA and compete more effectively for the resources it will need to achieve its targets.

Short-Term Acquisition Initiatives

The acquisition of defense materiel is a complex endeavor. Even commercial off-the-shelf (COTS) items are subject to a large number of regulations that can mean that relatively simple purchases can take months or years to complete. The acquisition of major weapon systems can take decades. However, current operations in Iraq and Afghanistan have made clear the need for more timely acquisition of various items. The Army has developed new techniques for what we call short-term acquisition to deliver items to the field as quickly as possible.

Short-Term Acquisition

In response to current operations, the Army developed two new major initiatives for the fast acquisition of mission-essential equipment. These are the Rapid Fielding Initiative (RFI) and the Rapid Equipping Force (REF). Both of these organizations attempt to supply items to soldiers as soon as possible after the needs are estimated and validated. They have slightly different missions and different users, but both are focused on solving problems in the near term. RFI focuses primarily on the fielding of items to large numbers of individual soldiers. REF offers engineering solutions to problems encountered on the battlefield. They were deliberately set up to avoid the complex acquisition routines that have resulted in long delays or, at times, inaction.

Rapid Fielding Initiative

RFI provides soldiers with individual and small unit equipment to enhance lethality, mobility, and survivability.¹ Items may be COTS or government off-the-shelf (GOTS) materiel.

[The Rapid Fielding Initiative] is intended to supplement unit and Soldier equipment with essential capabilities required for success in the [Global War on Terrorism]. The program enhances the capabilities of our Active and Reserve Component fighting forces while ensuring Soldier modernization in a systematic and integrated manner that is commensurate with the principles of the Soldier-as-a-System philosophy.²

The RFI kit provided to each soldier includes personal items of clothing (socks, moisture-wicking T-shirts) and footwear (new desert boots) and related force protection items (knee and elbow pads). Other materiel includes personal and unit tools such as ammunition packs, radios, optics for weapons, and battering rams.

This initiative began in 2002, after soldiers deployed to Afghanistan reported that they (or their families) were funding the purchase of these items. An Army acquisition organization, the Program Executive Office–Soldier was directed by the Vice Chief of Staff of the Army (VCSA), GEN John M. Keane, to develop a plan to deal with this problem. As a result of this, RFI was formed. It collected information by a variety of means on needed equipment and started issuing RFI kits to deployed and deploying soldiers with the goal of supplying the entire Army by the end of FY 2007. RFI purchased about \$991 million worth of goods in FY 2005.

How does it work? The first step is collecting ideas, which percolate up from the field in a variety of ways. Forward-deployed RFI teams talk to soldiers to uncover the nature of their needs. But suggestions also come in more casually. For example, the occasional telephone call comes with an idea. RFI works best when people in the field

¹ More information can be found at Program Executive Office Soldier, “PEO Soldier: Rapid Fielding Initiative (RFI),” undated.

² Program Executive Office Soldier (undated).

identify unanticipated materiel problems, and when RFI acts quickly to resolve these problems. In all these cases, an operational needs statement (ONS) is developed.

The next step is the validation of these suggestions, performed by staff at Fort Benning, Georgia. A TRADOC System Manager (TSM) oversees a Soldier-as-a-System integrated concept team, which screens ideas using standard doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) logic and pushes them to the TSM and combat developer, both O-6s (Level II), who vet them for the commander at the Infantry Center at Fort Benning (Level I), a major general. DOTMLPF priorities dictate that materiel solutions are always a last resort. Therefore, ideas for RFI go forward only if the Army cannot address them with a non-materiel solution. At this point, no effort is made to choose explicit ways in which procurements would improve capability or how the Army should balance alternative procurements.

Ideas approved at Fort Benning go forward to HQDA for consideration at the Army Requirements Oversight Council (AROC). The AROC reviews and approves requirements for RFI items once a year. But ideas can come up out of schedule. For example, someone casually suggested the adoption of a new kind of earplugs for noise protection. Fort Benning reviewed it and immediately pushed it up to the AROC for review. When the AROC approves an item, the requirement goes to G-8 for funding. G-8 then weighs each requirement against others and decides which to fund and how fast. With the funding in hand, the RFI program office can choose a source, take delivery, and ship the goods to the field.

Rapid Equipping Force

REF is a VCSA initiative under General Keane and was established in 2002.³ The mission of REF is to “provide operational command-

³ More information on the REF can be found in Department of the Army, Rapid Equipping Force, homepage, undated, online at <https://www.ref.army.mil/> (as of August 9, 2005). All information and quotations in this section are from this Web site, unless otherwise noted.

ers with rapidly employable solutions to enhance lethality, survivability and force protection through insertion of COTS-GOTS ('equip') and Future Force technologies ('insert') while informing relevant Army stakeholders ('assess') to remain ahead of an adaptive enemy[:]"⁴

EQUIP operational commanders with off-the-shelf (government or commercial) solutions or near-term developmental items that can be researched, developed and acquired quickly.

INSERT future force technology solutions that our engaged and deploying forces require. It does this by developing, testing, and evaluating key technologies and systems under operational conditions.

ASSESS capabilities and advise Army stakeholders of findings that will enable our forces to rapidly confront an adaptive enemy.⁵

In the equipping mission, REF finds and delivers solutions quickly, with GOTS or COTS items, or items for which development can be done very quickly. The insertion mission involves developing new items—which may take a few months (rather than years)—and getting them to the field quickly.⁶ Assessment involves deciding whether the materiel supplied is actually worthwhile and, if so, continuing to support it through spiral development or spinning it off to another Army purchasing organization.

REF seeks to increase mission capability and to reduce operational risk.

REF's in-theater personnel collect warfighters' battlefield needs that have not been addressed. Based upon both operational priority and the potential for the problem to be solved rapidly, REF works to solve these technical problems and brings a solution to

⁴ COL Gregory Tubbs, "Rapid Equipping Force," briefing, Rapid Equipping Force, Ft. Belvoir, Va., July 27, 2005.

⁵ Tubbs (2005).

⁶ It should be noted that REF is not an R&D organization.

theater. Often, REF follows the progress of this initial equipping to gain feedback and engages in “spiral development” to improve the product until it more fully meets the theater requirements.⁷

REF items undergo a process of validation similar to that in RFI, starting with an ONS, which is developed in response to required capabilities, combatant commanders or service requirements, or soldiers’ needs. REF chooses a solution, which may be employed or discarded.

For example, one of REF’s early success stories was the rapid development of a camera that could be lowered down wells to look for weapons caches. The day after the need was first identified, a field engineer put together the first well camera (now known as WellCam) out of existing spare parts. The very next day, in its first day in the field, this well camera helped to uncover a hidden weapons cache. After a process of spiral development, REF is currently supplying fifth-generation wireless webcams to units in both Afghanistan and Iraq.

REF was organized to be able to gain attention from and the support of the top levels of Army leadership. REF reports directly to the VCSA and takes operational guidance from G-3.

Setting High-Level Performance Goals for Short-Term Acquisition

These descriptions should have made it obvious that there are considerable similarities in goals for RFI and REF. Both aim to get materiel to the warfighter quickly and efficiently. Both have forward-deployed teams actively looking for ways to help the field. The key differences lie in what they supply, and to whom. RFI buys mostly personal use items for soldiers (although it does supply some items used by brigade combat teams and other units) and aims to supply the entire deployed force. REF chooses, develops, and purchases materiel solutions for problems faced overseas, and supplies only small numbers of items, turning over mass purchases to other program offices. It serves more as a facilitator

⁷ Tubbs (2005).

than a traditional program office. However, these differences do not mean that the desired outcomes of the two initiatives are significantly different. Both initiatives aim to increase mission capability with mission-essential equipment and critical lethality items, while reducing risk to soldiers and others with equipment for force protection. It is difficult to link these goals to metrics, but any elements of military capability that the new equipment can affect would be potentially relevant.

External Stakeholders for Short-Term Acquisition

While the institutional Army can affect the performance of the operating force by supplying materiel procured using the tools of short-term acquisition, it cannot be held responsible for the operating force's performance on the battlefield. What it can do is provide the materiel that enables better performance. The outputs of the institutional Army that directly affect the operating force in this case include (1) speedy equipping of the operating force with COTS/GOTS solutions that address specific problems identified in field, (2) materiel responses to specific requests from the field, (3) speedy insertion in the operating force of future force technology solutions that address specific problems identified in field, and (4) assessment of capabilities and advice to Army (operating force and institutional Army) stakeholders. Short-term acquisition leads to well-equipped soldiers and units or BCTs that enable them to be more effective. And as new organizations that the Army developed to cut through some of the red tape associated with acquisition, REF and RFI support transformation throughout the Army, both in what their own activities bring and as role models for new methods of organizing.

Table 7.1 clarifies the stakeholders outside the institutional Army that are relevant to these outputs. The operational users for these outputs include soldiers and the deployed operational units where they are located. Unit commanders will be able to take advantage of the performance of the better-equipped soldiers in their organizations. The specific priorities expressed by these commanders instantiate the higher-level priorities of the RCCs. The short-term acquisition programs consult the RCCs as well as FORSCOM as part of their ongoing efforts to understand the final user's priorities. The soldiers

Table 7.1
External Stakeholders for Short-Term Acquisition and Their Primary Interests

Stakeholder Type	Stakeholder	Interest
Final users	Unit commanders	Affects units' and soldiers' ability to function effectively
	Soldiers	Reduces perceived need to make individual purchases relevant to readiness, force protection, survivability
Resource stewards	G-3	Provides military billets for all related acquisition activities
	G-8, Comptroller	Provides dollars for all related acquisition activities
Others	VCSA	By enhancing mission capability and reducing mission risk enough, justifies the VCSA's continuing active engagement
	Secretary of the Army, CSA, others in HQDA	Clarifies opportunities for broader transformation in Army acquisition

themselves no longer have to buy equipment that the Army provides to them through these programs.

As elsewhere in the institutional Army, stewards of resources within the Army track the resources that the short-term acquisition organizations use to fulfill their missions. These include G-3 for the small number of military billets involved in these programs, and G-8 and the Comptroller for the very large numbers of dollars involved. Within the Comptroller, the Army Budget Office maintains a special interest in these programs.

The special nature of short-term acquisition increases the importance of other stakeholders. These programs report directly to the VCSA and rely on the authority of this office and its continuing interest to sustain their own authority. For them to succeed in their mission of breaking down organizational barriers, they must sustain the VCSA as an actively involved stakeholder. More broadly, as these programs highlight specific ways to streamline acquisition, they reveal lessons on how to accelerate transformation. The implications of these

lessons for transformation are of particular interest to the Secretary, the CSA, and other parts of HQDA responsible for policies that would have to change to act on these lessons to affect acquisition more broadly.

Attributes of Short-Term Acquisition Outputs Provided to the Operating Force

The aspects of short-term acquisition that its relevant stakeholders care about are hard to quantify. In particular, new materiel can affect units’ and soldiers’ ability to function effectively and mission capability in many ways. Operators are best able to assess such effects and should be directly involved in helping to set metrics for this part of the institutional Army. Table 7.2 lists key output attributes and goals for short-term acquisition. Drawing on Army documentation and discussions with officials from RFI and REF, it also presents metrics that the Army might use to monitor performance relative to the goals shown. Our discussions with RFI and REF indicate that these metrics should be viewed as starting points for further discussion, not definitive recommendations for specific metrics.

Table 7.2
Relevant Output Attributes and Associated Goals and Metrics

Institutional Output Attributes Relevant to Stakeholders	Goals for Specific Attributes	Metrics
Speed—quick and effective response to needs identified in the field	Fill identified needs in time to support deployed forces Reduce calendar time required to get solutions to field	RFI: % of kit filled before date of deployment % available at last acceptable date % of kit fielded before needed in theater n days for newly identified items to be received by end of RFI process % of items delivered on time to airfield for delivery overseas REF: Days to provide equipping solutions Target: 90 (not to exceed [NTE] 120) Days to insert solutions. Target: 180 (NTE 360) Days to transition. Target: 90% within 30 days Days to complete assessment Target: 30

Table 7.2—Continued

Institutional Output Attributes Relevant to Stakeholders	Goals for Specific Attributes	Metrics
Improved strategic, operational, or tactical mission performance	Demonstrate substantial contribution to increased mission capability	Qualitative assessment of contribution, from HQDA and deployed units Qualitative assessment by deployed units of the effect of materiel provided relative to their expectations when they requested it
Decreased risk to mission accomplishment and/or to soldier	Demonstrate substantial contribution to decreased mission risk	Qualitative assessment of contribution, from deployed units; may document specific incidents where new materiel helped reduce risk
Decreased soldier purchase of mission-related materiel	Reduce dollar cost of soldier purchase	Survey deployed soldiers in theater to estimate their dollars spent on mission-related equipment
Cost-effective execution of short-term acquisition	Improve internal business performance Reduce cost of purchases	Speed of transfer of materiel to standard supply or acquisition system REF target: 90% within NTE 30 days Failure rate of initiatives REF target: NTE 10% Benchmark cost of COTS purchases
New insights for broader Army Transformation	Highlight ideas with broader relevance	Qualitative assessment of insights forwarded to the Secretary of the Army and the CSA Documentation on specific examples of ideas successfully transferred elsewhere in Army

One of the key concerns for RFI and REF is made clear by the appearance of the word “rapid” in their names. The speedy acquisition and delivery (fielding, equipping, or insertion) of new material is the reason that both these organizations were set up. The relevant output attribute is hence speed or responsiveness, which can motivate two different kinds of goals. One seeks to achieve the asset fill that forces need before they need the assets in theater. The other seeks to cut the calendar time required to respond to a new request from the field. For RFI, relevant metrics may use some measure of the percentage of the soldiers’ authorized kit filled at deployment, the delivery of items to the appropriate U.S. airfield point of embarkation on time for aircraft departure (but not too early), percentage of the list of desired

items fielded, and the percentage of items available by the last date at which they would be useful. REF has suggested tracking the number of calendar days required to develop a solution and to insert it and the number of calendar days required to complete an assessment. It has suggested targets of 90 days⁸ for an average or median time to complete equipping solutions, 120⁹ days for an average or median time to insert solutions, and no more than 30 calendar days to complete an assessment. All these metrics have as a starting point the date of the original validation of the requirement.

An integral part of short-term acquisition, especially REF, is to standardize or “institutionalize” new materiel.¹⁰ If a traditional acquisition office or supply system can take over ongoing management of demand for an item, it can be presumed that the item is working well enough to keep. REF suggested tracking the share of items it identifies that it successfully transfers and suggested two related targets. First, the transfer rate should not be less than 10 percent.¹¹ Second, 90 percent of items successfully transitioned should be transitioned within 30 days.

Quality of materiel supplied is also important. One attribute of quality that external stakeholders care about is contribution to strategic, operational, or tactical mission performance, with the goal being performance improvement. Any effort to assess improvement must be qualitative. HQDA can assess the overall contribution of accelerated fieldings to operational capability. Surveys in the field can assess how well new materiel meets the perceived needs of deployed operators. Is it easy to use? Is it better than what they used to use? How does its contribution compare with what operators expected when they requested

⁸ With a not-to-exceed figure of 120 days.

⁹ With a not-to-exceed figure of 360 days.

¹⁰ RFI is taking a very different approach to the long-term management of acquiring items with validated requirements. Each program needs to choose goals and metrics that reflect its priorities and link them to operational priorities.

¹¹ Items not transitioned could still be successful if they alleviated an immediate problem. But total success places a new item in the standard supply system as a long-term solution to a broader problem.

it? Such assessments could be executed as a standard part of the development of lessons learned as units rotate out of theater.

Another valued quality attribute is the contribution of new materiel to decreased risk to mission accomplishment or to soldiers. The WellCam is a good example of this; using it can help soldiers find weapons caches that would be used against them. Documentation of the number of weapons caches found with WellCams could provide useful qualitative information about risk reduction. The risks reduced by simple RFI materiel, such as boots appropriate to the specific conditions in Iraq, are harder to define in terms that can be measured. Another issue is how to come up with broad metrics for groups of items, given that both REF and RFI provide very specific ones. Metrics that highlight individual items would be unwieldy. A metric based on qualitative operator perception of risk reduction could potentially provide useful summary information to the leadership.

A third valued quality attribute is the dollar value of soldier purchases of mission-related equipment. Reducing such purchases was a key motivation behind RFI, making this attribute valuable to the soldiers and to the office of the VCSA, which used its authority to initiate RFI. Defining “mission-related equipment” could present some challenges. But surveys of soldiers in theater could provide rough estimates that the leadership could use to track trends. Asking soldiers to compare their situation during a current deployment with one in the past could also provide useful trend information.

Given the dollar magnitude of short-term activities today, G-8 and the Comptroller have a strong interest in tracking their obligation of funds and seeking ways to manage these funds effectively. Two types of goals are likely to be important. The first is to improve internal process management. The second is to reduce the total ownership cost to the Army of the materiel purchased.

To measure the first, short-term acquisition could track the cost of administration as a fraction of the dollar value of the materiel purchased. Many purchasing activities in DoD track this percentage and could serve as potential benchmarks. Given the exceptional challenges faced in short-term acquisition, its administrative costs are likely to exceed those of analogous programs elsewhere. Nonetheless, under-

standing this, the leadership could still track cost against benchmarks to gain perspective on activity management. Benchmarks could help the leadership understand how much it was paying for speed and responsiveness.

One factor likely to drive up administrative costs in short-term acquisition is the pursuit of risky solutions that ultimately fails. Short-term acquisition is designed to accept some risk, but REF has suggested tracking this metric against a target that would limit failures to 10 percent of initiatives; a higher failure rate would indicate a need to become more cautious.

Where suitable analogs can be found, benchmarking could provide a way to assess the costs of purchases. Again, short-term acquisition occurs in a way that is likely to make relatively higher prices acceptable if they allow rapid response to user needs. But benchmarking would allow the Army leadership to understand what it is paying for such speed. When comparisons are made, G-8 and the Comptroller must be sure to seek estimates of relative total ownership costs. Such estimation typically requires analytic care. COTS items are likely to offer the best opportunity to compare an analogous set of items without too much analytic complication.

Finally, the Secretary of the Army and the CSA want ideas for transformation. Accelerated acquisition activities can take development of such ideas as a goal. Only qualitative metrics can measure performance relative to such a goal. The principal interested external stakeholders could assess the ideas they receive directly. Short-term acquisition could support such an assessment with documentation on specific ideas that have successfully spread elsewhere.

Key Subprocesses of Institutional Army Activity

RFI and REF can seek to improve their performance against the goals and metrics discussed above only by improving the performance of subprocesses they control. The senior leadership does not need details on these subprocesses, but because our analysis gave us some insights into these subprocesses, we provide information on them and goals and metrics that RFI and REF might use internally.

Table 7.3 lists five key subprocesses of short-term acquisition, with many of the high-level issues and decisions that they address. It also lists an associated internal issue of overall process management. The six subprocesses or steps are¹²

- requirement validation
- solution development
- sourcing
- equipping/insertion/fielding
- support and upgrade/spiral or dispose
- institutionalization.

Two goals are relevant in each step. The first is to execute the step well (quality). The second is to execute it quickly (speed). Some tension exists between these goals in each step; taking more time often makes it easier to do something well. In principle, we can use a calendar-time metric to track performance against the time goal. “Doing well” is much harder to quantify and is likely to require a metric based on a qualitative judgment of some kind—probably the level of satisfaction of an appropriate observer.

For example, consider requirement validation—the decision to allocate resources to seek a solution to an identified problem. The review and validation of requirements consumes calendar time. Different observers can and will differ on what proportion of requirements should be validated. Operators are likely to prefer a higher percentage, and G-8 and the Comptroller a smaller percentage. It may be useful to track subjective assessments of each of how close the cutoff point for commitment of resources was to the point they would prefer and the grounds for any dissatisfaction with a decision. Simple periodic, high-level contacts could collect enough information of this kind to track trends.

¹² By referring to these subprocesses as “steps,” we do not want to imply that they are strictly sequential, each starting only after the previous step is complete. In fact, speed depends on creative parallel execution of a number of these subprocesses. That said, in purely logical terms, it is reasonable to expect that these steps will typically occur in the order suggested, even if their beginning and end points often overlap.

Table 7.3
Key Subprocesses and Associated Goals and Metrics

Key Subprocesses Relevant to Short-Term Acquisition	Goals for Subprocesses	Metrics
Requirement validation	Validate requirements quickly Validate cost-effective requirements	Number of calendar days to validate requirement Satisfaction of operators and G-8 and the Comptroller
Solution development	Develop solutions quickly Develop solutions that address operator problems	Number of calendar days to develop solution Satisfaction of operators
Sourcing	Get delivery quickly Get cost-effective delivery	Number of calendar days from statement of specification to delivery Quality of order fulfillment relative to specifications Match between specifications and user priorities
Equipping, insertion, and assessment	Equip, insert, and assess quickly Distribute the right items to the right users	Number of calendar days to equip, insert, and assess % of target population that receives an item when needed User satisfaction with item received
Support and upgrade/spiral (or dispose)	Support, upgrade, spiral, and dispose of items effectively	User satisfaction with continuing support
Institutionalization	Institutionalize quickly Institutionalize more items	Number of calendar days to institutionalize % of items institutionalized

Solution development also consumes calendar time and cannot start until a valid requirement exists. For REF, engineering work may need to be done to invent the solution, as was done with the WellCam. The quality of the solution can be assessed using customer satisfaction information like that discussed above with regard to effects on mission performance and mission risk. Does the new materiel meet the identified needs? Is it better than what the Army used to have?

Choosing a source and getting delivery consumes calendar time. The Army can in principle choose a source before it develops a specific

solution, but it must wait to take delivery until a solution is developed. The short-term acquisition activity can assess the delivery against specifications in the contract with the source and those specifications with the needs of the user. Differences in quality of performance of both kinds are important. Differences between contract and performance point to poor choice of a source or poor contract oversight. Differences between specifications and user priorities point to problems in the design of the contract.

Equipping, insertion, or fielding consumes calendar time and cannot begin until a solution has been developed. A metric of how well it is done might simply measure the proportion of the deployed force that needs an item that gets it in time to use it where needed. This is an example where time and quality need not compete; the faster fielding occurs, the more likely all those who need it will get it. A second potential metric is the proportion of those who get the right version of the item—the right size, one with instructions suitable to the personnel who will use it, in a format that made it easy to assemble and use, one suited to the missions under way, and so on. Both metrics can potentially be tracked in a quantitative way; the second may benefit from reflecting qualitative judgments of users on how good the fit is.

Support and upgrade/spiral/dispose has an element of time, but customer satisfaction is likely more important here. Is the new materiel spiraled properly, as new issues with the solutions are uncovered?

Institutionalization consumes calendar time. It can begin while other steps are still under way. This time element probably dominates the question of how well institutionalization occurs. But an element of how fast institutionalization occurs is what percentage of items are institutionalized. The Army can use metrics on time and percentage to track performance in this step.

Key Investments in Institutional Army Activity

The senior leadership does not need the details in Table 7.3. But if short-term activities want to improve their performance, that improvement in all likelihood must occur in one or more of the subprocesses described above. To coordinate plans for the future and monitor program against those plans, the senior leadership needs to understand

enough about these subprocesses to know how changes in them would affect output attributes it cares about, how much change will cost, and when it will come.

To illustrate how our approach handles any such improvement initiative, we offer some suggestions that could lead to improvement. However, the short-term acquisition organizations themselves are the real experts on their own processes and would ideally interface with their users directly to brainstorm about improvements. Table 7.4 lists several illustrative initiatives.

Short-term acquisition organizations could consider ways to make requirements validation easier. For example, having Web pages where soldiers could describe problems they were having and additional task forces could help offices look for cost-effective improvements. They could gather and organize information more quickly to inform the validation process and help ensure that the process fully appreciates the basis for an operator's desire to fix a problem. In this way, such changes could speed validation and improve user satisfaction with it.

Standing contracts with prequalified suppliers for R&D and production of new items could speed solution development and delivery from a production source. Prequalification could improve the source selection and contract design processes in ways that yielded better solutions, a better match between user priorities and delivered product, and lower total cost of ownership to the Army.

If standard supply systems could use more commercial-type methods to test, quality, and create identification codes for COTS parts, then short-term acquisition could institutionalize the support of these items more quickly. Such a change would promote goals relevant to stakeholder discussed above. It would occur outside the subprocesses that short-term acquisition activities control. But it would be a natural process change for these activities to pursue in support of helping transform Army acquisition as a whole. Short-term acquisition offers a window on commercial practices that Army acquisition could benefit from; this is just one example.

Table 7.4
Potential Initiatives to Improve Short-Term Acquisition Outputs

Illustrative Process Improvement Initiatives for Short-Term Acquisition	Goals of Each Initiative	Metrics Relevant for Monitoring Each Initiative
New ways to assess needs Web pages for suggestions Task forces to review "incidents" to look for solutions	Improve speed and quality of requirements validation process	Assessments of performance improvement directly linked to stakeholders
Prequalified sources for R&D and production	Increase speed and quality of solution development and production delivery from source	Schedule for delivery of performance improvements to stakeholders
Transformation of standard supply systems to simplify management of COTS items	Lower total ownership cost to the Army Speed institutionalization of COTS items	Cost of completing process improvements

Whatever process changes short-term acquisition activities pursue in their own processes or in support of broader transformation, they would explain how each change relates to the goals relevant to stakeholders that we have discussed above. They would use standard acquisition program management methods to choose the schedule and cost milestones of the initiative they plan to use to achieve process change. They can then use metrics summarizing the key elements of performance change, schedule, and cost to coordinate their actions with the leadership's overall plan for transformation.

Summary

The short-term acquisition activities discussed in this chapter have proven to be an effective avenue for the identification, procurement or development, and delivery (fielding, equipping or insertion) of new items to soldiers in the field. RFI and REF have managed to break through the delays inherent in the way traditional acquisition has been performed. These new organizational structures have gotten the support and the resources they need.

The metrics we have laid out in this chapter offer a way to discuss how short-term acquisition initiatives support the operating force. We have also provided metrics that should serve the short-term acquisition

organizations as a starting point to use in figuring out how to judge their own internal performance.

However, the initiatives were set up to perform a particular function during a war. In contrast to the institutional activities examined in Chapters Five and Six, without that war, the short-term acquisition initiatives examined here would not have been developed. And when the war is over, it is likely that the VCSA's priorities will move on to other concerns. If this occurs, there may not be sufficient support for them to remain. The "pull" for new technology to deal with needs discovered during operations will diminish, as will the need for personal items geared for specific environmental conditions. By our notional target date for institutional performance, the end of the POM period, REF and RFI may not still exist.

This does not mean that there will not be future contingencies, and that future contingencies would not benefit from the organizational lessons of short-term acquisition learned during the current ones. It can almost be guaranteed that all future major operations that the Army participates in will reveal new needs that would benefit from the speedy provision of materiel. When planning the future nature and performance of the institutional Army, the Army leadership can keep in mind that it will want the kind of short-term acquisition capability it has today (and perhaps even a better capability) whenever the Army's operating force finds itself actively deployed as it is today. The leadership can then align the longer-term priorities of the institutional Army with those of the operating force by thinking about short-term acquisition as a contingent capability that it wants to be able to recreate as needed and to sustain for the duration of high-tempo deployments. Therefore, efforts to capture the organizational lessons should be institutionalized as part of the current initiatives, and these lessons should be incorporated into future war planning. That way, the RFI and REF would not be supporting just the current operating forces but future ones as well.

Conclusions

The operational Army is transforming into a new modular force, rebalanced between the active and reserve components and focused on new, stabilized brigade-sized units. The Army will be “brigade-centered” in ways that allow the Army to project power quickly from its home station. As the Army’s senior leadership pushed this transformation forward in 2004, it became ever-more apparent that the institutional Army would also have to transform in ways that aligned it to the newly emerging operating force. This is a daunting task that will take years to achieve.

To achieve it, the Army needs a strategy that places specific institutional activities clearly in the context of the newly emerging operational Army and uses formal change management methods to transform these activities. The approach to evaluating value chains described here can provide one important tool in support of such an effort. This closing chapter reviews why the alignment of the new operational and institutional parts of the Army will be so challenging, what form of strategic approach should help realize the alignment, and the promise and challenges of evaluating value chains to shape and implement an effective strategy.

The Problem: Aligning the Operational and Institutional Armies

The more the Army understands about what the outputs of the institutional Army are, how they affect operational performance, and what

they cost to produce, the better it can align its operational and institutional elements.

The Army has spent decades, through the Total Army Analysis and related, centrally coordinated requirements development processes, understanding how the units of the operating force work together to affect performance. It has a detailed view of how the outputs of one unit flow as inputs into other units. The Army has clear, centrally coordinated doctrine on reporting relationships, accountability, and command and control of these units. This high-level organizational focus and a tradition of increasingly refined review lie behind the Army's ability to present a fairly clear and succinct vision for a new operating force: modular, brigade-centered, stabilized, rebalanced, and expeditionary in a joint setting.

The Army has no comparable, central view of how institutional activities relate to one another or how their outputs ultimately affect operational performance. Broad agreement on the key outputs that the institutional Army must provide to the emerging operating force or their key attributes does not yet exist. The Army cannot accurately estimate how requirements for military personnel or dollars would change if the levels of these outputs or their attributes changed. It must rely on the military judgment of seasoned leaders to suggest how changes in the levels of these outputs or their attributes would affect operational performance.

The models that the Army uses to represent how operational activities relate to one another rely heavily on such military judgments. But they employ a refined vocabulary that helps various stakeholders sustain a common vision of how the operating force is supposed to work. No similar common vision, vocabulary, or suite of models exists to represent relationships within the institutional Army or between institutional activities and the operating force.

This lack of clear understanding is reflected in the Army's current vision for a new institutional Army: Use fewer resources to provide better support to the warfighter. This vision focuses attention on the warfighter relative to other users, but otherwise simply says, "Do better."

The Army can do better. Its success in understanding the outputs of the operating force, their effects on operational performance, and the resources required to produce them show that it can develop an effective, high-level understanding of a complex activity with many moving parts. But the Army took a long time to achieve this understanding. Developing an equally effective, high-level understanding of its institutional outputs, their effects on operational performance, and their resource requirements will surely take considerable time as well.

Taking such a long view is always challenging, because immediate budget concerns always force adjustments required by a tendency, in the current budget system, to overstate what can be done with current resources. Several times a year, year in and year out, Army resource managers find themselves in short-term budget drills that force them to shift or cut resources from an activity, while betting on the time when they can find a way to absorb the cuts without ill effect. As a result, they are always trying to recover from the effects of the last cut drill. This only stiffens the resistance of such managers to participate in any systematic, centralized activity, like that proposed here, that might result in further cuts.¹

Realigning the operational and institutional parts of the Army is a particularly challenging task today for two very different reasons. First, the operating force is changing rapidly in important ways. Second, the Army is at war and is being asked to project forces in ways that place enormous strain on the basic capabilities of the current operating force. Many in the Army see realignment as a critical part of any effort to create a new operating force that can meet new demands more effectively while releasing resources from institutional activities to pay for this new operating force. Crisis is often required to precipitate change. But crisis also sucks up any slack resources that might be committed to investing in effective and enduring change. To realign the Army's operational and institutional elements, the Army leadership must find effective ways to use the current crisis to motivate change while still finding the leadership, human, and material resources to plan an effec-

¹ We thank Mike Hix for this insight.

tive future for the Army and protecting them from the demands of the current crisis for long enough to develop and implement such a plan.

The Solution: A Strategic Approach to Change

The Army can begin to address this problem by taking a strategic approach on two different levels. It can initiate an effort to determine clearly where each institutional activity lies in the broader perspective of the Army as a whole and how it relates to operational performance. And it can coordinate this effort with a formal change management strategy that sustains the realignment effort through successful implementation and institutionalization.

Strategic Location of Institutional Activities in the Army as a Whole

Any strategic approach to aligning the operational and institutional parts of the Army should seek to link operational priorities to institutional capabilities. The effort we describe in this document uses the classification shown in Table 8.1 to do this.

The four rows in the body of the table clarify what kind of output each activity delivers to its most immediate user. Some activities create the doctrine; organizational design; and human, materiel, and information assets that fill operating force units. Some produce ongoing medical, logistical, installation, information, and mobilization support to these units after they exist. Some produce medical services to dependents and retirees, civil works for water resource management, emergency response for communities, and a panoply of other lesser services for external users other than the operating force. And many provide goods and services to other institutional activities, which in turn support external users or still other institutional Army users. All the activities in the institutional Army produce outputs that fall into one of these four categories.

The rightmost columns in Table 8.1 list high-level priorities reflected in the Army Campaign Plan, allowing us to associate specific institutional activities anywhere in the Army with specific high-

Table 8.1
Placing Institutional Activities in Relation to the Army as a Whole

	Examples Highlighted in the Army Campaign Plan		
	Improve Global, End-to-End Service Support	Improve Personnel Assets	Improve Materiel, Information Assets
Output of institutional activity	Medical, logistics, information, installations, mobilization	Accessioning, training, well-being, personnel management, integrated information system	Concepts, capabilities, and requirements; short-term acquisition; long-term acquisition
Creation of the operating force	Medical	Accessioning	
Ongoing support of the operating force	Medical		Short-term acquisition
Support of other external users	Medical		
Support for institutional users	Medical	Accessioning	

level priorities for change. Some institutional activities participate in increasingly integrated global, end-to-end processes that provide direct, ongoing support services to operational units throughout the world. The Army Campaign Plan envisions changes in all the processes that have immediate implications for specific institutional activities shown as examples in the table. Some institutional activities are part of the integrated complex that accesses, develops, and sustains the personnel who staff the operating force. The Army Campaign Plan envisions specific changes in accessioning, training, well-being, personnel management, and integration activities, and in personnel information systems that serve these activities. Some institutional activities develop and procure the material systems used in the operating force. The Army Campaign Plan envisions specific changes in the coordination of Army and joint concept, capability, and requirements development activities; short-term acquisition activities that support currently deployed forces; and more traditional long-term acquisition activities.

The three activities examined in this monograph are reflected by the categories in Table 8.1. *Institutional medical* activities involve participation in global, end-to-end, integrated processes that support operators all over the world. These activities provide outputs relevant to all four categories in the table. They create the doctrine and organizational design for operational medical units. They access, develop, and procure the human, materiel, and information assets used in these units. They then provide continuing direct support to the operational units they have created and to the soldiers in the operating force. They serve large nonoperational communities outside the institutional Army. And they produce assets, goods, and services for many institutional activities. We cannot understand how institutional medical outputs affect operational performance without understanding whether they create or support the operating force; where they fit in the global, end-to-end medical support process; and how they compete for resources with the other demands placed on these same activities. Our discussion of institutional medical activities in Chapter Five illustrates how to parse these factors in ways that reflect the strategic location of institutional medical activities in the Army as a whole.

The other activities discussed here are less complex, but these also require careful strategic attention. *Enlisted accessioning* is obviously an integral part of the institutional complex that generates and sustains skilled and experienced personnel for the operating force. The same accessioning activities, in coordination with the broader institutional personnel complex, also generate and sustain military personnel in institutional Army activities. Operational and institutional demands for personnel compete and interact as individuals flow between operational and institutional assignments. We cannot hope to understand how changes in the level or attributes of enlisted accessioning outputs affect operational performance without understanding better where accessioning lies in the institutional personnel complex—how minor “tweaks” in one phase of the process ripple through the force later on and how operational and institutional demands for personnel interact.

Short-term acquisition is a focused institutional activity created to deal with specific problems identified by operational commanders

as they are deployed to service current demands on the Army's operating force. Few other parts of the institutional Army are as intimately connected to operational needs and performance. Short-term, accelerated acquisition is a critical part of the institutional provision of materiel assets to operators, but it is likely to exist only during demanding deployments. This means that the Army needs a way to create such capabilities quickly when shortages in the operating force demand them—in competition for the resources that flow directly in other forms to the operating force, to dismantle them when priorities change, and to sustain the latent capability to reestablish them whenever needed. Such acquisition involves small numbers of military and civilian personnel, but immense numbers of dollars. And despite the fairly small number of people directly involved, it touches and affects much larger long-term acquisition activities in ways that are likely to affect the operational Army's access to materiel assets in the future.

The classification in Table 8.1 is obviously not the only way to place institutional activities in a strategic setting, but it provides a very simple way to connect high-level priorities, captured in the columns, to basic characteristics of institutional activities, captured in the rows. This facilitated our analyses and should prove useful in other similar applications. Limited applications to many of the other activities highlighted in the Army Campaign Plan tell us that activities that occupy the same boxes in the table are likely to raise similar questions relevant to aligning operational needs with institutional capabilities. Such similarities offer a way to coordinate a much broader effort and transfer lessons learned from one activity area to another.

Strategic Change Management

Broad experience with large changes in public and private organizations over the last two decades confirms the value of using formal change management methods to design and sustain changes of strategic importance. This is not the place to explain in detail what formal change management is or what a formal change management plan should look like for realigning the operational and institutional parts

of the Army. But we can offer a broad outline of what such a plan would include.²

Broadly stated, formal change management seeks to

- establish sustained senior leadership support for a change,
- empower champions of the change to pursue the change on a day-to-day basis,
- break the change into pieces that allow empirical experience with the change to accumulate over time,
- monitor the progress of each piece of the change with metrics meaningful to the senior leadership,
- build on success using demonstrated early wins to justify continuing investment in change,
- create and sustain a formal organization and process that helps champions to update the leadership and sustain its support for continuing efforts, and
- ultimately institutionalize changes achieved so that they are self-sustaining within the routine operating environment of the organization.

When institutionalization is complete, the formal change organization and process can be dismantled and its champions moved to other responsibilities.

² The best general reference on formal change management we have found remains John Kotter, *Leading Change*, Boston, Mass.: Harvard Business School Press, 1996. To see a wide variety of practical examples of how the approach described here works, see John Kotter, *The Heart of Change: Real-Life Stories of How People Change Their Organizations*, Boston, Mass.: Harvard Business School Press, 2002. For a discussion of how to apply this approach in a defense setting, see Frank Camm, Jeffrey A. Drezner, Beth E. Lachman, and Susan A. Resetar, *Implementing Proactive Environmental Management: Lessons Learned from Best Commercial Practice*, Santa Monica, Calif.: RAND Corporation, MR-1371-OSD, 2001; Nancy Y. Moore, Laura H. Baldwin, Frank Camm, and Cynthia R. Cook, *Implementing Best Purchasing and Supply Management Practices: Lessons from Innovative Commercial Firms*, Santa Monica, Calif.: RAND Corporation, DB-334-AF, 2002; and Frank Camm, "Adapting Best Commercial Practices to Defense," in Stuart E. Johnson, Martin C. Libicki, and Gregory F. Treverton, *New Challenges, New Tools for Defense Decisionmaking*, Santa Monica, Calif.: RAND Corporation, MR-1576-RC, 2003.

Effective Senior Leadership. In the context of aligning the institutional Army to the new operating force, a number of points are important. The “senior leadership” relevant to any portion of the alignment must include the leaders of the organizations that must change to realize the change. The changes envisioned in the Army Campaign Plan affect the institutional Army so broadly that only a panel of leaders at the highest level can empower such change. Because we are speaking of large changes in the institutional Army itself, institutional MACOM commanders must be involved. FORSCOM may be able to provide inputs from an Army operational user’s perspective, but commanders of operational units outside FORSCOM should also be involved, especially in questions about the institutional activities that support them locally or from a distance. To ensure the cooperation of these leaders and effective integration of their efforts, leaders above them must be involved. At a minimum, this includes the Vice Chief of Staff and, likely, the Chief of Staff and the Secretary of the Army. As this leadership turns over through the course of the change effort, the visible and active support of each new leader must be achieved and sustained. The difficulty of asking for such high-level, sustained emphasis may explain why the Army leadership has demurred from aligning institutional and operational activities more closely in the past. Unfortunately, the difficulty of sustaining high-level emphasis does not mean that the Army can proceed successfully without it.

As the change is broken into smaller pieces that can be achieved more quickly, narrower groups of leaders can be engaged. Smaller changes are easier to achieve in part because they involve fewer leaders at any given time and occur quickly enough to limit the number of changes in leadership engaged at each step of the process.

Champions. Champions given the responsibility to change institutional activities should be individuals who enjoy broad respect within the leadership and the Army as a whole. They will be asked to operate at levels well above their current rank and official status, relying on the authority and continually demonstrated support of their leaders to influence other leaders who outrank them. Such champions are obviously exceptional individuals; some organizations require up-and-coming fast-trackers to prove themselves as champions before they

are considered for executive positions, both as a test of their leadership skills and to attract exceptional personnel to championship positions. These champions are typically most successful if they have a broad background relevant to the core interests of the organization as a whole, not just the activity they have been given responsibility to change. This suggests that champions seeking to align institutional activities to the operating force should come from a broad operational background that has given them a network of productive relationships with senior operational leaders.

Metrics and Incentives. Clearly defined, actionable metrics are critical to success for a variety of reasons.³ Any leadership panel must be able to convey its intent to the champions who actually make the change happen on a day-to-day basis. And sustained leadership support is viable only if these champions can continually present clearly documented evidence that the change effort is having a large enough positive effort to justify the continuing commitment of leaders' own time and of the human and financial resources they control. These metrics must overcome the natural tensions that exist between operators in the leadership who want evidence of change that affects operational performance and institutional leaders, who have traditionally used metrics more focused on things they control. Well-defined metrics are equally important to the individuals in any institutional activity who must change what they do at work to ensure the success of organizational change. Metrics provide a concrete way to inform them of what change is expected and a concrete basis for motivating them to change, particularly if the metrics are used to affect their compensation, training opportunities, assignments, promotions, quality of life, and so on. Well-defined metrics are especially important for reorienting personnel in institutional activities from their traditional inward-looking metrics to metrics that emphasize their effects on the operational performance of users.

³ For more detail, see Laura H. Baldwin, Frank Camm, and Nancy Y. Moore, *Strategic Sourcing: Measuring and Managing Performance*, Santa Monica, Calif.: RAND Corporation, DB-287-AF, 2000.

Potentially Unending Change. Vast changes take many years. Increasingly, large, complex organizations that operate in dynamic environments find themselves affirming an active culture of ongoing change. In such organizations, formal change management begins to integrate itself with normal operations, effectively institutionalizing the formal change process itself in every leader's job description. The account of the external threat that the Army uses to motivate its ongoing efforts to change the operating force point directly to such a dynamic environment. If commercial experience is any indication, this could suggest that the Army seeks an approach to aligning its operational and institutional elements on an ongoing basis as the external threat and the capabilities available to address it continue to evolve. We are a long way from such an ambitious approach to Army leadership, but development of a formal change management system to address the alignment of operational priorities and institutional capabilities could be seen as a first step in such a direction.

One Useful Tool: Evaluation of Value Chains for Key Institutional Activities

Evaluation of value chains is one way to develop performance metrics that clarify the senior leadership's expectations about the alignment of operational needs and institutional capabilities. It uses a "process engineering" approach to clarify the points in the institutional Army at which services from military personnel and dollars produce institutional outputs, and at which these outputs contribute to the production of other institutional Army outputs that finally find their way to the operating force. Once it has traced this series of production actions, our evaluation of value chains asks why the operational Army wants each institutional output that it receives, and then transforms that want into a performance goal that has implications for performance goals at every production point in the institutional Army. Viewed properly, these goals point to performance metrics that the Army leadership can use to set goals for specific institutional activities and institutional resource

requirements, based on its operational priorities and expectations, and then track progress toward achieving these goals.

Executed properly, this approach offers great promise as a way to link goals for institutional Army capability to operational priorities. It is nevertheless challenging to implement properly. Much of the challenge results from the challenge inherent in linking operational priorities to institutional capabilities. The “up-side” and the “down-side” of a formal evaluation of a value chain is that it focuses our attention on both (1) what we need to know to make reliable linkages and (2) how little we often know now about how to make reliable linkages. Exposing this gap helps the Army ask how much new information it wants to invest in, and whether it uses a formal evaluation of value chains or some other method to tie the operational and institutional parts of the Army together more effectively. Let us now review briefly the promise and challenges of evaluating value chains effectively to map the links between operational priorities and institutional capabilities.

The Promise of Evaluating Value Chains

Throughout this monograph, we speak of an *operating force* and an *institutional Army* in ways that may confirm preconceptions that these are fundamentally separate and dissimilar entities. As the Army pursues a policy of improving the alignment of these two entities, it is important to appreciate in some degree of depth how interrelated these entities truly are without getting lost in the details. Formal evaluation of value chains is particularly well suited to tracing (1) the flows of *causation* that knit these entities together and (2) the flows of *goal setting* that can potentially improve their alignment through their many points of interaction.

Executed properly, formal evaluation of value chains offers the promise of two key benefits:

- It helps us clarify the structure of complex organizations, especially organizations large enough to have many different communities within them and hence many different views of what each part of the organization should do.

- It seeks to define this structure in as minimal a way as possible, limiting how much information the senior leadership of the organization needs to align all parts of the organization to a common purpose.

Clarity. Formal evaluation of value chains seeks clarity by honing attention in the institutional Army down to a few points of focus and seeking simple ways to link these points of focus: What outputs do institutional activities deliver to operational units? What are the critical attributes of these outputs? What do these operational units want these outputs and their attributes to do in the operating force? Who else cares about these outputs, and why? How do their interests differ from those of the operational units and from each other's? If the Army wants to change the levels of these outputs or their attributes, how long will it take and how much will it cost? Formal evaluation of value chains creates a structure in which the Army can pursue answers to these questions.

To the extent that it gets good enough answers, the stakeholders who care about the institutional outputs that the operating force uses can negotiate among themselves what changes they want to make to improve the alignment of the institutional and operational parts of the Army. That is, formal evaluation of value chains generates metrics that can improve decisionmaking in existing high-level Army decision processes by providing information that is more attuned to the priorities of the stakeholders who participate in these processes.

This approach forces an improved understanding of the range of perspectives relevant to decisions and the terms on which these decisions should be made. A better understanding of these perspectives allows the Army to appreciate where important barriers to realignment lie and to target them for change. In particular, this approach forces a careful statement of where exactly the institutional Army hands an output to the operating force and how the parties on each side of that transfer think about the output. It encourages the recipient and relevant resource stewards to think carefully about exactly what they want the output to do so that they can communicate these preferences to the provider in the form of a simple set of metrics. This can be thought of

as imposing accountability on the operational users and resource stewards; it tells the users and stewards that they cannot be upset about what they get if they do not clearly communicate what they want. It encourages the provider to think about how close it can get to taking responsibility for meeting the recipients' and stewards' needs and to communicate specifically (1) how much it is willing to be held accountable for, (2) where, and (3) why it cannot "step up" to their needs. This encouragement to step up can be thought of as imposing accountability on the institutional provider.

Well-defined metrics stand at the center of this quest for clarity. Our approach to evaluating value chains seeks metrics that operational users, resource stewards, and institutional providers can understand in similar terms despite their basic differences in perspective. As users, stewards, and providers work together toward metrics acceptable to all of them, they build a common vocabulary they can use to govern their relationships in a dynamic setting. With effective use, this vocabulary presumably deepens in clarity and refinement over time.

Results-Focused Parsimony. Formal evaluation of a value chain can pursue clarity on these perspectives at any level in an organization. We focus on the perspectives relevant to the Army's senior leadership—perspectives the senior leadership needs to consider when making decisions about the institutional Army. By facilitating focus at this level, such process evaluation supports parsimony. That is, in addition to seeking clarity, it seeks clarity only on issues relevant to a particular setting. In the context of how to align operational priorities to institutional capabilities, two types of questions are important to the senior leadership: (1) what levels of institutional outputs with selected attributes will the operating force receive, and (2) how many military personnel and dollars must the Army commit to the institutional Army to achieve these levels? Details on how the institutional Army produces and delivers these outputs and attributes is not directly relevant to the senior leadership; it is of interest mainly to support "reality checks" on the leadership's beliefs about the output levels institutional activities can achieve at the resource levels claimed.

Put another way, formal evaluation of a value chain can focus on a decision context in which the leadership decides what institutional

activities should do, and these activities then decide how to do it. This is consistent with the Army's long-standing preference of planning and deciding centrally and then delegating execution. It is consistent with a basic principle in command and control of establishing a results-oriented commander's intent at each level of command and preserving the initiative of lower echelons to act on that intent with the information available at those lower levels.⁴ It is consistent with the central principle in reinventing government that leaders should "steer" and providers should "row."⁵ It is consistent with a central insight into process engineering that the best way to integrate a value chain is (1) to optimize each segment of the value chain against metrics that define the performance of the value chain as a whole, but (2) to leave local execution within each segment to its own control processes, as long as these processes are consistent with the global metrics.⁶

Comparing the TAA Approach to Operating Force. This is an important way in which an approach that evaluates value chains differs from the TAA approach that relies on standardized unit types (i.e., standard requirements codes [SRCs]) and detailed rules for their relation to one another in a hierarchy. A formal evaluation of value chains designed to support senior leadership decisions about aligning operational activities and operational units does not require detail on what these institutional activities look like. It requires only information on what outputs they deliver to operational units and with what attributes, and how changes in these output levels and attributes affect institutional demand for military personnel and dollars. These information requirements are substantial, but not nearly as substantial as the requirements of the SRC-based modeling system that lies at the core of TAA assessments of the operating force.

⁴ See, for example, Headquarters, Department of the Army, Field Manual 5.0, *Army Planning and Orders Production*, Washington, D.C., 2005.

⁵ See, for example, David Osborne and Ted Gaebler, *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*, Reading, Mass.: Addison-Wesley, 1992; and Donald F. Kettl and John J. DiIulio, Jr., eds., *Inside the Reinvention Machine*, Washington, D.C.: Brookings Institution Press, 1995.

⁶ See, for example, Fred A. Kuglin, *Customer-Centered Supply-Chain Management: A Link-by-Link Guide*, New York: American Management Association, 1998.

Key Challenges of Evaluating Value Chains

Our examination of institutional medical services, enlisted accessioning, and short-term acquisition activities helped us understand challenges likely to arise in any Army effort to implement effective evaluation of value chains and use it to develop metrics. Most of these challenges ultimately result from the difficulty of linking operational priorities and institutional capabilities and resources in ways that allow effective high-level decisionmaking. As a result, they are likely to arise in any effort to align the operational and institutional parts of the Army. But we encountered them in the course of modeling and evaluating value chains and will discuss them here in that context.

Operational-Institutional Links. What operational capability is an institutional activity trying to improve? The Army does not have a unified way to talk about operational capabilities that can support all inquiries of this kind. We found three different ways to consider operational capability:

- the lethality, agility, survivability, deployability, supportability, and so on—the so-called “-ilities” of a deployed force
- the ability to execute a simultaneous set of missions, as envisioned in the Total Army Analysis
- asset fill against requirements for personnel, materiel, information, and so on.

Each of these can serve as a useful point of reference for specific questions about how to change institutional activities. Specific changes in medical support and short-term acquisition, for example, can have specific, predictable effects on the survivability of the operating force. Enlisted accessioning is part of an institutional system that can have specific, predictable effects on asset fill against operational manpower requirements.

More broadly, the Army has no unified system, like the Total Army Analysis, for putting all institutional activities in a common setting relative to operational capabilities. Until such a system exists, formal evaluation of value chains must depend on military judgment to assess the relative value of specific changes in different parts of the

institutional Army that seek to improve operational capability. Such judgment, for example, must assess how much some specific increase in survivability is worth relative to some specific increase in asset fill, relative to operational manpower requirements.

How do we expect specific changes in the institutional Army to in turn change specific operational capabilities? Developing empirically based answers to this question becomes increasingly difficult as we move from thinking about operational capability in terms of asset fill (for example, percentage of required language specialists available to the warfighter) to capability against a set of simultaneous missions (for example, level of risk associated with executing any required mission) to lethality or agility (for example, a multinational force's kill ratios or ability to change priorities quickly on the battlefield). The Army can talk about how specific accessioning actions are likely to affect asset fill against regional combatant command (RCC) requirements. But it still cannot predict with real certainty what would happen to other interpretations of operational capability if the Army were to significantly change the quality standards it applies to recruits—for example, if it were to access more personnel with low test scores. Today's Category IV might well be tomorrow's "prime market," in the case of full mobilization and all-out war. The Army might have no other choice. Although the Army found effective uses for lower-quality recruits as part of full mobilization in the past, today's Army seeks a highly trained force, comfortable with a warrior ethos, that can take full advantage of complex technologies in a chaotic, nonlinear combat setting with short decision cycles. The Army has no empirical information on how it would have to change its approach to combat with lower-quality personnel or how well such personnel would function in such a setting. This is a specific, practical issue the institutional Army faces today without basic evidence to inform a decision. Formal evaluation of value chains depends fundamentally on using such information to judge the value of improved institutional processes. It can be only as good as the best information available.

The challenge of developing such information raises a broader issue that often comes up in organizations, including military organizations. Different functional communities tend to privilege the impor-

tance of their own functions relative to those of other communities in the same organization, and optimize their activities relative to their own values rather than to broader organizational values. They prefer to be judged relative to things they can control rather than relative to more important things that they can affect. In a military setting, for example,⁷ operational resource managers tend to invest less in the inventory required to fill logistics pipelines than do logisticians. Logisticians, on the other hand, tend to give more attention to the efficiency of their own repair processes than to the effects of those processes on the availability of operator-owned weapon systems. Financial managers prefer being judged on the balances in the funding accounts that they manage to being judged on how those balances affect the performance of warfighters who use those accounts to buy support services from institutional sources. Life is simpler and less uncertain within the comfortable boundaries of a function than in a supply chain that must integrate functions to serve a final user. The inevitable result of isolating functions and failing to communicate across functional boundaries is suboptimization; lack of information about how specific institutional actions affect specific operational outcomes often reflects such suboptimization.⁸ Formal evaluation of value chains cannot overcome such suboptimization without effective communication between operational and institutional communities. Such communication is becoming more and more effective among activities that now see themselves as being part of global, end-to-end processes, like the medical and logistics communities. The more integrated such processes become, the better the information on operational-institutional links. This is just another reflection of the idea that better information on operational-institutional links allows better integration. Formal evaluation of value chains is one of many analytic approaches available to promote such integration.

⁷ These examples all come from recent RAND analyses of a variety of defense resource management processes that seek to reorient support activities to operational priorities.

⁸ We hope the notion of *failing to communicate* brings to mind the phrase (“failure to communicate”) from the famous scene in the movie *Cool Hand Luke*. Reluctance to reach mutual understanding when goals differ has real consequences.

Other Differences in Perspectives. At the heart of the formal evaluation of value chains is an effort to clarify and bridge different perspectives within an organization. Operational and institutional perspectives, broadly writ, are one example of important differences. We found in the three activities we examined that each key stakeholder is likely to bring a different perspective and that modeling becomes more challenging as more stakeholders play a role in an activity. Institutional medical activities, for example, provide direct support to four very different kinds of users: operational medical activities, soldiers in garrison, military dependents, and military retirees. Each of these groups has different priorities and different abilities to influence resource allocation decisions in institutional medical activities. By comparison, short-term acquisition is far simpler. But even here, three distinct interests are present. Deployed units want the materiel solutions that accelerated acquisition seeks to obtain. The VCSA wants evidence of success to verify that, as that office acts as a direct sponsor of this program, its commitment of leadership focus and authority is worth more than it would be worth elsewhere in the Army. And the Secretary and CSA look to accelerated short-term acquisition for ideas about how to accelerate long-term acquisition. These are diverse, highly visible priorities that pull short-term acquisition activities in very different directions. A formal model of a value chain must reflect this.

Although we have only limited evidence to support this idea, we expect that increasing jointness and interaction with defense activities outside the Army can easily add a perspective to institutional activities that complicates formal evaluation of value chains. In the exercise at hand, we have implicitly assumed that the ASCC could act as an effective buffer between the priorities of a joint RCC and the institutional Army. As a buffer, the ASCC could translate joint priorities into Army terms that would allow the institutional Army to act largely within an Army context. In fact, however, the institutional Army routinely interacts with many defense agencies and programs in which no buffer is present. For example, institutional medical activities work in close quarters with the Defense Health Program. DoD as a whole seeks an integrated system in which all parts work together toward a common vision. Formal evaluation of value chains offers an approach that DoD

can use to clarify different perspectives and bridge them. Bridging them will take time. And until many differing perspectives come to terms with one another, we expect formal models of value chains relevant to institutional Army activities to become more complex as joint and other external defense voices play an increasingly active role in institutional Army activities.

Qualitative Metrics. Each of the activities we examined highlighted the importance of using qualitative metrics to reflect certain specific goals. Stakeholder satisfaction—especially customer satisfaction—plays a dominant role. Even enlisted accessioning—the most quantitatively oriented of the three activities—finds a role for qualitative metrics in the satisfaction of recruits with their assignments and satisfaction of successful recruiters with their post-recruiting assignments. The Army currently collects extensive information on satisfaction levels and other qualitative metrics in many settings, but we are suggesting a more systematic integration of such metrics into ongoing efforts to shape the priorities of institutional activities. Use of such metrics is increasingly common in best commercial practice. In fact, customer satisfaction is one of the two most important metrics (the other is cost) used in many performance-based agreements.⁹ But it presents important challenges in the context of aligning the operational and institutional parts of the Army.

By their very nature, qualitative metrics are difficult to define. They can be *described* clearly by using a Likert scale of five ordinal levels of satisfaction—say, very satisfied, satisfied, neutral, unsatisfied, very unsatisfied. But such a description does not capture how different parties interpret each of the categories in the Likert scale. This presents a special challenge in the Army setting in which the problem is precisely the integration of the perspectives of stakeholders with differing priorities, as explained previously. Commercial firms face the same problem and resolve it by using a qualitative metric in a setting in which all relevant parties can learn over time how each other interprets each category and then reach agreement on the level they will mutually strive for.

⁹ For details, see Baldwin, Camm, and Moore (2000).

Such an approach presents two challenges. First, public agencies typically prefer more precision in performance agreements than private companies do. Many worry that qualitative metrics of any kind allow a degree of discretion that cannot be tolerated in public agencies that act in the public interest. This is a challenge in all efforts to introduce performance agreements to public agencies, including the formal evaluation of value chains. The irony here, of course, is that in the absence of metrics, there is no direct public accountability for decisions; we simply rely on decisionmakers in public agencies to apply their professional judgment in the public interest. As imperfect as they are, qualitative metrics offer a method for helping decisionmakers in public agencies, including institutional Army activities, understand better what their key stakeholders expect of them. Qualitative metrics are hard to apply precisely because the priorities in play are hard to define. Creating qualitative metrics helps sharpen the vocabulary that various stakeholders can use to talk to one another. Because this is a fairly new idea in the Army, we should expect resistance.

Second, we seek performance metrics that the Army leadership can use to direct institutional activities toward accountable levels of performance in the future that reflect the leadership's expectations. If we choose the end of the Future Years Defense Program as the target date, these metrics appear up to eight years in the future. If, by their very nature, qualitative metrics come to be understood only as they are applied, such a distant planning horizon presents a serious challenge to organizations that do not currently use the qualitative metrics in question. Surrogates are available. For example, the Army could say that it will benchmark future satisfaction levels and expect them to match the satisfaction level of some stratum of a comparable population outside the Army.¹⁰ For medical support of military retirees and dependents, for example, the Army could prescribe that it wants these stakeholders to be as satisfied with their medical services as civilian government

¹⁰ For a discussion of how the National Security Agency is doing this in its Groundbreaker Program, see Frank Camm, Irv Blickstein, and Jose Venzor, *Recent Large Service Acquisitions in the Department of Defense: Lessons for the Office of the Secretary of Defense*, Santa Monica, Calif.: RAND Corporation, MG-107-OSD, 2004.

employees are with theirs. It wants its successful recruiters to be as satisfied with their post-recruitment assignments as recruiters in the other services are with theirs. As the Army gains experience with such metrics, it will be easier to specify future targets; the transition required to initiate this process will be challenging.

Details on the Future. Qualitative metrics are not the only metrics that are difficult to project into the future. Although the Army routinely produces a program that makes statements about resource use up to eight years in the future, it rarely develops detail at the level discussed here for such use more than two or three years in the future. One simple way to accommodate that is to limit the planning horizon used in evaluating value chains to the period over which the Army has data that can inform the metrics that emerge from such a model. But initiatives to change institutional activities in significant ways will take longer than two or three years to complete, if only because the budgeting cycle itself takes that long to procure the resources required to initiate a new program. Unless the Army can look beyond three years in the future, it cannot set performance targets that can inform change initiatives. Without such targets, it is difficult to understand how the Army can prioritize investments in these initiatives in ways that reflect their value to the operating force.

Formal evaluation of value chains forces this challenge to the surface. The Army may want to approach this challenge in stages, starting with planning horizons compatible with the data available in various activity areas, and extending its planning horizons as these activities develop ways to look further into the future. During such a transition, the Army could rely on military judgment about operational value to set priorities and move toward a more systematic characterization of priorities for future operational performance as a more systematic characterization becomes available.

Requirements for Resources. The Army does not currently have the capability to estimate the military personnel and dollars required in the institutional Army to produce specific outputs that it delivers to the operating force. For example, the Army cannot determine how much it costs, looking across the entire institutional Army, to deliver a new infantryman or surgeon to the operating force. This is true for two

reasons. The Army does not have the capability to allocate resources expended within any institutional activity, such as medical services or enlisted accessioning, for the outputs of that activity. And it does not have a way it estimate the dollars and military personnel associated with other institutional activities whose outputs the institutional activities receive for free. As a result, it is simply impossible to make a list of all the outputs the institutional Army produces in a year and to outline for the senior leadership the portion of its total dollar budget for the year and the number of personnel hours expended on each output.

Activity-based management (ABM) is a widely used technique that can help the Army address both problems.¹¹ Existing Army data, examined through the lens of ABM, could yield the metrics of interest to us. Although many in the Army have endorsed the application of ABM, the Army does not currently have a standing capability that can generate the metrics on military personnel and dollars that we have discussed in the previous chapters. Until it develops such a capability, the Army cannot pursue formal models of value chains that seek to link institutional outputs to resource levels. Observers have been recommending the application of ABM methods to decisionmaking in the Army and the rest of DoD for many years. This observation simply adds another argument in favor of introducing ABM in the Army.

Cost of Developing and Sustaining Metrics. Like every other method of developing performance metrics that reflect the senior leadership's expectations about the future, formal evaluation of value chains is costly. It requires Army leaders and champions to commit some portion of their attention, as well as the scarce human and material resources available to them, to a formal change activity. It requires personnel to learn exactly what a formal evaluation of value chains is,

¹¹ ABM is a practical accounting technique first proposed in 1988 to allocate a total budget among outputs in a way that reflected the real resource demands of each product. See Robin Cooper and Robert S. Kaplan, "Measure Costs Right: Make the Right Decisions," *Harvard Business Review*, September–October 1988, pp. 96–103. For practical guides to applications of ABM that could generate the metrics of interest to us here, see Michael R. Ostrenza et al., *The Ernst and Young Guide to Total Cost Management*, New York: John Wiley & Sons, 1992; Robert S. Kaplan and Robin Cooper, *Cost and Effect: Using Integrated Cost Systems to Drive Profitability and Performance*, Boston, Mass.: Harvard Business Review Press, 1998.

how it works, and what the metrics it yields do. They require personnel representing the relevant institutional activities to work together with personnel from each stakeholder community to build the maps that link outcomes, outputs, and resource inputs; to choose which goals are relevant at each point in a map; and ultimately to pick a suite of metrics that the senior leadership can use to capture the interests of relevant stakeholders and to guide ongoing change in the relationship between operational units and institutional activities. This is how far we have carried these models in this monograph.

To implement and use metrics developed in this way, users must go further to identify relevant existing data sources or develop new ones to generate the values of metrics relevant to the value chains in question. These data sources must be able to update values often enough to support ongoing decisionmaking about the future of the institutional Army—perhaps quarterly, perhaps annually, depending on the nature of the planning process for a specific change.

Developing metrics and maintaining data relevant to them are typically costly enough that the Army will have to be ready to compromise on how close it gets to ideal measures for the metrics it sustains. Data from existing sources are far less costly than data from systems that have to be created simply to support a model of a value chain. Thus, there is a natural preference for choosing metrics that can be constructed with existing systems. That said, those responsible for aligning the operational and institutional parts of the Army should resist standing under the nearest lamppost when looking for a lost key, especially if that is not the most likely place to find it. The discussion above indicates the value of (1) metrics that assess how changes in the institutional Army are likely to affect operational capability, (2) qualitative metrics on stakeholder satisfaction, (3) metrics that require an ability to look much further into the future than many existing planning processes allow today, and (4) metrics on the resources required to produce institutional outputs.

At some point, the Army leadership may conclude that the formal evaluation of value chains is not worthwhile in the absence of better measures for each of these metrics than current Army data allow. It will then have to decide whether a formal evaluation of value chains that

systematically maps the relationships of operational outcomes, institutional outputs, and resource inputs to the institutional Army is worth the cost of developing the data needed to clarify these relationships. If the leadership decides it is not worth the cost, it will have to find an effective way to align the operational and institutional parts of the Army without understanding these relationships.

General Resistance to Change. Every significant organizational change provokes resistance. Organizations seek, first and foremost, to preserve themselves, so such resistance is to be expected. The Army should expect particular forms of resistance to formal evaluation of value chains. Because it highlights differences in perspectives and promotes metrics designed to induce institutional activities to orient themselves in new ways, it is bound to raise concerns among those who will be asked to operate with new goals. Because it focuses specifically on what the leadership expects of institutional activities, it will draw fire from those without the patience to wait for institutional activities to work out the details of how to respond. Leaders who prefer to reorganize the institutional Army without first explaining what benefits will flow from reorganization or why more targeted changes to individual processes are preferable are likely to find an approach that focuses on operational results alien to their customary thinking.

Perhaps most of all, many operators and experienced personnel in institutional activities are likely to object to the many questions raised during the formal evaluation of value chains about that which the Army has taken for granted for many years and that is, in effect, left to the judgment of experienced leaders expected to act in the best interests of the Army. We have found that, by pointing out the many gaps in knowledge about important elements of the relationship of specific institutional activities to operational priorities, the formal evaluation of value chains can be disturbing to personnel who find the sight of these gaps troubling. The Army has effectively managed the relationship between operational priorities and institutional capabilities for many years despite these gaps because experienced, dedicated personnel have, in effect, filled in the gaps and gotten the job done. Because a formal model of a value chain asks implicitly how the personnel responsible will negotiate these gaps in the future, it can raise questions that Army

personnel never thought they would have to answer in the past. From this perspective, the potential power of the formal evaluation of value chains can generate resistance to it.

Summary

As these points indicate, formal evaluation of value chains is demanding. The Army may conclude that it is too demanding to undertake. The alternative is likely to be a course of action that relies less on explicit information and more on professional judgment. The challenge to finding success with such an alternative approach is in finding a way to alter existing professional judgment about the institutional Army to reflect the new operating force. Without something like the information discussed above, it will be impossible to determine empirically whether such improved professional judgment actually uses the resources available to the institutional Army to improve the Army's operational performance.

Bottom Line: Will the Senior Leadership Invest and Stay the Course?

Formal evaluation of value chains is an investment in the future of the Army. As we have described it here, it seeks to use goals for future operational capability to drive investment in change to institutional activities that is compatible with those goals. The Army can start such an effort immediately, but its full implementation will take time. It has taken the Army decades to understand in fine detail the relationships within the operating force. It will take time to achieve a similar understanding of relationships within the institutional Army and between it and operational capabilities. It will take willpower to forgo the temptation to harvest the institutional Army's resources to sustain an operating force currently stretched too thin. The Army cannot wait for such information, but it can expect to adjust its approach repeatedly as it refines its understanding of these new relationships. And investments themselves take time to realize significant change.

During a war, when the Army leadership's priorities explicitly favor the present over the future of the Army, how much of its own attention can the leadership give to such a longer-term effort? During a time when resources of all kinds are stretched thin, how many dollars and military personnel can the leadership commit to the investment process to realize meaningful and effective change? As the members of the senior leadership turn over in their normal cycle of rotations, can new leaders carry on the priorities of those leaving and see investments in change through to their successful conclusion? The effectiveness of the formal evaluation of value chains in terms of the Army's efforts to realign its operational and institutional elements hangs directly on the answers to these questions. Unless it can make a long-term commitment to answering the kinds of questions about operational priorities and institutional capabilities raised by the formal evaluation of value chains, the leadership could find that the Army simply cannot fundamentally realign its operational and institutional elements: It can't get there from here.

Relevant Aspects of Emerging Changes in the Operating Force

Although this document focuses on the institutional Army, the issues we address nearly all flow from anticipated changes in the operating force. This appendix briefly reviews some specific operational changes that are relevant to discussions in the text. This appendix first discusses the Army's planned conversion to a modular, brigade-focused force. It then addresses broader shifts in the nature of the force and their implications for Army manpower, personnel, and training policy.

Modular Brigade Combat Teams

In fall 2003, the CSA determined that a need existed for additional brigade-sized force structure alongside greater capability, flexibility, and deployability of that structure. Transformation of the active component's 33 combat brigades to modular brigade combat teams (MBCTs) began in 2004 (with the 3rd Infantry Division). It continued in 2005 with the 4th Infantry and 101st Air Assault Divisions, and is slated for completion in the active component in 2007. Each MBCT will have combat and combat service support (e.g., artillery, intelligence) organic to its own structure, enabling deployment without division and corps-level "slice" elements.

While the Army begins to adapt its current force structure to the demands of a volatile, uncertain national security environment, it continues to maintain a sharp focus on the "old" new environment—that is, the one that led, beginning in October 1999, to a series of

decisions to transform to a future “Objective Force.”¹ The concept of highly mobile, technologically advanced combined arms units based on the Future Combat System—now collectively termed the future force—still remains the centerpiece of the transforming Army. Brigade combat teams (BCTs) and units of employment (UEs), successors to divisional and Joint Task Force structures, will have the capability to conduct joint operational maneuvers from strategic distances, creating havoc for adversaries by arriving at multiple points of entry.²

This force will (1) operate as part of a joint, combined, or inter-agency team; (2) be capable of conducting rapid and decisive offensive, defensive, stability, and support operations; and (3) be able to transition among any of these missions without a loss of momentum. It will simultaneously be lethal and survivable for both warfighting and force protection, responsive and deployable for rapid mission tailoring and the projection required for crisis response, versatile and agile for success across the full spectrum of operations, and sustainable for extended regional engagement and sustained land combat. This force will network fires and maneuver in direct combat; deliver direct and indirect fires; perform intelligence, surveillance, and reconnaissance functions; and transport soldiers and materiel as the means to tactical success.

The Future Force must be able to reach the theater quickly and to immediately conduct simultaneous combined arms and air-ground operations day and night, in open, close, and complex terrain throughout the battle space. Army units conducting these joint and combined operations³ must be able to see first, understand first, act first, and finish decisively at the strategic, operational, and tactical levels of operation.

Future Army forces, then, must be prepared to fight and win on vastly different types of battlefields than were anticipated during the last

¹ Training and Doctrine Command (TRADOC), *The United States Army Future Force Operational and Organizational Plan: Maneuver Unit of Action*, Pamphlet 525-3-90 (Change 3), Unit of Action Maneuver Battle Lab, Fort Knox, Ky., September 15, 2004.

² Formal terminology is always in flux in the Army. Formal usage appears to be moving again, from *UEx* back to *division* and from *UEy* back to *corps*.

³ By definition, joint operations are multiservice, while combined operations include military organizations from other countries. In almost all cases in recent history, U.S. military operations have been both joint and combined.

half of the 20th century. As a result of U.S. military dominance, adversaries will virtually always attempt to preclude U.S. military involvement in their regions, focusing on denying access to airfields, ports, and maritime zones. Hence, future army forces must be designed for rapid entry through unimproved areas and into multiple austere forward airfields and ports simultaneously. Moreover, such forces must be self-sustaining for periods of three to seven days upon arrival. At the tactical level, the enemy will fight and survive through a combination of asymmetric and unconventional tactics—aiming to deny situational understanding, the essence of the force's tactical advantage.

The Army plans to field 14 selected BCTs, fully equipped FCS-based Units of Action, over a period of years out to about 2025. In 2008, the Army will form an initial, experimental FCS-based BCT, the *E-BCT*, to perform experiments and evaluations as required. The evaluation brigade combat team will complete its own conversion to initial operational capability by about 2014 and full operational capability by about 2016.⁴ Thirty-one MBCTs, tentatively, will receive network and FCS developments *without* vehicles. The network includes a new command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) system; a non-line-of-sight launch system that uses this C4ISR system to aim and fire pods of missiles from miles away; so-called “smart” munitions; ground sensors; and unmanned aerial and ground vehicles.⁵

⁴ Future Combat System Transition Team, *Future Combat Systems: System Development and Demonstration Phase Spiral Out Strategy Paper (SOSP)*, St Louis, Mo., January 10, 2005. Initial operational capability is the first attainment of the capability to employ effectively a weapon, item of equipment, or system of approved specific characteristics that is operated by an adequately trained, equipped, and supported military unit or force. Full operational capability is the complete attainment of this capability. Department of Defense, *Integrated Defense Acquisition, Technology, and Logistics Life Cycle*, Washington, D.C.: Office of the Assistant Secretary of Defense for Acquisition, Technology, and Logistics, 2004.

⁵ BG Charles Cartwright, “FCS UAs,” *Army News*, July 24, 2004.

Manpower, Personnel, and Training Implications

Near-term symptoms of force overstress, such as the current recruiting shortfall in all three Army components, can be expected to worsen appreciably over the short term. Over the long term, as the threat environment that the Army plans for continues to evolve, these effects could prove serious. Operations in Iraq today require more than 130,000 soldiers in theater. The Army has more than 15,000 additional soldiers deployed to Afghanistan. Current troop strengths cannot sustain the already-strained current operating tempo over the long term and are not expected to suffice for these kinds of commitments over the long term, even if supplemented by “stop loss” and reserve component call-ups.

One response could be an increase in the Army’s active military end-strength. Army end-strength is expected to climb to a temporarily authorized 512,000 by the end of FY 2006, as the Army grows active-component brigade structure from 33 to 43 combat brigades by FY 2007. This also suggests, though, that a larger force over the near term may well become a practical necessity. Depending on how the threat environment changes over the next few years, the current plan to increase the end-strength by 30,000 (temporarily) could become permanent. But the question of whether or not the Army can procure that additional strength, let alone maintain it, is not easy to answer.

Whether active military end-strength changes permanently or not, the Army will require more light infantry to root out dispersed, competent enemy fighters. Even as precision strike becomes more deadly, it drives adversaries into increasingly complex terrain, where they can make ample use of cover and concealment. This posture demands a higher proportion of dismounted strength to conduct “close quarters” fighting.⁶ Persistent stability and support operations (SASO) missions are also manpower-intensive. The Army National Guard is converting about one-third of its heavy brigades to mobile light forces. These light forces will be better suited to the range of missions expected under the

⁶ Stephen Biddle, *Afghanistan and the Future of Warfare: Implications for Army and Defense Policy*, Carlisle, Pa.: Strategic Studies Institute, U.S. Army War College, 2002.

new strategy, from posthostilities management to critical infrastructure protection and consequence management.

The active component will also require more combat support and combat service support structure to support the SASO mission. Medical, civil affairs, construction, military police, language, supply, and related functions will be as critical to the management of post-hostilities periods as the infantry and precision strike are to the opening phases of war. Reductions in force structure for artillery, combat engineering, and some other military activities should help the Army accommodate some of this increase within fixed military end-strength constraints. Special operations missions (e.g., conducting raids, rapidly seizing enemy encampments, neutralizing enemy command-and-control capabilities [and leadership], and destroying enemy weapons of mass destruction capability on the ground before it can be used or deployed to other state and non-state actors) will also grow. Either some of these missions will have to be transferred to conventional light infantry units, or the size of Army Special Forces must be increased.⁷

Army changes that will flow from these developments will increase manpower and training requirements significantly until the Army's new force structure is fully in place. To facilitate Army transformation in the context of the broader national security environment surrounding it, military personnel management will have to change in many ways. The future needs environment for military personnel includes the following:

- mastery of complex skills and the technical expertise that will be increasingly necessary for success, at all grades and experience levels: This involves both using *technologies* effectively and dealing with an increasingly complex *operating environment*, to include sophisticated joint operations
- increased breadth of skills: for example, being able to conduct traditional direct-fire fights, as well as network-centric engagements

⁷ Thomas L. McNaugher and Bruce R. Nardulli, "The Army: Toward the Objective Force," in Hans Binnendijk, ed., *Transforming America's Military*, Washington, D.C.: National Defense University Press, 2002, p. 122.

with full FCS technologies, and being able to conduct SASO and other operations in the current operating environment, as well as possess mastery of joint operations and an ability to move smoothly and effectively between the joint force and the Army operational force

- increased cultural awareness and language skills in areas of the world where the Army is most likely to be employed, including the Middle East, Central Asia, Indonesia, and East Asia
- rapid acquisition of relevant skills, both individual and collective, manual to complex cognitive in character
- potentially, significantly more soldiers with these skills, fielded in a relatively short time period (that is, between determination of the need and emplacement of those personnel in operational billets).

Such broad changes in strategic and operational concepts could also induce broad changes in organizational structures, processes, and procedures.⁸ The strategic human resource policies and analyses that the Army uses to accommodate these changes should (1) service realistic, value-added structural alternatives in a timely way, and (2) provide effective approaches to leadership and managerial succession, both of which must be carefully, thoroughly integrated with strategic organizational direction.⁹

⁸ Alfred D. Chandler, Jr., *Strategy and Structure*, Cambridge, Mass.: M.I.T. Press, 1962.

⁹ Elmer Burack, *Creative Human Resource Planning and Applications: A Strategic Approach*, Englewood Cliffs, N.J.: Prentice-Hall, 1988, p. 506.

Simple Three-Sector Input-Output Model of the Army

This appendix provides additional information about the input-output model underlying the material presented in Figure 2.2 and Table 2.4. It describes the exact mathematical structure of the model and the constraints reflected in the model. It explains the mathematics of the Cobb-Douglas implementation, demonstrating the analytic simplicity of this approach, and the derivation of the parameter values used in the Cobb-Douglas implementation. Finally, it places the Cobb-Douglas-based results in a broader context by reporting the results of a variety of excursions from the Cobb-Douglas implementation designed to deal with concerns that the Cobb-Douglas assumptions are unrealistic.

The Structure of the Model

Total Army effectiveness, E , depends on the levels of output for n activities, x_i :

$$E = E(x_1, \dots, x_n). \quad (\text{B.1})$$

The Army produces x_i by using military billets, m_i ; DA civilian billets, c_i ; and other resources, z_i , in production functions, f_i :

$$x_i = f_i(m_i, c_i, z_i). \quad (\text{B.2})$$

The Army seeks to maximize its total effectiveness subject to three stylized constraints.

1. In the constraint on money,

$$\sum_i [p_m m_i + p_c c_i + p_z z_i] \leq B, \quad (\text{B.3})$$

p_m is the unit cost of military labor, p_c is the unit cost of DA civilian labor, p_z is the unit cost of other resources, and B is the Army's annual dollar budget. The model does not specify a time dimension or any structure to flows of money over time. For simplicity, the model treats these unit costs as annualized versions of the life-cycle costs of the billets in question. z_i comprises all "other resources," including weapon systems, contract services, information services, inventories, and so on. The Army is free to move resources across budget categories like military personnel, O&M, procurement, and so on. Narrower fences would be relevant to a short-term analysis; this formulation envisions a longer-term focus of at least a few years.

2. The military manpower end-strength constraint,

$$\sum_i m_i \leq M, \quad (\text{B.4})$$

applies to the whole military force. Constraints also apply to the active, reserve, and National Guard components, and to specific grade levels. We do not address these in this simple optimization.

3. The constraint on rotation forces military billets into institutional activities to preserve spaces in the United States for soldiers overseas to return to. This constraint states that

$$(s_{rot} - s_{afgm}) \sum_{i \in TOE} m_i \leq \sum_{i \in TDA} m_i, \quad (\text{B.5})$$

where s_{rot} is the fraction of time that rotation policy requires Army personnel to spend in the United States and s_{afgm} is the fraction of time that the Army Force Generation Model places Army personnel in operational units in the United States to reset and train. This constraint says basically that the institu-

tional (*TDA*) Army must retain billets for personnel who will deploy but who are not currently in operational (*TOE*) units in the United States. In fact, such a constraint is likely to be more relevant to individual functions in the Army than to the force as a whole. We apply it Army-wide for simplicity in this model and discuss later how the results of the model would change if we applied more realistic constraints. We also explain later how career management policies that use junior billets to build senior billets could impose similar constraints, with similar implications.

In this stylized model, the Army's problem is

$$\max_{m_i, c_i, z_i} E - \beta \left[\sum_i (p_m m_i + p_c c_i + p_z z_i) - Y \right] - \mu \left[\sum_i m_i - M \right] - \rho \left[(s_{rot} - s_{afgm}) \sum_{i \in TOE} m_i - \sum_{i \in TDA} m_i \right], \quad (\text{B.6})$$

where β , μ , and ρ are Lagrange multipliers for the budget, military end-strength, and rotation constraints, respectively. At the optimum defined by Equation B.6, the following first-order conditions apply:

$$\begin{aligned} \left(\frac{\partial E}{\partial x_i} \right) \left(\frac{\partial x}{\partial m_i} \right) &= \beta p_m + \mu + \rho (s_{rot} - s_{afgm}), \quad i \in TOE \\ \left(\frac{\partial E}{\partial x_i} \right) \left(\frac{\partial x}{\partial m_i} \right) &= \beta p_m + \mu - \rho, \quad i \in TDA \\ \left(\frac{\partial E}{\partial x_i} \right) \left(\frac{\partial x}{\partial c_i} \right) &= \beta p_c \\ \left(\frac{\partial E}{\partial x_i} \right) \left(\frac{\partial x}{\partial z_i} \right) &= \beta p_z. \end{aligned} \quad (\text{B.7})$$

Our policy analysis task is the following: (1) specify what the effectiveness and activity relationships above look like; (2) use these specifications with the first-order conditional above to choose opti-

mal pre-shift and post-shift allocations; and (3) compare these optimal allocations to determine how a shift in priorities toward current operational activities would affect the Army's use of resources, including military and DA civilian billets, in various activities.

A Cobb-Douglas Implementation

We chose Cobb-Douglas versions of the relationships above for their clarity and transparency. A Cobb-Douglas version of Equation B.1 that captures the key elements of the model above is

$$\ln E = k_E + a_O \ln x_O + a_S \ln x_S + a_I \ln x_I, \quad (\text{B.8})$$

where k_E is a constant, x_O is the level of output of operational activities, x_S is the level of output of directly supporting institutional activities, x_I is the level of output of other institutional activities, and a_I is the relative emphasis that the Army places on the output of the i th activity, assuming that the a_I sum to unity ensures that a proportional increase in all inputs yields the same proportional effect on total effectiveness.

A Cobb-Douglas version of Equation B.2 relevant to the model above is

$$\ln x_i = k_i + b_m \ln m_i + b_c \ln c_i + b_z \ln z_i, \quad (\text{B.9})$$

where k_i is a constant, m_i is the level of military labor input that the Army uses to produce x_i , c_i is the level of DA civilian labor input that the Army uses to produce x_i , z_i is the level of other resource inputs that the Army uses to produce x_i , and b_j is a technological factor that reflects x_j 's share in the total real costs of producing x_i , assuming that the b_j sum to unity ensures that a proportional increase in all inputs yields the same proportional effect on activity output (constant returns to scale).

Differentiating Equations B.8 and B.9 yields

$$\begin{aligned} \frac{\partial E}{\partial x_i} &= \frac{a_i E}{x_i} \\ \frac{\partial x_i}{\partial q_i} &= \frac{(b_j x_i)}{q_{ij}}, \text{ where } q_{ij} \text{ is the level of the } j\text{th input to the } i\text{th activity,} \\ \left(\frac{\partial E}{\partial x_i} \right) \left(\frac{\partial x_i}{\partial q_{ij}} \right) &= \frac{(a_i b_j E)}{q_{ij}}. \end{aligned} \quad (\text{B.10})$$

Substituting Equation B.10 into Equation B.7 yields the following demand functions for the model above:

$$\begin{aligned} m_i &= \frac{a_i b_m E}{\beta p_m + \mu + \rho(s_{rot} - s_{afgm})}, i \in TOE \\ m_i &= \frac{a_i b_m E}{\beta p_m + \mu - \rho}, i \in TDA \\ c_i &= \frac{a_i b_c E}{\beta p_c} \\ z_i &= \frac{a_i b_z E}{\beta p_z}. \end{aligned} \quad (\text{B.11})$$

Multiplying each equation within Equation B.11 by the appropriate denominator on the right and summing across activities yields

$$\begin{aligned} E &= \beta \sum_i [p_m m_i + p_c c_i + p_z z_i] + \mu M \\ &+ \rho \left[\sum_{i \in TOE} m_i (s_{rot} - s_{afgm}) - \sum_{i \in TDA} m_i \right]. \end{aligned} \quad (\text{B.12})$$

Using Equation B.3, the first term can be interpreted as βB whenever the budget constraint binds. In our model, it always binds. The third term reflects the rotation constraint. When it does not bind, $\rho = 0$; when it does, the expression in brackets equals zero. So, Equa-

tion B.12 reduces to $E = \beta B + \mu M^*$, where M^* defines a binding military end-strength constraint. We can then reexpress Equation B.11 as

$$\begin{aligned}
 m_i &= \frac{a_i b_m \left(B + \frac{\mu}{\beta} M^* \right)}{p_m + \frac{\mu}{\beta} + \frac{\rho}{\beta} (s_{rot} - s_{afgm})}, i \in TOE \\
 m_i &= \frac{a_i b_m \left(B + \frac{\mu}{\beta} M^* \right)}{p_m + \frac{\mu}{\beta} - \frac{\rho}{\beta}}, i \in TDA \\
 c_i &= \frac{a_i b_c \left(B + \frac{\mu}{\beta} M^* \right)}{p_c} \\
 z_i &= \frac{a_i b_z \left(B + \frac{\mu}{\beta} M^* \right)}{p_z}.
 \end{aligned} \tag{B.13}$$

These look like traditional Cobb-Douglas demand functions in which $B + (\mu/\beta)M^*$ measures income and the expression in the denominator in each equation measures own price. The terms in the denominator in each equation measure the real resource cost of an input to the Army. Viewed in this way, these Cobb-Douglas demand functions hold constant the real cost of an input to the Army as a fraction of total real cost to the Army, measured by $B + (\mu/\beta)M^*$. This total real cost to the Army measures all inputs at their budget accounting costs, p_i , unless $\mu > 0$. If $\mu > 0$, it uses budget accounting costs, p_i , to measure the real cost to the Army of all inputs but military manpower and the internal opportunity of a military billet, $p_m + (\mu/\beta)$, to measure the real cost to the Army of military billets.

The results in Table 2.4 in Chapter Two and Table B.2 in this appendix are the product of plugging appropriate assumptions about a_i , b_j , s_{rot} , s_{dfgm} , and M^* into Equations B.8, B.9, and B.13, and solving for values of μ/β , ρ/β , m_i , c_i , z_i , and E . Values of a_i in particular reflect the Army's relative priorities on activities. The model introduces the Army's shift in priorities by increasing a_O and a_S proportionally and reducing a_i to ensure that the p_i , always sum to unity.

Parameter Values Used

We chose the parameter values to be consistent with the FY 2005 Army appropriations reported in the FY 2005 Presidential Budget submission. The Army does not maintain data in the exact form we needed to choose parameter values. Thus, we drew relevant data from a number of sources and triangulated parameter values that were consistent with all these sources. These sources were located in two places:

- Assistant Secretary of the Army for Financial Management and Comptroller, "FY06 President's Budget Highlights," February 2005, and data from "Display O-1A for the Active, Reserve and National Guard" in Headquarters, Department of the Army, *FY 2006/2007 President's Budget Submission*, February 2005.
- August 2003 allocations of personnel requirements in the generating force used in Total Army Analysis-11.

The most difficult challenge in choosing parameter values came when splitting operations and maintenance dollars between expenditures on government civilians and other things. As part of this exercise, we estimated the per-billet cost implied by our budget allocations and verified that they were consistent with the types of civilian labor used in different institutional activities. We compared our treatment of civilian personnel with Nancy Moore's treatment in her ongoing spend analysis of where Army dollars go each year to verify that our approaches and estimates were compatible with one another. This effort revealed differences in assumptions our sources made about the status of Army

resources associated with medical services. We ultimately adjusted information from our sources to include only dollars and personnel associated with medical services that are included in the Army's budget and not those included in the Defense Health Program budget.

These efforts yielded the budget allocations and resulting parameter values shown in Table B.1. To choose changes in the a_i to reflect a shift in priorities toward the current operating force, we sought to shift about \$2.5 billion to the operating force in the presence of all effective constraints. So the post-change a_i reflect the values that induce this change in spending in the operational force. In the implementations discussed here, we assumed that the rotation constraint in Equation B.5 did not bind, i.e., $\rho/\beta = 0$ in all results reported below.

Simulation Results

In the initial simulation, we used the Cobb-Douglas implementation described above with the parameter values indicated. The results are

Table B.1
Expenditures and Parameter Values Based on FY 2005 Appropriations
(expenditures in millions of FY 2005 dollars)

Input	Operational Activities	Supporting Institutional Activities	Other Institutional Activities	Total
Military	30,847	4,491.5	3,610.5	38,949
b_m	0.746	0.203	0.099	0.390
DA civilians	783.5	5610.1	5967.2	12,360.6
b_c	0.019	0.254	0.163	0.124
z-input	9,730.2	12,024.6	26,931.8	48,686.6
b_z	0.235	0.544	0.738	0.487
Total	41,360.7	22,126.2	36,509.5	99,996.4
a_j	0.414	0.221	0.365	1.000

discussed in this appendix and displayed in Table B.2. As noted above, a Cobb-Douglas formulation offers the simplicity of a closed analytic solution that does not require complex mathematical programming. But a discussion of the results makes it clear that sensitivity analysis of the Cobb-Douglas assumptions would help clarify our findings.¹

The standard way to do this would be to use transcendental-logarithmic (translog) utility and production functions to implement the model described in Equation B.7.² This would allow us to vary the degree of substitutability between input pairs in each sector. A Cobb-Douglas implementation is a special case of a translog implementation in which all pair-wise “partial elasticities of substitution” are equal to one another and equal to one. In fact, partial elasticities of substitution can vary in value from zero, where two inputs must be used in “fixed proportions” and one simply cannot be substituted for the other, to infinity, where two inputs cannot be distinguished from one another and so are “perfect substitutes” for one another.

Among those with whom we discussed the Cobb-Douglas findings, there was a strong expectation that elasticities of substitution, especially those relevant to military labor, were likely to be (1) lower than we had assumed in the current operational sector and (2) higher than we had assumed in the institutional sectors. In a translog setting, we could adjust relevant elasticity values and test the sensitivity of our findings to these changes, but there is no simple, closed analytic way to implement a translog approach. We could not justify the cost of developing the mathematical programs required to do this in support of one small task in a larger project. Such analysis is well worth pursuing in the future.

¹ Carl Dahlman, Susan Gates, Victoria Greenfield, Mike Hix, Al Robbert, and Bernie Rostker were especially helpful in this phase of the analysis.

² Laurits Christensen, Dale W. Jorgenson, and Lawrence J. Lau, “Transcendental Logarithmic Production Frontiers,” *Review of Economics and Statistics*, Vol. 55, No. 1, February 1972, pp. 28–45; Laurits Christensen, Dale W. Jorgenson, and Lawrence J. Lau, “Transcendental Logarithmic Utility Functions,” *American Economic Review*, Vol. 65, No. 3, June 1975, pp. 367–383.

Instead, we ran a variety of excursions that, without complex optimization methods, might shed light on the concerns voiced above about substitutability. We report the results of four of them here. The excursions reflect specific concerns about the Cobb-Douglas assumption that we heard in our discussions and that we could address without complex mathematical programming. The results reported here capture the qualitative nature of the findings for all excursions pursued.

Table B.2 summarizes the assumptions made in these four cases and the results for each one. In brief,

- *Case 1* is the Cobb-Douglas (C-D) case discussed in the text.
- *Case 2* continues the assumption of Cobb-Douglas substitution with one important exception. It allows perfect substitution (infinite elasticity of substitution) between military and government civilian labor in the two institutional sectors. This polar assumption effectively reflects a belief that labor is labor in institutional activities and the only thing that distinguishes military and civilian labor is the cost per effective hour of work. The Army should prefer whichever is cheaper in all institutional activities.
- *Case 3* returns to a Cobb-Douglas assumption for institutional activities but now assumes that fixed proportions (zero elasticity of substitution) prevail in the current operational sector. This polar assumption implies that operational activities must use inputs in the exact, fixed proportions specified in doctrine, allowing no effective substitution of one input for another. If a government civilian replaced a soldier in any task, for example, effectiveness would fall as much as it would if we simply removed one soldier.
- *Case 4* continues the assumption of fixed proportions in the current operational sector. It returns to an assumption of perfect substitutability between military and civilian labor in the institutional sectors with one important caveat: It maintains a military core in the institutional sectors to reflect the importance of headquarters and other military-essential activities in this sector. If civilian labor is more costly than military labor, the Army will use military labor as the only labor input in the institutional sectors. If military labor is more costly than civilian labor, the Army

will use military labor only in the core military activities in the institutional Army. Case 4 assumes that the Army can replace up to a third of the military billets in the institutional sectors with civilians.

All these sets of assumptions are highly stylized, as they must be in a model of this kind. If we had to predict, we believe that more detailed mathematical programming models using translog functions

Table B.2
Effects of Shifting Priority Toward the Operating Force (\$ billions)

Column	1	2	3	4	5	6
Pre- or post-shift	Pre-shift	Post-shift excursions				
Binding constraints	Budget	Budget	Budget and military end-strength			
Case	All cases	All cases	Case 1	Case 2	Case 3	Case 4
μ/β	0	0	0.1896	0	0.3000	0.1394
Current operations						
Substitution	all	all	C-D	C-D	fixed	fixed
Military	30.88	35.36	31.92	35.36	32.27	33.77
DA civilian	0.79	0.90	0.97	0.90	0.82	0.86
Other resources	9.73	11.14	11.96	11.14	10.17	10.64
Sector budget	41.40	47.40	44.85	47.40	43.26	45.27
Direct support						
Substitution	all	all	C-D	perfect	C-D	perfect
Military	4.49	5.14	4.64	2.38	4.41	3.43
DA civilian	5.61	6.43	6.91	9.19	7.18	8.77
Other resources	12.02	13.76	14.78	13.76	15.37	14.51
Sector budget	22.12	25.33	26.33	25.33	26.96	26.71

Table B.2—Continued

Column	1	2	3	4	5	6
Rest of Institutional Army						
Substitution	all	all	C-D	perfect	C-D	perfect with core
Military	3.61	2.70	2.44	1.25	2.32	1.80
DA civilian	5.95	4.45	4.78	5.90	4.97	5.74
Other resources	26.94	20.15	21.64	20.15	22.51	21.25
Sector budget	36.50	27.30	28.86	27.30	29.80	28.79
Total Army						
Total Army budget	100.00	100.00	100.00	100.00	100.00	100.00

NOTE: Budget allocation in column 1 is based on FY 2005 appropriations data for the Army in Headquarters, Department of the Army (2005, Display O-1A and related materials). A shift in priorities is designed to induce a change that, subject to constraints, will shift \$2.5 billion a year from the institutional to the operational Army. Military end-strength constraint binds at any total Army demand for military manpower above that shown in column 2.

would yield outcomes that lie between those for cases 1 and 4 in this analysis. This is addressed further at the end of this appendix. First, we review quickly the results reported in Table B.2.

Note that all four cases have a common pre-change baseline. This must be understood in specific terms. We chose the pre-change baseline to reflect something close to the Army's current allocation of resources across sectors and available resources. But where perfect substitution exists between military and civilian labor in the institutional sectors, any specific allocation of labor between them is arbitrary as long as the real cost of military and civilian labor is the same. Their real cost is the same in the pre-change baseline because the only binding constraint is on dollars.³

More curiously, despite the extreme range of assumptions about substitution, when only the budgetary constraint binds, the post-

³ To understand this, see the prior discussion of Equation B.13.

change outcome is also the same for all four cases. This is true because, as long as the military end-strength constraint does not bind, the relative real costs of all inputs remain the same. Scale effects account for all changes and, because all cases treat scale effects in the same way—for any set of relative input prices, they allow movement along the same expansion paths in each sector—no substitution occurs and variations in the degree of substitutability among inputs are irrelevant.

We chose a military end-strength constraint that would bind if the shift in priorities increased Army demand for military labor. Because of the scale effects of a shift from the other institutional sector to the current operational and direct-support sectors, and because the growing sectors use military labor more intensely than the shrinking sector, the Army's total demand for military labor must grow. We discuss most of the implications for case 1 in the text. We add here only that, when the Army's total demand for military labor rises relative to its end-strength constraint, the shadow price of military labor rises above its market cost—the dollar budget cost of military personnel.⁴ In case 1, the shadow price is 19 percent higher than the market cost. This induces the systematic drop in military labor intensity observed in all three sectors. The remainder of this appendix compares the outcomes of cases 2 through 4 with those of case 1.

In case 2, the Army institutional activities treat military and civilian labor as perfect substitutes. So, if the shadow price of military labor ever rises, these sectors will shift to using civilians. Because substitution is so easy in case 2, it continues until the Army's total demand for military labor falls below the end-strength constraint. The constraint no longer binds; unlike in case 1, the shadow prices of military and civilian labor remain the same here. This can occur if demand for military labor falls by 54 percent in both institutional sectors.⁵ This is seen

⁴ In this model, the market price of all inputs is set at unity. Thus, the shadow price of military labor is $1 + \mu/\beta$. In effect, the shadow price in any case is $\mu/\beta * 100$ percent higher than the dollar budget cost of military manpower. Table B.2 displays the calculated value of μ/β for each case.

⁵ This assumes that two institutional sectors cut their use of military labor back proportionally to accommodate a military end-strength constraint of $M^* = 39 : 3.63 / (5.14 + 2.70) = 0.4360$; military labor falls 54 percent in both sectors.

in Table B.2. But again, when military and civilian labor are perfect substitutes and they are equally costly, only the total demand for both can be calculated exactly; the split between them need only ensure that the military end-strength constraint does not bind.

In case 3, with fixed proportions in the current operational sector, the demand functions for inputs become:

$$\begin{aligned}
 m_o &= \frac{a_o b_{mO} \left(B + \frac{\mu}{\beta} M^* \right)}{\left(1 + \frac{\mu}{\beta} \right) b_{mO} + (1 - b_{mO})} \\
 c_o &= \frac{a_o b_{cO} \left(B + \frac{\mu}{\beta} M^* \right)}{\left(1 + \frac{\mu}{\beta} \right) b_{mO} + (1 - b_{mO})} \\
 z_o &= \frac{a_o b_{zO} \left(B + \frac{\mu}{\beta} M^* \right)}{\left(1 + \frac{\mu}{\beta} \right) b_{mO} + (1 - b_{mO})}.
 \end{aligned} \tag{B.14}$$

Other demand functions remain the same. Relative to Case 1, the Army can no longer substitute away from military labor as the shift toward current operations raises the shadow price of military labor. Relative to Case 1, the shadow price of military labor rises from 19 percent above budget dollar costs to 30 percent above budget dollar costs. This has two effects in the operational sector. First, it forces the Army to rely more heavily on military labor than it did in Case 1 and less on government civilians and other inputs. Second, it discourages the Army from pushing resources into the operational sector. Army retains more resources in the institutional sectors and substitutes freely from military labor to other inputs in these sectors. But opportunities to substitute are not large enough, as they were in case 2, to hold down the shadow price of military labor.

Case 4 is a kind of hybrid of cases 2 and 3. The demand functions shown in Equation B.14 remain in place, continuing to restrict the Army's ability to expand operational capability or to use inputs other than military labor in current operations. Large substitution opportunities in the institutional sectors provide opportunities to replace up to a third of military labor used there with civilian labor and ease the pressure on the shadow price of military labor. In this case, the Army takes full advantage of all substitution opportunities in the institutional sectors. This holds down the shadow price of military labor, but does not drive it to zero as in case 2. The shadow price settles at 14 percent above budget dollar costs, a bit below its level in case 1, but still substantially different from market labor rates.

Table B.3 summarizes the material in Table B.2 for the four cases in which the military end-strength constraint can bind. Note how much the results vary across cases. More realistic information about substitution opportunities in various sectors would be helpful. Agreement across cases is much closer on sectoral allocation than on allocation to specific inputs, as we would expect when the only variation across cases derives from differences in substitution opportunities. It is striking that substitution opportunities can affect allocation across sectors as much as they do. Understanding these substitution opportunities is clearly important to understanding how aggressively the Army can push resources to current operations.

It seems reasonable to expect that actual substitution opportunities lie somewhere between the levels suggested by cases 1 and 4. That is, in current operations, it is surely true that proportions are not fixed except within the shortest planning horizon. But the importance of military-essential skills is likely to limit substitution more than the Cobb-Douglas assumptions would suggest. Similarly, it is certainly not realistic to believe that a small shift in the relative real costs of military and civilian labor would induce massive military-to-civilian conversions, even over the long run, as implied by an assumption of perfect substitutability. On the other hand, it is probably true that military and civilian labor are very nearly perfect substitutes in many commercial-type activities in which military training and responsibilities are of limited importance. This could suggest

that the Cobb-Douglas assumption is too conservative for long-run projects—certainly over important ranges of institutional activities.

Table B.3
Changes in Budget Allocation from Pre-Shift Baseline

	Case 1	Case 2	Case 3	Case 4
μ/β	0.1896	0	0.3000	0.1394
Current Operations				
Substitution	C-D	C-D	fixed	fixed
Military	0.034	0.145	0.045	0.094
DA civilian	0.229	0.145	0.045	0.094
Other resources	0.229	0.145	0.045	0.094
Sector budget	0.083	0.145	0.045	0.094
Direct Support				
Substitution	C-D	perfect	C-D	perfect
Military	0.034	-0.470	-0.018	-0.236
DA civilian	0.232	0.638	0.280	0.563
Other resources	0.230	0.145	0.279	0.207
Sector budget	0.190	0.145	0.219	0.208
Rest of Institutional Army				
Substitution	C-D	perfect	C-D	perfect with core
Military	-0.324	-0.654	-0.357	-0.501
DA civilian	-0.197	-0.008	-0.165	-0.035
Other resources	-0.197	-0.252	-0.164	-0.211
Sector budget	-0.209	-0.252	-0.184	-0.211

SOURCE: Calculated from data presented in Table B.2.

That said, the military services can currently identify only 3 percent of their military billets that are even suitable for potential conversion to civilian billets.⁶

About a fifth of active Army personnel work in institutional activities. To the extent that the Army is typical, this suggests that substitution can be considered only in 15 percent of the billets in institutional activities. These numbers suggest that even Cobb-Douglas assumptions overstate the opportunities for substitution in institutional activities.

Better answers await more detailed analysis.

⁶ Samuel D. Kleinman, "Military-to-Civilian Conversion and Other Religious Experiences: The Basis for the Belief," briefing, Center for Naval Analyses, presented at the Office of the Under Secretary of Defense for Personnel and Readiness, *Conference on Military-to-Civilian Conversion: Creating a Defense-Wide Strategy*, Arlington, Va., September 19, 2005.

Major Objectives of the Army Campaign Plan Relevant to the Institutional Army

Table C.1 presents the major objectives of the Army Campaign Plan, with their supported commanders or staff principals, and relates them to key Title 10 responsibilities and institutional activities.¹ The first column provides a reference number for each major objective, which is tied to one of the eight campaign objectives. The next column draws heavily on the language in the plan to describe each one. The third column, “Supported Principal,” lists the supported commands and/or HQDA staff principals responsible for each objective.

The column labeled “Effect in IA” indicates how each major objective might affect institutional activities. Each cell can contain up to four letters. These letters, and their respective placement, signify the following:

- O (first space): changes in local objectives and priorities within an institutional activity
- P (second space): changes in practices and procedures
- P (third space): changes in processes
- O (fourth space): changes in organization.

¹ The findings presented here were derived using the original coordinating draft of the Army Campaign Plan, which was not released to the general public. A publicly available version of the material referenced here is in Headquarters, Department of the Army, *Army Strategic Planning Guidance*, last updated June 26, 2006, Annex C. All information cited here has been approved for release to the general public.

If the objective is likely to induce a change in an institutional activity, the letter is listed in its respective place; if not, a dash is substituted. If no letter appears, the institutional Army is effectively irrelevant to the stated major objective.

The column labeled “Primary Title 10 Functions” indicates, for objectives that are relevant to the institutional Army, the dominant Title 10 function relevant to the major objective. Any function other than the 12 familiar ones listed in 10 U.S.C. 3013(b) appears in parentheses.

The column labeled “Primary Activities” indicates, for objectives that are relevant to the institutional Army, the dominant substantive activity relevant to the major objective.

The column labeled “Purpose” indicates whether the primary purpose of a major objective that is relevant to the institutional Army is to improve

- direct institutional support for a currently deployed force (D),
- institutional creation and sustainment of the future force (F), or
- jointness (J).

The column labeled “Focus” indicates whether the Army Campaign Plan explicitly frames a major objective that is relevant to the institutional Army in terms of

- improving the performance of the operating force (O),
- improving the performance or cost of the institutional Army (I),
or
- implementing a new program or policy (P).

Table C.1 is based on the text of the Army Campaign Plan.² A more detailed understanding of Army plans underlying this text could suggest a very different focus. Alternatively, a careful assessment of each objective could suggest the desirability of a different focus to achieve the broader goals of the Army Campaign Plan.

² Headquarters, Department of the Army (2006).

**Table C.1
Major Objectives of the Army Campaign Plan Relevant to the Institutional Army**

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
Support Global Operations							
1-1	Reorganize active and reserve component operating forces into modular UEs, units of action (UAs), and support units of action (SUAs).	Commanding general (CG)–ASCC	----				
1-2	Develop plan to use temporary 30,000 active component strength increase to enable active component modular conversion.	G-3	O---				
1-3	Activate 10 additional active component BCT UAs no later than 2006. Begin planning to activate up to five additional active component BCT (UAs) no later than 2007.	FORSCOM, U.S. Army Pacific (USARPAC)	----				
1-4	Reorganize Army aviation into modular theater, UEs, and multifunctional aviation brigade UAs no later than 2008.	CG-ASCC	O---				
1-5	Rebalance active and reserve component force structure to reduce or eliminate high-demand/low-density units.	G-3	----				

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
1-6	Provide organized, trained, and equipped forces in support of RCC theater-strategic and operational requirements (Operations Iraqi Freedom and Enduring Freedom, Stabilization Force, International Security Force, homeland defense).	CG-ASCC	----				
1-7	Provide organized, trained, and equipped forces in support of RCC forward presence requirements.	CG-ASCC	----				
1-8	Provide organized, trained, and equipped forces in support of RCC theater security cooperation requirements.	CG-ASCC	----				
1-9	Provide initial operational tests of Army prepositioned stocks and Army Regional Flotilla to increase the responsiveness of Army forces.	CG-ASCC, CG-AMC	O---				
1-10	Sustain operational-level headquarters staffing.	G-3	----				
1-11	Sustain the Rapid Fielding Initiative initial operational test equip soldiers properly for full-spectrum operations.	G-8	OPP-	equip	R&D, science and technology; weapon design, procurement	D	O

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
1-12	Establish intelligence overwatch for deploying units and revise MOS and region-specific training and related programs to reduce intelligence-preparation time.	G-2	OPP-	Intelligence (3013(c)(7)), training	Intelligence, training	D	P I
1-13	Develop and implement embedded theater-specific red team capabilities to support full-spectrum operations.	G-2	----				
Adapt and Improve Total Army Capabilities							
2-1	Resource conversion of active and reserve component operating forces into modular UEs, UAs, and SUAs.	G-8	O---				
2-2	Resource plan to use temporary 30,000 AC strength increase to enable AC modular conversion.	G-8	O---				
2-3	Resource activation of 10 active component BCT UAs no later than 2006. Up to five active component BCT (UA)s to be activated no later than 2007.	G-8	O---				
2-4	Complete fielding of Stryker Brigade Combat Teams (SBCTs): SBCT3 (FY 2005), SBCT4 (FY 2006), SBCT 5 (FY 2007), SBCT 6 (Stryker fielding by FY 2008, initial operational capability by FY 2010).	FORSCOM, USARPAC	----				

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
2-5	Resource the reorganization of Army aviation into modular theater, UEs, and multifunctional aviation brigade UAs no later than 2008.	G-8	O---				
2-6	Implement Army Battle Command through the network and "Good Enough" Battle Command solutions.	CG ASCC	----				
2-7	Establish home station operating centers to provide reach and expanded expeditionary command-and-control capabilities.	CG ASCC	OPPO	Many	Personnel support, materiel support, information management	D	P O
2-8	Reset and sustain Army prepositioned stocks and Army Regional Flotilla.	AMC	OP--	Supply	Materiel support	D F	I
2-9	Accomplish National Environmental Protection Act-associated actions to support reorganization and modular conversion.	Individual medical augmentees	O---				
2-10	Implement an Army capabilities integration and development system that parallels and supports the joint capabilities integration and development system.	G-8	OPP-	Equip, organize	Concepts, capabilities, requirements development	J	I

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
2-11	Resource the balancing of active and reserve component force structure to reduce or eliminate high-demand/low-density unit disparities.	G-8	O---				
2-12	Accelerate and anticipate solutions to requirements of operational forces including individual body armor, up-armored HMMWVs (high-mobility multipurpose wheeled vehicles), aircraft survivability equipment, rapid fielding initiative (RFI), and so on.	G-8	OPP-	Supply, equip	Weapon design, procurement; materiel support	D	I
Optimize Reserve Component Contributions							
3-1	Develop polices and procedures to streamline and reform the mobilization, deployment, and demobilization processes.	FORSCOM	OPP-	Mobilization/ demobilization, service	Personnel management	D F	I
3-2	Reengineer pre- and postmobilization actions and supporting infrastructure to maximize reserve component mission time.	FORSCOM	OPP-	Mobilization/ demobilization	Personnel management	D F	I
3-3	Reform and establish reserve component personnel, administrative, and legislative policies to support a joint and expeditionary Army.	Army National Guard (ARNG), Office of the Chief, Army Reserve (OCAR)	O---			F J	P

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
3-4	Build the ARNG TTHS account by 2008 to align structure, authorizations, and staffing.	ARNG	OPP-	Administer	Personnel management	F	P
3-5	Build the reserve TTHS account by 2006 to align structure, authorizations, and staffing.	OCAR	OPP-	Administer	Personnel management	F	P
Sustain the Right All-Volunteer Force							
4-1	Fill the force (UAs, UEs, and critical TDA units) to required skill and grade.	G-1	O---				
4-2	Reduce the personnel turbulence of the force through stabilization programs including unit-focused stability.	FORSCOM: execution; G-1: planning, preparation	OPP-	Organize, administer	Personnel management	F	I
4-3	Ensure that effective incentives, recruiter strength, and support tools are in place to access committed, flexible, and adaptive volunteers in the quantity required by the Army.	TRADOC	OP--	Recruit	Personnel management	F	I
4-4	Develop and implement retention and well-being strategies to support the right all-volunteer force.	G-1	OP--	Administer	Personnel management	F	P
4-5	Implement an enterprise network-centric human resources system and revise supporting personnel policies to deliver responsive personnel services support.	G-1	OPP-	Administer, service	Personnel, information management	F	I P

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
4-6	Implement Senior Army Workforce, National Security Personnel System, and military-to-civilian conversions to transform the civilian component.	G-1	OPP-	Organize, administer	Personnel management	F	P
Adjust Global Footprint							
5-1	Implement IGPBS in Commander, U.S. Pacific Command, area of responsibility.	USARPAC	OPP-	Facilities, real property	Facilities management	F	P
5-2	Implement IGPBS in Commander, U.S. European Command, area of responsibility.	U.S. Army Europe (USAREUR)	OPP-	Facilities, real property	Facilities management	F	P
5-3	Implement IGPBS in Commander, U.S. Central Command, area of responsibility.	U.S. Army Central	OPP-	Facilities, real property	Facilities management	F	P
5-4	Implement continental United States (CONUS) basing to support the IGPBS process and BRAC decisions.	FORSCOM, U.S. Army Special Operations Command (USASOC)	OPP-	Facilities, real property	Facilities management	F	P
5-5	Develop and implement near-term basing for new BCT UAs.	FORSCOM, USARPAC	O---				

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
5-6	Synchronize operational rotations and theater-support infrastructure to support IGPBS.	G-3	OP--	Organize, administer	Personnel, facilities management	F	I
5-7	Implement new Army prepositioned stocks and Army Regional Flotilla positioning to support strategic responsiveness.	G-3	OP--	Supply	Materiel support	F	I O
5-8	Develop and implement near-term and long-term facilities strategy for current and future forces.	Assistant Chief for Installation Management	OPPO	Facilities, real property	Facilities management	F	P
Build the Future Force							
6-1	Enhance Current Force capabilities by spiraling forward proven future capabilities with high payoff potential into the Current Force.	TRADOC	OPP-	Equip	Weapon design, procurement	F	I
6-2	Generate First FCS-equipped UA commencing FY 2006 and attaining initial operating capability by calendar year 10 and full operating capability in calendar year 12.	Supported relationships to be determined	----				

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
6-3	Coordinate and synchronize Army concept development and experimentation and science and technology development with parallel joint processes.	TRADOC	OPP-	Equip, organize	Concepts, capabilities, requirements development, science and technology, R&D	J	I
6-4	Develop the following joint interdependent capabilities: joint fires, joint battle command (including joint intelligence), joint force projection, joint air and missile defense, and joint logistics.	TRADOC	OPP-	Organize	Many	J	P
6-5	Develop the concepts and doctrine to guide force development of the future force.	TRADOC	O---				
6-6	Achieve Army strategic mobility objectives and initiate solution strategies for intertheater and intratheater mobility requirements to support the combatant commander’s land force mobility requirements and support DoD’s joint swiftiness goals and conflict separation objectives.	TRADOC: development, G-3: prioritization, G--8: resourcing.	OPP-	Service	Materiel support	D J	O

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
6-7	Develop an operating force network architecture and resource plan for the Army's portion of the global information grid.	TRADOC: development, G-3: prioritization, G-8: resourcing.	OPP-	Service	Information management	F	P
6-8	Develop a generating force network architecture and resource plan to link operating and generating forces, including the business enterprise architecture, as part of the global information grid.	G-6: development, G-3: prioritization, G-8: resourcing.	OPP-	Service	Information management	F	P
6-9	Ensure special operations and conventional force interoperability throughout all stages of transformation via adequate resourcing and synchronized fielding and training of Army common systems to special operations forces' units and training bases.	Special Operations Command	----				
6-10	Develop an Army medical structure that is capabilities-based, flexible, modular, scalable, and netcentric to support expeditionary forces in a joint framework. This force will be capable of rapidly transitioning from expeditionary to campaign environments, providing an integrated health care system that is not only efficient but also effective.	U.S. Army Medical Command: development, G-3: prioritization, G-8: resourcing.	OPP-	Administer, service	Personnel support	D J	O I

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
Adapt the Institutional Army							
7-1	Develop and organize the generating force infrastructure to support a joint, expeditionary, and modular Army with campaign qualities.	G-3	OPP-	Organize	Many	D F J	?
7-2	Divest nonessential functions, remove unnecessary layering and duplication, and consolidate functions within the Army.	Military Department, Assistant Secretary of the Army (Financial Management and Comptroller)	OPPO	Many	Many	F	I
7-3	Recruit and train the right volunteer force to withstand the rigors associated with a joint and expeditionary Army engaged in sustained full-spectrum operations.	TRADOC	OP--	Recruit	Personnel management, training	F J	I
7-4	Reduce TTHS account and number of nondeployable soldiers.	G-3: planning, G-1: execution	OPP-	Administer	Personnel management	F	I
7-5	Organize training and leader development to support an Army at war and facilitate active-reserve component balance and transformation.	TRADOC	OPP-	Train	Training	D F	I

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
7-6	Generate and project the force by identifying key locations and resourcing, staffing, and building joint power-projection installations to support mobilization, demobilization, and rapid deployment of CONUS-based forces and outside-CONUS forces in the Commander, U.S. Space Command, area of responsibility.	FORSCOM USARPAC USASOC	OPPO	Facilities, real property; others	Facility management	D F	O I
7-7	Improve sustainment of the force by developing processes and procedures; coordinating across the Army; and consolidating within Army and DoD maintenance, depot, and materiel development facilities to increase effectiveness and improve efficiency.	AMC	OPPO	Organize, supply, maintain, repair	Personnel support, materiel support	D F	I O
7-8	Accelerate requirements development and acquisition processes to meet current requirements of deployed forces and to anticipate requirements of operating forces.	Assistant Secretary of the Army (Acquisition, Logistics, and Technology)	OPP-	Equip	Concepts, capabilities, requirements development; weapon design, procurement	D F	O I
7-9	Develop and implement strategic communications with internal and external audiences.	Director of the Army Staff	OPP-	Service	General administration	F	I

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
Develop Joint, Interdependent Logistics Structure							
8-1	Shape theater logistics structure in accordance with RCC organization.	CG-ASCC	OPP-	Organize, supply, repair, service	Materiel support	F J	O
8-2	Develop an expeditionary theater logistics capability embedded in the joint, end-to-end distribution processes.	TRADOC	OPPO	Organize, supply. service	Materiel support	D J	O I
8-3	Develop theater opening and sustainment modular capabilities that support joint and coalition operations in simultaneous joint deployment, employment, and sustainment (JDES) construct.	TRADOC	OPP-	Organize, supply. service	Personnel support, materiel support	D F J	O I
8-4	Develop and implement the logistics enterprise architecture with necessary service and joint interoperability.	AMC	OPP-	Service	Materiel support, information management	D F J	I O
8-5	Implement the necessary materiel solutions, to include a tactical wheeled vehicle strategy, leveraging future technology to modernize distribution in support of modular conversions.	G-4: development, G-3: prioritization, G-8: resourcing	OP-	Equip	Concepts, capabilities, requirements development; weapon design, procurement	F	O

Table C.1—Continued

Ref. No.	Description	Supported Principal	Effect in IA	Primary Title 10 Functions	Primary Activities	Purpose	Focus
8-6	Develop and implement a strategy of purposeful reliance on global, joint capabilities to deploy and sustain the modular expeditionary force.	G4: development, G-3: prioritization, G-8: resourcing	OPP-	Service, supply, repair, maintain	Concepts, capabilities, requirements development; materiel support, personnel support	D J	O I

SOURCE: Headquarters, Department of the Army (2006).

More on Linking Metrics to a Value Chain

Figure 4.1 in Chapter Four establishes the basic elements of a simple, generic value chain:

- a final *operational activity* that creates value relevant to the chain and all the activities in it;
- an *institutional production activity* that generates outputs that this operational activity consumes;
- an *institutional investment activity* that generates improvements in subprocesses within the institutional production activity, improvements that advance the interests of the operational activity; and
- *resource inputs* that the institutional production and investment activities consume.

Figure 4.1 emphasizes the need for metrics associated with each of the elements of the value chain. The approach we developed to move from the value chain in Figure 4.1 to the types of metrics described in Table 4.1, also in Chapter Four, benefited from a graphical tool used in formal logic modeling. As noted in the text, we did not use logic modeling as it is normally applied in program evaluation. However, some important structures from logic modeling did help us translate the elements of a value chain into planning goals and choose metrics that inform these planning goals. These structures proved to be especially helpful when we found ourselves surrounded by data in each of the case studies in Chapters Five through Seven and had to choose among alternative sets of metrics. We discovered in each case study that the Army has a plethora of potential metrics; our challenge was

to choose a small, useful set of metrics that the senior Army leadership could use to support the continuing communication that will be required to improve the alignment of the operational and institutional portions of the Army. When considering a specific metric for inclusion, we found it invaluable to ask whether the metric helped clarify the Army's goals with respect to a specific element of the value chain we were examining.

Figure D.1 presents the simple graphic tool that helped us develop a way to do this in specific settings.¹

The "production chain" above the dashed line turns the value chain in Figure 4.1 on its side. In it, the institutional Army converts dollars and the services of military personnel into efforts to improve institutional processes and production activities in existing institutional

¹ Figure D.1 is based fairly directly on analogous maps in Victoria A. Greenfield, Elisa Eiseman, and Valerie Williams, "NIOSH External Impact Review: Learning from Other Agencies' Experiences," unpublished RAND research, 2005; and Victoria A. Greenfield, Valerie Williams, and Elisa Eiseman, *Using Logic Models for Strategic Planning and Evaluation: Application to the National Center for Injury Prevention and Control*, Santa Monica, Calif.: RAND Corporation, TR-370-NCIPC, 2006. More generally, like logic modeling, our approach uses a qualitative model of the value chain to trace paths from agency inputs through agency activities to agency outputs and policy outcomes beyond the agency's immediate control. Like logic modeling, our approach also seeks to apply this model to deriving goals throughout an agency's value chain from the policy outcomes that it seeks to influence, even though it has only limited control over these outcomes. Unlike a logic model, our approach focuses on selective portions of the value chain that we believe current Army processes do not emphasize enough. A formal logic model of the value chains we examine would develop complete information on all activities in the chains. Important technical differences exist in the way we conceive the outputs that institutional activities produce and deliver to operational activities. For more information about logic modeling, see Victoria A. Greenfield, Anny Wong, and Erika Howder, *Assessing the Relevance and Usefulness of Research: Developing and Applying Performance Measures for the National Institute for Occupational Safety and Health*, unpublished RAND research, Santa Monica, Calif., 2004; Scott Hassell, Anny Wong, Ari Houser, Debra Knopman, and Mark Bernstein, *Building Better Homes: Government Strategies for Promoting Innovation in Housing*, Santa Monica, Calif.: RAND Corporation, MR-1658-HUD/PATH, 2003; Gretchen Jordan, "Developing and Using Logic Models for R&D Programs: A Step-by-Step Process," briefing, Sandia Laboratory, Albuquerque, N.M. 2003; W. K. Kellogg Foundation, "Logic Model Development Guide," Grand Rapids, Mich., 2001; Emmalou Norland, *Using a Program Logic Model for Planning*, Washington, D.C.: Environmental Protection Agency, March 2001; and Dale Pahl, *Using Logic Models to Strengthen Research Performance Management, Accountability, and Results*, Washington, D.C.: Environmental Protection Agency, 2003.

subprocesses. In any year, existing subprocesses generate outputs with attributes that are relevant to key stakeholders outside the institutional Army, including users in the operational Army, resource stewards who allocate dollars and military personnel across institutional activities, and other Army activities seeking resources now consumed in institutional activities. The institutional Army finally delivers the outputs it has generated across the vertical dotted line to users in the operating force, which employs these outputs to generate operational outcomes.

For example, dollars (input) could flow into an institutional Army munitions activity to produce mortar shells (subprocess production) or to improve the performance of this munitions activity (improvement initiatives). The institutional Army could then deliver shells produced today (output) to an operational unit that used them to effect military goals in combat (outcome).

Logic modeling seeks qualitative or consensus models of what the input-output relationships are in the production chain. Precise, quantitative models are preferred but rarely exist, especially in government organizations, and are even rarer for organizations that are part of complex value chains with many related flows among activities and processes within them. We seek models that are “good enough” to allow effective planning; presumably, as the value of better models becomes apparent, they can improve over time.

A simple logic map develops a “planning goal chain” that corresponds to the production described previously. It looks like the flow chart below the dashed line in Figure D.1. This chain begins on the right with goals for performance in the operating force (e.g., a combat outcome) that the institutional Army can affect. Given these goals, it uses the consensus model to set goals for the attributes of institutional outputs delivered to the operating force (e.g., the ability to deliver shells by type, location, and date). These attributes cover factors relevant to each key stakeholder (e.g., for the operating force to match types and locations where shells are needed or the ability to change the mix on short notice). Given the consensus model in the production chain, these attributes have implications for resource requirements (dollars and military personnel in institutional munitions activities). To determine what resources the Army requires to produce outputs in any given year,

we can look at how the subprocesses that work together to produce these outputs consume dollars and the services of military personnel in the consensus model from the production chain. To determine what resources the Army requires in improvement initiatives to achieve the level of cost-effectiveness assumed for subprocesses that work together to produce outputs, we can look at what initiatives are required and what they will cost between now and the date for our planning horizon. The final box on the left side of Figure D.1 captures the summary information on the resources required in subprocesses in the last year of the planning horizon and the resources required between now and then to achieve the level of performance planned for that year.

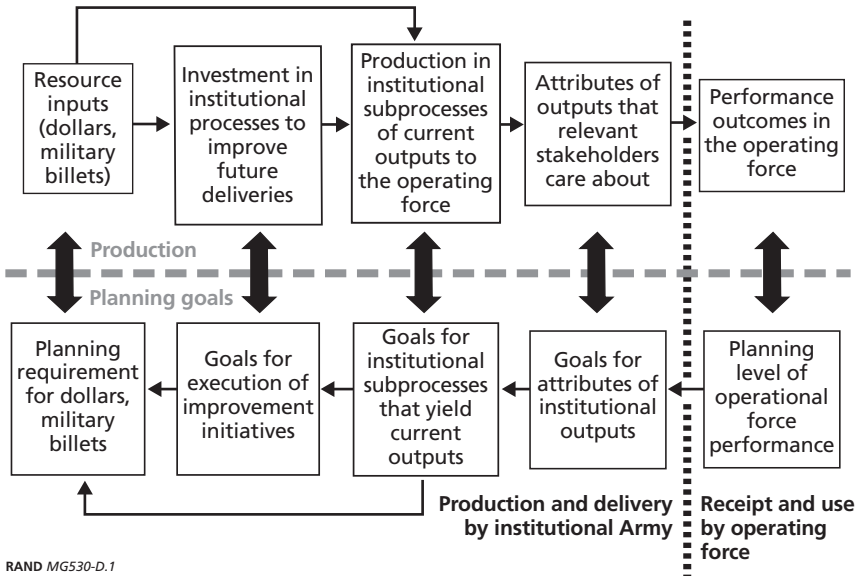
This structure helped us reflect the following considerations in the metrics we chose in Chapters Five through Seven:

- As in logic modeling, we recognize the value of using policy outcomes to derive values that analysts can use to assess an organization's performance, even if the organization has limited control over the outcomes in question.
- As in logic modeling, we recognize the tension between goals for operational performance outcomes and institutional outputs. We want operational outcomes to drive institutional outputs, but the Army rarely understands the connection between the two well, and institutional outputs are typically easier to measure than operational outcomes. As a practical matter, metrics on institutional outputs will drive decisions in the institutional Army. Given this, we seek metrics that come as close as possible to addressing the operating force's interest in outcomes. As a result, the institutional outputs we emphasize tend to be less tangible than the outputs that formal logic modeling emphasizes.
- As in logic modeling, we recognize the usefulness of drawing on a consensus model of production. We would prefer formal input-output models that quantitatively document production functions in a value chain, but such models rarely exist. The Army has a tradition of developing detailed, consensus-based input-output models of operational activities and using these to derive detailed goals for activities in a value chain based on requirements estab-

lished for outcomes from the value chain as a whole. Thus, the basic idea behind the logic map in Figure D.1 is likely to be intuitively attractive to Army analysts and decisionmakers, not the least because it explicitly uses operational priorities to drive goals in the institutional Army.

- As in logic modeling, we recognize the importance of simplicity. A common refrain in critiques of specific choices of metrics and of metrics-based management is that choosing specific metrics has consequences: “Be careful what you ask for, because you might get it.” This concern arises from the near impossibility of capturing all factors relevant to an organization or program and, as a result, driving decisionmakers to emphasize the factors highlighted by metrics, to the detriment of the organization or program under

Figure D.1
Chains of Production and Planning Goals Relevant to the Alignment of the Institutional Army and Operating Force



examination. As in logic modeling, we view metrics more as vehicles for *promoting communication* than for *creating formal incentives*. Any set of metrics, applied aggressively in a management setting, will create incentives that drive unanticipated results. As in logic modeling, we seek a short list of metrics that generate information to help relevant stakeholders observe an organization or program's behavior, including unanticipated effects of the metrics themselves, and that act on these effects together to improve policy outcomes.

- In practice, we found it quite useful to develop internally consistent definitions of (1) production-related elements such as outcomes, outputs, and inputs; (2) goal-oriented elements that capture the level or mix of production-related elements; and (3) metrics-related elements that help clarify goals.
- Looking beyond our specific case studies, we found that the classification imposed by the rows and columns in Table 4.1 in Chapter Four helped us in determining what useful sets of metrics might look like in institutional activities that we did not examine in such close detail. Less detailed examinations of institutional activities relevant to mobilization, training, logistics, installations, and quality of life strongly suggested that the sets of metrics relevant to global, end-to-end support services were likely to share many qualitative similarities. Sets of metrics relevant to personnel assets were also likely to share many qualitative similarities. We attribute our ability to draw such conclusions to the structure offered by the logic map in Figure D.1.

At the end of the day, of course, we did not conduct formal logic modeling. The following are two of the most important reasons why we did not:

- We were more interested in discovering what was missing in the Army's current understanding of the value chains that link institutional and operational activities than in documenting all the details about these value chains. The operating force understands the details of its portion of the Army. Individual institutional

activities understand the details of their portions of the Army. What is missing is a high-level understanding of the *linkages* among institutional activities and between institutional activities as a group and the operating force. We sought a way to highlight these less well understood linkages and sought metrics that could help us do that. The metrics we chose are likely to differ from those a formal logic model would emphasize because we sought to do something that logic models are generally not used to do.

- The two most consequential missing elements were clear statements of (1) what operational activities expect from institutional activities and (2) what total level and mix of resources the Army would have to commit to change the level or mix of anything that the operating force wanted from institutional activities. This discovery led us to use institutional outputs explicitly defined in terms relevant to the operating force as the centerpiece of our approach. As noted previously, formal logic modeling typically has a different view of outputs. As a result, logic modeling tends to emphasize very different data elements than were emphasized in our analysis of the Army. On this score, our analysis is likely to have more in common with definitions of outputs used in formal activity-based management and performance-based services acquisition than with the definitions that logic modeling prefers.

Background on Army Medical Services

This appendix has three sections. The first section is a brief overview of the current mission, organization, funding, and responsibilities of the Army Medical Department. The second highlights what is unique about AMEDD as an Army organization. The third discusses three major, ongoing transformational challenges in Army medicine.

AMEDD Mission, Organization, Funding, Responsibilities

AMEDD has a threefold mission:

Project and Sustain a Healthy and Medically Protected Force. Ensure [that] our Military Forces are deployed in a state of optimal health, equipped to protect themselves from disease and injury.

Deploy a Trained and Equipped Medical Force that Supports the Army Transformation. Ensure [that] our deploying medical units are trained and equipped, and capable of supporting the medical requirements of the deployed forces under any contingency.

Manage the Care of the Soldier and the Military Family. Provide quality, accessible, cost-effective health services.¹

¹ Army Medical Department (undated[c]). For more information on AMEDD, see Army Medical Department, “About AMEDD,” undated(a). Note that this mission includes care for dependents of current military members and for retirees. Although the mission is framed

TSG is concurrently head of AMEDD and MEDCOM.² TSG is responsible for development, policy, direction, organization, and overall management of the Army-wide health service system through the OTSG.³ TSG commands AMEDD units and facilities within MEDCOM, which includes most AMEDD commands, agencies, and all fixed hospitals.⁴ TSG is also the Secretary of the Army's representative for diverse DoD joint medical training, research, and health services executive agencies.⁵ A full list of reported Army executive agent activities is in Table E.1.

Title 10 of the U.S. Code provides that the Army—and each of the service medical departments—develops its own doctrine under a basic framework of joint medical doctrine produced by the Joint Staff.⁶ Each service must also organize, equip, and train its own personnel, and provide medical personnel for deployment with or in direct support of combat units. Each service supports itself medically using its own medical assets, except for those functions that have been assigned specifically to one service as the executive agent. For example, the Army is the executive agent for all medical logistics in a mature theater and it is responsible for administering the first set of immunizations to members of all services at accession.

as provision of medical care, it is best understood as an integral component of the compensation package that the Army uses to attract and retain soldiers. Among personnel benefits, the health benefit is second only to retirement in its value to soldiers.

² MEDCOM includes virtually all of AMEDD except field units.

³ OTSG is the Army staff element that develops policy and regulations on health service support, health hazards assessment, the establishment of health standards, and medical materiel.

⁴ See Army Medical Department (undated[a]).

⁵ AMEDD is responsible for numerous DoD executive agencies, which work at a triservice level to support all the services. For more information, see Peake (2004a); for information on AMEDD, see Army Medical Department, "Introduction to the U.S. Army Medical Department," undated(d).

⁶ The current military health service support system is based on the Joint Health Service Support Strategy that directly supports the National Military Strategy through Global Force Health Protection Programs that focus on a healthy and fit force, casualty prevention, and casualty care. See U.S. Army War College (2005).

Table E.1
DoD Executive Agencies Under AMEDD (as of March 2004)

Executive Agency	Description
Accession Medical Standards Analysis and Research Activity	Performs research and analysis that results in evidence-based recommendations regarding medical accession standards; research is focused on the reduction of premature medical attrition
Armed Forces Epidemiological Board	Continuing scientific advisory body that provides timely scientific and professional advice concerning operational programs, policy development, and research needs for the prevention of diseases and injury and the promotion of health
Armed Forces Institute of Pathology	Supports DoD and other governmental agencies to enhance their health and well-being; provides medical, dental, and veterinary expertise in secondary diagnostic consultation, education, and research
Armed Forces Medical Library	Provides biomedical and technical reference, educational, and research materials in support of worldwide military medical missions; supports service medical and overseas medical libraries
Armed Forces Pest Management Board (AFPMB)	Provides administrative and logistic support for the operation of the AFPMB; AFPMB ensures that combat forces have the most effective control of insects that carry diseases of military significance (e.g., malaria, dengue) and pest management capabilities
Armed Services Blood Program Office (ASBPO)	Coordinates the worldwide blood programs for the military departments and the combatant commands in both peace- and wartime
Civilian Employees Occupational and Medical Services Clinic	Provides occupational health services to DoD civilians in Medical Health Service–managed buildings
Combat Dental Research	Development of improved and/or simplified procedures and material for the field/war-zone management of dental maladies and prevention/care of combat maxillofacial wounds and injuries to reduce dental emergencies during deployments
Defense Medical Readiness Training Institute	Coordinates, evaluates and develops joint medical readiness training initiatives for all services with a focus on evolving doctrine and joint operational requirements

Table E.1—Continued

Executive Agency	Description
Defense Medical Surveillance System and the DoD Serum Repository	DMSS functions as a medical surveillance executive information system with a database containing current and historical data related to medical events (e.g., hospitalizations, outpatient visits, HIV results, immunizations), personal characteristics, and military experiences (e.g., deployments, assignments)
DiLorenzo TRICARE Health Clinic	Tri-service health clinics at the Pentagon, Ft McNair, and Navy Annex that provide primary care and limited specialty care to the Pentagon
DoD Nutrition Research Program	Provides biomedical nutrition research that supports DoD in developing nutritionally sound (healthful and scientifically based performance-enhancing) rations; provides advice on effective as well as dangerous performance-enhancing supplements
DoD Pesticide Regulatory Action System	Provides DoD with current information on regulatory actions and management practices on the use and disposition of pesticides
DoD Pharmacoeconomic Center	Improves the clinical, economic, and humanistic outcomes of drug therapy in support of the readiness and managed care missions of the Military Health System
DoD Tick-Borne Disease Program	Protects DoD personnel from the health threat posed by tick-borne disease including Lyme disease
DoD Veterinary Service Activity	Oversees control of animal diseases communicable to humans and veterinary care for government-owned animals supported by appropriate funds, provides support to RDT&E programs as required by military components, develops military sanitation standards for commercial food plants providing products to DoD components, publishes food suppliers list
DoD/Veterans Affairs Clinical Practice Guidelines	Develops clinical practice guidelines to standardize practices across the Services and Veterans Affairs
Global Emerging Infections Surveillance and Response System (GEIS)	Implements the Presidential Directive on emerging infections through a joint service program focused on timely recognition and control of emerging and reemerging infections
Gulf War Exposure Registry	Provides the systems capable of presenting to researchers the modeled exposures and risk levels from the oil well fires in Kuwait for all troop units in the Persian Gulf during Operations Desert Shield and Desert Storm

Table E.1—Continued

Executive Agency	Description
Gulf War Illness/Force Health Protection Research Program	Addresses congressional concerns about postdeployment health and fulfills research needs for new service regulations on occupational and environmental exposures and health risk monitoring as well as service members' well-being
Investigational New Drugs for Force Health Protection	DoD's single source for managing investigational new drug products for force health protection; executes DoD policy pertaining to the preventive or therapeutic use of investigational drugs or biological products for force health protection where no appropriate Federal Drug Administration–approved product is available
Joint Medical Executive Skills Institute	Provides senior military health care executives with the requisite professional administrative skills to efficiently manage DoD's healthcare system
Joint Readiness Clinical Advisory Board	Joint DoD activity that provides policy and standardization guidance relative to the development of deployable medical systems and medical materiel used for the delivery of health care in the Military Health Services System
Military Infectious Disease Research Program (MIDRP)	Conducts a focused infectious diseases R&D program leading to the fielding of effective, improved means of protection and treatment to maintain maximal global operational capability; addresses the DoD requirement to counter infectious disease threats through science and technology
Military Vaccine (MILVAX) Agency (formerly, Anthrax Vaccination Immunization Program)	Provides oversight for all functions associated with anthrax, smallpox, and other biodefense vaccinations for all services, including overseeing vaccine acquisition, stockpiling, and research
Nutrition Standards and Education Program	Establishes nutrition standards for military personnel subsisting in garrison and in simulated or actual combat situations
Peer Reviewed Medical Research Program	Military biomedical research program that enhances and complements existing DoD mission-related biomedical research by initiating research on newly identified research needs (e.g., fracture repair and bioterrorism agent detection) and funding additional research on identified force health protection issues (e.g., smoking cessation and alcoholism)
Pentagon Tri-Service Dental Clinic	Provides comprehensive dental care for 15,000 military personnel in and around Pentagon

Table E.1—Continued

Executive Agency	Description
Regional Tri-Service Medical Logistics Support Program	Tri-service corporate program leveraging purchasing power with logistical and clinical benefits; maximizes purchasing power for medical surgical commodity, equipment, and logistical support services
U.S. Military Entrance Processing Command (Medical)	Provides medical exams, enlistment qualification tests, and other processing to all applicants for enlistment in the military services
Vaccine Healthcare Centers Network	This network provides four strategically located regional centers of excellence in vaccine safety, clinical education, and support for any bioterrorism- and readiness-relevant vaccine program

RCCs can also call on AMEDD to provide assistance in health-related activities beyond the care of service members, their dependents, and eligible foreign military personnel.⁷

The Army health care system comprises the Medical Corps, Army Dental Corps, Army Medical Specialist Corps, Army Nurse Corps, Medical Service Corps, and Veterinary Corps. It also includes other related health services, such as preventive medicine, medical logistics, and medical evacuation. AMEDD provides graduate medical education and training for both active and reserve medical personnel, e.g., at the AMEDD Center and School at Fort Sam Houston, Texas. Medical R&D activities, as well as advanced technologies and information management and information technologies, are conducted at locations including the U.S. Army Medical Research and Materiel Command at Fort Detrick in Maryland, the U.S. Army Medical Information Technology Center at Fort Sam Houston in Texas, and the Center for Health Promotion and Preventive Medicine at Aberdeen Proving Grounds in Maryland.⁸

⁷ We draw on ongoing RAND research on joint medical support in a theater of operations in Gary Cecchine, David E. Johnson, John Bondanella, and Carolyn Wong, *Joint Medical Support in a Theater of Operations: Analysis and Alternatives*, unpublished RAND research, 2005.

⁸ See Army Medical Department (undated[d]).

All Army health care personnel around the world are part of AMEDD. AMEDD facilities are organized under six major Regional Medical Commands (RMCs): (1) North Atlantic; (2) Southeast; (3) Great Plains; (4) Western; (5) Pacific; and (6) Europe. RMCs are multistate command-and-control headquarters that allocate resources, oversee day-to-day management, and foster readiness through medical treatment facilities in their areas. Major subordinate commands (MSCs) for dental and veterinary medicine perform similar command-and-control functions. Together, there are 30 MTFs and MSCs located around the world.⁹

Since 1991, peacetime military health care has been funded through the DoD Unified Medical Program and the Defense Health Program (DHP) Appropriation, rather than through the services' budget.¹⁰ DHP funds the vast majority of AMEDD manpower, while Army funds support-deployable medical Table of Organization and Equipment (TOE) units and medical readiness missions.¹¹

⁹ The North Atlantic RMC headquarters is located in Washington, D.C., as are two Major Subordinate Commands: the Army Center for Health Promotion and Preventive Medicine and the Army Medical Research and Materiel Command. The Southeast RMC headquarters is at Fort Gordon, Georgia. The Great Plains RMC headquarters is at Fort Sam Houston, Texas, as are three Major Subordinate Commands: AMEDD Center and School, the Army Dental Command, and the Army Veterinary Command. The Western RMC headquarters is at Fort Lewis, Washington. The Pacific RMC headquarters is in Honolulu, Hawaii. The European RMC headquarters is in Heidelberg, Germany. An MTF is any fixed Army medical care site, whether a clinic, hospital, or medical center. Battalion aid stations and combat support hospitals in theaters of operation are not MTFs. See Army Medical Department, "Medical Facilities," undated(f).

¹⁰ The Assistant Secretary of Defense for Health Affairs (ASD/HA) issues policy guidance for the services and manages and monitors the service execution of the DHP appropriation and the DoD Unified Medical Program. The ASD/HA has considerable authority, defined by DoD Directive 5136.1, to integrate interservice health care and coordination with civilian care providers in the TRICARE program. However, the services retain their Title 10 responsibilities to staff, equip, and train medical forces. See Susan D. Hosek and Gary Cecchine, *Reorganizing the Military Health System: Should There Be a Joint Command?* Santa Monica, Calif.: RAND Corporation, MR-1350-OSD, 2001.

¹¹ The Army uses the Total Army Analysis (TAA) process to identify its resource requirements. Combat forces defined by the official defense planning guidance are run through models of two nearly simultaneous major theaters of war. The results show the force required and drives the development of the Army's POM. The POM outlines the force the Army

AMEDD provides health care services to more than three million beneficiaries. Eligible users of the Army medical health system include members of the Active Component and Reserve Component of the Army and their families, as well as retirees and their eligible dependents.¹² AMEDD also supports Army medical operation in combat theaters, and might be directed by RCCs to provide care to members of other services and U.S. defense personnel and, as required, to non-DoD U.S. government personnel, DoD contractors, nongovernmental organization staff, and foreign military personnel and civilians. In addition, AMEDD provides health care services to the military and accompanying family members of 25 North Atlantic Treaty Organization (NATO) member countries and 12 member countries in the Partnership for Peace Status of Forces Agreement (SOFA).¹³

plans to field in the final year of the sixth year DoD Future Years Defense Plan. See Gary Cecchine, David Johnson, John R. Bondanella, J. Michael Polich, and Jerry Sollinger, *Army Medical Strategy: Issues for the Future*, Santa Monica, Calif.: RAND Corporation, IP-208-A, 2001. A TOE prescribes the normal mission, organizational structure, and personnel and equipment requirements for a military unit and is the basis for an authorization document. Units are constituted and activated in accordance with an approved TOE or a modified TOE. All TOE personnel are military personnel and can be deployed anywhere in the world. Some current TOE organizations have TDA augmentations, which may include civilian and foreign personnel, to assist in performing their nontactical missions, but these augmentations are not deployable. See Headquarters, Department of the Army, Center of Military History, "History of Tables of Distribution and Allowances (TDA) Units," May 30, 1995.

¹² MTFs give priority access to active duty service members and their families and retirees under the age of 65. Beginning October 1, 2001, Medicare-eligible Army retirees also became eligible to use the DoD TRICARE program to access medical services at MTFs. Reserve personnel can obtain one year of TRICARE coverage at a modest fee for every 90 days of active service (Hosek and Cecchine, 2001).

¹³ These NATO member countries are Belgium, Bulgaria, Canada, the Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Turkey, and the United Kingdom. The United States is also a NATO country. The Partnership for Peace SOFA countries are Albania, Australia, Azerbaijan, Croatia, Finland, Georgia, Kazakhstan, Macedonia, Moldova, Sweden, Ukraine, and Uzbekistan. See North Atlantic Treaty Organization, "NATO Member Countries," updated July 11, 2006.; and Army Medical Department, "Partnership for Peace SOFA Members," undated(h).

A Unique Army Organization

AMEDD is a unique Army organization in the many ways it supports the Army's operating force.

First, AMEDD provides a continuum of care to the Army's fighting force. The Army's health services support system is expected to function as a single, integrated system. It provides medical services to soldiers in peacetime and in theater. It provides continuity of care to soldiers from accession through retirement, between their movement from peacetime units to wartime units and back, and between CONUS and in theater. AMEDD even administers health checks for all recruits. Maintaining a medically fit force in peacetime ensures a medically ready, deployable force for war and contingencies. Medical combat units deliver combat health service support in the theater of operations, and those wounded in need of a higher level of medical care are sent back to MTFs. Treatment and rehabilitation at MTFs either returns soldiers to the operating force or prepares them for medical discharge.

Second, few Army organizations cover the breadth of responsibilities AMEDD carries in supporting the Army's operating force. AMEDD recruits and trains military medical personnel, conducts medical research and surveillance on diseases, and develops medical treatment and protection materiel. The Army medical personnel, knowledge, products, and services produced are delivered to non-deployed soldiers through its MTFs and to deployed soldiers through combat medical units in theaters of operation. In addition, AMEDD provides many direct medical support services to combat medical units and RCCs. They include medical logistics, food safety checks, veterinary care, medical laboratories, and higher-level treatment at MTFs for the wounded. Only in a few areas does AMEDD have no authority or responsibility to ensure medical readiness, e.g., in medical materiel maintenance and unit training within the operating force.¹⁴

¹⁴ These activities occur in the deployable medical units, which are integrated with the organizations they support. There is no direct medical chain of command above the deployable medical unit level. The Army's medical organization is observed as less integrated in its line

Third, few Army organizations cover the broad spectrum of beneficiaries that AMEDD does. As indicated previously, AMEDD provides medical services to soldiers on and off the battlefield and simultaneously delivers medical services to military dependents and retirees. Only the Corps of Engineers has a similarly substantial mission to support beneficiaries outside the Army. Furthermore, AMEDD cannot allow a degradation of care among any of its beneficiaries as a result of war. This Army Chief of Staff guidance began with Operation Desert Storm in the early 1990s, and it has been kept in place ever since. Thus, AMEDD cannot shift capacity to emphasize combat medical support during wartime at the expense of medical services for the non-deployed, military dependents, and reserves.¹⁵

Fourth, AMEDD is responsible for more executive agencies than any other Army organization. As of mid-2004, the Army reported 99 executive agencies, and AMEDD is responsible for 31 of them.¹⁶ These EAs cover a broad range of activities, including analysis of accession medical standards, maintenance of the Armed Forces Medical Library, administrative and logistic support of the Armed Forces Pest Management Board, combat dental research, running the DoD Tick-Borne Disease Program, a full range of DoD veterinary services, and oversight of the MILVAX agency. Also, RCCs can ask AMEDD to provide additional health-related support when necessary. For example, AMEDD is helping to reconstruct health care infrastructure in Iraq.¹⁷ These medical support activities of the Army generate direct and indirect benefits for the operating force.

command structure than the other services (Cecchine, Johnson, Bondanella, and Wong, unpublished RAND research).

¹⁵ Davis et al. (1996).

¹⁶ Data (dated March 2004) from the Army Resources and Programs Agency, Office of the Administrative Assistant to the Secretary.

¹⁷ DoD staff explained that DoD Directive 5100.3 (Change 2), *Support of the Headquarters of the Combatant and Subordinate Joint Commands*, Washington, D.C., December 5, 2005, defines Army support of other services. The directive does not stipulate or limit what the support might be. This allows RCCs considerable flexibility in asking for assistance from AMEDD. However, Directive 5100.3 does stipulate that resources for ASOS are without reimbursement. See also Lois Davis et al. (1996).

Ongoing Transformational Challenges for Army Medicine

As the Army as a whole pursues transformation that will modularize the operating force and implement a new force generation model, AMEDD faces four major challenges to ensure that the Army achieves desired health outcomes for the force as a whole and for the operating force in particular: manpower shortage, the balancing of medical services at home and overseas, the balancing of current and future medical readiness, and an analysis of the subsequent ramifications for the operating force.

Manpower Shortage

Recruitment and retention of Army medical professionals are essential to the provision of medical care and other medical services to all Army health service beneficiaries in war and in peace. The U.S. medical health corps is made up of officers from the Active and Reserve Components, creating a total of 391 medical units that cover 23 areas of concentration.¹⁸ AMEDD needs to sustain a sufficient number of medical professionals and the specialties necessary to deliver a broad range of medical service in war and in peace, from staffing combat medical units and outpatient care at MTFs to medical R&D and managing medical logistics and acquisition.

AMEDD has reported increasing difficulty in recruiting new health professionals to join the active force. One important indicator is the steady decline in health professions scholarship applications among the Army medical and dental corps—the bedrock of AMEDD accessions. At the same time, retention is a problem. Between 1989 and 1997, AMEDD lost approximately 31 percent of its total medical force.¹⁹

¹⁸ The reserve component covers both the National Guard and the Army Reserves. There are a total of 391 medical units, comprising both AC and RC units, in the Army medical corps. See GEN Kenneth D. Herbst, “Army Reserve Creates AR Medical Command,” *Army Magazine*, June 2005.

¹⁹ Shonna L. Mulkey, COL L. Harrison Hassell, and Kevin G. LaFrance, “The Implications of TRICARE on Medical Readiness,” *Military Medicine*, Vol. 169, No. 1, January 2004, pp. 16–27.

Shortfalls in some areas of concentration are another part of the problem. Some medical specialties have no substitutes under AMEDD organization requirements. For example, there are no substitutes for urologists, anesthesiologists, infectious disease specialists, pathologists, ophthalmologists, and otolaryngologists.²⁰ An insufficient number of medical personnel, particularly in areas of concentration that are short of people and for which no replacements are possible, can severely limit AMEDD's capacity to meet medical personnel requirements in both its TDA and TOE units and can weaken its capacity to produce various outputs essential to health protection for the operating force.

The Army is working to cope with this manpower shortage. A great deal of energy is focused on the reserve component because about 66 percent of Army medical personnel are in the reserve component.²¹ Yet, in recent years, AMEDD has filled only 70 percent of required positions for reserve physicians, and recruitment and retention have been particularly low in some areas of concentration that are important to the Army, e.g., orthopedic surgeons.²² A pilot program launched in 1999 reduced reserve deployment in CONUS or abroad to 90 days (down from 270 days) for physicians, dentists, and nurse anesthetists.²³ This Army pilot program was a response to the massive loss in reserve medical personnel following 270-day deployments to support the peacekeeping mission in Bosnia. Many physicians complained that the 270-day rotation kept them away from their civilian practices for too long.

²⁰ By comparison, internists can be substituted with multiple specialists, including endocrinologists, infectious disease specialists, cardiologists, and nephrologists. Headquarters, Department of the Army, *Army Medical Department Professional Filler System*, Army Regulation 601-142, Washington, D.C., June 23, 2004.

²¹ Of the 391 medical units that make up the total Army medical corps, 258 are in the reserves. Thus, active medical units represent only 34 percent of the total medical force, while reserve medical units represent 66 percent of the total medical force. See Army Medical Department (2005b).

²² Hosek and Cecchine (2001).

²³ From late 1995 through early 1998, one-third of the reserve physicians deployed to the Balkans left the U.S. Army Reserves citing the 270-day rotation as a major cause for their decision. This resulted in a serious shortfall of physicians, dentists, and nurse anesthetists that was exacerbated by recruitment difficulties.

This 90-day “boots on the ground” rotation became Army policy in October 2003.²⁴ Only reserve medical personnel in leadership positions, e.g., medical unit commanders, are required to serve a 270-day rotation.²⁵ The Army also offers \$30,000 as sign-on bonus to medical reservists and pays up to \$50,000 to cover student loans.²⁶ Another incentive to join and stay in the Army reserves, including the Army medical reserves, is the Army’s offer of one year of TRICARE coverage for a modest fee for every 90 days of active service.²⁷

Manpower shortage in the medical reserve force has also prompted AMEDD to create the Active Component to Reserve Component Professional Officer Filler System (PROFIS) Program in 2000. The purpose of the program was to increase reserve unit readiness by allowing active duty soldiers under PROFIS to be assigned to the reserve units to relieve personnel shortages on a temporary basis. When active component soldiers are not available, contract providers are also used.²⁸ At this time, more than 1,200 active component soldiers are in the Active Component to Reserve Component PROFIS Program.²⁹ Finally, to ease critical shortages in medical specialties, the reserves created the National AMEDD Augmentation Detachment (NAAD) in 1988 to recruit and retain physicians and nurses who are geographically isolated from a reserve unit. In 1999, NAAD was expanded to include additional enlisted soldiers and AMEDD officers. Today, more than 1,400 reserve soldiers are attached to NAAD and assigned to high-priority medical units.³⁰

²⁴ Army Medical Department, “Reserve 90-day Rotation Implemented (1999),” undated(i).

²⁵ See Webb (2005) and Peake (2004b).

²⁶ “Nurses See Increased Cooperation on Medical Readiness,” excerpt from *AUSA News*, July 2001.

²⁷ Terri Lukach, “Army Reserves and National Guard to ‘Rebalance,’” American Forces Press Service, March 21, 2005.

²⁸ Army Medical Department, “AC to RC PROFIS Initiated (2000),” undated(b).

²⁹ See Headquarters, Department of the Army, “NAAD History,” Army National AMEDD Augmentation Detachment, last modified October 13, 2005c.

³⁰ Headquarters, Department of the Army (2005c).

Balancing Missions at Home and Overseas

Balancing demands to fulfill its mission at home and overseas is the second major challenge for AMEDD. Army policy seeks to avoid the deterioration of care among the peacetime force, military dependents, and retirees in times of war.³¹ AMEDD must maintain the level of care while the size of the Army medical corps is shrinking and the numbers of medical deployments and retirees are increasing.³²

On the home front, AMEDD has to provide medical services to nondeployed soldiers, including nondeployable medical holdovers (MHOs),³³ dependents, and retirees. As described in the preceding section, a healthy peacetime force and healthy dependents and retirees are desired health outcomes of the Army. In addition, capacity in the institutional Army medical force supports the operating force through its staffing and equipping of combat medical units and direct support to current medical services in theater.

Although resources provided through TRICARE share part of the load in providing medical care to nondeployed soldiers, dependents, and retirees, MTFs supply about two-thirds of the health care used by all TRICARE beneficiaries and almost all the health services

³¹ Department of the Army, Office of the Chief of Public Affairs, "Providing the Best Available Health Care for Medical Holdovers," December 1, 2004.

³² Peake (2004b).

³³ MHOs are reserve soldiers who are found to be nondeployable at mobilization. Because reserve soldiers tend to have less regimented medical assessments carried out on a regular basis than is the case for active soldiers, medical conditions are frequently undetected until mobilization during predeployment health assessments. Soldiers who cannot return to active duty in 60 days can either remain on active duty to obtain medical care at MTFs or be released from active duty and obtain care through established medical benefits in reserve status. The latter includes MTFs on a space-available basis for reserve soldiers who have opted to join TRICARE. Since this program, the TRICARE Reserve Select, was launched in April 2005, about 10,000 of 300,000 eligible reserve component soldiers have signed up. Family members of eligible reserve component soldiers also qualify for coverage. Eligible reserve component soldiers are those who were called or ordered to active duty to serve in support of contingency operations on or after September 11, 2001. See Office of the Assistant Secretary of Defense (Health Affairs) and the TRICARE Management Agency, "TRICARE Reserve Select (TRS)," last updated July 28, 2006.

used by active duty personnel.³⁴ Thus, MTFs are important to sustaining the medical readiness of the peacetime force and healthy dependents and retirees—two desired health outcomes defined in this study. At the same time, serving at MTFs allow Army medical personnel in TDA and TOE units under PROFIS to sustain their clinical skills and maintain a high level of individual readiness for deployment.

However, falling recruitment and retention and concurrent increased demand from the operating force make it difficult for AMEDD to fill military billets at MTFs. When active duty personnel under PROFIS are deployed in combat medical units, they are replaced by either active duty medical personnel from other MTFs or reserve medical units and individual mobilization augmentees (non-unit reservists).³⁵ The Army Reserve Medical Command³⁶ estimates that the reserve component provides 39 percent of all TDA medical personnel. Even with one reserve medical professional to replace two PROFIS medical personnel on the active force, it is not easy when reserve medical units and non-unit reservists are also mobilized for deployment in the OF-Medical. AMEDD uses the Active Component to Reserve Component PROFIS Program and NAAD to access reserve medical professionals, but it is uncertain whether these efforts will sustain long-term Army medical readiness without real improvements in the recruitment and retention of medical personnel in the active and reserve forces.

For the deployable medical force, war is no longer the only reason for deployment. Combat medical units are involved in an increasing number and variety of missions overseas under a policy of global engagement. These missions include peace-enforcement, peacekeeping, and peace-building in postconflict situations, as well as disaster relief,

³⁴ Hosek and Cecchine (2001).

³⁵ Under PROFIS, up to 26 percent of MEDCOM physicians and 43 percent of MEDCOM nurses are sent to field units during a full deployment. COL Randy Pullen, "Answering the Nation's Call for 97 Years," *Army News Service*, May 1, 2005.

³⁶ The new Army Reserve Medical Command (AR-MEDCOM) will assume responsibility for all Army Reserve medical units by early fiscal year 2006. This will consolidate and centralize management of all Army Reserve medical units and soldiers. AR-MEDCOM will be the largest functional command within the Army Reserve. See Herbst (2005).

humanitarian assistance, and national assistance to allies and foreign partners as part of security cooperation.

These operations other than war (OOTW) place many demands that stress AMEDD's capacity and capability to deliver medical services.³⁷ Patient populations in OOTW tend to be broader and have more diverse treatment needs. Combat medical units and the IA-Medical force (through its direct support to the operating force) might have to treat local civilians, refugees, and troops of coalition partners, as well as employees of the U.S. government, NATO, the United Nations, and civilian contractors. These patient groups vary more than U.S. troops in their health status, age structure, gender ratio, and types of acute and chronic medical conditions requiring treatment.

In addition, the number of multinational coalitions is increasing, and they involve many more foreign countries that are not traditional U.S. allies and generally do not have robust military medical services. As a result, coalition forces frequently demand more medical support than do U.S. soldiers because they tend to have lower levels of predeployment medical screening, preventive medical support, and medical and dental readiness. They might also lack their own combat medical support in theater or evacuation assets to send personnel to their home countries for higher-level medical treatment. Consequently, medical support for coalition forces often goes beyond immediate trauma care to include other medical services, e.g., dental care. Their ill and injured also stay at OF-Medical facilities, such as the combat support hospital (CSH), longer than U.S. soldiers with similar conditions because they have a lower level of medical readiness to begin with, and their own forces have no capability to evacuate them or provide care for them. Sometimes they are not evacuated to their own countries because medical treatment is not available there. All this adds a significant load to the combat medical force and to the RCC as a whole. In humanitarian and disaster relief missions, in addition to medical treatment for victims, AMEDD might also have to provide medical supplies, community health services, public health education, training, and even

³⁷ Davis et al. (1996).

basic equipment to shore up local medical infrastructure that has been destroyed by disaster or violence.

The greater diversity in patient populations and their medical service demands can greatly complicate planning and severely tax Army medical assets in theater, as well as for IA-Medical direct support to the operating force. They will also likely hinder the Army's efforts to reduce the medical footprint in theater and to implement modularized combat medical force concepts, e.g., use of forward surgical teams and rapid medical evacuation to CSH and MTFs to reduce patient load and resource requirements for treatment in a rapidly moving battlefield.

And like efforts to backfill PROFIS personnel at MTFs, mobilizing reserve medical professions for deployment in TOE units in theater is complicated by the shortfall in reserve medical personnel, the 90-rotation policy, and competing demand, specifically, to use reservists to backfill PROFIS personnel at MTFs. Medical personnel are among the few major reserve groups that are deployed to serve in theater with TOE units. The need for certain medical specialties to fill requirements in combat medical units and the lack of them in the active medical force deepen AMEDD's dependence on medical reserves. Medical reserves are deployed as individual fillers or as an entire unit to provide expanded capability or special medical skills in theater.³⁸ AR-MEDCOM estimates that medical reserve units represent about 53 percent of AMEDD's TOE medical units.³⁹

Balancing Current and Future Medical Readiness

Army leaders face the difficult question of striking the proper balance between maintaining current readiness and resourcing future readiness requirements. For AMEDD, present-day investments—e.g., in recruitment and retention, graduate medical education, training, R&D, and modularization of combat medical units under the Medical Reengi-

³⁸ Individual fillers are specialists who are not normally part of the wartime structure, or they are specialists in areas of concentration that are short in the Army. See Davis et al. (1996).

³⁹ Of the total 258 reserve medical units, 58 are TDA units and 200 are TOE units. See Herbst (2005).

neering Initiative—will ensure a supply of outputs critical to force health protection for the future Army. The connection between desired force health outcomes and their associated outputs and investments are illustrated in Figures 5.1 and 5.2 in Chapter Five.

Pressure to expend resources to support current combat medical operations, as well as other operating force activities, for war and other OOTW obligations intensify the competition for Army resources to build future medical readiness. Yet without investments in medical capacity-building activities, force health might be exposed to greater threats in the future because neither capacity nor capability will be available to sustain a high level of medical readiness for the Army or to anticipate and respond to health threats as they emerge.

AMEDD is reorganizing and building capacity to support the future force of the Army, which will be a modular one with combat units moving rapidly over dispersed battlefields. Combat medical units, under the Medical Reengineering Initiative, will become standardized, scalable, and modular medical capability packages that can be rapidly deployed to deliver medical services in theater to support the modular future force. As described earlier, FSTs will enable medical support to deal with trauma on the frontlines of the battlefield, while rapid medical evacuation will allow casualties to receive higher-level medical treatment at CSH and MTFs. Application of these concepts is expected to improve medical outcomes for patients and reduce the medical footprint in theater. MRI planned to have converted 165 of the total 391 active and reserve units by the end of FY 2005. At the end of FY 2004, AMEDD had completed about 42 percent of all MRI unit conversions.⁴⁰

Implications for the Operating Force

How the Army responds to these three major challenges will significantly determine AMEDD's ability to support the operating force of today and the future, as well as to achieve its three-fold mission of delivering medical services to all Army health service beneficiaries.

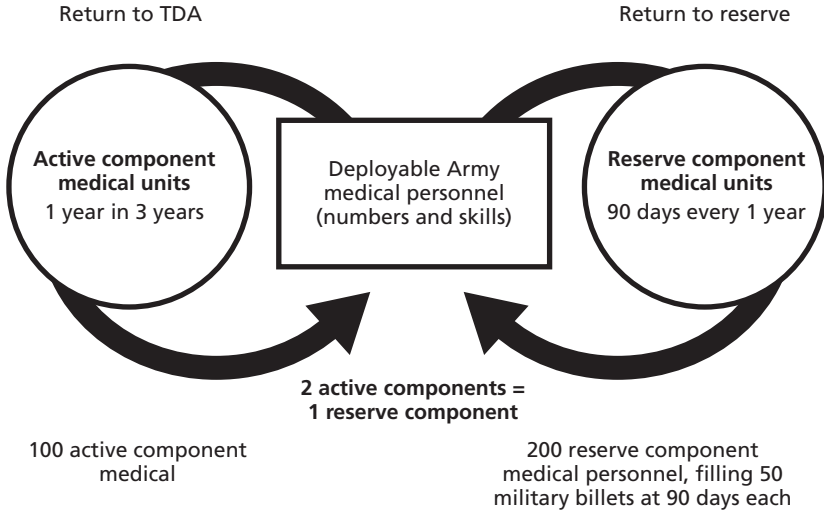
⁴⁰ See Peake (2004b); U.S. Army War College (2005).

Manpower shortage is clearly the most fundamental challenge. Without the necessary medical professionals in numbers and specialties, AMEDD (or the Army at large) will not be able to provide medical services at home or overseas, neither today nor in the future. Both the institutional and operating portions of AMEDD are connected, as are its active component and reserve component elements. Activity in one domain or element affects the other. All of them are connected like a giant mechanical clock.

Increased demand for medical deployment because of war and OOTWs are severely taxing the current pool of medical professionals. The 90-day rotation schedule for medical reserves also complicates medical force generation, and especially so under the Army Force generation (ARFORGEN) model. For example, not only must the medical reserves have a sufficient number of units and individual personnel to serve as backfills in MTFs and support deployment, that number must be sufficient to support 90-day rotations. Figure E.1 shows what the deployments of 100 active component medical personnel might demand of the medical reserves, even if a two-for-one replacement ratio is permitted.

In addition to these major challenges, realization of desired outcomes will also be affected by numerous important factors that AMEDD and the Army might or might not have full control over. For example, success in reducing the Army medical footprint in theater—a major goal for the Army—will depend on a quick and smooth transition of care from FST to CSH, and from CSH and MTF, so that OF-Medical can focus only on delivering essential care in theater. The presence of ground and air assets, as well as manpower, for rapid evacuation is essential. However, it is not clear that resources are available to turn this assumption into reality in terms of Army investment in developing and acquiring new medical evacuation assets or obtaining commitment from other services, e.g., the Air Force, to provide this support. In another RAND study, tabletop exercises involving AMEDD medical personnel found that, even in the best-case scenario, shortage of medical evacuation assets quickly overwhelmed FSTs and consequently affected medical outcomes for patients because of delays in

Figure E.1
Active Component/Reserve Component Mobilization Mix Under ARFORGEN Model



RAND MG530-E.1

treatment. AMEDD’s plans to reduce the number of CSH in the operating force (as part of AMEDD transformation) is also built on this assumption of the availability of medical evacuation capacity to quickly move casualties out of the theater to MTFs for further treatment.⁴¹

Another factor is the availability of combat medics and combat lifesavers to work in BCT UAs to deliver immediate trauma care at the critical, “platinum” 10 minutes and “golden” hour. The combat lifesaver, a soldier with additional training in medical skills, will assume a particularly important role as first responder in a dispersed and rapidly moving battlefield. Training to become a combat medic takes 16 weeks. Certification is necessary, as is regular training to maintain and update skills and knowledge. Whether a soldier, already loaded with combat-related training and responsibilities, will fulfill all train-

⁴¹ Development and acquisition of the UH-60Q medical evacuation (MEDEVAC) helicopter is a near-term modernization priority for AMEDD, but it does not address the full set of resource and coordination issues involving medical evacuation within a theater and between theater and MTFs.

ing requirements and perform effectively in the battlefield is open to question.

Another factor is AMEDD's ability to respond to the operating tempo and personnel tempo demands of the operating force when manpower is stretched and AMEDD is under pressure to balance services at home and overseas and between current and future medical readiness. This will impact how quickly AMEDD can mobilize active duty personnel, move reserve component units and IMAs to backfill PROFIS staff, or place reserve component units and IMAs in combat medical units in the operating force.

Army Strategic Management System

Chapter Four explains why understanding the SMS is important to any successful effort to use performance metrics to align the operational and institutional parts of the Army in ways that reflect the senior leadership's expectations for the future. This appendix provides additional information about the SMS that is designed to help the reader appreciate the relevance of the SMS to the topic at hand. It presents the currently approved version of the Army-wide SMS strategy map and explains why the Secretary of the Army supports the development and application of this map. It illustrates how this map cascades into a lower-level version relevant to one area discussed in the text—specifically, medical activities. And it provides more information about what planners who consider formal evaluation of value chains can learn from the Army's experience to date with SMS.

Army Leadership's Current Approach to SMS

Although the Army has been pursuing the development of the SMS as an effective, balanced “scorecard” since 2002, current efforts spring most directly from the strong interest and encouragement of the current Secretary of the Army.¹ He supports the SMS as an enterprise—

¹ The Army initially called the SMS the Strategic Readiness System (SRS). For simplicity and clarity, this appendix refers consistently to the initiative as the SMS. Much of the material in this section draws heavily on Robert Carrington, Strategic Management Divi-

wide performance-management system that he and his senior leaders can use to²

- communicate and align the Army’s mission, vision, strategic objectives and priorities;
- assess performance in an environment of continuing resource constraints and thereby link readiness to resources;
- manage most of the business transformation processes now under way within a unified framework; and
- streamline control and simplify staff processes within HQDA.

The Secretary sees the SMS as a tool he can use to align the Army’s strategic plan, as presented in the Army Posture Statement and Army Strategic Planning Guidance (ASPG), with broadly understood near-term operational and long-term strategic objectives. He wants the SMS to incorporate Secretariat staff performance objectives and plans to review his own, HQDA, and MACOM scorecards three times a year to verify that the SMS is serving its intended purpose.

As currently conceived, the SMS uses a common template to organize strategy maps throughout the Army. This template highlights and links ends, ways, and means:³

- *Ends* explain what the DA does to support the national strategy:
 - trains and equips soldiers and develops leaders
 - provides relevant and ready land power for the combatant commander as part of the joint team.
- *Ways* are the activities or functions and associated processes that an organization uses to achieve its ends.

sion, Headquarters, Department of the Army, Washington, D.C., “Welcome and Kick-Off,” briefing presented at the SRS Conference, San Antonio, Tex., September 13–15, 2005.

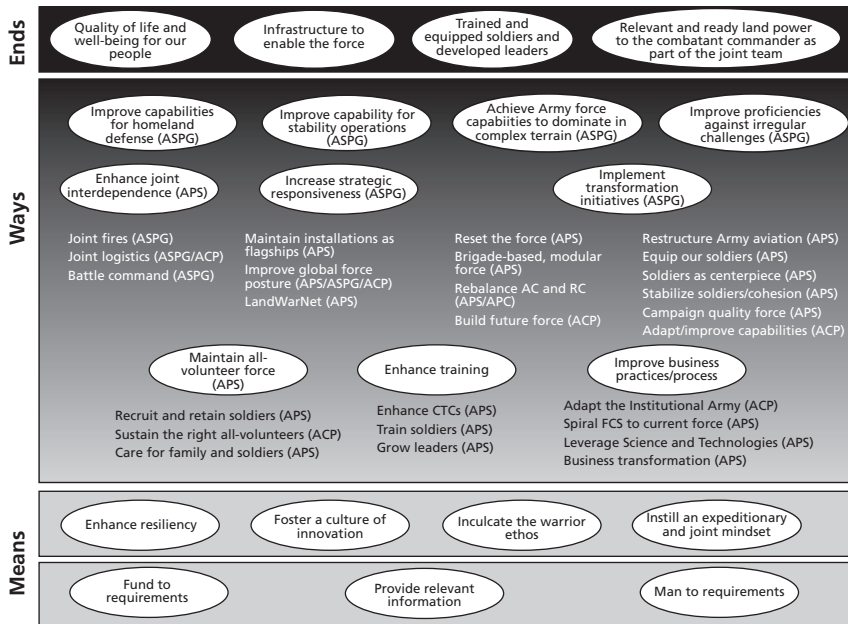
² The bulleted text closely paraphrases material in Carrington (2005, Chart 11).

³ The bulleted text closely paraphrases material in Carrington (2005, Chart 15). *Ends* capture the customer perspective in a typical balanced scorecard. *Ways* capture the internal process perspective. *Means* capture the learning and growth perspective and resource perspective. Note, for example, that the AMEDD map in Figure F.2 still includes these perspectives from an earlier version.

- *Means* are the resources (people, physical assets, information, finances) needed to achieve the ends.

Figure F.1 displays the strategy map approved by the Secretary on June 9, 2005.⁴ Note that the “ends” closely reflect the high-level goals presented in the Army Posture Statement and discussed in the text in Chapter Three. Each of the “ways” highlighted identifies the planning document that articulates what the Army seeks to do to achieve its strategic ends. The ways clarify the Army’s desire to “adapt the institutional Army” as one element of improving business practices and process. But, as the text explains, especially in Chapter Three, activities

Figure F.1
Level 0 Strategy Map for the Army’s Strategic Readiness System



RAND MG530-F.1

⁴ Carrington (2005, Chart 14).

in the institutional Army have an integral role to play in improving joint logistics, maintaining installations as flagships, resetting the force, building the future force, equipping and stabilizing soldiers, recruiting and retaining soldiers, sustaining the right volunteers, caring for families and soldiers, enhancing training, and so on. The design and performance of the institutional Army permeates the *ways* in which the Army seeks to achieve its *ends*.

The means address two different kinds of factors relevant to linking readiness to resources. The first row addresses cultural factors, stating that the Army as a whole should seek to become more resilient, innovative, expeditionary, joint, and focused on the priorities of the warrior. The map calls these out as *means* to highlight the importance of inculcating these ideas throughout all the *ways* highlighted in the map. The second row lists factors more easily understood as resources—full funding, staffing, and access to appropriate information.

The SMS is developing maps like these and the metrics associated with them at three different levels:⁵

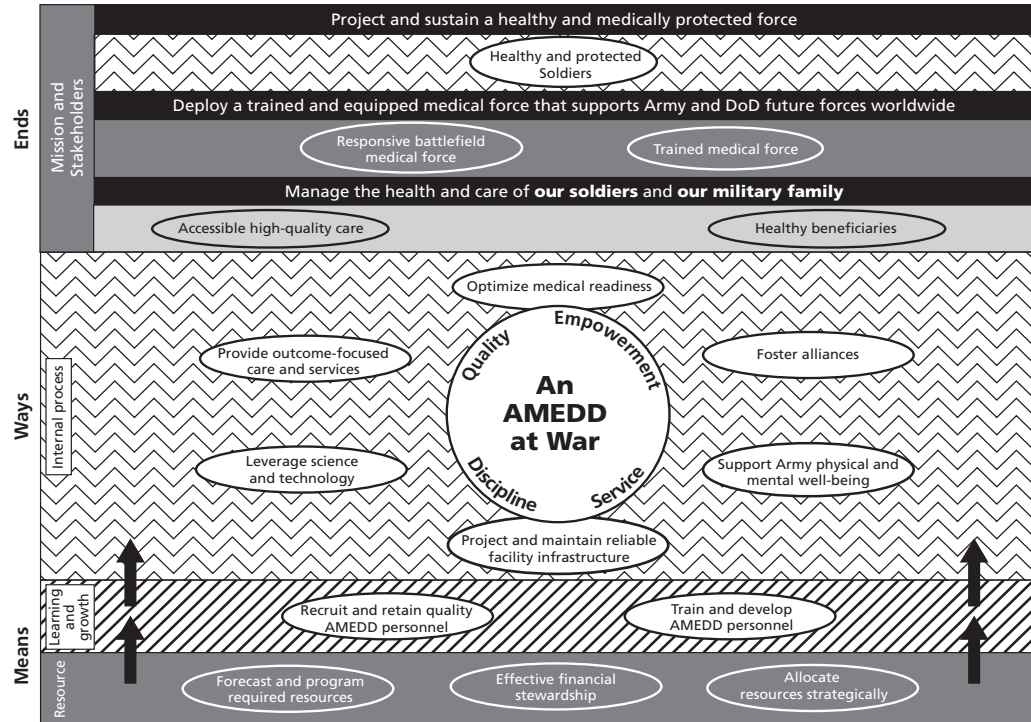
- Level 0. This defines the Secretary’s Army-wide map, shown in Figure F.1. It clarifies the Army’s strategic objectives.
- Level 1. This defines the maps relevant to assistant secretaries, deputy chiefs of staff, and MACOMs. These maps clarify “supporting objectives” relevant to each of these organizations.
- Level 2. This defines the maps relevant to deputy assistant secretaries, Army staff directorates, and major subordinate commands. These maps clarify “critical tasks” relevant to each of these organizations.

As noted above, the Secretary has approved the Level 0 map. The Army is now revising 35 Level 1 maps in the Secretariat (8), Army staff (10), and MACOMs (17), and is creating 11 new ones in the Secretariat (7) and Army staff (4).⁶ Revisions are addressing recent changes in the Level 0 scorecard and metrics proposed in the past that did not appear

⁵ Carrington (2005, Chart 16).

⁶ Carrington (2005, Chart 20).

Figure F.2
U.S. Army Medical Department (AMEDD) Strategy Map (June 2005)



RAND MG530-F.2

sufficient to provide the information needed for past scorecards. The SMS scorecards remain a work in progress.

Figure F.2 presents a Level 1 map relevant to one of the activities addressed in the text, medical services.⁷ The ends reflect the range of stakeholders discussed in the text in Chapter Five. The ways cascade from these and highlight a much smaller number of activities and processes than the Level 0 map in Figure F.1. This leaner map is more in tune with the simplicity sought in a commercial-style balanced scorecard and reflects the refinement that has come as the AMEDD map has evolved over the last three years. Means focus on the procurement and development of people and on effective management of resources, broadly writ. Recall that the scorecard that the Surgeon General uses for day-to-day management of AMEDD is more detailed than that shown in Figure F.2.

Relevant Lessons from the SMS Effort

Hundreds of people across the Army, if not more, are now engaged in the development and sustainment of the SMS. They are accumulating the experience often associated with the development and use of performance metrics to support strategic alignment within an organization. These people are a valuable resource that the Army can potentially tap to develop performance metrics like those discussed in the text or to bring such metrics into the context of the SMS itself if that is appropriate. They are also a valuable source of lessons learned. A growing literature offers valuable lessons learned about the development and sustainment of performance metrics in a strategic management

⁷ Sylvia Peré and LTC Ivan Speights, Headquarters, MEDCOM, Strategic Planning Branch, "Developing the Strategy-Focused Organization at U.S. Army Medical Department: Balanced Scorecard Marketing Communications," briefing presented at the SRS Conference, San Antonio, Tex., September 13–15 2005, Chart 190.

setting.⁸ But an Army audience may find lessons learned and presented in a Army-centered setting more informative or convincing. Army experience with the SMS offers precisely such lessons.

Important points relevant to the approach described in this monograph emerged from discussions in the September 2005 SRS conference in San Antonio, Texas:⁹

- Achieve and sustain the support of the senior leadership (Colello, Chart 111; “Strategy Refresh Breakout Session Debrief,” Chart 326). Senior leaders could benefit from a special training session; some understand SMS, while others need orientation (“Strategic Performance Review Breakout Session Debrief,” Charts 324 and 325). HQDA needs to articulate its strategy management philosophy, provide direction to implement it (“Strategy Refresh Breakout Session Debrief,” Chart 326), and sustain high visibility over design and sustainment of performance metrics (Briggs, Chart 137). The senior leadership must endorse a strategic review culture (“Strategic Performance Review Breakout Session Debrief,” Charts 324, 325). Senior leaders should deliver, on a frequent

⁸ See, for example, Nils-Göran Olve, Jan Roy, and Magnus Wetter, *Performance Drivers: A Practical Guide to Using the Balanced Scorecard*, Chichester, UK: John Wiley and Sons, 1999; James B. Whittaker, *Balanced Scorecard in the Federal Government*, Vienna, Va.: Management Concepts, 2001; Robert S. Kaplan and David P. Norton, *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*, Boston, Mass.: Harvard Business School Press, 2003; and other materials through Balanced Scorecard Collaborative (undated).

⁹ The following points closely paraphrase and integrate points raised in LTC Dave Briggs, Headquarters, USAREUR, “Balanced Scorecarding and the Strategic Readiness Update in USAREUR,” briefing presented at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Chart 137; Patricia Bush, “Cascading Scorecards into Organizations and to Teams/Individuals,” briefing presented at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Chart 162; Charlie Colello, Office of the Army CIO/G-6, HQDA, “CIO/G-6 Strategy, Implementation, and Monitoring,” briefing presented at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Chart 111; Daniel Kenny and Honter Lin, “SRS Automation at the Tactical Level, 3rd US Infantry, The Old Guard,” briefing presented at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Chart 237; Peré and Speights (2005, Chart 204); “Strategic Performance Review Breakout Session Debrief,” conducted at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Charts 324 and 325; and “Strategy Refresh Breakout Session Debrief,” conducted at the SRS Conference, San Antonio, Tex., September 13–15, 2005, Chart 326.

basis, the balanced scorecard message face-to-face (Peré and Speights, Chart 204).

- Leaders are more likely to use—and therefore support—a simple system that is easy to understand, use, and drill down (“Strategy Refresh Breakout Session Debrief,” Chart 326). Simpler systems are also easier to keep up-to-date and aligned with leadership priorities (Peré and Speights, Chart 204). That said, priorities should not change too much from year to year (“Strategy Refresh Breakout Session Debrief,” Chart 326).
- Lower-level participants can benefit from higher-level or operational metrics, especially if they are outcome-oriented (Colello, Chart 111). Cause-and-effect links should be clear, from the leadership’s strategic vision to the action plan for performance evaluation (Briggs, Chart 137).
- Strategy-focused meetings should spend 60 percent of the time reviewing strategic issues and 10 percent on actual measures. A strategy map provides the big picture; discussion should center on the map (“Strategic Performance Review Breakout Session Debrief,” Charts 324 and 325).
- To encourage staff buy-in, such an effort should be an integral part of ongoing planning and oversight activities (Colello, Chart 111; Briggs, Chart 137; “Strategy Refresh Breakout Session Debrief,” Chart 326). It should not be treated as simply another data-reporting requirement (Briggs, Chart 137). Automatic access to existing Army databases is crucial, yet very difficult to obtain. But activities should not be automated to simply feed a new requirement for performance objectives or metrics (Kenny and Lin, Chart 237).
- Leaders and champions responsible for such an effort should communicate effectively and continuously on what the effort is doing and why. They should never assume that the people who must execute the effort know what they should know. When in doubt, leaders should overcommunicate. Over time, the effort should seek news stories about accomplishments to date and share them with the entire organization (Peré and Speights, Chart 204).

- For such an effort to succeed, relevant participants must understand how things work in the Army. A shared understanding of overall Army management process flow and functional process flows is critical. Task organization will be required to achieve such shared understanding. One office must be responsible to lead each initiative, but each initiative can expect to use talents from across an agency or MACOM and the Army (Colello, Chart 111).
- Building a balanced scorecard requires an investment of resources, most optimally key, high-performing resources. At some point, driving a strategy throughout an organization will reach diminishing net returns. The decision to invest an additional dollar should consider how much value it is likely to yield (Bush, Chart 162).
- A typical balanced scorecard development takes eight to 12 weeks to complete. Once a scorecard is developed, a first report on performance should occur within 60 days (Bush, Chart 162).
- To provide an expectation that a strategic management effort will continue, it must establish a viable culture of its own and a repeatable process (“Strategic Performance Review Breakout Session Debrief,” Charts 324 and 325). Such an effort should revise the plan as needed. To do so, participants should “Listen, listen and listen some more” (Peré and Speights, Chart 204).

Reports from organizations such as AMC and USAREUR, which were recognized at the conference for their best practices, confirm that they indeed pursue many of these practices (Carrington, 2005, Chart 51).

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