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Cost Implications of a Unified Medical Command

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Executive summary

The Program Budget Decision (PBD) 753 dated 23 December 2004 directs the Under Secretary of Defense for Personnel and Readiness (USD (P&R)) to "develop an implementation plan for a Joint Medical Command by the FY 2008 – FY 2013 Program/Budget Review." To accomplish this, the USD (P&R) established the Unified Medical Command Working Group (UMCWG) made up of representatives from the Joint Staff, Health Affairs, and each of the Services to develop an implementation plan.

The Department of Defense (DOD) could configure a unified medical command any number of ways, so being able to objectively sift through the various alternatives is important. One important factor in choosing between the various alternatives is cost. Accordingly, the Bureau of Medicine and Surgery (BUMED) asked the Center for Naval Analyses (CNA) to estimate the potential cost implications of various configurations of a unified medical command, which we did in this study. We recognize that there are other considerations in choosing among alternative configurations, such as the interoperability and interchangeability of medical forces, but these are outside the scope of this study.

Approach

Because a unified medical command could potentially take on any number of configurations, we did not want to choose one configuration and estimate the cost implications of it alone. As such, we chose an approach—estimating savings and costs by function—that allowed us to estimate the cost implications of many different configurations. We used this approach to estimate the costs of three specific structures of a unified medical command: (1) a single medical command, (2) a medical command and a healthcare command, and (3) a single medical service.

Findings

Table 1 shows our potential long run, annual savings estimates by command structure. A single medical service has the largest potential savings—$417 million annually, assuming DOD eliminated a mix of civilian, military, and contractor personnel. The savings with a single medical command are $344 million annually. Savings are less ($282 million annually) with a separate medical and healthcare command structure because it is less unified or consolidated than the other two configurations. If, however, DOD were unwilling to cut military billets and took all of the personnel reductions from a mix of civilian and contractor positions, annual savings in the long run would be $384 million for a single medical service, $315 million for a single medical command, and $254 million for a structure with a medical and a healthcare command.[1]

Table 1. Potential annual savings in the long run by type of command structure (figures in thousands of 2005 dollars)

Type of structure	Eliminating a mix of civilian, military, and contractor personnel	Eliminating a mix of civilian and contractor personnel
Single Medical Command	$343,701	$315,478
Medical Command and a Healthcare Command	$281,818	$254,326
Single Medical Service	$416,640	$384,022

Note that the potential savings figures in table 1 are for long run costs. Implementing a unified medical command will require a long and potentially costly transition period. We have not estimated costs for this transition period because (1) we do not know the timing of such an implementation and (2) the transition costs will delay the

1. Another option is to reprogram the military headquarters positions identified for reduction into clinical positions within the medical treatment facilities. We estimated that if DOD did this, rather than eliminate the billets, it could save purchased care costs. However, the net gain of recapturing the purchased care costs saved would be 0 to 15 percent less than the cost of providing that purchased care within the military health system (MHS). So from a cost standpoint, it is more economical to simply cut the headquarters billets than to reprogram them to clinical billets.

realization of potential annual savings from personnel reductions. The notable exception is that a successful transition to a unified medical command would require the development of a common comptroller system. We estimated (based on the cost of the Defense Medical Logistics Standard Support (DMLSS) system) that it would cost roughly $450 million over 10 years to develop such a system. Note that these cost and time estimates may be on the high end because DOD already has some processes underway to standardize the accounting systems. These programs include the Standard Financial Information Structure (SFIS) and the Defense Enterprise Accounting and Management System (DEAMS). If these programs are successful, the cost and time to develop a common comptroller system may be substantially less.

We wish to emphasize that DOD's ability to realize the potential savings we show in table 1 depends crucially on clear command and control to make the necessary changes. For example, our analysis shows potential savings of $129 million annually from changes in the parent-child command structure of medical and dental treatment facilities. However, we do not believe that DOD will realize these savings without proper execution and clear command and control. It is essential that the unified commander have the ability to cut billets and positions and funding for programs that are redundant and not needed under a unified command. Otherwise, these savings will be illusive.

We base this conclusion on the fact that the parent-child changes at the Navy's medical treatment facilities in New England (NHCNE) and at Fort Monmouth (Army) have not produced the savings that they could have. Cuts in administrative positions are apparently difficult to make. While there may be an array of reasons for this, it seems clear that there is neither a structure nor guidelines for identifying which administrative responsibilities should be under a parent versus a child command structure.

Additionally, clear command and control is essential if DOD is to realize system savings in information management. We note that while DOD has developed or is developing tri-service systems to perform the function of Service-specific systems, it is difficult to actually cut off funding for legacy systems. The unified medical commander

must have the ability to cut off funding for redundant information management systems, if DOD is to fully realize potential savings.

Finally, there is the potential for savings in infrastructure, but these savings are likely small and realizing them at all would require the implementation of a unified medical command to begin almost immediately. If the implementation of the Base Realignment and Closure (BRAC) recommendations were too far along, it would be too late to realize these savings.

Introduction

A unified medical command is not a new idea. The government has revisited the issue of whether or not to unify the three Services' medical commands several times. Other than the current effort, the most recent review stemmed from the National Defense Authorization Act (NDAA) for FY 2000. It directed "that the Secretary of Defense submit a study identifying areas of military medicine in which joint operations might be increased, including organization, training, patient care, hospital management, and budgeting" [1].

The current effort is a result of the December 2004 Program Budget Decision (PBD) 753. PBD 753 directs the Under Secretary of Defense for Personnel and Readiness (USD (P&R)) to "develop an implementation plan for a Joint Medical Command by the FY 2008 – FY 2013 Program/Budget Review." To accomplish this, the USD (P&R) established the Unified Medical Command Working Group (UMCWG) made up of representatives from the Joint Staff, Health Affairs, and each of the Services to develop an implementation plan.

The Bureau of Medicine and Surgery (BUMED) asked the Center for Naval Analyses (CNA) to estimate the potential cost implications of a unified medical command. Note that this study is focused on the cost implications of such a command. Other factors may or may not favor a unified medical command such as interoperability and interchangeability of medical forces that are not measurable in terms of costs. While we recognize such issues, they are outside the scope of this study.

Structure

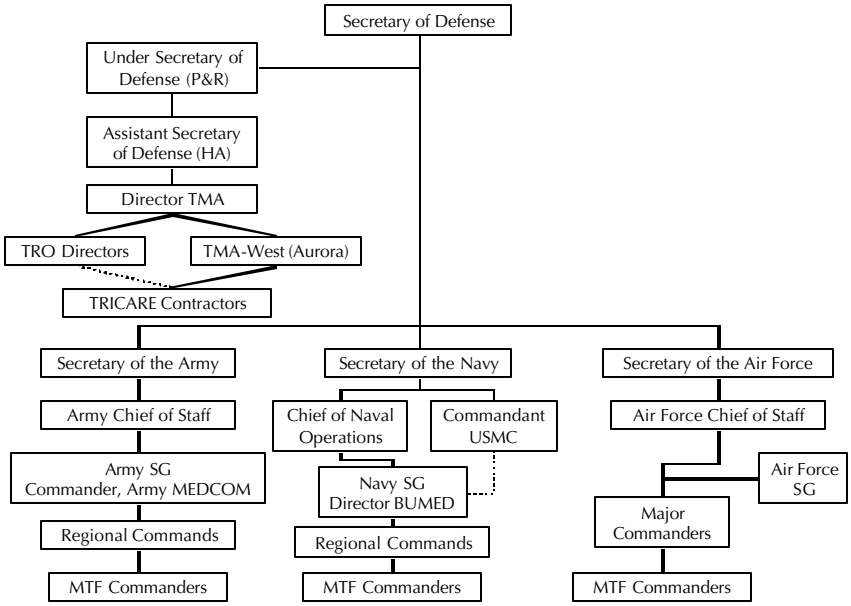
To estimate the cost of a unified medical command, we need to know how its command structure will differ from the current structure.

Current structure

Figure 1 illustrates the current structure in which Defense Health Program (DHP) dollars flow from the Secretary of Defense to the USD (P&R), to the Assistant Secretary of Defense for Health Affairs (ASD (HA)). ASD (HA) passes DHP funds on to the Services and Tricare Management Activity, which handles purchased care.

DHP funds flow directly from Health Affairs to the Surgeon General in the Army and the Navy, but not in the Air Force, where the funds flow to the Air Force line. In the Army and Navy, funds further flow from the Surgeon General to regional commands and from there to the military treatment facility commanders. Funds flow down the line of command in the Air Force to the Major Commands and from there to the military treatment facility commands.

Figure 1. Current medical command structure



Unified medical command structure

Because we don't know the exact structure a potential unified medical command would take, we have explored three possibilities

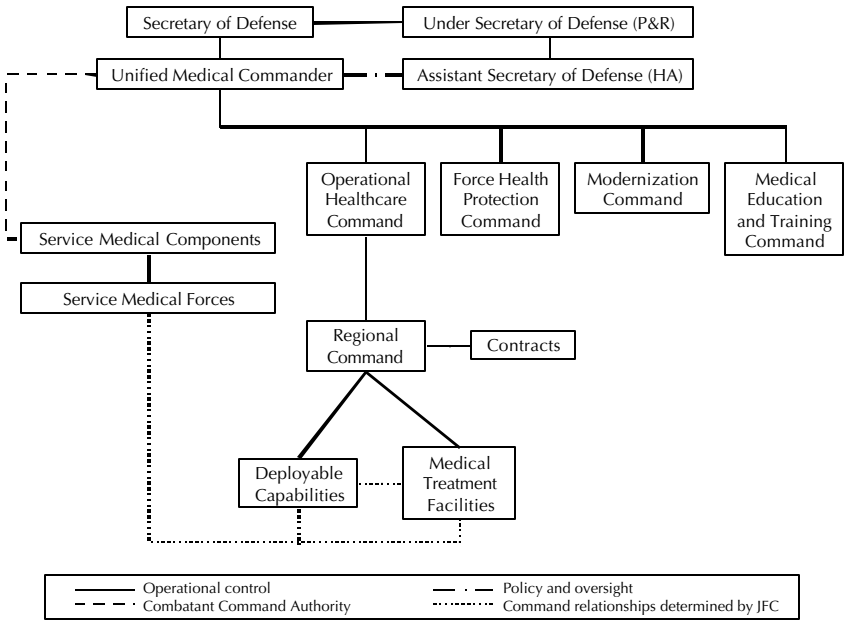
in conjunction with various options the Unified Medical Command Working Group is considering. These are the following:

- A single medical command
- A medical command and a healthcare command
- A single medical service

Figure 2 illustrates the concept of a single medical command where all aspects of the current command structure fall under a unified medical commander. The key differences from the current structure are the following:

- The Operational Healthcare Command rather than the Tricare Management Activity (TMA)has command over purchased care and the contracts .
- Military treatment facilities all fall under the Operational Healthcare Command.
- DHP funding flows directly to the unified commander and does not go to the Army or Navy Surgeon General or the Air Force line, which is a significant change for the Air Force.

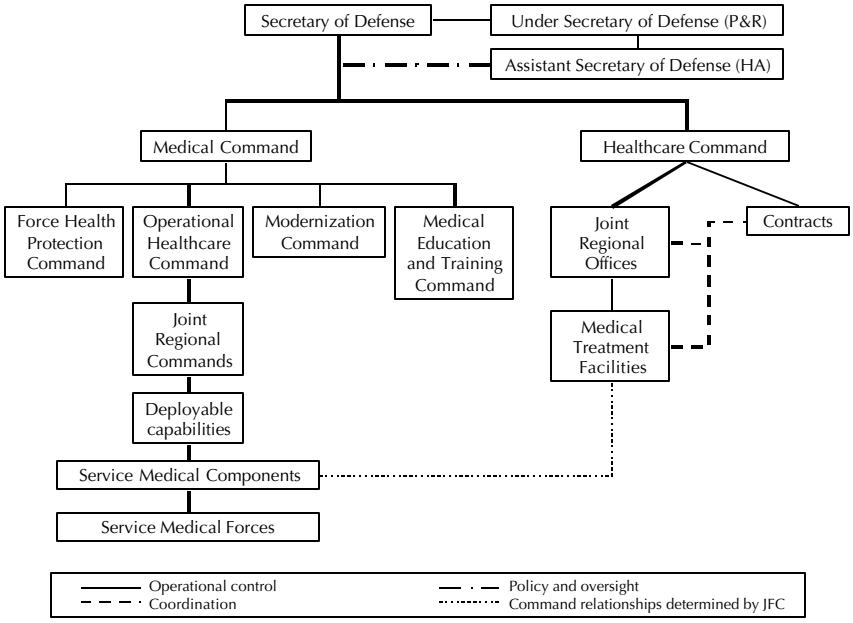
Figure 2. A single medical command structure



There are other changes in the structure, such as combining the medical education and training commands of the Services, but the above differences are the most significant.

An alternative structure to a single medical command is to have both a medical command and a healthcare command as figure 3 shows. Under such a structure, the benefits mission—both direct and purchased care—falls under the healthcare command. The healthcare command would own the military treatment facilities and handle the contracts. The medical command would handle all other components, with a primary emphasis on training personnel and the operational mission.

Figure 3. A medical command and a healthcare command structure

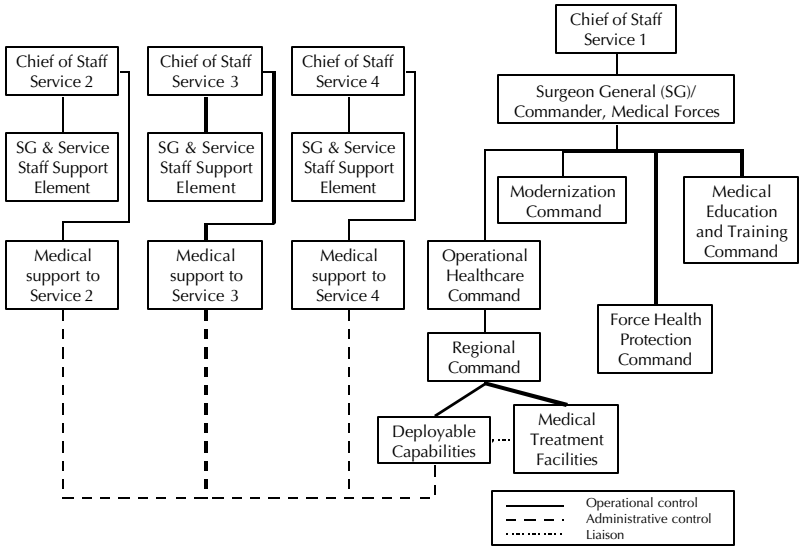


With this background, the most obvious research question is what differences would these two command structures have on cost? The key differences would be that there would be less reduction in headquarters command staff because DOD would be going from four to two command structures instead of four to one. In essence, the dual command structure of the medical and healthcare command would not alleviate all of the redundancies within functions such as regional commands, financial management, information

technology, and general headquarters support to the same degree as the other two alternatives. This means reduced potential savings.

The final option we looked at was a single medical service, and figure 4 shows its structure. This structure would have cost implications beyond those of a single medical command derived from additional savings in manpower functions that would otherwise not be possible. This option is modeled after the U. S. Special Operations Command (USSOCOM) that was created as part of the 1987 Goldwater-Nichols Act as a means to revitalize special operation forces (SOF) and correct deficiencies in low-intensity combat operations. The Goldwater-Nichols Act gave the special operations forces control over their own resources under a single four-star commander. Congress believed that giving SOF Service-like control over their resources would enhance interoperability and facilitate modernization. By all accounts, USSOCOM has met these expectations.

Figure 4. Single medical service



There was discussion during the Goldwater-Nichols negotiations about making USSOCOM a separate Service branch. Ultimately, a compromise was developed to endow USSOCOM with Service-like command and control responsibilities over SOF. USSOCOM, like the Services, has the authority and responsibility to develop a major

force program (MFP) budget submission for review by the Secretary of Defense. Goldwater-Nichols also established the Office of the Assistant Secretary of Defense (ASD) for Special Operations and Low-Intensity Combat (SO/LIC) to serve as the policy and resource agency. Subsequent legislation provided USSOCOM with full acquisition authority. Additionally, USSOCOM has the full authority and responsibility to train all SOF personnel and has the authority to monitor the promotions, assignments, retention, training, and professional military education of special operations forces officers. This broad range of command and control over a specific supporting function under the legislative authority of United States Code, Title 10, Section 167, is similar to the proposed arrangement for the single military Service. It is important to note that USSOCOM is both a supporting and supported organization. The Services provide personnel support to include recruitment, initial training, distribution policies and execution, pay, and promotions for SOF personnel. USSOCOM is a supporting command in that they supply other Combatant Commanders (COCOMs) with SOF support when required.

There is concern that the Unified Medical Command will somehow interfere with providing either the operational or healthcare benefit mission to the Services. USSOCOM organizational structure provides for single command and control for headquarters' functions of acquisition and logistics; requirement determination and resource allocation; operations, plans, and policy; and command support. Even though USSOCOM has command and control oversight of all SOF located within the continental United States (CONUS), each of the Services has its own "branch" for execution of the SOF mission. This provides a means to retain Service-specific core competencies for the unique environments of each of the Services.

Naval Special Warfare Command (NSWC) located in Coronado, California, has about 5,400 active duty personnel supplying support Sea, Air, Land (SEAL) teams, special boat units, and SEAL delivery vehicle teams. This elite force provides support in maritime, littoral, or riverine environments. Air Force Special Operations Command (AFSOC) headquartered in Hubert Field, Florida, has about 10,000 active and guard forces. AFSOC's primary mission is to provide specialized air power in support of SOF mobility, forward presence, precision strikes, and information operations. Army Special Opera-

tions Command (ARSOC) located in Fort Bragg, North Carolina, currently has about 26,000 active and guard personnel who are organized into Special Forces units, Ranger units, aviation units, civil affairs units, psychological operations units, and support units. On November 1, 2005, the United States Marine Corps announced the creation of the Marine Special Operations Command (MARSCOC). MARSCOM will be located in Camp Lejeune, North Carolina, and will grow to about 2,600 Marines assigned to various locations. MARSOC's implementation date and specific mission capabilities have not been determined.

The purpose of this background on USSOCOM is to frame a recommendation for a unified medical command structure that will have the least amount of turbulence upon the operational and direct healthcare mission. History suggests that unifying the SOF under the USSOCOM did not hinder the operational mission. In fact, the 2006 Quadrennial Defense Review (QDR) recommendations are to further increase the role and size of USSOCOM, suggesting that this model has not impinged upon the Service-specific missions. Assuming that any unified medical command structure would take great pains to protect support to operational missions, we do not include any positions directly linked to the operational missions of the Services in the cost estimates of this study. We do anticipate that there may be redundancies within land- or air-based missions, but believe that functional consolidation decisions should be left to the Services. It is important to note that legislation provided USSOCOM with clear command and control of SOF. Moreover, it appears that USSOCOM fully implemented the consolidation of these resources and missions to develop a remarkably effective organization.

Approach

Given the various prospective structures for a unified medical command, we needed an approach that would enable us to determine potential costs and savings by function. Under this approach, if a structural alternative would not affect a certain function, we would exclude its potential costs and savings from the estimate. Specifically, we estimated the potential costs and savings for the following functions:

- Healthcare operations
- Comptroller
- Information management / information technology (IM/IT)
- Education and training
- Research and development
- Logistics
- Strategic planning
- Human capital management
- Force health protection / environmental health
- General headquarters

It is possible that the Unified Medical Command Working Group or USD (P&R) may settle on an alternative structure not considered here. However, because we have used a functional approach to costing out alternatives, DOD could adapt the results of the study to estimate the potential costs and savings for another alternative by including or excluding the appropriate functions. This functional approach will also facilitate cost estimation alternatives that were not specifically considered in this study.

The sources of potential savings or costs include personnel, information management, and infrastructure; however, our focus was largely on personnel. Our approach was to estimate cost changes given a post-BRAC baseline to avoid double-counting an efficiency that has already been identified by the Base Realignment and Closure (BRAC) Commission. Additionally, we did not look at activities that were already "joint" because there would be no savings in these functions.

Note that in looking at personnel changes, we did not look at individual billets in each of the Services and TMA and make a subjective judgment call about the ones we thought were redundant and could therefore be eliminated. Rather, we relied on the economic literature that documents the reductions that organizations have realized when they merge. We discuss this literature in the next section. In addition, we detail how we estimated savings from personnel reductions before proceeding to discuss our specific savings estimates.

History of consolidations

In this study, we are not eliminating specific military, civilian, or contract positions. Clearly DOD will have to make those decisions when it implements a unified medical command, but this study is not the proper place for that. For our purposes, we need a methodology for estimating the number of positions in aggregate that DOD can eliminate for specific functions such as education and training or logistics. To make these estimates, we turned to the literature to look at what DOD might expect based on past consolidations of public and private institutions.

In brief, our review of relevant literature found evidence that a unified medical command, if well-executed, can be expected to produce operational efficiencies through economies of scale, administrative consolidations, elimination of underused inpatient capacity, and elimination of duplicative services [2]. We discuss the specific literature in the following sections.

Effect of consolidations for hospitals and HMOs

Not all studies of private sector consolidations are relevant to a unified medical command. There are a variety of motivations for consolidations in the private sector besides improving efficiency, such as gaining additional market power or access to capital. Therefore, some studies evaluate whether a consolidation has been successful according to criteria other than operational efficiency. Because operational efficiency is the principal motivation for a unified medical command, we limited our literature review to studies in which efficiency was the outcome of interest. We found both quantitative and qualitative studies of the effect of consolidations on operational efficiency in the private healthcare sector, and we discuss both types of studies here.

Hospitals

Quantitative studies of hospital consolidations have generally found that consolidation tends to increase operational efficiency [2-7]. In these studies, changes in operational efficiency are represented by changes in operating costs. When cost growth for a group of consolidating hospitals is compared with cost growth for non-consolidating hospitals, these studies find lower cost growth among consolidating hospitals. For example, [4] calculated that the cost per adjusted admission was 68.4 percent higher in 1994 compared to 1986 for merging hospitals but 75.5 percent higher for non-merging hospitals. Similarly, [6, 7] found lower cost growth in merging hospitals than in non-merging hospitals.

For information on exactly how hospital consolidations lead to cost savings, we turned to the qualitative literature. In general, case studies show that administrative consolidation occurs before clinical consolidation [8-11].[2] Clinical consolidation tends to be much more difficult, and in some cases hospitals had not been consolidated long enough to attempt comparative cost calculations at the time of the case study.

Clinical consolidation is not something that will occur with a unified medical command, so our focus was on administrative consolidations. Administrative consolidation tends to generate cost savings, although useful data on the magnitudes of the savings are difficult to locate. There is a useful example from the 1998 merger of two teaching hospitals in New York City. Combining the finance offices of the two original hospitals saved about $10 million after one year, which was 0.7 percent of the annual corporate income [11].

2. Reference [9] found that duplicate positions were eliminated at the senior- and middle-management levels and that there were savings from outsourced services such as insurance, maintenance, and facilities management because the merged organization was able to obtain more favorable rates due to its larger size. Another case study [8] found that "significant savings" accompanied hospital mergers, as a result of the consolidations of administrative services, such as finance, information systems, and marketing.

HMOs

Unlike the studies of hospital consolidations, the quantitative studies of health maintenance organizations (HMOs) consolidations do not provide any evidence of an increase in operational efficiency [12, 13]. Unfortunately, there do not seem to be any qualitative studies of HMO consolidations. Such case studies would have presumably provided some insight as to why consolidating HMOs do not seem to benefit from the same efficiency gains as consolidating hospitals.

Reference [13] used data on HMO mergers during the period 1988-1994 to determine whether operational efficiency tended to improve after a merger. The measures of operational efficiency were the two main expense categories for HMOs (administrative expenses and medical care expenses), each as a percentage of operating revenues. Controlling for industry trends in operating efficiency, Reference [13] found no statistically significant differences post-merger compared to pre-merger. Similarly, [12] used data on HMO mergers during the period 1985-1997 to study whether mergers tended to reduce costs. The authors found that the percentage cost difference (post-merger) between merging and non-merging HMOs was not significantly different from zero.

Existence of economies of scale

Although the qualitative studies indicate that the overall efficiency gains in consolidating hospitals are in part due to gains in administrative efficiency, neither the qualitative nor the quantitative studies are able to fully identify the exact sources of the efficiency gains. Because consolidated entities should tend to be larger after consolidation than ones that do not consolidate, possible sources of efficiency gains are economies of scale.[3] We found two studies of

3. Economies of scale exist when the cost to produce a unit of output declines as the total quantity of output increases. Economies of scale with respect to a particular input, such as administration, exist when the cost of the input per unit of output declines as the total quantity of output increases. For example, when there are administrative economies of scale, a firm is able to spread administrative input costs over a

economies of scale in hospitals, and both indicated that economies of scale are probably at least part of the explanation for lower cost growth in consolidating hospitals. Reference [14] found administrative economies of scale in smaller hospitals, and [15] found overall economies of scale for all hospital sizes.

As for economies of scale in HMOs, the previously discussed finding that consolidation did not seem to have much effect on the operating efficiency of HMOs is somewhat contradictory to the findings on economies of scale. Specifically, two studies found economies of scale for smaller HMOs. Reference [16] found scale economies in HMOs up to 115,000 enrollees, and [17] found scale economies up to 50,000 enrollees.

Estimates of administrative economies of scale

Because administrative consolidation is the major change that a unified medical command would embody, we reviewed studies of administrative economies of scale in a variety of industries. We were particularly interested in studies that provided estimates of the elasticity of administrative costs with respect to total output [18-25].[4] Although we would have preferred only studies that estimated administrative elasticity in the healthcare sector, there was only one such study [24] (dealing with the British National Health Service), so we have not relied on it solely as a scale economy estimate.[5] Con-

larger quantity of output. In the case of hospital consolidations, this means that two consolidating hospitals would be able to produce a combined level of output that is the same as before the consolidation, but they would need a combined level of administrative input that is less than the sum of the administrative inputs from each hospital before the consolidation.

4. Elasticity of administrative costs with respect to total output is defined as the percentage change in administrative costs divided by the percentage change in output. For example, for an administrative elasticity of 0.5, a 1.0-percent increase in output would require an increase in administrative costs that is only half as large (0.5 percent).

5. Note that if we did rely solely on this study's scale economy estimate, our savings estimates discussed in subsequent sections would be larger

sidering the wide range of industries in these studies, the estimates of administrative elasticities were generally similar, ranging from about 0.60 to 0.90, with a mean of about 0.80 as table 2 shows.

Table 2. Administrative scale economy estimates

Study	Data	Estimate
Coates and Updegraff [18]	Banks (1969)	0.907
Pickford [19]	U.K. universities (1965-1970)	0.826
Caswell [20]	Pension plans (1969-1970)	0.798
Mitchell and Andrews [21]	Pension plans (1975)	0.827
Ghilarducci and Terry [22]	Pension plans (1981-1993)	0.820[a]
Latzko [23]	Mutual funds (1997)	0.910
Giuffrida, Gravelle, and Sutton [24]	Family Health Service Authorities (FHSAs) in the British National Health Service (1989-1995)	0.627 [b]
Kahler and Sargeant [25]	Charities in the U.K. (1992-1996)	0.710
Average		**0.80**

a. Specifically, the estimates are 0.818 (1981 data), 0.835 (1987), and 0.808 (1993) for an average of 0.820.
b. The estimates were 0.603 and 0.650 for the fixed effects and random effects models, respectively.

Note that a scale economy estimate of 0.80 doesn't mean that by merging, the combined organization will only have 80 percent of the administrative cost of the sum of the administrative costs of the merging organizations. The combined administrative costs may be more or less than 80 percent. An estimate of 0.80 means that if the output of an organization increases by 1 percent, administrative costs will only need to increase by 0.80 percent. Hence, on the margin, the increase is only 0.80 percent; in total, the savings in administrative costs would be negligible because output only increase by 1 percent. But when organizations merge, the change in the output from pre-merge to post-merge levels will be substantially more than 1 percent, which may lead to substantial cost savings.

Clear command and control

The potential for savings through consolidation of administrative functions is clear from the civilian literature. The critical issue is

because the scale economy estimate from this study was lower than all of the other studies' scale economy estimates.

whether the military will be able to realize these savings. One example of military consolidations is the German Armed Forces, which has unified its medical forces under one command—their Joint Medical Service. The German Joint Medical Service was in its fourth year of implementation in 2005 when its medical chief, VADM Karsten Ocker, spoke to a Defense Economics conference and spoke of the German military's experience with implementing a unified medical force.

To some degree, the change in the German military was driven by budgetary pressure that drove reductions in money and personnel. To accomplish this goal, the medical components of the respective services had to pool their resources. When they did so, they found redundancies in personnel, training, development, procurement, and other areas that they had to eliminate [26].

Not surprisingly, a key element for the German Joint Medical Service is having more control and accountability for its own budget. Combining the financial controls with a single accountability point is "a very valuable tool in order to avoid redundancies and standardize" the system [26]. The point here is that the German Joint Medical Service saw opportunities for limiting redundancies that weren't going away without an outside impetus and an enabling environment. Financial constraints provided the motivation, and the command structure facilitated changes.

Similarly, it is clear from the literature that some mergers don't produce the expected benefits and efficiencies. For example, the Canadian government largely reversed the integration of its armed forces. This followed a task force that examined the unification and concluded, "with regard to financial savings, increased operational effectiveness, increased flexibility, and rapid decision-making, it is dubious whether unification has achieved the intended goals" [27].

Some mergers fail due to cultural differences between the merging organizations. "The period following an organizational consolidation is often characterized by 'we-they' tensions, power-struggles, turnover and absenteeism, and declines in job-related attitudes and performance...that typically require at least one to two years to resolve...and five to seven years before organization members feel truly assimilated" [28]. That said, these cultural issues aren't insur-

mountable. For instance, VADM Ocker said, “I gradually have the feeling that the people, even in their minds, now have made the transition to the Joint Medical Service. So if we sit together, it’s no longer Army people here, Navy people there, Air Force medical officers there, but they are mixing now, which is a good sign” [26].

Some mergers fail due to lack of good management. For example, a case study of a failed hospital merger noted the need for “the management skills necessary to achieve cost savings and address the operational inefficiencies resulting from a larger clinical enterprise” [10]. This study further pointed out that “health system mergers do not automatically result in economies of scale.” Clearly any merger needs to be well-planned and well-executed to realize any of the sought for benefits and efficiencies.

The commander of any unified medical command must have the clear command and control necessary to force the changes that will result in the desired operational efficiencies and cost savings. The commander must have the ability to cut billets, cut off funding for unnecessary civilian positions, and eliminate contracts that are no longer necessary; otherwise, DOD may not realize the savings we estimated using the scale economy estimates from the literature. The point is that leadership matters. In fact “senior leadership interest, effort, and buy-in” were seen as necessary for improving interagency interactions in a study looking at the functional training for the Joint National Training Capability (JNTC) [29]. It seems a reasonable inference that the same could be said of the integration that would be necessary for a unified medical command and the steps that would be necessary to drive the changes needed to realize potential savings.

Methodology for estimating personnel savings

This section details our methodology for estimating personnel reductions and costing out the savings associated with those reductions. We begin with the methodology for estimating personnel reductions.

Estimating personnel reductions

The review of the civilian literature showed that the average administrative economy of scale was 0.80 (see table 2). We now describe how that translates into an estimate of personnel reductions. There are two issues we must consider here. First, what is the "output" of the unified medical command, and second, how do we model the production function for producing this output?

Measuring administrative output

For our purposes of estimating the savings associated with a unified medical command, we thought of its output in terms of administrative (not clinical) output. None of the potential changes we costed out in this study assumed any change in the clinical operations of the military health system. All of the changes involve command or administrative changes. The problem was that administrative output does not have a well-defined, measurable output like medical or dental workload for clinical operations. Given this problem, we took two approaches to measuring output.

First, if we think of the administrative or command output as providing the management of the system, the output for each Service and TMA is 25 percent of the total output. Such an assumption could be problematic when the merging organizations are of vastly different size. This leads us to our second measure of output.

When size differences are substantial, we could assume that the administrative output is proportional to the number of people working a particular function. Essentially this means that if the Army has 400 people working in some function compared to 50 each for the Navy and Air Force (for a total of 500), the Army produces 80 percent of the combined output. In contrast, if we assume that the output of each Service was the same rather than proportional to its personnel (i.e., one-third share for each Service), the combined output would be 200 percent above the Army's current level. We have applied each of these methods in our subsequent estimates where appropriate.

Administrative production function

Given an estimate of administrative output, we now discuss how we modeled changes in personnel needed to meet the combined output. In economic terms, we think of organizations employing their resources—personnel and capital—to produce a good or a service and use a production function to describe this process. Essentially a production function is a formula that describes the output that a given set of inputs can produce, or the inverse—the inputs necessary to produce a given output.

This study used a simple production function with one input—personnel—to produce the administrative output. Specifically, this production function is the following:

$$A = \left(\frac{P}{C}\right)^{\frac{1}{e}}$$

where A is administrative output, P is personnel, C is a constant, and e is economies of scale. Note that this function was used in previous research looking at potential savings for consolidations of Navy system commands [30] and Navy facilities [31]. We can manipulate this formula to $P = CA^{e}$, which shows the number of personnel necessary to produce a particular level of administrative output.[6]

6. The constant term, C, is equal to $P_I / (A_I)^e$ where P_I is initial personnel and A_I is initial output and is equal to the output of the base organization prior to the merger. (The base organization output could

To illustrate how this formula translates into personnel reductions, we assumed that two organizations of equal size (in terms of output) merged. The personnel savings would be 13 percent of the sum of the personnel of the separate organizations as table 3 shows. If three organizations merged, the savings would be 20 percent because the combined output is a third larger than with two organizations, allowing for increased economies of scale.[7]

Table 3. Impact on personnel with a scale economy estimate of 0.80

Number of organizations (of equal size) merging	Reduction in personnel (as a percentage of the costs without a merger)
2	13%
3	20%
4	24%

We noted previously that "administrative output" is not as well defined as clinical workload. Again, we think of the command or headquarters functions producing some management output. But because "administrative output" is really not a true output of military medicine, we may underestimate personnel savings by assuming that the combined output is the sum of the output of the various merging organizations. What seems plausible is that the combined output will be less than the sum of the parts.

be an average output of the merging organizations or it could be the output of largest organization.) Substituting in $P_I/(A_I)^e$ for C in the equation $P = CA^e$ means that personnel after the merger (P_M) is equal to $P_M = P_I\,(A_M/A_I)^e$ where A_M is the merged output.

7. Note that the personnel reduction estimates are sensitive to the assumption of the size of scale economies. We used 0.80 because it is the average of the literature. However, these estimates ranged from 0.63 to 0.91. If scale economies were actually 0.90 (not 0.80), the personnel reductions would be 7, 10, and 13 percent from merging 2, 3, and 4, organizations, respectively, rather than the percentages that we show in table 3. Similarly, if the scale economy estimates were less than 0.80 as they were for the British National Health Service (0.63), savings estimates would be much larger. For example, assuming scale economy estimates of 0.70, the personnel reductions associated with merging 2, 3, and 4 organizations would be 19, 28, and 34 percent, respectively.

For example, only one office is needed to look at measures or metrics of military treatment facility performance rather than several groups from each Service and TMA doing this. To some degree, the workload increases because the Navy probably doesn't spend a lot of time analyzing the efficiency of Army and Air Force treatment facilities and vice versa. That said, TMA does look at all of the facilities, but perhaps not in the same way or to the level of detail that the Services use to analyze their own facilities. The point is that because the data used to analyze the treatment facilities are drawn from central databases, it really doesn't take much more work to analyze all of the facilities rather than a portion of them. This means there are large redundancies in this particular function. Hence, the combined or merged output would be substantially less than the sum of the parts.

Given potential redundancies, we also estimated the personnel reductions assuming the elimination of a 20-percent redundancy in addition to the personnel reductions from economies of scale. So if two organizations of equal size merged, personnel reductions would be 13 percent with scale economies of 0.80. Adding the elimination of a 20-percent redundancy on top of that, personnel reductions would be 27 percent or 14 percentage points higher than with no redundancy reduction (as table 4 shows). With three merged organizations, personnel reductions would be 33 percent with the elimination of 20-percent redundancy, or 13 percent higher than without the redundancy reduction.

Table 4. Impact on personnel with a scale economy estimate of 0.80 and elimination of 20-percent redundancies

	Reduction in personnel (as a percentage of the costs without a merger)	
Number of organizations (of equal size) merging	**No redundancies**	**20-percent redundancies**
2	13%	27%
3	20%	33%
4	24%	37%

Estimating savings from personnel reductions

To estimate the savings from a particular personnel reduction, we needed to (1) accurately estimate the total personnel costs prior to any reduction and (2) determine where these reductions would come from, that is, the mix of military, civilians, and contractors that a reduction eliminates? We began with specifying our estimates of compensation.

Compensation costs

Military

We estimated compensation costs for military personnel using the average FY 2005 composite rates for the Army, Navy, and Air Force. The composite rate includes basic pay, basic allowances for housing and subsistence, permanent-change-of-station costs, incentive pay, accrual contributions of retirement and healthcare, and miscellaneous items.[8]

Note that while the composite rate includes cash and non-cash compensation, it is not the fully loaded costs or life-cycle costs of military personnel because it does not include training costs. CNA has estimated the life-cycle costs of many military medical and dental specialties in previous studies [32, 33]. We did not use these fully loaded costs for this study because (1) it is not clear whether or not military billets will be cut and (2) if military billets are cut, it is difficult to tell exactly who would be affected because headquarters officer billets can be filled by personnel from various groups—Medical Corps, Dental Corps, Nurse Corps, and Medical Service Corps. In short, the effect of using the composite rates rather than the life-cycle costs is that we somewhat underestimated the cost savings for military personnel reductions, making our savings estimates conservative.

8. Miscellaneous items include things such as Social Security taxes, unemployment compensation, separation payments, overseas station allowances, death gratuities, re-enlistment bonuses, special duty assignment pay, and clothing allowances. See the appendix for specific rates.

Civilians

We used the FY 2005 Office of Personnel Management pay tables to estimate salaries for civilian General Schedule (GS), Senior Executive Service (SES), and Scientific or Professional (ST) positions. Annual wages for wage rate (hourly) employees were calculated using the Federal Wage System (FWS) schedules, with the assumption that all wage employees were full-time workers. Where we calculated the compensation for employees under the National Security Personnel System (NSPS) "pay-banding architecture" was complicated by the wide ranges of compensation within each band. When the employee was in a pay-banded category, we estimated that the compensation was at the mid-point (average) of the range. To be consistent with the methodology of the military composite rates, which include fringe benefits. To meet this goal, we used the FY 2005 DOD Civilian Personnel Fringe Benefit table published in the DOD Financial Management Regulation (DOD 7000.14-R) to develop a reasonably complete cost estimate for civilian positions. All salary and wage estimates were calculated without a geographic location adjustment. See the appendix for specific pay amounts.

Contractors

There is some uncertainty about what the Services' and TMA's contractors actually cost for a number of reasons. First, contract data are not easily extracted from central databases. Second, contracts often include costs for things other than labor. Third, the number of personnel or full-time equivalents (FTEs) associated with the contract costs are not easy to identify. Finally, headquarters activities generally fund centrally managed contracts in support of their clinical operations. These centrally managed funds are difficult to extract from the contracts that are in direct support of headquarters activities only.

With these things in mind, the Services provided to the best of their ability total contract costs for headquarters by general category. We used the Air Force estimate of $100,000 per contractor to develop an estimate of the number of contractors at each activity for the Services. TMA reported 742 total contractors at an estimated aver-

age cost of $156,000 per contractor.[9] However, there was a significant range depending upon type and complexity of the work performed. TMA provided an estimated cost of $117,000 for administrative support (257 positions); $184,000 for IM/IT (270 positions); and $142,000 for all other support (217 positions).

Estimating mix of personnel reductions

We detailed at the beginning of this section our methodology for estimating personnel reductions, and subsequent sections of this report show our specific estimates for the number of personnel that a unified medical command could reduce or eliminate. Note, however, that our methodology for estimating personnel reductions did not cut specific positions or billets. Rather, it showed an aggregate number or personnel that DOD could eliminate. Consequently, we have to make some assumptions about the mix of military, civilian, and contractor positions that a unified medical command would eliminate in order to cost out these reductions. We used two methods to estimate this personnel mix and the associated savings.

Method 1

Our first method is straightforward. We computed the weighted average cost of all positions, which is equivalent to the sum of all the compensation of officers, enlisted, civilians, and contractors divided by the total number of these personnel. We then used this average cost per position as an estimate of the savings for each eliminated position. Note that this method implicitly assumes that we eliminated a mix of officers, enlisted, civilians, and contractors equivalent to their share of personnel prior to any position reductions.

9. TMA also has 379 contractors in its Joint Medical Information Systems Office (JMISO). We did not include these in our estimate of costs per contractor because their contract costs are included with the information management and information technology costs that we deal with separately.

Method 2

We recognize that decision makers may not be willing to cut any or as many military billets as we estimate are possible due to the military-essential nature of the positions. If this is the case, method 1—which costs out the elimination of some military billets—may not be the best cost estimate. Accordingly, our second method assumes that none of the reductions are military. It assumes they are all civilians or contractors. Even within this method, we used two alternatives:

1. Keep all military billets in the affected organizations, and force all of the personnel reductions to come from civilians and contractors.
2. Eliminate military, civilian, and contractor positions in the affected organizations, but take the military billets cut from the affected organization and reprogram those billets to medical providers and staff. We then estimate the savings for these billets at the cost of the purchased care that DOD could recapture.

To estimate potential savings from alternative 2, it is necessary to know the value of recaptured purchased care and how this compares to the savings from just eliminating the military billets. We estimate these values in the next section.

Potential savings from recapture

As we've stated previously, the Services may not be willing to cut as many military billets as our analysis (which we've detailed in subsequent sections) indicates. One alternative to eliminating these billets is to reprogram them from headquarters to clinical billets. The Services could use these additional clinical billets to reduce the purchased care bill. In terms of estimating cost savings, the pertinent question is what is the value of reduced purchased care workload relative to the cost of the billets?

In other words, if the value of recaptured workload is greater than the cost of the billets, it would be more cost effective to keep military billets than to cut them so long as the Services reprogram them from headquarters to clinical billets. If the value of recaptured

workload is less than the cost of the billets, it would obviously be more cost effective to simply cut the billets. But if the Services are unwilling to do that, they could still save the costs associated with the reduced purchase case bill.

Our methodology for estimating savings from recapturing workload consisted of the following:

- Estimating how much a typical medical team could recapture
- Estimating the cost of a recapture
- Comparing the cost of recaptured workload to the purchased care costs.

Cost of medical team

We first had to know the makeup of the typical medical team before estimating the cost of the team and what that team could recapture. Note that for all estimates regarding personnel and costs that follow in this section, we used data from the Medical Expenditure Planning and Resource Survey (MEPRS). We used (FTEs) for personnel; for costs, we used only salary expenditures. This follows from our assumption that medical treatment facility capacity can be increased on the margin by simply increasing the number of personnel. For medical output, we looked only at outpatient relative value units (RVUs) for our workload measure because we wanted to look at both hospitals and clinics, and because hospitals vary tremendously in the amounts and types of inpatient services they provide.

Using these MEPRS data, we found that the average military hospital has 4.2 medical support staff for every provider. Of these, about half were para-professionals (enlisted personnel) and the other half RNs, direct-care professionals, and administrative support. At military clinics, there were about 5.9 medical support personnel per provider or about 40 percent more than at hospitals. Of these, more than 70 percent are para-professionals. So clinics not only have more support per provider than do hospitals, but clinics have a higher number of enlisted per support person.

We computed workload per team as the annual number of RVUs at a facility divided by the number of providers or teams. Accordingly, we estimated that the average FTE medical team in military hospi-

tals produced 5,096 RVUs annually; for medical teams in clinics, the annual RVUs were 5,429.[10] Of course, these RVU amounts are not the potential recapture because (1) they represent the output of a team FTE and (2) they do not account for the fact that not every additional RVU that a military facility provides will reduce the amount of purchased care by the same amount.

To make the first of these adjustments, we used a "non-availability" factor to adjust a team FTE to what one team (bodies) could actually provide because it would be less than an FTE since no team can spend all of its time in the clinic. This factor provides an adjustment for the fact that military personnel have duties other than clinical operations such as readiness training. Previous studies [34-36] have estimated the non-availability factor at 1.1 for physicians, 1.09 for other officers, and 1.17 for enlisted. A factor of 1.1 means that about 9 percent (1/1.1) of a physician's time is spent on non-clinical operations. Applying these factors effectively reduces the number of RVUs that a provider team could recapture.

We made the second adjustment to RVUs per medical team using a "volume tradeoff factor" (VTF). The purpose of this adjustment was to account for the fact that although an additional medical team at a military facility may provide 4,000 RVUs, it will not reduce purchased care workload by 4,000, but by something less.

The reason that purchased care workload would not fall by the same amount as the direct care system has to do with differences in cost to the patient between military and purchased care. Cost differences arise because there are no deductibles or co-payments at military treatment facilities. Similarly, the price in terms of time or ease of getting care at the military facility may fall with an additional medical team because the care is more readily available. Previous research [37], estimated the magnitude of the volume tradeoff factor at 1.3 for Tricare prime enrollees. This figure implies that beneficiaries who return to the medical treatment facility will increase their healthcare utilization by 30 percent. Hence, total healthcare in-

10. At clinics, however, the median number of RVUs per team was 4,629. Thus, the distribution is somewhat skewed, with larger clinics tending to have higher levels of productivity.

creases because the decrease in purchased care is less than the increase in care at the military treatment facility.

Overall, our estimate of the number of potential recaptured RVUs per medical team (bodies) is equal to about 68 percent of a FTE medical team's productivity. This means that an average medical team (bodies) should be expected to be able to recapture roughly 3,139 RVUs based on the hospital data or 3,469 based on the clinic data.

Cost of recapture

To estimate the cost of recapturing workload, we needed to estimate the cost of the average medical team (bodies). We estimated the cost of the medical team using military composite rates, which we've adjusted for special pays for physicians.[11] Accordingly, the average medical team costs $490,000 in the clinics and $471,000 in the hospitals. The difference between these two figures stems from the fact that the personnel makeup of the typical medical team differs between hospitals and clinics.

Another way to think about these costs is that to recapture 3,469 RVUs, DOD would need to put one additional medical team in a clinic at a cost of $490,000. This means it costs $163 to reduce the purchased care workload by one RVU. The equivalent figure for hospitals is $147 per recaptured RVU.

Comparing recapture costs with purchased care costs

We estimated purchased care costs per RVU based on the average cost to the government for the purchased care coming from a clinic's or hospital's catchment area. On average, purchased care was about $138 per RVU for either clinics or hospitals. Comparing the purchased care cost per RVU to the recapture costs per RVU, we see that point estimates for recapture costs are higher by $25 and $10 for the clinics and hospitals, respectively. However, given the

11. Specifically, we estimated that costs are $197,000 per physician, $116,000 per direct care professional (officers), $113,000 per registered nurse, and $56,000 per enlisted para-professional.

variability in the data, we tested to see whether these differences were significant statistically. We found that the difference between the purchased care and recapture costs was statistically significant for clinics but not for hospitals.[12]

To put these numbers in perspective, if DOD puts more medical teams in its clinics, those teams will be able to recapture workload at a cost of $163 per RVU, but DOD will save purchased care costs of only $138 per RVU. Hence, it is more cost effective to cut the billets rather than re-program them to clinical billets because the amount DOD could save from recapture is only 85 percent of the cost of recapture. For hospitals, the point estimate for the savings from recapture is 93 percent of the cost of recapture, but as we've already noted, this difference is not statistically significant. Hence, we conclude that for hospitals, it is no better from a cost standpoint to cut the billets than to reprogram them to clinical care.

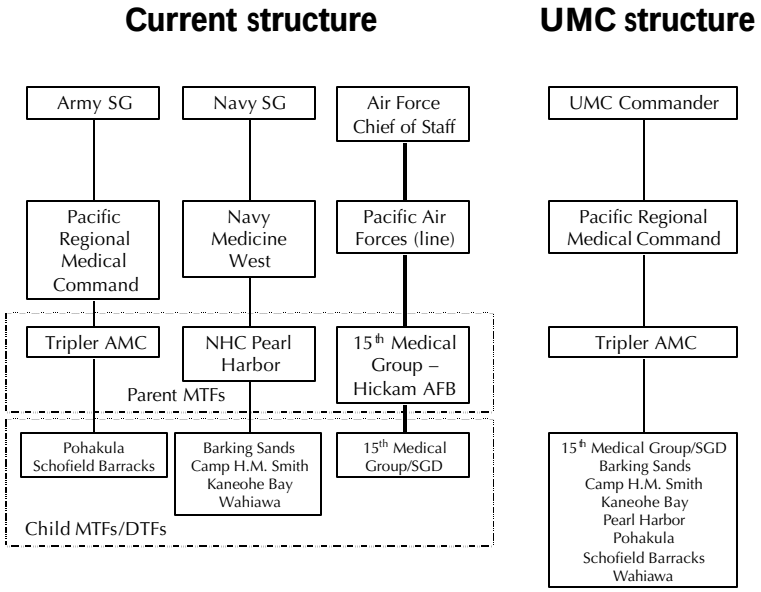
We recognize that there are non-economic reasons why DOD may want to reprogram those billets, but we've shown here that keeping (rather than cutting) the billets is at best cost neutral in the case of the hospitals and it is more costly in the case of the clinics. Furthermore, we have looked only at personnel costs of recapturing workload and assumed that the marginal cost of all other aspects of recapturing workload is $0. To the degree that these marginal costs are not $0, the cost of recapture would be higher. This would make for a stronger case economically to cut the billets rather than reprogram them. We also note the fact that reprogramming headquarters billets is not a simple process. It may take many years to make the transition because it is much more involved than simply putting people back in the clinics. They must have the right skill sets.

12. The difference in means test showed that the difference was significant at the 1-percent level for clinics, but the t-statistics for hospitals (1.35) are not significant at conventional significance levels.

Healthcare operations savings

A unified medical command has the potential to generate savings in healthcare operations, which would encompass the medical treatment facilities under a unified medical command. While it is conceivable that efficiencies could result from combining or optimizing clinical operations, we have not explored this. We assumed that clinical operations would not change while changes in the command and administrative structure could result in savings. To understand more clearly what we've done, consider as an example the command structure for medical and dental treatment facilities in the Hawaii area as figure 5 shows.

Figure 5. Current and potential command structure for Hawaii area medical and dental treatment facilities (MTFs and DTFs)



The current command structure for the Army and Navy is a regional command that reports to the Services' Surgeons General. Reporting to the regional command are "parent" medical treatment facilities. And reporting to the parents are child medical and dental treat-

ment facilities. The Air Force structure is similar to that of the Army and Navy structure, except that the regional command is a line command (Major Command or MAJCOM) reporting to the Air Force Chief of Staff rather than the Air Force Surgeon General.

To the extent that a regional command structure with three parallel commands could be combined into one under a unified medical command with one regional command and one parent rather than three of each, there is substantial redundancy in the system. In this section, we detail our methodology for and estimate of savings from combining the regional and parent-child command structures.

Parent-child savings

In order to estimate potential savings from the unification of medical treatment facilities in a region by changing the parent-child command structure, we must understand the differences between the command structures we observe at parents versus children. In some, but not all instances, medical treatment facilities within a given geographical area are commanded by a "parent" command as a means to contain costs and to maintain appropriate local or regional command and control. The primary responsibilities include quality assurance, legal counsel, facility planning, public affairs, logistics, information management system maintenance and plans, patient administration, human capital plans and policies, and comptroller and budget management functions. While "children" have these functions embedded within their mission requirements, they generally rely heavily upon the parent facility to provide the majority of resource management and planning support.

Carrying out these responsibilities is costly. In 2004, the average command and administrative costs were six times higher for the average parent versus the average child. Specifically, the average administrative costs were $4.5 million for parent clinics compared to $0.7 million for child clinics. While we note that this difference doesn't control for size, there is clearly a systematic difference. We now show our methodology and results for estimating parent-child costs, which control for size and the additional costs of managing more children.

Methodology

Our methodology for estimating parent-child savings has two parts. First, we estimate the savings from changing a parent to a child. And because each new child clinic (and its children) must have a parent, we estimate the additional cost to the parent facilities now responsible for them. So using the Hawaii region as an example, we suggest that NHC Pearl Harbor and the 15th Medical Group (Hickam AFB) should be changed from parent clinics to children of Tripler AMC as will the clinics that were formerly children of NHC Pearl Harbor or the 15th Medical Group. So DOD would realize savings changing two clinics from parents to children, but it would increase costs at Tripler because it now has several additional children to manage. If the savings from two fewer parents is greater than the cost increases at Tripler, DOD will have savings from this command structure change.

Accordingly, our approach was to estimate (1) how much could be saved in administrative costs by changing a parent clinic to a child clinic and (2) how much costs will increase at parent hospitals (or clinics) that receive additional children. We began with estimating command/administrative costs.

Command and administrative costs

We estimated these costs using the Medical Expenditure and Performance Reporting System (MEPRS) data from FY 2004. Specifically, we used salary expenditures from MEPRS functional e-cost codes. Salary expenditures aren't the only administrative costs, but they make up the bulk of those costs and should be the easiest to reduce.

Total MEPRS e-code costs include not only salaries, but also supplies and equipment used to command and administer the needs of the parent facility and its children. For example, one e-code cost is medical equipment repair. This functional cost code includes technicians, the equipment that the technicians use, trucks for traveling among medical treatment facilities, and supplies to make logs and reports. To the extent that we included only those costs associated with salaries, we underestimated total expenditures and thus total potential savings from changing facilities from parents to children.

The MEPRS data do not include expenditures for hiring contractors. Thus, even e-code salary expenditures are higher than reported. However, the MEPRS data do include contractor FTEs. Using these, we estimated the salary expenditure for contractors as a proportion of total salary costs equal to the contractor proportion of FTEs at each MTF. This method implicitly assumes that contractor costs and all other salary expenditures per FTE are equal. There is some evidence that contractor costs per FTE are actually higher [30]. If this is true, our method should tend to underestimate potential savings from changing parent facilities to children.

Finally, because we wanted to isolate only those command and administrative costs related to being a parent facility, we subtracted out e-code costs associated with graduate medical education (GME) and other training.

Estimating the cost of being a parent clinic

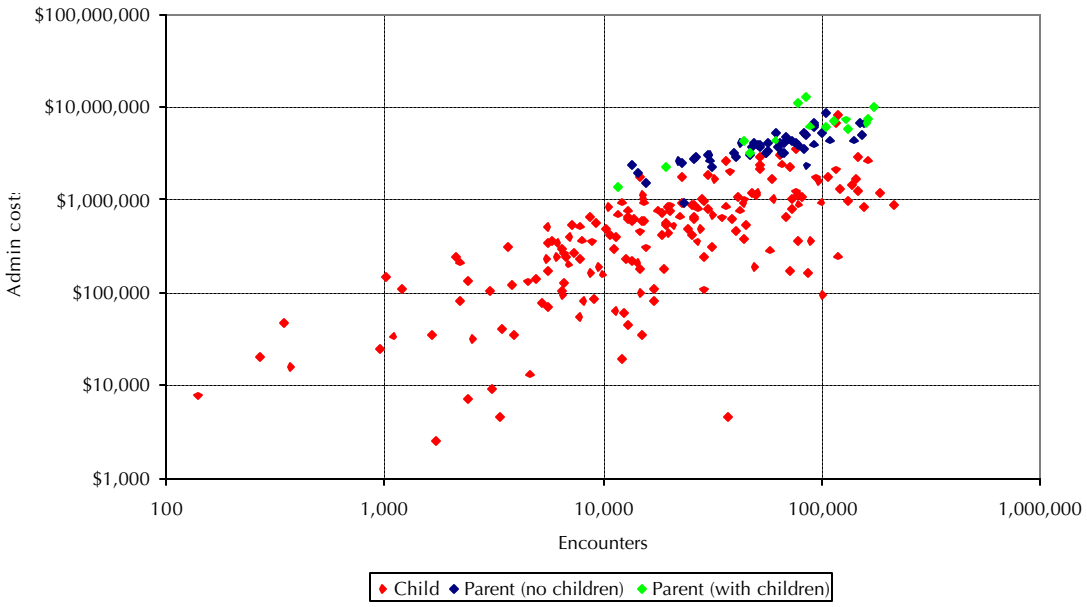
To estimate the savings from changing a parent clinic into a child, we needed to know what portion of administrative costs are due to being a parent facility and what portion are driven by other factors. Our hypothesis was that the differences in administrative costs are a function of the amount of workload performed (facility size) and whether or not a facility is a parent.[13] Visual review of the data clearly suggests that differences in command or administrative costs among medical treatment facilities are a function of these factors as figure 6 shows for clinics.

The figure shows that administrative costs are correlated with workload (measured here by encounters) given the generally higher administrative costs as encounters increase. But more important for this study, there is a strikingly clear delineation of costs between parent medical treatment facilities (in blue) and child facilities (in red). Although we observe a clear cost difference between parent and child clinics, it is not as visually obvious whether those costs are higher for parent clinics that have children other than themselves

13. In later estimates, we deal with how the number of children impacts the costs of parent clinics and hospitals.

(in green) compared to those parent clinics without any children (in blue).

Figure 6. Administrative costs for parent and child clinics



To estimate the impact that being a parent facility has on a clinic, we estimated the following equation:

$$\ln A = \ln a + b \ln E + d \ln P \qquad (1)$$

where A is administrative costs, E is the clinic's encounters, P is a binary variable indicating whether or not a clinic is a parent and a, b, and d are the parameters to be estimated from the model.[14] We show our specific estimates of this model in the appendix.

14. Note that we tried various specifications of the model, but we settled on this one because it "fit" the data best or best explained the variation in the cost data. For example, we tried a specification where we controlled for workload complexity, but complexity did not have any significant impact in terms of explaining why administrative costs vary across clinics, although it did for hospitals as we show in the next section. Additionally, we looked at controlling for the number of children for those parent clinics with children other than themselves. We chose to look at this issue in a model we discuss later.

While not strictly mathematically correct, you can think of *a* as the fixed administrative costs for a clinic that is a child and *d* as the additional administrative costs of being a parent facility.[15] In actuality, our estimate of *d* is 1.49, which means that all other things being equal, the administrative costs of a clinic are 4.4 times higher if that clinic is a parent rather than a child facility. In other words, about 77 percent of administrative costs are directly attributable to being a parent facility. This is a striking finding that is borne out in the empirical analysis and in the visual inspection of the data as figure 6 shows.[16]

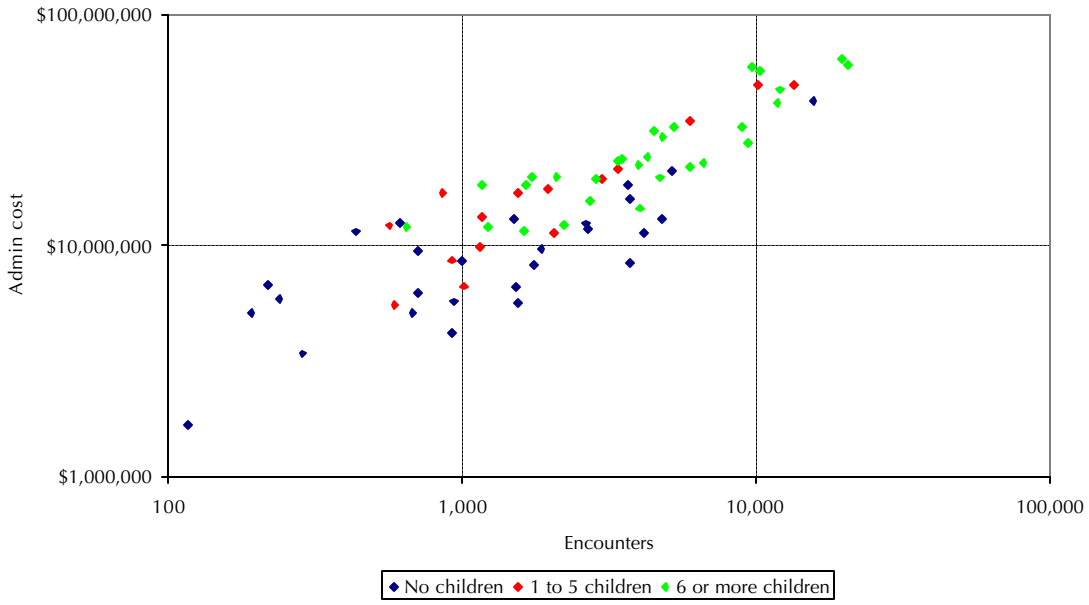
Estimating the cost of having more child clinics

We mentioned before that we need to estimate how much administrative costs will increase at the hospitals and clinics that take on additional children. One possibility (although not a likely one) is that the cost of being a parent facility is the same whether it has no children or many. Our hypothesis is that the administrative costs will rise marginally for each additional child and that the marginal cost of the next child will be less than the cost for the last one. As figure 7 shows, it is not visually obvious that hospitals with multiple children have higher costs than for those without children. While it does appear that the cloud of data points for those hospitals with children is slightly higher than those without children, it is not obvious because the two data clouds overlap.

15. Because our model is a multiplicative model, *a* doesn't represent in a strict mathematical sense the fixed administrative costs of a clinic. It represents the fixed logged administrative costs. Furthermore, d is also not technically a fixed cost because the nature of the multiplicative model is that the cost of being a parent is higher for larger clinics. Note that we tried linear specifications that were not multiplicative (meaning that the cost of being a parent would be the same regardless of how big the facility is), but the explanatory power of these models was vastly inferior to the multiplicative form.

16. Note that because figure 6 has a logarithmic scale, the administrative cost differences between the cluster of parent clinics and the group of child clinics is actually larger than it appears. Using just a simple average without adjusting for differences in encounters, the administrative costs of parents are 6 times higher on average than those of children.

Figure 7. Administrative costs for parent hospitals with and without children



To estimate the impact that the number of children has on hospital administrative costs, we estimated the following equation:

$$\ln A = a + b\ln OP + d\ln C_{OP} + f\ln IP + g\ln C_{IP} + l\left(\frac{1}{1+D}\right) \qquad (2)$$

where A is the administrative costs, OP is the outpatient workload (encounters), C_{OP} is the complexity of the outpatient workload, IP is the inpatient workload (relative weighted products or RWPs), C_{IP} is the complexity of the inpatient workload, D is the number of dependents or children, and a, b, d, f, g, and l are the parameters to be estimated from the model.[17] We show our specific estimates of this model in the appendix.

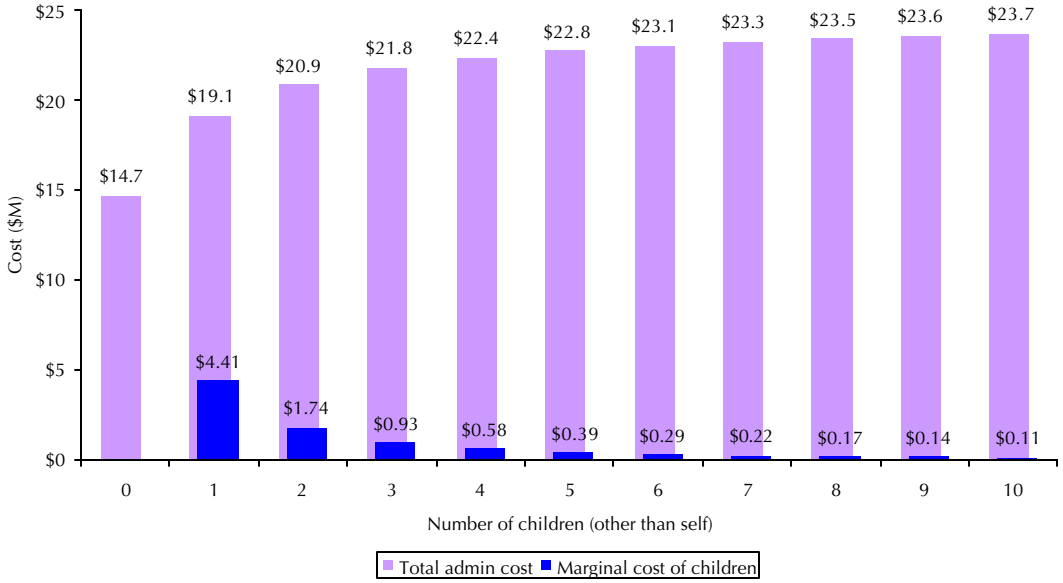
Similar to what we've done with hospitals, we estimated the impact that the number of children has on parent clinic administrative costs using the following equation:

17. Note that we have added workload complexity to this model because it had a significant explanatory power with hospital administrative costs even though it didn't with clinics.

$$\ln A = a + b \ln OP + l\left(\frac{1}{1+D}\right) \quad (3)$$

Based on the parameter estimates of the hospital and parent clinic equations, we have estimated the impact of additional children on administrative costs. For example, for the average hospital, the administrative costs without any dependent clinics are $14.7 million as figure 8 shows.[18] Adding one dependent clinic causes administrative costs to rise to $19.1 million for a marginal change of $4.4 million. If we add a second child clinic, the marginal change is $1.7 million. As we add more and more children, the marginal cost increase becomes smaller and smaller, and by the time we add the tenth child, the marginal costs are only $110,000.

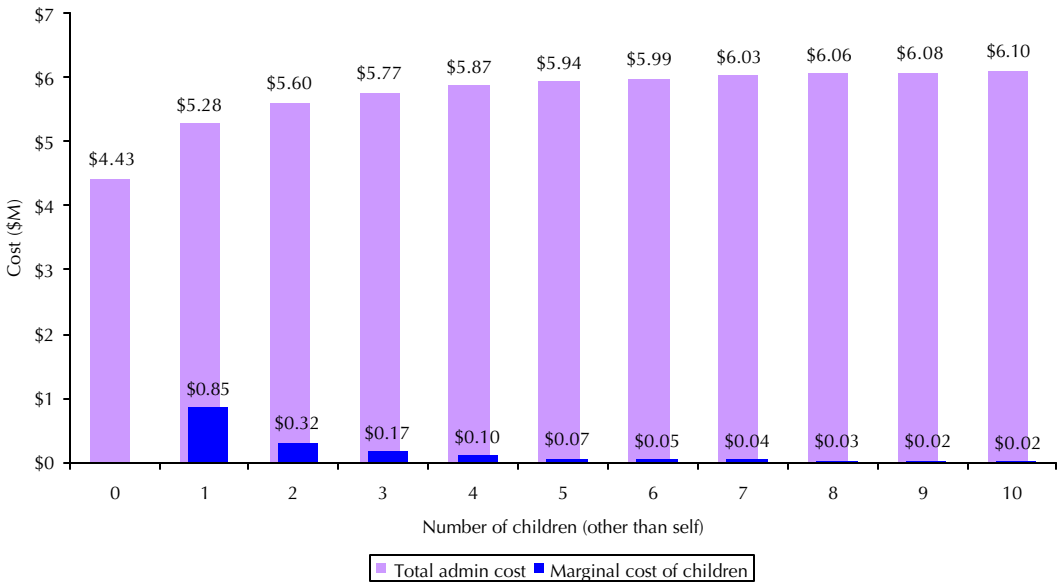
Figure 8. Total and marginal administrative costs by number of children – hospitals



The marginal costs of adding children to parent facilities that are clinics rather than hospitals are less, but follow the same decreasing pattern. Specifically, adding one child to a parent clinic with no children increases administrative costs by $0.9 million as figure 9 shows. And adding a second child only increases costs by $0.3 million.

18. We based our estimates on FY 2004 data and updated them to FY 2005 dollars using the 3.5 percent increase in basic pay for FY 2005.

Figure 9. Total and marginal administrative costs by number of children – clinics



Savings estimates

Given our model, we can estimate the savings from unifying any regional group of medical treatment facilities under one command, reducing the number of parents. The next question is which regions do we unify? One should consider the potential for savings in a particular region and also the ease of actually unifying the region.

There are nearly an unlimited number of possibilities. The more clinics DOD chooses to change from parents to children, the greater the possible savings. We picked for illustration purposes the clinics that we feel are good candidates to turn into children due to proximity to other medical treatment facilities.

We note in doing this that each of the Services has a very different approach to whether a clinic is a parent or a child facility. The Air Force, for example, has many clinics that are their own parent. In contrast, the Navy has few clinics that are their own parents. Most of its clinics are a child of a hospital that may be a great distance away (such as the clinic in Yuma, AZ, which is a child of NH Camp Pendleton or the clinic in Millington, TN that is a child of NH Pensacola). The Army structure is somewhere in between the Air Force and Navy.

To estimate potential savings, we chose a list of regions that are good candidates in that they have relatively large potential savings and a relatively high likelihood of success. The first criterion is straightforward: it is measured by the estimate for potential savings. The second criterion, probability for success, is more complex, less measurable. As a proxy for a measure of this, we use geographical proximity of the hospitals and clinics within a region. Our reasoning is that facilities in geographical proximity are more likely to be successfully interacting with each other, facilitating ease of unification.

As table 5 shows, we've divided our list into two distinct groups of regions. The first group contains those whose hospitals and clinics are in geographic proximity. Some examples are the Hawaii region, the facilities in the Tidewater area, and those in the National Capital Area (NCA). The second group could be good candidates for unification of parent facilities, but because the clinics in this group are not so close geographically, they are not as obvious candidates as those in the first group.

To understand our model and the choice of a particular region, consider for illustration again the Hawaii region. This region contains the Tripler AMC with its four child medical and dental clinics, Naval Health Center Pearl Harbor, with its five child medical and dental clinics, and U.S. Air Force 15th Medical Group (Hickam) medical and dental clinics. Under this scenario, all these medical and dental clinics would be unified under one command, which we assume would be Tripler. The two parent clinics, NHC Pearl and Hickam, would change from parent to child commands, and all 11 medical and dental clinics would fall under Tripler.

The model estimates potential savings as follows. Parent costs at Pearl Harbor are estimated to be $5.9 million, and at Hickam they are $2.5 million for a total of $8.5 million, which the change could eliminate. However, the number of children under Tripler increases from 4 to 11, which would increase its parenting cost by $1.4 million. In aggregate these changes could result in savings of $7.1 million.

Table 5. Savings from changing the parent-child command structure (in thousands)

Parent-child changes	Savings from changing parents to children	Cost of adding children to receiving parent	Potential Savings
Group 1	$52,580	$23,225	$29,356
Pearl Harbor & Hickam under Tripler • Eielson under Ft. Wainwright • Andersen under Agana • Quantico under Ft. Belvoir • USNA, Pax River & Ft. Meade under new Walter Reed • Bolling under Andrews • Randolph & Laughlin under Lackland • Ft. Lee under Portsmouth • Ft. Eustis under Langley			
Group 2	$130,198	$30,167	$100,031
Beale under Travis • Edwards under Ft. Irwin • Davis Monthan & Ft. Huachuca under Luke • USAFA, Peterson & Buckley under Ft. Carson • Holloman under Bliss • Vance, Atlus, Tinker & Sheppard under Ft. Sill • Barskdale under Ft. Polk • McConnell & Ft. Leavenworth under Ft. Riley • Whiteman under Ft. Leonard Wood • Hurlburt Field & Tyndall under Eglin • Moody, Robins, Maxwell & Ft. Rucker under Ft. Benning • Partick under MacDill • Shaw under Ft. Jackson • Charleston under Beaufort • Cherry Point under Camp Lejeune • Seymour Johnson under Ft. Bragg • Goodfellow under Dyess • Dover & Ft. Monmouth under McGuire			
Total[a]	$182,778	$53,391	$129,387

a. Totals may not match due to rounding.

Aggregating across regions in our first list, we get a total potential savings of $29.4 million. This is made up of $52.6 million in savings from changing parent facilities to children, and then subtracting $23.2 million in additional parent costs from adding children to the remaining parent facilities. In the second group, we estimated potential savings at $100.0 million, which is derived from $130.2 million in savings from changing parents into children minus $30.2 million in additional parent costs to the gaining facilities. If the military health system were to successfully unify all the regions in our list, potential savings could be as much as $129.4 million.[19]

19. Note that we based this analysis on the number of medical and dental treatment facilities that are children of a parent facility. However, the

Let us make two caveats here. First, note that in table 5 the potential savings in our second group of regions appears greater both in the magnitude of total potential savings and in potential savings per region (about $3.3 million per region in group 1 vice almost $5.6 million per region in group 2). That does not, in itself, suggest that it would be economically better to make the changes in group 2 regions rather than in group 1. We separated these two groups by the relative proximity of hospitals and clinics within each region, which is our proxy for "ease of unification." It is likely that unifying the regions in group 2 will be more difficult than for group 1, and that, as a result, the *expected* savings (potential savings times probability of success) could be greater in group 1.

Second, with regard to successfully achieving these potential savings, the Services would need to change NHC Pearl Harbor and the 15th Medical Group into child facilities and reduce all their command/administrative billets associated with parenting. In the Hawaii case, for example, that could be as many as 111 billets.

Case studies of parent-child transformation

In this section, we look at two case studies to glean some real-life aspects of our parent-child model. The two cases are Naval Health Care New England (NHCNE) and Patterson Army Health Center, Fort Monmouth. Both are examples of systems that have changed by transforming one or more parent MTFs into children. While the model predicts that administrative costs should be less for children, it doesn't address how the transformation from one status to another would work. Because realizing the potential parent-child savings detailed in the previous section requires substantial structural changes, these case studies provide some lessons learned. More specifically, we found that the potential savings from changing a parent clinic to a child were, in large part, not forthcoming in the NHCNE and Fort Monmouth transformations. In neither of these cases were

Army has many veterinary clinics that are children of other facilities. We conducted a separate analysis to see whether including the veterinary clinics as children would change our results substantially, but it didn't.

administrative costs reduced anywhere near the magnitudes predicted by the model.

There are a couple of possible explanations for this. First, and most important, there doesn't seem to be a system in place for reducing a large number of administrative billets when they become redundant. One consequence is that staffing changes are made on an ad hoc basis and are reliant on the system's own internal staffing processes.

Second, the types and magnitudes of the changes estimated by our model would occur over time. It is possible that there hasn't been enough time in these two cases to complete the changes; however, this explanation is unlikely because we don't see evidence of significant changes, even though it has been 5 years since NHCNE was transformed, and Patterson AHC was a child for 5 years between parenting stints.

Naval Health Care New England (NHCNE)

In 1997, medical treatment facilities in the New England area were unified under a single command—NHCNE. Prior to this, there were three parent facilities (NH Groton CT, NH Newport RI, and NMC Portsmouth NH) with eight other medical and dental treatment facilities under their command. After the change, the three original parent clinics and their children fell under the command of NHCNE.

Our model predicts that, controlling for any changes in services, administrative costs should have declined substantially since the transformation. This is not what we see. Using 1995 and 2004 historical cost and FTE data from the MEPRS, we found that administrative costs fell by about 14 percent, from $25.0 to $21.5 million (in 2004 dollars). Additionally, FTEs fell by over 17 percent from 441 to 365. We also see that outpatient visits (encounters) declined over the same period by 29 percent. The question here is what part of the $3.5 million decline in administrative costs is attributable to changes in the command structure and what part to changes in encounters? To see the answer to this question, consider figure 10, which illustrates the relationship between actual and forecast ad-

ministrative costs under various command and workload assumptions.

Figure 10. NHCNE actual and forecast administrative costs by workload and command structure (cost figures in 2005 dollars)

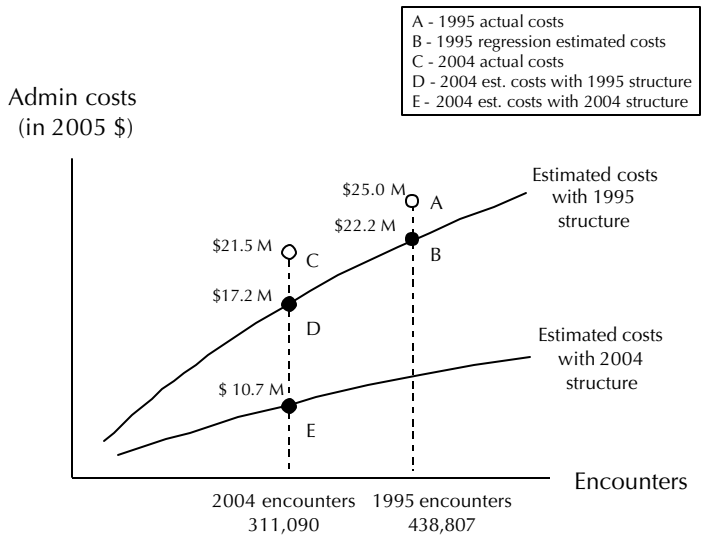


Figure 10 shows three important forecasts of our model:

- The forecast change in administrative costs due strictly to changes from three parent commands to one. The model estimate is that this change would reduce administrative costs by $6.5 million (see the difference between points D and E).
- The forecast change in administrative costs due solely to reducing encounters from 438,807 to 311,090. The model estimates that this change should be about $5.0 million (see the difference between points B and D).
- The total forecast change from reducing encounters and going from three parents to one (difference between points B and E) is about $11.5 million.

This $11.5 million forecast change is substantially more than the actual administrative cost change of about $3.5 million (difference between points A and C). Furthermore, the actual cost change is less

than the cost change the model predicts from just reducing encounters alone. This implies that there have been no savings from unifying these clinics under NHCNE.

Further evidence of this conclusion is shown when we look at the changes for only the three formerly parent facilities (Newport, Portsmouth, and Groton). Here it becomes clear that there were no real changes in the administrative costs due to changes in the parent-child structure (see table 6).

Table 6. New England region 1995 & 2004 actual and forecast costs and encounters for former parent commands (all cost figures in millions of 2005 dollars)

Facility	1995 encounters	2004 encounters	Actual costs 1995	Actual costs 2004	Forecast costs 1995	Forecast costs 2004
Groton	205,738	118,415	$9.8	$8.0	$6.8	$1.5
Newport	153,398	117,005	$11.1	$6.6	$6.8	$1.5
Portsmouth	33,698	36,360	$2.3	$2.6	$2.8	$0.6
Total	392,834	271,780	$23.2	$17.2	$16.4	$3.6

In 1995, New England's three parent commands had a total of $23.2 million in administrative costs. By 2004, this had fallen to $17.2 million. But what does the model predict the costs should be? With the fall in encounters and the change from parent to child facilities, the model predicts costs for three facilities of just $3.6 million or $13.6 million less than actual costs. If there had been only changes in encounters and no change in command structure, the model predicts costs to be $16.4 million, which is in the ballpark of actual costs.

These figures suggest that the changes in cost at the three formerly parent facilities were due primarily, if not exclusively, to changes in the number of encounters. Essentially, the unification of the New England facilities under NHCNE resulted in peripheral changes for reporting requirements and command structure. Consolidation of administrative day-to-day operations and policy development did not result in reduced administrative costs.

Patterson Army Health Center, Fort Monmouth

Fort Monmouth was a parent clinic that converted to a child in 1998, and then converted back to a parent in 2002. As with the

NHCNE case, our model predicts that we should see a sizable reduction in administrative costs as the parent duties shift to another command. We found that the historical costs were somewhat less during its child years but still substantially higher than forecast by the model.

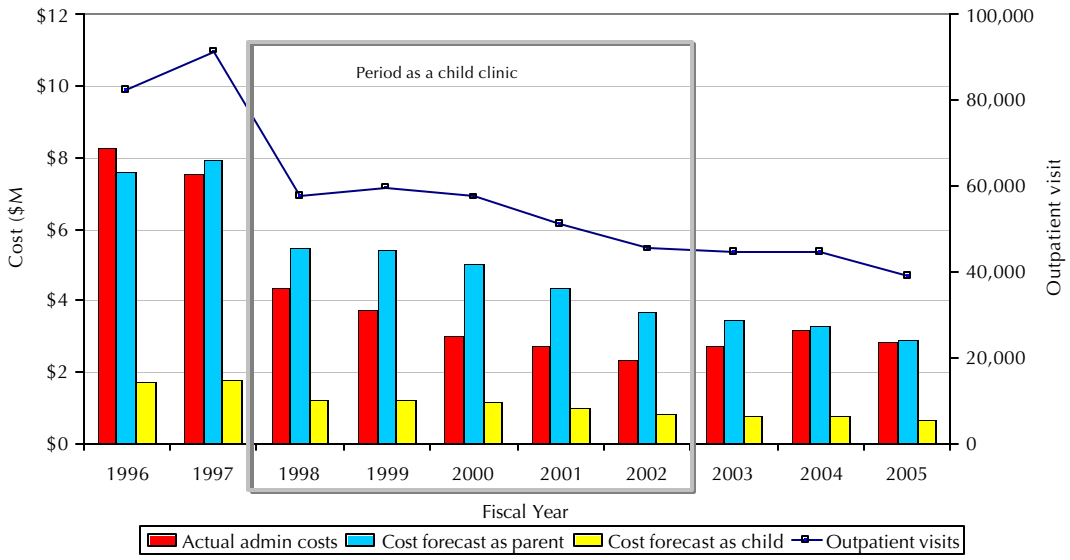
Figure 11 shows the outpatient visits and administrative costs from 1996 to 2005 (in 2005 dollars). It also shows the model's predicted costs for Patterson AHC (1) as if it were a child facility during the whole period (which it was from FY 1998 to FY 2002) and (2) as if it were a parent during the whole period (which it was in FY 1996 and 1997 and FY 2002 to 2005).

Figure 11 shows actual annual administrative costs as red bars. The blue bars show the forecast costs as a parent, and the yellow bars show forecast costs as a child. We see that in FY 1996 and FY 1997, when Fort Monmouth was a parent facility, costs were roughly equal to the amounts predicted, at $8.3 million and $7.6 million, respectively. In FY 1998, Fort Monmouth became a child facility (under West Point), and at the same time, outpatient visits fell by roughly 37 percent. The model predicted that administrative costs should have fallen by 77 percent due to parent-child change, and then by another 7 percent due to the change in visits. In other words, if the facility had been able to make immediate adjustments to administrative costs due to changes in command structure and output, administrative costs would have fallen by about 84 percent, or from $7.9 million to about $1.2 million.

Clearly that didn't happen, nor would we really expect that such adjustments would transpire so quickly. But what did occur? While visits fell 37 percent, administrative costs fell by 43 percent from $7.6 to $4.3 million. Based on the statistical model of parent-child costs, the 37-percent change in visits would result in a 30-percent change in administrative costs.[20] Thus, we infer that 13 percentage points of the decrease were attributable to the change from a parent to a child.

20. We estimated that the elasticity of administrative costs with respect to encounters is 0.79. This means that a 1-percent change in encounters is associated with a 0.79-percent change in administrative costs.

Figure 11. Patterson AHC (Fort Monmouth) outpatient visits and historical and forecast administrative costs (cost figures in millions of 2005 dollars)



For the following 2 years (FY 1999 to 2000), outpatient visits changed very little. Yet during these 2 years, administrative costs fell by about 30 percent from $4.3 in FY 1998 to $3.0 million in FY 2000. Because medical visits didn't change during this period, it is reasonable to infer that this was a reduction in parenting costs. Note, however, that the model predicts that a child facility of the size of Fort Monmouth would incur administrative costs of about $1.1 million in 2000, or roughly 38 percent of their actual costs of $3.0 million. Fort Monmouth had clearly not made the complete cost adjustment to a child facility by FY 2000.

In fact, in the subsequent years, as a child facility (FY 2001 to 2002), Fort Monmouth's administrative cost reductions generally followed the pattern of its visits. Thus it appeared that no additional parenting cost reductions would be forthcoming. Finally, in FY 2003, Fort Monmouth resumed its responsibilities as a parent facility. Administrative costs immediately rose to levels that were approximately the same as the forecasted costs as a parent facility.

Summary

In general, we have not found that the Army and Navy were able to realize the kind of savings predicted by our parent-child model. There is some indication that costs will fall a little due to parent-child transformations as we showed with Fort Monmouth. Results from both case studies show that the facilities' administrative costs change fairly quickly as clinical workload changes, suggesting that there is a methodology in place to do so. The costs related to command (parenting) appear to not respond so easily when the change is from a parent command to a child.[21] Consequently, if DOD is to realize any significant portion of the predicted savings from a change from parent facilities to children, it is crucial that the Services or a unified medical command put in place a system for eliminating billets related to parenting responsibilities. Otherwise, the results are likely to be no better than what we observed with NHCNE and Fort Monmouth.

Regional command savings

Under the various unified medical command structures we are considering in this analysis (a single medical command, both a medical and a healthcare command, or single medical service structure), there is the potential for savings in reducing the regional command structure.

Current structure

Table 7 shows the current regional command structures of the Services and TMA. The Army has six regional medical commands with a total of 72 people and an average of 12 positions per region. The Navy is currently in the process of reorganizing and downsizing the Healthcare Support Offices into four regional commands—Navy Medicine East, West, NCA, and Support—with a total of 189 positions or 47 per command.

21. The Fort Monmouth example showed that administrative costs quickly increased to a level consistent with the predicted parent costs.

Table 7. Current regional command structure

	Army	Navy	Air Force	TMA
CONUS	Western, Great Plains, Southeast, and North Atlantic Regional Medical Commands	Navy Medicine East, West, NCA, and Support	MAJCOMs: Combat, Education & Training, Space. Mobility, and Special Operations	Tricare Regional Offices: North, South, and West
OCONUS	Pacific and Europe		MAJCOMs: Pacific and Europe	Tricare Area Offices: Pacific and Europe; Tricare Latin America and Canada
Total personnel	72	189	452	213
Number of regions	6	4	7	6
Personnel per region	12	47	65	36

As we mentioned previously, the Air Force military treatment facilities fall under the line command and report to a Major Command (MAJCOM). A unified medical command will not eliminate a line Air Force command, but it could realign the 452 medical personnel supporting its various MAJCOMs. Specifically, these personnel are spread across seven MAJCOMs with an average 65 people per command.

TMA, similar to the Services' regional commands, has regional offices oversee its operations. These are the three CONUS Tricare Regional Offices (North, South, and West) and the three OCONUS offices—Tricare Area Offices (Pacific and Europe) and Tricare Latin America and Canada. These offices have a total of 213 people or 36 people per office. Across the Services and TMA, there are 926 personnel (costing $98.5 million annually) working in the 23 regional commands/offices with an average of 40 people per office (see table 8).

Table 8. Regional personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	6	66		72
Navy	99	80	10	189
Air Force	49	278	125	452
TMA	139	46	28	213
Total	293	470	163	926
Costs				
Total (K)	$23, 879	$57,606	$16,990	$98,475
Average	$81,498	$122,565	$104,270	$106,351

Savings

The potential savings from unifying the regional command structure depend on the structure of the unified medical command. If the structure is a single medical command or a single service, the current four regional command structures will collapse to one. If the structure is either a medical command and a healthcare command or a single military service, it will collapse to two. However, we estimate that there is greater potential for consolidating resources under the single military service scenario.

Single-regional-command structure

We estimated personnel savings of having a single-regional-command structure assuming that 122 people are required per region. This figure is based on the average personnel per region of 40 increased by the scale economy factors such that each unified regional command would have enough personnel to perform the equivalent workload of one regional command from each of the Services and TMA. Note that if we sum up the average personnel per region for each Service and TMA, the number of personnel is 159. Thus, by unifying, personnel requirements are 77 percent of the current personnel from one region in each Service and TMA.

Given 122 people per region, we estimated the total personnel required for five unified regional commands (three CONUS and two OCONUS). This means that total personnel requirements are 610 or that unification could eliminate 316 (926 minus 610) personnel, which would save $33.6 million annually as table 9 shows. If we as-

sume that none of the cuts come from military positions, annual savings would be $28.3 million.

Table 9. Regional command personnel savings from combining the Services' and TMA's regional command structures

	Assuming no redundancy	Assuming 20% redundancy
Sum of average personnel per region[a]	159	159
Personnel required per region with UMC	122	102
Current personnel	926	926
Required personnel with UMC	610	510
Number of personnel saved	316	416
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$33,579	$44,190
Eliminate civilian and contractors only	$28,302	$37,244

a. This is the sum of the average personnel per region across the Services and TMA.

Furthermore, if we assume that a 20-percent redundancy across the Services and TMA exists in this function, our methodology indicates that personnel required per region falls to 102. Under this assumption, annual personnel savings are $44.2 million or $37.2 million if DOD eliminates only civilian and contractor positions.

Two-regional-commands structure

We estimated the personnel savings of a two-regional-commands structure assuming that TMA's regional offices would provide the regional command structure for the healthcare command. For the medical command, we combined the regional commands of the Services to form the regional command of the medical command using the same two methods we used in the previous section.

We assumed that the personnel required per region are 101. This figure is based on the average personnel per region increased by the scale economy factors such that each unified regional command would have enough personnel to perform the equivalent workload of one regional command from each of the Services. Note that if we sum up the average personnel per region for each Service, the number of personnel is 124 Thus, by unifying, personnel requirements are 82 percent of the current personnel from one region in

each Service. Given 101 people per region, we estimated that total personnel requirements are 718 (505 plus 213 for TMA) or that unification could eliminate 208 personnel, which would save $22.1 million annually as table 10 shows. Furthermore, if we assume that a 20-percent redundancy across the Services exists, annual personnel savings are $30.9 million.

Table 10. Regional command personnel savings from combining the Services' regional command structures

	Assuming no redundancy	Assuming 20% redundancy
Sum of average personnel per region[a]	124	124
Personnel required per region with UMC	101	101
Current personnel	926	926
Required personnel with UMC	505	422
Number of personnel saved	208	290
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$22,114	$30,893
Eliminate civilian and contractors only	$18,639	$26,038

a. This is the sum of the average personnel per region across the Services.

Single medical service

As we assumed in our earlier discussion, table 11 suggests that there are deeper savings to be found under the single military service. We assume that there is a requirement for five regions (3 CONUS and 2 OCONUS), but there is no longer a requirement for a separate TMA regional command. Under this scenario, the elimination of redundancies is built into the sizing model. Using the Air Force's average of 65 people per region as the base case for the minimum number of people required, the model suggests that 603 positions could be reduced for a total estimated savings of $64.1 million. Savings would be reduced to $54.1 if military were excluded from the reductions.

Table 11. Regional command personnel savings from combining the Services' regional command structures

	Assuming no redundancy
Personnel required per region with UMC	65
Current personnel	926
Required personnel with UMC	323
Number of personnel saved	603
Cost of personnel saved (K)	
Eliminate civilian, military, and contractors	$64,151
Eliminate civilian and contractors only	$54,069

a. This is the sum of the average personnel per region across the Services.

Personnel and systems savings

This section details our analysis and personnel and systems savings estimates for the comptroller, IM/IT, education and training, research and development, logistics, strategic planning, human capital management, force health protection/environmental health, and general headquarters functions.

Positions under consideration

We do not intend to recommended savings that could disrupt either the operational or healthcare benefit mission. As such, we did not include any positions assigned to line activities, such as ships, squadrons, battalions, and so forth. Generally, this means that we did not include positions that fell within DOD programs of strategic forces, general purpose forces, intelligence and communications, mobility forces, guard and reserves, or special operating forces. Additionally, we did not include any positions that we considered to be part of the execution of the primary mission. For example, for education and training, we did not include any instructor or student positions; for research and development, we did not include researchers or direct research support; any clinical positions at treatment facilities; positions that are in joint activities; or personnel recruiting or distribution. Additionally, we did not include activities that have already been consolidated, such as veterinary activities, the Uniformed Services University of the Health Sciences (USUHS), or lead agents.

We specifically requested that the Services provide us with data regarding headquarters and "headquarter-like" activities in the categories listed above. Each of the activities and positions was evaluated to determine its contribution to the operational or benefit mission and its level of integration. When in doubt, we excluded the positions from consideration. Table 12 shows the count and dollar value of the positions that were provided by the Services for considera-

tion, but not included in this study. None of these positions were directly from operational units, such as ships, squadrons, or other "line-funded" medical support.

Table 12. Positions provided by the Services but not included in estimates

Service and reason	Total positions	Total cost (in thousands)
Air Force		
Execution	136	$15,895
Joint	427	$44,549
Line activity	325	$37,481
Total	888	$97,925
Army		
Execution	1,854	$195,850
Navy		
Execution	533	$43,611
Joint	727	$50,456
Operational	575	$44,678
Total	1,835	$138,745

As suggested by table 13, we considered a small portion of the Services' medical resources. Each of the activities and positions was evaluated for its contribution to headquarters' support. Only those activities and positions that were clearly headquarters' support were included in this study. In total, we considered 9,681 military, civilian, and contractor positions. This is a relatively small fraction (6 percent) of the 168,118 military and civilian positions for FY 2011 in the POM-06 submission. In actuality, we looked at less than 6 percent of the positions because the 168,118 positions is for military and civilians. It does not include contractors.

Table 13. Positions included in cost estimates (costs in thousands)

	Army		Navy		Air Force		TMA		Totals	
Category	Count	Costs	Count	Costs	Count	Costs	Count	Costs	Count	Costs
E&T	304	$20,605	218	$18,699	307	$29,149			829	$68,453
Financial mgmt	93	$7,650	54	$6,390	21	$2,560	207	$24,191	375	$40,791
FHP	1,094	$87,499	632	$53,315	395	$33,816			2,121	$174,630
General HQ	583	$59,318	220	$23,397	264	$29,211	324	$42,097	1,391	$154,023
Manpower (HCM)	132	$11,445	$51	$5,940	$42	$5,292	$20	$2,812	245	$25,489
Info mgmt	354	$23,919	131	$12,692	64	$8,081	324	$57,073	872	$101,765
Logistics	1,292	$87,099	235	$21,320	128	$12,825	72	$10,167	1,727	$131,411
Regional Commands	72	$9,798	189	$18,585	452	$48,419	213	$21,672	926	$98,474
R&D	610	$43,681	80	$5,474	71	$6,390	20	$2,769	781	$58,314
Strategic plans	272	$24,868	14	$1,940	5	$681	125	$16,284	416	$43,773
Totals	**4,806**	**$375,882**	**1,824**	**$167,752**	**1,748**	**$176,424**	**1,303**	**$177,065**	**9,681**	**$897,123**

Resource management/comptroller

The resource management/financial management/comptroller functions include personnel from the following activities:

- Army Office of the Surgeon General, Army Medical Command, and the Army Medical Department Center and School
- Navy Bureau of Medicine and Surgery
- Air Force Medical Support Agency and Headquarters U.S. Air Force
- Tricare Management Activity

As the examples of the German, Canadian and USSOCOM consolidations discussed in the introduction suggest, the relative success of any approach to a unified medical command depends on the flow and control of resources. On the surface, functions for medical de-

partments' resource managers are comparable among the Services and TMA. Resource management functions include serving as the principal advisor for budgetary and fiscal matters (including financial management, accounting policy and systems, budget formulation and execution, and contract audit administration and organization), program analysis and evaluation, and general management improvement programs. However, beyond this superficial view, there is remarkable variation in the levels of control, information management systems, business practices, and processes directed by Service-specific regulations. The key challenges in unifying this headquarters function reside in these variations.

Of these four key variations, the one with the most relevance to personnel costs is the level of command and control. Levels of control for resource management at the Surgeon Generals' headquarters range from remarkably little control of funds within the Air Force Surgeon General's office to almost complete control of funds within the Army's Surgeon General. Unlike the Army or Navy, within the Air Force the funds for all medical programs, including the direct healthcare system, are controlled by the line (Air Staff). In contrast, the Army Surgeon General's resource manager controls all funds and directly passes operating funds to each activity. Taking the middle ground, the Navy uses regional commands to coordinate and control funds for subordinate activities and the direct healthcare system. As such, the Air Force poses the most complex arrangement to evaluate when considering the impact of a unified medical command. The chief financial officer for TMA has an additional burden of serving as the single point of contact for programming and budgeting for issues relating to the private care sector and centralized IM/IT programs.

As table 14 shows, a total of 375 positions are allocated to resource management with an annual cost of $40.8 million. Based on these numbers, TMA reports the most people working in resource management functions at the headquarters level (207 compared to 93, 54, and 21 for the Army, Navy, and Air Force, respectively).

It is important to note when reviewing the disparities in these numbers that each Service has a different approach to financial and resource management, with varying degrees of authority at each level,

resulting in potentially large variances in personnel assets allocated to this function at the subordinate activity level.

Table 14. Resource management personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	76	7	10	93
Navy	36	18		54
Air Force	5	15		21
TMA	139	8	60	207
Total	256	49	70	375
Costs				
Total (K)	$24,365	$6,878	$9,548	$40,791
Average	$95,071	$141,703	$136,402	$108,829

Given the fact that the unified medical command does not eliminate Service-specific regulations and mandated use of data systems, we can reasonably assume that until unified resource management business processes and data systems are developed, the redundancies within the three medical departments will be perpetuated. Additionally, it is possible that separating the Air Force resource management from the Air Staff's command and control will to some degree result in increased workload for the Air Force medical component. With this in mind, it is also possible that there are Air Force line resources involved in the medical department's resource management activities, suggesting that there are more than 21 personnel associated with managing medical resources.

Despite the dissimilar nature of resource management level of oversight control and asymmetrical personnel levels under the current structure, we can assume a standard level of workload among the Services under a unified medical command. In the case of TMA, it is unlikely that the workload required to manage the complex and extensive network of private care contracts or centralized data systems will be fair-shared among the services. That said, it is reasonable to expect that the remaining demands on TMA resources, such as coordination with the military Services and policy development would decrease under a unified medical command.

In the long term, there are potential personnel savings from a unified medical command as a direct result of the standardized business processes and a common data collection and reporting system. As such, we have developed our cost savings with the long-term view in mind. Similar to the regional commands, the cost savings could vary depending on the structure of the unified medical command. If there is a single structure, it is possible that Service functions and the TMA-unique functions could be collapsed into a single agency. On the other hand, if the structure has a medical command and a healthcare command, there could possibly be two resource management agencies. Services could continue their current operations under the medical command and TMA would continue their oversight of contracts under the healthcare command.

Single-resource-management-command structure

This scenario assumes that all resource management functions currently performed by headquarters and TMA will be consolidated under one agency. This scenario suggests that the effort will be balanced among the Services, even though the data suggest that the staffing ratios are remarkably asymmetrical among the Services and TMA. For the Air Force, we have assumed, that because the line controls the medical resource, there will be additional personnel (not under the control of the Surgeon General) assigned to oversee these resources that will be required under a unified medical command. For the Navy, we have assumed that resource management at the regional command level will decrease as command and control becomes more centralized.

With these assumptions in mind, we have assumed that four like-sized functions will merge under the unified medical command with a balanced level of workload. We estimated that personnel requirements under a unified medical command would be 284 compared to the currently reported 375 (which is suspected to be low under the assumption that we have not captured all of the Air Force's positions in support of this function). As displayed in table 15, this equates to a savings of 91 positions at a value of $11.3 million annually. Assuming that none of these reductions are derived from military positions, the savings falls to approximately $10.6 million annually.

Table 15. Resource management savings for a single medical service

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	375	375
Required personnel with UMC	284	238
Number of personnel saved	91	137
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$11,258	$17,017
Eliminate civilian and contractors only	$10,607	$16,034

If redundancies are found that could be eliminated, in addition to the economies of scale, the personnel savings would be substantially higher. Even with the ongoing requirements to comply with Service-specific regulations and processes, we can assume that consolidating business practices will eliminate redundancies. For example, a single submission to comply with the Defense Health Program (DHP) Planning, Programming, and Budgeting System (PPBS) submission requirements alone saves countless man-hours and eliminates redundant efforts. We estimate that if this example and other redundancies are found and eliminated, in conjunction with the economies of scale, the personnel requirement would decrease from the current allocation of 375 positions to 238. This reduced requirement would potentially save 137 positions, which would equate to approximately $17.0 million or $16.0 million (without military reductions) annually.

Medical command and healthcare command scenario

The inability to extract the resources dedicated towards direct healthcare management from the operational requirements complicates the dual mission approach under this scenario. We estimate an average of 56 positions for the three Services (average of Army, Navy, and Air Force under the current structure). As depicted in table 16, applying the economies of scale, we estimate that the total required under the medical command and healthcare command scenario for all three services would be 135, compared to the current 168, this would generate a savings of 33 positions. This equates to an annual savings of approximately $3.3 million, if we include military positions. Excluding the military, the savings is estimated to

be $2.9 million annually. Applying redundancies, in addition to the economies of scale, we estimate that 113 positions are required for a savings of 55 positions. This results in an estimated savings of $5.5 million annually or $4.7 million if military positions are excluded.

Table 16. Resource management savings single medical command and healthcare command

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	168	168
Required personnel with UMC	135	113
Number of personnel saved	33	55
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$3,275	$5,453
Eliminate civilian and contractors only	$2,850	$4,747

This scenario assumes that TMA would retain its responsibility for oversight of the managed care contract and would retain all of its current 207 positions within TMA. However, future analysis should examine each of these positions to extract the functions of coordination with the Services, which should diminish under a unified medical command.

IM/IT

Our analysis of the effect of a unified medical command on costs in the area of Information Management/Information Technology (IM/IT) has three separate components. First, we estimate the savings from eliminating the Service-specific IM/IT systems whose capabilities duplicate those of tri-service systems. Second, we estimate the cost of the new financial management system that would have to be developed for joint use by TMA and the Services. Last, we estimate the personnel savings resulting from economies of scale.

Savings from eliminating Service-specific IM/IT systems

Currently a number of tri-service IM/IT systems that are already in place or under development. Because these systems are designed

for joint functionality across the Services and TMA, they have the potential to replace existing Service-specific systems that perform the same functions. Without a unified medical command, it is very likely that these duplicative Service-specific systems will continue to exist (and generate costs) because current users are reluctant to give up something that they are familiar with. With a unified medical command that would control and coordinate funding of all IM/IT systems, these duplicative systems would be eliminated. The resulting savings would simply be the amount of money that would have been spent on these duplicative systems in the absence of a unified medical command.

We calculated these savings by first identifying the Service-specific systems that could be replaced by one of the tri-service systems and then adding up their annual costs. For example, the BUMIS II system (Bureau of Medicine Manpower Information System II) is a Navy-specific personnel management system. It provides an online inventory of personnel assigned to Navy Medicine. In FY 2007, the budget for BUMIS II was $223,000. The implementation of the tri-service system DMHRSi (Defense Medical Human Resource System Internet) will make BUMIS II redundant. A unified medical command could ensure that BUMIS II is eliminated, thereby saving its costs.

Note that we did not assume that every Service-specific system would be replaced by a tri-service system. For example, the Air Force has fitness software (FITSOFT) for information on the aerobic fitness of active duty personnel. Because there is no tri-service system designed for that type of data, we assumed that the annual cost of that system (budgeted for $118,000 in FY 2007) would remain, even with a unified medical command.

Table 17 shows that without a unified medical command, the total annual cost of Service-specific systems would be $28.5 million. With a unified medical command that is able to cut off the funding of the duplicative systems, total annual costs decline to $4.4 million, resulting in annual savings of $24.1 million.

Table 17. Savings from elimination of Service-specific IM/IT systems not needed under a unified medical command

	Annual cost of Service-specific systems (in thousands of FY05 dollars)		Annual savings from unified medical command (in thousands of FY05 dollars)
	Without unified medical command	With unified medical command	
Army	$10,477	$258	$10,219
Navy	$9,716	$2,632	$7,085
Air Force	$8,303	$1,505	$6,797
Total	$28,496	$4,395	$24,101

Source: cost data for Service-specific systems come from TMA.

Cost of a joint comptroller/financial management system

Although a unified medical command would produce savings by eliminating the funding of the duplicative Service-specific systems, it would also require spending for the creation of a joint financial management system. As we already noted, the tri-service IM/IT systems already in place or currently under development will replace most Service-specific systems. Hence, a unified medical command will not require the development of new systems, with the exception of a comptroller or financial management system. No such tri-service system is in place. Furthermore, we cannot just assume that a financial management system currently used by one of the Services could fill this requirement because the system will need to be able to interface with the systems from each of the Services and TMA.

So what will it cost to develop, maintain, and operate a financial management system? This is an exceedingly difficult question to answer given the scope of this study and the complexity of such a system. To help answer this question, we asked each of the Services and TMA what they thought such a system would cost, but definitive answers were not forthcoming. The consensus was that it would be complex, and expensive and would take many years to implement. Given the absence of specific information, we proxied the costs of a unified financial management system using the cost history of other tri-service systems.

Specifically, we relied heavily on the cost history of the Defense Medical Logistics Standard Support (DMLSS) system. We chose DMLSS as a reference because (1) like a unified financial manage-

ment system would be, it is a complex tri-service system and (2) we have good estimates of what it cost to develop the system and the time period of the development phase.

The development of DMLSS began after the Gulf War, and in 2002, DOD released it for worldwide deployment [38]. From its inception through 2001, DMLSS program costs were $417 million in 2002 dollars or $452 million in 2005 dollars. Hence, if we assume a 10-year development phase, development costs were roughly $45 million per year [39].

In terms of continuing to operate, maintain, and improve DMLSS, TMA estimated annual costs of $36 million in FY 2005 and $35 million in FY 2008. As another comparison point, annual costs for the Defense Medical Human Resource System Internet (DMHRSi), another new and developing tri-service system, were $37 million in FY 2005.[22] Similarly, annual costs for the Executive Information/Decision Support (EI/DS) system were $43 million in 2005 and projected to be $61 million in 2008. The average annual costs of these three systems are $39 million in 2005 and $35 million in 2008. Assuming that the costs of a unified financial management system would be similar to costs for these systems, we estimate that development costs would be roughly $450 million over a 10-year period and annual operating and maintenance costs would be roughly $35 to $40 million.

Processes under way to standardize may offset these costs accounting processes under the cognizance of the Enterprise Resource Planning (ERP), which uses commercial off-the-shelf products. Financial management programs, which have made substantial progress, include the Standard Financial Information Structure (SFIS) and the Defense Enterprise Accounting and Management System (DEAMS). Current plans are to implement SFIS within the various DOD and Service-specific systems to begin the steps towards common accounting practices and lexicon. DEAMS was developed by the Air Force to facilitate financial accounting between their Service

22. This figure includes $25 million in procurement costs. TMA projects that annual costs for DMHRSi will fall to about $10 million (FY 2008) after the procurement and testing and evaluation phases pass.

systems and the joint system used by the Transportation Command (TRANSCOM). Where SFIS provides the processes, DEAMS may provide the vehicle towards a single accounting system.

Personnel savings in IM/IT functions

Personnel from the following groups are included in this analysis of the IM/IT savings resulting from economies of scale:

- Army Medical Information Management
- Naval Medical Information Management Center (NMIMC)
- Air Force Element Medical Systems
- TMA Information Management, Technology, and Re-engineering[23]

Table 18 shows the number and cost of IM/IT personnel in TMA and the Services. The fact that there are no contractor positions listed for the Services requires some explanation. Recall that we have already estimated the savings from eliminating Service-specific systems whose capabilities will no longer be necessary because of the creation of certain tri-service systems. Since labor is such a large component of the costs of IM/IT systems, and since contractors are so heavily used in IM/IT systems, we assume that most of the cost savings already estimated come from reductions in contractor personnel. Therefore, we do not want to include those contractors in the analysis of personnel savings because we have already calculated the savings from eliminating their positions. Unfortunately, our data could not tell us which contractors are working on the Service-specific systems that could be eliminated. As a result, we had to make the conservative assumption that all current IM/IT contractor positions in the Services are for Service-specific legacy systems and will be eliminated with the elimination of those systems. Although we know this assumption is not entirely accurate, we made it in order to avoid overstating the potential IM/IT savings from a unified medical command.

23. We also included the BUMED Liaison for Defense Medical System Initiates (LDMSI) in the TMA totals.

Table 18. IM/IT personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	327	27	0	354
Navy	105	26	0	131
Air Force	12	52	0	64
TMA	42	12	270	324
Total	486	116	270	872
Costs				
Total (K)	$36,445	$14,868	$50,453	$101,766
Average	$74,941	$127,765	$187,000	$116,638

IM/IT savings from combining the Services and TMA

Unification of IM/IT functions in the Army, Navy, Air Force, and TMA could reduce total personnel by 144 people from the current total of 872, assuming no redundancy (see table 19). The estimates of savings associated with this reduction are $16.8 million (if eliminating military, civilian, and contractor positions) and $16.5 million (if eliminating only civilians and contractors). If we assume 20-percent redundancy, the possible reduction in personnel is 263 people. The estimates of savings associated with that reduction are $30.7 million (if eliminating military, civilian, and contractor positions) and $30.2 million (if eliminating only civilians and contractors).

Table 19. IM/IT personnel savings from combining the Services and TMA

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	872	872
Required personnel with UMC	729	609
Number of personnel saved	144	263
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$16,783	$30,677
Eliminate civilian and contractors only	$16,537	$30,226

IM/IT savings from combining the Services

The estimation of personnel reductions from combining just the Services is slightly different from estimation for combining the Services and TMA. The reason is our decision, described above, not to include contractors in the analysis of savings resulting from administrative economies of scale. This simply means that all personnel reductions come from military and civilian positions only instead of military, civilian, and contractor positions.

Table 20 shows that unification of IM/IT functions in just the Army, Navy, and Air Force could reduce total personnel by 46 people from the current total of 549, assuming no redundancy. That represents a 9-percent reduction. The estimates of savings associated with that reduction are $3.7 million (if eliminating both military and civilian positions) and $3.2 million (if eliminating civilian positions only). If we assume 20-percent redundancy, the possible reduction in personnel is 128 people (a 24-percent reduction). The estimates of savings associated with that reduction are $10.4 million (if eliminating both military and civilian positions) and $9.1 million (if eliminating only civilian positions).

Table 20. IM/IT personnel savings from combining the Services

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	549	549
Required personnel with UMC	503	421
Number of personnel saved	46	128
Cost of personnel saved (K)		
Eliminate civilian and military	$3,742	$10,438
Eliminate civilian only	$3,277	$9,139

Volume discounts in IM/IT

Total IM/IT costs consist not only of labor costs but also substantial hardware and software costs. Although many organizations can negotiate for better prices when they become larger and are purchasing larger volumes from vendors, we have not estimated savings from such "volume discounts" for a unified IM/IT function. The reason is that the military organizations are already so large that there is probably no more potential to increase their volume dis-

counts. The topic of volume discounts is addressed in more detail in a subsequent section.

Education and training

The Services' medical education and training programs are numerous. They include enlisted medical training, field training, medical school, graduate medical education, graduate dental education, and medical accession programs such as the Armed Forces Health Professions Scholarship Program and the Financial Assistance Program. Note that in estimating the potential cost savings in education and training that a unified medical command may have, we have not changed in any way the scope or size of these training programs. We looked solely at education and training management. Specifically, we have estimated the potential savings of unifying the Services' education and training commands and of unifying the non-student billets and non-instructor staff of the post-BRAC enlisted medical training programs at Fort Sam Houston.

Education and training commands

The education and training command functions of the Services include elements from the following:

- Army Medical Department Center and School
- Navy Medical Education and Training Command
- Air Force Aerospace Medicine Command, Air Force Medical Support Agency, Air Education and Training Command, and Air Force Reserve Command

It is logical that DOD locate a unified medical education and training command at Fort Sam Houston given that BRAC is collocating the Services' enlisted medical education and training there. But in this section, we are concerned with personnel reductions from a unified medical command; our methodology for estimating personnel requirements does not depend on location, so we don't concern ourselves with those issues here. (We look at the infrastructure implications in a subsequent section.)

As table 21 shows, there are 829 personnel working in these education and training command functions with an annual personnel cost of $68.5 million. Based on these personnel numbers, the Air Force has slightly more people working these functions than the other Services (307 compared to 304 and 218 from the Army and Navy, respectively).

Table 21. Education and training command personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	235	68	1	304
Navy	99	119		218
Air Force	58	248	1	307
Total	392	435	2	829
Costs				
Total (K)	$24,312	$43,989	$153	$68,453
Average	$62,020	$101,123	$76,390	$82,573

We have estimated personnel savings under the assumption that the workload—providing the education and training command function—is the same across the Services. In other words, we are assuming that the workload share among the Services is one-third for each. The average number of personnel in this function is 276 per Service. Extrapolating from this figure using the scale economy estimates, we estimated that personnel requirements with a unified command are 665 compared to the current 829 personnel. Hence, scale economies could eliminate 164 positions saving $13.5 million annually (see table 22). If we assume that none of these reductions can come from military personnel, annual savings are $10.1 million.[24]

24. Alternatively, if we assume that the command workload is proportional to the number of people currently working these functions, annual savings are smaller. Assuming that workload is proportional to the number of people, annual savings are $12.3 million (or $9.3 million if no cuts are made in military positions). However, given that we are looking at the merger of a command function and not the merger of schools, it seems that the better assumption is that the workload is the same across the Services.

Table 22. Education and training command savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	829	829
Required personnel with UMC	665	557
Number of personnel saved	164	272
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$13,503	$22,487
Eliminate civilian and contractors only	$10,154	$16,909

If there are redundancies to eliminate in addition to scale economy savings, personnel reductions and cost savings are substantially higher. This could very well be the case given that (for example) it probably is not much more difficult to manage the Armed Forces Health Professions Scholarship Program (AFHPSP) for three Services compared to one. Similarly, there may be redundancies in the management of the Services' graduate education programs. We show in table 22 the potential savings assuming the elimination of 20-percent redundancies (in conjunction with the scale economy savings), which is $22.5 million or $16.9 million assuming no cuts in military positions.

Defense Medical Education and Training Center (DMETC)

DOD is consolidating its enlisted education and training programs at Fort Sam Houston as a result of BRAC. Specifically, DOD is consolidating the programs currently at Naval Station Great Lakes, Naval School of the Health Sciences (Portsmouth and San Diego), and Sheppard AFB with Army Medical Department's Center and School at Fort Sam Houston.

Table 23 shows that prior to BRAC, there were 2,153 instructors and support staff working in these enlisted training programs, which DOD would reduce to 1,836 through BRAC. Because we did not look at changes in the laydown of these training programs, we focused on whether a unified medical command could increase the reductions in the support staff. Support staffs here are essentially all non-instructor personnel. Prior to BRAC, there were 1,005 support

staff in these programs, and post-BRAC, there would be 804, based on an assumption of 20-percent personnel savings in support staff.

Table 23. Enlisted training programs instructors and support staff pre- and post-BRAC[a]

	Instructors		Support staff		Total	
Program	**Pre-BRAC**	**Post-BRAC**	**Pre-BRAC**	**Post-BRAC**	**Pre-BRAC**	**Post-BRAC**
Fort Sam Houston	427	384	498	398	925	782
NS Great Lakes	109	98	71	57	180	155
NSHS Portsmouth	74	66	51	41	125	107
NSHS San Diego	170	153	119	95	289	248
Sheppard AFB	368	331	266	213	634	544
Total	1,148	1,032	1,005	804	2,153	1,836

a. These figures are from the BRAC COBRA (Cost of Base Realignment Actions) data. The BRAC assumption was that 10 percent of instructors would be eliminated and 20 percent of support staff would be eliminated.

We estimated, using our scale economy methodology, the additional savings in support staff that could come from a unified command. If we assume a base of 1,005 personnel (pre-BRAC level), the scale economy methodology indicates that 849 personnel would be required under a unified medical command. Note that this is 45 personnel more than the post-BRAC figure of 804 (see table 23). But when we assume a 20-percent redundancy in conjunction with the scale economy estimates, the required personnel would be 710 or savings of 94 personnel below the BRAC level. This reduction would save $7.6 million annually or $5.7 million if we assume that none of these reductions come from military personnel. Given the likely high level of crossover of support staff functions between these enlisted training programs, it seems that the 20-percent redundancy assumption is the better of the two.

Table 24. DMETC savings (costs)

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	1,005	1,005
Required personnel with UMC	849	710
Personnel post-BRAC	804	804
Number of personnel saved	(45)	94
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	($3,668)	$7,602
Eliminate civilian and contractors only	$(2,747)	$5,694

We also estimated personnel reductions going from the post-BRAC base of 804. In this case, the scale economy estimates (assuming no redundancies) indicate that the personnel requirement is 679 or 125 below the post-BRAC level of 804. This would save $10.1 million annually or $7.6 million if we assumed that none of these reductions can come from military personnel. These estimates are similar to (although somewhat higher than) the estimates going from the pre-BRAC base assuming a 20-percent redundancy. But because we were going from a post-BRAC base for these estimates, we didn't include a 20-percent redundancy on the assumption that the post-BRAC figure already accounts for a redundancy reduction.

Research and Development (R&D)

In this section, we describe our estimation of the cost savings that a unified medical command would produce in the area of research and development (R&D). We first explain the specific way in which a unified command would result in economies of scale. We then describe how we estimated the savings from those economies of scale. Last, we present our estimates of the savings.

Background and expected effect of a unified medical command

Medical R&D groups for all three Services are currently spread across different locations in the U.S. and around the world. Groups from different Services doing research on similar topics might or

might not be collocated.[25] Many parallel research groups that are not now collocated will soon be so as a result of BRAC.[26]

Ideally, these collocations of research groups from different Services would automatically result in efficiencies and cost savings through economies of scale. However, in the absence of a unified medical command, that potential for cost savings will not necessarily be realized. In particular, without a unified medical command, the research groups from each Service could very likely continue to operate essentially independently, since each Service would retain its own funding, chain of command, and research agenda.

The role of a unified medical command in R&D would be to ensure better cooperation and collaboration between collocated research groups from different Services through a single chain of command. Thus, in our analysis, we calculate the R&D savings from a unified command as the economies of scale resulting from administrative cooperation among these groups.

Calculating the effect of a unified medical command

The first step in estimating cost savings was determining the baseline from which the effect of a unified medical command would be measured. Because our baseline is post-BRAC, but our data represent pre-BRAC staffing, we constructed our baseline by collocating the pre-BRAC personnel according to the changes specified by BRAC.[27]

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25. An example of collocation across Services is dental research. The Army, Navy, and Air Force research groups are all located at Great Lakes.

26. For example, in the case of combat casualty care, BRAC will result in research groups from both the Army and Navy collocating at the Army Institute of Surgical Research (USAISR).

27. We assumed that groups from the same Service that are collocated post-BRAC would consolidate within Service, even without a unified medical command. Therefore, for those groups, we calculated our baseline personnel levels by applying our standard administrative elasticity (0.8). This produced the estimated level of administrative staff after within-Service consolidations but before a unified medical command.

As described above, our estimates of savings are based on the notion of increased cross-Service cooperation. Therefore, we look exclusively at the situations where there will be post-BRAC collocation of research groups from different Services. Table 25 lists those five research areas and the associated research groups.

Table 25. Research areas with collocation of multiple Services

Post-BRAC Research Groups	Pre-BRAC Research
Combat casualty care research at USAISR	▪ USAISR's original group for combat casualty care research ▪ Walter Reed Army Institute of Research's (WRAIR's) combat casualty care research ▪ NMRC's combat casualty care research
Directed energy bio-effects research at USAISR	Directed energy bio-effects research group for each Service from Brooks City Base
Dental research at (USAISR)	Dental research group for each Service from Great Lakes
Medical biological defense research at the Army Medical Research Institute of Infectious Diseases (USAMRIID)	▪ USAMRIID's original group for medical biological defense research ▪ WRAIR's medical biological defense research ▪ NMRC's medical biological defense research
Biosciences and Protection Division at the Air Force Research Laboratory (AFRL)	▪ Naval Aerospace Medical Research Lab (NAMRL) ▪ Environmental Health Effects Research Lab (NHRC-EHEL) ▪ Air Force Institute of Operational Health ▪ Existing biosciences and protection research at AFRL

Table 26 shows the expected total number and cost of personnel in those five research areas post-BRAC. These are the personnel numbers that represent our baseline for calculating the effect of a unified medical command. We were not able to obtain information on the number and cost of contractors for each research group, and so we were not able to include contractors in this analysis. Their omission means that our estimates understate the potential savings from a unified medical command.

Table 26. Baseline R&D personnel and costs for the five research areas with post-BRAC collocation from different Services

	Civilian	Military	Total
Personnel			
Army	526	628	1,154
Navy	212	61	273
Air Force	78	83	161
Total	816	772	1,588
Costs			
Total (K)	$53,307	$67,758	$119,867
Average	$65,328	$87,770	$75,483

In calculating R&D savings, we made a distinction between research personnel and administrative personnel. We assumed that the number of research personnel and their level of output would not be affected by a unified medical command. However, for administrative personnel, we applied our standard administrative elasticity (0.8) to calculate how many could be eliminated because of economies of scale. Therefore, all estimates of savings presented in the next section come from elimination of administrative personnel and not research personnel.

Results

Unification of R&D in the Army, Navy, and Air Force would increase administrative personnel by three people over our estimate of the post-BRAC baseline, assuming no redundancy (table 27). The costs associated with that increase are $189,000 (if eliminating military and civilian positions) and $158,000 (if eliminating only civilians). If we assume a 20-percent administrative redundancy, the possible reduction in administrative personnel is 87 people (a 5-percent reduction from total baseline staff). The estimates of savings associated with that reduction are $5.5 million (if eliminating military and civilian positions) and $4.6 million (if eliminating only civilians).

Table 27. R&D personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Baseline personnel (i.e., post-BRAC)	1,588	1,588
Required personnel with UMC	1,591	1,501
Number of personnel saved	(3)	87
Cost of personnel saved (K)		
Eliminate civilian and military	($189)	$5,493
Eliminate civilian only	($158)	$4,585

Logistics

The logistics personnel of the Services include personnel from the following groups:

- Army Medical Command Health Care Acquisition Activity, Army Medical Materiel Agency, and Army Medical Command
- Navy Medical Logistical Command and Navy Fleet Hospital Support Office
- Air Force Materiel Command and Air Force Medical Support Agency

The Services have collocated most of their medical logistical personnel at Fort Detrick. Given the collocation, the Services have likely optimized their logistics functions to some degree. Much of the potential savings from logistics and acquisition comes from the ability to pool purchases and purchasing power to get volume discounts. As we discuss in a subsequent section, we believe the Services have largely exhausted these types of savings. Nonetheless, there are potential savings from unifying the command structure of the Services' medical functions.

We noted that collocation at Fort Detrick has helped to optimize logistics somewhat, but even with collocation, the Services still maintain separate command structures. The unification of the logistics command structure is what we see as the source of potential savings. As table 28 shows, there are 1,727 personnel working in these logistics commands with an annual personnel cost of $131.4 million.

Table 28. Logistical personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	1,201	83	8	1,292
Navy	169	66		235
Air Force	44	68	16	128
TMA			72	72
Total	1,414	217	96	1,727
Costs				
Total (K)	$93,698	$29,946	$12,768	$131,412
Average	$66,265	$114,958	$133,555	$76,110

Based on these personnel numbers, the Army clearly has many more people working logistics functions than the Navy and the Air Force, which suggests that the Navy and Air Force are not performing the same amount of workload as the Army does with 1,292 people. We assumed (given the large disparity in personnel numbers) that the logistics workload is proportional to the number of people working these functions. In other words, we assumed for purposes of estimating personnel savings that the Army performs 75 percent (1,292/1,727) of the work. Table 29 shows personnel savings under this assumption.

Table 29. Logistical personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	1,727	1,727
Required personnel with UMC	1,629	1,363
Number of personnel saved	97	364
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$7,404	$27,678
Eliminate civilian and contractors only	$6,861	$25,647

Our analysis showed that a unified medical command could reduce logistics personnel by 97 or about 6 percent even when we assume that there are no redundancies to eliminate. Eliminating these personnel could save $7.4 million if DOD eliminated a mix of personnel equal to the current mix of civilian, military, and contractor personnel. If DOD is unwilling to cut any military personnel and the

reduction comes completely from civilians and contractors, savings would not increase substantially, because civilians and contractors combined are on average less costly than military personnel working these functions. Specifically, savings would be $6.9 million.

If there were redundancies to eliminate in addition to scale economy savings, personnel reductions and cost savings would be substantially higher as table 29 shows. Given that the logistics functions are largely collocated at Fort Detrick, it seems unlikely that these types of redundancies would still exist in a significant way. Hence, while we note what those reductions and savings would be for completeness, we think the estimates that assume no redundancy are the better estimates.

We stated previously that most (926 of 1,727) of the logistical personnel we considered in this section are at Fort Detrick. Given the location difference, we also estimated personnel reductions and savings assuming that we were only unifying the 926 personnel currently at Fort Detrick. Specifically, we estimate that through unification, DOD could save 78 personnel. The cost savings from this reduction would be $6.3 million assuming that DOD eliminated a mix of civilian, military, and contract personnel or $5.8 million if only civilians and contractors were eliminated.

Strategic planning

The strategic-planning function includes the following groups:

- Army Office of the Surgeon General, Army Medical Command Element, and the Army Medical Department Center and School
- Navy Bureau of Medicine and Surgery
- Headquarters U.S. Air Force
- Tricare Management Activity

Strategic planning possibly permeates all levels and activities of a headquarters activity. As a result, it is one of the more difficult to define by specific functions. However, by even the most general definition, this function lends itself more readily to a unified medi-

cal command and resultant vision than possibly any other function within this study. Although strategic planning has been the relentless focus of leadership journals, books, and other forms of documentation, it is generally considered to be the process by which a corporation or company identifies its long-term goals and then determines the best approach to achieve them.

Given that broad understanding of strategic planning and the implication that this is a key function of all headquarters activities, it is not surprising that each Service has its own strategic planning function. What is noteworthy is that the Army reports 272 positions compared to 14 for the Navy and 5 for the Air Force. This disparity among the Services suggests that there is either an imbalance of the workload or the Army has more resources to dedicate towards this important function. TMA follows closer to the Army with 125 positions allocated towards strategic planning.

Regardless, there are no apparent reasons for the disparity in numbers, other than a decision to focus attention and resources in this area. Unlike logistics, the Army has not taken the role of executive agent and assumed the lion's share of the work. Nor do the Air Force and Navy seem to share the benefits of the Army's considerable allocation of positions towards this function. One of the benefits of the unified medical command would be to share this expertise and the dedicated personnel with the other Services. Accordingly, our approach to this analysis was to assume that there would be an equal distribution of work remaining under a unified medical command, with one-third share of the personnel and work aligned with each of the Services. As table 30 shows, 416 positions are allocated towards strategic planning with an annual personnel cost of approximately $43.8 million.

With this in mind, we assumed that there were no large disparities in workload and that under a unified medical command, the workload would be fairly balanced among the Services and TMA. As such the workload and resources would be fairly distributed among these four agencies. Using the average of 104 positions for this function across the Services and TMA as a base, we estimated (using scale economies) that 315 positions would be required under a unified medical command, if no redundancies were found, resulting in elimination of 101 positions (see table 31). This would result in a savings of approximately $10.6 million annually. If none of these

positions were military, savings would not change substantially. With elimination of redundancies combined with economies of scale, this function would require 264 positions and could eliminate 152 positions. This would result in a cost savings of approximately $16.0 million annually. Since so much of TMA's resources are contractors, including military positions does not substantially alter the estimated savings.

Table 30. Strategic planning personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	160	108	4	272
Navy	3	11		14
Air Force		5		5
TMA	68	39	18	125
Total	231	163	22	416
Costs				
Total (K)	$19,482	$21,418	$2,874	$43,774
Average	$84,337	$131,398	$132,442	$105,301

Table 31. Strategic planning personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	416	416
Required personnel with UMC	315	264
Number of personnel saved	101	152
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$10,559	$16,023
Eliminate civilian and contractors only	$8,905	$13,462

Human capital management

The human capital management positions that the Services include are personnel from the following groups:

- Army Office of the Surgeon General, Army Medical Command Element, and Army Medical Department Center and School

- Navy Bureau of Medicine and Surgery
- Air Force Medical Support Agency, Headquarters, U. S. Air Force, Headquarters Air Force Reserve Command, Air Force Personnel Center

Most of these functions are heavily linked to line personnel systems and processes, which include recruiting, community management, personnel distribution, and military pay and compensation. By and large, in the absence of a single medical service, it is unlikely that unlinking the medical departments from these line systems in the near or long term will be possible. As such, efficiencies within the human capital arena would have to be focused on those functions where the functions are not controlled by line policies, procedures, and data systems. Remaining functions that should be considered are requirements determination, personnel allocation, and human capital strategy. It is within these last categories that we believe there are potential savings from unifying the headquarters functions involved with human capital management.

In the mid-1990s, DOD established the Joint Healthcare Management Engineering Team (JHMET) to develop tri-service standards to determine manpower requirements for healthcare delivery and administrative support. Although few of these standards were adopted, the JHMET provides an example of how at least one aspect of human capital strategy can be merged into a unified approach.

The Defense Medical Human Resource System Internet (DMHRSi), which will standardize personnel reporting across the medical enterprise, can be used in combination with joint workload reporting systems available via either the Tri-service Business Planning Tool or the Military Health System (MHS) Management Analysis and Reporting Tool (M2) to move towards a unified approach to resource allocation. We use the term resource allocation to suggest that a unified headquarters could develop strategic plans for the allocation of providers and support staff to minimize overall healthcare costs and maximize productivity.

While resource allocation is closely tied to human capital strategy, we are suggesting that a unified approach to plans and policies regarding the recruiting, retention, and training of military and civil-

ian personnel would reduce competition among the Services, in addition to eliminating redundancies.

As noted above, we have not included any positions that are aligned with line activities in the functions of recruiting, distribution, pay and compensation, or community management. We have included only those positions that are believed to be predominantly working on the areas where we have noted that there may be potential savings. As table 32 shows, there are 245 personnel working in human capital management at the commands listed in the introduction to this section with an annual personnel cost of approximately $25.5 million.

Table 32. Human capital personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	92	40		132
Navy	22	29		51
Air Force	10	32		42
TMA			20	20
Total	**124**	**101**	**20**	**245**
Costs				
Total (K)	$8,909	$13,768	$2,812	$25,489
Average	$72,136	$135,996	$142,000	$104,231

Based on these personnel numbers, the Army has 90 more positions than the Air Force and 81 more positions than the Navy. Even though the Army is substantially larger than the Navy or the Air Force, since we are focusing our interest on plans and policies rather than day-to-day execution of personnel functions, we assume a relatively similar balance of workload among these headquarters staffs.

With this in mind, we assumed that there were no large disparities in workload and that under a unified medical command, the workload would be fairly balanced among the Services. To that end, we assumed that each Service would take one-third of the work with one-third of the positions. Using the average of 75 positions for this function to derive the economies of scale, we estimated that 200 positions would be required under a unified medical command, if no

redundancies were found, resulting in elimination of 44 positions (see table 33). This would result in a savings of approximately $4.6 million annually, or if none of these positions were military, a savings of approximately $3.6 million annually. With elimination of redundancies combined with economies of scale, this function would require 143 personnel for a savings of 102 positions. We estimated that this scenario would result in a cost savings of approximately $10.6 million annually or $8.3 million annually if only military positions are eliminated.

Table 33. Human capital management personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	245	245
Required personnel with UMC	200	143
Number of personnel saved	44	102
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$4,621	$10,588
Eliminate civilian and contractors only	$3,626	$8,308

Under the scenario of the single medical service, we assumed that personnel services traditionally managed by the line would be incorporated into the single medical command. The functions that we included in this excursion are recruiting, distribution, and community management. Consistent with our initial belief that the single medical service will result in larger savings, this scenario, as presented in table 34, suggests that combining these additional personnel and manpower management functions under one Service yields potential savings that are substantially larger. If there were no redundancies, the single military service would require 432 people for a savings of 101 positions, representing approximately $10.6 million in savings. If there were redundancies, the savings would increase to a reduction of 169 positions or $17.6 million annually.

Table 34. Human capital management personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	533	533
Required personnel with UMC	432	365
Number of personnel saved	101	169
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$10,568	$17,599
Eliminate civilian and contractors only	$9,214	$15,345

Force health protection/environmental health

Force health protections, preventive medicine, and environmental health include the following groups:

- Army Office of the Surgeon General, Army Medical Command Element, and the Army Medical Department Center and School, Center for Health Promotion and Preventive Medicine, and Program Office for Preventive Medicine
- Bureau of Medicine and Surgery, Naval Environmental Health Center, Navy Environmental and Preventive Medicine Units (NEPMUs), Disease Vector Ecology and Control Centers, and Navy Drug Screening Laboratories (NDSLs)
- Headquarters U.S. Air Force, Air Force Institute for Operational Health (AFIOH), and Air Force Medical Support Agency
- Tricare Management Activity

Force health protection (combined with environmental health and preventive medicine) is one of the primary missions of the military health system. Not surprisingly, it is perhaps one of the largest and broadest in scope of all the areas under consideration in this study. Generally, this function relates to all services needed to promote, improve, maintain, or restore the mental and physical well-being of the workforce. Force health protection services include preventive and curative health measures, health surveillance, evacuation and treatment of the wounded, disposition of the medically unfit, and

some aspects of medical intelligence. It is important to note that the primary focus for this function is military personnel with spillover effects into the civilian workforce. Of importance to this study, is the notion that this function is a vital part of each TMA and the Services' structure and overall mission. The focus of attention on the force will not dissipate with a unified medical command. To the contrary, this area has potential to benefit from the synergy that should result from combining resources, processes, and expertise.

Because there are so many personnel resources associated with this category, it is worth the time to give a brief background of the largest activities under review. Without question, the largest single activity is the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM). CHPPM is a 1,056-person agency with headquarters at the Aberdeen Proving Ground. There are five subordinate activities located at Fort Meade, Fort McPherson, Fort Lewis, Landstuhl Germany, and Camp Zama Japan. While this agency appears to be quite large, it is actually six activities under one umbrella with subordinate activities aligned with the Army regional centers.

The Navy has the second largest number of positions in this function. Under the guidance of the primary leadership of the Navy Environmental Health Centers, there are eight mission-specific field activities Disease Vector Environment Control Center (DVECC), four NEPMUs, and three NDSLs). Although they have the same mission as CHPPM, they describe their functions in terms of product lines of readiness support, field activities, laboratory services, and training. Of the Services, the Navy appears to have the most disperse resources located in their fleet concentration areas.

Of the Services, the Air Force has the smallest, but not unsubstantial, number of positions. Most of these positions are aligned with the Air Force Institute for Operational Health (AFIOH). With headquarters and primary operations at Brooks City-Base, Texas, AFIOH also has a detachment in Kadena, Japan. AFIOH appears to be more centralized than the Army or Navy activities, but does report similar functions.

Considering the fact that TMA only has 48 positions allocated to force health protection and focuses on medical surveillance and policy guidance, rather than the more direct delivery of force health protection that the Services provide, we have determined that the

best approach to this analysis is to merge the three services' activities, using the Army as the baseline. Although this approach is more conservative than simply fair-sharing the work and resources, it has the least potential to impact Service-specific functions.

Accordingly, our approach was to assume that there would be an equal distribution of work remaining under a unified medical command. As table 35 shows, the Army reports 1,094 positions allocated to force health protection, with an annual personnel cost of almost $87.5 million. Based on these personnel numbers, the Army has more people working these functions than the other Services (1,094 compared to 632 (Navy) and 395 (Air Force)). Despite the variances in positions, we assumed that there were no large disparities in workload and that under a unified medical command the workload would be fairly balanced among the Services.

Table 35. Force health protection personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	817	255	22	1,094
Navy	391	241		632
Air Force	192	203		395
Total	1,400	699	22	2,121
Costs				
Total (K)	$101,796	$70,927	$1,906	$174,629
Average	$72,712	$101,469	$86,658	$82,334

There is an average of 707 positions per Service. Using Army as the baseline and extrapolating from this figure using the scale economy estimates, we estimated that personnel requirements with a unified command are 1,703 compared to the current 2,121 personnel. Hence, scale economies could eliminate 418 positions saving $34.4 million annually (see table 36). If we assume that none of these reductions can come from military personnel, annual savings would be $30.5 million. Although the savings would be substantially higher if redundancies are identified, it cannot be assumed that the mission will substantially decrease under a unified medical command. In fact, the increased focus on force health protection issues suggests that any savings by identifying and eliminating redundancies

could most effectively be reinvested in the pursuit of this critical mission. However, the savings in personnel would increase to a reduction of 697 positions, representing a cost savings of $57.4 million annually. If no military positions were excluded, this savings would decrease to $50.8 million annually.

Table 36. Force health protection personnel savings

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	2,121	2,121
Required personnel with UMC	1, 703	1,424
Number of personnel saved	418	697
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$34,447	$57,365
Eliminate civilian and contractors only	$30,512	$50,812

General headquarters

Our analysis of the consolidation of headquarters functions is based on personnel in the following groups:

- For the Army: Office of the Surgeon General, Army Medical Command Headquarters, Army Dental Command, Army Medical Command Element, Army Medical Department Center and School at Fort Sam Houston, and miscellaneous contract support for healthcare operations.
- For the Navy: Bureau of Medicine and Surgery.
- For the Air Force: Air Force Medical Operations Agency, Air Force Inspection Agency, Headquarters, U.S. Air Force

Note that for each of these headquarters activities we excluded comptroller, strategic planning, and IM/IT functions. As discussed below, we accounted for these personnel in other parts of our analysis.

Table 37 shows the number and cost of personnel in these headquarters groups. Including those personnel in this analysis of general headquarters would result in overstating both the initial

number of staff and the savings that could result from a unified medical command. In addition, note that the counts of personnel in the table represent expected personnel after implementation of BRAC. In other words, the BRAC eliminations were subtracted from current personnel counts.

Table 37. Headquarters personnel and costs

	Civilian	Military	Contractors	Total
Personnel				
Army	282	122	179	583
Navy	95	114	12	220
Air Force	75	158	31	264
TMA	60	8	256	324
Total	511	402	478	1,391
Costs				
Total (K)	$38,024	$54,843	$61,156	$154,022
Average	$74,349	$136,507	$128,048	$110,745

Headquarters savings from combining the Services and TMA

Unification of Army, Navy, Air Force, and TMA headquarters functions could reduce total headquarters personnel by 222 people, assuming no redundancy (see table 38). The estimates of savings associated with that reduction are $25.6 million (if eliminating military, civilian, and contractor positions) and $22.3 million (if eliminating only civilians and contractors). If we assume 20 percent redundancy, the possible reduction in personnel increases to 413 people. The estimates of savings associated with that reduction are $45.7 million (if eliminating military, civilian, and contractor positions) and $41.4 million (if eliminating only civilians and contractors).

Table 38. General headquarters personnel savings from combining the Services and TMA

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	1,391	1,391
Required personnel with UMC	1,169	978
Number of personnel saved	222	413
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$25,583	$45,745
Eliminate civilian and contractors only	$22,260	$41,422

Headquarters savings from combining the Services

Unification of Army, Navy, and Air Force headquarters functions could reduce total headquarters personnel by 122 people (about 13 percent), assuming no redundancy (see table 39). The estimates of savings associated with that reduction are $12.7 million (if eliminating military, civilian, and contractor positions) and $10.5 million (if eliminating only civilians and contractors). If we assume a 20-percent redundancy, the possible reduction in personnel increases to 276 people (a 27-percent reduction). The estimates of savings associated with that reduction are $29.0 million (if eliminating military, civilian, and contractor positions) and $23.9 million (if eliminating only civilians and contractors).

Table 39. General headquarters personnel savings from combining the Services

	Assuming no redundancy	Assuming 20% redundancy
Current personnel	1,067	1,067
Required personnel with UMC	946	791
Number of personnel saved	122	276
Cost of personnel saved (K)		
Eliminate civilian, military, and contractors	$12,748	$28,962
Eliminate civilian and contractors only	$10,498	$23,850

Not surprisingly, combining the headquarters functions of just the Services produces about 31 to 45 percent less savings (depending on the analytic scenario) than including TMA in the consolidation.

This is simply because including TMA results in a larger combined organization, which means that it is better able to benefit from administrative economies of scale.

Other potential savings

In addition to the command structure, personnel, and system savings and costs that we detailed in the previous sections, there are other potential savings that we discuss in this section.

Infrastructure costs

Two BRAC recommendations drive significant infrastructure costs:

- The collocation of TMA, HA, and the Services' medical headquarters in the National Capital Area.
- The collocation of the enlisted training programs at Fort Sam Houston.

The recommendation to collocate the medical headquarters in the National Capital region for example, assumes that 1,720 personnel will need to be collocated. Based on a requirement of 200 gross square feet per person, the infrastructure needs are 344,000 square feet.[28] The question that concerned us in this study was how would a unified medical command change these infrastructure requirements?

As we've previously discussed, infrastructure requirements for administrative space are really a second order issue. They are driven by manpower. So to the degree that manpower falls, infrastructure costs may also fall. Accordingly, we estimated the potential infrastructure savings the unified medical command might generate for the collocated medical headquarters and collocated enlisted training programs.

28. The BRAC recommendation also includes a requirement for 35,524 square feet of Sensitive Compartmented Information Facility (SCIF) space.

Collocated medical headquarters

We estimated savings assuming that the medical headquarters is located (1) at the National Naval Medical Center (NNMC) Bethesda and (2) in leased space in the National Capital Area.

New military construction at NNMC

If a unified medical command can reduce the number of personnel needed to some number below the 1,720 figure from the BRAC recommendation, it could potentially save infrastructure costs because it would not be necessary to build as much new headquarters or administrative space. We estimated infrastructure savings on the assumption that the size of the new military construction could be reduced for personnel requirements below 1,720. We estimated these infrastructure costs per person.

The military construction costs per square foot for headquarters or administration space is $176.61.[29] This means that the costs per person are $35,322 ($176.61*200 square feet). In addition to this one-time cost for military construction, there are annual costs of sustainment, recapitalization, and base operations support (BOS). We estimated these costs based on the FY 2005 costs for NNMC Bethesda. These costs were $38.2 million or $13.00 per square foot.[30] Hence, the annual sustainment, recapitalization, and BOS costs per person are $2,600 ($13*200 square feet).

Leased space

If DOD decides to implement the BRAC recommendation by locating the medical headquarters groups in leased space rather than NNMC Bethesda, the annual savings depend on the lease costs that

29. The cost for administrative space is $1,901.17 per square meter. This figure incorporates a guidance cost of $1,769 multiplied by a size factor of 0.92 multiplied by an area cost factor of 1.12 multiplied by an escalation factor of 1.043. Given 10.765 square feet per square meter, the cost per square foot is $176.61.

30. These costs exclude FA-M2 (Facility Sustainment, Nonrecurring Maintenance) and FB-R2 (Facility Restoration & Modernization, Minor Construction).

can be avoided. We estimated the average lease cost per square foot based on information from the 15 October 2005 lease inventory from the U.S. General Services Administration.

We extracted from this inventory all of the leases for fully serviced properties in the National Capital Area. Furthermore, we limited the sample to properties between 200,000 and 600,000 rentable square feet so that the size is comparable to the estimated needs of the collocation of medical headquarters. The median lease cost per square foot is $32.34 for this group of properties.[31] On this basis, we estimated that the lease costs per person are $6,468 annually.

Collocated enlisted training programs

The Cost of Base Realignment Actions (COBRA) data from BRAC indicate that 1,836 staff (officers, enlisted, and civilian) and 7,869 students will be collocated at Fort Sam Houston. To accommodate these people, several new military construction projects are necessary. Two of these are the construction of a general purposes instruction building and an applied instruction building. If the unified medical command can reduce the number of staff needed below this level, it may be able scale back the size of these construction projects.

These general and applied instruction buildings are to be 302,000 and 120,000 square feet facilities, respectively, costing a combined $74.41 million based on COBRA data. For our purposes, the pertinent question was if the unified medical command is able to reduce the required staff, how much of these construction costs could it avoid?

Because Fort Sam Houston already has the infrastructure capacity to train some of the 7,869 students, we wanted to allocate the construc-

31. If DOD did use lease space, it would have to meet antiterrorism force protection (ATFP) requirements. It is our understanding that the Office of Naval Research (ONR) lease space in Ballston (Arlington, VA) is a good example of lease space that meets these requirements. Its lease cost per square foot is $32.13, which is very close to the median lease costs.

tion costs based on the fraction of students that Fort Sam Houston's current infrastructure can't accommodate. Our estimate was that the current infrastructure can't accommodate 45 percent of the students who will be there post-BRAC. This means new construction of 96 square feet per person (staff and students) or construction savings of $17,006 per staff position that the unified medical command can eliminate.[32]

In addition to these construction savings, there would be savings for sustainment, recapitalization, and base operations support. We estimated these costs at $9.95 per square foot annually based on COBRA data.[33] Assuming 96 square feet of construction per staff member, annual savings for these items would be $1,990.

Timing

Note that while we can estimate the potential infrastructure savings for either of these unified medical command changes, decisions regarding a unified medical command have to be made in a timely manner to actually realize any infrastructure savings. If, for example, the BRAC recommendation to collocate medical headquarters is implemented by a military construction project at NNMC Bethesda, construction would have to begin in 2008 to be ready for occupancy in 2010. This means that construction funding would have to be obligated in FY 2007, and the assumption is that once the funds are obligated, it is too late to change the size of the construction project. Hence, although a unified medical command may end up with a smaller personnel requirement, it would be too late to save construction costs, because the building would already be built or at least be in the process. The same argument would hold for new construction at Fort Sam Houston.

With lease space for collocating medical headquarters, the timeline is not as tight because the BRAC recommendation is looking for oc-

32. Construction costs per square foot are $176.32 ($74.41 million for 422,000 square feet).

33. Sustainment, recapitalization, and BOS costs are $26.9, $18.2, and $116.2 million, respectively. Given 16.2 million square feet at Fort Sam Houston, these costs are $9.95 annually per square foot.

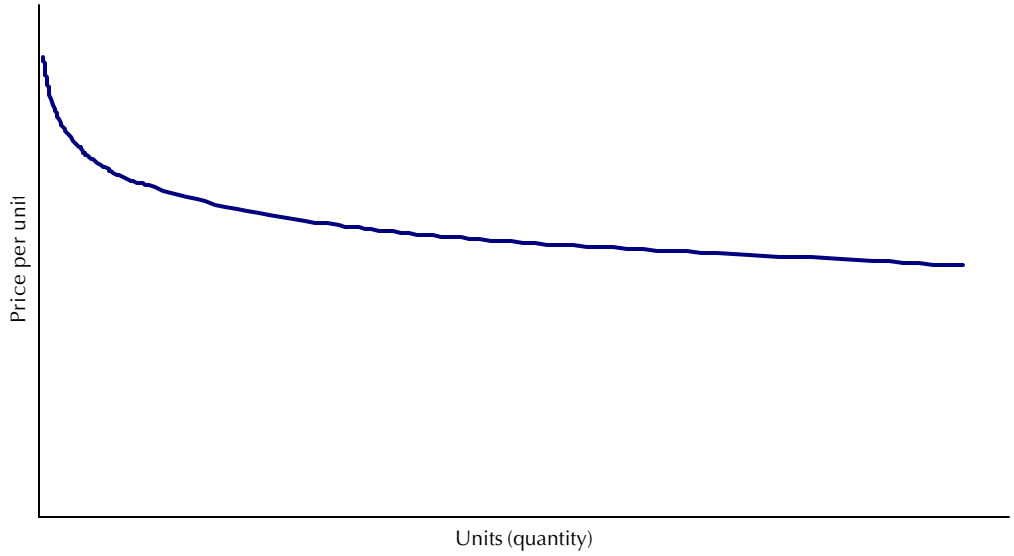
cupancy by 2010. The constraint with lease space is how far in advance the lease needs to be signed. All personnel reductions due to a unified medical command would have to be in progress before this time to impact the amount of space DOD leases. Of course, DOD may be able to reduce the amount of space leased in future contracts once the original lease expires. However, given human nature's desire to fill whatever space is available, it seems unlikely that the "excess" space would ever be given up.

Volume discounts

Another potential source of savings from a unified medical command is volume discounts from pooling purchasing power. The Services can pool their purchasing power for pharmaceuticals, medical equipment, information technology, etc. Substantial literature documents the potential savings stemming from volume discounts [40]. The basic idea is that the more units you purchase, the better the price per unit. However, as figure 12 illustrates, the largest reductions in price per unit occur for the first few units purchased. If the Services have already purchased a large quantity of units, increasing the quantity even more will not lower the price per unit very much because they are already in the "flat" part of the price-per-unit curve.

The pertinent question for this study was to what degree have the individual Services already realized these savings either individually (through large purchases) or collectively through joint efforts such as the Defense Supply Center Philadelphia and the collocated medical logistics commands at Fort Detrick? In other words, how far down the curve are the Services already? Based on our analysis, we believe that the savings from volume discounts have already been largely realized. Nevertheless, we give two examples to demonstrate the range of possibilities.

Figure 12. Notional relationship between price per unit and quantity purchased



Information technology purchases

The Services' medical commands spend approximately $123 million annually on hardware and software.[34] Industry estimates are that savings from purchasing pools can save around 10 percent [41], which would indicate potential savings of $12.3 million. However, it is likely that the Services already realize substantial savings from volume purchases, so the $12.3 million represents an upper bound on savings in this area.

Another way to estimate potential savings from pooling these hardware and software purchases is to assume that by unifying, DOD reduces the number of different items that it purchases and that it will in turn purchase more of the remaining items. In other words, the total amount of hardware and software the Services use would not change, but the types of hardware and software used would be fewer. The idea here is that if a unified medical command is to increase interchangeability and interoperability, there will probably

34. This is a FY 2007 figure deflated to FY 2005 dollars.

be some streamlining of equipment to make things more consistent across the Services. If we assume that the number of items could be reduced by 5 percent and that the "learning curve" is 0.95, savings would be 0.4 percent or $0.5 million.[35] Similarly, if we assume a 10 percent reduction in items and a learning curve of 0.9, savings would be 1.6 percent or $2.0 million.[36]

Based on our discussions with Service representatives, the Services really don't know what they spend on information technology. The $123 million figure certainly doesn't encompass all spending in this area. Information technology is not all purchased centrally, but often by individual commands. If a commander finds that the command needs something, he/she might simply tell a subordinate to "make it happen." These are relatively small purchases, and they probably do not receive volume discounts. Furthermore, if the individual Services have not been able to pool these command-level information technology purchases to realize volume discount savings, it seems unlikely that a unified medical command would be able to either.

Healthcare contracts

Another potential source of savings from volume discounts is in healthcare contracts—contracts for physicians, dentists, nurses, technicians, and other medical staff. Our hypothesis is that if the Services can get what they need in larger contracts, they will realize some savings from volume discounts.

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35. A learning curve is a concept that recognizes that repetition of the same operation results in less time/effort expended on that operation. While this concept's origins deal with manufacturing, it can be applied to purchases as well. The learning curve values vary by process and typically range between 0.7 and 0.9, where the smaller numbers represent greater learning rates [28]. We have used learning curve values of 0.9 and 0.95 for this example because learning rates are lower for purchased products.

36. Scenarios of (1) a 5-percent item reduction and a learning curve of 0.9 or (2) a 10-percent item reduction and a 0.95 learning curve both result in savings of 0.8 percent or $1.0 million.

We estimated these potential discounts using the information on contract hours, cost per hour, and type of contract (e.g., physicians, dentists) from the Navy's Healthcare Contracts Database. From these data, we statistically confirmed our hypothesis that there is a volume discount for larger contracts. Specifically, we estimated that the elasticity of contract cost to quantity (hour) is 0.957.[37]

Our assumption is that a unified medical command may be able to increase the average size of the healthcare contracts because instead of two or three Services purchasing separate contracts for the National Capital or Tidewater area, it would be one group—the unified medical command—purchasing healthcare contracts for all of the medical treatment facilities in each area.

Table 40 shows what savings the elasticity figure of 0.957 would result in if the average size of the healthcare contracts increased by 10 or 20 percent. For physicians, the average contract size was 2,537 hours costing $109.09 per hour. A 10-percent increase would increase average contract hours to 2,791 costing $108.64 per hour or a savings of $0.45 per hour. Hence, the overall savings for purchasing the same number of total contract hours is $254,000. If the average contract size increased by 20 percent, savings would be $485,000. Applying the same methodology to all contracts, potential savings are $1.1 and $2.0 million for 10- and 20-percent increases in average contract size, respectively.

37. To derive this elasticity, we estimated the equation $C = \alpha + \beta H + \mathbf{Y}\delta + \mathbf{T}\gamma$, where C is the natural logarithm of contract cost, H is the natural logarithm of contract hours, **Y** is a vector of the fiscal year of the contract, **T** is a vector of the type of contract, and α, β, δ, and γ are the parameters to be estimated. The estimated value for β is the elasticity of contract cost with respect to quantity or hours.

Table 40. Potential Navy healthcare contract savings

	Physician contracts			All contracts[a]		
	Current size	Current size + 10%	Current size + 20%	Current size	Current size + 10%	Current size + 20%
Hours per contract	2,537	2,791	3,045	3,658	4,024	4,390
Cost per hour	$109.09	$108.64	$108.24	$38.44	$38.28	$38.13
Total hours	568,308	568,308	568,308	6,712,591	6,712,591	6,712,591
Total cost ($K)	$61,996	$61,743	$61,511	$258,007	$256,931	$255,969
Savings ($K)		$254	$485		$1,077	$2,039
Percent		0.4%	0.8%		0.4%	0.8%

a. Includes contracts that would correspond to Medical Corps, Dental Corps, Nurse Corps, Medical Service Corps, and enlisted.

Summary

Our analysis shows that a unified medical command has the potential to generate substantial savings in personnel and systems through the merging of commands and headquarters groups performing similar functions. Specifically, we estimated annual savings the transition to a unified medical command is complete as well as the transition costs.[38]

Long run annual savings

To overcome these issues, we estimated annual personnel and system savings in the long run or steady state after a unified medical command would be fully implemented. Additionally, we made these estimates using a functional approach so that we could estimate the potential cost savings of several different unified medical command structures. We estimated long run personnel and system costs and savings for the following three structures:

- A single medical command—the Services and TMA are unified under a single command.
- A medical command and a healthcare command—the healthcare command would cover the medical treatment facilities and the purchased care contracts, and the medical command would cover all other functions.
- A single medical service—one Service provides the medical function for the other three, similar to how the Navy provides it for the Marine Corps.

[38] Without a timeline of when and how DOD would implement a unified medical command, we could not estimate the costs and savings from year to year as DOD makes the transition. Furthermore, we don't know what the exact structure of the unified medical command would be. This further complicated our ability to give year-by-year costs and savings estimates.

Table 41 shows our savings estimates for each of these structures as well as the savings and costs for individual functions. A single medical service has the potential for the largest savings—$417 million annually. The savings with a single medical command are $344 million annually. Savings are less ($282 million annually) with a medical and healthcare command structure because it is less unified or consolidated than the other two configurations.

Table 41. Potential annual savings (costs) in the long run by type of command structure (figures in thousands of 2005 dollars)

Function	Single medical command	Medical command and a healthcare command	Single medical service
Healthcare operations			
Parent-child structure	129,387	129,387	129,387
Regional commands	44,190	30,893	64,151
Comptroller			
Personnel	17,017	5,453	17,017
Systems	(40,000)	(40,000)	-
IM/IT			
Personnel	30,677	10,438	30,677
Systems	24,101	24,101	24,101
Education and training			
Education and training command	22,487	22,487	22,487
DMETC	7,602	7,602	7,602
Research and development	0	0	0
Logistics	7,404	7,404	7,404
Strategic planning	16,023	16,023	16,023
Manpower (human capital mgmt)	4,621	4,621	17,599
Force health protection	34,447	34,447	34,447
General/other headquarters functions	45,745	28,962	45,745
Total savings	**343,701**	**281,818**	**416,640**

Note that for each of the functional areas, we computed potential savings under different assumptions. Most notable is our assumption regarding redundancies—assuming either 0 or 20 percent redundancies. The figures in table 41 represent our best estimate of the potential savings for each function. For some functions like logistics and R&D, for instance, our best estimate assumes no redundancies because we believe that given the current collocation of

logistics and the BRAC reductions in R&D there would not be 20-percent redundancies to eliminate.

For the single medical service structure, we assumed that the unified medical command would adopt one of the existing financial management systems currently employed by one of the Services or another agency (such as USSOCOM). Under this structure, the unified medical command would have the authority to develop its own major force program (MFP) and would not have to submit its proposal via the military Services. As a result, the financial management and budget systems would not have to meet three different standards. Any existing system that is DOD compliant could be easily adapted without the rigors of translating business practices and systems into one system. Additionally, the single medical service structure assumes enhanced control over personnel management and resource allocation decisions, similar to USSOCOM. As such, DOD could eliminate an additional layer of redundancies, increasing savings.

Furthermore, the data in table 41 are based on the assumption that DOD would eliminate a mix of civilian, military, and contractor positions in proportion to their current mix. If, however, DOD were unwilling to cut military billets and took all of the personnel reductions from a mix of civilian and contractor positions, annual savings in the steady state would be $384 million for a single medical service, $315 million for a single medical command, and $254 million for a structure with a medical and a healthcare command.

Another option is to eliminate a mix of civilian, military, and contractor positions at headquarters functions, but rather than cutting these military billets completely, DOD could reprogram these headquarters billets to clinical billets and provide more patient care at the medical treatment facilities. We estimated that if DOD did this, it could save purchased care costs. However, the value of the purchased care costs saved would be 0 to 15 percent less than the cost of recapturing that purchased care. So from a cost standpoint, it is more economical to simply cut the headquarters billets rather than reprogramming them to clinical billets. We further note that the transition period would very likely be long and costly as billets were reprogrammed and DOD acquired/trained its personnel to the clinical skills that it would need.

Transition costs

We noted that our personnel and systems estimates are long run annual savings estimates. Although we have not attempted to quantify transition costs in general, there is one very significant transition cost that we must mention: developing a comptroller system for a unified medical command. A unified medical command will need a common comptroller system if it is to realize the potential savings we document in this study. For instance, the savings figures for changes in the parent-child and regional command structure implicitly require a common comptroller system if they are to generate the savings our analysis indicates are possible. We estimated (based on the cost of the DMLSS system) that it would cost roughly $450 million over 10 years to develop such a system. Note that these cost and time estimates may be on the high end because DOD already has some processes underway to standardize the accounting systems. These programs include the SFIS and DEAMS. If these programs are successful, the cost and time to develop a common comptroller system may be substantially less. In general, these transition costs for a new comptroller system would not exist for the single medical service option.

Clear command and control is essential

Our analysis showed that there are large potential savings in personnel and system costs, most notably the $129 million potential savings from changing the medical/dental treatment facility command structure by changing some facilities that are currently parent commands to children of another command. However, we do not believe that DOD will realize these savings without proper execution and clear command and control. It is essential that the unified commander have the ability to cut billets and positions and funding for programs that are redundant and not needed under a unified command. Otherwise, these savings will be illusive.

We based this conclusion on the fact that the parent-child changes at the Navy's medical treatment facilities in New England (NHCNE) and at Fort Monmouth have not produced the savings that they could have. Cuts in administrative positions are apparently difficult to make. While there may be an array of reasons for this, it seems

clear that there is neither a structure nor guidelines for which administrative responsibilities should be under a parent versus a child command structure.

Additionally, clear command and control is essential if DOD is to realize system savings in information management. We note that while DOD has developed or is developing tri-service systems to perform the function of Service-specific systems, it is difficult to actually cut off funding for old systems. The unified medical commander must have the ability to cut off funding for redundant information management systems, if DOD is to realize these savings.

Infrastructure savings

Finally, there is the potential for savings in infrastructure, but these savings are likely small and realizing them at all would require the implementation of a unified medical command to begin almost immediately. Potential infrastructure savings would come from being able to reduce the size of BRAC-driven construction projects or leases. For instance, if a unified medical command could reduce the number of personnel needed in a joint medical headquarters (National Capital Area) or the enlisted medical training program (Fort Sam Houston), it could result in smaller military construction projects than are required to meet the requirements of the BRAC recommendations. But if the BRAC construction projects are too far along, it will be too late to realize these savings. Similarly, if DOD decides to lease a property in the National Capital Area rather than use military construction, it will be too late to save lease costs if the lease is already signed. Of course, DOD could reduce its leased space when the initial lease expires, but it is difficult to believe that the space would be given up at that point because people and organizations tend to fill up the space they have.

Appendix

Tables 42 and 43 show the FY 2005 average military composite rates by paygrade and civilian compensation, respectively.

Table 42. FY 2005 average composite rate by paygrade[a]

Paygrade	Composite rate	Paygrade	Composite rate	Paygrade	Composite rate
O-10	$221,924	WO-5	$127,785	E-9	$106,770
O-9	$218,376	WO-4	$119,961	E-8	$91,348
O-8	$201,358	WO-3	$102,302	E-7	$80,668
O-7	$183,084	WO-2	$92,937	E-6	$70,269
O-6	$175,994	WO-1	$69,657	E-5	$59,142
O-5	$150,298			E-4	$48,708
O-4	$133,288			E-3	$41,058
O-3	$106,836			E-2	$38,029
O-2	$82,953			E-1	$35,382
O-1	$67,590				

a. Average composite rate across the Army, Navy, and Air Force.

Table 43. Civilian compensation—2005

Grade	Pay	Grade	Pay	Grade	Pay	Grade	Pay
AD-0	$141,652	DK-2	$54,244	IC-7	$44,668	WG-2	$30,079
AG-1	$23,398	DK-3	$80,446	IC-8	$49,469	WG-3	$32,977
AG-2	$25,472	DK-4	$126,043	IC-9	$54,642	WG-4	$35,901
AG-3	$28,714	EF-0	$184,470	ID-1	$23,398	WG-5	$38,853
AG-4	$32,233	GG-1	$23,398	ID-2	$25,472	WG-6	$41,885
AG-5	$36,062	GG-2	$25,472	ID-3	$28,714	WG-7	$44,890
AG-6	$40,197	GG-3	$28,714	ID-4	$32,233	WG-8	$47,815
AG-7	$44,668	GG-4	$32,233	ID-5	$36,062	WG-9	$50,793
AG-8	$49,469	GG-5	$36,062	ID-6	$40,197	WG-10	$53,691
AG-9	$54,642	GG-6	$40,197	ID-7	$44,668	WG-11	$56,723
AG-10	$60,170	GG-7	$44,668	ID-8	$49,469	WG-12	$59,648
AG-11	$66,112	GG-8	$49,469	ID-9	$54,642	WG-13	$62,572
AG-12	$79,235	GG-9	$54,642	ID-10	$60,170	WG-14	$65,497
AG-13	$94,223	GG-10	$60,170	ID-11	$66,112	WG-15	$68,368
AG-14	$111,344	GG-11	$66,112	ID-12	$79,235	WL-1	$29,864
AG-15	$130,973	GG-12	$79,235	ID-13	$94,223	WL-2	$33,030

Table 43. Civilian compensation—2005

Grade	Pay	Grade	Pay	Grade	Pay	Grade	Pay
CC-1	$23,398	GG-13	$94,223	ID-14	$111,344	WL-3	$36,331
CC-2	$25,472	GG-14	$111,344	ID-15	$130,973	WL-4	$39,497
CC-3	$28,714	GG-15	$130,973	NH-1	$27,379	WL-5	$42,743
CC-4	$32,233	GM-13	$94,223	NH-2	$51,158	WL-6	$46,071
CC-5	$36,062	GM-14	$111,344	NH-3	$84,583	WL-7	$49,398
CC-6	$40,197	GM-15	$130,973	NH-4	$118,076	WL-8	$52,618
CC-7	$44,668	GS-1	$23,398	NJ-1	$27,379	WL-9	$55,837
CC-8	$49,469	GS-2	$25,472	NJ-2	$42,085	WL-10	$59,057
CC-9	$54,642	GS-3	$28,714	NJ-3	$58,948	WL-11	$62,358
CC-10	$60,170	GS-4	$32,233	NJ-4	$84,583	WL-12	$65,577
CC-11	$66,112	GS-5	$36,062	NK-1	$27,379	WL-13	$68,824
CC-12	$79,235	GS-6	$40,197	NK-2	$33,018	WL-14	$72,098
CC-13	$94,223	GS-7	$44,668	NK-3	$53,541	WL-15	$75,210
CC-14	$111,344	GS-8	$49,469	NU-1	$23,398	WS-1	$43,146
CC-15	$130,973	GS-9	$54,642	NU-2	$25,472	WS-2	$46,151
DB-2	$33,396	GS-10	$60,170	NU-3	$28,714	WS-3	$49,022
DB-3	$54,244	GS-11	$66,112	NU-4	$32,233	WS-4	$52,027
DB-4	$80,446	GS-12	$79,235	NU-5	$36,062	WS-5	$55,032
DB-5	$126,043	GS-13	$94,223	NU-6	$40,197	WS-6	$58,091
DR-1	$33,396	GS-14	$111,344	NU-7	$44,668	WS-7	$61,016
DR-2	$54,244	GS-15	$130,973	NU-8	$49,469	WS-8	$63,967
DR-3	$80,446	IC-1	$23,398	NU-9	$54,642	WS-9	$66,892
DR-4	$126,043	IC-10	$60,170	NU-10	$60,170	WS-10	$69,871
DE-1	$33,396	IC-11	$66,112	NU-11	$66,112	WS-11	$72,151
DE-2	$54,244	IC-12	$79,235	NU-12	$79,235	WS-12	$74,861
DE-3	$80,446	IC-13	$94,223	NU-13	$94,223	WS-13	$78,376
DE-4	$126,043	IC-14	$111,344	NU-14	$111,344	WS-14	$82,213
DJ-1	$33,396	IC-15	$130,973	NU-15	$130,973	WS-15	$86,721
DJ-2	$54,244	IC-2	$25,472	SES-0	$184,470	WS-16	$91,819
DJ-3	$80,446	IC-3	$28,714	SES-4	$213,924	WS-17	$97,507
DJ-4	$93,698	IC-4	$32,233	ST-0	$141,652	WS-18	$103,840
DJ-5	$126,043	IC-5	$36,062	ST-4	$184,470	WS-19	$108,670
DK-1	$33,396	IC-6	$40,197	WG-1	$27,100		

Tables 44 through 46 show our regression estimates for the parameters in equations (1) through (3), respectively. Note that we ran our regressions using FY 2004 data.

Table 44. Parameter estimates for the impact of parent-child status on administrative costs (clinics)

Variable	Parameter	Estimate[a]
Constant	*a*	5.5144†
ln encounters	*b*	0.7444†
ln parent	*d*	1.4905†
no. of observations	243	
Adjusted R^2	0.7079	

a. † indicates that the parameter estimate is statistically significant at the 99-percent level.

Table 45. Parameter estimates for the impact of the number of children on administrative costs (hospitals)

Variable	Parameter	Estimate[a]
Constant	*a*	12.3483†
ln encounters	*b*	0.2706†
ln OP complexity	*d*	0.3849
ln dispositions	*f*	0.1842†
ln IP complexity	*g*	0.6332†
1/(1 + no. of children)	*l*	-0.5236†
no. of observations	71	
Adjusted R^2	0.9347	

a. † indicates that the parameter estimate is statistically significant at the 99-percent level.

Table 46. Parameter estimates for the impact of the number of children on administrative costs (clinics)

Variable	Parameter	Estimate[a]
Constant	*a*	9.4468†
ln encounters	*b*	0.5521†
1/(1 + no. of children)	*l*	-0.3516†
no. of observations	67	
Adjusted R^2	0.6967	

a. † indicates that the parameter estimate is statistically significant at the 99-percent level.

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