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Life-Cycle Costs of Selected Uniformed Health Professions

(Phase II: The Impact of Constraints and Policies on the Optimal-Mix-of-Accession Model)

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Summary

Introduction

The Department of Defense (DoD) charges the Military Health System (MHS) to maintain the health of the active duty forces, attend to the sick and wounded in time of war (known as the *readiness* or *force health protection* mission), and provide health care services as part of its *peacetime benefit* mission. To effectively execute these sometimes disparate missions, the MHS draws on a broad mix of highly trained health care professionals from the active and reserve forces, the civil service system, and various contractors and network personnel. The medical departments of the three Services rely heavily on active duty professionals to meet the majority of these health care demands. Each medical department decides on the number, skill mix, and type of professionals needed in the active duty ranks to perform required services.

What are life-cycle costs and why are they important?

Because so much of the health care mission depends on active duty personnel, it is important to understand the total cost, or uniformed life-cycle costs, of these health care professionals. We define *uniformed life-cycle costs* as the total cost to DoD to attract, access, train, and maintain a fully trained health care professional in the MHS.

Life-cycle costs are important because the resources of the Defense Health Program (DHP), the Services, and DoD in general are limited. Potentially, there are many different ways, levels, and mixes of providers through which the MHS could fulfill its active duty force requirements, but each has different costs. By looking at life-cycle costs, we provide useful information that will help to determine the most cost-effective way to fulfill the MHS's active duty force requirements, given current constraints and chosen business practices.

This study helps answer and shape four policy questions

High-level policy-makers are becoming increasingly aware that DoD is using a wide variety of subsidized accession and special pay programs to initially attract and ultimately retain health care professionals in the military. This study (documented in two phases) helps to answer the following questions:

- What are the determinants of life-cycle costs associated with different accession sources and career paths?
- How does retention vary by accession source and career path?
- Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions to fill long-term billet requirements?
- Is it more cost-effective to fill specialty billets by increasing special pays to retain the existing inventory or to concede a preestablished loss ratio and access more providers into the system by increasing accession subsidies?

The TRICARE Management Activity (TMA) at DoD asked the Center for Naval Analyses (CNA) to evaluate the life-cycle costs of selected uniformed specialists—as fully trained specialists—based on different accession programs. We also look at the cost per year of practice and the expected years of practice as fully trained specialists.[1]

Major assumption for this study

It is beyond the scope of this study to comment on the optimal way or the best level and mix of health care professionals to fulfill the MHS's mission. For our analysis, we must assume that the active component billet authorizations developed by the three Services' medical departments are appropriate. In this study, we take these billet authorizations as given and look for the most economical way of filling them.

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1. We gratefully acknowledge the assistance of various representatives of the Services, the Uniformed Services University of the Health Sciences (USUHS), TMA, and Health Affairs (HA) who gave us invaluable support throughout this study.

Major findings

Our research of this study's four major policy questions resulted in six major findings. The following paragraphs describe each of these findings.

First, the cost to access and train health care professionals is substantial, particularly for those in subsidized accession programs and those with in-house training, such as graduate medical education (GME) or graduate dental education (GDE). DoD needs to consider these costs when making comparisons to civilian alternatives because failure to do so substantially underestimates actual DoD costs.

Second, policy-makers need to consider the costs and benefits for each accession source. For example, even though USUHS accessions are the most costly, their better retention makes USUHS the most cost-effective accession source for filling O-6 grade requirements.

Third, the level of experience that DoD requires for its physician specialists is a key determinant of the optimal mix of accessions. If the current experience requirements are appropriate, in-house GME (i.e., USUHS and Armed Forces Health Professions Scholarship Program (AFHPSP) direct accessions) is a more cost-effective way to meet those requirements than AFHPSP deferred or Financial Assistance Program (FAP) accessions. Conversely, if the stated experience requirements could be lowered, AFHPSP deferred and FAP accessions would be the more cost-effective option.

Fourth, if the dental corps and optometry community were to rely on AFHPSP as their sole accession source, costs would increase by 3.3 and 2.0 percent, respectively. The additional cost, however, would provide them with a reliable accession source for planning future accessions.

Fifth, increasing accession subsidization of FAP and direct accessions through accession bonuses results in small cost savings for all three communities. Additionally, bonuses of this type are examples of the kind of flexibility that would help DoD fix short-term manning difficulties.

Sixth, reducing attrition through higher special pays is generally not cost-effective. However, under certain circumstances (such as short career paths meaning few years of service at completion of the initial active duty obligation), it is cost-effective to reduce attrition through special pays targeted at specialties with low retention.

Format of this report

This study is complex and has required us to divide our research effort into two phases. The purpose of this report is to document our phase II analysis, but first we provide a summary of phase I (previously documented in [1]).

Phase I

Our first step in this study was to develop the methodology and model to quantify the life-cycle costs of the major accession sources for selected uniformed specialties. We examined them for all three Services (Army, Navy, and Air Force) for the following professionals:

- Physicians (23 specialties)
- Dentists (10 specialties)
- Optometrists
- Pharmacists
- Clinical psychologists
- Certified registered nurse anesthetists.

Specifically, we determined life-cycle costs, and expected retention, at specific stages of a typical military health care professional's career path.[2] We also looked at the cost per year of practice and the expected years of practice as fully trained specialists.

In the next main section of this document, we provide a synopsis of our methodology and major findings from our phase I efforts [1] to

2. The detailed results of phase I may be found in CNA Research Memorandum D0006686.A3 [1].

facilitate the reader's transition and interpretation of our phase II research and findings.

Phase II

Using our phase I results as a foundation and focusing on physicians, dentists, and optometrists,[3] we developed and ran a model to assess the most cost-effective mix of accessions to fill duty billet requirements in the future, we assessed the efficacy of current accession/retention programs, and we recommended ways to strengthen the personnel planning process.[4] In a subsequent section of this document, we provide an overview of the approach we used during phase II of this study [2 through 18] and a summary of our major findings. However, detailed accounts of our methodology and results, for each Service, are contained in the appendixes to this report:

- Appendix A—Physicians
- Appendix B—Dentists
- Appendix C—Optometrists.

We now turn our attention to briefly describing our approach and findings from the first phase of this study.

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3. As previously stated, in phase I of this study, we also determined the life-cycle costs for pharmacists, clinical psychologists, and certified registered nurse anesthetists (CRNAs). These specialties were not modeled during phase II. Phase I results for these specialties may be found in [1].
4. Duty billets refer to those specialty billets that are for fully trained personnel who are not in training. By a duty specialist, we mean someone who is not in training and is qualified to fill one of these specialty billets.

Life-cycle costs (phase I)

Although the primary focus of this report is to document our analysis and findings from the study's second phase, we summarize phase I because its results are important inputs for the phase II optimal mix of accession model and analysis. In addition, there are several key findings from phase I that are important to highlight. For additional or detailed results, please refer to our phase I report [1].

Approach for phase I

Overview

Based on our review of both public- and private-sector literature, we break down uniformed health professions' life-cycle costs into three broad categories.

First, for each group of health care professionals, we determine the cost of "getting them in the door" to the point where they are fully trained specialists. In other words, how much does it cost to attract and access these officers into the military? We do this for each Service's predominant accession sources. This measure is important because, if the cost of accessing a health care provider into the MHS is higher for one source than for others, the MHS needs these professionals to remain in the military longer to be as economical as accessions from a less costly source.

Second, we measure the cost per year of practice (YOP) as a fully trained professional at the first stay-leave military decision point.[5] This is a critical measure because it tells us what DoD paid for them annually for the obligatory period.

5. By YOP, we mean the number of years health care professionals provide services after they become fully trained specialists.

Third, we measure the cost per YOP for the expected number of years of practice that providers give, on average, as fully trained specialists before separating from the military. This annualized cost is very useful to compare the cost of civilian and contract providers with military health care professionals.

Our approach accounts for the fact that life-cycle costs for health care professions vary for a number of reasons, including but not limited to the following:

- The type of accession programs
- In-house training requirements
- Varying length of initial active duty obligation
- Expected years of service (career path)
- Differences in compensation (special pays)
- Differences in how the Services recruit and manage these professionals.

Six factors in the life-cycle-cost model (phase I)

Table 1 outlines the six major life-cycle-cost factors in the general cost model and the applicability of specific costs to each professional group. A brief description of each cost factor follows.[6]

Accession

Accession costs consist of recruiting costs and accession bonuses. Recruiting costs account for military and civilian personnel costs, advertising, communications, training, computer support, travel, supplies, equipment, and leased facilities used to recruit health professionals into the military directly or into one of its subsidized accession programs.

6. A detailed description of each cost factor for each Service, specialty, and accession source may be found in phase I of this study, which includes pharmacists, clinical psychologists, and CRNAs. [1].

Table 1. Life-cycle-cost factors by health care profession

Life-cycle-cost factor	Health care profession		
	Physicians	Dentists	Optometrists
Accession			
Recruiting costs	X	X	X
Accession bonus		X	
Education			
USUHS costs	X		
AFHPSP costs	X	X	X
FAP costs	X		
HPLRP			Navy
Compensation			
Stipend	X	X	X
Basic pay, BAH, BAS	X	X	X
Special pays	X	X	X
VSP	X	X	
ASP	X	X	
BCP	X	X	X
ISP	X		
MSP	X		
DOMRB		X	
ORB			X
OSP			X
Current benefits	X	X	X
Retirement benefits	X	X	X
Temporary duty			
TAD, TDY, ADT	X	X	X
COT, OBC, OIS	X	X	X
Clerkships	X	X	
C4	X	X	
CME	X		X
CDE		X	
Moving (PCS costs)	X	X	X
Internship and residency			
GME	X		
GDE		X	

Education

Education costs include costs to cover tuition, fees, supplies, equipment, and books and grants, in addition to the overhead of administering the program.

Compensation

Compensation costs include stipends, salary, and benefits. Salary consists of basic pay and basic allowances for housing and subsistence. Benefits include both current benefits (i.e., life insurance, disability, health care, statutory benefits, family support centers, education assistance, personal legal services, and morale, welfare, and recreation activities) and retirement benefits (pension and retiree health care).

Temporary duty

Temporary duty costs consist of active duty training periods in which health care personnel may perform one of the following programs: officer indoctrination, clerkships, combat casualty care course (C4), and continuing medical/dental education.

Moving

Moving costs are permanent-change-of-station (PCS) expenses, which include but are not limited to travel, household good shipments, and dislocation allowances.

Internship and residency

Internship and residency costs for interns, residents, and fellows are a factor for physicians and dentists. These internship and residency costs specifically include those associated with graduate medical or dental education (GME or GDE).

Major findings of phase I

Examination of the various life-cycle-cost factors for the health professions reveals some interesting information about costs and retention. The key findings follow.

General findings

The first general finding is that the Services make a substantial investment to recruit health care professionals. Average recruiting costs per health care professional were $34,492 for the Army, $25,738 for the Navy, and $26,745 for the Air Force.

Second, DoD's total costs, including education costs, stipend, benefits, and temporary duty costs (but not recruiting costs) for its Armed Forces Health Professions Scholarship Program (AFHPSP) students, range between $40,000 and $47,000, depending on the health profession. Because most AFHPSP scholarships are for 2 to 4 years, this represents a substantial investment by the Services.

Third, DoD's benefit package is quite rich for all military personnel. Current benefits (those received while on active duty) cost $11,784 for O-1s to $18,356 for O-6s. In addition, retirement benefits—pension, retiree health care, and TRICARE For Life—are substantial. Specifically, each year DoD must set aside 48.1 percent of basic pay of every officer to pay for the retirement (pension and health care) benefits for those who reach retirement. This is the average percentage across all communities. A community's actual costs depend on its continuation profile.

Physician-specific findings

In addition to general findings, our analysis yielded several findings that are unique to each group of health professionals. Here we present our findings for physicians.

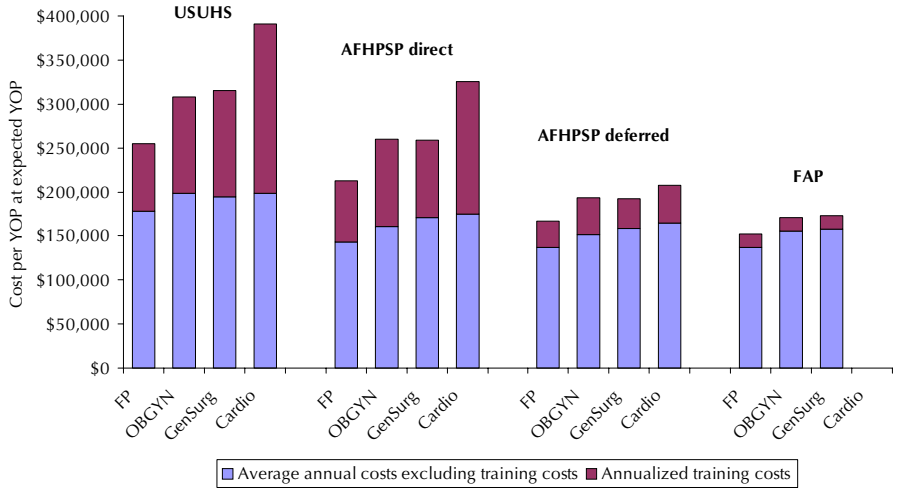
The annual cost of putting a student through medical school at the Uniformed Services University of the Health Sciences (USUHS) is $185,059. Similarly, the average annual cost to DoD for putting a student through medical school using the AFHPSP is $53,492. For both USUHS and AFHPSP, these costs include education costs, stipend, benefits, recruiting, and temporary duty costs.

Although USUHS costs represent a substantial investment by DoD, USUHS accessions also have the best return in terms of expected years of practice as fully trained specialists. For example, the results show that USUHS is the most cost-effective accession source for filling O-6 billets because of the higher retention of those accessions.

We conservatively estimate that GME costs DoD $103,909 per resident per year. Again, this is a substantial investment by the Services, particularly for those specialties that have 5- and 6-year residencies.

Training costs must be considered when looking at billet costs because they account for a substantial portion of the average annual cost per expected year of practice. For example, for USUHS and AFHPSP (direct) accessions, training costs account for 30 to 49 percent of costs depending on the specialty. Similarly, training costs for AFHPSP (deferred) and FAP accessions account for 18 to 26 percent of costs and 8 to 10 percent of costs, respectively (see figure 1).

Figure 1. MHS physician average annual training and non-training costs/YOP at expected YOP[a]



a. FP—family practice; OBGYN—obstetrics and gynecology; GenSurg—general surgery; Cardio—cardiology.

The amount that DoD needs to set aside in an accrual fund to pay for physicians' retirement benefits varies substantially by accession source because of differences in retention. For example, because USUHS accessions are 8 times more likely than AFHPSP deferred accessions to reach retirement, DoD needs to set aside 61.8 percent of basic pay each year to fund the retirement benefits of USUHS accessions, but only 20.9 percent for AFHPSP deferred accessions.

The length of the accession/training pipeline for physicians is quite long depending on the accession source, specialty, and Service. DoD incurs 7 to 11 years (depending on specialty) of education and training costs before a specialist is fully trained. Thus, the longevity of the

pipeline makes it extremely difficult for the Services' personnel planners to quickly adjust to changes in billet or readiness requirements.

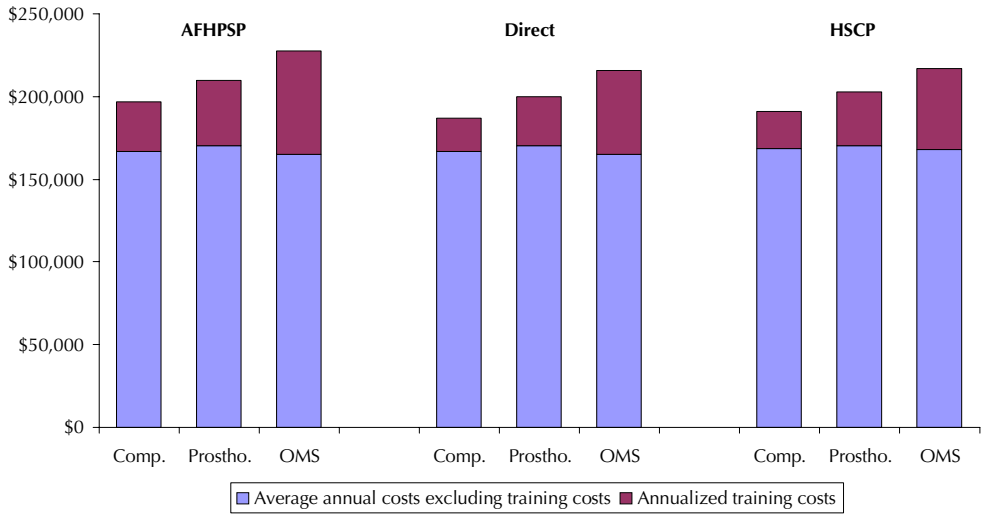
Dentist-specific findings

On average, AFHPSP dental accessions cost DoD $54,245 annually, or approximately $217,000 to put someone through 4 years of dental school.[7]

We estimate that GDE costs DoD $122,370 per resident per year. Again, this is a substantial investment by the Services, particularly for those being trained in oral surgery, which has the longest dental residency (4 years).

Training costs account for 11 to 27 percent of costs, depending on the specialty and accession source (see figure 2).

Figure 2. MHS dentist average annual training and non-training costs/YOP at expected YOP[a]



a. Comp.—comprehensive dentistry, Prostho.—prosthodontics, OMS—oral maxillofacial surgery.

7. The average annual cost during the AFHPSP period is slightly higher for dentists ($54,245) than it is for physicians ($53,492) because the average direct education costs in the Navy were higher for dentists than for physicians. Whether this difference will persist over time is unknown. Average direct education costs fluctuate from year to year based on the array of universities in which a corps subsidizes students.

We based our analysis on the current business practice, which is to have new accessions practice for a few years as general dentists before going on to become dental specialists. If the Services change their business practice to have new accessions go directly into residency training, we estimate that the expected years of practice as a dental specialist may fall 20 to 28 percent depending on the specialty.

Optometrist-specific findings

Our analysis of the life-cycle costs of uniformed optometrists yielded the following two major observations.

On average, each AFHPSP optometry accession cost DoD $42,613 annually to put through 2 to 3 years[8] of optometry school, in return for a 3-year active duty obligation. In FY 2000 and FY 2001, the MHS accessed an average of 37 fully trained optometrists per year, and 57 percent of those total accessions were through AFHPSP.

Currently, the Services don't have the ability to offer fully trained optometrists accession bonuses, but they do for pharmacists and dentists. This is surprising given that DoD usually first attempts to initiate a signing bonus when it begins to have difficulty attracting the required number of qualified accessions for a given health care profession (as all three Services experienced over the last decade for optometry). Each of the Services responded to this void by initiating highly subsidized programs, such as AFHPSP and the Navy's Health Services Collegiate Program (HSCP), which may stem from the fact that optometrists typically have high student debt loads. The American Optometric Association (AOA) indicates that the average optometry student debt load increased from $49,000 in 1990 to over $100,000 in 2000 [1].

8. The Army and Navy predominantly subsidize their AFHPSP optometry students for 3 years, whereas the Air Force usually only subsidizes their students for 2 years.

Optimal mix of accession model (phase II)

Approach

In phase I of the life-cycle-cost study, we identified the key components that drive the life-cycle costs for selected uniformed health care professionals' predominant accession sources and career paths [1]. Two questions that phase I did not answer follow:

1. Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions?
2. Is it more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?

In this section of the report, we provide an overview of the approach we used during phase II, followed by our major findings. For a detailed account of our methodology and results, for each Service, refer to the appendixes at the end of this document:

- Appendix A – Physicians
- Appendix B – Dentists
- Appendix C – Optometrists.

Basic model

The basic model we used to look at the optimal mix of accessions is a cost minimization model. A simple description of this model is that we are *minimizing the total cost (over a long time horizon) of meeting all of the active duty requirements given the constraints the Services and DoD place on a given corps.*

Steady-state solution

We use a long time horizon to obtain the steady-state solution to the model. What is meant by the optimal accession mix in the *steady state?* If we ran the model with a 1-year time horizon, the output of the model would tell us the optimal mix of accessions given that time horizon. Assuming that the model is currently out of equilibrium, if we ran it over a 2-year time horizon, the optimal mix of accessions would be different in the second year than in the first. This would occur because the model has 2 years to move the given corps toward its long-term optimal mix of accessions. Essentially, the steady state is a solution in which the optimal mix of accessions is the same year after year.

To find the optimal mix of accessions in the steady state, we ran the model for 80 years. This long time horizon ensures that the solution is not affected by the personnel currently in the corps or in one of its accession pipelines.

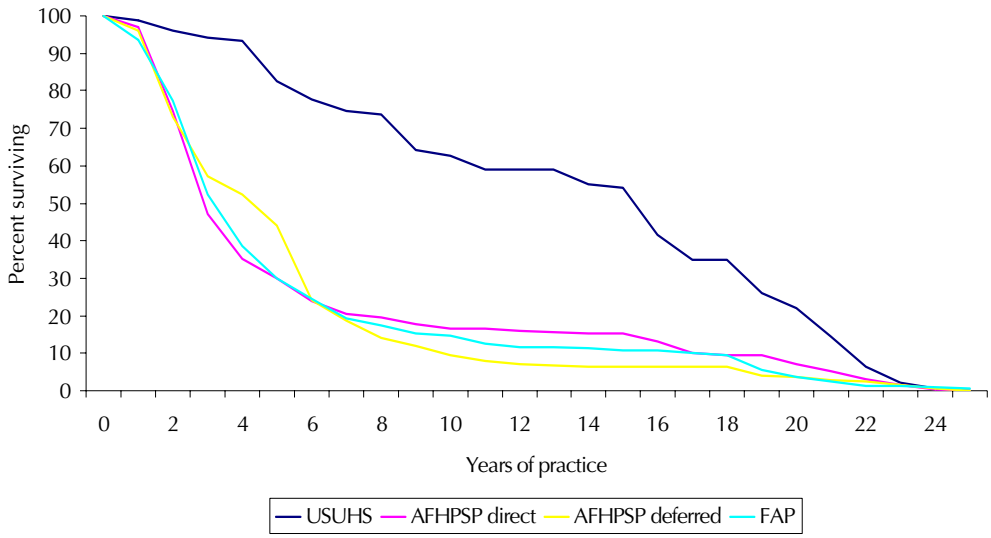
By looking at the steady state, we are modeling what the Services should do in the long term—not what they should do next year. The reason is that the model allows us to see the long-term consequences of various policies, constraints, and business practices. Hence, a model that is applicable only to next year's accessions has a one-time usefulness, whereas policy-makers can use the steady-state model to focus on the policies, constraints, and business practices that have a substantial impact on the system.

Model costs and retention

The costs we modeled are the life-cycle costs from phase I: training and accession, compensation, PCS, and temporary duty [1]. Costs are largely driven by the career path—timing of promotions, training, and board certification. In conjunction with TMA and representatives from each Service, we determined in phase I the predominant career path by specialty, accession source, and Service. Although we will not determine the impact of the career path on the optimal mix of accessions by altering it in various model excursions, if the career path changes, costs and continuation patterns will change (see [1]).

Given the career paths we developed in phase I, we computed average retention for each accession source using data for FY 1991-2000 from the Defense Manpower Data Center (DMDC). When computing the optimal mix of accessions, however, we will use the entire survival curve (which incorporates attrition by year of service and not average attrition across all years of service). For example, figure 3 shows the survival curves for family practitioners for the four major physician accession sources. These curves illustrate that, even though USUHS is substantially more costly than the other physician accession sources, it is also associated with much higher retention than the other accession sources. When we view costs through the life-cycle-cost model, this high retention makes USUHS more cost-effective relative to other accession sources.

Figure 3. Percentage of family practitioners surviving by years of practice and accession source



Constraints

If we place no constraints on the model, the obvious solution to the optimal mix of accessions is to have all new accessions come from the least expensive source. Allowing the model to be unconstrained doesn't reflect the environment in which the Services operate

(market supply and demand as well as unique military requirements). Consequently, we imposed the following constraints on the model:

- Billet (manning) requirements
- Experience profile requirements
- Accession source constraints
- In-house training requirements.

Billets

The first constraint is the number of billets that must be filled. From this point forward, we will use "billets" to describe the subset of billets considered for the selected specialists in our model and not the entire universe of billets (i.e., we modeled 23 physician specialties, not the entire medical corps billet file).

From a modeling standpoint, the number of billets is the *minimum* number of duty specialists the Services require—not the maximum they can have. For military personnel planners, authorized billets are more akin to the maximum number of bodies the Services can have on active duty at the end of any given fiscal year. To fill the billets with the exact same number of bodies, we would have to constrain bodies to be no less and no more than billets. However, doing this makes the model infeasible because of other constraints on the model that may force bodies to exceed billets or may not allow them to reach billets.

That said, the model doesn't want more bodies than billets because it is trying to minimize cost and, obviously, each extra body is costly. In other words, modeling billets as the minimum number of bodies is akin to modeling a target number of billets; in the steady state, the number of bodies exceeds billets *only* if the model's other constraints force it to do so.

Experience profile

One of the more influential constraints in the model is the desired experience profile of the force. What percentage of the duty specialists should be O-6s, and what percentage should be at least O-5s? Though it will always be the case that it is most cost-effective to fill

junior billets from the least expensive accession source, it may be more cost-effective to fill senior billets from more expensive accession sources if the retention rates of these accession sources are substantially higher than the least costly one.[9]

Accession source constraints

Even when we impose a force structure constraint on the model, the model may find that the optimal mix of accessions consists of more of some accession sources than the Services could reasonably get. For this reason, another critical constraint is the maximum number of accessions the Services can expect from each source given the current rewards of the program. Hence, though the Services may want more (unsubsidized) accessions, they may not be able to get more without increasing the subsidization of these programs. Accession source constraints are an acknowledgment that there are economic and political constraints on the number of specialists that can be assessed through each accession source.

In-house training requirements

The in-house training requirements are requirements for the size of the GME or GDE programs. We modeled the GME requirement as a target that the model must fill. We did this by setting the minimum and maximum number of GME starts at the same level. For GDE, we modeled the minimum and maximum number of GDE starts so that there was a small range of values the model could choose from in determining the optimal solution. We didn't allow the GME starts this flexibility because, unlike the dental corps, there are other accession sources the medical corps can use to access fully trained specialists.

Penalties

Sometimes the model's constraints will not allow it to fill all of the requirements. For example, the constraints may not allow it to fill all of the billet requirements. When this occurs, the model has not

9. We are not directly assigning new accessions to fill senior billets but "growing" them into senior billets. Differences in retention patterns across accession sources, therefore, can make it more or less costly to grow senior personnel from specific accession sources.

technically met the minimum billet requirement. Again, if we imposed the billet requirement as a hard minimum, the model would be infeasible because the other constraints simply don't allow the model to meet the billet requirement. To overcome this problem, we've constructed the model to handle these cases by imposing an arbitrarily large financial penalty. In other words, we allow the model to meet the requirement by buying a civilian specialist—albeit at an unrealistically high cost.

In addition to a financial penalty for failing to meet billet requirements, the model includes a financial penalty if the constraints do not allow it to fill experience profile requirements. Note that the penalty costs for failing to fill requirements with military personnel or personnel of the right experience level *are not included in the cost figures that we report*. The cost figures represent only those costs associated with military personnel—the life-cycle costs we developed in phase I of the study. However, we did adjust cost for billet requirement shortages. We make this adjustment by adding in the average billet cost for each unfilled billet. The costs don't reflect any adjustment for unfilled experience requirements. Unfilled experience requirements don't mean that there is not a body for each billet, just that the body doesn't have the right experience level.

Other modeling issues

We modeled the process of filling billets using continuous variables rather than an integer programming approach. We allowed for fractions of personnel, such as accessing 4.5 in the steady state rather than forcing the model to always use a whole number. Because we are looking for a steady-state solution, all we really want is the average number of personnel that should be accessed each year. So, if the steady state is 4.5, we interpret the steady state as accessing 4 one year and 5 in the next. Integer programming would add substantially to the modeling complexity without meaningfully affecting the results.

Another modeling issue is the starting point—today's inventory of specialists and trainees in a given speciality as well as the inventory in the accession pipelines. The starting point is the driver for how and whether the Services will be able to meet near-term requirements. That said, the starting point we used for inventories *does not affect the*

optimal mix of accessions in the steady state because, once enough time passes to let the current inventory work through the system, the model reaches the same steady state regardless of the starting point. What it affects is the time it takes to reach the steady state and the path used to reach it.

Baseline assumptions

We have conceptually discussed the model, and we remind the reader that appendixes A through C provide the assumptions we made for our baseline model for each Service and specialty evaluated. The purpose of the baseline model is twofold. First, given the basic parameters and constraints, it determines the long-term consequences in terms of meeting requirements. That is, the baseline tells us whether the Services can meet their requirements given the current constraints on the system and the optimal mix of accessions to use. Second, the baseline model provides a reference point, to which we compare all of our various excursions.

Model excursions

An important aspect of modeling is the ability to change assumptions regarding one or more parameters and/or constraints and compare results. This allows one to test the sensitivity of the model to specific assumptions and evaluate the impact of changes without actually having to make real-world changes.

For this analysis, we ran numerous excursions of the model. In each excursion, we altered one or two parameters and/or constraints and then determined the most cost-effective way to meet requirements. We compared these results with the baseline model to see how changing the parameters and constraints altered the optimal mix of accessions, GME, the experience profile, and the inventory of physicians, as well as the total cost to the system. The excursions we ran altered the parameters and constraints of the model in one or more of the following ways:

- Changes in the experience profile
- Changes in GME or GDE

- Changes in accession programs' constraints or bonuses
- Changes in special pays.

Now that we have stepped through our methodology and approach, let's review some of the key findings and recommendations.

Major findings of phase II

As we discussed at the start of this report, the phase II analysis focused on answering the following questions:

1. Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions?
2. Is it more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?

We explore answers to these questions in the following subsections.

What factors influence the optimal mix of accessions?

There is not one definitive answer to the question, *what is the optimal mix of accessions?* The optimal mix of accessions depends on what DoD defines as its requirements to fulfill its mission. One requirement that affects the optimum mix of accessions is the desired experience profile and whether DoD wants this profile for each specialty or just for the community as a whole. Second, it depends on the parameters, or inputs, such as costs and retention patterns by accession source and years of service. Third, it depends on constraints, such as in-house training positions (GME and GDE) and accession source limits. Given a certain set of requirements, parameters, and constraints, we model what the optimal mix of accessions is. If the requirements, parameters, and constraints change, however, DoD's optimal accession mix will change.

Because the optimal mix of accessions is conditional on an array of factors, we show the impact of three major factors on the optimal mix

of accessions so that policy-makers will be more fully aware how the various factors influence, or shape, the force. The factors we considered are experience profile, in-house training requirements, and accession source constraints.

Experience profile

The debate over the importance of the seniority (or rank) of health care professionals is a long-standing one within DoD. In 1967, Congress excluded all physicians and dentists from grade table requirements (paygrades O-4 through O-6) *in recognition of the unique problems of obtaining and retaining these officers* [14]. When the Defense Officer Personnel Management Act (DOPMA) was enacted in 1980, the law again excluded physicians and dentists from grade table constraints *in recognition that officers working in a small number of particular specialties are out of the normal promotion stream and receive their grade based on professional education and experience rather than service in the military* [15].

For physicians, the required experience profile is a crucial constraint that drives the optimal mix of accessions in the steady state.[10] As a starting point, or baseline, we defined the experience profile constraint as follows:

- At least 30 percent of duty billets should be filled with O-5s or O-6s.
- At least 10 percent of duty billets should be filled with O-6s.

We based this constraint on a Health Affairs memorandum [7].[11] In setting this constraint, we make no judgment whether the constraint

10. The experience constraint is binding for physicians, but not for dentists because dental specialists are quite senior. Similarly, because optometrists are DOPMA constrained, the experience constraint is a maximum for the number that can be promoted. Hence, the optometry model has to limit the number of senior personnel rather than drive the community to a high experience level.

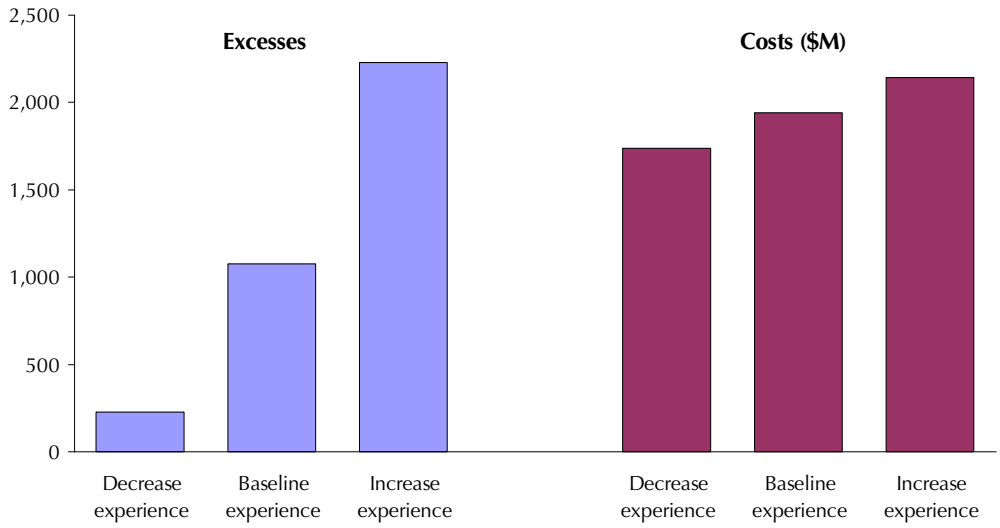
11. This memorandum states a goal of 25 to 30 percent of physicians' endstrength with an experience level of 5 to 12 years beyond initial certification. Data do not allow us to determine years of experience within a specialty, but these physicians tend to be in paygrades O-5 and O-6.

is appropriate for the medical corps (or each of its specialties). We simply model the impact of the constraint on the optimal mix of accessions—at the specialty level, not at the aggregate or corps level.

To see how the experience requirement affects the steady state, we ran two excursions with alternate experience constraints. First, we lowered the experience constraint to at least 25 percent O-5s/O-6s and at least 5 percent O-6s. We chose this level because the DOPMA guideline for O-6s is no more than 5 percent of the force. Second, we increased the experience constraint to at least 35 percent O-5s/O-6s and at least 12 percent O-6s. Note that this increase is arbitrary; it is not based on any policy, but it shows how sensitive the model is to a relatively small change in the experience constraint.

As the excursions show, the higher the experience constraint, the higher the cost and the greater the number of excess physicians the Services will have. In figure 4, for example, the number of excess physicians (bodies above billets) in the baseline model is 1,078, or 16 percent of the 23 specialty billets included in our model. To fill all of the baseline experience requirements, it is necessary to bring in more physicians than billets so that the MHS has enough physicians remaining in the military long enough to fill senior billets.

Figure 4. Excesses and costs for the medical corps by experience requirement



When we increase the experience requirement for O-6s by 2 percentage points to 12 percent of billets and the requirement for O-5s/O-6s by 5 percentage points to 35 percent, excesses more than double to 2,228. These excesses result in cost increases of 10 percent over the baseline costs. Hence, a relatively small increase in required experience results in large changes in excesses and costs. Similarly, when we cut the requirement for O-6s in half from 10 to 5 percent of billets, excesses fall to 230, and costs fall by 11 percent from baseline costs.

We recognize that, in execution, the Service cannot have such large excesses. Although there is a stated DoD goal for experience, it is not actively "managed to" in execution. Personnel planners primarily focus on filling billet requirements, and not on the paygrade distribution of the personnel filling the billets. This model demonstrates that, if the Services are to fill all requirements for each physician specialty—including experience goals—they must bring in substantial numbers of excess physicians. Given all of the other constraints, excesses are the consequence of the experience requirement.

Note that we modeled the experience constraint such that it must be met for each specialty and not just for the medical corps as a whole. If we modeled the experience constraint only across the medical corps rather than by specialty, excesses would be substantially less, and the model would be less sensitive to changes in the constraint. However, we believe that making the constraint across the medical corps and not specialty specific is incorrect and brings into question the validity of the current experience profile policy. Such a constraint might result in a disproportionately large percentage of senior personnel coming from primary care specialties and a disproportionately small percentage coming from surgical specialties.

In our view, an experience profile is justified only if it helps one's business—if it improves readiness, productivity, quality of care, and patient satisfaction. How can one make the case that experience is necessary for the business as a whole and not require experience in every specialty? Doing so implies that experience improves readiness, productivity, quality, and satisfaction in primary care but not in surgical specialties. That said, we are not arguing for or against a certain

experience requirement, but we do want to focus the discussion on what experience profile is necessary.[12]

In-house training requirements

Before we begin our discussion of the influence of in-house training on our optimal-mix-of-accession model, we think it is important to put this constraint into context. Over the past 3 decades, the MHS has undergone several transformations. The balancing act between the readiness and peacetime missions has intensified because of increasing pressure to control costs and recapture CHAMPUS workload, while maintaining patient satisfaction and positive patient outcomes. The focus on readiness in the 1980s shifted to productivity and patient outcomes in the late 1990s. The focus on inpatient care turned to same-day and outpatient surgery and a greater emphasis on clinic management.

The Reagan Administration achieved large budget increases in the Defense Department, resulting in large billet increases within each of the military medical departments, but the end of the Cold War in the 1990s resulted in a deliberate downsizing of the military. Once again, the military medical departments mirrored DoD as a whole, as their force structure was also deliberately decreased. As TRICARE evolved, the focus changed from growing surgically intensive specialties to increasing the inventory of "primary care managers," such as family practice physicians. The MHS's shift in focus to primary care mirrored the civilian sector's movements toward managed care.

In response to some of these evolving demands—and the large uniformed-civilian pay gaps for many specialties—the Services have created and are heavily reliant on in-house training programs to "grow"

12. DoD and the Services should take full advantage of the current DOPMA grade table exclusions, for physicians and dentists, to better retain required specialists in specialties that are experiencing shortfalls and possibly reduce the need for increasing discretionary (medical) special pays for some physician specialties that the military is not having difficulty acquiring or retaining. Moreover, other health care professionals (e.g., optometrists) should be evaluated for possible exclusion from DOPMA guidelines.

the vast majority of its required physician and dentist specialists. In general terms, there are two schools of thought on the Services' in-house training programs.

First, for many, the in-house training programs are viewed as a reliable bedrock for filling duty specialist requirements. Moreover, these programs help provide a wide array of quality care to MHS beneficiaries and help retain the "best and brightest clinicians" to serve as residency program directors. Put simply, many believe that in-house training is the "life blood" to the MHS meeting its readiness and peacetime missions simultaneously and that it should be protected.

Second, there are those who believe that the Services' current in-house career path, to grow certain physician and dentist specialists, is simply too long and expensive. This is because although residents provide care, there is a net cost to DoD for training programs. When inventory shortfalls occur, for a particular specialty, it is difficult for the military to quickly remedy the problem. Conversely, if the MHS's personnel planning process is not on target and a specialty's inventory exceeds the billet structure, it is very difficult to "turn off" training outputs. This is exacerbated by the fact that the billet file is often unstable because of:

- Base Realignment and Closure (BRAC) decisions
- Overall military downsizing
- Changing contingency or platform requirements
- Responses to the demands to build a more performance-based peacetime MHS that will control costs while maximizing patient satisfaction.

Given the importance of the GME program to the Services and the controversy that it engenders, we felt it was essential to evaluate the role that GME requirements play in determining the optimal mix of accessions and the cost to the MHS. Because in-house GME and GDE don't affect our model in exactly the same way, we discuss the impact of in-house GME and GDE training requirements separately.

Graduate Medical Education. The in-house GME program requires that, if the Services have an in-house residency program that must place five physicians into that program each year, our model must put five physicians into the program each year whether or not this number of starts is appropriate for the number of billets in this specialty.[13] Conversely, if the in-house residency program doesn't provide enough in-house GME outputs—fully trained specialists—to fill billet requirements, the difference must be made up by AFHPSP deferred and FAP accessions.

The Services provided us the number of residency/fellowship starts they have each year in the 23 specialties that we considered in this study. In total, the annual number of in-house GME starts for all three Services in these specialties is 782. To see how the size of the in-house GME program affects costs, we increased and decreased the size of the in-house GME program by 20 percent. As figure 5 shows, costs are about the same regardless of the size of the in-house GME program ($1.94 billion with baseline in-house GME, $1.96 billion with decreased in-house GME, and $2.00 billion with increased in-house GME).[14] Given that costs didn't change significantly, we must ask: does the size of the in-house GME program affect costs?

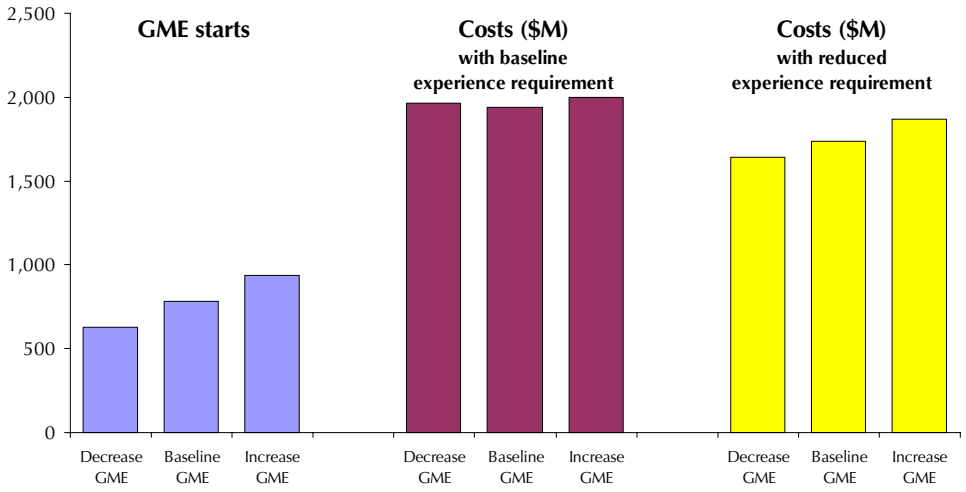
The results of this study highlight two important issues about how the size of the in-house GME programs affects costs. *First*, when we lower the experience constraint, costs do vary by the size of the in-house GME program. With a reduced in-house GME program, costs are $1.64 billion compared with $1.74 billion with the baseline in-house GME program and $1.87 billion with the increased in-house GME program (figure 5). The implication is that, if the Services don't have a high requirement for senior physician specialists, it is more cost-

13. In practice, the in-house GME program doesn't have to remain exactly the same from year to year, but it cannot be turned off one year and started back up the next. For program stability, we modeled the in-house GME program so that it must remain the same from year to year.

14. The reason costs did not change much is that GME is too large in some specialties and too small in others. Hence, increasing (or decreasing) GME across the board does not change overall costs much because it lowers costs in some specialties while raising them in others.

effective to defer a larger percentage of their AFHPSP accessions to a civilian residency than to train them in-house. The in-house training programs effectively improve retention over those with deferred training, but AFHPSP direct accessions are only more cost-effective than AFHPSP deferred when it comes to filling senior requirements. If those requirements are small (or at least smaller than our baseline assumption), in-house GME should be sized accordingly. *Second,* even though the aggregate GME numbers presented in figure 5 do not indicate the necessity for a change in GME (the cost to the MHS is fairly constant whether GME is increased or decreased with respect to the baseline), we do find cases in which a Service's cost can be significantly altered by changing the GME requirements for a given specialty.[15] For example, let us look at orthopedic surgery in the Air Force and the Army.

Figure 5. Costs for the medical corps by number of GME starts[a]



a. The blue bars show the number of GME starts in the model. The baseline has 782. The excursion in which we decreased GME has 626 (20 percent less than the baseline), and the excursion in which we increased GME has 938 GME starts (20 percent more than the baseline). The red bars are DoD's costs for the medical corps given these three sizes of the GME program and the baseline experience constraint. The yellow bars are DoD's costs for the medical corps given these three sizes of the GME program combined with a reduced experience constraint.

15. For more detail, refer to the discussion of excursions 4 through 7 in appendix A.

The Air Force has 91 orthopedic surgery billets. Based on the baseline requirements regarding experience profile, this means that the Air Force should have about 27 O-5s/O-6s and about 9 O-6s. Our results show that accessions trained in the in-house GME program (either USUHS or AFHPSP direct accessions) are more cost-effective in filling these experience requirements than AFHPSP deferred accessions.[16] This is because the Services must bring in so many AFHPSP deferred accessions in order to get just a few to remain in the military long enough to fill senior billets.

Unfortunately, in the baseline model, the Air Force has only seven in-house orthopedic surgery GME starts each year. Therefore, they must rely heavily on AFHPSP deferred accessions to meet the required experience profile for orthopedic surgery. As a result, we find that the baseline steady-state solution for the Air Force has an excess number of orthopedic surgeons (again because they must bring in so many AFHPSP deferred accessions to fill the experience requirement). These excesses could be reduced and costs of filling these senior billets lowered if the size of the Air Force's orthopedic surgery in-house GME program were increased (allowing for more USUHS and AFHPSP direct accessions).

Alternatively, the Army has 145 orthopedic surgery billets requiring 43.5 O-5s or O-6s. We find in the baseline steady-state solution that the Army's in-house orthopedic surgery GME program, with its 20 starts, is more than enough to fill billets and experience requirements without having to access any AFHPSP deferred accessions. This means that the Army could cut its in-house orthopedic surgery GME program and still meet the billet and experience profile requirement for this community. This would result in fewer excess orthopedic surgeons and lower overall costs. Hence, we show with these two cases that whether in-house GME should be increased or decreased is really a question that must be posed for each specialty within each Service.

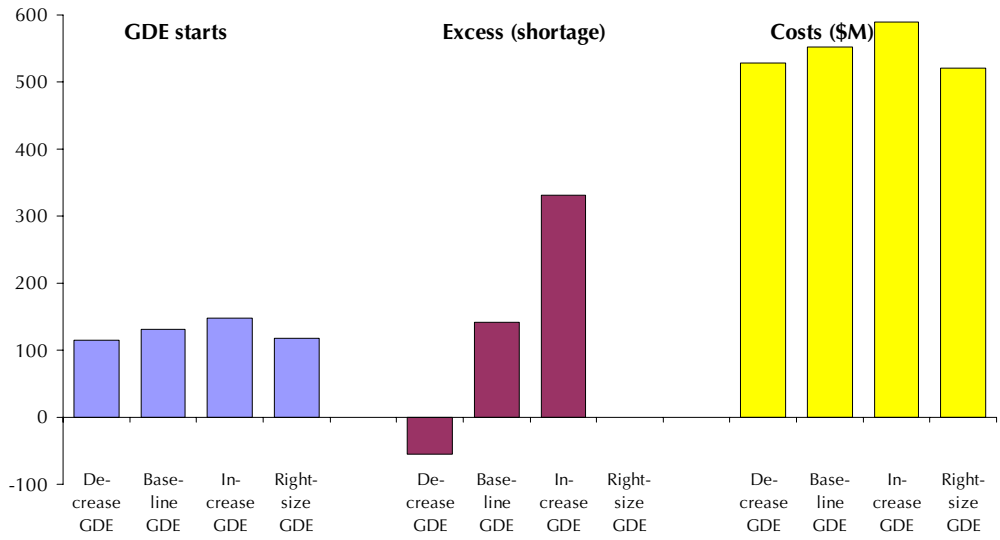
Graduate Dental Education. The dental corps does not have an accession source (comparable to AFHPSP deferred and FAP for physicians) that it can use to consistently access fully trained specialists.

16. For more detail, see **tables AA-4 through AA-7** at the end of appendix A.

The dental corps must grow all of its dental specialists from its pool of general dentists by providing GDE opportunities. In other words, if we forced the number of GDE starts to be exactly some number, the model would have no ability to affect the number of bodies in any specialty. They would be determined exactly by the number of GDE starts. In light of this, we modeled GDE starts such that the number of dentists put into a residency program each year had to be within a certain range, such as 4 to 6, rather than always be 5. Modeling in this fashion allowed the model to have some ability to control the number of bodies in every specialty.

As we did with GME, we increased and decreased the size of the GDE program by 20 percent. In the baseline, the size of the GDE program results in an excess of 142 dentists (see figure 6). When we reduce the size of the GDE program, there are not enough GDE starts to fill all of the specialty billets, leaving a shortage of 55 dentists. Increasing GDE starts pushes excesses up to 331 and increases costs by 7 percent over the baseline.

Figure 6. Excesses and costs for the dental corps by size of the GDE program[a]



a. The blue bars show the number of GDE starts in the baseline and each of the excursions. The red bars are the excesses associated with each size of the GDE program in the steady state. The yellow bars are costs associated with each size of the GDE program in the steady state.

As with physicians, whether an increase or decrease in GDE is more cost-effective varies by specialty. To that end, we ran an excursion that allowed the model to pick the optimal size of the GDE program for each specialty, meaning no change in some specialties but increases and decreases in others. The net effect is that excesses and shortages are eliminated, and costs are 6 percent less than in the baseline.

Findings. In summary, the model shows that, for physicians, if the experience constraint is high, it is more cost-effective to fill experience requirements through in-house GME (USUHS and AFHPSP direct accessions) than AFHPSP deferred or FAP accessions. In addition, both the physician and dentist models show that we cannot generically say that GME/GDE is too big or too small. Whether it is too big or too small varies by specialty and by Service. Consequently, the Services should consider the size of each GME program individually to determine the appropriate size.

Accession source constraints

The accession source constraints in our model recognize the economic reality that the Services' ability to acquire specialists from some accession sources is limited. For example, direct accessions may be the most cost-effective, but the potential number of these accessions is quite limited. Moreover, although AFHPSP accessions are a richly subsidized accession program, it takes time for DoD to significantly ramp up these accessions because of cost and the time lag of the budget cycle. Here we discuss how accession limits affect the optimum.

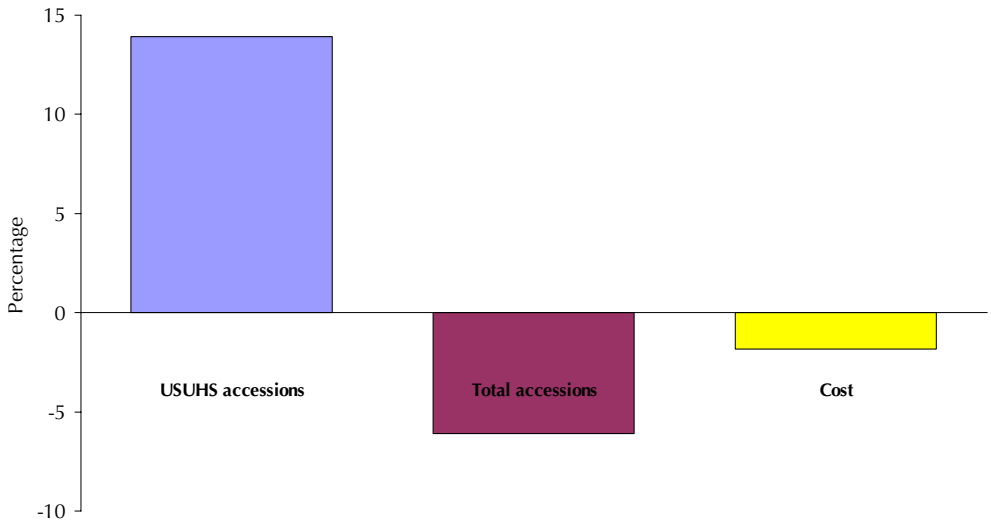
USUHS. One important finding from our baseline model and our various experience requirement excursions is that USUHS is the most cost-effective of the four major physician accession sources for filling senior physician specialist requirements. For example, in the baseline model, the optimal mix of accessions includes 165 USUHS accessions, which is what the constraint allows. This means that costs could be reduced if more USUHS accessions were available.

Given that the model would have taken more USUHS accessions, we ran an excursion in which we increased the size of each USUHS cohort by 15 percent to 190. We didn't want to set a higher constraint because there are limitations on the number of medical students USUHS can accommodate given its facilities and the availability of

clinical rotations. In addition to these limitations, there are limits on how much USUHS could expand its student body without bringing in a lower quality candidate.[17]

Figure 7 shows that, when we imposed this higher constraint, USUHS accessions increased by 14 percent to 188 annually. At the same time, total accessions fell 6 percent from 1,308 to 1,228 annually. Thus, the 23 additional USUHS accessions eliminated the need for 103 other accessions. Overall, the cost increase for the additional USUHS accessions was more than offset by the reduced excesses and accession needs it eliminated, causing costs to fall by 2 percent. Note that we modeled the average cost of USUHS accessions rather than the marginal cost of each additional accession. Because the marginal cost of additional USUHS accessions should be less than the average cost, the estimated cost decrease is a lower bound.

Figure 7. Impact of additional USUHS accessions on total accessions and cost



17. The Services and USUHS report a potential decline in the number of AFHPSP and USUHS applications. If this perception is valid, it might inhibit a significant expansion of USUHS accessions.

AFHPSP. The MHS has relied heavily on AFHPSP accessions to fill the majority of its physician requirements since the 1980s. AFHPSP accessions have proved to be a steady and reliable accession pipeline for physicians and recently for dentists and optometrists as well.

As we have previously reported [2], in the early 1990s DoD began experiencing problems consistently accessing the required numbers of dentists and optometrists through the direct procurement pipeline. Given that a reliable accession base is important, we explored how much costs would increase if the dental corps and optometry specialty relied solely on AFHPSP for all of their accessions. As table 2 shows, with only AFHPSP accessions, costs increase by 3.3 percent over the baseline for the dental corps and by 2.0 percent for the optometry community. Hence, although relying solely on AFHPSP is more costly, it provides a reliable base of accessions that personnel planners can count on when projecting future accessions. Note that we are not making any judgment about whether this cost increase is worth the added reliability in accessions it would provide. We are merely pointing out the cost associated with this potential benefit.

Table 2. Costs if the selected MHS dental specialists and optometrists relied solely on AFHPSP accessions compared to the baseline[a]

Group	Baseline costs ($M)	AFHPSP excursion costs ($M)	Percentage change
Dentists	552	570	3.3
Optometrists	52.6	53.7	2.0

a. The accession sources in the baseline case are AFHPSP, direct (with a $30,000 signing bonus), and HSCP for dentists and AFHPSP, direct (no signing bonus), HSCP, and HPLRP for optometrists. In the AFHPSP excursion, we eliminated all accession sources except AFHPSP to see how costs would change.

FAP. The number of physician specialists brought into the MHS through FAP varies substantially by year, specialty, and Service. Because of this variability, we explored for the Army and the Navy how costs would change if there were no FAP accessions.[18] Our results

18. We did not explore this question for the Air Force because it has been much more successful than the other Services in getting FAP accessions.

indicate that total accessions would increase by about 4.9 percent (see table 3). Because the numbers of USUHS and AFHPSP direct accessions are fixed by the GME constraint, the only way the model can replace the FAP accessions is through AFHPSP deferred accessions. Because retention of AFHPSP deferred accessions is less than that of FAP accessions in some specialties, AFHPSP deferred accessions have to replace FAP accessions on more than a one-to-one basis (see appendix A, table A-24).

Table 3. Costs if the FAP accessions were eliminated for the Army and Navy medical corps

Service	Army	Navy	Total
Total accessions			
Baseline	477	417	894
No FAP excursion	509	429	938
Percentage change	6.7	2.9	4.9
Cost			
Baseline	811	563	1,374
No FAP excursion	838	578	1,416
Percentage change	3.3	2.7	3.1

As for costs, we know that eliminating FAP accessions will increase costs because we are tightening the FAP constraint. Specifically, costs increase by 3.1 percent for the Army and Navy combined. Hence, although the total number of FAP accessions accounts for only 12 and 9 percent of Army and Navy steady-state accessions, respectively, these accessions are a cost-effective supplement to the predominant medical corps accessions—USUHS and AFHPSP direct accessions.

Increase accessions or increase pay?

The appropriate level of compensation for personnel serving in the military is continually being monitored. This issue is particularly important for military health care professionals because, as this study shows, they are costly to access and train, and they have skills that are readily transferable in the private sector. If compensation is perceived to be too low for the demands and duties required, uniformed health care professionals may abandon the military for a private-sector career path. Conversely, total compensation should be no higher than the amount required to attract and retain a quality force.

Congress authorizes DoD to offer financial incentives to selected uniformed specialists to attract and retain the desired force structure. A policy board, the Flag Officer Review Board, annually reviews manning, civilian income data, and MHS requirements to determine the special pay plan rates that will be offered to uniformed physicians and dentists. From DoD's perspective, DoD pays for the current accession program and career path costs and any increases in special pays for uniformed specialists.

Once again, there are differing views when evaluating special pay increases for military health care professionals. DoD is attempting to build a more performance-based health system that will better integrate its resources. DoD needs its frontline clinicians to be actively engaged in these processes if cost reductions are to occur without decreasing quality. If military medicine's frontline clinicians are unhappy with their working environment and compensation, the likelihood of their embracing, let alone leading, these new programs significantly diminishes.

When a uniformed health care professional is deciding to continue a career in the military, he or she must consider not only pay but also employer-sponsored benefits (such as health care and retirement) and a variety of less quantifiable features (such as the conditions and nature of the work) that distinguish a military from a civilian career. Both areas—benefits and conditions of work—have features that might tend to make the military look particularly attractive, at least to some people, and other features that could tend to make military service look unattractive. If the attractive features predominate, the military might be able to offer lower pay than civilian employers; if the unattractive features predominate, DoD might have to pay a premium to meet its personnel needs. From the Services' perspectives, special pay increases send a clear signal to the workforce that their contributions are acknowledged and appreciated.

There is yet another view to the debate on increasing special pays. DoD is responsible for paying the "cradle to grave" costs for each uniformed health professional (accession subsidization, training, salary and benefits, and retirement (pension and health care) for those eligible). As this study shows, the outlays by DoD are substantial. As previous CNA research revealed [2], uniformed health professionals'

retention is modestly sensitive to pay increases. What policy-makers don't want to do is pay people more who were going to stay in the military anyway, unless it significantly enhances their performance. DoD does not want to retain all clinicians, but it does want to retain the ones who embrace the values and objectives of increasing readiness and productivity while maintaining positive patient outcomes.

On which side of the ledger (increasing special pays or maintaining the status quo) is DoD getting a better return on its investment? Should the MHS access more health professionals or pay those in the system more to retain more of them? This is a basic flow problem. A bucket needs to have a certain amount of water in it, but the bucket leaks. There are two options: (1) put more water into the bucket or (2) repair or slow down some of the leaks. The question is: *which of these options is more cost-effective?* Applying this analogy to the MHS, the life-cycle-cost model shows how costs change if we (1) increase the flow into the system or (2) reduce the leakage, or attrition, from the system. From these results, we see which option is more cost-effective.

Accession bonuses

Constraints on the number of accessions exist because of limits on how many the Services can access given the current economic incentives. To increase the flow into the system, the MHS would need to increase the economic incentives. For the purpose of this analysis, we modeled how providing an accession bonus (or enhancing an existing one) would increase the potential number of FAP and direct accessions the Services could access. We estimated how the potential number of accessions may change using an elasticity of enlistment with respect to the military-civilian pay ratio of 1.8, based on enlisted communities' enlistment responsiveness to changes in pay [4, 5].[19]

FAP accession bonus. The baseline FAP constraint for physicians is 180 total accessions, but the number of accessions varies by specialty

19. An elasticity of 1.8 is interpreted as a 1.8 percent increase in accessions for every 1 percent increase in the military-civilian pay ratio. For more detail on how we modeled changes in the potential number of accessions given an accession bonus, see appendixes A, B, and C.

because of supply and demand differences across the specialties. (For example, family practice's constraint is 75, whereas the constraint for anesthesiology, cardiology, general surgery, and orthopedic surgery is 0 for each.) We estimate that if DoD provided a $100,000 FAP accession bonus, the potential number of FAP accessions would increase from 180 to 276 (see table 4).[20] In terms of cost, the FAP accession bonus is more cost-effective than no bonus because it reduces costs by 2.3 percent.

Table 4. Impact of accession bonuses on cost

Category	Physicians: FAP bonus	Dentists: direct bonus	Optometrists: direct bonus
Accession bonus			
Baseline	$0	$30,000	$0
Excursion	$100,000	$50,000	$30,000
Accession constraint			
Baseline	180	75	10
Excursion	276	90	21
Cost ($M)			
Baseline	$1,940	$552	$52.6
Excursion	$1,896	$549	$52.1
Percentage change	-2.3	-0.5	-0.9

Direct accession bonus. Like the FAP accession bonus, the direct accession bonuses for dentists and optometrists are more cost-effective than the current bonus. Increasing the direct accession bonus for dentists by $20,000 would decrease costs by 0.5 percent. Similarly, providing a $30,000 accession bonus for optometrists would decrease costs by 0.9 percent (as shown in table 4). Each bonus is cost-effective,

20. Although $100,000 is a significant sum, it does not eliminate the civilian-military pay gap. In addition, when one considers that FAP accessions are in the system for 6 or 7 years before they reach a stay-leave decision point, the $100,000 means about $15,000 additional compensation per year.

but none will increase the potential number of FAP and direct accessions enough to allow the Services to access large numbers.[21]

Increasing special pays

We now turn to the cost-effectiveness of slowing the attrition from the system. Although multiple factors influence health professionals' decisions to remain in the military, we look only at the effect of pay.[22] We model this effect using estimates of the elasticity of attrition with respect to changes in civilian-military pay gaps from a previous CNA study [2, 3]. We do this for entitlement and discretionary special pay increases for physicians, additional special pay increases for dentists, and an optometry retention bonus increase for optometrists.

Physicians. For physicians, we modeled an entitlement special pay increase and a discretionary special pay increase. CNA's Health Professions' Retention-Accession Incentives Study [2] recommended both of these increases. Entitlement special pays include additional special pay (ASP), variable special pay (VSP), and board certification pay (BCP), and they do not vary by specialty. Specifically, we modeled a 20-percent increase in each of these pays.

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21. Our estimate of how the accession bonuses will change the potential number of accessions assumes that the baseline accession constraint accurately represents what the market can bear. However, if the Services' business practices limit the number of accessions by how actively they recruit directly or through FAP, the constraint won't represent what the market will bear. If current business practices limit the number of accessions, giving larger accession bonuses may provide the Services enough incentive to change their business practices. If this is the case, our estimate of the potential number of accessions would be low.

22. A number of factors, in addition to compensation, play important roles in the decision of a health care professional to remain in the military. For instance, the conditions and nature of work affect retention and include such factors as the ability to practice quality medicine, the risk of deployment, adequate support staff and equipment, facility infrastructure, business practices, family stability, professional growth, promotion, continuing medical education opportunities, and recognition and respect [18].

Discretionary special pays are incentive special pay (ISP) and multi-year special pay (MSP) and the amount physicians receive varies by specialty. Specifically, we modeled increasing the ISP cap from $36,000 to $45,000 and increasing the MSP cap from $14,000 to $20,000.[23] Not all specialties receive the cap amount. For example, under the current ISP cap of $36,000, pediatricians receive $12,000 and anesthesiologists $36,000. We model ISP increases such that each specialty's ISP is the same percentage of the new cap as it was of the old cap. This means that some specialties receive larger dollar increases in discretionary special pays and, to the degree that current ISP and MSP amounts are higher for specialties with lower retention, the discretionary pay increases are targeted to those specialties.

Table 5 shows the effect of these two pay increases on costs relative to the baseline model. We present these results by Service rather than for the MHS as a whole because the story varies by Service. For example, the model indicates that entitlement special pays are not a cost-effective way to reduce the attrition from the medical corps in the Army and Navy (costs increase by 4 and 9.3 percent, respectively), but it is cost-effective in the Air Force (costs decrease by 5.4 percent).

Table 5. Impact of physician entitlement and discretionary special pay (ESP and DSP) increases on cost by Service

	Army		Navy		Air Force	
Cost	Amount ($M)	Change from baseline	Amount ($M)	Change from baseline	Amount ($M)	Change from baseline
Baseline	811		563		566	
ESP excursion	844	4.0%	615	9.3%	536	-5.4%
DSP excursion	804	-0.9%	612	8.7%	522	-7.9%

The important question here is, why do costs increase in the Army and Navy and decrease in the Air Force? Many of the excursions we ran show that the career path is a key component of retention and cost. For example, the GME excursions showed that increasing the size of the GME program means more AFHPSP direct accessions,

23. Although the ISP cap changed to $50,000 in the FY 2003 National Defense Authorization Act, the change was not unfunded.

which have more years of service before physicians reach a stay-leave decision point. And, more AFHPSP direct accessions makes filling experience profile constraints easier because they have better retention than AFHPSP deferred accessions. Similarly, we found that the Navy's GMO policy elongates the career path of its physicians relative to the Army and Air Force making it easier for the Navy to fill experience profile constraints relative to the other Services.

Based on these findings, we conclude that the longer the career path of the average accession, the less cost-effective an increase in special pays will be because longer career paths lead to better retention. Accordingly, Army and Navy physicians' average career paths are longer than those of their Air Force counterparts because of the Air Force's dependence on AFHPSP deferred accessions. It is the cost savings from reduced dependence on AFHPSP deferred accessions that makes the entitlement special pay increase in the Air Force cost-effective. In addition, Navy physicians' average career path is longer than that of Army physicians, which explains why the entitlement special pay increase is even less cost-effective in the Navy than in the Army.

Similarly, the model shows that a discretionary special pay increase is not cost-effective in the Navy but it is in the Army and Air Force (see table 5). The explanation for the differences by Service is the same as the explanation for the entitlement special pay increase—career path of the average accession. The more important question is: are entitlement or discretionary pay increases more cost-effective?

The answer is that discretionary special pays are more cost-effective than entitlement special pays. For example, in the Navy model, costs increased 9.3 percent with the entitlement special pay increase, but they increased only 8.7 percent with the discretionary special pay increase (see table 5). This same pattern holds for the Army and Air Force. The pattern holds even though the average discretionary special pay increase per specialist was more in dollar terms than the entitlement special pay increase (see appendix A). Hence, if the dollar amounts were the same, the cost difference between the discretionary and entitlement special pay excursions would be larger.

The reason discretionary special pay increases are more cost-effective is rooted in how pay increases are distributed across the specialties. Entitlement special pays are the same across all specialties—neurosurgeons get the same amount as family practitioners—whereas discretionary special pays are targeted to specific specialties (that is, those with lower retention).[24] Essentially, DoD will get more return on its investment in terms of retention from targeting special pays to hard-to-retain specialties than it would from giving a flat special pay increase for all specialties.[25]

Dentists. For the dental corps, we model two additional special pay (ASP) increases, which we show in table 6. The ULB proposal is a $15,000 increase across the board. The CNA proposal is "targeted" in that it provides modest increases to those with less than 4 years of services and those with 9 or more years of service, with a larger increase targeted to those with at least 4 but less than 9 years of service. It is in this period that most dentists face stay-leave decisions. The model shows that neither of these pay proposals is more cost-effective than no ASP increase. Specifically, costs increase by 8.7 percent with the ULB proposal and 2.9 percent with the CNA proposal.[26]

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24. By saying that targeted special pays are more cost-effective than across-the-board increases, we are not suggesting short-term pay increases as a temporary fix. We mean permanent pay increases that provide more funds to some specialties over others because military compensation is largely tied to YOS and paygrade, whereas targeted special pays allow DoD to generate a compensation system in which wage differentials across the specialties better reflect wage differentials in the private sector.

25. We are not arguing against any increase in entitlement special pays. Some increase is necessary to prevent inflationary devaluation.

26. Although the cost increase is less with the CNA than the ULB proposal, we cannot definitively say that the CNA proposal is the more cost-effective of the two because the pay increases are not the same size. However, given our finding that targeted special pays are more cost-effective than across-the-board increases for physicians, it is reasonable to assume that this would be true for dentists as well. On this basis, the CNA proposal may be more cost-effective than the ULB increase because it is targeted to year groups that are facing stay-leave decisions.

Table 6. Comparison of current Dentist ASP to ULB and CNA proposals

			CNA proposal	
YOS	Current ASP	ULB ASP	YOS	ASP
< 3	$4,000	$19,000	< 4	$8,000
3 but < 10	$6,000	$21,000	4 but < 9	$16,000
10 or more	$15,000	$30,000	9 or more	$18,000
Intern	None	Based on YOS	Intern	None
Resident	None	Based on YOS	Resident	None

As with physicians, we believe that the reason neither of these dentist special pay proposals is more cost-effective than no increase is that the career path is a key determinant of retention. As the data show, once dentists have about 8 years of service, retention is high [2]. Hence, if the timing of residency training is such that the stay-leave decision point occurs after 8 years of service, many stay in the military. Consequently, although pay will improve retention, large pay increases are required to generate relatively small improvements in retention because retention is relatively high to begin with.

Optometrists. For optometrists, we modeled an increase in the optometry retention bonus (ORB) from $6,000 to $12,000. Our estimates show that increasing the ORB is not cost-effective. This ORB increase causes costs to rise by 6 percent. As with the dental corps, this pay increase does not improve retention very much because retention is already relatively high. Targeting pay increases (or HPLRP) to optometrists facing stay-leave decisions may be more cost-effective than the across-the-board increases, such as the ORB increase we modeled, because across-the-board increases provide additional pay to a lot of optometrists who would have stayed anyway.

Results. In exploring whether it is cost-effective to reduce the attrition from the system through pay increases, we found the following:

1. If retention is high, additional special pays are not cost-effective because increasing special pays does not buy enough retention.
2. Discretionary special pays are more cost-effective than entitlement special pays. Targeting pay to specialties with low retention is more cost-effective than across-the-board pay increases.
3. The longer the predominant career path, the less cost-effective special pay increases will be. In other words, the more years of

service the typical accession has before making a stay-leave decision, the less cost-effective pay increases will be.

Bottom line

So, is it more cost-effective for DoD to add water to the bucket or to plug the holes? The results show that increasing accession subsidization results in small cost savings for all three communities, but reducing attrition through higher special pays is generally not cost-effective. However, under certain circumstances (such as short career paths), it is cost-effective to reduce attrition through special pays targeted at specialties with low retention.

Personnel planning factors

We believe it is critical that policy-makers understand three factors that permeate our analysis: career path, stable billet file, and lack of flexibility and fungibility. *What is the optimal mix of accessions for selected uniformed health professionals?* There is no definitive answer. It depends on the constraints DoD imposes on the force (e.g., desired experience and in-house training). Personnel planning is a complex business process that is critical to DoD meeting both its readiness and peacetime-benefit workforce objectives cost-effectively and efficiently. Personnel plans and policies affect the recruiting, manning, retention, and overall "health" of each uniformed health care specialty. Often these plans are developed in an uncertain and tumultuous environment. We offer a few final thoughts on this process.

Career path

One of the main difficulties that personnel planners have is that the accession and training pipeline is long, particularly for physician specialists. For example, a medical student accessed into a 4-year AFHPSP scholarship in FY 2003 will not come on active duty until at least FY 2007. Once on active duty, he or she will go through an internship and residency, the length of which varies by specialty. This means that if our FY 2003 AFHPSP accession enters into a general surgery program, he or she will not be a fully trained general surgeon until FY 2012.[27]

27. For those in the Navy, most AFHPSP (direct) and USUHS accessions serve a 2-year GMO tour, after completing their intern year, so they will not be fully trained general surgeons until FY 2014.

The point is—based on the predominant career path—it takes a very long time to grow fully trained uniformed specialists. To illustrate, table 7 shows the years of practice and expected years of service for eight physician specialties for each of the four major physician accession sources.

Table 7. Expected MHS YOS and YOP by specialty, program length, and accession source

Specialty, program length (years),[a] and accession source	YOS[b]	YOP[b]	Initial ADO A-N-AF[c]	Specialty, program length (years),[a] and accession source	YOS[b]	YOP[b]	Initial ADO A-N-AF[c]
Anesthesiology (4)				OB/GYN (4)			
USUHS	16.1	10.1	7-5-7	USUHS	16.7	10.7	7-5-7
AFHPSP direct	10.0	6.0	4-3-4	AFHPSP direct	9.8	5.8	4-3-4
AFHPSP deferred	4.9	4.9	4-4-4	AFHPSP deferred	5.2	5.2	4-4-4
FAP	7.2	7.2	4-4-3	FAP	7.3	7.3	4-4-3
Family practice (3)				Ortho. surgery (5)			
USUHS	18.7	13.7	7-5-7	USUHS	17.8	10.8	7-5-7
AFHPSP direct	9.9	6.9	4-2-4	AFHPSP direct	11.7	6.7	4-4-4
AFHPSP deferred	6.7	6.7	4-4-4	AFHPSP deferred	4.4	4.4	4-4-4
FAP	6.7	6.7	4-4-3	FAP	5.7	5.7	4-4-3
Internal med. (3)				Radiology (5)			
USUHS	18.7	13.7	7-5-7	USUHS	18.7	11.7	7-5-7
AFHPSP direct	10.1	7.1	4-2-4	AFHPSP direct	11.6	6.6	4-4-4
AFHPSP deferred	6.7	6.7	4-4-4	AFHPSP deferred	4.8	4.8	4-4-4
FAP	8.0	8.0	4-4-3	FAP	6.5	6.5	4-4-3
General surgery (5)				Cardiology (6)			
USUHS	17.8	10.8	7-5-7	USUHS	16	8	7-3-7
AFHPSP direct	12.5	7.5	4-4-4	AFHPSP direct	12	6	5-3-5
AFHPSP deferred	5.8	5.8	4-4-4	AFHPSP deferred	5	5	4-4-4
FAP	7.3	7.3	4-4-3	FAP[d]	N/A	N/A	4-4-3

a. Residency/fellowship program length, in years, is shown in parentheses (includes PGY-1 year).

b. The expected YOS and YOP are MHS level averages based on DMDC data for all three Services from FY 1991 to FY 2000. They are not Service specific. As discussed in [2], DMDC data don't perfectly match Service figures. In addition, for some years in the DMDC data, the Air Force "commingled" physicians in training with duty specialists. This would tend to increase retention estimates.

c. The predominant initial active duty obligation (ADO) is given in years by Service: Army-Navy-Air Force (A-N-AF).

d. Because of the small sample size, we have not estimated the expected YOS and YOP for FAP cardiologists. Estimates for the other accession sources are based on data for all internal medicine subspecialists.

Even though general surgeons coming through USUHS have on average 17.8 years of service when they leave the military, they have only 10.8 years of practice as a fully trained general surgeon (see table 7). For DoD policy-makers, it is important to remember two salient points about the career path of uniformed specialists:

- The training pipeline is not complete once someone enters active duty—for many specialties it is only the halfway point for becoming fully trained specialists. (Residency program lengths, including PGY-1 or intern year, vary from 3 years (family practice) to 7 years (neurosurgery), depending on the specialty.)
- This long career path is one of the major reasons that special pay increases have a modest effect on retention. Why? For many uniformed specialists, particularly in the Navy, it makes economical sense to stay until retirement because they have already accrued several years of service before they reach their first stay-leave decision point.

Before we leave the career path issue, let's look at the potential effects of reducing a career path in order to shorten the planning horizon. Most military dental residents are taken from the pool of active duty general dentists who have practiced general dentistry in the military for a few years. This career path could be easily shortened by putting new accessions directly into specialty training rather than waiting until after they practiced general dentistry for a few years. However, shortening the career path has a cost in terms of retention. We estimate that shortening the dental career path by putting new accessions directly into residency training would reduce the expected years of practice as dental specialists by 20 to 28 percent depending on the specialty [1]. So, although shortening the career path may help planners more quickly adjust to changes in billets and retention, more accessions would be needed because of lower retention.

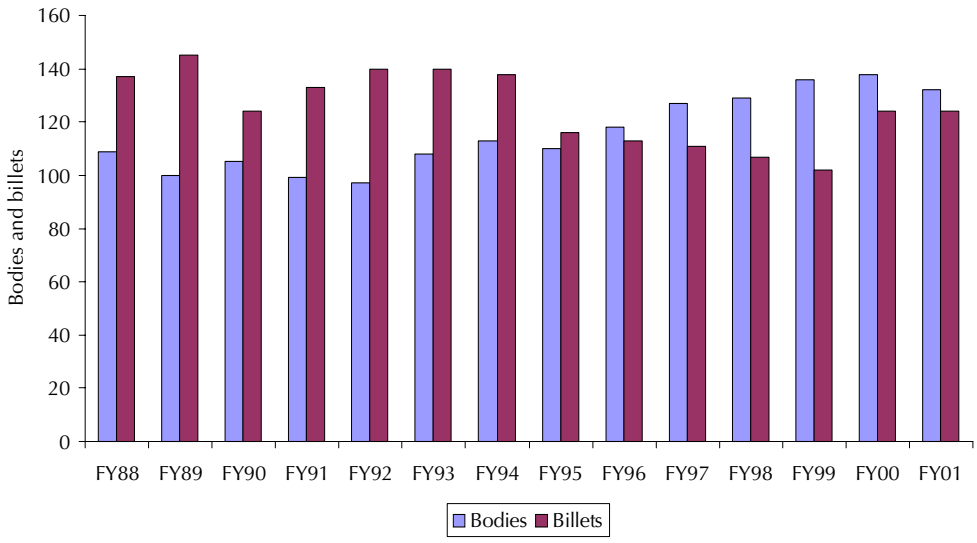
Stable billet file

In addition to these long accession and training pipelines, personnel planners must make a critical assumption when determining the number of residency "startups" or FAP accessions that will be needed

in the out-years. This assumption is that *no major changes in the billet requirements will occur.* Given a stable billet file and assuming there is not a major unexpected decline or improvement in retention patterns, personnel planners can attempt to channel an adequate inventory of AFHPSP (both direct and deferred) and USUHS graduates into the appropriate training program to fill the billets for fully trained specialists. Another challenge arises when the billet requirements change within a short time horizon. If personnel planners are told this fiscal year that the number of duty billets will be increasing or decreasing significantly in the out-years, there is little that they can do—in the short run—to turn accession or training outputs on or off.

To illustrate this challenge, figure 8 shows the number of OB/GYN "duty" specialists (bodies) and billets in the Navy from FY 1988 to FY 2001. In FY 1988, there were 109 OB/GYN specialists for 137 billets, an 80-percent manning level. Like today, the Navy had limited options to close the manning gap in the short term. Unfortunately, the most potent weapon the military has to close physician manning gaps is the FAP, which has proved ineffective for many specialties (given the program's current incentives) because of the large uniformed-civilian pay gap that exists for many specialties.

Figure 8. Bodies and billets for Navy OB/GYN (FY 1988-2001)



DoD's primary solution (without substantially increasing discretionary special pays to improve retention) is to increase the overall AFHPSP student accession pipeline so that additional inventory can be channeled into training programs both deferred and in-house (if capacity exists). As we have discussed, however, given the career path, this takes a long time. In fact, the Navy's OB/GYN manning shortages persisted until FY 1996 when those put into the training pipeline in FY 1988 started coming out of the pipeline as fully trained OB/GYN specialists.

As figure 8 displays, in FY 1996 the problem for the Navy reversed itself and there was an excess of OB/GYN specialists relative to billets. Why did this happen? After the personnel planners increased the flow of OB/GYN residents (primarily through AFHPSP deferred accessions), the billet file for this community was cut from 138 in FY 1994 to 116 in FY 1995. Hence, the persistently moving billet target and the long planning horizon (given the career path) make filling billets without excesses or shortages very problematic for the Services.

This example demonstrates several important points. The first is the importance of a steady billet file to personnel planning. Manning difficulties are often the result of the target (the billet file) moving up and down over a short time horizon. Even in the case with a stable billet target, manning problems may be the direct result of not putting enough people into the accession or training pipeline to fill the requirements. Moreover, it clearly shows how one cannot automatically assume that manning shortages (or overages) are the result of a decline or improvement in retention. This is why increasing special pays is normally not the panacea policy-makers would like it to be in shaping the force. Consequently, the Services may need flexibility to remedy short-term manning problems.

Enhanced flexibility

As we have discussed, it takes a long time to grow certain specialists, and DoD's ability to channel its inventory into required specialties (from its predominant accession sources) must be accounted for during this complex planning process. Moreover, we know that the billet file requirements—that are supposed to drive the personnel

plans—are not always stable. The combination of a long career path to make most specialists, a potentially unstable billet target, and the reality that a large uniformed-civilian pay gap exists for certain specialties accentuates the need for TMA and the Services to have better tools available to aggressively solve manning problem areas without legislation. When inventory shortfalls occur, for a particular specialty, it is difficult for the military to quickly remedy the problem. Conversely, if the MHS's personnel planning process is not on target and a specialty's inventory exceeds the billet structure, it is very difficult to "turn off" training outputs.

We find that DoD and the Services are significantly hampered and the current short-term subsidization tools are restrictive and ineffective to access some specialists. We recommend that HA/TMA and the Services be given more latitude and better tools to fix short-term problems (i.e., substantially increasing FAP and signing bonuses for specialties experiencing significant manning shortfalls). However, in conjunction with this added flexibility, DoD should be assured that this change is a needed and cost-effective business decision by requiring HA/TMA and the Services to:

1. Validate their readiness requirements.
2. Determine if the billet structure, which exceeds the readiness requirement, is the most cost-effective method to provide those services. If this process confirms that the active duty billet structure is the most cost-effective approach, an aggressive personnel plan should be put into place to fill every billet.
3. Establish a retention rate goal—at critical military career junctures—when specialists are most likely to be at stay-leave military decision points based on the predominant accession source and career pattern. Closely track and record retention rates at the stay-leave military decisions to determine if the retention goal is being met.

Our life-cycle-cost model can help DoD answer broader and more complex issues

Based on our analysis thus far, we have identified the components of life-cycle costs for selected military health care professionals and quantified these cost components in terms of accessing, training, and maintaining fully qualified specialists in staff utilization tours. Given these costs, historical retention patterns, current constraints, and business practices, we determined the optimal mix of accessions and whether it is more cost-effective to increase special pays to retain the existing inventory or to concede the loss and access more providers into the system by increasing accession subsidies. Our existing model also allowed us to run several excursions to test the sensitivity of the model to specific assumptions and evaluate the impact of personnel policy changes without actually making real-world changes.

Now that we have developed accurate cost data and a rigorous model, let's discuss the added value to DoD of using life-cycle costs to evaluate broader and more complex policy issues such as:

- The make-versus-buy decision
- What is the right size for in-house graduate medical education ?
- How much would it cost DoD to access and train to only the active component (AC) readiness requirements?

Make-versus-buy decision

As we stated in the beginning of this report, the primary mission of the MHS and the three Services' medical departments is *force health protection*. This readiness mission involves providing medical support in combat and other military operations and maintaining the day-to-day health of about 1.5 million men and women who serve in the Army, Air Force, Navy, and Marines Corps.

The second mission is to provide a *health care benefit* to nearly 6.6 million other people who are eligible to use the MHS. To effectively execute these missions, the MHS uses a mix of its own uniformed medical personnel—active duty and reservists—as well as civilian professionals (civil service and various contractors and network personnel). Each of the Services' medical departments decides on the number, skill mix, and type of professionals that will be maintained in the active duty ranks to perform required services by authorizing (funding) a certain number of active duty billets. Each medical department's inventory of authorized active duty billets should encompass, at a minimum, the entire operational medical requirement for the respective Service, and in some cases may include billets above and beyond this readiness requirement.

The DoD Commission on Roles and Missions (CORM)[28] and the Section 733 Study reviewed and helped to define the MHS's readiness requirements. Specifically, the readiness requirement includes those uniformed personnel (active and reserve) who are needed to meet both the wartime and peacetime operational needs. The AC readiness requirements include, but are not limited to, wartime casualty care, theater workload (as well as augments required for the additional demands of wartime casualty care), staffing for military treatment facilities that are outside the continental United States, day-to-day operational requirements, rotation base, and sustainment pieces. As we have seen in earlier CNA work, a significant variance exists in the Services' reported readiness requirements [2]. TMA and Health Affairs are currently evaluating the AC readiness requirements for each Service.

28. The CORM examined alternatives for eliminating redundancy in the military departments, including military medicine. In August 1995, the final report of the CORM stated that "operational readiness must be the unequivocal top medical priority." No restructuring was recommended, other than that "the Secretary of Defense establish uniform procedures to guide the Services in determining their medical needs to support operational requirements" [17].

Billets above the readiness requirement

Once DoD is confident in each Service's AC readiness requirement, the next step is for the MHS and three Service medical departments to assess the endstrength (billets) in excess of the readiness requirement.[29] When MHS infrastructure (including personnel) exists beyond the requirements of readiness, the costs to maintain that infrastructure should be considered a health care benefit cost and therefore be compared with purchased care (e.g., managed care support contracts) in a make-buy decision.[30] This validation process must include such factors as graduate educational requirements, patient demands based on demographic mix, direct care funding, and facilities.

Using life-cycle costs

The life-cycle-cost approach that CNA developed for this study is the most appropriate measure for comparing personnel costs among military and civilian alternatives in the *long run*. We refer to the long run because in the short run DoD has already invested a great deal of money in attracting and "producing" a fully trained physician, dentist, or other type of health care professional in the current inventory. DoD can't get that investment back should he or she leave tomorrow. Therefore, it needs to decide today what it wants to produce in the future, before the investment is made and the training pipeline is set. For that reason, we believe the life-cycle-cost approach is appropriate for determining the long-run cost-effectiveness of individual billets in

29. For many specialties, in each Service, the AC billets exceed the AC readiness requirement.

30. CNA recently conducted a study for Navy Medicine that offered methods for making two kinds of comparisons between uniformed and civilian sources of care: (1) the costs of active duty personnel versus the cost of a civilian replacement and (2) the costs of retaining Navy Medicine's local facilities versus closing them, on a case-by-case basis, using our life-cycle-cost methodology. For additional details about this research, please see the December 2002 CNA Annotated Briefing D0007133.A2, *Sizing Navy Medicine: Methods and Savings Associated With the "Make-Buy" Decision* [16].

determining whether to maintain above readiness billets through either a billet-by-billet analysis or a site closure analysis [16].

As we now know, *life-cycle cost* represents the costs of a medical professional over his or her entire career. In that sense, although we incorporate the basic notion that investments must be made in some prior period for an active duty person to perform in a medical capacity, we are focusing on the cost of a current billet. In other words, we're not examining an individual over time, but a billet at a point in time. The value of using the life-cycle cost for determining the total costs associated with a billet is that it not only allows us to include the current salary, benefits, TAD, PCS, and other costs associated with filling a specific billet today, but it enables us to allocate the sunk costs associated with recruiting and training a person to fill that billet. To do this, we must determine the expected years of return on this sunk investment (on average, how many years of practice a fully trained active duty specialist will stay in the Service). Each billet is designated by its specialty and paygrade. Based on this information, we can determine the current cost associated with the billet (specialty and grade specific compensation, TAD, PCS, etc.), and we can allocate a fixed portion of the sunk cost to reflect the average training tail associated with any fully trained specialist eligible to fill the billet.

By using the above approach, senior policy-makers may begin to validate that the required health services within the MHS are being delivered in the most efficient and cost-effective way possible.

Right-sizing graduate medical education

Our goal in this study was to quantify and model the life-cycle costs for the major accession sources, predominant career paths, and business practices being used by the Services. By using these constraints and parameters in our baseline optimal-mix-of-accession model, we were able to show the effect on the accession sources and costs when we made small deviations from these practices. This approach was critical to ensuring that CNA, Health Affairs, TMA, and the Services were confident in the robustness of our model. Now that this has been accomplished, our model lends itself to more complex questions, such as *how many and which specialties should DoD train in-house?* Our existing

model allows us to eliminate many of today's business practices and constraints so we can explore alternative choices for DoD to efficiently and cost-effectively fill its active duty specialty requirements. In other words, we can architect and cost out the best system to access and train military health care professionals—to meet the needs of tomorrow—without being constrained by today's business practices.

Costing out the AC readiness requirements

It was beyond the scope of this study to comment on the optimal way or best level and mix of health care professionals to fulfill the MHS mission. Therefore, for this analysis, we assumed that the billet authorizations developed by the three Services' medical departments were appropriate. In light of Health Affairs' and TMA's ongoing efforts to validate the AC readiness requirements, we think it would be very beneficial for policy-makers to run our optimal-mix-of-accession model using these newly validated requirements to quickly assess the effect that potential policy changes might have on DoD's overall cost and business practices.

Appendix A: Physicians' results

Background

In phase I of the life-cycle-cost study, we identified the key components that drive the life-cycle costs for selected uniformed health care professionals' predominant accession sources and career paths [1]. Two questions that phase I did not answer are the following:

1. Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions?
2. Is it more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?

In phase II of the study, we developed and ran a model to assess the most economical mix of accessions to fill duty billet requirements in the future, assessed the efficacy of current accession/retention programs, and recommended ways to strengthen the personnel planning process.[1]

Basic model

The basic model we used to look at the optimal mix of accessions is a cost minimization model. The objective function of this model is as follows:

1. Duty billets refer to those billets that are for fully trained personnel who are not in training. By a duty physician, we mean someone who is not in training and is qualified to fill one of these billets.

$$\min Cost = \sum_i \sum_j Cost_j Trainees_j Year_i + \sum_i \sum_j Cost_j Interns_j Year_i$$
$$+ \sum_i \sum_j Cost_j GMOs_j Year_i + \sum_i \sum_j Cost_j RFs_j Year_i$$
$$+ \sum_i \sum_j Cost_j Specialists_j Year_i + penalties$$

subject to

$$Accessions_i \in [\min, \max] \text{ for } i = 1 \text{ to } 4$$
$$Bodies_i \geq Billets_i \text{ or pay penalty for specialties } i = 1 \text{ to } 23$$
$$First\ yr\ residents_i = GME\ starts_i \text{ for specialties } i = 1 \text{ to } 23$$
$$O\text{-}6s_i \geq \min_i \text{ or pay penalty for specialties } i = 1 \text{ to } 23$$
$$O\text{-}5s_i + O\text{-}6s_i \geq \min_i \text{ or pay penalty for specialties } i = 1 \text{ to } 23.$$

Note that trainees are those in the accession pipeline and RFs are those in a residency or fellowship. Subscripts *"i"* represent the fiscal year between FY 2003 and FY 2083. Subscripts "*j*" represent the accession source, year of practice, and specialty combination for the cost and inventory associated with that combination.[2]

A simpler way to state this model is that we are *minimizing the total cost (over a long time horizon) of meeting all of the medical corps requirements given the constraints the Services and DoD place on the medical corps.*[3]

Steady-state solution

We use a long time horizon to obtain the steady-state solution to the model. What is meant by the optimal accession mix in the *steady state?*

If we ran the model with a 1-year time horizon, the output of the model would tell us the optimal mix of accessions given that time horizon. Assuming that the model is currently out of equilibrium, if we ran the model over a 2-year time horizon, the optimal mix of

2. The inventory for group *j* is the group's inventory at year *i* - 1 less attrition.

3. We ran this optimization model using the software package, AMPL.

accessions would be different in the second year than in the first. This would occur because the model has 2 years to move the medical corps toward its long-term optimal mix of accessions. Essentially, the steady state is a solution in which the optimal mix of accessions is the same year after year.

To find the optimal mix of accessions in the steady state, we ran the model for 80 years to let personnel currently in the medical corps or one of its accession pipelines work their way out of the system. For example, personnel in their first year of medical school under the Armed Forces Health Professions Scholarship Program (AFHPSP) will need 4 years to complete medical school. If they go through an in-house graduate medical education (GME) program, they may be in the medical corps for another 30 years. So, in total, they are in the system for 34 years, counting time in medical school. If they go through a civilian residency program, their 30-year career in the military will not begin for another 3 to 7 years, depending on length of their residency. In other words, they are in the system for a total of 37 to 41 years, counting time in medical school.

What this means is that the personnel we put into the system today will affect it for years to come. Consequently, what the model says the optimal mix of accessions is for each year depends on what is currently in the system. Eventually, however, when current inventory works out of the model, we reach a point where the optimal mix of accessions is stable—and doesn't vary much from year to year. This stable accession mix is what we call the steady-state solution. This also implies that there is an optimal path of accessions to reach the steady state. This path depends on the current inventory in the system. Although we are not reporting the optimal path to the steady state, we want to be clear that the steady-state accession mix and the path of accessions to reach the steady state are *not* the same.

Model costs and retention

The costs we modeled are training and accession costs, compensation, permanent-change-of-station (PCS) costs, and temporary duty costs (refer to phase I of our life-cycle-cost study [1]). Costs are largely driven by the career path—timing of promotions, training, and board

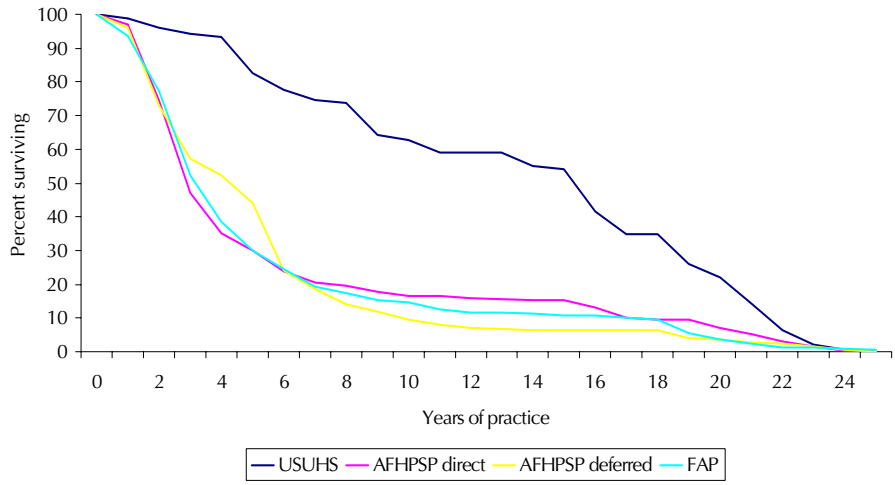
certification. In conjunction with the TRICARE Management Activity (TMA) and representatives from each Service, we determined in phase I the predominant career path by specialty, accession source, and Service. Although we will not determine the impact of the career path on the optimal mix of accessions by altering it in various model excursions, if the career path changes, costs and continuation patterns will change (see [1]).

For example, the Navy's predominant policy of sending its physicians on a GMO tour after the intern year and before residency training is different from that of the other Services, which usually send physicians straight into residency training. If the Navy were to eliminate a GMO tour for the majority of its accessions, its costs and retention would be comparable to those in the Army and Air Force. Also, physicians, which the Army and Air Force train as subspecialists, go directly from a residency to a fellowship. In contrast, physicians in the Navy predominantly practice their specialty for 2 years after their residency before going on fellowship training. For example, a physician would practice as a general internist before going on to become a cardiologist. This career difference between the Navy and the Army and Air Force also affects costs and retention.

Given the career paths we developed in phase I, we computed average retention for each accession source using data for FY 1991-2000 from the Defense Manpower Data Center (DMDC). When computing the optimal mix of accessions, however, we will use the entire survival curve (which incorporates attrition by year of service and not average attrition across all years of service).

Figure A-1, for example, shows the survival curves for each of the four major accession sources for family practitioners. Uniformed Services University of the Health Sciences (USUHS) costs are substantially higher than all other accession source costs, but the survival rate of USUHS accessions is dramatically higher than that of all other accession sources. These facts have a significant impact on determining the most cost-effective way to fill senior billets.

Figure A-1. Percentage of family practitioners surviving by years of practice and accession source



Constraints

If we don't place any constraints on the model, the obvious solution to the optimal mix of accessions is to have all new accessions come from the least expensive accession source. Allowing the model to be unconstrained doesn't reflect the environment in which the Services operate (market supply and demand as well as unique military requirements). Consequently, we imposed four constraints on the model: (1) billets, (2) experience profile requirements, (3) accession source caps, and (4) in-house training requirements.

Billets

The first constraint is the number of billets that must be filled. Note that we modeled billets in 23 specialties.[4] We did not model executive medicine because our focus was on clinical billets. Though we haven't modeled all billets, also note that we didn't model about 9 percent of physicians' historical accessions because we focused on the

4. We haven't modeled billets in some small specialties, such as allergy, surgical subspecialties (except for plastic), endocrinology, infectious disease, nephrology, nuclear medicine, pulmonary, and rheumatology.

predominant accession sources. From this point forward, we will use "billets" to describe the subset of billets considered in our model and not the entire universe of billets.

From a modeling standpoint, the number of billets is the *minimum* number of duty physicians the Services require—not the maximum they can have. For military personnel planners, authorized billets represent more of the maximum number of bodies the Services can have on active duty at the end of any given fiscal year. To fill the billets with the exact same number of bodies, we would have to constrain bodies to be no less and no more than billets. However, doing this makes the model infeasible because there are other constraints on the model that may force bodies to exceed billets or may not allow them to reach billets.

That said, the model doesn't want more bodies than billets because it is trying to minimize cost and, obviously, each extra body is costly. In other words, modeling billets as the minimum number of bodies is akin to modeling a target number of billets; in the steady state, the number of bodies exceeds billets *only* if the model's other constraints force it to do so.

Experience profile

One of the more influential constraints in the model is the desired experience profile of the force. What percentage of the duty specialists should be O-6s and what percentage should be at least O-5s? Though it will always be the case that it is most cost-effective to fill junior billets with the least expensive accession source, it may be more cost-effective to fill senior billets with more expensive accession sources if the retention rates of these accession sources are substantially higher than the least costly one.[5] For example, as phase I of the study shows, if the Army needs 1 O-6 anesthesiologist, it needs on average 4 USUHS accessions to fill this requirement; however, it would need 11 AFHPSP direct or 14 FAP accessions (given their

5. We are not directly filling senior billets with new accessions, but we grow these individuals into senior billets. Differences in retention patterns across accession sources, therefore, can make it more or less costly to grow senior personnel from specific accession sources.

retention patterns) to get 1 accession to stay long enough to be promoted to O-6 [1].

Accession source caps

Even when we impose a force structure constraint on the model, the model may find that the optimal mix of accessions consists of more of some accession sources than the Services could reasonably get. For example, FAP is the least expensive of the four major physician accession sources; however, the number of FAP accessions the Services can access is very limited given the program's current incentives. For this reason, another critical constraint is the maximum number of accessions the Services can expect from each source given the current rewards of the program. Hence, though the Services may want more FAP and direct (unsubsidized) accessions, they may not be able to get more without increasing the subsidization of these programs.

Accession source caps are an acknowledgment that there are economic and political constraints on the number of physicians that can be accessed through each accession source. Just as FAP accessions are limited, USUHS accessions are limited by the university's constraints. Similarly, AFHPSP accessions are constrained by the number of qualified AFHPSP applications.

In-house training requirements

The in-house training requirements are requirements for the size of the graduate medical education program. We are modeling GME requirements as a given. GME requirements are not a constraint in the sense that the model cannot exceed them. Rather, they are a target the model must fill, which is akin to a minimum and maximum requirement that are the same. Future research should examine the optimal size of the GME program.

Penalties

Sometimes the model's constraints will not allow the model to fill all of the requirements. For example, the constraints of the model may not allow it to fill all of the billet requirements. When this occurs, the model has not technically met the minimum billet requirement. Again, if we imposed the billet requirement as a hard minimum, the

model would be infeasible because the other constraints simply don't allow the model to meet the billet requirement. To overcome this problem, we've constructed the model so that it handles these cases by imposing an arbitrarily large financial penalty. In other words, we allow the model to meet the requirement that it couldn't fill it with a uniformed physician by buying a civilian physician—albeit at an unrealistically high cost.

Note that we set the penalty arbitrarily large so that it will always use a uniformed physician if the constraints allow it. Our tasking in this study was to determine the most cost-effective way of filling billets with military personnel, so we designed the model so that it would go to the civilian sector to fill a requirement only if the constraints of the system do not allow it to fill a requirement with a military physician. Future studies should examine the cost-effectiveness of the make-buy decision for billets above readiness requirements.

In addition to a financial penalty for failing to meet billet requirements, the model includes a financial penalty if the constraints do not allow it to fill experience profile requirements. Note that the penalty costs for failing to fill requirements with military personnel or personnel of the right experience level *are not included in the cost figures that we report.* The cost figures represent only those costs associated with military personnel—the life-cycle costs we developed in phase I of the study. However, we did adjust cost for billet requirement shortages. We make this adjustment by putting in the average billet cost for each unfilled billet. The costs don't reflect any adjustment for unfilled experience requirements. Unfilled experience requirements don't mean that there is not a body for each billet, just that the body doesn't have the right experience level.

Other modeling issues

We modeled the process of filling billets using continuous variables rather than an integer programming approach. This means that we allowed for fractions of personnel, such as accessing 4.5 in the steady state rather than forcing the model to always use a whole number. Because we are looking for a steady-state solution, all we really want is the average number of personnel that should be accessed each year.

So, if the steady state is 4.5, we interpret the steady state as accessing 4 one year and 5 in the next. Integer programming would add substantially to the modeling complexity without meaningfully affecting the results.

Another modeling issue is the starting point—today's inventory of specialists and trainees in the medical corps as well as the inventory in the accession pipelines. The starting point is the driver for how and whether the Services will be able to meet near-term requirements. That said, the starting point we used for inventories *does not affect the optimal mix of accessions in the steady state* because, once enough time passes to let the current inventory work through the system, the model reaches the same steady state regardless of the starting point. What it affects is the time it takes to reach the steady state and the path used to reach it.

Baseline assumptions

Now that we have conceptually discussed the model, we present the assumptions we made for our baseline model. The purpose of the baseline model is twofold. First, given the basic parameters and constraints, it determines the long-term consequences in terms of meeting requirements. That is, the baseline tells us whether the Services can meet their requirements given the current constraints on the system and the optimal mix of accessions to use. Second, the baseline model provides a reference point, to which we compare all of our various excursions.

Billets, GME starts, and accession source caps

Table A-1 details our baseline assumptions for billets, GME starts, and accessions for each Service. The Army has the largest overall billet requirement by far—2,715 compared with 2,015 in the Navy and 1,853 in the Air Force. Accordingly, the Army's GME program is larger than those in the other Services.[6]

6. These billet figures are for fully trained specialists in the 23 specialties we've considered in this study. These billet figures don't include training, GMO, and executive medicine billets or billets in other specialties.

Table A-1. Baseline assumptions for billets, GME starts, and number of accessions by Service

	Army		Navy		Air Force		Accession constraints[a]		
	Billets	GME starts	Billets	GME starts	Billets	GME starts	USUHS	AFHPSP	FAP
Anesthesiology	121	16	138	18	78	8	n/a	n/a	0
Cardiology	50	7	25	4	31	5	n/a	n/a	0
Family practice	491	50	403	43	439	45	n/a	n/a	25
General IM	309	55	135	31	162	37	n/a	n/a	10
General surgery	185	24	139	9	111	13	n/a	n/a	0
OB/GYN	170	21	124	13	116	12	n/a	n/a	8
Orthopedic surgery	145	20	133	11	91	7	n/a	n/a	0
Radiology	140	16	112	14	124	16	n/a	n/a	2
Other specialties	1,104	135	806	78	701	74	n/a	n/a	15
Total	2,715	344	2,015	221	1,853	217	51/63[b]	200/400[c]	60

a. Accession requirements for USUHS and AFHPSP are not by specialty because we do not know at the time USUHS and AFHPSP students enter medical school what specialty they will eventually pursue.
b. The maximum number of USUHS accessions is 51 for the Navy and Air Force and 63 for the Army.
c. The minimum and maximum number of AFHPSP accessions is 200 and 400, respectively.

In addition to differences in number of billets, the mix of specialties varies considerably among the Services. We found that the Air Force is more reliant on primary care (45 percent of its specialty billets) compared with 42 percent in the Army and 40 percent in the Navy.[7] Similarly, the Navy is more reliant on surgical specialties (27 percent of its specialty billets) compared with the Army (25 percent) and the Air Force (23 percent).[8] Given these differences, the model for each Service deviates from the other Services because the mix of billet requirements by specialty affects the dynamics of the cost-retention tradeoff between the various accession sources. We do not judge whether one Service's specialty mix is better than another; we simply point out that this is a source of variation. The varying mix of GME starts also affects the dynamics of the model by constraining the combined number of USUHS and AFHPSP direct accessions.

7. We defined primary care as family practice, pediatrics, general internal medicine, and preventive medicine.

8. We've included general surgery, OB/GYN, ophthalmology, otolaryngology, neurosurgery, orthopedic surgery, plastic surgery, and urology in the surgical specialties group.

Table A-1 also shows the minimum and maximum number of accessions the three Services can bring in each year from each accession program. Currently, the Services access 165 physicians each year from USUHS. The Navy and Air Force each access 51 annually and the Army 63 annually. Realistically, the size of the USUHS class cannot change significantly from year to year. Despite this, we model the 51/63 accessions into the Services as the maximum, meaning that the model isn't required to take any USUHS accessions if that is the most economical solution. Modeling USUHS accessions in this manner allows us to extract some meaning based on the number of USUHS accessions the model selects. If we were to constrain USUHS to be exactly 51 (Navy and Air Force) or 63 (Army), we cannot determine whether USUHS is an economical option because we have told the model exactly how much USUHS must be.

We have also constrained the number of AFHPSP accessions to be between 200 and 400 each year. As with the size of the USUHS class, there are political constraints on the annual fluctuation in the program's size. One cannot turn it off one year and start it back up the next.

As table A-1 shows, the maximum number of FAP accessions is 60, but these accessions cannot be in any accession source. Given current FAP subsidization and the market of potential FAP candidates, the Services cannot expect to be successful in getting FAP accessions in some specialties because of the disparity between military and civilian compensation. For example, the Services have not been successful getting FAP accessions in anesthesiology, cardiology, and orthopedic surgery. In these specialties, the gap between civilian and military compensation is in excess of $100,000 [6]. Consequently, we assume that the Services will not be able get any FAP accessions in these specialties and will have to meet their requirements in these specialties through the other three accession sources.

Experience profile constraint

We constrained the experience profile of the medical corps fully trained duty billets based on a Health Affairs memorandum [7]. This policy states a goal of 25 to 30 percent of physician endstrength with

an experience level of 5 to 12 years beyond initial certification. Our data do not allow us to determine years of experience within a specialty, but these physicians tend to be in paygrades O-5 and O-6. Consequently, we set the experience profile constraint at the following levels:

- At least 30 percent of duty billets should be filled with O-5s or O-6.s
- At least 10 percent of duty billets should be filled with O-6s.

Cost and retention

In addition to these assumptions, we model costs and retention based on the phase I life-cycle analysis [1] in which we detailed the costs by accession source and Service for each year personnel were in training or practicing as duty physician specialists.[9] We use results from previous CNA research [2, 3] looking at the responsiveness of physician continuation rates to pay to model how the survival curves change in response to changes in special pays and bonuses. In other words, we project how the survival curve will shift as we alter pay. Also, we modeled how the maximum number of FAP accessions changes as we increase the subsidization of FAP by adding an accession bonus.[10]

Baseline model

In this section, we present the results of the baseline model for each Service. Because there is a great deal of relevant information in the model results, we go through it in detail for the baseline. The type of information and format of presentation are much the same for each excursion.[11] Consequently, we will not go through as extensive an

9. The results are the same whether or not we use a non-zero discount rate.
10. We model the responsiveness of accessions to changes in the FAP accession bonus using estimates of the responsiveness of enlisted accessions to changes in pay [4, 5].
11. For each excursion, data are presented separately for each Service. For ease of comparison, each portion of the excursion results is presented along with the comparable results from the baseline.

analysis of the data for the excursions. Rather, we will highlight the important differences between each excursion's results in relation to the baseline results.

Accessions and training

Table A-2 presents, for all three Services, the optimal number of accessions from each accession source subject to constraints. We show this accession mix at two stages: (1) when personnel enter the accession pipeline and (2) when physicians complete specialty training and begin practice as a fully trained specialist.[12] For each Service, the USUHS accession constraint is binding, meaning the model uses the maximum number of USUHS accessions allowed. In fact, the model would prefer more of these accessions because they are the most cost-effective in meeting the requirements for O-6 physicians, but it just can't get them. Although FAP accessions are the least costly per year of practice, the model isn't using all of the FAP accessions it can—primarily because of the GME constraint.

Table A-2. Baseline steady-state accessions

	Army		Navy		Air Force	
Accession mix	Number	Percent	Number	Percent	Number	Percent
Accession pipeline mix[a]						
USUHS (0/63)	63	13	51	12	51	12
AFHPSP (200/400)	359	75	327	78	309	75
FAP (0/60)	55	12	39	9	54	13
Total	477	100	417	100	414	100
Accession mix at YOP-1[b]						
USUHS	59	14	44	12	48	13
AFHPSP direct	255	60	170	48	149	41
AFHPSP deferred	59	14	106	30	117	32
FAP	52	12	36	10	52	14
Total	425	100	357	100	366	100

a. Annual accession source constraints are in parentheses (minimum/maximum).
b. The number of accessions at YOP-1 is smaller than the number in the accession pipeline because of attrition during medical school, internships, residencies, and GMO tours.

12. Accessions into the accession pipeline are those personnel beginning medical school at USUHS or subsidized through AFHPSP and residents who enter contracts to come into the military through FAP.

In the Army, for example, the GME constraint requires that 344 physicians go through in-house residency programs. By definition, these GME slots can be filled only with USUHS or AFHPSP direct accessions. So, in part, the GME constraint dictates the number of USUHS and AFHPSP direct accessions combined that the model must have. Consequently, some specialties may get the manning they need largely through USUHS and AFHPSP direct accessions, thus eliminating or reducing the need for AFHPSP deferred or FAP accessions. We show in the excursions how changes in GME requirements affect the need for AFHPSP deferred and FAP accessions.

In table A-3, we show the steady-state number of people in various stages of training. For example, in the Navy, each year the model estimates that there are 2,092 people in the accession pipeline. These include medical students and civilian residents. The Navy has 204 medical students at USUHS and another 1,268 AFHPSP students in civilian medical schools. Residents in training consist of 507 AFHPSP students for whom the Navy deferred their active duty obligation and another 113 civilian residents contracted to come into the Navy through FAP.

Table A-3. Baseline steady-state accession and training inventories

Inventory	Army	Navy	Air Force
Accession pipeline[a]			
USUHS students	252	204	204
AFHPSP students	1,390	1,268	1,201
AFHPSP deferred	272	507	536
FAP	162	113	107
Total	2,076	2,092	2,048
Training pipeline[b]			
Interns[c]	329	235	201
GMOs[d]	n/a	454	n/a
Residents/fellows	882	616	584
Total	1,211	1,305	785

a. We've classified all personnel who have not entered the medical corps as part of the accession pipeline. This includes all personnel in USUHS and all AFHPSP medical students. We also include all civilian residents who are under contract to come into the medical corps (AFHPSP deferred and FAP accessions).
b. We've classified the training pipeline to include all personnel in the medical corps who are not fully trained specialists or who are in training. This is a classification for USUHS and AFHPSP direct accessions who are interns, GMOs, residents, or fellows.
c. We realize that the number of interns may exceed the number of PGY-1 slots the Services currently have in-house. This occurs because we modeled the predominant accession sources (covering 90 percent)—not the entire universe of accessions. Consequently, the reported number of interns may be thought of as those with in-house internships and others (e.g., those who were deferred (1-year delays) to complete civilian internships).
d. The General Medical Officer (GMO) is unique to the Navy.

Once USUHS and AFHPSP direct accessions go on active duty, they enter a training pipeline to become specialists. In the steady state, the Navy has 1,305 active duty physicians in training (internships, GMOs, and residents/fellows).

Cost

Cost is another key output from the model because the main objective of the model is to minimize total costs of meeting requirements subject to various constraints. Table A-4 shows the estimated steady-state *annual* cost. This cost includes all life-cycle costs that we detailed in phase I [1]. These costs include the compensation costs (salary and benefits), temporary duty costs, and PCS costs of all active duty personnel and the compensation and training costs of all personnel in training regardless of whether they are on active duty.

Table A-4. Baseline steady-state annual life-cycle cost

	Army	Navy	Air Force
Total cost of medical corps ($M)	808	563	566
Cost per fully trained duty physician ($)	254,810	260,456	242,912
Shortage of fully trained duty physicians	12.2	0.0	1.9
Cost adjusted for shortages ($M)[a]	811	563	566

a. Total cost for the medical corps plus the average cost per fully trained duty physician for each physician shortage ($808M + (254,810 x 12.2) for Army).

In addition, table A-4 shows the average annual cost per fully trained duty physician specialist. In the steady state, there are 2,330 duty physicians in the Air Force model, meaning that each costs an average of $242,912 ($566 million/2,330). This cost reflects not only each physician's compensation, temporary duty, and PCS costs, but also the cost of the personnel in the accession and training pipelines. In other words, the cost of a duty billet is compensation, temporary duty, and PCS costs plus the training tail required to support the billet.

In certain cases, the constraints of the model are such that requirements cannot be met. For instance, the Army cannot meet its requirements for neurosurgeons.[13] The annual cost figures we reported encompass only life-cycle costs—they don't include the penalty costs for not meeting billet or experience profile requirements. Consequently, the cost output from the model in this case does not provide a very useful benchmark when we compare each excursion's cost to the baseline; cost is artificially low because the model could not fill all requirements with military personnel.

To correct for this, we adjusted cost to account for the cost of filling any billet shortages. We did this by taking the baseline cost of $808 million (Army) and adding to it the average cost per fully trained duty billet ($254,810) for each of the 12.2 billets that the model couldn't fill. This gave us an adjusted cost of $811 million, which we can use to compare costs between the baseline model and the various excursions.[14] However, we have not made any adjustment to costs for unmet experience profile requirements.[15] This means that, in excursions where the experience profile requirement isn't met, we must be careful when interpreting costs relative to the baseline.

Experience profile

One of the crucial constraints in the physician model is the required force structure—the desired experience profile of the force, which DoD defines as at least 30 percent O-5s or O-6s and at least 10 percent O-6s. Meeting experience profile constraints is difficult for some

13. For any given specialty, we define an excess (shortage) as having more (less) fully trained personnel than there are billets.

14. We use $254,810 to make this adjustment because it is about what it would cost the system in terms of increased accessions, GME training, and compensation to fill each vacant billet. It doesn't necessarily represent the cost of replacing the billet with a civilian or contract provider or purchased care. This cost is likely a lower bound of what it would actually cost to fill the billet with a military or civilian provider.

15. We didn't make this type of adjustment because we don't know exactly how many more military personnel need to be brought in to fill the unmet experience requirement.

specialties because of attrition or an insufficient number of GME training slots. Consequently, in some specialties, the experience profile constraint is not met.

We track the number of O-5 and O-6 personnel that the model requires but can't fill. Table A-5 shows that no shortages of senior personnel existed in the baseline model for the Navy and Air Force, but there were shortages for the Army. Specifically, the Army filled all but 1.8 billets where the physicians must be at least an O-5. Similarly, it filled all but 0.8 billet where the physician must be an O-6. These experience shortages are a result of not filling 12.2 of the 21 billets for neurosurgery.

Table A-5. Baseline steady-state annual experience profile shortages

Experience group	Army	Navy	Air Force
O-5/6 shortage	1.8	0	0
O-6 shortage	0.8	0	0

Inventory by specialty

In table A-6, we also show the steady-state inventory from the baseline model. This inventory is provided by paygrade and specialty, which we can easily compare with billets to determine if there are any excesses or shortages. In addition, we show the constraint on the number of GME starts the model requires each year.

In some sense, the number of GME starts is the principal determinant of whether we have an excess or shortage in some specialty. If the number of GME starts is too high given attrition patterns and requirements, a specialty may be overmanned simply because in-house GME produces more specialists than the billets require. Similarly, if the number of GME starts is too low given attrition patterns and requirements, the model may not be able to draw in enough AFHPSP deferred and FAP accessions to make up the difference.

Table A-6. Baseline steady-state annual inventory by specialty and paygrade for each Service

Specialty	Billets	O-3/4	O-5	O-6	Total	Excess (shortage)	GME starts
			Army				
Anesthesiology	121	84	24	12	121	0.0	16
Cardiology	50	51	10	5	66	15.7	7
Family practice	491	349	85	62	496	5.2	50
General IM	309	295	59	34	387	78.4	55
General surgery	185	139	77	32	248	62.9	24
OB/GYN	170	141	32	19	192	22.0	21
Orthopedic surgery	145	114	62	23	199	54.0	20
Radiology	140	96	52	23	171	31.2	16
Other specialties	1,104	941	225	126	1,292	187.5	135
Overall	2,715	2,210	626	336	3,172	457.0	344
			Navy				
Anesthesiology	138	95	30	14	138	0.0	18
Cardiology	25	10	11	4	25	0.0	4
Family practice	403	283	70	51	404	1.2	43
General IM	135	133	28	13	175	39.5	31
General surgery	139	97	46	14	157	17.7	9
OB/GYN	124	87	24	13	124	0.0	13
Orthopedic surgery	133	83	37	13	133	0.0	11
Radiology	112	75	25	11	112	0.0	14
Other specialties	806	633	171	89	893	86.9	78
Overall	2,015	1,496	442	223	2,160	145.4	221
			Air Force				
Anesthesiology	78	54	16	8	78	0.0	8
Cardiology	31	22	6	3	32	0.5	5
Family practice	439	401	78	61	540	101.2	45
General IM	162	153	32	19	203	40.9	37
General surgery	111	67	32	13	111	0.0	13
OB/GYN	116	99	22	13	134	17.8	12
Orthopedic surgery	91	129	24	9	163	71.8	7
Radiology	124	85	27	12	124	0.0	16
Other specialties	701	722	139	85	946	244.8	74
Overall	1,853	1,733	375	223	2,330	477.0	217

Percentage paygrade distribution

In table A-7, we report the percentage paygrade distribution of the inventory in the steady state. We report this information to demonstrate where the experience profile constraint is binding and the consequences this constraint has on the steady state of the model. The results show that, for some specialties, meeting this constraint is difficult.

Table A-7. Baseline steady-state annual percentage paygrade distribution by specialty

	Army			Navy			Air Force		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Anesthesiology	70	20	10	69	21	10	70	20	10
Cardiology	77	15	8	39	45	15	70	18	11
Family practice	70	17	13	70	17	13	74	14	11
General IM	76	15	9	76	16	8	75	16	9
General surgery	56	31	13	62	29	9	60	28	11
OB/GYN	73	17	10	70	19	11	74	16	10
Orthopedic surgery	57	31	12	63	27	10	80	15	5
Radiology	56	30	14	67	23	10	68	22	10
Other specialties	73	17	10	71	19	10	76	15	9
Overall	70	20	11	69	20	10	74	16	10

For example, the Air Force model requires 91 orthopedic surgeons. The experience profile constraint requires that at least 9.1 of these be O-6s and at least 27.3 be O-5s or O-6s. Given the GME starts and attrition patterns, this means that the Air Force needs 129 orthopedic surgeons who are O-3s or O-4s so that enough will stay in the Air Force long enough to become O-6s. The consequence of the experience profile constraint is that it drives an excess of 71.8 orthopedic surgeons in the steady state—163 compared with the billet requirement of 91.[16]

16. Note that 15 and 5 percent of Air Force orthopedic surgeons are O-5s and O-6s, respectively. Despite having O-6s accounting for 5 percent of all fully trained orthopedic surgeons, the specialty still meets its requirement for having 10 percent of billets filled by O-6s. This is because we based the paygrade distribution on bodies and the experience profile constraint on billets. The reason for the difference is the excess number of orthopedic surgeons required to meet the O-6 requirement.

For comparison, table A-8 shows the percentage paygrade distribution by specialty in FY 2000.[17] Substantial differences exist among the Services. Specifically, the Navy is the most senior, with about 45 percent of fully trained specialists being O-5 or O-6 compared with 41 percent in the Army and 24 percent in the Air Force. These results are not unexpected because the Air Force has historically relied on AFHPSP deferred accessions more heavily than the Army and Navy. Similarly, the Navy is the most senior because of its policy to send most of its USUHS and AFHPSP direct accessions on a GMO tour; this delays the stay/leave decision of Navy physicians compared with their counterparts in the Army and Air Force.[18]

Table A-8. FY 2000 percentage paygrade distribution by specialty

	Army			Navy			Air Force		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Anesthesiology	71	20	8	64	24	12	81	10	9
Cardiology	57	28	15	52	30	19	71	11	18
Family practice	68	15	17	65	20	15	84	11	5
General IM	64	16	20	73	14	13	80	13	7
General surgery	49	28	22	48	30	22	73	13	15
OB/GYN	73	16	11	83	12	5	83	11	6
Orthopedic surgery	55	36	10	69	19	13	75	19	6
Radiology	68	18	15	48	40	12	71	21	8
Other specialties	52	25	23	42	36	22	69	20	11
Overall	59	22	19	55	28	17	76	15	9

17. We computed these percentages from the DMDC data for FY 2000.

18. The Army's and Navy's percentages of O-5s and O-6s appear to easily meet experience profile requirements. But, if a specialty is undermanned, increasing manning through AFHPSP deferred and FAP accessions to meet billets will lower the percentage of O-5s and O-6s. In addition, current O-5 and O-6 manning may also be higher than in the steady state because of downsizing. Downsizing causes the Services to temporarily slow down the number of physicians it puts into the accession pipeline to adjust long-term manning so that it is more in line with billets. During such a transition, manning will be temporarily more senior than in a steady state.

FAP accessions by specialty

Finally, table A-9 shows the FAP constraint we placed on the model and the annual number of FAP accessions in the steady state. This is important because, given the other constraints and parameters of the model, the steady state of the model doesn't use all of the available FAP accessions even though they are the least costly per year of practice of any of the accession sources. As previously discussed, this is largely because of the GME requirements.

Table A-9. Baseline steady state annual FAP accessions by specialty

Specialty	FAP constraint: all Services	FAP accessions		
		Army	Navy	Air Force
Anesthesiology	0	0.0	0.0	0.0
Cardiology	0	0.0	0.0	0.0
Family practice	25	25.0	25.0	25.0
General IM	10	10.0	3.6	5.9
General surgery	0	0.0	0.0	0.0
OB/GYN	8	8.0	0.0	8.0
Orthopedic surgery	0	0.0	0.0	0.0
Radiology	2	0.0	0.0	1.8
Other specialties	15	12.0	10.0	13.4
Overall	60	55.0	38.6	54.1

Model excursions

An important asset of modeling is the ability to change assumptions regarding one or more parameters and/or constraints and compare results. This allows one to (1) test the sensitivity of the model to specific assumptions and (2) evaluate the impact of changes without actually making real-world changes.

For this analysis, we ran 15 excursions of the model. In each excursion, we altered one or two parameters and/or constraints and then determined the most cost-effective way of meeting requirements. We compared these results with the baseline model to see how the parameters and constraints altered the optimal mix of accessions, GME, the experience profile, and the inventory of physicians, as well as the total

cost to the system. The excursions we ran altered the parameters and constraints of the model in one or more of the following ways:[19]

- Changes in the experience profile
- Changes in GME
- Changes in accession programs' constraints
- Changes in special pays.

Experience profile

We ran several excursions to show the importance of the experience profile constraint in determining the steady state's optimal accession mix. As we stated previously, we used a baseline constraint of at least 30 percent duty billets to be filled with an O-5 or O-6 and at least 10 percent to be filled with an O-6.

As the baseline model showed, these constraints were binding for many specialties, resulting in large excesses in some specialties because the model had to bring in many more bodies than billets to get enough physicians to stay in the medical corps long enough to fill the seniority requirement. We relaxed this constraint somewhat in a few of our excursions by cutting the requirement for O-6s to at least 5 percent of duty billets and the requirement for O-5s or O-6s to at least 25 percent of duty billets. We chose 5 percent O-6s based on DOPMA. Also, in one excursion, we removed this constraint entirely.

GME starts

Because the military provides residency training to most of its accessions in-house, we ran two excursions showing how the optimum or steady state changes as we alter the size of the GME program. The

19. In one excursion, we removed the retirement costs because differences in retention patterns between the accession sources cause the annual retirement accrual contribution to vary by accession source. When we remove these costs, the order of the most to least costly accession source is unchanged and substantial cost differences still exist between the different accession sources. The result is that removing retirement costs from the model does not affect the optimal mix of accessions.

current number of GME slots provides a starting point for what the system's GME constraints are, but we don't assume that they are unchangeable. It seems reasonable that the number of GME slots could increase or decease somewhat based on changes in policy, civilian market forces, and physicians' behavior.[20] For these reasons, we study how the optimal mix of accessions changes as we increase or decrease the number of annual GME starts by 20 percent.

This provides us with insight as to the sensitivity of the model and our results to assumptions made regarding the GME constraint. It also demonstrates the consequences of replacing AFHPSP deferred accessions with AFHPSP direct accessions and vice versa.

Accession constraints

The baseline model constrains accessions from the various accession sources based on the constraints the Services face today. Because we looked at the optimal mix of accessions, we wanted to have some latitude to change accessions if it were warranted. Consequently, we ran several excursions in which we altered the constraints on USUHS, AFHPSP, and FAP accessions.

USUHS

Currently, the Services receive an allotment of USUHS accessions that does not vary (or varies very little) from year to year: 51 each year for the Navy and Air Force and 63 for the Army. As we showed in the baseline model, USUHS is a cost-effective accession source (given the other constraints and parameters) in that the model uses all of the USUHS accessions it can. This means that the model could find a more cost-effective solution if the constraint on the number of USUHS accessions were not binding. From the baseline case, however, we can't tell how many more USUHS accessions it would take.

20. Cutting substantial portions of these programs could have a negative impact on the retention behavior of the GME faculty (these training opportunities may provide significant incentives for military physicians to remain with the Services). However, we don't have data to confirm or dispute this hypothesis.

By raising the USUHS constraint by 15 percent, we allow the model to find a more economical solution by using more USUHS accessions.

AFHPSP

The Services face similar constraints on the number of AFHPSP accessions. These constraints stem from limits on the size of the qualified pool of AFHPSP applicants, the long-term feasibility of the program, and the political reality of the number of AFHPSP students the Services can fund. In the baseline, we constrained the number of each Service's AFHPSP accessions to be no less than 200 and no more than 400 each year. The lower bound recognizes that, for a program to work, it can't be turned off one year and started back up the next. The upper bound reflects the supply of AFHPSP applicants and funding for the AFHPSP program.

To test the sensitivity of the model to the AFHPSP accession constraint, we ran two excursions. First, we removed the cap on the number of AFHPSP accessions. This removed the cap on the number of AFHPSP deferred accessions because, by definition, the number of GME starts determines the total number of USUHS and AFHPSP direct accessions.[21] We also ran an excursion in which we constrained the number of AFHPSP accessions to be no more than 300. This excursion allowed us to show the sensitivity of the optimal mix of accessions to the availability of AFHPSP deferred accessions.

FAP

The number of FAP accessions the Services have historically accessed varies substantially across the Services. Furthermore, the potential number of FAP accessions varies by specialty because of each specialty's civilian-military pay disparity. These pay disparities vary widely by specialty [6, 8, 9].

Historically, the Air Force has been the most successful with FAP accessions. We have modeled our baseline FAP constraint for each

21. This excursion will give different results from the baseline only if the number of AFHPSP accessions is constrained in the baseline model. Because this was not the case for any Service, we don't present the results of this excursion. They are identical to the baseline results.

Service on the number of FAP accessions the Air Force accessed between FY 1994 and FY 2001.[22] We recognize that this constraint is higher than what the Army and Navy have historically achieved. However, we feel it is a reasonable benchmark for two reasons.

First, the number (and specialty) of FAP accessions depends on the business practices of the Services. Do they actively go after FAP accessions? The Air Force's experience suggests that perhaps the Army and Navy business practices have not focused on FAP accessions.

Second, the life-cycle-cost model is, by definition, an abstraction of reality. Regardless of the constraints we place on FAP accessions, the model provides insight into how the medical corps would best use them in the context of the model's other constraints. In other words, the level or number of FAP accessions is not as important as whether FAP accessions go up or down as various constraints change.

In several excursions, we altered the FAP constraints, which are shown in table A-10. In one of these excursions, we model how the baseline FAP constraint would change if DoD offered a $100,000 accession bonus to FAP accessions.

Table A-10. FAP constraint: baseline and various excursions

Specialty	Baseline	Army excursion	Air Force excursion	FAP bonus excursion
Anesthesiology				1
Family practice	25	5	34	33
General internal medicine	10		17	13
Emergency medicine	2	5	2	3
General surgery		5		4
OB/GYN	8	5	9	10
Ophthalmology	1		1	1
Urology				1
Pediatrics	10	5		16
Preventive medicine				2
Orthopedic surgery				1
Radiology	2	5	5	3
Psychiatry	2		2	3
Pathology				1
All others	0	0	0	0
Total	60	30	70	92

22. For each specialty, we looked at the maximum in any one year, the average accessions across all years, and the data trend. Accordingly, we modeled the FAP constraint at 60 accessions per year, as table A-10 shows.

Special pays

The cost and retention data we used in the baseline model reflect FY 2002 special pays. However, we are interested in how the steady state of the model will change as special pays are increased.

To model the effect of pay, we used the changes in special pays proposed in our Health Professions' Retention-Accession Incentives Study [2]. First, we recommended increasing entitlement special pays by 20 percent. These pays include additional special pay (ASP), variable special pay (VSP), and board certification pay (BCP). Second, we recommended increasing the caps on discretionary special pays by raising the cap on incentive special pay (ISP) from $36,000 to $45,000 and the cap on the multiyear special pay (MSP) from $14,000 to $20,000. The difference between these two pay proposals is that the entitlement pay increase raises all physicians' wages by the same amount regardless of specialty. In contrast, the discretionary pay increase allows DoD to target pay increases at certain specialties. We modeled both of these pay increases in the excursions.

Excursion 1: lower the experience profile constraint

The experience profile constraint in the baseline model was binding for most specialties. That is, it took as few senior personnel as the model allowed. The purpose of this excursion is to test the sensitivity of the steady state to changes in the experience profile constraint. By lowering the experience profile constraint to at least 25 percent O-5 or O-6 and at least 5 percent O-6 (from at least 30 percent O-5/O-6 and at least 5 percent O-6), we gain insight on what has to occur to get the additional 5 percent O-6s required in the baseline model.

We show the results of this excursion in **table AA-1** (for Army, Navy, and Air Force) at the end of this appendix.[23] Although each Service's model reacts differently to the lower experience profile constraint (because of differences in GME, billets, and career path), the optimal

23. Beginning on page A-59, **tables AA-1** through **AA-15** present the results of excursions 1 through 15, respectively. Each table is three pages long, distinguished in the caption as "Army," "Navy," or "Air Force."

number of USUHS accessions in the steady state falls for each Service. As shown in table A-11, the number of USUHS accessions fell by 14, 38, and 59 percent in the Air Force, Army, and Navy, respectively. Intuitively, this implies that USUHS accessions are the most cost-effective way to fill senior billets because of higher retention despite higher training costs.

Table A-11. Change in USUHS accessions from lowering the experience profile constraint

Service	USUHS constraint	Baseline	Excursion	Percent change
Army	63	63	40	-38
Navy	51	51	21	-59
Air Force	51	51	44	-14

We are not recommending for or against USUHS or for or against a certain experience profile in the medical corps. We are simply pointing out the consequences of having a certain experience profile. It shows that, if DoD requires a certain percentage of the medical corps to be O-6s such as the 10 percent in the baseline model, USUHS is the most cost-effective of the four major physician accession sources to access these physicians.

Similarly, table A-12 shows that for each Service, the number of excess physicians in the steady state falls substantially when we lower the experience profile constraint. For example, the number of excess fully trained duty physician specialists in the Air Force fell from 477 in the baseline model to 21 when we lowered the experience profile constraint.[24] This extremely large change demonstrates the importance

24. In practice, having an excess of 477 physicians is not possible in the long term because the political and economic constraints would force the size of the medical corps to be more in line with billets. However, the model indicates that to meet all of the constraints—including the experience profile constraint—the Air Force would need to bring in 477 physicians for which it has no billets. Although the Air Force can limit its physicians to the number of billets, it won't meet its experience profile constraint. This result holds for the Army and Navy as well.

of the experience profile constraint on how the Services should access physicians.

Table A-12. Change in the number of excess fully trained physicians

Service	Billets for fully trained physicians	Excess of fully trained physicians	
		Baseline	Excursion
Army	2,715	457	175
Navy	2,015	145	36
Air Force	1,853	477	21

There are two mechanisms that reduce the number of excess physicians. First, because GME is fixed, the number of AFHPSP direct accessions increases to offset the decrease in the number of USUHS accessions. Second, the number of FAP accessions falls from 54 to 46, and the number of AFHPSP deferred accessions falls substantially from 117 to 46. As we demonstrate more completely in later excursions, the size of the GME program plays an important role here.

A large in-house GME program requires a large number of USUHS or AFHPSP direct accessions (i.e., accessions with the highest retention). Consequently, the size of the GME program affects the ability of the Services to achieve a certain experience profile. For example, the Air Force only has 1 orthopedic surgery GME start for every 13 orthopedic surgery billets compared with 1 for every 7.3 billets in the Army. This means that the Army is able to fill a higher percentage of its orthopedic billets with either USUHS or AFHPSP direct accessions than the Air Force can. Hence, the Air Force must rely much more heavily on FAP and AFHPSP deferred accessions to make up the difference. Because these accession sources have low retention, the Services need more of them to get a few physicians to stay in the medical corps long enough to fill senior billets.

We also observe that the Navy's excesses fall from 145 to 36. This decrease is not as pronounced as the Air Force's because of differences in GME programs and the GMO tour, which extends Navy

physicians' career paths relative to Army and Air Force physicians' career paths.[25] Similarly, the Army's excesses fall from 457 to 175.

In each Service, the model shows that requiring a senior force is costly. Again, we are not arguing for or against a senior force; however, if it is something the Services deem important, the model shows that it is costly. Specifically, by lowering the experience profile constraint, we estimate that costs would fall by 8, 9, and 16 percent for the Navy, Army, and Air Force, respectively.[26]

Excursion 2: raise the experience profile constraint

In this excursion, we test the sensitivity of the accession mix to an increase in the experience profile constraint. Specifically, we raise the constraint to at least 35 percent O-5/O-6 and at least 12 percent O-6. The baseline constraint is at least 30 percent O-5/O-6 and 10 percent O-6, so this excursion shows us what must occur to increase the percentage of O-6s by 2 percentage points and the percentage of O-5s/O-6s by 5 percentage points.[27]

We show the results of excursion 2 in **table AA-2** (for Army, Navy, and Air Force). Recall that in excursion 1, the model reacted by

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25. The differences in the career path of Navy physicians also explains why the number of Navy USUHS accessions falls (59 percent) more dramatically than the number of Air Force (14 percent) or Army (38 percent) accessions. This occurs because the Navy career path is longer than the career paths in the Army and Air Force. This means that AFHPSP direct accessions have better retention—and fill more O-6 billets—in the Navy than the other Services.

26. We modeled the average cost, not the marginal cost of each USUHS accession. If the USUHS class size decreased by a small number, it's unlikely that USUHS's budget would decrease very much. Similarly, if the class size increased by a small number of students, we wouldn't expect USUHS's budget to increase very much. This means that average cost overestimates the cost of additional USUHS accessions and overestimates the cost savings of reducing USUHS accessions.

27. This increase in the experience profile constraint is arbitrary—we didn't base it on any Health Affairs policy. We used it simply to illustrate the constraint's impact on the optimum.

decreasing the number of USUHS accessions; consequently, the model will want more USUHS accessions in this excursion because we are raising rather than lowering the experience profile constraint. However, the number of USUHS accessions can't increase because the constraint is already binding in the baseline.

As a result, the model turns to the next best accession source for getting senior personnel—AFHPSP direct accessions. Unfortunately, the number of AFHPSP direct accessions can't increase because of the GME constraint. Therefore, the model must turn to FAP and AFHPSP deferred accessions to fill this higher experience requirement.

As table A-13 shows, FAP accessions increase only marginally. Because the FAP accession constraint is specialty specific, the number of FAP accessions is still below the FAP constraint of 60 for each Service. Hence, if the GME program is large enough relative to billets, FAP accessions may not be needed for some specialties. For example, the Navy can meet all of its requirements for general internists without using all 10 potential FAP accessions. It can do this because of its 31 general internal medicine GME billets—meaning AFHPSP direct and USUHS accessions—meet the requirement more cost effectively than FAP accessions.

Table A-13. Number of FAP accessions (excursion 2)

Service	Baseline	Excursion
Army	55	56
Navy	39	41
Air Force	54	58

This leaves AFHPSP deferred accessions to meet the requirements for senior personnel. Historically, AFHPSP deferred accessions attrition has been substantially higher than USUHS and AFHPSP direct accession [1, 2]. This means that, on average, the Services need to bring in many more AFHPSP deferred accessions than USUHS or AFHPSP direct accessions to get one to stay long enough to fill a senior billet.

Because FAP accessions can increase only marginally in the Army model, the Army must turn to AFHPSP deferred accessions. These

accessions do, in fact, increase substantially from 59 to 93. The model would have taken additional AFHPSP deferred accessions, but it was constrained by the 400 total AFHPSP accessions. The result is a substantial increase in the shortfall of senior physicians—33.7 O-5s or O-6s (4.1 percent) and 15.4 O-6s (5.7 percent) compared with a shortfall of 1.8 O-5s or O-6s and 0.8 O-6 in the baseline.

The Navy and Air Force were able to increase their AFHPSP deferred accessions more than the Army. The number of AFHPSP deferred accessions increased from 106 to 168 in the Navy and from 117 to 197 in the Air Force. But, just as in the Army model, the AFHPSP accessions in the excursion are constrained by the 400 total AFHPSP accessions. The result is that the Navy wasn't able to fill 11 O-6 billets (5.3 percent) and the Air Force wasn't able to fill 6 O-6 billets (3.0 percent), whereas in the baseline model the Navy and Air Force filled all of their requirements.

This change in accession mix and increase in overall accessions significantly increased the number of excess physicians in each Service. Table A-14 shows these excesses in relation to the baseline case. Note that the Air Force's excesses increase the most (500) compared with the Army (267) or Navy (383). This occurs because the Air Force is more reliant on AFHPSP deferred accessions than the other Services. Overall, the increase in the experience profile requirement increased costs substantially—6, 11, and 16 percent in the Army, Navy, and Air Force, respectively.

Table A-14. Number of excess physicians (excursion 2)

Service	Baseline	Excursion
Army	457	724
Navy	145	528
Air Force	477	977

We realize that in actual execution, the Services cannot have excess physicians without making reductions in other communities. What the excesses demonstrate is that the Services could not meet this higher experience profile requirement if bodies did not exceed billets by a substantial margin given their other constraints. It may be

that they could meet the requirement without having excesses by relaxing the USUHS constraint or changing the GME constraint, but those are different excursions. However, it is clear that a higher experience profile constraint is very costly.

Excursion 3: raise the USUHS constraint

Given the importance of USUHS in meeting the experience profile constraint, we examined what would happen if we increased the size of each USUHS cohort. Specifically, we raised the USUHS constraint by 15 percent from 51 to 59 each year for the Navy and Air Force and from 63 to 72 for the Army. We didn't want to set a higher constraint because there are limitations on the number of medical students USUHS can accommodate given its facilities and the availability of clinical rotations. In addition to these limitations, there are limits on how much USUHS could expand its student body without bringing in a lower quality candidate.[28]

We show the results of excursion 3 in **table AA-3** (for Army, Navy, and Air Force). The Army and the Air Force still take as many USUHS accessions as the model allows; therefore, if it were possible, it would take more than the constraint. Again, this is an indication of how relatively cost-effective USUHS accessions are for filling senior billets compared with the other accession sources. The Navy model indicates that the Navy should bring in 57 USUHS accessions each year (compared with 51 in the baseline), but 2 less than the constraint. It is likely that if we were able to model the marginal (rather than the average) cost of adding USUHS accessions, the model would take all of the USUHS accessions allowed.

Increasing USUHS's output lowers the Services' reliance on AFHPSP deferred to meet the experience profile constraint. Specifically, this modest change in the size of the USUHS cohort means that in the

28. The Services and USUHS indicate that there has been a drop in the number of AFHPSP and USUHS applications. This trend would also further inhibit the expansion of USUHS accessions. Additionally, a drop in medical school applications nationwide may dilute the quality of applicants available to both AFHPSP and USUHS.

steady state, the Air Force can decrease AFHPSP deferred accessions from 117 to 82. The relatively small change in the USUHS constraint and the resulting new accession mix causes the excess in the steady state to fall from 477 to 341. Similarly, in the Navy, AFHPSP deferred accessions fall from 106 to 94 and excesses fall from 145 to 86. For the Army, the AFHPSP deferred accessions fall (59 to 40) but to a lesser degree that in the other Services. At the same time, excesses fall from 457 to 349.

Because this is a cost minimization model, the model will take more USUHS accessions only if it is more cost-effective than the baseline solution. This is exactly what we see. Costs fall by 0.7 percent in the Navy, 1.6 percent in the Army, and 3.2 percent in the Air Force. Note that these cost reductions are a lower bound because we were not able to model the marginal cost of increasing USUHS accessions.[29]

Excursion 4: increase GME starts

Career path is a key driver in determining how long physicians typically remain in the medical corps. By increasing the size of the GME program, we increase the proportion of accessions that have a relatively long military career path. This results in better retention overall. In general, increasing the size of the GME program increases the number of AFHPSP direct accessions because in-house GME positions can only be filled with USUHS or AFHPSP direct accessions. Because USUHS accessions are already at their maximum, the model requires AFHPSP direct accessions to fill every new GME position. **Table AA-4** (Army, Navy, and Air Force) shows the results. In excursion 4, we increase the number of GME starts by 20 percent.

This change increases the number of GME starts *that must be filled*, not the maximum number of starts than can occur. For each Service, table A-15 shows that the number of AFHPSP direct accessions increases by about 26 percent for each of the Services.

29. It is unlikely that USUHS education costs would increase much if USUHS's student body expanded by a few percentage points. Hence, modeling USUHS costs so that they increase at the average cost for each new accession overestimates the cost of expanding USUHS.

For every Service, there is a substantial decrease in the number of AFHPSP deferred accessions because many of the AFHPSP accessions that would have been deferred to do civilian residency programs can now be accommodated in the larger GME program. For example, steady-state AFHPSP deferred accessions fall from 59 to 13 in the Army model.

Table A-15. Change in AFHPSP direct and deferred accessions from increasing GME starts by 20 percent

Service	Baseline	Excursion	Percent change
AFHPSP direct			
Army	255	318	25
Navy	170	216	27
Air Force	149	188	26
AFHPSP deferred			
Army	59	13	-78
Navy	106	73	-31
Air Force	117	41	-65

When constraints are relaxed in a cost minimization model, costs should never increase. Constraints, by definition, prevent the model from reaching a more cost-effective solution. The GME constraint, however, is not a constraint in the sense that it is a minimum or maximum number that the model allows. Rather, it is an exact target that must be filled regardless. So, increasing the target by 20 percent may not result in a more cost-effective solution.

What did we find regarding cost? Whether a larger GME program is more cost-effective depends on the specialty and Service. For example, overall costs increased by 5 percent in the Navy and 6 percent in the Army while decreasing by 3 percent in the Air Force. Whether costs increase or decrease depends on the size of the GME program relative to the billets it must fill by specialty.

For example, the number of GME starts for Army anesthesiology increases from 16 to 19.2. The model requires that these positions be filled whether the specialty needs them or not. In this case, raising the GME starts creates an excess of 9.8 anesthesiologists—an excess that didn't exist in the baseline case. So raising the number of GME starts was not particularly helpful for this specialty.

In contrast, increasing the number of GME starts was helpful for Navy pediatrics. In the baseline case, the 18 GME starts were insufficient to provide enough senior pediatricians to meet the experience profile requirement. Consequently, the Navy model had to bring in a lot of FAP and AFHPSP deferred accessions so that a few of them would stay long enough to supply the needed senior personnel. In the steady state, this resulted in 225 pediatricians for 174 billets, or an excess of 51. Increasing the number of GME starts by 20 percent, however, eliminated the 51 excess pediatricians because pediatrics was less reliant on FAP and AFHPSP deferred accessions.

These examples demonstrate two things. First, AFHPSP direct accessions can be an effective way to meet the experience profile constraint. Whether the Services train AFHPSP accessions in-house or defer them can make a big difference. Second, excesses or shortages in some specialty do not necessarily indicate a retention problem [9]. It may simply be that the services are not operating with the optimal number of GME starts for that specialty. For example, in the baseline model, the Army is short 12.2 neurosurgeons. The problem is not a retention problem. The problem is that the Army has only one GME start to fill its 21 billets. Increasing GME starts by 20 percent from 1 to 1.2 doesn't eliminate this shortage. The Army would likely need to increase GME starts to between 2 and 2.5 to fill its billets.

Excursion 5: increase GME starts and lower the experience profile constraint

Table AA-5 (Army, Navy, and Air Force) shows detailed results for this excursion, which is really a combination of excursions 1 and 4.[30] As table A-16 shows, excursion 1 (lowering the experience profile constraint) reduces the need for USUHS accessions while increasing the need for AFHPSP direct accessions to fill GME positions. Similarly, excursion 4 (increasing GME starts) increases the number of

30. Excursion 5 assumes sufficient senior clinicians to administer the larger GME program despite lowering the experience profile requirement, which doesn't mean we won't have senior people—just that a certain number isn't required. A larger GME will provide some base of senior clinicians because it increases the number of AFHPSP direct accessions, which have much better retention than AFHPSP deferred accessions.

AFHPSP direct accessions in order to fill the increased number of GME starts.

Table A-16. Number of USUHS and AFHPSP direct accessions by excursion

	USUHS accessions into pipeline				AFHPSP direct accessions at YOP-1			
		Excursions				Excursions		
Service	Baseline	1	4	5	Baseline	1	4	5
Army	63	40	63	43	255	276	318	338
Navy	51	21	47	16	170	195	216	242
Air Force	51	44	51	35	149	155	188	202

When we simultaneously lower the experience profile constraint and increase the number of GME starts, we see just how important the career path is in meeting requirements. To see why this is the case, consider the Air Force as an example. When we lower the experience profile constraint, the number of USUHS accessions falls from 51 to 44. When we increase the number of GME starts in addition to lowering the experience profile constraint, the number of USUHS accessions in the steady state falls further to 35. This occurs even though increasing the number of GME starts puts pressure on the model to increase USUHS and/or AFHPSP direct accessions. Not only does the model fill all of the new GME starts with AFHPSP direct accessions, but it fills some of the old GME starts with AFHPSP direct accessions that were previously filled with USUHS accessions. The interesting question is, why does the model substitute USUHS accessions for AFHPSP direct accessions?

It does this because the career path of AFHPSP direct versus AFHPSP deferred accessions results is such different retention patterns. If the GME program is large enough, the problem of getting enough senior physicians goes away. We see a similar result in the Navy, although those results are less striking than in the Air Force because the GMO tour of Navy physicians extends their career path relative to their Air Force peers. In the Army model, the vast majority of new GME starts are filled with AFHPSP direct accessions, although not excessively as in the Navy and Air Force models.

What does this excursion mean in terms of cost? Again, because GME is essentially a target rather than a constraint in the traditional sense, costs may increase or decrease in this excursion relative to the baseline. Table A-17 compares costs in the baseline and excursions 1, 4, and 5. Recall that, in excursion 4, where we increased GME starts with no other changes, the result was a cost increase in the Army and Navy and a cost decrease in the Air Force. Excursion 4 assumes that the experience profile constraint was the same as in the baseline. This excursion shows whether the cost changes resulting from increasing the size of the GME program depend on the experience profile constraint.

Table A-17. Annual costs for the baseline and excursions 1, 4, and 5

Costs by Service	Baseline	Excursion		
		1	4	5
Army				
Costs ($M)	811	742	863	815
Percentage of baseline	100.0	91.5	106.4	100.4
Navy				
Costs ($M)	563	520	590	560
Percentage of baseline	100.0	92.4	104.9	99.5
Air Force				
Costs ($M)	566	474	548	493
Percentage of baseline	100.0	83.7	96.7	87.0

To see this, consider excursion 1 (lowering the experience profile constraint) as the base or reference point. Army costs in this excursion are $742 million. When we increase GME starts, costs increase to $815 million. Similarly, Navy costs rise from $520 to $560 million, and Air Force costs increase from $474 to $493 million. Hence, the directional cost impact for the Army and Navy are the same as in excursion 4, where we increased GME without changing the experience profile constraint. Directional cost impact is different for the Air Force, however. If we lower the seniority requirement, GME is not as cost-effective because the model doesn't need to have a lot of its physicians remain in the military for an extended period. Again, career path plays an important role in determining the most cost-effective outcome for a given set of constraints.

Excursion 6: decrease GME starts

Table AA-6 (Army, Navy, and Air Force) shows the results for excursion 6, in which we decrease GME starts by 20 percent. This excursion further explores the sensitivity of the model to changes in GME starts.

Table A-18 shows that the number of AFHPSP accessions increases substantially for each Service. The difference is that the number of AFHPSP direct accessions decreases while the number of AFHPSP deferred accessions increases substantially. This occurs because we dramatically reduce the in-house training capacity, thus increasing the need to defer AFHPSP accessions to a civilian residency program. For example, in the Army model, once these students complete medical school, more than twice as many (138 versus 59) go to a civilian (deferred) residency as in the baseline model. We find the same effect with the Navy and Air Force.

Table A-18. Change in AFHPSP direct and deferred accessions from decreasing GME starts by 20 percent (excursion 6)

AFHPSP accessions	Army	Navy	Air Force
Into accession pipeline			
Baseline	359	327	309
Excursion	382	400	395
Direct accessions at YOP-1			
Baseline	255	170	149
Excursion	192	127	110
Deferred accessions at YOP-1			
Baseline	59	106	117
Excursion	138	209	230

Another issue is what happens in terms of excesses and shortages. We get a mixed result that varies by Service and specialty. For example, downsizing GME helps alleviate excesses in cardiology, OB/GYN, orthopedic surgery, and radiology in the Army. This indicates that these GME programs were too large.

However, decreasing the size of the Army's preventive medicine GME program results in a large excess of preventive medicine physicians because it now must bring in a substantial number of AFHPSP

deferred accessions to try to fill experience profile requirements. We observe similar problems with Navy orthopedic surgery and with Air Force family practice and orthopedic surgery.

In total, Navy excesses increase from 145 to 397, and Air Force excesses increase from 477 to 788. At the same time, Army excesses fall only marginally from 457 to 448. These disparate results again demonstrate the importance of career path (in terms of GME) in meeting experience profile requirements.

As for costs, they fall in the Army by 4 percent while rising in the Navy by 1 percent and in the Air Force by 9 percent. Costs fall in the Army because, for several specialties, the GME program was too large relative to billets. This is reflected in the slight decrease in the number of excess physicians. In the Navy and Air Force, however, the excesses increased because the model was forced to rely more on AFHPSP deferred accessions to meet experience requirements. A heavy reliance on AFHPSP deferred accessions to meet experience requirements suggests that a GME program is too small.

Excursion 7: decrease GME starts and lower the experience profile constraint

The impact of simultaneously decreasing GME starts by 20 percent (excursion 6) and lowering the experience profile constraint (excursion 1) is not obvious because the impact on accessions usually works in the opposite direction. We show our results for excursion 7 in **table AA-7 (**Army, Navy, and Air Force).

As table A-19 shows, lowering the experience profile constraint (excursion 1) reduces the need for USUHS accessions because it reduces the need for senior personnel. Similarly, lowering the GME constraint (excursion 6) reduces the combined need for USUHS and AFHPSP direct accessions by definition, but it does not proportionally reduce the need for USUHS and AFHPSP direct accessions.

In excursion 6, the reduction in GME starts came completely from AFHPSP direct accessions. There was no reduction in the number of USUHS accessions because it was difficult to meet the experience

profile constraint even before we downsized GME. Thus, it should be even harder to meet the experience profile when GME is downsized because that means more reliance on AFHPSP deferred and FAP accessions. If, however, the Services can keep those with the best retention (USUHS), they are more able to meet experience profile constraints than if they decrease USUHS and AFHPSP direct proportionally. This means more demand for USUHS accessions.

Table A-19. Number of USUHS accessions by excursion

		Excursion		
Service	Baseline	1	6	7
Army	63	40	63	49
Navy	51	21	51	27
Air Force	51	44	51	51

As table A-19 shows, this is precisely what occurs. For example, in excursion 1, where we lowered the experience profile constraint, the optimal number of USUHS accessions is 21 for the Navy. When we add to this a smaller GME program (excursion 7), USUHS accessions increase to 27. As in the previous excursions, this demonstrates how changing the requirements or constraints significantly changes the optimal mix of accessions.

Decreasing GME lowers costs when the experience profile constraint is lowered (see table A-20). For example, Air Force costs in excursion 1 (lower experience profile constraint) are $474 million. When we add to this a decrease in the GME program, costs fall to $466 million. Similar decreases occur in the Army and Navy. This is in direct contrast to GME increasing costs (Navy and Air Force) when the experience profile remained at the baseline level (excursion 6). This further demonstrates the importance of the experience profile constraint in terms of whether other changes in the model (such as GME changes) will be cost-effective.

Table A-20. Annual costs for the baseline and excursions 1, 6, and 7

Costs by Service	Baseline	Excursion 1	Excursion 6	Excursion 7
Army				
Costs ($M)	811	742	778	686
Percentage of baseline	100.0	91.5	95.9	84.5
Navy				
Costs ($M)	563	520	570	488
Percentage of baseline	100.0	92.4	101.3	86.6
Air Force				
Costs ($M)	566	474	615	466
Percentage of baseline	100.0	83.7	108.5	82.3

Excursion 8: set USUHS accessions at current levels and remove the experience profile constraint

We have demonstrated how the experience profile and GME constraints are important determinants of the optimal mix of accessions. If the experience requirement is high, the Services must bring in a large excess of physicians—AFHPSP deferred and FAP accessions—to fill the seniority requirement. Similarly, if the GME constraint is low, the model must bring in large numbers of AFHPSP deferred and FAP accessions to fill the seniority requirement. All of these excursions showed the importance of USUHS and, to a lesser degree, AFHPSP direct accessions (via GME) in meeting seniority requirements.

Again, we realize that persistent excesses are not feasible in the long run without reductions in other communities. To this end, we developed an excursion that eliminates most of the excesses while maintaining some seniority in the medical corps. Specifically, we eliminated the experience profile constraint or the requirement for senior personnel. This means that the only reason the Services would bring in AFHPSP direct accessions would be to fill GME starts and it would bring in USUHS accessions only to fill GME starts that couldn't all be filled by AFHPSP direct accessions. Thus, the existence of the GME program provides the force with some seniority.

In addition, because USUHS is the most cost-effective accession source for filling senior billets, we maintained USUHS at its current

cohort size by requiring the model to take 51 (Navy and Air Force) and 63 (Army) USUHS accessions each year. Doing this provides a base of senior personnel, but it doesn't provide as many senior personnel as the excursions in which we make seniority a requirement. Essentially, it provides a minimum base of senior personnel through USUHS and GME so that we can see just how costly the additional senior personnel in the baseline model are. We show the results for this excursion in **table AA-8** (Army, Navy, and Air Force) at the end of this appendix.

As table A-21 shows, when we drop the experience profile constraint (while maintaining USUHS), the number of O-6s falls by 9, 17, and 18 percent for the Army, Navy, and Air Force, respectively. However, the reduced number of O-6s still fills 9 to 11 percent of billets, depending on the Service. These percentages are down only slightly from the baseline case in which O-6s filled 11 to 12 percent of billets.

Table A-21. Percentage of O-6s relative to billets and bodies (excursion 8)

	Number of O-6s		O-6s as a percent of billets		O-6s as a percent of bodies	
Service	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Army	336	307	12.4	11.3	10.6	10.7
Navy	223	185	11.1	9.2	10.3	9.0
Air Force	223	183	12.0	9.9	9.6	9.8

We have repeatedly discussed how important the experience profile constraint is in determining the optimal mix of accessions. However, data in table A-21 suggest that the experience constraint is easily meet with 11 to 12 percent O-6s compared with the requirement of 10 percent O-6s. So what's going on here?

Consider the Army as an example. In the baseline, there are enough O-6s in the Army to fill 12.4 percent of billets overall. However, the requirement for O-6s is by specialty, not overall. Thus, because there are 491 billets for family practitioners, there is a requirement for 49 family practitioners who are O-6s. In the baseline, there are actually 62 O-6 family practitioners, or 13 more than the model requires.

These 13 O-6s are not used to meet the experience requirements in other specialties.[31]

Specialties that have difficulty meeting experience requirements through USUHS and AFHPSP direct accessions must bring in AFHPSP deferred and FAP accessions to fill the requirement. But, this creates large excesses because more accessions than are needed are brought in. We see this same pattern of filling billets with AFHPSP deferred and FAP in many specialties in each Service.[32]

What does all this mean? For the Air Force to go from 9.9 percent of overall billets filled by O-6s to 12 percent in the baseline model, it costs $91 million (19 percent) and requires another 105 accessions each year (see table A-22). This increases the excess from 5 to 477 physicians to meet the additional requirements for O-5s and O-6s. Costs increase in the Army and Navy as well; however, the percentage cost increases aren't as large (7.1 percent in the Army and 3.5 percent

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31. All of our tables with the excursion results (**AA-1** though **AA-15**) show the percentage paygrade distribution in the baseline model and FY 2000 as benchmarks. For the Army and the Navy, the actual FY 2000 inventory is quite senior (19 percent O-6 in the Army and 17 percent in the Navy), but these figures don't show that bodies may be below billets in some specialties. For example, there were 426 general surgeons in the MHS in FY 2000 compared with 514 billets. Consequently, the percentage of O-6s in FY 2000 is high relative to the baseline model and the excursions because inventory is below requirements. If the Services increased the number of AFHPSP deferred and FAP accessions to get up to requirements, the percentages would be lower. In addition, downsizing of the medical corps causes the Services to temporarily reduce the number of accessions so that future manning will be more in line with long-term billets. During such a transition, the medical corps will be more senior than in the steady state.

32. In the Army, specialties include cardiology, emergency medicine, gastroenterology, general internal medicine, hematology/oncology, OB/GYN, and pediatrics. In the Navy, these include general surgery, ophthalmology, pediatrics, and psychiatry. Finally, Air Force specialties include otolaryngology, family practice, general internal medicine, neurosurgery, OB/GYN, orthopedic surgery, pathology, pediatrics, preventive medicine, and urology.

in the Navy) because the Army and Navy aren't as dependent as the Air Force on AFHPSP deferred accessions.

Table A-22. Additional cost of increasing the experience profile above what USUHS and in-house GME provide (excursion 8)

Service	Costs ($M)			Percent difference
	Excursion 8	Baseline	Difference	
Army	757	811	54	7.1
Navy	544	563	19	3.5
Air Force	475	566	91	19.2

Excursion 9: alternate FAP constraint

Discussions with and feedback from the Service representatives suggest that they feel the baseline FAP constraint may not be a completely accurate reflection of the potential number of FAP accessions they can get each year. Accordingly, we ran a ninth excursion in which we altered the FAP constraint to reflect the Services' perception of the constraint. **Table AA-9** (Army and Air Force) shows the results of this excursion.[33]

Table A-23 shows the baseline and alternate FAP constraints for the Army and Air Force. Note that these alternative FAP constraints do not have a universal effect. The constraint is tighter in some specialties and looser in others. For example, the Air Force constraint for family practitioners increases from 25 to 34 accessions, and the general internist constraint increases from 10 to 17 accessions. At the same time, potential pediatric accessions fall from 10 to 0. Consequently, we cannot say whether costs should increase or decrease. Although one might expect Army costs to *rise* because the overall FAP constraint (30) is less than in the baseline (60), one might expect costs in the Air Force to *fall* because its overall FAP constraint (70) is larger than in the baseline (60). This is, in fact, precisely what we

33. The Navy did not request that we run an alternate FAP constraint, so excursion 9 results are for the Army and the Air Force only.

observe. Army costs are 1 percent higher in the baseline; Air Force costs are 1 percent lower.

Table A-23. Baseline and alternative Army and Air Force FAP constraints

Specialty	Baseline	Army excursion	Air Force excursion
Family practice	25	5	34
General internal medicine	10		17
Emergency medicine	2	5	2
General surgery		5	
OB/GYN	8	5	9
Ophthalmology	1		1
Pediatrics	10	5	
Radiology	2	5	5
Psychiatry	2		2
All others	0	0	0
Total	60	30	70

Cost differences aside, we are interested in how the change in the FAP constraint will affect AFHPSP accessions. It will have no impact on USUHS and AFHPSP direct accessions because the FAP constraint does not affect in-house GME. **Table AA-9** shows that, in either the baseline or the excursion, the Air Force brings in 54 FAP accessions, but with a different specialty mix—more family practitioners and no pediatricians. Because of this adjustment in the specialties of the FAP accessions, the Air Force can bring in seven fewer AFHPSP deferred accessions, which is the source of the 1-percent cost savings.

As table A-23 shows, the distribution of potential Army FAP accessions is very different from that in the baseline model. Specifically, the Army's FAP constraint is for five potential accessions in each of the following specialties: emergency medicine, family practice, general surgery, OB/GYN, pediatrics, and radiology. Such an even constraint across specialties may be an indication that FAP accessions are somewhat limited by business practices rather than being limited by what the market can bear. That said, the change in the FAP constraint causes the number of AFHPSP deferred accessions to more than offset the decrease in the number of FAP accessions causing total

accessions to rise from 477 to 483. This change accounts for the 1-percent cost increase.

Excursion 10: remove AFHPSP constraint and eliminate FAP

Because the number of FAP accessions is small and highly variable, some Service representatives feel that the Services should not rely on it heavily to meet requirements. Excursion 10 addresses this issue by looking at what the optimal mix of accessions would be if the Services didn't rely on FAP accessions at all. What we are most interested in is just how much costs rise as a result of eliminating FAP accessions.

To allow the Services to meet requirements in light of no FAP accessions, we removed the AFHPSP constraint so that the Services could offset FAP accessions with AFHPSP deferred accessions. We ran this excursion for the Army and Navy, but not for the Air Force because FAP has been a reliable accession source for it. **Table AA-10** (Army and Navy) shows the results of excursion 10.

As table A-24 shows, eliminating FAP accessions causes costs to rise from $811 to $838 million in the Army and from $563 to $578 million in the Navy. These increases represent about a 3-percent change in either Service. Hence, while FAP may not allow the Services to bring in large numbers of accessions, they do allow the Services to fill requirements more cost-effectively than without them.

Table A-24. Number of AFHPSP deferred and FAP accessions (excursion 10)

	Army		Navy	
Accession variable	Baseline	Excursion	Baseline	Excursion
Total accessions into accession pipeline	477	509	417	429
AFHPSP accessions into accession pipeline	359	446	327	378
AFHPSP deferred accessions at YOP-1	59	133	106	150
FAP accessions into accession pipeline	55	0	39	0
Costs ($M)	811	838	563	578

Other than costs, eliminating FAP accessions dramatically increases AFHPSP accessions in both the Army and Navy, as table A-24 shows. Specifically, AFHPSP deferred accessions increase from 59 to 133 in the Army and from 106 to 150 in the Navy. These increases more than

offset the number of FAP accessions, resulting in more total accessions and higher cost.

The reason AFHPSP accessions don't replace FAP accessions on a one-for-one basis is that the AFHPSP accession pipeline is longer than the FAP accession pipeline—meaning more attrition from the AFHPSP pipeline than from the FAP pipeline before a physician is a fully trained specialist. Also, historical retention patterns of AFHPSP deferred and FAP accessions indicate that, for some specialties, retention of FAP accessions is better than that of AFHPSP deferred accessions.

Excursion 11: lower the AFHPSP constraint

This excursion explored what happens if the number of AFHPSP accessions becomes more limited. This excursion is not about cost but about feasibility and what requirements the Services can't meet if the AFHPSP pipeline becomes much more limited. Specifically, we lowered the AFHPSP constraint from 400 to 300. The results of excursion 11 are shown in **table AA-11** (Army, Navy, and Air Force). We made no changes in the other constraints and assumptions. Other than lowering AFHPSP constraint, the assumptions are the same as in the baseline.

Lowering the AFHPSP constraint is really a change in the possible number of AFHPSP deferred accessions because the number of GME starts and USUHS accessions determines the number of AFHPSP direct accessions. As table A-25 shows, the Services cannot meet all of the experience profile requirements that the model requires with a lower AFHPSP constraint. In the Navy, for instance, capping AFHPSP accessions at 300 creates a shortfall of 7.4 O-6s and 6.3 O-5s/O-6s. For the Army, the shortfall is 7.7 O-6s (compared with 0.8 in the baseline) and 44.6 O-5s/O-6s (compared with 1.8 in the baseline). The reason the Army has more difficulty meeting its experience requirements than the Navy or Air Force does is that the Army has about 700 more billets but the same limits on the number of annual accessions (with the exception of 12 more USUHS accessions).

Table A-25. Requirements for and shortages of senior personnel (excursion 11)

	Requirements and shortages: O-5s or O-6s			Requirements and shortages: O-6s		
Service	Requirement	Baseline	Excursion	Requirement	Baseline	Excursion
Army	814.5	1.8	44.6	271.5	0.8	7.7
Navy	604.5	0	6.3	201.5	0	7.4
Air Force	555.9	0	0	185.3	0	0.3

Excursion 12: give a FAP accession bonus

Our remaining excursions address whether it is *more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?* Excursion 12 considers whether increasing FAP subsidization is more cost-effective than the status quo. The remaining three excursions take accession constraints as given and determine whether paying the existing inventory is more cost-effective.

In excursion 12, we modeled how the potential number of FAP accessions would change if the Services gave FAP accessions a $100,000 accession bonus. The difficulty with doing this is that there is no history of changes in FAP bonuses to show us how responsive FAP accessions would be to a $100,000 bonus. As an alternative, there are elasticity estimates of the responsiveness of accessions to changes in the military-civilian pay ratio for enlisted personnel [4, 5]. These studies estimate the elasticity of accessions to the military-civilian pay ratio at about 1.8.[34]

Using this elasticity, we estimated that a $100,000 FAP bonus would increase FAP accessions from 60 to 92, as table A-26 shows.[35] Even with a $100,000 FAP accession bonus, we estimate that the Services will not be able to use FAP to access physicians in some specialties (e.g., cardiology, hematology/oncology, neurosurgery, plastic surgery,

34. This means that a 1-percent increase in the military-civilian pay ratio will increase accessions by 1.8 percent.

35. We didn't model active duty obligation above what FAP accessions are currently under. Modeling additional obligation would improve retention but also lower the potential number of FAP accessions.

otolaryngology, and gastroenterology) because of extremely large civilian-military pay gaps [2, 6, 8].

Table A-26. FAP constraint: baseline and various excursions

Specialty	Baseline	FAP bonus excursion
Anesthesiology		1
Family practice	25	33
General internal medicine	10	13
Emergency medicine	2	3
General surgery		4
OB/GYN	8	10
Ophthalmology	1	1
Urology		1
Pediatrics	10	16
Preventive medicine		2
Orthopedic surgery		1
Radiology	2	3
Psychiatry	2	3
Pathology		1
All others	0	0
Total	60	92

It is probable that the medical corps and enlisted community have different accession responsiveness to changes in pay. Previous research shows that enlisted personnel's responsiveness (in terms of retention) to pay is likely higher than for the medical corps [2, 10, 11]. If a similar difference exists for accessions elasticities, our estimate on the number of FAP accessions with an accession bonus is too high. In either case, a $100,000 accession bonus will not allow the Services to bring in as many FAP accessions as they may want. These estimates imply that a $100,000 accession bonus will not be a panacea.

Our estimate of the potential number of FAP accessions with the $100,000 accession bonus assumes that the baseline constraint of 60 FAP accessions accurately represents what the market can bear. However, if the Services' business practices limit the number of FAP accessions by how actively they recruit physicians through FAP, the FAP constraint won't represent what the market will bear. If it is the case

that business practices are part of the reason for the current constraint on FAP accessions, giving a $100,000 FAP bonus may provide the Services enough incentive to change their business practices. If this is the case, our estimate of the potential number of FAP accessions would be low.

We show our results for this excursion in **table AA-12** (Army, Navy, and Air Force). The results show that for each Service, there are more FAP accessions than in the baseline model. However, the Services do not use all of the potential FAP accessions because USUHS and AFHPSP direct accessions more cost-effectively meet experience profile requirements.

As table A-27 shows, giving a FAP bonus reduces costs 0.4 percent in the Navy, 1.2 percent in the Army, and 5.6 percent in the Air Force. The reason for the larger change in the Air Force has to do with its greater dependence on AFHPSP deferred accessions relative to the Army and Navy. Being able to draw in more FAP accessions allows the Air Force to reduce substantially the number of AFHPSP deferred accessions (and its excesses) because FAP accessions are more cost-effective in some specialties. In family practice, for example, the FAP accession bonus increases the cap on FAP accessions from 25 to 33. This allows the Air Force to reduce the number AFHPSP deferred accessions, substantially reducing the excess of family practitioners from 101 in the baseline to 42.

Table A-27. Number of FAP accessions and costs (excursion 12)

Service	Baseline	Excursion	Percent cost relative to the baseline (100)
Army	55	72	98.8
Navy	39	54	99.6
Air Force	54	81	94.4

Excursion 13: increase entitlement special pays

In this excursion, we modeled a 20-percent increase in entitlement special pays, which was one of our proposals in the Health Professions' Retention-Accession Incentives study [2]. This means

increasing variable special pay (VSP), additional special pay (ASP), and board certification pay (BCP) by 20 percent each. This pay increase is the same across all specialties; it doesn't give any specialty more than another. **Table AA-13** (Army, Navy, and Air Force) shows the results of excursion 13.[36] The key question of this excursion is whether the entitlement special pay increase is more cost-effective than no increase.

With higher pay and its associated better retention, the Services are less reliant on AFHPSP deferred and FAP accessions. As table A-28 shows, AFHPSP deferred accessions at YOP-1 fell from 59 to 32 in the Army model, and FAP accessions fell from 52 to 46. The fact that AFHPSP deferred accessions fall more that FAP accessions suggests that AFHPSP deferred accessions are the least cost-effective accession source. This same pattern of greater reductions in AFHPSP deferred accessions than in FAP accessions appears in the Navy and Air Force as well.

Table A-28. AFHPSP deferred and FAP accessions, excess physicians, O-6 shortage, and cost (excursion 13)

Category	Army	Navy	Air Force
AFHPSP deferred and FAP accessions at YOP-1			
Baseline (AFHPSP deferred, FAP)	59, 52	106, 36	117, 52
Excursion (AFHPSP deferred, FAP)	32, 46	91, 32	64, 49
Excess physicians			
Baseline	457	145	477
Excursion	327	49	257
Excursion cost as a percentage of baseline costs	104.0	109.3	94.6

The results also show that excesses in this excursion are less than in the baseline case (see table A-28). Excesses fall more in the Air Force model (from 477 to 257) than in the Army or Navy models. This stems from the Air Force's greater reliance on AFHPSP deferred accessions

36. For this and the remaining excursions, we increased life-cycle costs given the special pay increases. We modeled retention increases based on the elasticity estimates from previous CNA research [2, 11].

and the fact that the increase in entitlement special pays allows the Air Force to cut AFHPSP deferred accessions substantially.

Although the change in accession mix is important, the real issue is whether increasing entitlement special pays is more cost-effective than the status quo. The results show that in the Army and Navy models, increasing entitlement special pays increases costs by 4 percent (Army) and 9 percent (Navy). In contrast, costs fall by 5 percent in the Air Force model.

The important issue here is why costs increase in the Army and Navy and decrease in the Air Force. Many of the excursions show that career path is a key component of retention and cost. For example, the GME excursions showed that increasing the size of the GME program reduced each Service's dependence on USUHS accessions. This occurs because in-house GME means more AFHPSP direct accessions, which have more years of service before physicians reach a stay-leave decision point. And, having more AFHPSP direct accessions makes filling experience profile constraints easier because they have better retention. Similarly, we found that the Navy's GMO policy elongates the career path of its physicians relative to the Army and Air Force.

Based on these findings, we conclude that the longer the career path of the average accession the less cost-effective an increase in special pays will be because the longer career paths mean better retention. Accordingly, Army and Navy physicians' average career path is longer than their Air Force peers because of the Air Force's high dependence on AFHPSP deferred accessions. It is the cost savings from reduced dependence on AFHPSP deferred accessions that makes the entitlement special pay increase in the Air Force cost-effective. In addition, Navy physicians' average career path is longer than their Army peers, which explains why the entitlement special pay increase is even more costly in the Navy than in the Army.

Excursion 14: increase discretionary special pays

In excursion 14, we explored whether increasing discretionary special pays is more cost-effective than the status quo. Discretionary special pays consist of incentive special pay (ISP) and multiyear special

pay (MSP). The FY 2002 caps on ISP and MSP are $36,000 and $14,000, respectively. We modeled an increase in discretionary special pays by raising the caps to $45,000 (ISP) and $20,000 (MSP) based on one of our proposals from the Health Professions' Retention-Accession Incentives study [2].

Currently, not all specialties' ISP and MSP amounts are equal to the cap. For example, pediatrics' ISP is $12,000 and its MSP (for a 4-year commitment) is $10,000, whereas other specialties (e.g., anesthesiology) are paid at the caps. Consequently, we did not want to model the pay increase in such a way that all specialties received the maximum amount; we wanted to preserve the same pay disparity among the specialties. We modeled the increase so that a specialty's ISP and MSP would be the same percentage of the new cap as it is under the FY 2002 cap (see table A-29).

Table A-29. Change in ISP and MSP based on CNA's discretionary special pay proposal

	Incentive special pay (ISP)		Multiyear special pay (MSP)		ISP and MSP
Specialty	FY 2002	Proposed	FY 2002	Proposed	increase
Anesthesiology	36,000	45,000	14,000	20,000	15,000
Cardiology	36,000	45,000	14,000	20,000	15,000
Family practice	13,000	16,250	14,000	20,000	9,250
General IM	14,000	17,500	10,000	14,286	7,786
General surgery	29,000	36,250	14,000	20,000	13,250
OB/GYN	31,000	38,750	10,000	14,286	12,036
Orthopedics	36,000	45,000	14,000	20,000	15,000
Radiology	36,000	45,000	14,000	20,000	15,000

For pediatrics, which has the lowest ISP and MSP, this means an ISP increase of $3,000 to $15,000 and an MSP increase of $4,286 to $14,286. In total, their special pays increase by $7,286. Similarly, because anesthesiology, which has the highest ISP and MSP, is paid at 100 percent of both caps, their special pays increase by $15,000. In short, the discretionary pay increase targets certain specialties by giving larger pay increases. We show the results for excursion 14 in **table AA-14** (Army, Navy, and Air Force).

Just as with the entitlement special pay excursion, the main issue is whether the pay increase is cost-effective. For the Navy, the model shows that costs increase by 8.7 percent. In contrast, the model shows that costs decrease by 0.9 percent in the Army and 7.9 percent in the Air Force. Given that Navy physicians' have a longer average career path than their Army and Air Force counterparts, this supports the conclusion that career path and the mix of accession sources that each Service relies on are determining factors in whether special pay increases will be cost-effective. Given that both excursions 13 and 14 support this conclusion, we now turn to the question: *Which is more cost-effective—entitlement or discretionary special pay increases?*

We don't mean to imply than one dollar from an entitlement special pay is more or less valuable to the recipient than one dollar from a discretionary special pay given at the same career juncture. The difference arises because of the way in which pay increases are distributed across the specialties. Entitlement special pays are the same across all specialties—neurosurgeons get the same amount as family practitioners—whereas discretionary special pays are targeted to specific specialties. This fact alone suggests that discretionary special pay increases should be more cost-effective than entitlement special pay increases because more money goes to the specialties with lower retention.[37]

This is, in fact, exactly what our analysis shows. For the Navy, the entitlement special pay change increases costs by 9.3 percent over the baseline compared with an 8.7-percent increase over the baseline for the discretionary special pay change. The entitlement special pay increase in the Army increases costs by 4.0 percent, and the discretionary special pay increase decreased costs by 0.9 percent. Similarly, costs in the Air Force model fall by 5.4 percent in the entitlement special pay excursion, compared with falling by 7.9 percent in the discretionary special pay excursion. In each Service, increasing discretionary

37. By saying that targeted special pays are more cost-effective than across-the-board increases, we are not suggesting short-term pay increases to fix a short-term problem. We mean permanent pay increases that provide more funds to some specialties than others.

special pays is more cost-effective than increasing entitlement special pays.

This is true even though the special pay changes we modeled do not have the same dollar amounts. To illustrate this, we modeled how much the entitlement and discretionary special pays change over the 30-year life cycle of physicians from the predominant accession source—AFHPSP direct accessions. Pediatrics has the smallest difference between the discretionary and entitlement special pay increases—$26,831 over the 30-year life cycle (see table A-30). Similarly, the difference for anesthesiology is $216,760. The average between the pediatric and anesthesiology numbers is $121,796.

Table A-30. Change in entitlement and discretionary special pay over the 30-year life cycle of AFHPSP direct accessions

Special pay	Pediatrics	Anesthesiology
Change in entitlement special pay relative to the baseline[a]	152,740	149,240
Change in discretionary special pay relative to the baseline	179,571	366,000
Difference over the 30-year life cycle	26,831	216,760

a. Entitlement special pay increases are the same (20 percent) across all specialties. Residency length differences cause the difference between pediatrics and anesthesiology. This difference means that pediatricians get ASP and BCP one year sooner than anesthesiologists.

Clearly, given the way we model the discretionary special pay increase, it gives more to each physician than the entitlement special pay increase, yet it is the more cost-effective of the two. This demonstrates that targeting pay to where retention is the lowest has a greater effect on the Services' ability to meet requirements than do across-the-board pay increases.

Excursion 15: increase entitlement and discretionary special pays

At the end of this appendix, we show our results for excursion 15 in **table AA-15** (Army, Navy, and Air Force). This excursion combines

excursions 13 and 14 by modeling both the entitlement and discretionary special pay increases. Table A-31 shows the cost for excursions 13 through 15 relative to the baseline. The results reiterate that discretionary special pay increases are more cost-effective (excursion 14) than entitlement special pay increases (excursion 13).

Table A-31. Comparison of costs and experience profile shortages for excursions 14-16

Cost by Service	Baseline	Excursion 13	Excursion 14	Excursion 15
Army				
Cost ($M)	811	844	804	816
Percentage of baseline	100.0	104.0	99.1	100.5
Navy				
Cost ($M)	563	615	612	623
Percentage of baseline	100.0	109.3	108.7	110.7
Air Force				
Cost ($M)	566	536	522	521
Percentage of baseline	100.0	94.6	92.1	92.0

In the Army, for example, costs in the entitlement special pay excursion are $844 million. When we add a discretionary special pay increase on top of an entitlement special pay increase, costs fall to $816 million. This is a 3.3-percent decrease. In comparison, the costs in the discretionary special pay excursion are $804 million. Adding an entitlement special pay increase on top of the discretionary special pay increases cost to $816, or by 1.5 percent.

Following similar logic with the Air Force, costs decrease whether we add a discretionary or an entitlement special pay increase on top of the other, but the discretionary special pay increase reduces costs the the most—$15 million (536 - 521)—compared with the entitlement special pay increase—$1 million (522 - 521). Similarly, although both pay increases are costly in the Navy model, the discretionary special pay increase is the less costly of the two.

One final observation is that, with the addition of both the discretionary and entitlement special pay increases, retention improves such that the Services aren't as reliant on USUHS to meet experience

profile requirements. For example, the number of USUHS accessions in this excursion are 53 (down from 63) for the Army and 30 (down from 51) in the Navy. However, in the Air Force model, USUHS accessions remain at 51. This further supports the notion that USUHS is a very important accession source for filling senior billets if many of a Service's other accession sources have low retention.

Table AA-1 (Army): Physician excursion 1 - lower the experience profile constraint to at least 25 percent O-5/6 and 5 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	40	9
AFHPSP (200/400)	359	75	361	79
FAP (0/60)	55	12	53	12
Total	477	100	455	100
Accession mix at YOP-1				
USUHS	59	14	37	9
AFHPSP direct	255	60	276	69
AFHPSP deferred	59	14	40	10
FAP	52	12	50	12
Total	425	100	403	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	161
AFHPSP students	1,390	1,402
AFHPSP deferred	272	188
FAP	162	156
Total	2,076	1,907
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	881
Total	1,211	1,210

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	739
Cost per fully trained duty physician ($)	254,810	255,856
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	742
Cost as a percentage of baseline		91.5

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	0.8
O-6 shortage	0.8	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	91	20	10	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	38	8	5	50	15.7	0.0	7.0	7.0
Family practice	491	349	85	62	496	368	70	53	491	5.2	0.0	50.0	50.0
General IM	309	295	59	34	387	238	49	28	315	78.4	6.0	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	127	27	16	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	823	193	108	1124	187.5	20.3	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,034	558	297	2,889	457.0	174.5	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	75	16	9	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	75	14	11	25	25	25.0	25.0
General IM	64	16	20	76	15	9	75	16	9	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	75	16	9	8	8	8.0	6.2
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	73	17	10	15	15	12.0	12.0
Overall	59	22	19	70	20	11	70	19	10	60	60	55.0	53.2

Table AA-1 (Navy): Physician excursion 1 - lower the experience profile constraint to at least 25 percent O-5/6 and 5 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	21	5
AFHPSP (200/400)	327	78	376	87
FAP (0/60)	39	9	35	8
Total	417	100	432	100
Accession mix at YOP-1				
USUHS	44	12	18	5
AFHPSP direct	170	48	195	53
AFHPSP deferred	106	30	120	33
FAP	36	10	33	9
Total	357	100	367	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	84
AFHPSP students	1,268	1,458
AFHPSP deferred	507	587
FAP	113	104
Total	2,092	2,234
Training pipeline		
Interns[b]	235	235
GMOs	454	455
Residents/fellows	616	616
Total	1,305	1,306

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	520
Cost per fully trained duty physician ($)	260,456	253,451
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	520
Cost as a percentage of baseline		92.4

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	104	24	11	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	292	64	47	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	117	24	10	151	39.5	15.8	31.0	31.0
General surgery	139	97	46	14	157	102	42	12	156	17.7	17.3	9.0	9.0
OB/GYN	124	87	24	13	124	93	20	11	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	100	25	9	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	84	19	9	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	589	146	74	809	86.9	3.0	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,489	376	186	2,051	145.4	36.1	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	75	17	8	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	72	16	12	25	25	25.0	25.0
General IM	73	14	13	76	16	8	78	16	7	10	10	3.6	0.3
General surgery	48	30	22	62	29	9	65	27	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	75	16	9	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	75	19	6	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	75	17	8	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	73	18	9	15	15	10.0	10.0
Overall	55	28	17	69	20	10	73	18	9	60	60	38.6	35.3

Table AA-1 (Air Force): Physician excursion 1 - lower the experience profile constraint to at least 25 percent O-5/6 and 5 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	44	14
AFHPSP (200/400)	309	75	231	72
FAP (0/60)	54	13	46	14
Total	414	100	321	100
Accession mix at YOP-1				
USUHS	48	13	41	14
AFHPSP direct	149	41	155	54
AFHPSP deferred	117	32	46	16
FAP	52	14	44	15
Total	366	100	287	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	176
AFHPSP students	1,201	898
AFHPSP deferred	536	218
FAP	107	91
Total	2,048	1,384
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	785

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	474
Cost per fully trained duty physician ($)	242,912	252,668
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	474
Cost as a percentage of baseline		83.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	58	13	6	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	3	31	0.5	0.0	5.0	5.0
Family practice	439	401	78	61	540	323	65	51	439	101.2	0.0	45.0	45.0
General IM	162	153	32	19	203	137	27	14	178	40.9	15.7	37.0	37.0
General surgery	111	67	32	13	111	67	32	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	87	18	11	116	17.8	0.0	12.0	12.0
Orthopedic surgery	91	129	24	9	163	69	16	6	91	71.8	0.0	7.0	7.0
Radiology	124	85	27	12	124	94	21	10	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	518	121	67	706	244.8	5.5	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,374	319	182	1,874	477.0	21.2	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	71	18	11	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	73	15	12	25	25	25.0	25.0
General IM	80	13	7	75	16	9	77	15	8	10	10	5.9	2.5
General surgery	73	13	15	60	28	11	60	28	12	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	75	16	9	8	8	8.0	6.1
Orthopedic surgery	75	19	6	80	15	5	76	18	7	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	76	17	8	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	73	17	10	15	15	13.4	10.4
Overall	76	15	9	74	16	10	73	17	10	60	60	54.1	46.1

Table AA-2 (Army): Physician excursion 2 - raise the experience profile constraint to at least 35 percent O-5/6 and 12 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	12
AFHPSP (200/400)	359	75	400	77
FAP (0/60)	55	12	56	11
Total	477	100	519	100
Accession mix at YOP-1				
USUHS	59	14	59	13
AFHPSP direct	255	60	255	55
AFHPSP deferred	59	14	93	20
FAP	52	12	53	12
Total	425	100	460	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,553
AFHPSP deferred	272	403
FAP	162	166
Total	2,076	2,374
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	857
Cost per fully trained duty physician ($)	254,810	249,192
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	860
Cost as a percentage of baseline		106.0

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	33.7
O-6 shortage	0.8	15.4

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	25	13	122	0.0	1.1	16.0	16.0
Cardio	50	51	10	5	66	41	7	4	52	15.7	2.2	7.0	7.0
Family practice	491	349	85	62	496	369	100	72	541	5.2	50.1	50.0	50.0
General IM	309	295	59	34	387	388	67	41	496	78.4	187.0	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	147	37	22	207	22.0	36.9	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	1032	237	133	1402	187.5	298.5	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,412	665	362	3,439	457.0	723.8	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	69	21	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	79	14	7	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	68	19	13	25	25	25.0	25.0
General IM	64	16	20	76	15	9	78	14	8	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	71	18	11	8	8	8.0	8.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	74	17	9	15	15	12.0	13.5
Overall	59	22	19	70	20	11	70	19	11	60	60	55.0	56.5

Table AA-2 (Navy): Physician excursion 2 - raise the experience profile constraint to at least 35 percent O-5/6 and 12 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	10
AFHPSP (200/400)	327	78	400	81
FAP (0/60)	39	9	41	8
Total	417	100	492	100
Accession mix at YOP-1				
USUHS	44	12	44	10
AFHPSP direct	170	48	170	40
AFHPSP deferred	106	30	168	40
FAP	36	10	39	9
Total	357	100	421	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,553
AFHPSP deferred	507	765
FAP	113	121
Total	2,092	2,643
Training pipeline		
Interns[b]	235	235
GMOs	454	455
Residents/fellows	616	616
Total	1,305	1,306

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	623
Cost per fully trained duty physician ($)	260,456	245,058
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	623
Cost as a percentage of baseline		110.8

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.3
O-6 shortage	0.0	10.7

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	90	33	15	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	342	82	59	483	1.2	80.1	43.0	43.0
General IM	135	133	28	13	175	146	31	16	194	39.5	58.9	31.0	31.0
General surgery	139	97	46	14	157	151	50	16	217	17.7	78.4	9.0	9.0
OB/GYN	124	87	24	13	124	81	27	16	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	86	34	12	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	73	27	12	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	828	186	103	1117	86.9	311.0	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,808	482	254	2,543	145.4	528.3	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	65	24	11	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	71	17	12	25	25	25.0	25.0
General IM	73	14	13	76	16	8	75	16	8	10	10	3.6	6.3
General surgery	48	30	22	62	29	9	70	23	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	65	22	13	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	65	26	9	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	65	24	11	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	74	17	9	15	15	10.0	10.0
Overall	55	28	17	69	20	10	71	19	10	60	60	38.6	41.3

Table AA-2 (Air Force): Physician excursion 2 - raise the experience profile constraint to at least 35 percent O-5/6 and 12 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	10
AFHPSP (200/400)	309	75	400	79
FAP (0/60)	54	13	58	11
Total	414	100	509	100
Accession mix at YOP-1				
USUHS	48	13	48	11
AFHPSP direct	149	41	149	33
AFHPSP deferred	117	32	197	44
FAP	52	14	56	12
Total	366	100	450	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	1,553
AFHPSP deferred	536	818
FAP	107	115
Total	2,048	2,690
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	785

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	657
Cost per fully trained duty physician ($)	242,912	232,246
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	658
Cost as a percentage of baseline		116.1

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	5.6

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	53	18	9	80	0.0	2.2	8.0	8.0
Cardio	31	22	6	3	32	23	7	4	33	0.5	2.4	5.0	5.0
Family practice	439	401	78	61	540	543	92	73	708	101.2	268.9	45.0	45.0
General IM	162	153	32	19	203	169	36	23	228	40.9	66.1	37.0	37.0
General surgery	111	67	32	13	111	67	32	13	111	0.0	0.2	13.0	13.0
OB/GYN	116	99	22	13	134	103	25	16	144	17.8	28.1	12.0	12.0
Orthopedic surgery	91	129	24	9	163	79	23	8	110	71.8	18.8	7.0	7.0
Radiology	124	85	27	12	124	89	32	14	135	0.0	10.9	16.0	16.0
Other specialties	701	722	139	85	946	1025	159	96	1280	244.8	579.1	74.0	74.0
Overall	1,853	1,733	375	223	2,330	2,150	424	256	2,830	477.0	976.6	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	66	23	11	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	68	20	12	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	77	13	10	25	25	25.0	25.0
General IM	80	13	7	75	16	9	74	16	10	10	10	5.9	9.3
General surgery	73	13	15	60	28	11	60	29	12	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	72	17	11	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	72	21	8	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	66	24	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	80	12	8	15	15	13.4	14.0
Overall	76	15	9	74	16	10	76	15	9	60	60	54.1	58.3

Table AA-3 (Army): Physician excursion 3 - increase the USUHS constraint of 63 by 15 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	72	16
AFHPSP (200/400)	359	75	324	73
FAP (0/60)	55	12	49	11
Total	477	100	446	100
Accession mix at YOP-1				
USUHS	59	14	68	17
AFHPSP direct	255	60	246	62
AFHPSP deferred	59	14	40	10
FAP	52	12	46	12
Total	425	100	400	100

a. Annual accession source constraints are in parentheses (minimum/maximum).
The USUHS constraint for the excursion is 72.45.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	290
AFHPSP students	1,390	1,260
AFHPSP deferred	272	180
FAP	162	145
Total	2,076	1,874
Training pipeline		
Interns[b]	329	328
Residents/fellows	882	883
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	795
Cost per fully trained duty physician ($)	254,810	259,453
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	798
Cost as a percentage of baseline		98.4

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.8
O-6 shortage	0.8	0.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	24	12	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	35	10	5	50	15.7	0.1	7.0	7.0
Family practice	491	349	85	62	496	349	85	62	496	5.2	5.2	50.0	50.0
General IM	309	295	59	34	387	250	59	34	342	78.4	33.4	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	119	32	19	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	916	225	126	1267	187.5	162.6	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,102	626	336	3,064	457.0	349.4	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	70	19	11	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	25	25.0	25.0
General IM	64	16	20	76	15	9	73	17	10	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	19	11	8	8	8.0	2.3
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	72	18	10	15	15	12.0	12.0
Overall	59	22	19	70	20	11	69	20	11	60	60	55.0	49.3

Table AA-3 (Navy): Physician excursion 3 - increase the USUHS constraint of 51 by 15 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	57	14
AFHPSP (200/400)	327	78	308	76
FAP (0/60)	39	9	38	9
Total	417	100	403	100
Accession mix at YOP-1				
USUHS	44	12	49	14
AFHPSP direct	170	48	165	48
AFHPSP deferred	106	30	94	27
FAP	36	10	36	10
Total	357	100	344	100

a. Annual accession source constraints are in parentheses (minimum/maximum).
The USUHS constraint for the excursion is 58.65.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	226
AFHPSP students	1,268	1,197
AFHPSP deferred	507	469
FAP	113	111
Total	2,092	2,002
Training pipeline		
Interns[b]	235	235
GMOs	454	454
Residents/fellows	616	616
Total	1,305	1,305

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	559
Cost per fully trained duty physician ($)	260,456	266,018
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	559
Cost as a percentage of baseline		99.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	30	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	282	70	51	403	1.2	0.1	43.0	43.0
General IM	135	133	28	13	175	133	28	13	175	39.5	39.5	31.0	31.0
General surgery	139	97	46	14	157	96	46	14	156	17.7	17.1	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	13	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	83	37	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	75	25	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	575	173	87	835	86.9	29.4	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,436	444	221	2,101	145.4	86.1	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	69	21	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	24.7
General IM	73	14	13	76	16	8	76	16	8	10	10	3.6	3.6
General surgery	48	30	22	62	29	9	61	30	9	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	63	27	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	67	23	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	69	21	10	15	15	10.0	9.6
Overall	55	28	17	69	20	10	68	21	11	60	60	38.6	37.9

Table AA-3 (Air Force): Physician excursion 3 - increase the USUHS constraint of 63 by 15 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	59	15
AFHPSP (200/400)	309	75	266	70
FAP (0/60)	54	13	54	14
Total	414	100	379	100
Accession mix at YOP-1				
USUHS	48	13	55	17
AFHPSP direct	149	41	142	43
AFHPSP deferred	117	32	82	25
FAP	52	14	52	16
Total	366	100	331	100

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	235
AFHPSP students	1,201	1,025
AFHPSP deferred	536	421
FAP	107	107
Total	2,048	1,788
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	786

a. Annual accession source constraints are in parentheses (minimum/maximum).
The USUHS constraint for the excursion is 58.65.

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	548
Cost per fully trained duty physician ($)	242,912	249,541
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	548
Cost as a percentage of baseline		96.8

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	54	16	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	4	32	0.5	0.5	5.0	5.0
Family practice	439	401	78	61	540	319	77	59	455	101.2	15.8	45.0	45.0
General IM	162	153	32	19	203	153	32	19	203	40.9	40.9	37.0	37.0
General surgery	111	67	32	13	111	67	32	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	99	22	13	134	17.8	17.7	12.0	12.0
Orthopedic surgery	91	129	24	9	163	129	24	9	163	71.8	71.8	7.0	7.0
Radiology	124	85	27	12	124	85	27	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	670	141	84	896	244.8	194.6	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,599	376	220	2,194	477.0	341.4	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	70	18	11	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	70	17	13	25	25	25.0	25.0
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	5.9
General surgery	73	13	15	60	28	11	60	28	11	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	74	16	10	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	80	15	5	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	68	22	10	2	2	1.8	1.8
Other specialties	69	20	11	76	15	9	75	16	9	15	15	13.4	13.4
Overall	76	15	9	74	16	10	73	17	10	60	60	54.1	54.1

Table AA-4 (Army): Physician excursion 4 - increase GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	13
AFHPSP (200/400)	359	75	375	78
FAP (0/60)	55	12	46	9
Total	477	100	484	100
Accession mix at YOP-1				
USUHS	59	14	58	13
AFHPSP direct	255	60	318	74
AFHPSP deferred	59	14	13	3
FAP	52	12	43	10
Total	425	100	433	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,453
AFHPSP deferred	272	62
FAP	162	135
Total	2,076	1,902
Training pipeline		
a. Annual accession source c	329	394
Residents/fellows	882	Interns[b]
Total	1,211	394

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	860
Cost per fully trained duty physician ($)	254,810	263,450
Shortage of fully trained duty physicians	12.2	10.5
Cost adjusted for shortages ($M)	811	863
Cost as a percentage of baseline		106.4

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	0.9
O-6 shortage	0.8	0.6

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	94	24	12	131	0.0	9.8	16.0	19.2
Cardio	50	51	10	5	66	37	9	6	52	15.7	2.1	7.0	8.4
Family practice	491	349	85	62	496	378	85	63	525	5.2	33.8	50.0	60.0
General IM	309	295	59	34	387	279	59	33	372	78.4	62.7	55.0	66.0
General surgery	185	139	77	32	248	167	93	38	298	62.9	112.5	24.0	28.8
OB/GYN	170	141	32	19	192	124	32	19	175	22.0	5.1	21.0	25.2
Orthopedic surgery	145	114	62	23	199	137	74	28	239	54.0	93.8	20.0	24.0
Radiology	140	96	52	23	171	115	62	28	205	31.2	65.4	16.0	19.2
Other specialties	1104	941	225	126	1292	908	232	129	1269	187.5	165.1	135.0	162.0
Overall	2,715	2,210	626	336	3,172	2,239	671	355	3,265	457.0	550.5	344.0	412.8

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	72	19	9	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	71	18	11	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	72	16	12	25	25	25.0	24.7
General IM	64	16	20	76	15	9	75	16	9	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	71	18	11	8	8	8.0	0.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	72	18	10	15	15	12.0	11.0
Overall	59	22	19	70	20	11	69	21	11	60	60	55.0	45.7

Table AA-4 (Navy): Physician excursion 4 - increase GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	47	11
AFHPSP (200/400)	327	78	344	83
FAP (0/60)	39	9	25	6
Total	417	100	415	100
Accession mix at YOP-1				
USUHS	44	12	40	11
AFHPSP direct	170	48	216	61
AFHPSP deferred	106	30	73	21
FAP	36	10	23	7
Total	357	100	353	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	188
AFHPSP students	1,268	1,334
AFHPSP deferred	507	363
FAP	113	73
Total	2,092	1,957
Training pipeline		
Interns[b]	235	282
GMOs	454	545
Residents/fellows	616	739
Total	1,305	1,567

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	590
Cost per fully trained duty physician ($)	260,456	278,679
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	590
Cost as a percentage of baseline		104.9

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	30	14	138	0.0	0.0	18.0	21.6
Cardio	25	10	11	4	25	9	13	5	27	0.0	2.0	4.0	4.8
Family practice	403	283	70	51	404	282	70	51	403	1.2	0.0	43.0	51.6
General IM	135	133	28	13	175	147	30	14	190	39.5	55.0	31.0	37.2
General surgery	139	97	46	14	157	95	51	14	160	17.7	20.6	9.0	10.8
OB/GYN	124	87	24	13	124	87	24	13	124	0.0	0.0	13.0	15.6
Orthopedic surgery	133	83	37	13	133	83	37	13	133	0.0	0.0	11.0	13.2
Radiology	112	75	25	11	112	76	25	11	112	0.0	0.0	14.0	16.8
Other specialties	806	633	171	89	893	567	178	87	832	86.9	26.2	78.0	93.6
Overall	2,015	1,496	442	223	2,160	1,440	457	222	2,119	145.4	103.8	221.0	265.2

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	68	22	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	34	49	17	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	17.4
General IM	73	14	13	76	16	8	77	16	7	10	10	3.6	1.6
General surgery	48	30	22	62	29	9	60	32	9	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	62	28	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	68	22	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	68	21	11	15	15	10.0	5.7
Overall	55	28	17	69	20	10	68	22	10	60	60	38.6	24.8

Table AA-4 (Air Force): Physician excursion 4 - increase GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	14
AFHPSP (200/400)	309	75	263	73
FAP (0/60)	54	13	45	12
Total	414	100	358	100
Accession mix at YOP-1				
USUHS	48	13	48	15
AFHPSP direct	149	41	188	59
AFHPSP deferred	117	32	41	13
FAP	52	14	43	13
Total	366	100	320	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	1,019
AFHPSP deferred	536	194
FAP	107	89
Total	2,048	1,505
Training pipeline		
Interns[b]	201	242
Residents/fellows	584	701
Total	785	943

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	548
Cost per fully trained duty physician ($)	242,912	254,502
Shortage of fully trained duty physicians	1.9	0.0
Cost adjusted for shortages ($M)	566	548
Cost as a percentage of baseline		96.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	54	16	8	78	0.0	0.0	8.0	9.6
Cardio	31	22	6	3	32	26	6	4	36	0.5	4.6	5.0	6.0
Family practice	439	401	78	61	540	345	77	59	481	101.2	42.3	45.0	54.0
General IM	162	153	32	19	203	164	32	17	213	40.9	51.2	37.0	44.4
General surgery	111	67	32	13	111	73	28	11	112	0.0	0.7	13.0	15.6
OB/GYN	116	99	22	13	134	91	22	13	126	17.8	9.6	12.0	14.4
Orthopedic surgery	91	129	24	9	163	57	24	9	91	71.8	0.0	7.0	8.4
Radiology	124	85	27	12	124	88	27	12	127	0.0	2.9	16.0	19.2
Other specialties	701	722	139	85	946	657	146	84	888	244.8	187.1	74.0	88.8
Overall	1,853	1,733	375	223	2,330	1,556	378	218	2,151	477.0	298.4	217.0	260.4

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	74	16	10	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	72	16	12	25	25	25.0	25.0
General IM	80	13	7	75	16	9	77	15	8	10	10	5.9	3.0
General surgery	73	13	15	60	28	11	65	25	10	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	72	17	10	8	8	8.0	4.1
Orthopedic surgery	75	19	6	80	15	5	63	27	10	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	69	21	10	2	2	1.8	0.0
Other specialties	69	20	11	76	15	9	74	16	10	15	15	13.4	12.6
Overall	76	15	9	74	16	10	72	18	10	60	60	54.1	44.7

Table AA-5 (Army): Physician excursion 5 - increase GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	43	9
AFHPSP (200/400)	359	75	400	84
FAP (0/60)	55	12	32	7
Total	477	100	475	100
Accession mix at YOP-1				
USUHS	59	14	38	9
AFHPSP direct	255	60	338	81
AFHPSP deferred	59	14	12	3
FAP	52	12	30	7
Total	425	100	418	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	171
AFHPSP students	1,390	1,553
AFHPSP deferred	272	73
FAP	162	95
Total	2,076	1,891
Training pipeline		
Interns[b]	329	394
Residents/fellows	882	1,057
Total	1,211	1,451

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	812
Cost per fully trained duty physician ($)	254,810	264,096
Shortage of fully trained duty physicians	12.2	10.5
Cost adjusted for shortages ($M)	811	815
Cost as a percentage of baseline		100.4

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	0.0
O-6 shortage	0.8	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	91	20	10	121	0.0	0.0	16.0	19.2
Cardio	50	51	10	5	66	38	8	5	50	15.7	0.0	7.0	8.4
Family practice	491	349	85	62	496	361	73	56	491	5.2	0.0	50.0	60.0
General IM	309	295	59	34	387	236	51	26	313	78.4	4.1	55.0	66.0
General surgery	185	139	77	32	248	167	93	38	298	62.9	112.5	24.0	28.8
OB/GYN	170	141	32	19	192	128	28	15	170	22.0	0.0	21.0	25.2
Orthopedic surgery	145	114	62	23	199	137	74	28	239	54.0	93.8	20.0	24.0
Radiology	140	96	52	23	171	115	62	28	205	31.2	65.4	16.0	19.2
Other specialties	1104	941	225	126	1292	859	214	115	1188	187.5	83.9	135.0	162.0
Overall	2,715	2,210	626	336	3,172	2,131	624	320	3,075	457.0	359.8	344.0	412.8

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	75	15	10	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	74	15	11	25	25	25.0	24.1
General IM	64	16	20	76	15	9	75	16	8	10	10	10.0	0.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	75	16	9	8	8	8.0	2.5
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	72	18	10	15	15	12.0	5.6
Overall	59	22	19	70	20	11	69	20	10	60	60	55.0	32.2

Table AA-5 (Navy): Physician excursion 5 - increase GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	16	4
AFHPSP (200/400)	327	78	400	90
FAP (0/60)	39	9	29	7
Total	417	100	445	100
Accession mix at YOP-1				
USUHS	44	12	14	4
AFHPSP direct	170	48	242	64
AFHPSP deferred	106	30	93	25
FAP	36	10	27	7
Total	357	100	376	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	66
AFHPSP students	1,268	1,553
AFHPSP deferred	507	464
FAP	113	85
Total	2,092	2,168
Training pipeline		
Interns[b]	235	283
GMOs	454	546
Residents/fellows	616	739
Total	1,305	1,567

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	560
Cost per fully trained duty physician ($)	260,456	266,644
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	560
Cost as a percentage of baseline		99.5

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	103	24	11	138	0.0	0.0	18.0	21.6
Cardio	25	10	11	4	25	9	13	5	27	0.0	2.0	4.0	4.8
Family practice	403	283	70	51	404	287	67	49	403	1.2	0.0	43.0	51.6
General IM	135	133	28	13	175	139	28	12	178	39.5	43.4	31.0	37.2
General surgery	139	97	46	14	157	100	48	12	160	17.7	20.8	9.0	10.8
OB/GYN	124	87	24	13	124	90	22	11	124	0.0	0.0	13.0	15.6
Orthopedic surgery	133	83	37	13	133	100	25	8	133	0.0	0.0	11.0	13.2
Radiology	112	75	25	11	112	84	20	9	112	0.0	0.0	14.0	16.8
Other specialties	806	633	171	89	893	591	156	78	824	86.9	18.4	78.0	93.6
Overall	2,015	1,496	442	223	2,160	1,502	402	195	2,100	145.4	84.6	221.0	265.2

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	75	17	8	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	34	49	17	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	71	17	12	25	25	25.0	19.1
General IM	73	14	13	76	16	8	78	16	7	10	10	3.6	0.0
General surgery	48	30	22	62	29	9	62	30	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	73	18	9	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	75	19	6	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	75	17	8	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	72	19	9	15	15	10.0	9.9
Overall	55	28	17	69	20	10	72	19	9	60	60	38.6	29.0

Table AA-5 (Air Force): Physician excursion 5 - increase GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	35	11
AFHPSP (200/400)	309	75	267	80
FAP (0/60)	54	13	31	9
Total	414	100	334	100
Accession mix at YOP-1				
USUHS	48	13	34	11
AFHPSP direct	149	41	202	68
AFHPSP deferred	117	32	31	10
FAP	52	14	30	10
Total	366	100	296	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	142
AFHPSP students	1,201	1,035
AFHPSP deferred	536	150
FAP	107	62
Total	2,048	1,390
Training pipeline		
Interns[b]	201	242
Residents/fellows	584	700
Total	785	942

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	493
Cost per fully trained duty physician ($)	242,912	257,997
Shortage of fully trained duty physicians	1.9	0.0
Cost adjusted for shortages ($M)	566	493
Cost as a percentage of baseline		87.0

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	58	13	6	78	0.0	0.0	8.0	9.6
Cardio	31	22	6	3	32	26	5	3	34	0.5	2.8	5.0	6.0
Family practice	439	401	78	61	540	319	67	53	439	101.2	0.0	45.0	54.0
General IM	162	153	32	19	203	150	28	14	191	40.9	29.1	37.0	44.4
General surgery	111	67	32	13	111	72	28	11	111	0.0	0.0	13.0	15.6
OB/GYN	116	99	22	13	134	87	19	10	116	17.8	0.0	12.0	14.4
Orthopedic surgery	91	129	24	9	163	69	16	6	91	71.8	0.0	7.0	8.4
Radiology	124	85	27	12	124	93	21	10	124	0.0	0.0	16.0	19.2
Other specialties	701	722	139	85	946	535	124	67	726	244.8	24.7	74.0	88.8
Overall	1,853	1,733	375	223	2,330	1,409	320	181	1,910	477.0	56.7	217.0	260.4

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	77	14	9	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	73	15	12	25	25	25.0	20.8
General IM	80	13	7	75	16	9	78	15	7	10	10	5.9	0.0
General surgery	73	13	15	60	28	11	65	25	10	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	75	16	9	8	8	8.0	4.1
Orthopedic surgery	75	19	6	80	15	5	75	18	7	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	75	17	8	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	74	17	9	15	15	13.4	4.4
Overall	76	15	9	74	16	10	74	17	9	60	60	54.1	31.3

Table AA-6 (Army): Physician excursion 6 - decrease GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	13
AFHPSP (200/400)	359	75	382	76
FAP (0/60)	55	12	58	12
Total	477	100	504	100
Accession mix at YOP-1				
USUHS	59	14	59	13
AFHPSP direct	255	60	192	43
AFHPSP deferred	59	14	138	31
FAP	52	12	55	12
Total	425	100	444	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,479
AFHPSP deferred	272	620
FAP	162	171
Total	2,076	2,522
Training pipeline		
Interns[b]	329	263
Residents/fellows	882	706
Total	1,211	969

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	774
Cost per fully trained duty physician ($)	254,810	244,583
Shortage of fully trained duty physicians	12.2	18.8
Cost adjusted for shortages ($M)	811	778
Cost as a percentage of baseline		95.9

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	2.7
O-6 shortage	0.8	1.1

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	25	12	121	0.0	0.0	16.0	12.8
Cardio	50	51	10	5	66	43	10	5	58	15.7	8.0	7.0	5.6
Family practice	491	349	85	62	496	344	86	62	491	5.2	0.3	50.0	40.0
General IM	309	295	59	34	387	329	57	36	422	78.4	112.7	55.0	44.0
General surgery	185	139	77	32	248	111	62	25	198	62.9	13.3	24.0	19.2
OB/GYN	170	141	32	19	192	127	32	19	178	22.0	7.6	21.0	16.8
Orthopedic surgery	145	114	62	23	199	91	50	18	159	54.0	14.2	20.0	16.0
Radiology	140	96	52	23	171	79	42	19	140	31.2	0.0	16.0	12.8
Other specialties	1104	941	225	126	1292	1054	216	126	1396	187.5	292.1	135.0	108.0
Overall	2,715	2,210	626	336	3,172	2,263	577	323	3,163	457.0	448.2	344.0	275.2

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	74	17	9	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	25	25.0	25.0
General IM	64	16	20	76	15	9	78	13	9	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	71	18	11	8	8	8.0	8.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	57	30	13	2	2	0.0	0.6
Other specialties	52	25	23	73	17	10	76	15	9	15	15	12.0	14.7
Overall	59	22	19	70	20	11	72	18	10	60	60	55.0	58.3

Table AA-6 (Navy): Physician excursion 6 - decrease GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	10
AFHPSP (200/400)	327	78	400	81
FAP (0/60)	39	9	41	8
Total	417	100	492	100
Accession mix at YOP-1				
USUHS	44	12	44	11
AFHPSP direct	170	48	127	30
AFHPSP deferred	106	30	209	50
FAP	36	10	39	9
Total	357	100	420	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,553
AFHPSP deferred	507	1,032
FAP	113	121
Total	2,092	2,909
Training pipeline		
Interns[b]	235	188
GMOs	454	364
Residents/fellows	616	493
Total	1,305	1,045

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	570
Cost per fully trained duty physician ($)	260,456	236,310
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	570
Cost as a percentage of baseline		101.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.2

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	30	14	138	0.0	0.0	18.0	14.4
Cardio	25	10	11	4	25	12	10	3	25	0.0	0.0	4.0	3.2
Family practice	403	283	70	51	404	282	70	51	403	1.2	0.1	43.0	34.4
General IM	135	133	28	13	175	122	26	14	163	39.5	27.7	31.0	24.8
General surgery	139	97	46	14	157	130	42	14	186	17.7	46.8	9.0	7.2
OB/GYN	124	87	24	13	124	87	24	14	124	0.0	0.0	13.0	10.4
Orthopedic surgery	133	83	37	13	133	216	37	13	267	0.0	133.7	11.0	8.8
Radiology	112	75	25	11	112	75	26	11	112	0.0	0.0	14.0	11.2
Other specialties	806	633	171	89	893	738	167	90	995	86.9	188.8	78.0	62.4
Overall	2,015	1,496	442	223	2,160	1,758	431	224	2,412	145.4	397.2	221.0	176.8

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	69	21	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	49	38	13	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	25.0
General IM	73	14	13	76	16	8	75	16	9	10	10	3.6	6.0
General surgery	48	30	22	62	29	9	70	22	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	81	14	5	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	67	23	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	74	17	9	15	15	10.0	10.0
Overall	55	28	17	69	20	10	73	18	9	60	60	38.6	41.0

Table AA-6 (Air Force): Physician excursion 6 - decrease GME starts by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	10
AFHPSP (200/400)	309	75	395	78
FAP (0/60)	54	13	58	12
Total	414	100	504	100
Accession mix at YOP-1				
USUHS	48	13	48	11
AFHPSP direct	149	41	110	25
AFHPSP deferred	117	32	230	52
FAP	52	14	56	13
Total	366	100	443	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	1,533
AFHPSP deferred	536	1,025
FAP	107	115
Total	2,048	2,877
Training pipeline		
Interns[b]	201	161
Residents/fellows	584	467
Total	785	628

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	612
Cost per fully trained duty physician ($)	242,912	231,734
Shortage of fully trained duty physicians	1.9	11.6
Cost adjusted for shortages ($M)	566	615
Cost as a percentage of baseline		108.5

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	71	16	8	95	0.0	16.6	8.0	6.4
Cardio	31	22	6	3	32	19	7	4	30	0.5	(1.2)	5.0	4.0
Family practice	439	401	78	61	540	469	78	64	611	101.2	171.8	45.0	36.0
General IM	162	153	32	19	203	142	31	20	193	40.9	30.6	37.0	29.6
General surgery	111	67	32	13	111	59	33	13	106	0.0	(5.4)	13.0	10.4
OB/GYN	116	99	22	13	134	91	22	13	126	17.8	9.7	12.0	9.6
Orthopedic surgery	91	129	24	9	163	256	24	9	289	71.8	198.2	7.0	5.6
Radiology	124	85	27	12	124	84	27	12	124	0.0	0.0	16.0	12.8
Other specialties	701	722	139	85	946	846	138	84	1068	244.8	367.4	74.0	59.2
Overall	1,853	1,733	375	223	2,330	2,037	376	227	2,641	477.0	787.6	217.0	173.6

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	62	24	14	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	77	13	10	25	25	25.0	25.0
General IM	80	13	7	75	16	9	74	16	10	10	10	5.9	8.8
General surgery	73	13	15	60	28	11	56	31	13	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	72	17	11	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	89	8	3	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	68	22	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	79	13	8	15	15	13.4	14.5
Overall	76	15	9	74	16	10	77	14	9	60	60	54.1	58.3

Table AA-7 (Army): Physician excursion 7 - decrease GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	49	12
AFHPSP (200/400)	359	75	322	75
FAP (0/60)	55	12	57	13
Total	477	100	428	100
Accession mix at YOP-1				
USUHS	59	14	46	12
AFHPSP direct	255	60	205	54
AFHPSP deferred	59	14	75	20
FAP	52	12	54	14
Total	425	100	380	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	198
AFHPSP students	1,390	1,248
AFHPSP deferred	272	328
FAP	162	168
Total	2,076	1,943
Training pipeline		
Interns[b]	329	263
Residents/fellows	882	706
Total	1,211	969

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	681
Cost per fully trained duty physician ($)	254,810	250,074
Shortage of fully trained duty physicians	12.2	18.8
Cost adjusted for shortages ($M)	811	686
Cost as a percentage of baseline		84.5

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.7
O-6 shortage	0.8	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	91	20	10	121	0.0	0.0	16.0	12.8
Cardio	50	51	10	5	66	38	8	4	50	15.7	0.0	7.0	5.6
Family practice	491	349	85	62	496	368	70	53	491	5.2	0.0	50.0	40.0
General IM	309	295	59	34	387	232	49	29	309	78.4	0.0	55.0	44.0
General surgery	185	139	77	32	248	111	62	25	198	62.9	13.3	24.0	19.2
OB/GYN	170	141	32	19	192	128	26	16	170	22.0	0.0	21.0	16.8
Orthopedic surgery	145	114	62	23	199	91	50	18	159	54.0	14.2	20.0	16.0
Radiology	140	96	52	23	171	79	42	19	140	31.2	0.0	16.0	12.8
Other specialties	1104	941	225	126	1292	795	186	104	1085	187.5	(18.8)	135.0	108.0
Overall	2,715	2,210	626	336	3,172	1,933	513	278	2,724	457.0	8.8	344.0	275.2

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	75	16	9	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	75	14	11	25	25	25.0	25.0
General IM	64	16	20	76	15	9	75	16	9	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	75	15	10	8	8	8.0	8.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	57	30	13	2	2	0.0	0.6
Other specialties	52	25	23	73	17	10	73	17	10	15	15	12.0	13.6
Overall	59	22	19	70	20	11	71	19	10	60	60	55.0	57.2

Table AA-7 (Navy): Physician excursion 7 - decrease GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	27	6
AFHPSP (200/400)	327	78	360	85
FAP (0/60)	39	9	38	9
Total	417	100	425	100
Accession mix at YOP-1				
USUHS	44	12	23	6
AFHPSP direct	170	48	148	41
AFHPSP deferred	106	30	155	43
FAP	36	10	36	10
Total	357	100	362	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	108
AFHPSP students	1,268	1,398
AFHPSP deferred	507	741
FAP	113	112
Total	2,092	2,359
Training pipeline		
Interns[b]	235	188
GMOs	454	364
Residents/fellows	616	493
Total	1,305	1,045

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	488
Cost per fully trained duty physician ($)	260,456	238,918
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	488
Cost as a percentage of baseline		86.6

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	103	24	11	138	0.0	0.0	18.0	14.4
Cardio	25	10	11	4	25	12	10	3	25	0.0	0.0	4.0	3.2
Family practice	403	283	70	51	404	299	60	44	403	1.2	0.0	43.0	34.4
General IM	135	133	28	13	175	108	23	11	142	39.5	6.6	31.0	24.8
General surgery	139	97	46	14	157	104	37	12	153	17.7	13.9	9.0	7.2
OB/GYN	124	87	24	13	124	93	20	11	124	0.0	0.0	13.0	10.4
Orthopedic surgery	133	83	37	13	133	100	25	9	133	0.0	0.0	11.0	8.8
Radiology	112	75	25	11	112	84	20	8	112	0.0	0.0	14.0	11.2
Other specialties	806	633	171	89	893	601	138	72	811	86.9	5.2	78.0	62.4
Overall	2,015	1,496	442	223	2,160	1,505	355	181	2,041	145.4	25.7	221.0	176.8

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	75	17	8	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	49	38	13	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	74	15	11	25	25	25.0	25.0
General IM	73	14	13	76	16	8	76	16	8	10	10	3.6	3.1
General surgery	48	30	22	62	29	9	68	24	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	75	16	9	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	75	19	6	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	75	17	8	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	74	17	9	15	15	10.0	10.0
Overall	55	28	17	69	20	10	74	17	9	60	60	38.6	38.1

Table AA-7 (Air Force): Physician excursion 7 - decrease GME starts by 20 percent and lower the experience profile constraint to at least 25 percent O-5/6 and 10 percent O-6

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	16
AFHPSP (200/400)	309	75	214	67
FAP (0/60)	54	13	55	17
Total	414	100	320	100
Accession mix at YOP-1				
USUHS	48	13	48	17
AFHPSP direct	149	41	110	38
AFHPSP deferred	117	32	76	27
FAP	52	14	53	18
Total	366	100	287	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	831
AFHPSP deferred	536	333
FAP	107	109
Total	2,048	1,477
Training pipeline		
Interns[b]	201	161
Residents/fellows	584	467
Total	785	628

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	463
Cost per fully trained duty physician ($)	242,912	244,982
Shortage of fully trained duty physicians	1.9	11.6
Cost adjusted for shortages ($M)	566	466
Cost as a percentage of baseline		82.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	58	13	6	78	0.0	0.0	8.0	6.4
Cardio	31	22	6	3	32	19	7	4	30	0.5	(1.2)	5.0	4.0
Family practice	439	401	78	61	540	323	65	51	439	101.2	0.0	45.0	36.0
General IM	162	153	32	19	203	125	26	16	167	40.9	5.4	37.0	29.6
General surgery	111	67	32	13	111	59	33	13	106	0.0	(5.4)	13.0	10.4
OB/GYN	116	99	22	13	134	87	18	11	116	17.8	0.0	12.0	9.6
Orthopedic surgery	91	129	24	9	163	69	16	6	91	71.8	0.0	7.0	5.6
Radiology	124	85	27	12	124	94	21	9	124	0.0	0.0	16.0	12.8
Other specialties	701	722	139	85	946	548	120	72	740	244.8	38.6	74.0	59.2
Overall	1,853	1,733	375	223	2,330	1,383	319	188	1,890	477.0	37.4	217.0	173.6

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	75	17	8	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	62	24	14	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	74	15	12	25	25	25.0	25.0
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	5.4
General surgery	73	13	15	60	28	11	56	31	13	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	75	16	9	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	76	18	7	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	76	17	8	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	74	16	10	15	15	13.4	14.5
Overall	76	15	9	74	16	10	73	17	10	60	60	54.1	54.9

Table AA-8 (Army): Physician excursion 8 - set USUHS accessions at current levels and remove the experience profile constraint

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	15
AFHPSP (200/400)	359	75	313	73
FAP (0/60)	55	12	55	13
Total	477	100	430	100
Accession mix at YOP-1				
USUHS	59	14	58	15
AFHPSP direct	255	60	256	66
AFHPSP deferred	59	14	20	5
FAP	52	12	51	13
Total	425	100	385	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,215
AFHPSP deferred	272	78
FAP	162	160
Total	2,076	1,705
Training pipeline		
Interns[b]	329	328
Residents/fellows	882	883
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	754
Cost per fully trained duty physician ($)	254,810	261,571
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	757
Cost as a percentage of baseline		93.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	0.0
O-6 shortage	0.8	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	25	12	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	32	11	7	50	15.7	0.0	7.0	7.0
Family practice	491	349	85	62	496	358	74	59	491	5.2	0.0	50.0	50.0
General IM	309	295	59	34	387	234	48	27	309	78.4	0.0	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	131	26	13	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	797	213	112	1122	187.5	18.3	135.0	135.0
Overall	2,715	2,210	626	336	3,172	1,985	589	307	2,881	457.0	166.4	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	69	21	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	64	23	13	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	73	15	12	25	25	25.0	25.0
General IM	64	16	20	76	15	9	76	16	9	10	10	10.0	9.6
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	77	16	7	8	8	8.0	8.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	71	19	10	15	15	12.0	12.0
Overall	59	22	19	70	20	11	69	20	11	60	60	55.0	54.6

Table AA-8 (Navy): Physician excursion 8 - set USUHS accessions at current levels and remove the experience profile constraint

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	12
AFHPSP (200/400)	327	78	331	79
FAP (0/60)	39	9	35	8
Total	417	100	417	100
Accession mix at YOP-1				
USUHS	44	12	49	14
AFHPSP direct	170	48	164	46
AFHPSP deferred	106	30	109	31
FAP	36	10	33	9
Total	357	100	356	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,283
AFHPSP deferred	507	531
FAP	113	103
Total	2,092	2,122
Training pipeline		
Interns[b]	235	235
GMOs	454	453
Residents/fellows	616	614
Total	1,305	1,302

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	544
Cost per fully trained duty physician ($)	260,456	265,438
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	544
Cost as a percentage of baseline		96.6

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	84	37	17	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	8	12	5	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	291	64	47	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	116	23	10	149	39.5	14.0	31.0	31.0
General surgery	139	97	46	14	157	82	56	18	156	17.7	16.6	9.0	9.0
OB/GYN	124	87	24	13	124	107	13	4	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	115	14	4	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	87	18	8	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	558	178	72	809	86.9	3.0	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,449	414	185	2,049	145.4	33.7	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	61	27	12	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	32	48	20	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	72	16	12	25	25	25.0	25.0
General IM	73	14	13	76	16	8	78	16	7	10	10	3.6	0.0
General surgery	48	30	22	62	29	9	52	36	12	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	87	10	3	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	87	10	3	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	78	16	7	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	69	22	9	15	15	10.0	10.0
Overall	55	28	17	69	20	10	71	20	9	60	60	38.6	35.0

Table AA-8 (Air Force): Physician excursion 8 - set USUHS accessions at current levels and remove the experience profile constraint

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	16
AFHPSP (200/400)	309	75	210	68
FAP (0/60)	54	13	48	16
Total	414	100	309	100
Accession mix at YOP-1				
USUHS	48	13	48	17
AFHPSP direct	149	41	149	54
AFHPSP deferred	117	32	34	12
FAP	52	14	47	17
Total	366	100	278	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	814
AFHPSP deferred	536	150
FAP	107	96
Total	2,048	1,265
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	585
Total	785	786

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	475
Cost per fully trained duty physician ($)	242,912	255,600
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	475
Cost as a percentage of baseline		83.9

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	51	18	9	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	3	31	0.5	0.0	5.0	5.0
Family practice	439	401	78	61	540	322	65	52	439	101.2	0.0	45.0	45.0
General IM	162	153	32	19	203	126	24	12	162	40.9	0.0	37.0	37.0
General surgery	111	67	32	13	111	66	32	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	91	17	8	116	17.8	0.0	12.0	12.0
Orthopedic surgery	91	129	24	9	163	60	22	8	91	71.8	0.0	7.0	7.0
Radiology	124	85	27	12	124	86	26	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	519	121	66	706	244.8	4.8	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,344	331	183	1,858	477.0	4.8	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	65	23	11	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	71	18	10	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	73	15	12	25	25	25.0	25.0
General IM	80	13	7	75	16	9	78	15	7	10	10	5.9	0.3
General surgery	73	13	15	60	28	11	60	29	12	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	79	14	7	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	66	25	9	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	69	21	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	74	17	9	15	15	13.4	13.1
Overall	76	15	9	74	16	10	72	18	10	60	60	54.1	48.5

Table AA-9 (Army): Physician excursion 9 - use alternate FAP constraint

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	13
AFHPSP (200/400)	359	75	400	83
FAP (0/60)	55	12	20	4
Total	477	100	483	100
Accession mix at YOP-1				
USUHS	59	14	59	14
AFHPSP direct	255	60	255	60
AFHPSP deferred	59	14	94	22
FAP	52	12	19	4
Total	425	100	426	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Change the FAP constraint to 30.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,553
AFHPSP deferred	272	390
FAP	162	59
Total	2,076	2,254
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	816
Cost per fully trained duty physician ($)	254,810	255,392
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	819
Cost as a percentage of baseline		101.0

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.8
O-6 shortage	0.8	3.2

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	24	12	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	52	10	5	67	15.7	16.9	7.0	7.0
Family practice	491	349	85	62	496	344	86	62	491	5.2	0.0	50.0	50.0
General IM	309	295	59	34	387	326	60	32	418	78.4	109.5	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	129	32	19	180	22.0	10.3	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	955	220	124	1299	187.5	195.5	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,240	623	332	3,195	457.0	480.3	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	78	15	7	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	5	25.0	5.0
General IM	64	16	20	76	15	9	78	14	8	10	0	10.0	0.0
General surgery	49	28	22	56	31	13	56	31	13	0	5	0.0	0.0
OB/GYN	73	16	11	73	17	10	72	18	11	8	5	8.0	5.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	5	0.0	0.0
Other specialties	52	25	23	73	17	10	73	17	10	15	10	12.0	10.0
Overall	59	22	19	70	20	11	70	20	10	60	30	55.0	20.0

Table AA-9 (Air Force): Physician excursion 9 - use alternate FAP constraint

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	13
AFHPSP (200/400)	309	75	301	74
FAP (0/60)	54	13	54	13
Total	414	100	406	100
Accession mix at YOP-1				
USUHS	48	13	48	13
AFHPSP direct	149	41	149	41
AFHPSP deferred	117	32	110	31
FAP	52	14	52	14
Total	366	100	358	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Change the FAP constraint to 70.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	1,169
AFHPSP deferred	536	513
FAP	107	107
Total	2,048	1,993
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	785

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	561
Cost per fully trained duty physician ($)	242,912	243,586
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	562
Cost as a percentage of baseline		99.1

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	54	16	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	4	32	0.5	0.5	5.0	5.0
Family practice	439	401	78	61	540	377	77	61	515	101.2	76.3	45.0	45.0
General IM	162	153	32	19	203	153	32	19	203	40.9	40.9	37.0	37.0
General surgery	111	67	32	13	111	67	32	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	103	22	13	138	17.8	21.8	12.0	12.0
Orthopedic surgery	91	129	24	9	163	129	24	9	163	71.8	71.8	7.0	7.0
Radiology	124	85	27	12	124	85	27	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	717	138	85	940	244.8	239.2	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,707	374	223	2,303	477.0	450.5	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	70	18	11	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	73	15	12	25	34	25.0	34.0
General IM	80	13	7	75	16	9	75	16	9	10	17	5.9	5.9
General surgery	73	13	15	60	28	11	60	29	11	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	75	16	9	8	9	8.0	9.0
Orthopedic surgery	75	19	6	80	15	5	80	15	5	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	68	22	10	2	5	1.8	1.8
Other specialties	69	20	11	76	15	9	76	15	9	15	5	13.4	3.4
Overall	76	15	9	74	16	10	74	16	10	60	70	54.1	54.1

Table AA-10 (Army): Physician excursion 10 - remove the AFHPSP constraint and set the FAP constraint to zero

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	12
AFHPSP (200/400)	359	75	446	88
FAP (0/60)	55	12	0	0
Total	477	100	509	100
Accession mix at YOP-1				
USUHS	59	14	59	13
AFHPSP direct	255	60	255	57
AFHPSP deferred	59	14	133	30
FAP	52	12	0	0
Total	425	100	447	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,736
AFHPSP deferred	272	558
FAP	162	0
Total	2,076	2,546
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	835
Cost per fully trained duty physician ($)	254,810	254,265
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	838
Cost as a percentage of baseline		103.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.8
O-6 shortage	0.8	0.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	24	12	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	51	10	5	66	15.7	15.8	7.0	7.0
Family practice	491	349	85	62	496	344	85	62	491	5.2	0.2	50.0	50.0
General IM	309	295	59	34	387	373	58	34	466	78.4	156.8	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	119	32	19	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	1006	218	127	1351	187.5	247.0	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,327	619	337	3,283	457.0	567.9	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	77	15	8	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	0	25.0	0.0
General IM	64	16	20	76	15	9	80	13	7	10	0	10.0	0.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	19	11	8	0	8.0	0.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	0	0.0	0.0
Other specialties	52	25	23	73	17	10	74	16	9	15	0	12.0	0.0
Overall	59	22	19	70	20	11	71	19	10	60	0	55.0	0.0

Table AA-10 (Navy): Physician excursion 10 - remove the AFHPSP constraint and set the FAP constraint to zero

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	12
AFHPSP (200/400)	327	78	378	88
FAP (0/60)	39	9	0	0
Total	417	100	429	100
Accession mix at YOP-1				
USUHS	44	12	44	12
AFHPSP direct	170	48	170	47
AFHPSP deferred	106	30	150	41
FAP	36	10	0	0
Total	357	100	364	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,465
AFHPSP deferred	507	677
FAP	113	0
Total	2,092	2,346
Training pipeline		
Interns[b]	235	235
GMOs	454	455
Residents/fellows	616	616
Total	1,305	1,306

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	578
Cost per fully trained duty physician ($)	260,456	260,913
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	578
Cost as a percentage of baseline		102.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	30	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	282	70	51	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	119	28	13	160	39.5	25.2	31.0	31.0
General surgery	139	97	46	14	157	122	45	14	181	17.7	42.1	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	13	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	83	37	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	75	25	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	679	168	90	938	86.9	132.0	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,552	438	224	2,214	145.4	199.4	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	69	21	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	0	25.0	0.0
General IM	73	14	13	76	16	8	74	17	8	10	0	3.6	0.0
General surgery	48	30	22	62	29	9	67	25	8	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	0	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	63	27	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	67	23	10	2	0	0.0	0.0
Other specialties	42	36	22	71	19	10	72	18	10	15	0	10.0	0.0
Overall	55	28	17	69	20	10	70	20	10	60	0	38.6	0.0

Table AA-11 (Army): Physician excursion 11 - decrease the AFHPSP constraint to 300

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	15
AFHPSP (200/400)	359	75	300	72
FAP (0/60)	55	12	55	13
Total	477	100	418	100
Accession mix at YOP-1				
USUHS	59	14	60	16
AFHPSP direct	255	60	254	68
AFHPSP deferred	59	14	8	2
FAP	52	12	52	14
Total	425	100	374	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,164
AFHPSP deferred	272	50
FAP	162	162
Total	2,076	1,628
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	755
Cost per fully trained duty physician ($)	254,810	261,455
Shortage of fully trained duty physicians	12.2	50.6
Cost adjusted for shortages ($M)	811	769
Cost as a percentage of baseline		94.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	44.6
O-6 shortage	0.8	7.7

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	84	24	12	120	0.0	(0.7)	16.0	16.0
Cardio	50	51	10	5	66	30	6	4	39	15.7	(10.6)	7.0	7.0
Family practice	491	349	85	62	496	348	83	61	491	5.2	0.2	50.0	50.0
General IM	309	295	59	34	387	244	55	31	329	78.4	20.5	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	138	30	17	184	22.0	14.4	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	774	217	115	1107	187.5	2.6	135.0	135.0
Overall	2,715	2,210	626	336	3,172	1,967	605	317	2,889	457.0	174.5	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	77	14	9	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	71	17	12	25	25	25.0	25.0
General IM	64	16	20	76	15	9	74	17	9	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	56	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	75	16	9	8	8	8.0	8.0
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	70	20	10	15	15	12.0	12.0
Overall	59	22	19	70	20	11	68	21	11	60	60	55.0	55.0

Table AA-11 (Navy): Physician excursion 11 - decrease the AFHPSP constraint to 300

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	13
AFHPSP (200/400)	327	78	300	77
FAP (0/60)	39	9	39	10
Total	417	100	390	100
Accession mix at YOP-1				
USUHS	44	12	44	13
AFHPSP direct	170	48	170	51
AFHPSP deferred	106	30	83	25
FAP	36	10	36	11
Total	357	100	333	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,164
AFHPSP deferred	507	414
FAP	113	113
Total	2,092	1,896
Training pipeline		
Interns[b]	235	235
GMOs	454	454
Residents/fellows	616	616
Total	1,305	1,305

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	545
Cost per fully trained duty physician ($)	260,456	266,520
Shortage of fully trained duty physicians	0.0	30.6
Cost adjusted for shortages ($M)	563	553
Cost as a percentage of baseline		98.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	6.3
O-6 shortage	0.0	7.4

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	97	28	13	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	283	70	50	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	133	28	13	175	39.5	39.5	31.0	31.0
General surgery	139	97	46	14	157	97	45	13	156	17.7	17.2	9.0	9.0
OB/GYN	124	87	24	13	124	72	32	20	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	66	29	11	106	0.0	(27.1)	11.0	11.0
Radiology	112	75	25	11	112	76	25	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	560	162	83	806	86.9	(0.3)	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,394	431	219	2,044	145.4	29.2	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	70	20	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	25.0
General IM	73	14	13	76	16	8	76	16	8	10	10	3.6	3.6
General surgery	48	30	22	62	29	9	62	29	9	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	58	25	16	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	62	28	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	67	23	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	70	20	10	15	15	10.0	10.0
Overall	55	28	17	69	20	10	68	21	11	60	60	38.6	38.6

Table AA-11 (Air Force): Physician excursion 11 - decrease the AFHPSP constraint to 300

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	13
AFHPSP (200/400)	309	75	300	74
FAP (0/60)	54	13	54	13
Total	414	100	405	100
Accession mix at YOP-1				
USUHS	48	13	48	13
AFHPSP direct	149	41	149	42
AFHPSP deferred	117	32	109	30
FAP	52	14	52	15
Total	366	100	358	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	1,164
AFHPSP deferred	536	500
FAP	107	107
Total	2,048	1,976
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	785

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	560
Cost per fully trained duty physician ($)	242,912	243,173
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	560
Cost as a percentage of baseline		98.9

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.3

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	54	16	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	3	31	0.5	0.5	5.0	5.0
Family practice	439	401	78	61	540	399	78	61	537	101.2	98.5	45.0	45.0
General IM	162	153	32	19	203	153	32	19	203	40.9	40.9	37.0	37.0
General surgery	111	67	32	13	111	67	32	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	99	22	13	134	17.8	17.8	12.0	12.0
Orthopedic surgery	91	129	24	9	163	102	24	9	134	71.8	43.1	7.0	7.0
Radiology	124	85	27	12	124	86	27	12	125	0.0	0.8	16.0	16.0
Other specialties	701	722	139	85	946	724	139	85	947	244.8	246.3	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,705	374	222	2,301	477.0	447.9	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	70	18	11	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	74	14	11	25	25	25.0	25.0
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	5.9
General surgery	73	13	15	60	28	11	60	28	11	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	74	16	10	8	8	8.0	8.0
Orthopedic surgery	75	19	6	80	15	5	76	18	6	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	69	22	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	76	15	9	15	15	13.4	13.4
Overall	76	15	9	74	16	10	74	16	10	60	60	54.1	54.3

Table AA-12 (Army): Physician excursion 12 - increase FAP subsidization by a $100,000 bonus

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	13
AFHPSP (200/400)	359	75	333	71
FAP (0/60)	55	12	72	15
Total	477	100	468	100
Accession mix at YOP-1				
USUHS	59	14	59	14
AFHPSP direct	255	60	255	61
AFHPSP deferred	59	14	37	9
FAP	52	12	68	16
Total	425	100	419	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Including a $100,000 bonus raises the FAP constraint to 92.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,292
AFHPSP deferred	272	183
FAP	162	213
Total	2,076	1,940
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see t

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	798
Cost per fully trained duty physician ($)	254,810	255,104
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	801
Cost as a percentage of baseline		98.8

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.8
O-6 shortage	0.8	0.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	87	24	12	124	0.0	2.9	16.0	16.0
Cardio	50	51	10	5	66	37	10	5	52	15.7	1.7	7.0	7.0
Family practice	491	349	85	62	496	375	85	62	522	5.2	30.9	50.0	50.0
General IM	309	295	59	34	387	259	59	34	352	78.4	42.7	55.0	55.0
General surgery	185	139	77	32	248	139	77	32	248	62.9	62.9	24.0	24.0
OB/GYN	170	141	32	19	192	120	32	19	171	22.0	0.9	21.0	21.0
Orthopedic surgery	145	114	62	23	199	114	62	23	199	54.0	54.0	20.0	20.0
Radiology	140	96	52	23	171	96	52	23	171	31.2	31.2	16.0	16.0
Other specialties	1104	941	225	126	1292	942	224	126	1291	187.5	187.1	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,169	624	337	3,129	457.0	414.4	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	71	20	10	0	1	0.0	1.0
Cardio	57	28	15	77	15	8	71	19	10	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	72	16	12	25	33	25.0	33.0
General IM	64	16	20	76	15	9	74	17	10	10	13	10.0	13.0
General surgery	49	28	22	56	31	13	56	31	13	0	4	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	18	11	8	10	8.0	2.3
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	1	0.0	0.0
Radiology	68	18	15	56	30	14	56	30	14	2	3	0.0	0.0
Other specialties	52	25	23	73	17	10	73	17	10	15	27	12.0	23.0
Overall	59	22	19	70	20	11	69	20	11	60	92	55.0	72.3

Table AA-12 (Navy): Physician excursion 12 - increase FAP subsidization by a $100,000 bonus

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	51	12
AFHPSP (200/400)	327	78	314	75
FAP (0/60)	39	9	54	13
Total	417	100	419	100
Accession mix at YOP-1				
USUHS	44	12	44	12
AFHPSP direct	170	48	170	47
AFHPSP deferred	106	30	94	26
FAP	36	10	51	14
Total	357	100	359	100

a. Annual accession source constraints are in parentheses (minimum/maximum).
Including a $100,000 bonus raises the FAP constraint to 92.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,268	1,216
AFHPSP deferred	507	468
FAP	113	160
Total	2,092	2,048
Training pipeline		
Interns[b]	235	235
GMOs	454	454
Residents/fellows	616	616
Total	1,305	1,305

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	560
Cost per fully trained duty physician ($)	260,456	259,471
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	560
Cost as a percentage of baseline		99.6

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	30	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	10	11	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	313	70	51	433	1.2	30.4	43.0	43.0
General IM	135	133	28	13	175	133	28	13	175	39.5	39.5	31.0	31.0
General surgery	139	97	46	14	157	96	46	14	156	17.7	17.1	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	13	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	83	37	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	76	25	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	604	173	87	864	86.9	57.7	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,495	443	222	2,160	145.4	144.8	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	69	21	10	0	1	0.0	0.0
Cardio	52	30	19	39	45	15	39	45	15	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	72	16	12	25	33	25.0	33.0
General IM	73	14	13	76	16	8	76	16	8	10	13	3.6	3.6
General surgery	48	30	22	62	29	9	61	30	9	0	4	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	10	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	63	27	10	0	1	0.0	0.0
Radiology	48	40	12	67	23	10	67	23	10	2	3	0.0	0.0
Other specialties	42	36	22	71	19	10	70	20	10	15	27	10.0	17.6
Overall	55	28	17	69	20	10	69	21	10	60	92	38.6	54.2

Table AA-12 (Air Force): Physician excursion 12 - increase FAP subsidization by a $100,000 bonus

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	14
AFHPSP (200/400)	309	75	243	65
FAP (0/60)	54	13	81	21
Total	414	100	375	100
Accession mix at YOP-1				
USUHS	48	13	48	15
AFHPSP direct	149	41	149	45
AFHPSP deferred	117	32	58	17
FAP	52	14	77	23
Total	366	100	332	100

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	935
AFHPSP deferred	536	288
FAP	107	159
Total	2,048	1,586
Training pipeline		
Interns[b]	201	202
Residents/fellows	584	585
Total	785	786

a. Annual accession source constraints are in parentheses (minimum/maximum).
Including a $100,000 bonus raises the FAP constraint to 92.

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	534
Cost per fully trained duty physician ($)	242,912	244,781
Shortage of fully trained duty physicians	1.9	1.9
Cost adjusted for shortages ($M)	566	535
Cost as a percentage of baseline		94.4

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	54	16	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	4	32	0.5	0.5	5.0	5.0
Family practice	439	401	78	61	540	344	77	60	481	101.2	42.1	45.0	45.0
General IM	162	153	32	19	203	153	32	19	203	40.9	40.9	37.0	37.0
General surgery	111	67	32	13	111	75	25	11	112	0.0	0.9	13.0	13.0
OB/GYN	116	99	22	13	134	105	22	13	140	17.8	23.6	12.0	12.0
Orthopedic surgery	91	129	24	9	163	108	24	9	141	71.8	49.9	7.0	7.0
Radiology	124	85	27	12	124	85	27	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	645	142	84	872	244.8	170.9	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,591	371	219	2,182	477.0	328.8	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	1	0.0	1.0
Cardio	71	11	18	70	18	11	70	18	11	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	71	16	12	25	33	25.0	33.0
General IM	80	13	7	75	16	9	75	16	9	10	13	5.9	5.9
General surgery	73	13	15	60	28	11	67	23	10	0	4	0.0	4.0
OB/GYN	83	11	6	74	16	10	75	16	9	8	10	8.0	9.4
Orthopedic surgery	75	19	6	80	15	5	77	17	6	0	1	0.0	1.0
Radiology	71	21	8	68	22	10	68	22	10	2	3	1.8	1.8
Other specialties	69	20	11	76	15	9	74	16	10	15	27	13.4	24.4
Overall	76	15	9	74	16	10	73	17	10	60	92	54.1	80.5

Table AA-13 (Army): Physician excursion 13 - increase entitlement special pays (VSP, ASP, and BCP) by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	14
AFHPSP (200/400)	359	75	326	74
FAP (0/60)	55	12	49	11
Total	477	100	438	100
Accession mix at YOP-1				
USUHS	59	14	59	15
AFHPSP direct	255	60	255	65
AFHPSP deferred	59	14	32	8
FAP	52	12	46	12
Total	425	100	392	100

b. Please see table A-3, footnote c.

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,262
AFHPSP deferred	272	148
FAP	162	145
Total	2,076	1,807
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	841
Cost per fully trained duty physician ($)	254,810	276,348
Shortage of fully trained duty physicians	12.2	12.2
Cost adjusted for shortages ($M)	811	844
Cost as a percentage of baseline		104.0

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.7
O-6 shortage	0.8	0.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	85	24	12	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	35	9	6	50	15.7	0.0	7.0	7.0
Family practice	491	349	85	62	496	347	84	63	494	5.2	3.2	50.0	50.0
General IM	309	295	59	34	387	249	59	34	342	78.4	32.7	55.0	55.0
General surgery	185	139	77	32	248	140	79	34	253	62.9	67.5	24.0	24.0
OB/GYN	170	141	32	19	192	119	31	20	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	115	63	24	202	54.0	56.6	20.0	20.0
Radiology	140	96	52	23	171	97	53	25	174	31.2	34.4	16.0	16.0
Other specialties	1104	941	225	126	1292	882	224	130	1236	187.5	132.1	135.0	135.0
Overall	2,715	2,210	626	336	3,172	2,067	627	348	3,042	457.0	326.5	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	70	19	11	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	25	25.0	25.0
General IM	64	16	20	76	15	9	73	17	10	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	55	31	13	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	18	12	8	8	8.0	2.4
Orthopedic surgery	55	36	10	57	31	12	57	31	12	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	55	30	14	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	71	18	11	15	15	12.0	12.0
Overall	59	22	19	70	20	11	68	21	11	60	60	55.0	49.4

Table AA-13 (Navy): Physician excursion 13 - increase entitlement special pays (VSP, ASP, and BCP) by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	46	12
AFHPSP (200/400)	327	78	314	80
FAP (0/60)	39	9	34	9
Total	417	100	395	100
Accession mix at YOP-1				
USUHS	44	12	40	12
AFHPSP direct	170	48	174	52
AFHPSP deferred	106	30	91	27
FAP	36	10	32	10
Total	357	100	337	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	184
AFHPSP students	1,268	1,221
AFHPSP deferred	507	453
FAP	113	100
Total	2,092	1,958
Training pipeline		
Interns[b]	235	235
GMOs	454	454
Residents/fellows	616	616
Total	1,305	1,305

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	615
Cost per fully trained duty physician ($)	260,456	297,999
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	615
Cost as a percentage of baseline		109.3

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	95	29	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	9	12	4	25	0.0	0.0	4.0	4.0
Family practice	403	283	70	51	404	282	69	52	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	119	28	14	160	39.5	25.3	31.0	31.0
General surgery	139	97	46	14	157	97	45	14	156	17.7	17.3	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	14	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	84	36	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	76	24	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	554	170	89	813	86.9	6.9	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,404	435	225	2,064	145.4	49.4	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	69	21	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	36	46	18	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	24.6
General IM	73	14	13	76	16	8	74	17	8	10	10	3.6	0.0
General surgery	48	30	22	62	29	9	62	29	9	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	63	27	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	68	22	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	68	21	11	15	15	10.0	9.6
Overall	55	28	17	69	20	10	68	21	11	60	60	38.6	34.2

Table AA-13 (Air Force): Physician excursion 13 - increase entitlement special pays (VSP, ASP, and BCP) by 20 percent

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	15
AFHPSP (200/400)	309	75	245	71
FAP (0/60)	54	13	51	15
Total	414	100	347	100
Accession mix at YOP-1				
USUHS	48	13	48	16
AFHPSP direct	149	41	149	48
AFHPSP deferred	117	32	64	21
FAP	52	14	49	16
Total	366	100	310	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	952
AFHPSP deferred	536	309
FAP	107	101
Total	2,048	1,565
Training pipeline		
Interns[b]	201	201
Residents/fellows	584	584
Total	785	786

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	535
Cost per fully trained duty physician ($)	242,912	253,574
Shortage of fully trained duty physicians	1.9	1.7
Cost adjusted for shortages ($M)	566	536
Cost as a percentage of baseline		94.6

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	55	16	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	6	4	32	0.5	0.6	5.0	5.0
Family practice	439	401	78	61	540	317	76	60	453	101.2	14.1	45.0	45.0
General IM	162	153	32	19	203	149	31	18	199	40.9	37.4	37.0	37.0
General surgery	111	67	32	13	111	66	31	13	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	92	22	13	127	17.8	10.7	12.0	12.0
Orthopedic surgery	91	129	24	9	163	88	24	9	121	71.8	30.1	7.0	7.0
Radiology	124	85	27	12	124	86	26	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	642	138	85	866	244.8	164.5	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,518	370	222	2,110	477.0	257.4	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	71	18	12	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	70	17	13	25	25	25.0	25.0
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	4.9
General surgery	73	13	15	60	28	11	60	28	12	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	73	17	10	8	8	8.0	6.4
Orthopedic surgery	75	19	6	80	15	5	73	20	7	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	69	21	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	74	16	10	15	15	13.4	12.7
Overall	76	15	9	74	16	10	72	18	11	60	60	54.1	51.0

Table AA-14 (Army): Physician excursion 14 - increase caps on discretionary special pays (ISP to $45,000 and MSP to $20,000)

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	63	15
AFHPSP (200/400)	359	75	316	75
FAP (0/60)	55	12	44	10
Total	477	100	423	100
Accession mix at YOP-1				
USUHS	59	14	59	16
AFHPSP direct	255	60	255	68
AFHPSP deferred	59	14	21	6
FAP	52	12	41	11
Total	425	100	377	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	252
AFHPSP students	1,390	1,227
AFHPSP deferred	272	121
FAP	162	130
Total	2,076	1,730
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	801
Cost per fully trained duty physician ($)	254,810	268,513
Shortage of fully trained duty physicians	12.2	12.1
Cost adjusted for shortages ($M)	811	804
Cost as a percentage of baseline		99.1

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.7
O-6 shortage	0.8	0.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	85	24	13	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	36	9	6	51	15.7	0.9	7.0	7.0
Family practice	491	349	85	62	496	344	84	64	491	5.2	0.2	50.0	50.0
General IM	309	295	59	34	387	248	59	34	341	78.4	32.0	55.0	55.0
General surgery	185	139	77	32	248	140	81	37	258	62.9	72.6	24.0	24.0
OB/GYN	170	141	32	19	192	119	31	20	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	115	64	26	205	54.0	59.6	20.0	20.0
Radiology	140	96	52	23	171	97	55	27	179	31.2	38.7	16.0	16.0
Other specialties	1104	941	225	126	1292	811	227	130	1168	187.5	63.7	135.0	135.0
Overall	2,715	2,210	626	336	3,172	1,995	633	356	2,983	457.0	267.7	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	19	11	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	71	18	12	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	25	25.0	24.6
General IM	64	16	20	76	15	9	73	17	10	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	54	31	14	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	18	12	8	8	8.0	2.6
Orthopedic surgery	55	36	10	57	31	12	56	31	13	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	54	31	15	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	69	19	11	15	15	12.0	6.9
Overall	59	22	19	70	20	11	67	21	12	60	60	55.0	44.1

Table AA-14 (Navy): Physician excursion 14 - increase caps on discretionary special pays (ISP to $45,000 and MSP to $20,000)

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	38	10
AFHPSP (200/400)	327	78	323	82
FAP (0/60)	39	9	35	9
Total	417	100	396	100
Accession mix at YOP-1				
USUHS	44	12	33	10
AFHPSP direct	170	48	181	54
AFHPSP deferred	106	30	91	27
FAP	36	10	32	10
Total	357	100	337	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	152
AFHPSP students	1,268	1,256
AFHPSP deferred	507	454
FAP	113	101
Total	2,092	1,964
Training pipeline		
Interns[b]	235	235
GMOs	454	455
Residents/fellows	616	616
Total	1,305	1,306

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	612
Cost per fully trained duty physician ($)	260,456	296,829
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	612
Cost as a percentage of baseline		108.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	97	28	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	8	12	6	25	0.0	0.4	4.0	4.0
Family practice	403	283	70	51	404	282	69	52	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	119	28	14	160	39.5	25.3	31.0	31.0
General surgery	139	97	46	14	157	97	45	15	156	17.7	17.3	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	14	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	86	34	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	78	23	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	549	169	91	809	86.9	3.2	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,401	431	230	2,061	145.4	46.2	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	70	20	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	31	47	22	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	24.9
General IM	73	14	13	76	16	8	74	17	8	10	10	3.6	0.0
General surgery	48	30	22	62	29	9	62	29	10	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	64	26	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	70	20	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	68	21	11	15	15	10.0	9.7
Overall	55	28	17	69	20	10	68	21	11	60	60	38.6	34.6

Table AA-14 (Air Force): Physician excursion 14 - increase caps on discretionary special pays (ISP to $45,000 and MSP to $20,000)

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	16
AFHPSP (200/400)	309	75	221	69
FAP (0/60)	54	13	48	15
Total	414	100	320	100
Accession mix at YOP-1				
USUHS	48	13	48	17
AFHPSP direct	149	41	149	52
AFHPSP deferred	117	32	43	15
FAP	52	14	46	16
Total	366	100	287	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	862
AFHPSP deferred	536	202
FAP	107	96
Total	2,048	1,363
Training pipeline		
Interns[b]	201	202
Residents/fellows	584	584
Total	785	786

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	521
Cost per fully trained duty physician ($)	242,912	258,328
Shortage of fully trained duty physicians	1.9	1.6
Cost adjusted for shortages ($M)	566	522
Cost as a percentage of baseline		92.1

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	55	15	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	22	5	4	32	0.5	0.6	5.0	5.0
Family practice	439	401	78	61	540	315	76	60	451	101.2	12.2	45.0	45.0
General IM	162	153	32	19	203	149	31	19	199	40.9	36.6	37.0	37.0
General surgery	111	67	32	13	111	66	31	14	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	81	21	13	116	17.8	0.0	12.0	12.0
Orthopedic surgery	91	129	24	9	163	59	23	9	91	71.8	0.0	7.0	7.0
Radiology	124	85	27	12	124	87	24	12	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	590	141	86	817	244.8	115.6	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,424	369	225	2,018	477.0	165.1	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	20	10	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	71	17	12	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	70	17	13	25	25	25.0	25.0
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	4.8
General surgery	73	13	15	60	28	11	59	28	13	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	70	18	12	8	8	8.0	3.9
Orthopedic surgery	75	19	6	80	15	5	65	25	10	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	70	20	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	72	17	10	15	15	13.4	12.6
Overall	76	15	9	74	16	10	71	18	11	60	60	54.1	48.2

Table AA-15 (Army): Physician excursion 15 - increase entitlement and discretionary special pays

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/63)	63	13	53	13
AFHPSP (200/400)	359	75	324	77
FAP (0/60)	55	12	43	10
Total	477	100	420	100
Accession mix at YOP-1				
USUHS	59	14	50	13
AFHPSP direct	255	60	264	71
AFHPSP deferred	59	14	20	5
FAP	52	12	40	11
Total	425	100	374	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	252	213
AFHPSP students	1,390	1,257
AFHPSP deferred	272	107
FAP	162	125
Total	2,076	1,703
Training pipeline		
Interns[b]	329	329
Residents/fellows	882	882
Total	1,211	1,211

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	808	812
Cost per fully trained duty physician ($)	254,810	271,708
Shortage of fully trained duty physicians	12.2	12.0
Cost adjusted for shortages ($M)	811	816
Cost as a percentage of baseline		100.5

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	1.8	1.6
O-6 shortage	0.8	0.7

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	121	84	24	12	121	85	23	13	121	0.0	0.0	16.0	16.0
Cardio	50	51	10	5	66	35	9	6	50	15.7	0.0	7.0	7.0
Family practice	491	349	85	62	496	344	83	65	491	5.2	0.0	50.0	50.0
General IM	309	295	59	34	387	248	58	35	340	78.4	31.3	55.0	55.0
General surgery	185	139	77	32	248	140	83	40	263	62.9	77.7	24.0	24.0
OB/GYN	170	141	32	19	192	119	31	20	170	22.0	0.0	21.0	21.0
Orthopedic surgery	145	114	62	23	199	115	65	27	207	54.0	62.3	20.0	20.0
Radiology	140	96	52	23	171	97	56	29	182	31.2	42.3	16.0	16.0
Other specialties	1104	941	225	126	1292	799	230	137	1166	187.5	61.5	135.0	135.0
Overall	2,715	2,210	626	336	3,172	1,982	637	371	2,990	457.0	275.1	344.0	344.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	71	20	8	70	20	10	70	19	11	0	0	0.0	0.0
Cardio	57	28	15	77	15	8	70	17	13	0	0	0.0	0.0
Family practice	68	15	17	70	17	13	70	17	13	25	25	25.0	25.0
General IM	64	16	20	76	15	9	73	17	10	10	10	10.0	10.0
General surgery	49	28	22	56	31	13	53	31	15	0	0	0.0	0.0
OB/GYN	73	16	11	73	17	10	70	18	12	8	8	8.0	2.8
Orthopedic surgery	55	36	10	57	31	12	56	31	13	0	0	0.0	0.0
Radiology	68	18	15	56	30	14	53	31	16	2	2	0.0	0.0
Other specialties	52	25	23	73	17	10	69	20	12	15	15	12.0	5.0
Overall	59	22	19	70	20	11	66	21	12	60	60	55.0	42.7

Table AA-15 (Navy): Physician excursion 15 - increase entitlement and discretionary special pays

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/51)	51	12	30	8
AFHPSP (200/400)	327	78	348	89
FAP (0/60)	39	9	12	3
Total	417	100	391	100
Accession mix at YOP-1				
USUHS	44	12	26	8
AFHPSP direct	170	48	188	57
AFHPSP deferred	106	30	105	32
FAP	36	10	13	4
Total	357	100	332	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	121
AFHPSP students	1,268	1,356
AFHPSP deferred	507	497
FAP	113	38
Total	2,092	2,011
Training pipeline		
Interns[b]	235	235
GMOs	454	455
Residents/fellows	616	616
Total	1,305	1,306

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	563	623
Cost per fully trained duty physician ($)	260,456	301,846
Shortage of fully trained duty physicians	0.0	0.0
Cost adjusted for shortages ($M)	563	623
Cost as a percentage of baseline		110.7

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	138	95	30	14	138	97	27	14	138	0.0	0.0	18.0	18.0
Cardio	25	10	11	4	25	8	13	6	27	0.0	1.7	4.0	4.0
Family practice	403	283	70	51	404	282	68	53	403	1.2	0.0	43.0	43.0
General IM	135	133	28	13	175	119	28	14	160	39.5	25.4	31.0	31.0
General surgery	139	97	46	14	157	93	46	17	156	17.7	17.3	9.0	9.0
OB/GYN	124	87	24	13	124	87	24	14	124	0.0	0.0	13.0	13.0
Orthopedic surgery	133	83	37	13	133	86	33	13	133	0.0	0.0	11.0	11.0
Radiology	112	75	25	11	112	78	22	11	112	0.0	0.0	14.0	14.0
Other specialties	806	633	171	89	893	544	169	97	810	86.9	3.9	78.0	78.0
Overall	2,015	1,496	442	223	2,160	1,395	430	239	2,063	145.4	48.2	221.0	221.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	64	24	12	69	21	10	70	20	10	0	0	0.0	0.0
Cardio	52	30	19	39	45	15	29	47	24	0	0	0.0	0.0
Family practice	65	20	15	70	17	13	70	17	13	25	25	25.0	12.2
General IM	73	14	13	76	16	8	74	17	8	10	10	3.6	0.0
General surgery	48	30	22	62	29	9	60	30	11	0	0	0.0	0.0
OB/GYN	83	12	5	70	19	11	70	19	11	8	8	0.0	0.0
Orthopedic surgery	69	19	13	63	27	10	65	25	10	0	0	0.0	0.0
Radiology	48	40	12	67	23	10	70	20	10	2	2	0.0	0.0
Other specialties	42	36	22	71	19	10	67	21	12	15	15	10.0	0.0
Overall	55	28	17	69	20	10	68	21	12	60	60	38.6	12.2

Table AA-15 (Air Force): Physician excursion 15 - increase entitlement and discretionary special pays

Steady-state accessions and accession and training inventories

	Baseline		Excursion	
Accession mix	Number	Percent	Number	Percent
Accession pipeline mix[a]				
USUHS (0/53)	51	12	51	17
AFHPSP (200/400)	309	75	209	71
FAP (0/60)	54	13	34	12
Total	414	100	294	100
Accession mix at YOP-1				
USUHS	48	13	48	18
AFHPSP direct	149	41	149	56
AFHPSP deferred	117	32	33	13
FAP	52	14	33	13
Total	366	100	264	100

a. Annual accession source constraints are in parentheses (minimum/maximum).

Inventory	Baseline	Excursion
Accession pipepline		
USUHS students	204	204
AFHPSP students	1,201	813
AFHPSP deferred	536	164
FAP	107	68
Total	2,048	1,249
Training pipeline		
Interns[b]	201	202
Residents/fellows	584	584
Total	785	786

b. Please see table A-3, footnote c.

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of medical corps ($M)	566	521
Cost per fully trained duty physician ($)	242,912	270,085
Shortage of fully trained duty physicians	1.9	1.4
Cost adjusted for shortages ($M)	566	521
Cost as a percentage of baseline		92.0

Steady-state annual experience profile shortages

Experience group	Baseline	Excursion
O-5/6 shortage	0.0	0.0
O-6 shortage	0.0	0.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GME starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Anesthesiology	78	54	16	8	78	55	15	8	78	0.0	0.0	8.0	8.0
Cardio	31	22	6	3	32	23	6	4	33	0.5	1.6	5.0	5.0
Family practice	439	401	78	61	540	306	75	61	442	101.2	3.0	45.0	45.0
General IM	162	153	32	19	203	146	31	18	195	40.9	33.3	37.0	37.0
General surgery	111	67	32	13	111	65	31	14	111	0.0	0.0	13.0	13.0
OB/GYN	116	99	22	13	134	81	21	14	116	17.8	0.0	12.0	12.0
Orthopedic surgery	91	129	24	9	163	60	22	9	91	71.8	0.0	7.0	7.0
Radiology	124	85	27	12	124	87	24	13	124	0.0	0.0	16.0	16.0
Other specialties	701	722	139	85	946	512	141	84	737	244.8	36.3	74.0	74.0
Overall	1,853	1,733	375	223	2,330	1,335	367	225	1,927	477.0	74.2	217.0	217.0

Steady-state annual percentage paygrade distribution and FAP accessions by specialty

	FY 2000			Baseline			Excursion			FAP constraint		FAP accessions	
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6	Baseline	Excursion	Baseline	Excursion
Anesthesiology	81	10	9	70	20	10	70	19	11	0	0	0.0	0.0
Cardio	71	11	18	70	18	11	69	18	13	0	0	0.0	0.0
Family practice	84	11	5	74	14	11	69	17	14	25	25	25.0	22.2
General IM	80	13	7	75	16	9	75	16	9	10	10	5.9	3.8
General surgery	73	13	15	60	28	11	59	28	13	0	0	0.0	0.0
OB/GYN	83	11	6	74	16	10	70	18	12	8	8	8.0	3.9
Orthopedic surgery	75	19	6	80	15	5	66	24	10	0	0	0.0	0.0
Radiology	71	21	8	68	22	10	70	19	10	2	2	1.8	2.0
Other specialties	69	20	11	76	15	9	69	19	11	15	15	13.4	2.1
Overall	76	15	9	74	16	10	69	19	12	60	60	54.1	34.1

Appendix B: Dentists' results

Background

In phase I of the life-cycle-cost study, we identified the key components that drive the life-cycle costs for selected uniformed health care professionals' predominant accession sources and career paths [1]. Two questions that phase I did not answer are the following:

1. Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions?
2. Is it more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?

In phase II of the study, we developed and ran a model to assess the most economical mix of accessions to fill duty billet requirements in the future, assessed the efficacy of current accession/retention programs, and recommended ways to strengthen the personnel planning process.[1]

Basic model

The basic model we used to look at the optimal mix of accessions is a cost minimization model. The objective function of this model is the following:

1. Duty billets refer to those billets that are for fully trained personnel who are not in training. By a duty dentist, we mean someone who is not in training and is qualified to fill one of these billets.

$$\min Cost = \sum_i \sum_j Cost_j Trainees_j Year_i + \sum_i \sum_j Cost_j GeneralDentists_j Year_i$$
$$+ \sum_i \sum_j Cost_j GDEs_j Year_i + \sum_i \sum_j Cost_j Specialists_j Year_i + penalties$$

subject to

$$Accessions_i \in [\min, \max] \text{ for } i = 1 \text{ to } 3$$

$$Bodies_i \geq Billets_i \text{ or pay penalty for general dentists and specialties } i = 1 \text{ to } 10$$

$$First\ yr\ residents_i = GDE\ starts_i \text{ for specialties } i = 1 \text{ to } 9$$

$$O\text{-}6s_i \geq \min_i \text{ or pay penalty for specialties } i = 1 \text{ to } 9$$

$$O\text{-}5s_i + O\text{-}6s_i \geq \min_i \text{ or pay penalty for specialties } i = 1 \text{ to } 9.$$

Note that trainees are those in the accession pipeline and GDEs are those in a dental residency. Subscripts *"i"* represent the fiscal year between FY 2003 and FY 2083. Subscripts *"j"* represent the accession source, year of practice, and specialty combination for the cost and inventory associated with that combination.[2] A simpler way to state this model is that we are *minimizing the total cost (over a long time horizon) of meeting all of the dental corps requirements given the constraints the Services and DoD place on the dental corps.*[3]

Steady-state solution

We use a long time horizon to obtain the steady-state solution to the model. What is meant by the optimal accession mix in the *steady state?* If we ran the model with a 1-year time horizon, the output of the model would tell us the optimal mix of accessions given that time horizon. Assuming that the model is currently out of equilibrium, if we ran the model over a 2-year time horizon, the optimal mix of accessions would be different in the second year than in the first. This would occur because the model has 2 years to move the dental corps toward its long-term optimal mix of accessions. Essentially, the steady state is a solution in which the optimal mix of accessions is the same year after year.

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2. The inventory for group j is the group's inventory at year i - 1 less attrition.

3. We ran this optimization model using the software package, AMPL.

To find the optimal mix of accessions in the steady state, we ran the model for 80 years to let personnel currently in the dental corps or one of its accession pipelines work their way out of the system. For example, personnel in their first year of dental school under the Armed Forces Health Professions Scholarship Program (AFHPSP) will need 4 years to complete dental school. Once on active duty, they may be in the dental corps for another 30 years. So, in total, they are in the system for 34 years, counting time in dental school.

What this means is that the personnel we put into the system today will affect it for years to come. Consequently, what the model says the optimal mix of accessions is for each year depends on what is currently in the system. Eventually, however, when current inventory works out of the model, we reach a point where the optimal mix of accessions is stable—and doesn't vary much from year to year. This stable accession mix is what we call the steady-state solution. This also implies that there is an optimal path of accessions to reach the steady state. This path depends on the current inventory in the system. Although we are not reporting the optimal path to the steady state, we want to be clear that the steady-state accession mix and the path of accessions to reach the steady state are *not* the same.

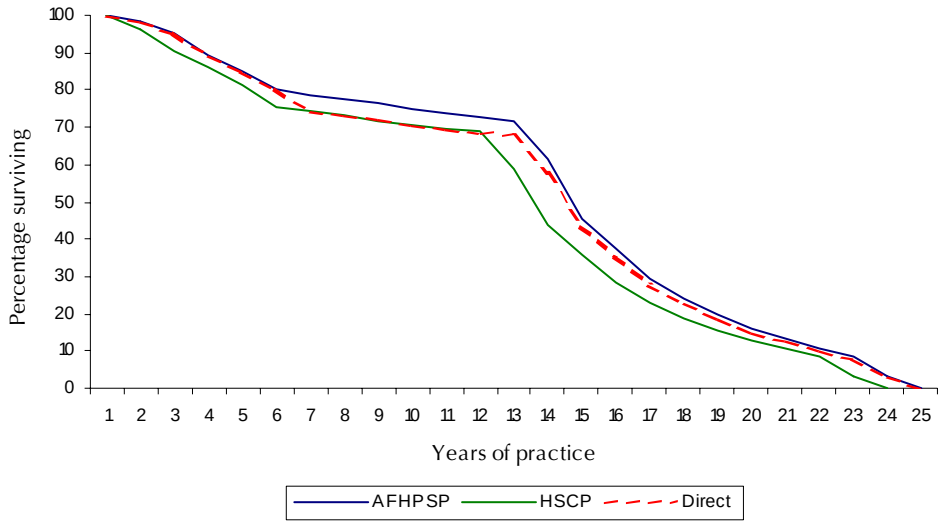
Model costs and retention

The costs we modeled are training and accession costs, compensation, PCS costs, and temporary duty costs [1]. Costs are largely driven by the career path—timing of promotions, training, and board certification. In conjunction with TMA and representatives from each Service, we determined in phase I the predominant career path by specialty, accession source, and Service. Although we will not determine the impact of the career path on the optimal mix of accessions by altering it in various model excursions, if the career path changes, costs and continuation patterns will change (see [1]).

Given the career paths we developed in phase I, we computed average retention for each accession source using data for FY 1991-2000 from the Defense Manpower Data Center (DMDC). When computing the optimal mix of accessions, however, we will use the entire survival curve (which incorporates attrition by year of service and not average

attrition across all years of services).[4] For example, figure B-1 shows the survival curves for each of the three major accession sources for Navy dentists.

Figure B-1. Percentage of Navy comprehensive dentists surviving by years of practice and accession source



Constraints

If we don't place any constraints on the model, the obvious solution to the optimal mix of accessions is to have all new accessions come from the least expensive accession source. Allowing the model to be

4. Because the AFHPSP and the HSCP (Health Services Collegiate Program) are fairly new for the dental corps, not enough time has passed to develop survival curves unique to these accession sources. Consequently, we computed a survival curve for the entire dental corps. We then modified this survival curve for each accession source to reflect survival rate differences we expect based on what we know of physician accession sources. For example, we assumed that AFHPSP accessions have slightly better retention than direct accessions. But, as figure B-1 shows, we didn't build in large differences in survival rates.

unconstrained doesn't reflect the environment in which the Services operate (market supply and demand as well as unique military requirements). Consequently, we imposed the following constraints on the model:

- Billets
- Experience profile requirements
- Accession source caps
- In-house training requirements.

Billets

The first constraint is the number of billets that must be filled. Note that we modeled billets in general dentistry and 9 specialties. We did not model executive dentistry because our focus was on clinical billets. Though we haven't modeled all billets, also note that we didn't model about 7 percent of dentists' historical accessions because we focused on the predominant accession sources. From this point forward, we will use "billets" to describe the subset of billets considered in our model and not the entire universe of billets.

From a modeling standpoint, the number of billets is the *minimum* number of duty dentists the Services require—not the maximum they can have. For military personnel planners, authorized billets represent more of the maximum number of bodies the Services can have on active duty at the end of any given fiscal year. To fill the billets with the exact same number of bodies, we would have to constrain bodies to be no less and no more than billets. However, doing this makes the model infeasible because there are other constraints on the model that may force bodies to exceed billets or may not allow them to reach billets.

That said, the model doesn't want more bodies than billets because it is trying to minimize cost and, obviously, each extra body is costly. In other words, modeling billets as the minimum number of bodies is akin to modeling a target number of billets; in the steady state, the number of bodies exceeds billets *only* if the model's other constraints force it to do so.

Experience profile

One potential driver of the model is the desired experience profile of the force. What percentage of the duty specialists should be O-6s and what percentage should be at least O-5s? Though it will always be the case that it is most cost-effective to fill junior billets with the least expensive accession source, it may be more cost-effective to fill senior billets with more expensive accession sources if the retention rates of these accession sources are substantially higher than the least costly one.[5]

Accession source caps

Even when we impose a force structure constraint on the model, the model may find that the optimal mix of accessions consists of more dentists from some accession sources than the Services could reasonably get. For example, direct procurement is the least expensive of the three major dentist accession sources; however, the number of direct procurement accessions the Services can access is limited given the programs' current incentives.

For this reason, another critical constraint is the maximum number of accessions the Services can expect from each source given the current rewards of the program. Hence, though the Services may want more direct procurement accessions, they may not be able to get more without increasing the subsidization of the program. We also constrain the model to use all subsidized accession sources to some minimum extent. This ensures that the programs remain a politically viable option for the Services from year to year.

5. We are not directly filling senior billets with new accessions, but we fill them with accessions that move up through the ranks. Differences in costs and retention patterns across accession sources, therefore, can make it more or less costly to fill senior billets from specific accession sources. Note that we are not saying that senior billets should be filled exclusively with a certain accession source, but that some accession sources make filling these positions easier than others.

In-house training requirements

The in-house training requirements are requirements for the size of the graduate dental education (GDE) program. Though in-house training is an important consideration for *all* the communities we considered in our analysis, correctly characterizing the in-house training requirement is particularly important for the dental community.[6]

Unlike the programs used to access fully trained physicians (AFHPSP deferred and FAP), the Services do not currently have accession programs designed to bring in significant numbers of fully trained dental specialists. Therefore, the Services rely almost exclusively on the in-house training programs to meet their dental specialists billet requirement.

Penalties

Sometimes the model's constraints will not allow the model to fill all of the requirements. For example, the constraints of the model may not allow it to fill all of the billet requirements. When this occurs, the model has not technically met the minimum billet requirement. Again, if we imposed the billet requirement as a hard minimum, the model would be infeasible because the other constraints simply don't allow the model to meet the billet requirement. To overcome this problem, we've constructed the model so that it handles these cases by imposing an arbitrarily large financial penalty. In other words, we allow the model to meet the requirement that it couldn't fill it with a uniformed dentist by buying a civilian dentist.

Note that we set the penalty arbitrarily large so that it will always use a uniformed dentist if the constraints allow it. Our tasking in this study was to determine the most cost-effective way of filling billets with military personnel, so we designed the model so that it would go

6. Although the Services primarily get the vast majority of their dental specialists through in-house training programs, they occasionally access a few FAP or direct procurement (fully trained) dental specialists. Because these accessions are so limited in number, we have not modeled them.

to the civilian sector to fill a requirement only if the constraints of the system do not allow it to fill a requirement with a military dentist. Future studies should examine the cost-effectiveness of the make-buy decision for billets above readiness requirements.

In addition to a financial penalty for failing to meet billet requirements, the model includes a financial penalty if the constraints do not allow it to fill experience profile requirements. Note that the penalty costs for failing to fill requirements with military personnel or personnel of the right experience level *are not included in the cost figures that we report.* The cost figures represent only those costs associated with military personnel—the life-cycle costs we developed in phase I of the study. However, we did adjust cost for billet requirement shortages. We make this adjustment by putting in the average billet cost for each unfilled billet.[7]

Other modeling issues

We modeled the process of filling billets using continuous variables rather than an integer programming approach. This means that we allowed for fractions of personnel, such as accessing 4.5 in the steady state rather than forcing the model to always use a whole number. Because we are looking for a steady-state solution, all we really want is the average number of personnel that should be accessed each year. So, if the steady state is 4.5, we interpret the steady state as accessing 4 one year and 5 in the next. Integer programming would add substantially to the modeling complexity without meaningfully affecting the results.

Another modeling issue is the starting point—today's inventory of specialists and trainees in the dental corps as well as the inventory in the accession pipelines. The starting point is the driver for how and whether the Services will be able to meet near-term requirements. That said, the starting point we used for inventories *does not affect the optimal mix of accessions in the steady state* because, once enough time

7. Adjusting costs for unfilled experience requirements in the steady state was never an issue for the dental model because experience constraints are all easily met.

passes to let the current inventory work through the system, the model reaches the same steady state regardless of the starting point. What it affects is the time it takes to reach the steady state and the path used to reach it.

Baseline assumptions

Now that we have conceptually discussed the model, we present the assumptions we made for our baseline model. The purpose of the baseline model is twofold. First, given the basic parameters and constraints, it determines the long-term consequences in terms of meeting requirements. That is, the baseline tells us whether the Services can meet their requirements given the current constraints on the system and the optimal mix of accessions to use. Second, the baseline model provides a reference point, to which we compare all of our various excursions.

Billets, GDE starts, and accession source caps

Table B-1 details our baseline assumptions for billets and GDE starts for each Service. The Navy's billet requirement is 1,018, which is a little larger than in the Army (933) and the Air Force (946). Again, these figures are for billets in general dentistry and the 9 specialties we considered in this study—they do not include executive dentistry billets.

In addition to differences in the number of billets, the mix of specialties varies considerably among the Services. For example, 55 percent of the Navy duty billets are for general dentists compared with 42 percent in the Army and 50 percent in the Air Force. At the same time, only 13 percent of the Navy's duty billets are for comprehensive dentistry, compared with 25 and 22 percent in the Army and Air Force, respectively. Note that in pointing out these differences, we make no judgment whether one Service's specialty mix is better than another. We are simply pointing out that this is a source of variation between the Services that may impact the steady state optimal mix of accessions.

Table B-1. Baseline assumptions for billets and GDE starts by Service

	Army			Navy			Air Force		
		GDE starts			GDE starts			GDE starts	
	Billets[a]	Min	Max	Billets	Min	Max	Billets	Min	Max
Endodontics	48	5	7	53	5	8	22	5	7
Oral pathology	12	0	1	24	0	2	7	0	1
Oral maxillo. surgery	79	8	9	81	6	10	57	9	11
Orthodontics	31	3	4	16	2	4	34	4	5
Pedodontics	25	2	3	16	0	2	18	1	2
Periodontics	47	4	5	56	2	5	61	5	7
Prosthodontics	58	4	5	83	2	6	67	5	7
Public health	5	0	1	6	0	1	2	0	1
Comprehensive	229	19	21	127	8	11	209	12	16
General dentistry	399			556			469		
Total	933			1,018			946		

a. We group the three Services' dentists into the dental specialties in the same way that DMDC does (see [12]). For example, billets and GDE starts for "Comprehensive" dentistry includes billets and GDE starts for comprehensive and operative dentistry. Additionally, these are clinical billets. They do not include executive dentistry.

We have modeled a range of the number of dentists that can be placed in GDE programs each year. We've done this because historically the number of dentists going into the various GDE programs changes some from year to year and also because in-house training is the only way the model can get the specialists it needs. If we fix the number of prosthodontics GDE starts at 5, for example, the model would have no way to manage the size of the prosthodontics community; it would be fixed by the constraint.

What are the minimum and maximum number of dental accessions the three Services can bring in each year from each accession program? We assume that the number of AFHPSP accessions must be between 50 and 125 each year. The minimum constraint is a reflection of the political reality that the program needs some minimum number to continue from year to year; you just can't turn it off one year and then start it back up the next year. The maximum number of accessions reflects the fact that there is a limit on the supply of qualified applicants and funding constraints for the AFHPSP program.

Similarly, we've limited the number of direct procurement accessions at 25 per year based on the number of direct accessions the Services have brought in historically.[8] In addition to the AFHPSP and direct procurement accessions, the Navy accesses dentists through the Health Services Collegiate Program (HSCP). We set the constraints on this accession source to be between 15 and 25 each year based on the Navy's historical and projected number of HSCP accessions.

Experience profile constraint

We constrained the experience profile of the dental corps fully trained duty billets based on a Health Affairs memorandum [7]. This policy states a goal of 25 to 30 percent of physician endstrength with an experience level of 5 to 12 years beyond initial certification. We assumed similar experience goals for the dental corps. Consequently, we set the experience profile constraint at the following levels:

- At least 30 percent of duty billets should be filled with O-5s or O-6s.
- At least 10 percent of duty billets should be filled with O-6s.

Cost and retention

In addition to these assumptions, we model costs and retention based on the phase I life-cycle analysis [1] in which we detailed the costs by accession source and Service for each year personnel were in training or practicing as duty dentist.[9] We use results from previous CNA research looking at the responsiveness of dentists' continuation rates to pay [2] to model how the survival curves change in response to changes in special pays and bonuses. In other words, we project how survival curves will shift as we alter pay. Also, we modeled how the

8. Some Service representatives feel that 25 for a direct accession constraint is too high. Whether the constraint should be 20, 25, or something else, the important thing is how the model uses to them. If the model uses them all (whatever the constraint is), this means that they are more cost effective than other accession sources given the life-cycle costs and retention patterns.

9. The results are the same whether or not we use a non-zero discount rate.

maximum direct procurement accessions change as we alter the size of the direct accession bonus.[10]

Baseline model

In this section, we present the results of the baseline model for each Service. Because there is a great deal of relevant information in the model results, we go through it in detail for the baseline. The type of information and format of presentation are much the same for each excursion.[11] Consequently, we will not go through as extensive an analysis of the data for the excursions. Rather, we will highlight the important differences in each set of results from that of the baseline model.

Accessions and training

Table B-2 presents, for all three Services, the optimal number of accessions from each accession source subject to constraints. For each Service, the direct procurement accession constraint is binding, meaning the model uses the maximum number of direct accessions allowed. The model would prefer more of these accessions because they are the most cost effective, but it just can't get them. In the Navy case, the model uses the minimum number of AFHPSP accessions allowed. This means that AFHPSP accessions are less cost effective than either direct procurement or HSCP accessions. From a cost standpoint, it is preferable to have direct and HSCP accessions than AFHPSP accessions given the cost and retention of each.

We also show in table B-2 the optimal number of personnel in the various stages of training. In the Army, for example, each year the model estimates that there should be 241 people in the accession pipeline. These include AFHPSP accessions in the 4 years of dental school and

10. We model the responsiveness of accessions to changes in the direct accession bonus using estimates of the responsiveness of enlisted personnel to changes in pay [4, 5].

11. For each excursion, data are presented separately for each Service. For ease of comparison, each portion of the excursion results is presented along with the comparable results from the baseline.

next year's direct procurement accessions.[12] Once these personnel go on active duty, each goes through an advanced education in general dentistry (AEGD) program. Each year the model estimates that there should be about 77 dentists in an AEGD program.[13] Although 80 people enter the accession pipeline each year, only about 77 will eventually go on active duty because we've modeled some attrition from the accession pipeline. The final training group consists of those in a residency or GDE program. In the steady state, this is about 119 people each year.

Table B-2. Baseline steady-state accessions and training inventories

Source or group	Army	Navy	Air Force
Accessions by source[a]			
AFHPSP (50/125)	55	50	67
Direct (0/25)	25	25	25
HSCP (15/25)		21	
Total	80	96	92
Inventory by group			
Accession pipeline	241	266	286
AEGD programs[b]	77	83	88
Residency programs	119	139	136
Total	437	488	510

a. Annual accession source constraints are in parentheses (minimum/maximum).
b. Includes general practice residency (GPR) program.

12. The next year's direct procurement accessions are not really in the accession pipeline, but we count them in it because of the resources the Services used in any year to recruit next year's accessions. The Navy pipeline also includes personnel in the various stages of the HSCP.

13. For modeling purposes, we model all accessions going through an AEGD year because it is the predominant pattern. We realize that in practice not all do. Additionally, some go through a general practice residency (GPR) year rather than an AEGD year. In modeling the life-cycle costs, their is no cost distinction between a AEGD and GPR year; consequently, what we've labeled as AEGD includes those who do either an AEGD or GPR year.

Cost

Cost is another key output from the model because the main objective of the model is to minimize total costs subject to various constraints. Table B-3 shows the estimated annual cost in the steady state, which is $188 million in the Air Force case. This cost includes the compensation costs (salary and benefits) of all active duty dental corps personnel and the compensation and training costs of all personnel in training (that is, in the dental corps' accession and training inventory) regardless of whether they are on active duty. In addition, we show the average annual cost per fully trained duty dentist. In the steady state, there are 1,034 duty dentists in the Air Force case meaning that each costs an average of $181,378 ($188 million/1,034). This cost reflects not only each dentist's compensation, temporary duty, and PCS costs, but also the cost of the personnel in the accession and training pipelines. In other words, the cost of a duty billet is compensation, temporary duty, and PCS costs plus the training tail required to support the billet.

Table B-3. Baseline steady-state annual life-cycle cost

Service	Total cost of dental corps ($M)	Cost per fully trained duty dentist ($)	Shortage of fully trained duty dentists	Cost adjusted for shortage[a] ($M)
Army	177	181,196	0.0	177
Navy	186	180,671	5.6	187
Air Force	188	181,378	0.0	188

a. Total cost for the dental corps plus the average cost per fully trained dentist for each dental shortage ($186M + (180,671 x 5.6) for Navy).

In certain cases, the constraints of the model are such that some requirements cannot be met. For instance, the results of the baseline model in the Navy case indicate that, given the constraints, the Navy cannot meet its requirement for prosthodontics.[14] The cost from the

14. For any given specialty, we define an excess (shortage) as having more (less) fully trained personnel than there are billets.

model in this case does not provide a very useful benchmark for the various excursions; cost is artificially low because not all requirements were filled. To correct for this, we adjusted cost to account for the cost of filling any shortages (again, see table B-3). We did this by taking the baseline cost of $186 million and adding to it the average cost per fully trained duty billet ($180,671) for each of the 5.6 billets that the model couldn't fill.[15] This gave us an adjusted cost of $187 million, which we can use to compare costs between the baseline model and the various excursions.

Inventory by specialty

In table B-4, we show the resulting steady-state inventory from the baseline model. This inventory is provided by paygrade and specialty for each of the Services, which we can easily compare with their respective billets to determine if the baseline results in any excesses or shortages. In addition, because the number of GDE starts is the principal determinant of whether we have an excess or shortage in a given specialty, we show each Service's annual number of GDE starts in the baseline steady-state solution.

Recall that we used a range for the minimum and maximum number of GDE starts each year. If the model is constrained in the steady state such that it takes the maximum number of GDE starts allowed, this means that the model would like to have more GDE starts but can't because of the constraint. It needs more GDE starts to be able to fill all the billet requirements. Hence, we have a shortage. Similarly, if the model takes the minimum number of GDE starts allowed (meaning it is only taking that many because it is forced to by the constraint), we have an excess because more dentists are put into training than are necessary to fill requirements.

15. We use $180,671 to make this adjustment because it is about what it would cost the system in terms of increased accessions, GDE training, and compensation to fill each vacant billet. It doesn't necessarily represent the cost of replacing the billet with a civilian or contract provider or purchased care. This cost is likely a lower bound of what it would actually cost to fill the billet with a military or civilian provider.

Table B-4. Baseline steady-state annual inventory by specialty and paygrade for each Service

Specialty	Billets[a]	O-3/4	O-5	O-6	Total	Excess (shortage)	GDE starts
Army							
Endodontics	48	27	22	17	66	18.0	5.0
Oral pathology	12	4	4	3	12	0.0	0.9
Oral surgery	79	29	32	17	79	0.0	8.2
Orthodontics	31	16	13	10	39	8.4	3.0
Pedodontics	25	11	9	7	26	1.4	2.0
Periodontics	47	18	18	14	50	2.7	4.0
Prosthodontics	58	20	21	16	58	0.0	4.5
Public health	5	2	2	1	5	0.0	0.4
Comprehensive	229	102	80	61	243	14.1	19.0
General dentistry	399	330	39	30	399	0.0	
Overall	933	560	241	176	978	44.7	47.0
Navy							
Endodontics	53	30	20	10	60	6.8	5.0
Oral pathology	24	8	9	7	24	0.0	1.9
Oral surgery	81	30	33	18	81	0.0	8.4
Orthodontics	16	12	8	4	24	7.9	2.0
Pedodontics	16	7	5	4	16	0.0	1.2
Periodontics	56	20	20	16	56	0.0	4.3
Prosthodontics	83	27	28	22	77	(5.6)	6.0
Public health	6	2	2	2	6	0.0	0.5
Comprehensive	127	52	42	33	127	0.0	9.6
General dentistry	556	445	64	47	556	0.0	
Overall	1,018	632	233	162	1,027	9.2	38.9
Air Force							
Endodontics	22	27	21	16	64	41.9	5.0
Oral pathology	7	2	3	2	7	0.0	0.5
Oral surgery	57	32	34	18	85	27.6	9.0
Orthodontics	34	22	17	13	51	17.2	4.0
Pedodontics	18	7	6	5	18	0.0	1.4
Periodontics	61	22	22	18	62	1.2	5.0
Prosthodontics	67	23	25	19	67	0.0	5.1
Public health	2	1	1	0	2	0.0	0.1
Comprehensive	209	85	71	53	209	0.0	15.8
General dentistry	469	380	49	40	469	0.0	
Overall	946	603	249	182	1,034	87.9	45.9

a. These figures are for clinical billets. They do not include billets for executive dentistry.

Percentage paygrade distribution by specialty

Finally, in table B-5, we report the percentage paygrade distribution of the inventory in the steady state. Unlike in the physician case, the dentists' experience profile constraint is not binding and is easily met. Though it varies by specialty, the inventory of dental specialists is actually quite senior. Overall, 16 percent of duty dentists in the Navy are O-6s compared with 18 percent in the Army and Air Force. The only case in which it is not very senior is general dentistry, but this is because many of the general dentists who make a decision to remain in the military go on to receive specialty training.[16]

Table B-5. Baseline steady-state annual percentage paygrade distribution by specialty

	Army			Navy			Air Force		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	41	0	25	50	34	16	42	33	25
Oral pathology	35	37	28	35	37	28	34	37	29
Oral surgery	37	41	22	37	41	22	38	40	21
Orthodontics	41	34	25	50	34	16	42	33	25
Pedodontics	41	34	25	41	34	25	40	34	25
Periodontics	36	36	28	35	37	29	36	36	28
Prosthodontics	35	37	28	35	36	29	35	37	28
Public health	42	34	25	41	34	25	41	34	25
Comprehensive	42	33	25	41	33	26	41	34	25
General dentistry	83	10	8	80	12	9	81	11	8
Overall	57	25	18	62	23	16	58	24	18

We also show in table B-6 the percentage paygrade distribution by specialty as it existed in FY 2000.[17] For each Service's dental corps, the inventories in FY 2000 are more senior than in the steady state of the baseline model.

16. It is for this reason that we didn't require the inventory of general dentists to meet the experience profile constraint.

17. We computed these percentages from the DMDC data for FY 2000.

Table B-6. FY 2000 percentage paygrade distribution by specialty

	Army			Navy			Air Force		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	19	47	34	31	25	44
Oral pathology	21	29	50	13	42	46	17	17	67
Oral surgery	46	31	23	21	52	27	16	56	28
Orthodontics	42	12	45	29	38	33	40	44	16
Pedodontics	16	22	63	20	67	13	33	27	40
Periodontics	25	40	35	21	41	38	8	42	51
Prosthodontics	13	42	44	11	44	46	13	42	44
Public health	25	25	50	20	40	40	0	100	0
Comprehensive	12	36	51	20	40	40	19	43	38
General dentistry	89	11	0	96	3	1	79	12	9
Overall	40	28	32	51	26	22	55	24	21

Model excursions

An important asset of modeling is the ability to change assumptions regarding one or more parameters and/or constraints and compare results. This allows one to (1) test the sensitivity of the model to specific assumptions and (2) evaluate the impact of changes in the system without having to actually make real-world changes. We can use the model to optimize the accession mix subject to current policies regarding experience profile, billet requirements, GDE availability, and accession program parameters (essentially our baseline model), but we can also compare these results with model excursions that test what-if scenarios regarding, for example, changes in accession bonuses, special pays, or GDE goals.

For this analysis, we ran several excursions of the model for each Service. In each excursion, we altered one or two parameters and/or constraints and then determined the most economical way of meeting requirements given the new set of parameters and constraints. We then compared these results with the baseline model to see how the parameters and constraints we altered change the optimal mix of accessions, training, experience profile, and inventory as well as the total cost to the system. The excursions we ran altered the parameters and constraints of the model in one or more of the following ways:

- Changes in experience profile
- Changes in GDE
- Changes in accession programs' parameters
- Changes in additional special pay (ASP).

Experience profile

We ran several excursions to show the importance of the experience profile constraint in determining the steady state's optimal accession mix. As a baseline, we constrained the experience profile of the dental corps fully trained billets to be at the following levels:

- At least 30 percent of dental duty billets should be O-5 or O-6
- At least 10 percent of the dental duty billets should be O-6.

As the baseline model showed, these constraints were not binding for the dental corps—at the specialty level or for the corps as a whole (see table B-5). Hence, when we relaxed these constraints somewhat in some of our excursions by cutting the requirement for O-6s to at least 5 percent of duty billets and the requirement for O-5s or O-6s to at least 25 percent of duty billets, it had no impact on the steady state.[18]

GDE starts

We designed the next set of excursions to examine the sensitivity of the model to assumptions regarding graduate dental education (GDE). Although the current number of GDE slots provided a starting point for what the system's GDE constraints are, it seems reasonable that the number of GDE slots could increase or decrease somewhat based on changes in policy, civilian market forces, and dentist's behavior.[19] For these reasons, we study how the optimal mix

18. We chose 5 percent O-6s based on DOPMA.

19. Cutting substantial portions of these programs could have a negative impact on the retention behavior of both general dentists and the GDE faculty (we believe that these training opportunities may provide significant incentives for military dentists to remain with the Services, but we cannot document this effect given the available data). That said, we model retention behavior as if changing the size of the GDE program has no impact on retention because we can't quantify it.

of accessions changes as we change the minimum and maximum GDE slots by 20 percent (excursions 1 and 2). In addition, we ran an excursion where we set the GDE constraint such that the model produces the exact number of dental generalists and specialists currently billeted for (excursion 3).

Accession program parameters

The baseline case models the accession programs constraints and costs as they currently exist, but it is reasonable to assume that these might change. These changes could be the result of policy changes in response to changing market forces, dentists' behavior, or political realities. We ran two scenarios that explored:

- What if AFHPSP were the only viable option for accessing dentists (excursion 4)?
- What if the Services increased the direct accession bonus from $30,000 to $50,000, leaving all other accession options unchanged (excursion 5)?

Additional special pay

Cost and survival curves for dentists in the baseline model reflect the current ASP. However, a proposal to increase dental ASP was submitted to the Unified Legislation Board (ULB) in the first quarter of 2002, and previous CNA research [2] agrees that the current uniformed dental ASP should be increased (although we recommended an alternative ASP proposal). Therefore, we run two excursions that reflect the ULB proposal (excursion 6) and an alternative ASP proposal designed by CNA (excursion 7). These ASP proposals are incorporated into the model via alternative costs and retention behavior for uniformed dentists. Table B-7 shows the two ASP alternatives compared with the current ASP.

Excursion 8 looks at the interaction of the CNA proposed ASP with increasing the direct accession bonus. This final excursion increases the direct accession bonus to $50,000 and makes targeted increases to the dental ASP based on CNA's ASP proposal.

Table B-7. Comparison of current ASP to ULB and CNA proposals

			CNA proposal	
YOS	Current ASP	ULB ASP	YOS	ASP
< 3	$4,000	$19,000	< 4	$8,000
3 but < 10	$6,000	$21,000	4 but < 9	$16,000
10 or more	$15,000	$30,000	9 or more	$18,000
Intern	None	Based on YOS	Intern	None
Resident	None	Based on YOS	Resident	None

Excursion 1: increase GDE starts

As stated earlier, because in-house training is almost exclusively the program used to provide the Services with dental specialists, it is particularly important that we correctly characterize the GDE requirement for the dental community. For this reason, we tested the sensitivity of the model to changes in the GDE constraints. Changes may occur because we may be able to make better assumptions regarding the current range of GDE constraints and/or because policy changes in the in-house training program result in changes in the allowable range of GDE starts.

In this first excursion from the baseline model, we evaluate the consequences of shifting up the range of GDE starts by 20 percent. We show the detailed results of this excursion in **table BB-1** (Army, Navy, and Air Force), which begins on page B-37.

Shifting up the range of GDE starts increases both the minimum and maximum number of GDE starts allowed. The result of increasing the range of GDE starts will always lead to either stable manning (no change from the baseline) or greater manning than in the baseline model. To see how this works, consider the possible outcomes in the baseline model for any particular GDE program. The optimal number of GDE starts for any specialty will fall into one of three cases:

1. The minimum allowable GDE starts
2. The maximum allowable GDE starts
3. A number of starts that falls within the allowable range.

When we increase the range of GDE starts, we find that, in the first case, the optimal solution must increase (the minimum is now a greater number of starts). In the second case, we assume that the model would opt to increase starts because it was previously constrained to do so (the maximum allowable is now a greater number). In the final case, if the optimal still falls within the new range, there will be no change. If the optimal is now outside the new range, the model will have to increase the number of starts to at least meet the new minimum. From table B-8, we can see some specific examples of how this works.

Table B-8. Optimal annual, steady-state GDE starts by Service and specialty[a] (excursion 1)

	Army		Navy		Air Force	
Specialty	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Endodontics	**5.0**	**6.0**	**5.0**	**6.0**	**5.0**	**6.0**
Oral pathology	0.9	0.9	1.9	1.9	0.5	0.5
Oral maxillo. surgery	8.2	**9.6**	8.4	8.4	**9.0**	**10.8**
Orthodontics	**3.0**	**3.6**	**2.0**	**2.4**	**4.0**	**4.8**
Pedodontics	**2.0**	**2.4**	1.2	1.2	1.4	1.4
Periodontics	**4.0**	**4.8**	4.3	4.3	**5.0**	**6.0**
Prosthodontics	4.5	**4.8**	**6.0**	6.4	5.1	**6.0**
Public health	0.4	0.4	0.5	0.5	0.1	0.1
Comprehensive	**19.0**	**22.8**	9.6	9.7	15.8	15.7
Total	47.0	55.3	38.9	40.7	45.9	51.4
Percentage change		18		5		12

a. Figures in bold represent cases in which the number of starts is constrained at the minimum or maximum number of allowed GDE starts.

Consider Army periodontics. The Army's baseline range of annual GDE starts for periodontics is 4 to 5. In the baseline case, the model uses the minimum number of starts because, even with these 4 starts, there is overmanning. Consequently, when we increase the minimum GDE starts by 20 percent to 4.8 per year, overmanning in periodontics will increase. However, in some specialties like oral pathology, increasing the range of GDE starts doesn't change the steady state number of GDE starts at all because the optimum still falls within the new range. As anticipated, from the table, we can see that the optimal

GDE starts from the excursion are always the same or higher than the optimal found in the baseline case.

In addition to increasing manning, increasing the range of GDE starts means that more personnel are needed in the accession and training pipelines to fill the required number of GDE starts. From table B-9, we see that accessions increase by 8, 2, and 5 percent for the Army, Navy, and Air Force, respectively. Because direct procurement accessions are already constrained for all three Services, all of these new accessions come through AFHPSP or HSCP. Hence, the number of people in the accession pipeline increases. The bottom line is that increasing dental corps GDE by 20 percent does lead to increased manning, accessions, and ultimately costs. But these increases are significantly less than 20 percent. In fact, Navy costs increase by only 2 percent (fairly insensitive to increases in GDE), Air Force by 7 percent, and Army by 12 percent.

Table B-9. Percentage increase from baseline model—by service (excursion 1)

	Percentage increase from baseline		
	Army	Navy	Air Force
Annual accessions	8	2	5
Accession pipeline inventory	10	1	6
Total cost[a]	12	2	7

a. Total cost of dental corps adjusted for shortages.

Excursion 2: decrease GDE starts

The purpose of excursion 2 is to evaluate the consequences of shifting down the range of GDE starts by 20 percent. We show the detailed results of this excursion in **table BB-2** (Army, Navy, and Air Force).

Shifting down the range of GDE starts decreases both the minimum and maximum number of GDE starts allowed. The result of decreasing the range of GDE starts will always lead to either stable manning (no change from the baseline) or lesser manning than in the baseline model. That is, the expectation is exactly opposite of that described in excursion 1.

From table B-10, we see that, in fact, the optimal GDE starts from the excursion are always the same as or lower than the optimal found in the baseline case. This decreased manning leads to fairly significant specialty-specific shortages for all three Services, as well as Army and Navy shortages for the dental communities as a whole (table B-11).

Table B-10. Optimal annual, steady-state GDE starts by Service and specialty[a] (excursion 2)

	Army		Navy		Air Force	
Specialty	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Endodontics	**5.0**	**4.0**	**5.0**	**4.0**	**5.0**	**4.0**
Oral pathology	0.9	**0.8**	1.9	**1.6**	0.5	0.5
Oral maxillo. surgery	8.2	**7.2**	8.4	**8.0**	**9.0**	**7.2**
Orthodontics	**3.0**	**2.4**	**2.0**	**1.6**	**4.0**	**3.2**
Pedodontics	**2.0**	1.9	1.2	1.2	1.4	1.4
Periodontics	**4.0**	3.6	4.3	**4.0**	**5.0**	4.7
Prosthodontics	4.5	**4.0**	**6.0**	**4.8**	5.1	5.2
Public health	0.4	0.4	0.5	0.5	0.1	0.1
Comprehensive	**19.0**	**16.8**	9.6	**8.8**	15.8	**12.8**
Total	47.0	41.1	38.9	40.7	45.9	39.1
Percentage change		13		11		15

a. Figures in bold represent cases in which the number of starts is constrained at the minimum or maximum number of allowed GDE starts.

Table B-11. Steady-state duty dentist inventory excesses (and shortages shown in parentheses) by Service and specialty (excursion 2)

	Army		Navy		Air Force	
Specialty	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Endodontics	18.0	3.2	6.8	0.0	41.9	29.2
Oral pathology	0.0	(1.7)	0.0	(3.4)	0.0	0.0
Oral maxillo. surgery	0.0	(9.5)	0.0	(3.8)	27.6	10.7
Orthodontics	8.4	0.0	7.9	3.1	17.2	6.9
Pedodontics	1.4	0.0	0.0	0.0	0.0	0.0
Periodontics	2.7	0.0	0.0	(4.4)	1.2	0.0
Prosthodontics	0.0	(6.4)	(5.6)	(21.1)	0.0	0.0
Public health	0.0	0.0	0.0	0.0	0.0	0.0
Comprehensive	14.1	(7.0)	0.0	(10.7)	0.0	(39.9)
General dentistry	0.0	0.0	0.0	0.0	0.0	0.0
Total	44.7	(21.5)	9.2	(40.2)	87.9	6.9
Percentage change						

Finally, in addition to decreasing GDE and manning, shifting the range of GDE starts in this manner means that fewer personnel are needed in the accession and training pipelines to fill the required number of GDE starts. From table B-12, we see that accessions decrease by 5, 4, and 6 percent for the Army, Navy, and Air Force, respectively. Because each of the Services is already using fewer direct procurement accessions than it would like to (the direct accession constraint of 25 annual accessions is binding), all of these decreases in accessions come through AFHPSP or HSCP. Hence, the number of people in the accession pipeline decreases.

Table B-12. Percentage decrease from baseline model—by Service (excursion 2)

	Percentage decrease from baseline		
	Army	Navy	Air Force
Annual accessions	5	4	6
Accession pipeline inventory	6	3	7
Total cost[a]	5	2	5

a. Total cost of dental corps adjusted for shortages.

The bottom line is that decreasing dental corps GDE by 20 percent does lead to decreased manning, accessions, and ultimately costs. But these increase are significantly less than 20 percent. In fact, Navy costs decrease by only 2 percent (fairly insensitive to decreases in GDE), whereas Air Force and Army costs decrease by 5 percent each. Even though we adjusted the cost measure for the specialty-specific manning shortages, there may be additional unmeasured costs to the military system in terms of decreased readiness, morale, and so on.

Excursion 3: right-size GDE starts

In the baseline model and excursions 1 and 2, the optimal solution includes either excess inventory or shortages of duty dentists. In this excursion, we adjust the baseline range of GDE such that it allows the model to right-size GME starts to find an optimal solution (no excesses or shortages in dental corps manning). We show the detailed results of this excursion in **table BB-3** (Army, Navy, and Air Force).

We begin by showing the GDE constraints used in excursion 3 (see table B-13). Note that the range of GDE starts for each dental specialty does not vary from the baseline range in a uniform way (for the baseline range of GDE starts, see table B-1). In some cases, the entire range shifts up or down. In other cases, the range may be increased or decreased by changing only the minimum or maximum allowable GDE starts.

Table B-13. Right-size assumptions for GDE starts by Service and specialty (excursion 3)

	Army		Navy		Air Force	
Specialty	Min	Max	Min	Max	Min	Max
Endodontics	3	6	3	6	1	4
Oral pathology	0	2	0	3	0	1
Oral maxillo. surgery	7	9	6	10	5	9
Orthodontics	2	4	0	3	2	5
Pedodontics	1	3	0	2	1	2
Periodontics	2	4	3	6	4	6
Prosthodontics	4	6	5	8	4	7
Public health	0	1	0	1	0	1
Comprehensive	15	20	8	11	13	17

Table B-14 indicates the optimal steady-state GDE starts required to eliminate the excess manning we observed in the baseline case (baseline excess manning was roughly 45, 9, and 88 duty dentists for the Army, Navy, and Air Force, respectively). Excess manning for the dental corps is particularly troublesome because there is no large reserve requirement that can be used to absorb such overages. Therefore, excess dental manning must be offset by manning shortfalls in one of the other medical officer department communities (typically the nurse, biomedical services, or medical services corps).

Because the baseline solution for the Navy had the least manning excesses, we see very little change in GDE starts between baseline and this excursion. Note, however, that it takes fairly small changes in the annual number of accessions and GDE starts over time to eliminate fairly substantial excesses in the other Services.

Table B-14. Optimal annual, steady-state GDE starts by Service and specialty[a] (excursion 3)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Endodontics	**5.0**	3.6	**5.0**	4.0	**5.0**	1.7
Oral pathology	0.9	0.9	1.9	1.9	0.5	0.5
Oral maxillo. surgery	8.2	8.2	8.4	8.4	**9.0**	5.9
Orthodontics	**3.0**	2.3	**2.0**	1.2	**4.0**	2.6
Pedodontics	**2.0**	1.9	1.2	1.2	1.4	1.4
Periodontics	**4.0**	3.6	4.3	4.3	**5.0**	4.7
Prosthodontics	4.5	4.5	**6.0**	6.4	5.1	5.2
Public health	0.4	0.4	0.5	0.5	0.1	0.1
Comprehensive	**19.0**	17.2	9.6	9.6	15.8	15.7
Total	47.0	42.6	38.9	37.5	45.9	37.8
Percentage change		9		4		18
Number of accessions	80	78	96	95	88	83
Excesses	44.7	0	9.2	0	87.9	0

a. Figures in bold represent cases in which the number of starts is constrained at the minimum or maximum number of allowed GDE starts.

As table B-15 shows, the Army's 44.7 manning excess can be eliminated by decreasing total annual accessions by 2 and GDE starts by less than 4. The Air Force's excess of 87.9 can be eliminated by decreasing annual accessions by 5 and GDE starts by 8. In the steady state, this solution would result in decreased costs of 5, 1, and 10 percent for the Army, Navy, and Air Force, respectively, while eliminating the costly and undesirable excess manning.

Table B-15. Comparison of optimal annual outcomes in the steady state by Service (excursion 3)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Excess manning	44.7	0	9.2	0	87.9	0
Annual accessions	80	78	96	95	88	83
Total cost[a] ($M)	177	168	187	184	188	169
Percentage change		5		1		10

a. Total cost of dental corps adjusted for shortages.

Excursion 4: AFHPSP is the sole accession source

Recent CNA analysis of the direct accession program [2] concluded that the current $30,000 direct accession bonus will not be sufficient to attract the required candidates. This conclusion was based on:

- The rising level of debt faced by dental school graduates[20]
- Entry-level uniformed-civilian pay gaps
- Projected workforce shortages in the civilian sector due to large number of retiring dentists[21]
- The Services' recent inability to attract direct accessions.[22]

Rather, AFHPSP is considered to be the most robust accession program available to the Services' dental communities. Current military accession trends show that the vast majority of accessions are AFHPSP accessions, which essentially eliminate dental school debt. In addition, we believe that the military will increasingly rely on the AFHPSP to meet its dental corps accession goals.

Taking these findings to the extreme, excursion 4 was designed to evaluate the effect of relying solely on AFHPSP to meet all accession requirements. To model this, we allow AFHPSP accession to be unconstrained in the model and eliminate all other accession options (that would be direct accessions as well as Navy's HSCP accession program). We summarize the results here. For details of this excursion, see **table BB-4** (Army, Navy, and Air Force).

As table B-16 shows, compared with the baseline model, excursion 4 results in little change in the total number of accessions. Because all accessions now come from AFHPSP, however, the accession pipeline inventory increases by about one-third for each of the Services.

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20. In 1999, the average debt of graduating dental students was about $100,000—up 19 percent from 1998 and 166 percent from 1980 [13].
21. It is believed that this trend could lead to reduced cost of buying a dental practice and might also increase civilian dental earnings, increasing the attractiveness of civilian practice over military service [1].
22. The Air Force only had 28 direct accessions in FY 2001, far short of its goal of 120.

Table B-16. Comparison of optimal annual outcomes in the steady state by Service (excursion 4)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Total accessions	80	82	96	93	88	89
AFHPSP accessions	55	82	50	93	63	89
Accession pipeline	241	318	261	364	270	374
Manning excess (shortage)	44.7	54.8	9.2	17.9	87.9	96.3
Total cost[a] ($M)	177	183	187	194	188	193
Percentage change		3		4		3

a. Total cost of dental corps, adjusted for shortages.

Relying solely on AFHPSP also increases the total steady-state cost of the dental corps for all three Services (by 4 percent for the Navy and by 3 percent each for the Army and the Air Force). This result is not surprising because AFHPSP is the most costly dental accession program. Relying solely on AFHPSP accessions also results in greater excesses compared with the baseline, creating an additional burden on the system.

Excursion 5: increase the direct accession bonus

Given that the current direct accession bonus is considered to be insufficient to attract the required candidates, it seems reasonable to examine the impact to the system of increasing the direct accession bonus. In this excursion, we compare the baseline outcome to the model outcome produced when we increase the direct accession bonus from $30,000 to $50,000, holding all other parameters and constraints constant. We show the detailed results of this excursion in **table BB-5** (Army, Navy, and Air Force).

In the baseline scenario, the model finds that the optimal mix of accessions includes bringing in the maximum number of allowed direct procurement accessions (25). Therefore, this constraint is binding. By modeling how the number of direct procurement accessions changes in response to a change in the direct accession bonus, we are able to loosen the constraint to see if increasing accession subsidization results in a more cost-effective solution than not increasing subsidization. We estimate that increasing the direct accession bonus

to $50,000 would allow the Services to get a maximum of 30 direct accessions each year rather than the current 25.[23]

As we can see from table B-17, increasing the direct incentive bonus changes the optimal accession mix (for each Service, the optimal solution includes maxing out direct accessions and reducing AFHPSP and/or HSCP), resulting in smaller accession pipeline inventories. This change in accession mix results in marginally lower costs (approximately half of a percent, or about $1 million, for each of the Services). In addition, the excursion has little to no effect on the total number of accessions, GDE starts, and manning inventories relative to the baseline.

Table B-17. Comparison of optimal annual outcomes in the steady state by Service (excursion 5)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	55	50	50	50	63	58
Direct accessions	25	30	25	30	25	30
HSCP accessions	n/a	n/a	21	15	n/a	n/a
Total	80	80	96	95	88	88
Accession pipeline	241	226	261	255	270	255
Manning excess (shortage)	44.7	42.8	9.2	9.2	87.9	87.9
Total cost[a] ($M)	177	176	187	186	188	187
Percentage change		0.6		0.3		0.4

a. Total cost of dental corps, adjusted for shortages.

23. Although we model how the number of direct procurement accessions may change in response to an increase in the accession bonus (using an elasticity of 1.8 [4, 5]) our findings depend on the starting point—in this case, 25 accessions with a $30,000 bonus. We based this constraint on the recent experiences of the Services. It is our opinion that, before the accession bonus was raised to its current $30,000, efforts to access dentists directly waned as the Services became more reliant on AFHPSP accessions because of the rising debt load of dental students. When the $30,000 accession bonus was put in place, we believe it may not have been met with a commensurate increase in the recruiting effort because of the growing number of AFHPSP accessions. Therefore, we believe that 25 accessions may underestimate the true potential accessions associated with a $30,000 bonus.

Although increasing the direct accession bonus from $30,000 to $50,000 allows the Services to access more dentists directly and lower costs slightly, the evidence does not suggest that even a $50,000 accession bonus will be a panacea for all accession problems.

If the baseline constraint of 25 direct accessions is accurate, even a $100,000 accession bonus would only raise the accession constraint to 45.[24] One reason why even a $100,000 bonus may not allow the Services to attract as many direct accessions as they may want is that this bonus is effectively $25,000 per year for each year of obligation. And, $25,000 a year in no way closes the gap between civilian and military pay at the early stages of a military dentist's career [1, 2].

Excursion 6: increase dental ASP based on ULB proposal

For excursion 6, we evaluate the impact of changes in ASP based on the current ASP proposal submitted to the ULB. As we showed in table B-7, the ULB proposal requests that MHS dental officers' ASP be increased by $15,000 for FY 2003. This would mean that, if enacted, dental ASP would increase to $19,000, $21,000, and $30,000 for dentists with less than 3, 3 to 9, and 10 or more years of service, respectively.

To incorporate this alternative ASP into the model excursion, we modified costs accordingly and estimated how survival curves for MHS dentists would change based on the ULB proposed ASP. We made this adjustment based on military dentists responsiveness to pay [2]. We show the detailed results of this excursion in **table BB-6** (Army, Navy, and Air Force).

From table B-18, we see that, relative to the baseline, each of the Services was able to make marginal decreases in total accessions as a result of increasing ASP (because higher pay results in increased retention). The reduced accessions, however, are not enough to offset the higher cost of the increased special pay. In other words, increasing ASP by $15,000 across the board does not buy enough

24. This estimate is based on an elasticity of enlistment with respect to pay of 1.8 [4, 5].

increased retention to pay for itself given the career path of military dentists. The result is that the annual steady-state total cost under the ULB ASP proposal increases relative to the baseline by about 9 percent (or about $16 million) for each of the three Services.

Table B-18. Comparison of optimal annual outcomes in the steady state by Service (excursion 6)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	55	51	50	50	63	57
Direct accessions	25	25	25	22	25	25
HSCP accessions	n/a	n/a	21	15	n/a	n/a
Total	80	76	96	87	88	82
Percentage change		5		9		6
Accession pipeline	241	224	261	247	270	248
Manning excess (shortage)	44.7	53.7	9.2	12.4	87.9	93
Total cost[a] ($M)	$177	$193	$187	$203	$188	$204
Percentage change		9		9		9

a. Total cost of dental corps, adjusted for shortages.

Excursion 7: increase dental ASP based on CNA's proposal

In a previous CNA study of the adequacy of special pays and bonuses for uniformed health care professionals, we determined that the current uniformed dental ASP should be increased. In addition, we designed a proposal that targets the group for which compensation increases will have the most impact on retention—those facing stay-leave decisions [2]. As we showed in table B-7, unlike the current or ULB proposed ASP, the CNA proposal targets the majority of ASP increases to those with 4 to 9 years of service.

To incorporate the CNA-proposed ASP into the model excursion, we use costs and survival curves for MHS dentists based on this alternative ASP. We show the detailed results of this excursion in **table BB-7** (Army, Navy, and Air Force).

As in the previous excursion, the increased ASP leads to increased retention of dentists, which ultimately decreases the need for new accessions. Again we see that the decrease in accessions is marginal and does not offset the increased cost of the proposed increase in ASP (see table B-19).

Table B-19. Comparison of optimal annual outcomes in the steady state by Service (excursion 7)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	55	53	50	50	63	60
Direct accessions	25	25	25	25	25	25
HSCP accessions	n/a	n/a	21	16	n/a	n/a
Total	80	78	96	91	88	85
Accession pipeline	241	231	261	251	270	257
Manning excess (shortage)	44.7	49.5	9.2	10.8	87.9	90.4
Total cost[a] ($M)	177	183	187	192	188	193
Percentage change		3		3		3

a. Total cost of dental corps, adjusted for shortages.

The bottom line is that total cost increases by 3 percent above the baseline cost for each of the Services. Note that this increase is one-third as large as the cost increase associated with the ULB ASP proposal, but we cannot definitely say that one proposal is more cost-effective than the other because the size of the pay increases are not the same. However, given our finding that targeted pay increases are more cost-effective for physicians, the same is likely to be true for dentists.

This excursion further substantiates and explains CNA's earlier work that recommended that the special pay increases be most directed mainly toward mid-career dentists (O-4s), which is the group the MHS has the most difficulty retaining [2]. The reason for this is to improve military compensation at the career juncture where dentists are making a stay-leave decision. The data indicate that, if a dentist remains in the military past about 8 years of service, that dentist seems to have made the decision to remain in the military.

In addition, as we reported in phase I of this study, changing the predominant career path can significantly change retention and where the first-stay leave military decision occurs [1]. Our model reflects the

current business practice, which is to have new accessions practice for a few years as general dentists before going to become dental specialists. If the Services were to change their business practices to have new accessions go directly into residency training (substantially shortening the career path), we estimate that the expected years of practice as a dental specialist may fall 20 to 28 percent, depending on the specialty [1]. In that case, the CNA proposed ASP increase would be more cost-effective than excursion 7 estimates it would be.

Excursion 8: increase the direct accession bonus to $50,000 and increase ASP based on CNA's proposal

As a final excursion, we evaluate the interaction of increasing both the direct accession bonus and making targeted increases to the dental ASP (based on CNA's ASP proposal). We show the detailed results of this excursion in **table BB-8** (Army, Navy, and Air Force).

As table B-20 shows, there is a small change in the number and mix of accessions. Note that given the minimum requirements for AFHPSP and HSCP, Army and Navy cannot fully capitalize on the benefits from offering an increased accession bonus (specifically increasing the possible number of direct accessions from 25 to 30). Even with this decrease in the total number of accessions and the shift toward less costly accession sources, the resulting savings do not outweigh the increased cost associated with the new direct accession bonus and ASP increases. We find that, relative to the baseline, total cost is 3 percent higher for the Army and Navy and 2 percent higher for the Air Force.

Table B-20. Comparison of optimal annual outcomes in the steady state by Service (excursion 8)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	55	50	50	50	63	54
Direct accessions	25	28	25	26	25	30
HSCP accessions	n/a	n/a	21	15	n/a	n/a
Total	80	78	96	91	88	84
Accession pipeline	241	223	261	250	270	243
Manning excess (shortage)	44.7	48.2	9.2	10.8	87.9	90.4
Total cost[a] ($M)	177	182	187	192	188	192
Percentage change		3		3		2

a. Total cost of dental corps, adjusted for shortages.

Table BB-1 (Army): Dentist excursion 1 - increase the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	55	62	Accession pipeline	241	266
Direct (0/25)	25	25	AEGD programs	77	83
			Residency programs	119	139
Total	80	87	Total	437	488

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	198
Cost per fully trained duty dentist ($)	181,196	183,169
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	198
Cost as a percentage of baseline		111.9

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	32	27	20	79	18.0	31.2	5.0	6.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	35	38	20	93	0.0	13.6	8.2	9.6
Orthodontics	31	16	13	10	39	19	16	12	48	8.4	16.6	3.0	3.6
Pedodontics	25	11	9	7	26	13	11	8	32	1.4	6.7	2.0	2.4
Periodontics	47	18	18	14	50	22	21	17	60	2.7	12.7	4.0	4.8
Prosthodontics	58	20	21	16	58	22	21	17	60	0.0	1.7	4.5	4.8
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	123	98	74	295	14.1	66.5	19.0	22.8
General dentistry	399	330	39	30	399	337	35	27	399	0.0	0.0		
Overall	933	560	241	176	978	608	274	200	1,082	44.7	149.0	47.0	55.3

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	0	25	41	34	25
Oral pathology	21	29	50	35	37	28	35	37	28
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	41	34	25
Pedodontics	16	22	63	41	34	25	41	34	25
Periodontics	25	40	35	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	36	36	28
Public health	25	25	50	42	34	25	41	34	25
Comprehensive	12	36	51	42	33	25	42	33	25
General dentistry	89	11	0	83	10	8	84	9	7
Overall	40	28	32	57	25	18	56	25	18

Table BB-1 (Navy): Dentist excursion 1 - increase the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	25
HSCP (15/25)	21	22
Total	96	97

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	264
AEGD programs	92	94
Residency programs	106	110
Total	459	468

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	190
Cost per fully trained duty dentist ($)	180,671	181,089
Shortage of fully trained duty dentists	5.6	0.0
Cost adjusted for shortage ($M)	187	190
Cost as a percentage of baseline		101.9

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	36	24	12	72	6.8	18.8	5.0	6.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.9
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.4
Orthodontics	16	12	8	4	24	14	10	5	29	7.9	12.7	2.0	2.4
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	20	21	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	29	30	24	83	(5.6)	0.0	6.0	6.4
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.5
Comprehensive	127	52	42	33	127	52	43	32	127	0.0	0.0	9.6	9.7
General dentistry	556	445	64	47	556	446	63	47	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	643	240	166	1,050	9.2	31.5	38.9	40.7

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	50	34	16
Oral pathology	13	42	46	35	37	28	35	37	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	50	34	16
Pedodontics	20	67	13	41	34	25	41	34	25
Periodontics	21	41	38	35	37	29	35	37	28
Prosthodontics	11	44	46	35	36	29	35	37	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	34	25
General dentistry	96	3	1	80	12	9	80	11	9
Overall	51	26	22	62	23	16	61	23	16

Table BB-1 (Air Force): Dentist excursion 1 - increase the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	63	67	Accession pipeline	270	286
Direct (0/25)	25	25	AEGD programs	84	88
			Residency programs	120	136
Total	88	92	Total	474	510

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	201
Cost per fully trained duty dentist ($)	181,378	183,086
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	201
Cost as a percentage of baseline		107.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	32	25	19	77	41.9	54.7	5.0	6.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	39	42	23	104	27.6	47.1	9.0	10.8
Orthodontics	34	22	17	13	51	26	20	15	61	17.2	27.4	4.0	4.8
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.4
Periodontics	61	22	22	18	62	27	27	21	75	1.2	13.6	5.0	6.0
Prosthodontics	67	23	25	19	67	27	27	21	75	0.0	7.6	5.1	6.0
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	71	52	209	0.0	0.0	15.8	15.7
General dentistry	469	380	49	40	469	385	47	38	469	0.0	0.0		
Overall	946	603	249	182	1,034	632	269	196	1,096	87.9	150.4	45.9	51.4

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	37	41	22
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	41	34	25
Periodontics	8	42	51	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	36	36	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	82	10	8
Overall	55	24	21	58	24	18	58	25	18

Table BB-2 (Army): Dentist excursion 2 - decrease the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	52
Direct (0/25)	25	25
Total	80	77

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	227
AEGD programs	77	73
Residency programs	119	104
Total	437	404

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	164
Cost per fully trained duty dentist ($)	181,196	179,560
Shortage of fully trained duty dentists	0.0	24.6
Cost adjusted for shortage ($M)	177	168
Cost as a percentage of baseline		94.9

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	22	17	13	51	18.0	3.2	5.0	4.0
Oral pathology	12	4	4	3	12	4	4	3	10	0.0	(1.7)	0.9	0.8
Oral surgery	79	29	32	17	79	26	28	15	69	0.0	(9.5)	8.2	7.2
Orthodontics	31	16	13	10	39	13	10	8	31	8.4	0.0	3.0	2.4
Pedodontics	25	11	9	7	26	10	8	6	25	1.4	0.0	2.0	1.9
Periodontics	47	18	18	14	50	17	17	13	47	2.7	0.0	4.0	3.6
Prosthodontics	58	20	21	16	58	18	19	15	52	0.0	(6.4)	4.5	4.0
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	91	75	56	222	14.1	(7.0)	19.0	16.8
General dentistry	399	330	39	30	399	328	40	31	399	0.0	0.0		
Overall	933	560	241	176	978	530	220	162	912	44.7	(21.5)	47.0	41.1

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	42	33	25
Oral pathology	21	29	50	35	37	28	35	36	29
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	42	33	25
Pedodontics	16	22	63	41	34	25	41	33	26
Periodontics	25	40	35	36	36	28	35	36	29
Prosthodontics	13	42	44	35	37	28	35	36	29
Public health	25	25	50	42	34	25	42	33	25
Comprehensive	12	36	51	42	33	25	41	34	25
General dentistry	89	11	0	83	10	8	82	10	8
Overall	40	28	32	57	25	18	58	24	18

Table BB-2 (Navy): Dentist excursion 2 - decrease the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	25
HSCP (15/25)	21	17
Total	96	92

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	254
AEGD programs	92	89
Residency programs	106	95
Total	459	438

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	175
Cost per fully trained duty dentist ($)	180,671	179,333
Shortage of fully trained duty dentists	5.6	43.3
Cost adjusted for shortage ($M)	187	183
Cost as a percentage of baseline		98.2

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	22	18	13	53	6.8	0.0	5.0	4.0
Oral pathology	24	8	9	7	24	7	7	6	21	0.0	(3.4)	1.9	1.6
Oral surgery	81	30	33	18	81	29	32	17	77	0.0	(3.8)	8.4	8.0
Orthodontics	16	12	8	4	24	10	6	3	19	7.9	3.1	2.0	1.6
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	18	19	15	52	0.0	(4.4)	4.3	4.0
Prosthodontics	83	27	28	22	77	22	22	18	62	(5.6)	(21.1)	6.0	4.8
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.5
Comprehensive	127	52	42	33	127	47	39	30	116	0.0	(10.7)	9.6	8.8
General dentistry	556	445	64	47	556	443	65	47	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	607	217	154	978	9.2	(40.2)	38.9	34.5

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	41	34	25
Oral pathology	13	42	46	35	37	28	35	36	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	50	34	16
Pedodontics	20	67	13	41	34	25	41	34	25
Periodontics	21	41	38	35	37	29	35	36	29
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	34	25
General dentistry	96	3	1	80	12	9	80	12	9
Overall	51	26	22	62	23	16	62	22	16

Table BB-2 (Air Force): Dentist excursion 2 - decrease the range of GDE starts by 20 percent

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	63	58	Accession pipeline	270	251
Direct (0/25)	25	25	AEGD programs	84	79
			Residency programs	120	102
Total	88	83	Total	474	432

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	171
Cost per fully trained duty dentist ($)	181,378	179,280
Shortage of fully trained duty dentists	0.0	39.9
Cost adjusted for shortage ($M)	188	178
Cost as a percentage of baseline		95.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	22	17	13	51	41.9	29.2	5.0	4.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	26	27	14	68	27.6	10.7	9.0	7.2
Orthodontics	34	22	17	13	51	17	13	10	41	17.2	6.9	4.0	3.2
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.4
Periodontics	61	22	22	18	62	21	22	17	61	1.2	0.0	5.0	4.7
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.2
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	69	57	43	169	0.0	(39.9)	15.8	12.8
General dentistry	469	380	49	40	469	376	52	41	469	0.0	0.0		
Overall	946	603	249	182	1,034	565	223	165	953	87.9	6.9	45.9	39.1

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	21
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	41	34	25
Periodontics	8	42	51	36	36	28	35	37	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	80	11	9
Overall	55	24	21	58	24	18	59	23	17

Table BB-3 (Army): Dentist excursion 3 - right-size GDE starts

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	55	53	Accession pipeline	241	233
Direct (0/25)	25	25	AEGD programs	77	75
			Residency programs	119	110
Total	80	78	Total	437	417

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	168
Cost per fully trained duty dentist ($)	181,196	180,348
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	168
Cost as a percentage of baseline		95.0

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	20	16	12	48	18.0	0.0	5.0	3.6
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	17	79	0.0	0.0	8.2	8.2
Orthodontics	31	16	13	10	39	13	10	8	31	8.4	0.0	3.0	2.3
Pedodontics	25	11	9	7	26	10	9	6	25	1.4	0.0	2.0	1.9
Periodontics	47	18	18	14	50	16	17	13	47	2.7	0.0	4.0	3.6
Prosthodontics	58	20	21	16	58	20	21	16	58	0.0	0.0	4.5	4.5
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	94	78	57	229	14.1	0.0	19.0	17.2
General dentistry	399	330	39	30	399	330	38	30	399	0.0	0.0		
Overall	933	560	241	176	978	540	228	165	933	44.7	0.0	47.0	42.6

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	41	34	25
Oral pathology	21	29	50	35	37	28	35	37	27
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	41	34	25
Pedodontics	16	22	63	41	34	25	41	34	25
Periodontics	25	40	35	36	36	28	35	37	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	25	25	50	42	34	25	42	34	25
Comprehensive	12	36	51	42	33	25	41	34	25
General dentistry	89	11	0	83	10	8	83	10	8
Overall	40	28	32	57	25	18	58	24	18

Table BB-3 (Navy): Dentist excursion 3 - right-size GDE starts

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	50	50	Accession pipeline	261	260
Direct (0/25)	25	25	AEGD programs	92	92
HSCP (15/25)	21	20	Residency programs	106	104
Total	96	95	Total	459	456

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	184
Cost per fully trained duty dentist ($)	180,671	180,508
Shortage of fully trained duty dentists	5.6	0.0
Cost adjusted for shortage ($M)	187	184
Cost as a percentage of baseline		98.5

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	22	18	13	53	6.8	0.0	5.0	4.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.9
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.4
Orthodontics	16	12	8	4	24	7	5	4	16	7.9	0.0	2.0	1.2
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	20	21	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	29	31	24	83	(5.6)	0.0	6.0	6.4
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.5
Comprehensive	127	52	42	33	127	52	42	32	127	0.0	0.0	9.6	9.6
General dentistry	556	445	64	47	556	448	63	45	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	625	229	164	1,018	9.2	0.0	38.9	37.5

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	41	34	25
Oral pathology	13	42	46	35	37	28	35	37	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	41	33	25
Pedodontics	20	67	13	41	34	25	41	34	25
Periodontics	21	41	38	35	37	29	35	37	28
Prosthodontics	11	44	46	35	36	29	35	37	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	81	11	8
Overall	51	26	22	62	23	16	61	23	16

Table BB-3 (Air Force): Dentist excursion 3 - right-size GDE starts

Steady-state accessions and training inventories

	Accessions			Accession and training inventory	
Accession source[a]	Baseline	Excursion	Group	Baseline	Excursion
AFHPSP (50/125)	63	58	Accession pipeline	270	250
Direct (0/25)	25	25	AEGD programs	84	79
			Residency programs	120	97
Total	88	83	Total	474	426

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	169
Cost per fully trained duty dentist ($)	181,378	178,672
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	169
Cost as a percentage of baseline		90.1

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	9	8	6	22	41.9	0.0	5.0	1.7
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	21	23	13	57	27.6	0.0	9.0	5.9
Orthodontics	34	22	17	13	51	14	12	9	34	17.2	0.0	4.0	2.6
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.4
Periodontics	61	22	22	18	62	21	23	17	61	1.2	0.0	5.0	4.7
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.2
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	72	52	209	0.0	0.0	15.8	15.7
General dentistry	469	380	49	40	469	378	50	41	469	0.0	0.0		
Overall	946	603	249	182	1,034	561	221	164	946	87.9	0.0	45.9	37.8

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	40	34	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	22
Orthodontics	40	44	16	42	33	25	40	34	25
Pedodontics	33	27	40	40	34	25	40	34	25
Periodontics	8	42	51	36	36	28	35	37	28
Prosthodontics	13	42	44	35	37	28	34	37	29
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	80	11	9
Overall	55	24	21	58	24	18	59	23	17

Table BB-4 (Army): Dentist excursion 4 - AFHPSP is the sole accession source

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	82
Direct (0/25)	25	
Total	80	82

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	318
AEGD programs	77	77
Residency programs	119	119
Total	437	514

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	183
Cost per fully trained duty dentist ($)	181,196	185,234
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	183
Cost as a percentage of baseline		103.3

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, AFHPSP accessions are unconstrained and direct accessions are constrained to be zero.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	27	22	17	66	18.0	18.1	5.0	5.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	17	79	0.0	0.0	8.2	8.2
Orthodontics	31	16	13	10	39	16	13	10	40	8.4	8.6	3.0	3.0
Pedodontics	25	11	9	7	26	11	9	7	26	1.4	1.4	2.0	2.0
Periodontics	47	18	18	14	50	18	19	15	52	2.7	4.6	4.0	4.0
Prosthodontics	58	20	21	16	58	20	21	16	58	0.0	0.0	4.5	4.5
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	102	85	64	251	14.1	22.1	19.0	19.0
General dentistry	399	330	39	30	399	330	39	30	399	0.0	0.0		
Overall	933	560	241	176	978	561	247	181	988	44.7	54.8	47.0	47.0

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	41	34	25
Oral pathology	21	29	50	35	37	28	35	37	28
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	41	34	25
Pedodontics	16	22	63	41	34	25	41	34	25
Periodontics	25	40	35	36	36	28	35	36	29
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	25	25	50	42	34	25	42	34	25
Comprehensive	12	36	51	42	33	25	41	34	25
General dentistry	89	11	0	83	10	8	83	10	8
Overall	40	28	32	57	25	18	57	25	18

Table BB-4 (Navy): Dentist excursion 4 - AFHPSP is the sole accession source

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	93
Direct (0/25)	25	
HSCP (15/25)	21	
Total	96	93

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	364
AEGD programs	92	88
Residency programs	106	106
Total	459	558

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	193
Cost per fully trained duty dentist ($)	180,671	185,978
Shortage of fully trained duty dentists	5.6	5.6
Cost adjusted for shortage ($M)	187	194
Cost as a percentage of baseline		103.8

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, AFHPSP accessions are unconstrained and direct accessions are constrained to be zero.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	27	22	17	66	6.8	13.1	5.0	5.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.9
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.4
Orthodontics	16	12	8	4	24	11	9	7	26	7.9	10.4	2.0	2.0
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	20	21	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	27	28	22	77	(5.6)	(5.6)	6.0	6.0
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.5
Comprehensive	127	52	42	33	127	52	42	33	127	0.0	0.0	9.6	9.6
General dentistry	556	445	64	47	556	437	66	53	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	621	237	177	1,036	9.2	17.9	38.9	38.9

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	41	34	25
Oral pathology	13	42	46	35	37	28	35	37	28
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	41	34	25
Pedodontics	20	67	13	41	34	25	41	34	25
Periodontics	21	41	38	35	37	29	35	37	28
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	79	12	10
Overall	51	26	22	62	23	16	60	23	17

Table BB-4 (Air Force): Dentist excursion 4 - AFHPSP is the sole accession source

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	63	89
Direct (0/25)	25	0
Total	88	89

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	270	347
AEGD programs	84	84
Residency programs	120	120
Total	474	551

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	193
Cost per fully trained duty dentist ($)	181,378	185,078
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	193
Cost as a percentage of baseline		102.9

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, AFHPSP accessions are unconstrained and direct accessions are constrained to be zero.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	27	22	17	66	41.9	44.1	5.0	5.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	32	35	19	87	27.6	29.8	9.0	9.0
Orthodontics	34	22	17	13	51	22	18	13	53	17.2	18.9	4.0	4.0
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.4
Periodontics	61	22	22	18	62	23	23	18	65	1.2	3.5	5.0	5.0
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.1
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	71	53	209	0.0	0.0	15.8	15.8
General dentistry	469	380	49	40	469	380	49	40	469	0.0	0.0		
Overall	946	603	249	182	1,034	603	253	186	1,042	87.9	96.3	45.9	46.0

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	41	34	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	37	41	22
Orthodontics	40	44	16	42	33	25	41	34	25
Pedodontics	33	27	40	40	34	25	41	34	25
Periodontics	8	42	51	36	36	28	35	36	29
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	81	11	8
Overall	55	24	21	58	24	18	58	24	18

Table BB-5 (Army): Dentist excursion 5 - increase the direct accession bonus from $30,000 to $50,000

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	50
Direct (0/25)	25	30
Total	80	80

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	226
AEGD programs	77	77
Residency programs	119	119
Total	437	421

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	176
Cost per fully trained duty dentist ($)	181,196	180,416
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	176
Cost as a percentage of baseline		99.4

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	27	21	16	64	18.0	16.3	5.0	5.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	17	79	0.0	0.0	8.2	8.2
Orthodontics	31	16	13	10	39	16	13	10	39	8.4	8.1	3.0	3.0
Pedodontics	25	11	9	7	26	11	9	7	26	1.4	1.4	2.0	2.0
Periodontics	47	18	18	14	50	18	18	14	50	2.7	2.7	4.0	4.0
Prosthodontics	58	20	21	16	58	20	21	16	58	0.0	0.0	4.5	4.5
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	102	80	61	243	14.1	14.3	19.0	19.0
General dentistry	399	330	39	30	399	330	39	30	399	0.0	0.0		
Overall	933	560	241	176	978	560	240	176	976	44.7	42.8	47.0	47.0

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	42	33	25
Oral pathology	21	29	50	35	37	28	35	37	28
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	41	33	25
Pedodontics	16	22	63	41	34	25	41	34	25
Periodontics	25	40	35	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	25	25	50	42	34	25	42	34	25
Comprehensive	12	36	51	42	33	25	42	33	25
General dentistry	89	11	0	83	10	8	83	10	8
Overall	40	28	32	57	25	18	57	25	18

Table BB-5 (Navy): Dentist excursion 5 - increase the direct accession bonus from $30,000 to $50,000

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	30
HSCP (15/25)	21	15
Total	96	95

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	255
AEGD programs	92	91
Residency programs	106	106
Total	459	452

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	185
Cost per fully trained duty dentist ($)	180,671	180,157
Shortage of fully trained duty dentists	5.6	5.6
Cost adjusted for shortage ($M)	187	186
Cost as a percentage of baseline		99.7

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	30	20	10	60	6.8	6.8	5.0	5.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.9
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.4
Orthodontics	16	12	8	4	24	12	8	4	24	7.9	7.9	2.0	2.0
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	20	20	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	27	28	22	77	(5.6)	(5.6)	6.0	6.0
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.5
Comprehensive	127	52	42	33	127	52	42	33	127	0.0	0.0	9.6	9.6
General dentistry	556	445	64	47	556	443	64	49	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	631	233	163	1,027	9.2	9.2	38.9	38.9

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	50	34	16
Oral pathology	13	42	46	35	37	28	35	37	28
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	50	34	16
Pedodontics	20	67	13	41	34	25	41	34	25
Periodontics	21	41	38	35	37	29	35	37	29
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	80	12	9
Overall	51	26	22	62	23	16	61	23	16

Table BB-5 (Air Force): Dentist excursion 5 - increase the direct accession bonus from $30,000 to $50,000

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	63	58
Direct (0/25)	25	30
Total	88	88

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	270	255
AEGD programs	84	84
Residency programs	120	120
Total	474	459

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	187
Cost per fully trained duty dentist ($)	181,378	180,636
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	187
Cost as a percentage of baseline		99.6

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	27	21	16	64	41.9	41.9	5.0	5.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	32	34	18	85	27.6	27.6	9.0	9.0
Orthodontics	34	22	17	13	51	22	17	13	51	17.2	17.2	4.0	4.0
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.4
Periodontics	61	22	22	18	62	22	22	18	62	1.2	1.2	5.0	5.0
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.1
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	71	53	209	0.0	0.0	15.8	15.8
General dentistry	469	380	49	40	469	381	49	39	469	0.0	0.0		
Overall	946	603	249	182	1,034	604	248	182	1,034	87.9	87.9	45.9	46.0

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	21
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	40	34	25
Periodontics	8	42	51	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	81	10	8
Overall	55	24	21	58	24	18	58	24	18

Table BB-6 (Army): Dentist excursion 6 - increase dental ASP based on the ULB's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	51
Direct (0/25)	25	25
Total	80	76

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	224
AEGD programs	77	73
Residency programs	119	118
Total	437	415

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	193
Cost per fully trained duty dentist ($)	181,196	195,898
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	193
Cost as a percentage of baseline		109.1

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	27	23	17	67	18.0	19.1	5.0	5.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	18	79	0.0	0.0	8.2	8.0
Orthodontics	31	16	13	10	39	16	14	10	40	8.4	9.3	3.0	3.0
Pedodontics	25	11	9	7	26	11	9	7	27	1.4	2.0	2.0	2.0
Periodontics	47	18	18	14	50	18	18	15	51	2.7	3.7	4.0	4.0
Prosthodontics	58	20	21	16	58	20	21	17	58	0.0	0.0	4.5	4.4
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	103	82	63	249	14.1	19.5	19.0	19.0
General dentistry	399	330	39	30	399	318	45	36	399	0.0	0.0		
Overall	933	560	241	176	978	549	250	188	987	44.7	53.7	47.0	46.7

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	41	34	26
Oral pathology	21	29	50	35	37	28	35	37	29
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	40	34	26
Pedodontics	16	22	63	41	34	25	40	34	26
Periodontics	25	40	35	36	36	28	36	36	29
Prosthodontics	13	42	44	35	37	28	35	36	29
Public health	25	25	50	42	34	25	41	34	25
Comprehensive	12	36	51	42	33	25	42	33	25
General dentistry	89	11	0	83	10	8	80	11	9
Overall	40	28	32	57	25	18	56	25	19

Table BB-6 (Navy): Dentist excursion 6 - increase dental ASP based on the ULB's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	22
HSCP (15/25)	21	15
Total	96	87

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	247
AEGD programs	92	84
Residency programs	106	105
Total	459	436

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	202
Cost per fully trained duty dentist ($)	180,671	195,895
Shortage of fully trained duty dentists	5.6	4.1
Cost adjusted for shortage ($M)	187	203
Cost as a percentage of baseline		108.6

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	30	21	10	61	6.8	8.1	5.0	5.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.8
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.3
Orthodontics	16	12	8	4	24	12	8	4	24	7.9	8.4	2.0	2.0
Pedodontics	16	7	5	4	16	6	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	19	20	16	56	0.0	0.0	4.3	4.2
Prosthodontics	83	27	28	22	77	27	29	23	79	(5.6)	(4.1)	6.0	6.0
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.4
Comprehensive	127	52	42	33	127	52	42	33	127	0.0	0.0	9.6	9.4
General dentistry	556	445	64	47	556	422	74	60	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	609	244	178	1,030	9.2	12.4	38.9	38.4

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	49	34	17
Oral pathology	13	42	46	35	37	28	34	37	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	49	34	17
Pedodontics	20	67	13	41	34	25	40	34	26
Periodontics	21	41	38	35	37	29	34	36	29
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	33	26
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	76	13	11
Overall	51	26	22	62	23	16	59	24	17

Table BB-6 (Air Force): Dentist excursion 6 - increase dental ASP based on the ULB's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	63	57
Direct (0/25)	25	25
Total	88	82

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	270	248
AEGD programs	84	79
Residency programs	120	119
Total	474	446

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	204
Cost per fully trained duty dentist ($)	181,378	196,115
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	204
Cost as a percentage of baseline		108.7

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	27	22	17	65	41.9	43.3	5.0	5.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	33	35	19	86	27.6	29.0	9.0	9.0
Orthodontics	34	22	17	13	51	22	17	13	52	17.2	18.3	4.0	4.0
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.3
Periodontics	61	22	22	18	62	23	23	18	63	1.2	2.4	5.0	5.0
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.1
Public health	2	1	1	0	2	1	1	1	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	84	71	53	209	0.0	0.0	15.8	15.4
General dentistry	469	380	49	40	469	365	56	48	469	0.0	0.0		
Overall	946	603	249	182	1,034	587	257	194	1,039	87.9	93.0	45.9	45.5

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	22
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	40	34	26
Periodontics	8	42	51	36	36	28	36	36	29
Prosthodontics	13	42	44	35	37	28	35	37	29
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	40	34	26
General dentistry	79	12	9	81	11	8	78	12	10
Overall	55	24	21	58	24	18	57	25	19

Table BB-7 (Army): Dentist excursion 7 - increase dental ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	53
Direct (0/25)	25	25
Total	80	78

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	231
AEGD programs	77	75
Residency programs	119	118
Total	437	424

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	183
Cost per fully trained duty dentist ($)	181,196	185,855
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	183
Cost as a percentage of baseline		103.1

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	27	22	17	66	18.0	18.1	5.0	5.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	17	79	0.0	0.0	8.2	8.1
Orthodontics	31	16	13	10	39	16	13	10	40	8.4	8.9	3.0	3.0
Pedodontics	25	11	9	7	26	11	9	7	27	1.4	1.7	2.0	2.0
Periodontics	47	18	18	14	50	18	18	14	50	2.7	3.2	4.0	4.0
Prosthodontics	58	20	21	16	58	20	21	16	58	0.0	0.0	4.5	4.4
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	103	82	62	247	14.1	17.5	19.0	19.0
General dentistry	399	330	39	30	399	323	43	33	399	0.0	0.0		
Overall	933	560	241	176	978	554	247	182	983	44.7	49.5	47.0	46.8

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	41	34	25
Oral pathology	21	29	50	35	37	28	35	37	29
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	41	34	26
Pedodontics	16	22	63	41	34	25	41	34	26
Periodontics	25	40	35	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	25	25	50	42	34	25	41	34	25
Comprehensive	12	36	51	42	33	25	42	33	25
General dentistry	89	11	0	83	10	8	81	11	8
Overall	40	28	32	57	25	18	56	25	18

Table BB-7 (Navy): Dentist excursion 7 - increase dental ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	25
HSCP (15/25)	21	16
Total	96	91

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	251
AEGD programs	92	87
Residency programs	106	105
Total	459	444

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	191
Cost per fully trained duty dentist ($)	180,671	185,592
Shortage of fully trained duty dentists	5.6	4.9
Cost adjusted for shortage ($M)	187	192
Cost as a percentage of baseline		102.8

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	30	21	10	60	6.8	7.5	5.0	5.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.8
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.3
Orthodontics	16	12	8	4	24	12	8	4	24	7.9	8.2	2.0	2.0
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	19	20	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	27	28	22	78	(5.6)	(4.9)	6.0	6.0
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.4
Comprehensive	127	52	42	33	127	52	42	33	127	0.0	0.0	9.6	9.5
General dentistry	556	445	64	47	556	431	71	54	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	619	240	170	1,029	9.2	10.8	38.9	38.6

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	49	34	17
Oral pathology	13	42	46	35	37	28	35	37	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	49	34	17
Pedodontics	20	67	13	41	34	25	41	34	26
Periodontics	21	41	38	35	37	29	35	37	29
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	78	13	10
Overall	51	26	22	62	23	16	60	23	16

Table BB-7 (Air Force): Dentist excursion 7 - increase dental ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	63	60
Direct (0/25)	25	25
Total	88	85

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	270	257
AEGD programs	84	81
Residency programs	120	119
Total	474	457

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	193
Cost per fully trained duty dentist ($)	181,378	186,078
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	193
Cost as a percentage of baseline		102.8

a. Annual accession source constraints are in parentheses (minimum/maximum).

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	27	21	16	65	41.9	42.7	5.0	5.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	32	34	18	85	27.6	28.2	9.0	9.0
Orthodontics	34	22	17	13	51	22	17	13	52	17.2	17.8	4.0	4.0
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.3
Periodontics	61	22	22	18	62	23	22	18	63	1.2	1.8	5.0	5.0
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.1
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	71	53	209	0.0	0.0	15.8	15.6
General dentistry	469	380	49	40	469	372	54	44	469	0.0	0.0		
Overall	946	603	249	182	1,034	594	255	188	1,036	87.9	90.4	45.9	45.7

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	22
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	40	34	25
Periodontics	8	42	51	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	79	11	9
Overall	55	24	21	58	24	18	57	25	18

Table BB-8 (Army): Dentist excursion 8 - increase the direct accession bonus to $50,000 and increase ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	55	50
Direct (0/25)	25	28
Total	80	78

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	241	223
AEGD programs	77	75
Residency programs	119	118
Total	437	416

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	177	182
Cost per fully trained duty dentist ($)	181,196	185,493
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	177	182
Cost as a percentage of baseline		102.7

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	48	27	22	17	66	27	22	17	66	18.0	18.0	5.0	5.0
Oral pathology	12	4	4	3	12	4	4	3	12	0.0	0.0	0.9	0.9
Oral surgery	79	29	32	17	79	29	32	17	79	0.0	0.0	8.2	8.1
Orthodontics	31	16	13	10	39	16	13	10	39	8.4	7.9	3.0	3.0
Pedodontics	25	11	9	7	26	11	9	7	26	1.4	1.5	2.0	2.0
Periodontics	47	18	18	14	50	18	18	14	50	2.7	3.2	4.0	4.0
Prosthodontics	58	20	21	16	58	20	21	16	58	0.0	0.0	4.5	4.4
Public health	5	2	2	1	5	2	2	1	5	0.0	0.0	0.4	0.4
Comprehensive	229	102	80	61	243	103	82	62	247	14.1	17.7	19.0	19.0
General dentistry	399	330	39	30	399	323	43	33	399	0.0	0.0		
Overall	933	560	241	176	978	554	246	181	981	44.7	48.2	47.0	46.8

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	43	30	26	41	34	25	41	33	25
Oral pathology	21	29	50	35	37	28	35	37	29
Oral surgery	46	31	23	37	41	22	37	41	22
Orthodontics	42	12	45	41	34	25	42	33	25
Pedodontics	16	22	63	41	34	25	41	34	25
Periodontics	25	40	35	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	25	25	50	42	34	25	41	34	25
Comprehensive	12	36	51	42	33	25	42	33	25
General dentistry	89	11	0	83	10	8	81	11	8
Overall	40	28	32	57	25	18	56	25	18

Table BB-8 (Navy): Dentist excursion 8 - increase the direct accession bonus to $50,000 and increase ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	50	50
Direct (0/25)	25	26
HSCP (15/25)	21	15
Total	96	91

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	261	250
AEGD programs	92	87
Residency programs	106	105
Total	459	443

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	186	191
Cost per fully trained duty dentist ($)	180,671	185,544
Shortage of fully trained duty dentists	5.6	4.9
Cost adjusted for shortage ($M)	187	192
Cost as a percentage of baseline		102.8

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	53	30	20	10	60	30	21	10	60	6.8	7.5	5.0	5.0
Oral pathology	24	8	9	7	24	8	9	7	24	0.0	0.0	1.9	1.8
Oral surgery	81	30	33	18	81	30	33	18	81	0.0	0.0	8.4	8.3
Orthodontics	16	12	8	4	24	12	8	4	24	7.9	8.2	2.0	2.0
Pedodontics	16	7	5	4	16	7	5	4	16	0.0	0.0	1.2	1.2
Periodontics	56	20	20	16	56	19	20	16	56	0.0	0.0	4.3	4.3
Prosthodontics	83	27	28	22	77	27	28	22	78	(5.6)	(4.9)	6.0	6.0
Public health	6	2	2	2	6	2	2	2	6	0.0	0.0	0.5	0.4
Comprehensive	127	52	42	33	127	52	42	33	127	0.0	0.0	9.6	9.5
General dentistry	556	445	64	47	556	431	71	55	556	0.0	0.0		
Overall	1,018	632	233	162	1,027	619	240	170	1,029	9.2	10.8	38.9	38.6

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	19	47	34	50	34	16	49	34	17
Oral pathology	13	42	46	35	37	28	35	37	29
Oral surgery	21	52	27	37	41	22	37	41	22
Orthodontics	29	38	33	50	34	16	49	34	17
Pedodontics	20	67	13	41	34	25	41	34	26
Periodontics	21	41	38	35	37	29	35	37	29
Prosthodontics	11	44	46	35	36	29	35	36	29
Public health	20	40	40	41	34	25	41	34	25
Comprehensive	20	40	40	41	33	26	41	33	26
General dentistry	96	3	1	80	12	9	77	13	10
Overall	51	26	22	62	23	16	60	23	17

Table BB-8 (Air Force): Dentist excursion 8 - increase the direct accession bonus to $50,000 and increase ASP based on CNA's proposal

Steady-state accessions and training inventories

	Accessions	
Accession source[a]	Baseline	Excursion
AFHPSP (50/125)	63	54
Direct (0/25)	25	30
Total	88	84

	Accession and training inventory	
Group	Baseline	Excursion
Accession pipeline	270	243
AEGD programs	84	81
Residency programs	120	119
Total	474	443

Steady-state annual life-cycle cost

	Baseline	Excursion
Total cost of dental corps ($M)	188	192
Cost per fully trained duty dentist ($)	181,378	185,342
Shortage of fully trained duty dentists	0.0	0.0
Cost adjusted for shortage ($M)	188	192
Cost as a percentage of baseline		102.4

a. Annual accession source constraints for the baseline model are in parentheses (minimum/maximum). For excursion, direct accession constraints were increased to 30.

Steady-state annual inventory by specialty and paygrade

		Baseline				Excursion				Excess (shortage)		GDE starts	
Specialty	Billets	O-3/4	O-5	O-6	Total	O-3/4	O-5	O-6	Total	Baseline	Excursion	Baseline	Excursion
Endodontics	22	27	21	16	64	27	21	16	65	41.9	42.7	5.0	5.0
Oral pathology	7	2	3	2	7	2	3	2	7	0.0	0.0	0.5	0.5
Oral surgery	57	32	34	18	85	32	34	18	85	27.6	28.2	9.0	9.0
Orthodontics	34	22	17	13	51	22	17	13	52	17.2	17.8	4.0	4.0
Pedodontics	18	7	6	5	18	7	6	5	18	0.0	0.0	1.4	1.3
Periodontics	61	22	22	18	62	23	22	18	63	1.2	1.8	5.0	5.0
Prosthodontics	67	23	25	19	67	23	25	19	67	0.0	0.0	5.1	5.1
Public health	2	1	1	0	2	1	1	0	2	0.0	0.0	0.1	0.1
Comprehensive	209	85	71	53	209	85	71	53	209	0.0	0.0	15.8	15.6
General dentistry	469	380	49	40	469	372	53	43	469	0.0	0.0		
Overall	946	603	249	182	1,034	595	254	188	1,036	87.9	90.4	45.9	45.7

Steady-state annual percentage paygrade distribution by specialty

	FY 2000			Baseline			Excursion		
Specialty	O-3/4	O-5	O-6	O-3/4	O-5	O-6	O-3/4	O-5	O-6
Endodontics	31	25	44	42	33	25	42	33	25
Oral pathology	17	17	67	34	37	29	34	37	29
Oral surgery	16	56	28	38	40	21	38	40	22
Orthodontics	40	44	16	42	33	25	42	33	25
Pedodontics	33	27	40	40	34	25	40	34	25
Periodontics	8	42	51	36	36	28	36	36	28
Prosthodontics	13	42	44	35	37	28	35	37	28
Public health	0	100	0	41	34	25	41	34	25
Comprehensive	19	43	38	41	34	25	41	34	25
General dentistry	79	12	9	81	11	8	79	11	9
Overall	55	24	21	58	24	18	57	25	18

Appendix C: Optometrists' results

Background

In phase I of the life-cycle-cost study, we identified the key components that drive the life-cycle costs for selected uniformed health care professionals' predominant accession sources and career paths [1]. Two questions that phase I did not answer are the following:

1. Given the current billet requirements, life-cycle costs, retention patterns, and other constraints, what is the optimal mix of accessions?
2. Is it more cost-effective to increase special pays to retain the existing inventory or to concede a pre-established loss ratio and access more providers into the system by increasing accession subsidies?

In phase II of the study, we developed and ran a model to assess the most economical mix of accessions to fill duty billet requirements in the future, assessed the efficacy of current accession/retention programs, and recommended ways to strengthen the personnel planning process.[1]

Basic model

The basic model we used to look at the optimal mix of accessions is a cost minimization model. The objective function of this model is the following:

1. Duty billets refer to billets for fully trained personnel who are not in training. A duty optometrist, therefore, is someone who is not in training and is qualified to fill one of these billets.

$$\min Cost = \sum_i \sum_j Cost_j Trainees_j Year_i + \sum_i \sum_j Cost_j Optometrists_j Year_i + penalties$$

subject to

$$Accessions_i \in [\min, \max] \text{ for } i = 1 \text{ to } 4$$

$$Bodies \geq Billets \text{ or pay penalty}$$

$$O\text{-}6s \leq \max$$

$$O\text{-}5s + O\text{-}6s \leq \max$$

$$O\text{-}4s + O\text{-}5s + O\text{-}6s \leq \max.$$

Note that trainees are those in the accession pipeline. Subscripts *"i"* represent the fiscal year between FY 2003 and FY 2083. Subscripts *"j"* represent the accession source and year of practice for the cost and inventory associated with that combination.[2]

A simpler way to state this model is that we are *minimizing the total cost (over a long time horizon) of meeting all of the optometry community requirements given the constraints the Services and DoD place on the optometry community.*[3]

Steady-state solution

We use a long time horizon to obtain the steady-state solution to the model. What is meant by the optimal accession mix in the *steady state?* If we ran the model with a 1-year time horizon, the output of the model would tell us the optimal mix of accessions given that time horizon. Assuming that the model is currently out of equilibrium, if we ran the model over a 2-year time horizon, the optimal mix of accessions would be different in the second year than in the first. This would occur because the model has 2 years to move the optometry community toward its long-term optimal mix of accessions. Essentially, the steady state is a solution in which the optimal mix of accessions is the same year after year.

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2. The inventory for group j is the group's inventory at year i - 1 less attrition.

3. We ran this optimization model using the software package, AMPL.

To find the optimal mix of accessions in the steady state, we ran the model for 80 years to allow personnel currently in the optometry community or one of its accession pipelines to work their way out of the system. For example, personnel in their first year of Armed Forces Health Professions Scholarship Program (AFHPSP) subsidization will need 3 years to complete graduate school. They may be in the optometry community for another 30 years. So, in total, they are in the system for 33 years.

This means that the personnel we put into the system today will affect it for years to come. Consequently, what the model says the optimal mix of accessions is for each year depends on what is currently in the system. Eventually, however, when current inventory works its way out of the model, we reach a point where the optimal mix of accessions is stable—and doesn't vary much from year to year. This stable accession mix is what we call the steady-state solution. This also implies that there is an optimal path of accessions to reach the steady state. This path depends on the current inventory in the system. Although we are not reporting the optimal path to the steady state, we want to be clear that the steady-state accession mix and the path of accessions to reach the steady state are *not* the same.

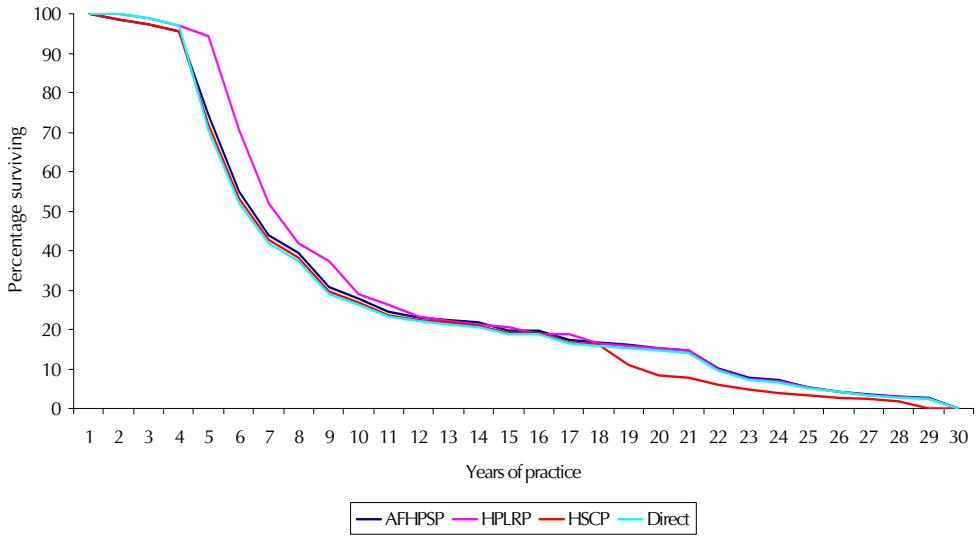
Model costs and retention

The costs we modeled are training and accession costs, compensation, permanent-change-of-station (PCS) costs, and temporary duty costs [1]. Costs are largely driven by the career path—timing of promotions, training, and board certification. In conjunction with the TRICARE Management Activity (TMA) and representatives from each Service, we determined in phase I the predominant career path by accession source and Service. Although we will not determine the impact of the career path on the optimal mix of accessions by altering it in various model excursions, if the career path changes, costs and continuation patterns will change (see [1]).

Given the career paths we developed in phase I, we computed average retention for each accession source using FY 1991-2000 data from the Defense Manpower Data Center (DMDC). In computing the optimal mix of accessions, however, we use the entire survival curve (which

incorporates attrition by year of service, not average attrition across all years of service). For example, figure C-1 shows the survival curves for each of the four major accession sources for Navy optometrists.[4]

Figure C-1. Percentage of Navy optometrists surviving by years of practice and accession source



Constraints

If we place no constraints on the model, the obvious solution to the optimal mix of accessions is to have all new accessions come from the least expensive accession source. Allowing the model to be unconstrained doesn't reflect the environment in which the Services operate (market supply and demand, as well as unique military requirements), so we imposed three constraints on the model:

4. Because the number of optometrists is small and the AFHPSP and HSCP accession programs are relatively new to optometry, not enough time has passed to provide sufficient data to develop reliable survival curves for each accession source. As a surrogate, we modified the average survival of all optometrists to develop notional survival curves by accession source. We did this based on what we know of survival differences among the physician accession sources. For example, we model the survival curves such that the retention of AFHPSP accessions is better than direct accessions.

- Billets
- Experience profile requirements
- Accession source caps.

Billets

The first constraint is the number of billets that must be filled. From a modeling standpoint, the number of billets is the *minimum* number of duty optometrists the Services require—not the maximum they can have. For military personnel planners, authorized billets are more akin to the maximum number of bodies the Services can have on active duty at the end of any given fiscal year. To fill the billets with the exact same number of bodies, we would have to constrain bodies to be no less and no more than billets. However, doing this makes the model infeasible because there are other constraints on the model that may force bodies to exceed billets or may not allow them to reach billets.

That said, the model doesn't want more bodies than billets; it is trying to minimize cost, each extra body is costly. In other words, modeling billets as the minimum number of bodies is akin to modeling a target number of billets; in the steady state, the number of bodies exceeds billets *only* if the model's other constraints force it to do so.

Experience profile

One potential driver of the model is the desired experience profile of the force. What percentage of optometrists should be O-6s and what percentage should be O-5s?[5] Though it will always be the case that it

5. The 1980 Defense Officer Personnel Management Act (DOPMA) stipulates (i.e., controls) the percentage of inventory that may be promoted to paygrades O-4–O-6. On average, DOPMA guidelines for a given community are 5% for O-6, 12% for O-5, and 20% for O-4. These guidelines are predominant patterns, but each military department may elect to promote more O-4s and fewer O-5s in a given fiscal year based on total manning constraints or to better manage the overall grade force structure. Unlike physicians and dentists, optometrists are not a separate competitive category/community; they exist as one of many specialties within the DOPMA-controlled Medical Service or Biomedical Science Corps. Physicians and dentists are excluded from DOPMA controls.

is most cost-effective to fill junior billets from the least expensive accession source, it may be more cost-effective to fill senior billets from more expensive accession sources if the retention rates of these accession sources are substantially higher than the least costly one.[6]

Accession source caps

Even when we impose a force structure constraint on the model, the model may find that the optimal mix of accessions consists of more optometrists from some accession sources than the Services could reasonably get. For example, direct procurement is the least expensive of the major optometrist accession sources; however, the number of direct procurement accessions the Services can access is limited given the programs' current incentives. For this reason, another critical constraint is the maximum number of accessions the Services can expect from each source given the current rewards of the program. Hence, although the Services may want more direct procurement accessions, they may not be able to get more without increasing the subsidization of the program. Overall, accession source caps are an acknowledgment that there are economic and political constraints on the number of optometrists that can be accessed through each accession source.

Penalties

Sometimes the model's constraints will not allow it to fill all of the billet requirements. When this occurs, the model has not technically met the minimum billet requirement. Again, if we imposed the billet requirement as a hard minimum, the model would be infeasible because the other constraints simply don't allow the model to meet the billet requirement. To overcome this problem, we've constructed the model so that it handles these cases by imposing an arbitrarily large financial penalty. In other words, we allow the model to meet the requirement that it couldn't fill it with a uniformed optometrist by buying a civilian optometrist.

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6. We are not directly filling senior billets with new accessions, but we grow these individuals into senior billets. Differences in retention patterns across accession sources, therefore, can make it more or less costly to grow senior personnel from specific accession sources.

We set the penalty arbitrarily large so that it will always use a uniformed optometrist if the constraints allow it. Our tasking in this study was to determine the most cost-effective way of filling billets with military personnel, so we designed the model to go to the civilian sector to fill a requirement only if the constraints of the system do not allow it to fill a requirement with a military optometrist. Future studies should examine the cost-effectiveness of the make-buy decision for billets above readiness requirements.

Note that the penalty costs for failing to fill requirements with military personnel *are not included in the cost figures that we report.* The annual cost figures represent only those costs associated with military personnel—the life-cycle costs we developed in phase I of the study. In fact, in the steady state, penalty costs are not an issue for the optometry community because the model meets all requirements.[7]

Other modeling issues

We modeled the process of filling billets using continuous variables rather than an integer programming approach. This means that we allowed for fractions of personnel, such as accessing 4.5 in the steady state rather than forcing the model to always use a whole number. Because we are looking for a steady-state solution, all we really want is the average number of personnel that should be accessed each year. So, if the steady state is 4.5, we interpret the steady state as accessing 4 in one year and 5 in the next. Integer programming would add substantially to the modeling complexity without meaningfully affecting the results.

Another modeling issue is the starting point—today's inventory in both the optometry community and the accession pipelines. The starting point is the driver for how and whether the Services will be able to meet near-term requirements. That said, the starting point we

7. Penalty costs come into play only in the path to the steady state. This occurs because the optometry community is below manning at present. To meet requirements, the penalty comes into effect; however, after enough time has passed to fill these shortages with new accessions, the penalty costs are not an issue.

used for inventories *does not affect the optimal mix of accessions in the steady state* because, once enough time passes to let the current inventory work through the system, the model reaches the same steady state regardless of the starting point. What it affects is the time it takes to reach the steady state and the path used to reach it.

Baseline assumptions

Now that we have conceptually discussed the model, we present the assumptions for our baseline model. The purpose of the baseline model is twofold. First, given the basic parameters and constraints, it determines the long-term consequences of meeting requirements. The baseline tells us whether the Services can meet their requirements given the current constraints on the system and the optimal mix of accessions to use. Second, the baseline model provides a reference point, to which we compare all of our various excursions.

Billets and accession source caps

Table C-1 details our baseline assumptions for billets and accessions for each Service. The Air Force has the largest overall billet requirement—155 compared with 133 in the Army and 127 in the Navy.

Table C-1. Baseline assumptions for optometrist billets and number of accessions by Service

Service	Billets	Accessions	
		Minimum	Maximum
Army	133	0	22[a]
Navy	127	0	33[b]
Air Force	155	0	25[c]

a. The annual accession source constraint (maximum) for the Army is 20 for AFHPSP and 2 direct procurement.

b. The annual accession source constraint (maximum) for the Navy is 20 for AFHPSP, 3 direct procurement, 6 HPLRP, and 4 HSCP.

c. The annual accession source constraint (maximum) for the Air Force is 20 for AFHPSP and 5 direct procurement.

Table C-1 also shows the minimum and maximum number of optometrist accessions the three Services can bring in each year from each accession program. Unlike physicians and dentists, there is no minimum number of accessions required annually from any given accession source because optometrists are not a separate competitive category and because of the relatively small size of the total specialists as a whole. The accession maximum reflects the fact that there is a limit on the number of AFHPSP funding available for this program. Similarly, we've limited the number of direct procurement accessions to two to five per year based on the number of direct accessions the Services have brought in historically and the fact that, unlike pharmacists, no signing bonus currently exists for optometrists.

In addition to AFHPSP and direct procurement accessions, the Navy accesses optometrists through the Health Services Collegiate Program (HSCP). We set the constraints on this accession source to four each year based on the Navy's historical and projected number of HSCP accessions. Moreover, the Navy plans to offer the Health Profession Loan Repayment Program (HPLRP) to qualified applicants, and it will try to access about six optometrists annually through this program.[8]

Experience profile constraint

We constrained the experience profile of the optometry community based on DOPMA guidelines. Accordingly, we set the experience profile constraint at the following levels:

- No more than 5 percent of billets should be filled by O-6s.
- No more than 17 percent of billets should be filled by O-5s or O-6s.
- No more than 37 percent of billets should be filled by O-4s, O-5s, or O-6s.

8. Details about the subsidies and career path for each accession source are documented in phase I of this study [1].

Cost and retention

In addition to these assumptions, we model costs and retention based on the phase I life-cycle analysis [1] in which we detailed the costs by accession source and Service for each year personnel were in an accession pipeline or in the optometry community.[9] We use results from previous CNA research [2], looking at the responsiveness of dentists' continuation rates to pay to model how the optometrists' survival curves change in response to changes in special pays and bonuses. We did this because no previous research has estimated an elasticity of optometrists' retention with respect to pay.

We believe that this is a reasonable proxy given the high student debt load and the large military-civilian pay gap for optometrists.[10] Also, we modeled how the maximum direct procurement accessions change when we initiate a $30,000 direct accession signing bonus.[11]

Baseline model

In this subsection, we present the results of the baseline model for each Service. Because there is a great deal of relevant information in the model results, we go through it in detail for the baseline. The type of information and format of presentation are much the same for each excursion,[12] so we will not go through as extensive an analysis of the data for the excursions. Rather, we will highlight the important differences in each set of results from that of the baseline model.

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9. The results are the same whether or not we use a non-zero discount rate.
10. Because the military-civilian pay gap for uniformed dentists is larger than the optometry pay gap, our elasticity estimates may be slightly low. Hence, we think the actual changes in retention, given pay disparities, may be larger than we modeled.
11. As we did for the physician and dentist communities, we model the responsiveness of accessions to changes in the direct accession bonus using estimates of the responsiveness of enlisted personnel to changes in pay [4, 5].
12. For each excursion, data are presented for each Service. For ease of comparison, each portion of the excursion results is presented along with the comparable results from the baseline.

Accessions and training

Table C-2 presents, for all three Services, the optimal number of accessions from each accession source subject to constraints.

Table C-2. Baseline steady-state annual accessions and accession inventory

Accessions	Army	Navy	Air Force
Number[a]			
AFHPSP (20-20-20)	16	3	14
Direct (2-3-5)	2	3	5
HPLRP (0-6-0)		6	
HSCP (0-4-0)		4	
Total	18	16	19
Percentage			
AFHPSP	89	17	74
Direct	11	19	26
HPLRP		39	
HSCP		26	
Total	100	100	100
Student load	49	19	28

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

For each Service, the direct procurement accession constraint is binding, meaning that the model uses the maximum number of direct accessions allowed. The model would like more of these accessions because they are the most cost-effective given their costs and retention. In fact, in the Navy case, the model uses the maximum number of accessions from each accession source except for AFHPSP, indicating that AFHPSP is the least cost-effective accession source among the four options available to Navy. As a result, AFHPSP accessions are less cost-effective than direct procurement, HSCP, or HPLRP.

Cost

Cost is another key output from the model because the main objective of the model is to minimize total costs subject to various constraints. Table C-3 shows the estimated annual cost in the steady state both when DOPMA constraints are binding, and when DOPMA constraints are not binding, which allows the model to promote as many optometrists as it desires.

With DOPMA binding, the estimated annual cost in the steady state is nearly $19 million in the Air Force case. This cost includes the compensation costs (salary and benefits) of all active duty optometrist personnel and the compensation and accession costs of all personnel in the student load (i.e., in the optometrists' student load (accession) inventory) regardless of whether they are on active duty. In addition, we show the average annual cost per fully trained optometrist. In the steady state, there are 155 active duty optometrists in the Air Force case, meaning that each costs an average of $122,108 (approximately $19 million/155).[13] This cost reflects not only each optometrist's compensation (salary and benefits), but also the cost of the personnel in the accession pipelines. In other words, the cost of a duty billet is compensation, temporary duty, and PCS costs plus the training tail required to support the billet.

Table C-3. Baseline steady-state annual life-cycle costs

	Costs with DOPMA		Costs without DOPMA	
Service	Total ($K)	Per optometrist ($)	Total ($K)	Per optometrist ($)
Army	17,281	129,929	17,509	131,650
Navy	16,407	129,186	16,624	130,897
Air Force	18,927	122,108	19,191	123,811

13. Table C-3 also shows that the estimated annual cost in the steady state, without the DOPMA constraint, is near $19.2 million in the Air Force case. The average annual cost per fully trained optometrist, in the steady state, averages $123,811 (approximately $19.2 million/155).

Inventory

Table C-4 shows the resulting steady-state inventory from the baseline model and the percentage paygrade distribution of the inventory in the steady state. The inventory and percentage paygrade distribution for each of the Services can be easily compared with their fiscal year 2000 inventory and distribution. We also display the percentage paygrade distribution without the DOPMA constraints.

Table C-4. Baseline steady-state inventory by paygrade

	Army		Navy		Air Force	
Paygrade	FY 2000	Baseline	FY 2000	Baseline	FY 2000	Baseline
Number						
O-3	60	84	51	80	58	98
O-4	17	27	28	25	46	31
O-5	26	16	21	15	31	19
O-6	13	7	8	6	5	8
Total[a]	116	133	108	127	140	155
Percentage						
O-3	52	63	47	63	41	63
O-4	15	20	26	20	33	20
O-5	22	12	19	12	22	12
O-6	11	5	7	5	4	5
Total	100	100	100	100	100	100
Percentage w/o DOPMA[b]						
O-3		60		58		56
O-4		19		21		22
O-5		13		13		15
O-6		8		8		7
Total		100		100		100

a. There are no excesses or shortages in the baseline.

b. The reason we show the percentage paygrade distribution without the DOPMA constraints is that the Military Health System (MHS) is increasingly accessing optometrists and other health care professionals as O-3s, in addition to physicians and dentists, because of the educational program length for so many specialties. For some DOPMA-constrained specialties, high student debt loads and uniformed-civilian pay gaps also exist, making them potentially difficult to access initially and retain in the military. Although beyond the scope of this study, we believe that the existing DOPMA policies should be evaluated for several MHS health care specialties.

Table C-4 shows that the DOPMA experience profile is easily met for all three Services in the baseline model. As noted in the table, for the optometrist baseline model (and subsequent excursions) no excesses or shortages occurred in the steady state. In other words, the model was able to exactly meet all the billet requirements, which was not the case for physicians and dentists.[14] This finding is not surprising given CNA's previous research and findings on uniformed optometrists [2]. At present, the MHS is filling only about 87 percent of its billets because a bedrock accession source, such as AFHPSP, has only recently been established. What our baseline model (and excursions) show is that the military's manning difficulties for optometry will disappear if sufficient quotas for optometry AFHPSP (and HSCP for the Navy) students are available.

Model excursions

An important asset of modeling is the ability to change assumptions regarding one or more parameters and/or constraints and compare results. This allows one to (1) test the sensitivity of the model to specific assumptions and (2) evaluate the impact of changes in the system without having to make real-world changes. We can use the model to optimize the accession mix subject to current policies about experience profile, billet requirements, and accession program parameters (essentially our baseline model). We can also compare these results with model excursions that test what-if scenarios regarding, for example, changes in accession bonuses or special pays.

For this analysis, we ran several excursions of the model for each Service. In each excursion, we altered one or two parameters and/or constraints and determined the most cost-effective way of meeting

14. As discussed earlier, we have modeled the baseline to reflect today's business practices and policies. The steady-state solution derived in the model, however, may not reflect what the Services are experiencing for a given specialty today (e.g., manning shortages/overages, experience profiles, and accession source distribution mix). Our model's steady-state accession mix shows how the Services should access and train selected health care professionals in the long run, if all the current constraints are being met.

requirements given the new set of parameters and constraints. We then compared these results with the baseline model to see how the parameters and constraints we altered change the optimal mix of accessions, experience profile, and inventory as well as the total cost to the system. The excursions for this analysis exploit one or more of the following:

- Changes in accession programs
- Changes in board certification pay and optometry retention bonus (ORB).

Experience profile

For both the baseline and excursions, we ran a version with and without DOPMA constraints to show the importance of the experience profile constraint in determining the steady state's optimal accession mix. As a baseline, we constrained the experience profile of the optometrist billets to be at the following levels:

- No more than 5 percent of billets should be filled by O-6s
- No more than 17 percent of billets should be filled by O-5s or O-6s
- No more than 37 percent of billets should be filled by O-4s, O-5s, or O-6s.

These experience profile constraints were designed to reflect the grade requirement constraints set forth under DOPMA.

We removed the DOPMA constraints to see what the experience profile would look like if optometrists weren't constrained by DOPMA. Because optometrists are accessed into the military as O-3s (as are most physician and dentist accessions) and usually experience a $100,000 optometry student debt load, we thought it would benefit the Services to see what steady-state percentage paygrade distribution the model reaches "without" the DOPMA constraint. Removing the constraint in the baseline resulted in the Army and the Navy having 8 percent of their inventories as O-6s and the Air Force having 7 percent, compared with the DOPMA guideline of 5 percent.

Accession program parameters

The baseline case models the accession program constraints and costs as they currently exist, but it is reasonable to assume that these might change. These changes could be the result of policy changes in response to changing market forces, optometrists' behavior, or political realities. We ran two scenarios that explored:

- What if AFHPSP were the only viable option for accessing optometrists (excursion 1)?
- What if the Services initiated a $30,000 accession bonus for optometrists, which then increased the potential number of direct accessions (excursion 2)?

Board certification pay and optometry retention bonus

Cost and survival curves for optometrists in the baseline model reflect the current special pays for military optometrists, including the optometry special pay, optometry retention bonus, and board certification pay. The remaining excursions explore the following three scenarios:

- What if no optometrist received board certification pay (excursion 3)?
- What if the optometry retention bonus were increased by $6,000 (excursion 4)?
- What if the optometry retention bonus were increased by $6,000 *and* a $30,000 accession bonus was initiated for optometrists?

Excursion 1: AFHPSP is the sole accession source

AFHPSP is considered the most reliable optometry accession program available to the Services for accessing large numbers of optometrists. Recent CNA analysis [2] concluded that the military will increasingly rely on the AFHPSP to meet its optometrist accession goals. This conclusion was based on:

- The rising level of debt faced by optometry school graduates[15]
- A uniformed-civilian pay gap
- The Services' chronic inability to attract direct accessions.[16]

In fact, current accession trends show that the Army and the Air Force are accessing the vast majority of their optometry accessions through the AFHPSP program, whereas the Navy uses a mixture of accession sources to meet its requirements.

Excursion 1 was designed to evaluate the effect of relying solely on AFHPSP to meet all accession requirements. To model this, we allow AFHPSP accessions to be unconstrained in the model, and we eliminate all other accession options (i.e., direct accessions as well as Navy's HSCP and HPLRP accession programs). We summarize the results here. For details of this excursion, see **table CC-1** (Army, Navy, and Air Force), which begins on page C-27.

As table C-5 shows, compared with the baseline model, excursion 1 results in very little change in the total number of accessions. Because all accessions now come from AFHPSP, however, the accession pipeline inventory increases significantly (by about 10, 36, and 147 percent for the Army, Air Force, and Navy, respectively).

Table C-5. Optimal annual outcomes in the steady state by Service (excursion 1)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Total accessions	18	18	16	16	19	19
AFHPSP accessions	16	18	3	16	14	19
Accession pipeline	49	54	19	47	28	38
Total cost ($K)	17,281	17,533	16,407	16,882	18,927	19,261
Percentage change		1.5		2.9		1.8

15. The average optometry student educational debt load has doubled in the last decade, from $49,000 in 1990 to over $100,000 in 2000 [2].

16. Unlike pharmacists, optometrists are not currently offered a $30,000 signing bonus by the military departments.

Relying solely on AFHPSP increases the total steady-state cost for the optometry community for all three Services. Costs increase by about 3 percent for the Navy and under 2 percent each for the Air Force and the Army. This is not surprising because AFHPSP (besides HSCP for Navy) is the most costly optometry accession program. Moreover, because the Army and the Air Force already rely on the AFHPSP for the majority of their optometrists, their cost increase is less than that of the Navy. In contrast to a similar excursion for dentists, relying solely on AFHPSP accessions does not result in excess optometrists.[17] Even though relying solely on AFHPSP accessions to meet requirements is more costly, one of the distinct advantages of AFHPSP accessions over direct procurement accessions, is that they are obligated to the military and may be assigned on a worldwide basis.[18]

Excursion 2: initiate a $30,000 direct accession bonus

Given that the Services have no direct accession bonus for optometrists and are unable to attract the required candidates into the military without subsidization, it seems reasonable to examine the impact to the system of initiating a direct accession bonus. In this excursion, we compare the baseline outcome to the model outcome produced when we offer a $30,000 direct accession bonus, holding all other parameters and constraints constant. We show the detailed results of this excursion in **table CC-2** (Army, Navy, and Air Force).[19]

Recall that the baseline model assumed Service-unique direct procurement constraints of 2 (Army), 3 (Navy), and 5 (Air Force). Here, we estimated that providing a $30,000 signing bonus would allow

17. The Air Force mainly offers optometry AFHPSP accessions 2-year scholarships, whereas the Army and Navy usually offer 3-year scholarships. Because of the small number of total optometry AFHPSP accessions, our model does not capture any differences in retention among the Services; data are insufficient to determine the effect of this difference on retention, which would probably lead to biases in the outcomes.

18. The Navy's HSCP accessions are also obligated and assignable on a worldwide basis.

19. Like our earlier excursions, in appendix A for physicians, on Financial Assistance Program (FAP) accessions, we do not model the additional active duty obligation (ADO) associated with the $30,000 signing bonus.

each Service to access 7 direct procurements per year. This estimate depends on what we use as the starting point—in other words, what we think the market will bear absent any direct accession bonus.

Given the differences between what each Service has historically accessed, we believe that the Services' business practices (in how they actively recruit direct accessions) may limit direct accessions. For example, the Air Force has historically direct-accessed significantly more optometrists than the Army. On this basis, the Air Force's constraint of 5 is a better representation of what the market might bear. Given an elasticity with respect to pay of 1.8, we estimate that the $30,000 direct accession signing bonus will allow direct accessions to increase from 5 to 7. This means that we modeled a larger increase for the Army (2 to 7) and the Navy (3 to 7) than the Air Force (5 to 7).

In the baseline scenario, the model finds that the optimal mix of accessions includes bringing in the maximum number of allowed direct procurement accessions (2 for the Army, 3 for the Navy, and 5 for the Air Force). Therefore, this constraint is binding. By modeling how the number of direct procurement accessions may change in response to offering the direct accession bonus, we are able to loosen the constraint to see whether increasing accession subsidization results in a more cost-effective solution. We estimate that, with a $30,000 optometry direct accession bonus, DoD would bring in 20 direct accessions each year rather than the current 10.[20]

As we can see from table C-6, initiating a signing bonus changes the optimal accession mix. The Army and Air Force each use the maximum number of direct accessions allowed (7) and reduces AFHPSP accessions accordingly. The Navy increases from 3 to 6 direct accessions, one short of the maximum constraint.[21]

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20. We based this constraint on the recent experiences of the Services. It is our opinion that the Services may became more reliant on subsidized accessions for optometrists because of the rising student debt load and the current cash compensation uniformed-civilian pay gap that exists for this specialty.

21. The Navy model doesn't take the maximum number of direct accessions allowed (7) because it continues to rely on the HPLRP and HSCP alternatives as cost-effective solutions.

Table C-6. Optimal annual outcomes in the steady state by Service (excursion 2)

	Army		Navy		Air Force	
Accession variable	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	16	11	3	0	14	12
Direct accessions	2	7	3	6	5	7
HSCP accessions	n/a	n/a	4	4	n/a	n/a
HPLRP accessions	n/a	n/a	6	6	n/a	n/a
Total	18	18	16	16	19	19
Accession pipeline	49	34	19	12	28	24
Total cost ($K)	17,281	16,854	16,407	16,269	18,927	19,003
Percentage change		(2.5)		(0.8)		0.4

This change in accession mix results in lower costs for the Army (approximately 2.5 percent). The Army is the most reliant of the three Services on AFHPSP and the least reliant on direct accessions. As a result, it has more to gain from the direct accession bonus, which increases the potential number of direct accessions from 2 to 7. The Navy's costs go down marginally and it eliminates AFHPSP accessions (because the HPLRP and HSCP accessions are more cost-effective than AFHPSP accessions).

In contrast, Air Force costs rise slightly with the addition of the direct accession bonus. Because this is a cost minimization model, costs should never rise when we relax a constraint. That said, providing a direct accession bonus changes a parameter (in addition to changing the direct accession constraint); therefore, costs may increase. To understand why this occurs, recall that the Air Force was bringing in 5 direct accessions in the baseline without the bonus and 7 with the bonus. The Air Force must pay the 5 direct accessions it was accessing without the bonus even though they would have come into the Air Force anyway. This means that the 2 new direct accessions cost the Air Force $210,000 (7 times $30,000), not $60,000, in bonuses (2 times $30,000).

Although initiating a $30,000 direct accession bonus allows the Services to access more optometrists directly and to lower costs slightly (for the Army and the Navy), the evidence does not suggest that even

a $30,000 accession bonus will allow the Services to access all their optometrist requirements directly; even if they could, it may not be the most cost-effective solution (as the Air Force results shows). Note that we did not model additional active duty obligation associated with receiving a signing bonus. We did not do this because we can't estimate how it might reduce the potential number of direct accessions. If it were included, the potential number of direct accessions taken annually would be less, but retention would be improved.

Excursion 3: removing board certification pay (BCP)

The Military Health System has the ability to compensate several uniformed health care professionals for attaining board certification status.[22] For optometrists, BCP ranges from $2,000 per year for those with less than 10 years of creditable service to $5,000 per year for those with 18 or more years of creditable service. In both phases of this study, we appropriately modeled the optometry community receiving BCP at the end of their third year of active duty service because it is the predominant DoD pattern. In conversations with the Navy, however, we were advised that the majority of its optometrists do not receive BCP until after at least 6 years on active duty, and many never attain this certification status.

To address this concern and show the effect of BCP to the total lifecycle costs of optometrists, we ran excursion 3 and eliminated BCP for all three Services (see table C-7). The results show that, except for minor decreases in total costs (averaging 1.5 percent for all three Services), there are no other changes. We show the detailed results of this excursion in **table CC-3** (Army, Navy, and Air Force) at the end of this appendix.

22. We repeat our earlier recommendation, in previous CNA work, that DoD assess its criteria for awarding BCP for other health care professionals so that there is consistency across the specialties, to the maximum extent possible [2].

Table C-7. Optimal annual outcomes in the steady state by Service (excursion 3)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	16	16	3	3	14	14
Direct accessions	2	2	3	3	5	5
HSCP accessions	n/a	n/a	4	4	n/a	n/a
HPLRP accessions	n/a	n/a	6	6	n/a	n/a
Total	18	18	16	16	19	19
Accession pipeline	49	49	19	19	28	28
Total cost ($K)	17,281	17,034	16,407	16,165	18,927	18,632
Percentage change		(1.4)		(1.5)		(1.6)

Excursion 4: increasing the optometry retention bonus

For excursion 4, we evaluate the impact of increasing the optometry retention bonus (ORB) by $6,000. The Services have just begun offering qualified individuals the ORB. On 1 October 2001, Congress authorized eligible officers to receive the ORB who (a) have not been on active duty for a period of not less than 1 year, (b) are not under any obligation for any other government subsidized program, such as AFHPSP or HPLRP, and (c) are not undergoing an initial internship or residency program.

Currently, an award of $6,000 per year of the contract shall be paid in a lump sum after execution of a multiyear contract. The minimum contract will be for 2 years from the date the officer accepts the award of the special pay and is concurrent with any obligations excluded. We wanted to explore the effect on the accession mix and costs of increasing the ORB from $6,000 to $12,000.

To incorporate this alternative ORB into the model excursion, we modified costs accordingly and estimated how survival curves for MHS optometrists would change based on the increased ORB. We made this adjustment based on the responsiveness of military dentists to pay [2], because no pay elasticity data currently exist for optometrists.[23]

23. This seems a reasonable proxy given that the average student debt load in each community exceeds $100,000 and each has similar uniformed-civilian cash compensation pay gaps.

We show the detailed results of this excursion in **table CC-4** (Army, Navy, and Air Force) at the end of this appendix.

From table C-8, we see that, relative to the baseline, each of the services was able to make marginal decreases in total accessions as a result of increasing ORB (because higher pay results in increased retention). The reduced accessions, however, are not enough to offset the higher cost of increasing the ORB. In other words, increasing ORB by $6,000 across the board does not buy enough increased retention to pay for itself given the career path of military optometrists. The result is that the annual steady-state cost increases relative to the baseline (by about 5, 6, and 7 percent for the Army, Air Force, and Navy, respectively).

Table C-8. Optimal annual outcomes in the steady state by Service (excursion 4)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	16	16	3	4	14	17
Direct accessions	2	0	3	0	5	0
HSCP accessions	n/a	n/a	4	4	n/a	n/a
HPLRP	n/a	n/a	6	6	n/a	n/a
Total	18	16	16	14	19	17
Accession pipeline	49	47	19	23	28	33
Total cost ($K)	17,281	18,154	16,407	17,425	18,927	20,181
Percentage change		5.1		6.2		6.6

Note that, by increasing the ORB by $6,000, the model stops using direct accessions entirely. The question is, why does this occur?

First, because of differences in the timing of when ORB is received, total ORB over the life cycle increases more for direct accessions than for AFHPSP accessions. Direct accessions are eligible for ORB once they have been on active duty at least a year; AFHPSP accessions must wait until they complete their active duty obligation associated with AFHPSP. In our model, this means that direct accessions receive ORB 2 years sooner than AFHPSP accessions.

Second, in conjunction with the ORB increase, retention increases. We modeled retention increases using the same elasticity for all accession sources. But, unlike AFHPSP accessions, direct accessions are still obligated for the 2 additional years for which they receive ORB. Therefore, their retention is largely unaffected during these years. Hence, costs for direct accessions increase more than for AFHPSP accessions, while retention for direct accessions increases less than for AFHPSP accessions.

Third, the model's choice between which accessions to use is very simple—use the most cost-effective source until it is exhausted and then go to the next most cost-effective source. It doesn't matter if AFHPSP is $0.01 more cost-effective than direct accessions, the model will only stop using it if the constraint on the number of AFHPSP accessions is exhausted. What is happening in the model is that in the baseline, direct accessions are slightly more cost-effective than AFHPSP accessions, but the ORB change causes that order to switch. And, because the costs are close, the model may be sensitive to cost and retention changes.

Fourth, given the model's sensitivity, we need to emphasize that the model is reaching the correct solution given the costs and retention data we've put into it. That said, neither DMDC (which we used to model retention behavior for optometrists) nor any other data source allows us to estimate retention patterns by accession source for optometrists because:

1. The number of optometrists is small, given their community size
2. AFHPSP accessions for optometry have not been around long enough for us to observe their retention behavior over their life cycle.

Consequently, we used notional survival curves for each accession source. We estimated these notional survival curves by taking the average survival curve for all accession sources and modifying them slightly based on differences we observe in the medical corps.

If the true differences in retention behavior are significantly above or below what we have modeled, the mix of accessions may be different. What *doesn't* change is that the accession choice is an ordinal one. It will take the most cost-effective accession until the source is exhausted regardless of whether the cost difference between the accession sources is $1 or $1,000,000.

Finally, because we don't know the exact true retention differences of the different accession sources, we modeled only slight differences between direct and AFHPSP accessions. Consequently, it doesn't take much in terms of pay and retention changes to change the order of which accession source is the most cost-effective.

That said, the result that ORB causes costs to increase for the optometry community is not a side effect of the movement away from direct accessions. To see this, consider excursion 1 (in which AFHPSP is the sole accession source) as the base or reference point. In that excursion, the Air Force accessed 19 persons each year and the total cost of the optometry community was $19.3 million. An additional $6,000 ORB increase causes annual accessions to fall by 2 from 19 to 17, but the additional cost of paying the ORB causes costs to increase to $20.2 million—a 4.8-percent increase in costs. Using this same logic, we see increases of 3.2 and 3.5 percent in the Navy and Army, respectively, between this excursion and excursion 1.

Excursion 5: providing direct accession bonus and ORB increase

As a final excursion, we evaluate the interaction of initiating both the direct accession bonus and increasing the ORB by $6,000. We show the detailed results of this excursion in **table CC-5** (Army, Navy, and Air Force) at the end of this appendix.

As table C-9 shows, there are minimal changes in the number and mix of accessions from the previous excursion in which we only altered the ORB. In fact, the results are virtually identical to excursion 4. This is driven by the fact that direct procurement accessions are marginally less cost effective than AFHPSP accessions given the increased

ORB (as explained in the previous section). The $30,000 signing bonus, therefore, is not even a factor.[24]

Table C-9. Optimal annual outcomes in the steady state by Service (excursion 5)

	Army		Navy		Air Force	
	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
AFHPSP accessions	16	16	3	4	14	17
Direct accessions	2	0	3	0	5	0
HSCP accessions	n/a	n/a	4	4	n/a	n/a
HPLRP accessions	n/a	n/a	6	6	n/a	n/a
Total	18	16	16	14	19	17
Accession pipeline	49	47	19	23	28	33
Total cost ($K)	17,281	18,169	16,407	17,426	18,927	20,181
Percentage change		5.1		6.2		6.6

24. The only difference between excursions 4 and 5 steady-state solutions is a very small change in Army costs ($18,169,000 compared with $18,154,000 in excursion 4). This difference occurs because the addition of the $30,000 direct accession bonus means the model takes a slightly different path to the steady state than in excursion 4. Mathematically, the steady states will be identical if we allow the model to have a long enough time horizon to let the ripples caused by the accession path to completely work out of the system. Again, we acknowledge that the results depend to a certain degree on the assumptions (e.g., the number of direct accessions that could be achieved and the retention patterns). However, we believe we have provided an excellent starting point for DoD and the Services to look at potential policy changes and invaluable insights regarding potential outcomes to costs and the accession mix.

Table CC-1: Optometrists excursion 1 - unconstrain AFHPSP and eliminate all other accession sources

Steady-state annual accessions and student load

	Army		Navy		Air Force	
Accessions	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Number[a]						
AFHPSP (20-20-20)	16	18	3	16	14	19
Direct (2-3-5)	2	0	3	0	5	0
HPLRP (0-6-0)			6	0		
HSCP (0-4-0)			4	0		
Total	18	18	16	16	19	19
Percent						
AFHPSP	89	100	17	100	74	100
Direct	11	0	19	0	26	0
HPLRP			39	0		
HSCP			26	0		
Total	100	100	100	100	100	100
Student load	49	54	19	47	28	38

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

Steady-state annual life-cycle costs

	Army		Navy		Air Force	
Costs	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
With DOPMA						
Total costs ($K)	17,281	17,533	16,407	16,882	18,927	19,261
Cost per optometrist ($)	129,929	131,826	129,186	132,929	122,108	124,262
Without DOPMA						
Total costs ($K)	17,509	17,763	16,624	17,122	19,191	19,526
Cost per optometrist ($)	131,650	133,554	130,897	134,815	123,811	125,976
Cost as a percentage of baseline		101.5		102.9		101.8

Steady-state inventory by paygrade

	Army			Navy			Air Force		
Paygrade	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion
Number									
O-3	60	84	84	51	80	80	58	98	98
O-4	17	27	27	28	25	25	46	31	31
O-5	26	16	16	21	15	15	31	19	19
O-6	13	7	7	8	6	6	5	8	8
Total[a]	116	133	133	108	127	127	140	155	155
Percent									
O-3	52	63	63	47	63	63	41	63	63
O-4	15	20	20	26	20	20	33	20	20
O-5	22	12	12	19	12	12	22	12	12
O-6	11	5	5	7	5	5	4	5	5
Total	100	100	100	100	100	100	100	100	100
Percent w/o DOPMA									
O-3		60	60		58	57		56	56
O-4		19	19		21	21		22	22
O-5		13	13		13	14		15	15
O-6		8	8		8	9		7	7
Total		100	100		100	100		100	100

a. There are no excesses or shortages in the baseline or excursion.

Table CC-2: Optometrists excursion 2 - provide a $30,000 direct accession bonus

Steady-state annual accessions and student load

	Army		Navy		Air Force	
Accessions	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Number[a]						
AFHPSP (20-20-20)	16	11	3	0	14	12
Direct (2-3-5)	2	7	3	6	5	7
HPLRP (0-6-0)			6	6		
HSCP (0-4-0)			4	4		
Total	18	18	16	16	19	19
Percent						
AFHPSP	89	62	17	0	74	63
Direct	11	38	19	36	26	37
HPLRP			39	39		
HSCP			26	26		
Total	100	100	100	100	100	100
Student load	49	34	19	12	28	24

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

Steady-state annual life-cycle costs

	Army		Navy		Air Force	
Costs	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
With DOPMA						
Total costs ($K)	17,281	16,854	16,407	16,269	18,927	19,003
Cost per optometrist ($)	129,929	126,725	129,186	128,103	122,108	122,597
Without DOPMA						
Total costs ($K)	17,509	17,082	16,624	16,486	19,191	19,266
Cost per optometrist ($)	131,650	128,433	130,897	129,808	123,811	124,295
Cost as a percentage of baseline		97.5		99.2		100.4

Steady-state inventory by paygrade

	Army			Navy			Air Force		
Paygrade	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion
Number									
O-3	60	84	84	51	80	80	58	98	98
O-4	17	27	27	28	25	25	46	31	31
O-5	26	16	16	21	15	15	31	19	19
O-6	13	7	7	8	6	6	5	8	8
Total[a]	116	133	133	108	127	127	140	155	155
Percent									
O-3	52	63	63	47	63	63	41	63	63
O-4	15	20	20	26	20	20	33	20	20
O-5	22	12	12	19	12	12	22	12	12
O-6	11	5	5	7	5	5	4	5	5
Total	100	100	100	100	100	100	100	100	100
Percent w/o DOPMA									
O-3		60	60		58	58		56	56
O-4		19	19		21	20		22	22
O-5		13	13		13	13		15	15
O-6		8	8		8	8		7	7
Total		100	100		100	100		100	100

a. There are no excesses or shortages in the baseline or excursion.

Table CC-3: Optometrists excursion 3 - remove board certification pay

Steady-state annual accessions and student load

	Army		Navy		Air Force	
Accessions	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Number[a]						
AFHPSP (20-20-20)	16	16	3	3	14	14
Direct (2-3-5)	2	2	3	3	5	5
HPLRP (0-6-0)			6	6		
HSCP (0-4-0)			4	4		
Total	18	18	16	16	19	19
Percent						
AFHPSP	89	89	17	17	74	74
Direct	11	11	19	19	26	26
HPLRP			39	39		
HSCP			26	26		
Total	100	100	100	100	100	100
Student load	49	49	19	19	28	28

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

Steady-state annual life-cycle costs

	Army		Navy		Air Force	
Costs	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
With DOPMA						
Total costs ($K)	17,281	17,034	16,407	16,165	18,927	18,632
Cost per optometrist ($)	129,929	128,079	129,186	127,282	122,108	120,205
Without DOPMA						
Total costs ($K)	17,509	17,250	16,624	16,369	19,191	18,879
Cost per optometrist ($)	131,650	129,700	130,897	128,893	123,811	121,802
Cost as a percentage of baseline		98.6		98.5		98.4

Steady-state inventory by paygrade

	Army			Navy			Air Force		
Paygrade	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion
Number									
O-3	60	84	84	51	80	80	58	98	98
O-4	17	27	27	28	25	25	46	31	31
O-5	26	16	16	21	15	15	31	19	19
O-6	13	7	7	8	6	6	5	8	8
Total[a]	116	133	133	108	127	127	140	155	155
Percent									
O-3	52	63	63	47	63	63	41	63	63
O-4	15	20	20	26	20	20	33	20	20
O-5	22	12	12	19	12	12	22	12	12
O-6	11	5	5	7	5	5	4	5	5
Total	100	100	100	100	100	100	100	100	100
Percent w/o DOPMA									
O-3		60	60		58	58		56	56
O-4		19	19		21	21		22	22
O-5		13	13		13	13		15	15
O-6		8	8		8	8		7	7
Total		100	100		100	100		100	100

a. There are no excesses or shortages in the baseline or excursion.

Table CC-4: Optometrists excursion 4 - increase the optometry retention bonus (ORB) by $6,000

Steady-state annual accessions and student load

	Army		Navy		Air Force	
Accessions	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Number[a]						
AFHPSP (20-20-20)	16	16	3	4	14	17
Direct (2-3-5)	2	0	3	0	5	0
HPLRP (0-6-0)			6	6		
HSCP (0-4-0)			4	4		
Total	18	16	16	14	19	17
Percent						
AFHPSP	89	100	17	27	74	100
Direct	11	0	19	0	26	0
HPLRP			39	44		
HSCP			26	29		
Total	100	100	100	100	100	100
Student load	49	47	19	23	28	33

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

Steady-state annual life-cycle costs

	Army		Navy		Air Force	
Costs	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
With DOPMA						
Total costs ($K)	17,281	18,154	16,407	17,425	18,927	20,181
Cost per optometrist ($)	129,929	136,493	129,186	137,205	122,108	130,199
Without DOPMA						
Total costs ($K)	17,509	18,419	16,624	17,672	19,191	20,479
Cost per optometrist ($)	131,650	138,486	130,897	139,148	123,811	132,126
Cost as a percentage of baseline		105.1		106.2		106.6

Steady-state inventory by paygrade

	Army			Navy			Air Force		
Paygrade	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion
Number									
O-3	60	84	84	51	80	80	58	98	98
O-4	17	27	27	28	25	25	46	31	31
O-5	26	16	16	21	15	15	31	19	19
O-6	13	7	7	8	6	6	5	8	8
Total[a]	116	133	133	108	127	127	140	155	155
Percent									
O-3	52	63	63	47	63	63	41	63	63
O-4	15	20	20	26	20	20	33	20	20
O-5	22	12	12	19	12	12	22	12	12
O-6	11	5	5	7	5	5	4	5	5
Total	100	100	100	100	100	100	100	100	100
Percent w/o DOPMA									
O-3		60	53		58	52		56	50
O-4		19	21		21	22		22	23
O-5		13	15		13	16		15	17
O-6		8	11		8	10		7	9
Total		100	100		100	100		100	100

a. There are no excesses or shortages in the baseline or excursion.

Table CC-5: Optometrists excursion 5 - provide a $30,000 direct accession bonus and increase ORB by $6,000

Steady-state annual accessions and student load

	Army		Navy		Air Force	
Accessions	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
Number[a]						
AFHPSP (20-20-20)	16	16	3	4	14	17
Direct (2-3-5)	2	0	3	0	5	0
HPLRP (0-6-0)			6	6		
HSCP (0-4-0)			4	4		
Total	18	16	16	14	19	17
Percent						
AFHPSP	89	100	17	27	74	100
Direct	11	0	19	0	26	0
HPLRP			39	44		
HSCP			26	29		
Total	100	100	100	100	100	100
Student load	49	47	19	23	28	33

a. Annual accession source constraints (maximum) are in parentheses (Army-Navy-Air Force).

Steady-state annual life-cycle costs

	Army		Navy		Air Force	
Costs	Baseline	Excursion	Baseline	Excursion	Baseline	Excursion
With DOPMA						
Total costs ($K)	17,281	18,169	16,407	17,426	18,927	20,181
Cost per optometrist ($)	129,929	136,612	129,186	137,213	122,108	130,198
Without DOPMA						
Total costs ($K)	17,509	18,437	16,624	17,673	19,191	20,479
Cost per optometrist ($)	131,650	138,622	130,897	139,158	123,811	132,125
Cost as a percentage of baseline		105.1		106.2		106.6

Steady-state inventory by paygrade

	Army			Navy			Air Force		
Paygrade	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion	FY 2000	Baseline	Excursion
Number									
O-3	60	84	84	51	80	80	58	98	98
O-4	17	27	27	28	25	25	46	31	31
O-5	26	16	16	21	15	15	31	19	19
O-6	13	7	7	8	6	6	5	8	8
Total[a]	116	133	133	108	127	127	140	155	155
Percent									
O-3	52	63	63	47	63	63	41	63	63
O-4	15	20	20	26	20	20	33	20	20
O-5	22	12	12	19	12	12	22	12	12
O-6	11	5	5	7	5	5	4	5	5
Total	100	100	100	100	100	100	100	100	100
Percent w/o DOPMA									
O-3		60	53		58	52		56	50
O-4		19	21		21	22		22	23
O-5		13	15		13	16		15	17
O-6		8	11		8	10		7	9
Total		100	100		100	100		100	100

a. There are no excesses or shortages in the baseline or excursion.

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