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Health Professions' Retention- Accession Incentives Study Report to Congress

**(Phases II & III: Adequacy of Special Pays and
Bonuses for Medical Officers and Selected
Other Health Care Professionals)**

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STATEMENT A
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Summary

Introduction

The Military Health System (MHS), one of the largest and oldest health care delivery systems in the United States, must execute twin missions. The primary mission of the MHS and the three Service 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.

Because the Department of Defense (DoD) relies on a single force to meet these sometimes disparate missions, it must cultivate a workforce that is dedicated to caring for patients, committed to continuous improvement in performance and productivity, and competent in both wartime and peacetime. This challenge is particularly difficult because uniformed health care professionals are costly to access and train, and they have skills that are in demand in the private sector.

Congressional awareness of this mandate and competition from the private sector for qualified health care professionals resulted in the following committee language in the National Defense Authorization Act for Fiscal Year 2001:

The committee directs the Secretary of Defense to conduct a review and to report to the Committee on Armed Services of the Senate and the House of Representatives on the adequacy of special pays and bonuses for medical corps officers and other health care professionals. The committee directs this review because of the level of competition within the economy for health care professionals and the potential devaluation of current special pays and bonuses, which could have a significant impact on recruiting and retention of health care professionals.

As a result of this language, the TRICARE Management Agency (TMA) at DoD asked the Center for Naval Analyses (CNA) to conduct a study to address the concerns voiced by Congress. Historically, there has been a single underlying objective to DoD's health professions special pay program—namely, the need to attract and retain a sufficient number of qualified health professionals to meet the health care demands of the armed forces [1].

How does one know if uniformed health care professionals are being adequately compensated? We believe the answer lies in the MHS's ability to fill both its peacetime and active component readiness requirements with the right professionals, the right skill mix, and the right years of experience from today's force and future accessions. If one of these attributes is missing or significantly deficient, the current special pays and bonuses may need adjusting to help achieve the required inventory for a given specialty requirement. Moreover, our analysis will begin discussions on additional factors that are relevant to evaluating the adequacy of the MHS health professionals' force structure and compensation plans—productivity and positive patient outcomes.

Approach

Several questions require answers:

- Has retention increased or decreased in the last decade?
- Do the Services, and the MHS as a whole, have an adequate inventory to meet both readiness and peacetime roles?
- Does the inventory have a sufficient balance of junior, mid-grade, and senior personnel?
- How much does the uniformed-civilian pay gap, for certain specialties, affect retention?
- Does the MHS have an adequate personnel planning process to determine whether reduced inventory levels are a function of decreased accessions/training outputs versus increased attrition rates?
- What is the most cost-effective approach, based on current retention trends, for the MHS to achieve its long-run requirements for high-quality, experienced personnel?

Our approach to answering the questions posed by Congress has three phases. The first phase was a comparative analysis of compensation between uniformed and private-sector health care professionals at logical military career junctures [2, 3, 4]. This analysis was an essential first step because we needed to understand whether a military-civilian pay gaps exists, how large it is, and at what career junctures to evaluate the effect of pay on retention during the second phase of this study.¹ The mere existence or absence of a pay gap, however, does not answer the question of the adequacy of pay. Because uniformed-civilian pay gaps have long existed for certain health care specialties, the answer lies in DoD's ability to achieve its MHS workforce objectives.

As we discussed in phase I of this study, before deciding to continue a career in the military, a person 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 [2, 5]. A 1999 Congressional Budget Office Report on *What Does the Military "Pay Gap" Mean?* [6] states the following:

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 the 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.

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*. As reported in the *CNA Provider Satisfaction Study*,² the ability to practice quality medicine, the risk of deployment, adequate support staff and

1. CNA Research Memorandum D0003360.A1 [2] contains the results of the compensation comparison of selected uniformed and private-sector health care professionals.
2. Reference [7] presents the results of the key factors affecting Navy physician job satisfaction and a comparative analysis of how those factors differ from civilian physicians working in a managed care environment.

equipment, facility infrastructure, business practices, family stability, professional growth, promotion, continuing medical education opportunities, and recognition and respect are some of the other factors that affect DoD's ability to attract and retain quality health care professionals [7].

In the second and third phases of this study, we evaluate the MHS's ability to meet selected physician specialties and other health care professional personnel requirements by:

- Providing a historical context of the MHS to evaluate the potential effect of these changes on retention of uniformed health care professionals. We briefly review:
 - Evolution of the peacetime benefit
 - Administration of the benefit
 - Beneficiary demographic mix
 - MHS force structure
- Evaluating continuation, retention, and accession trends
- Determining current and projected manning levels based on:
 - Billet authorizations
 - Readiness requirements
 - Grade and length-of-service distribution
- Evaluating the effect of pay on retention through regression analysis for selected physician specialties and dentists
- Assessing the MHS's ability to meet its active duty billet authorization and readiness profiles in later fiscal years.

Based on the findings above, we assess the adequacy of existing and proposed special pay and accession bonus plans for MHS health care professionals (phase III of the study plan), and make cogent recommendations, when warranted.

To effectively respond to the concerns of the Senate and the House Armed Services Committees, we felt it was important to select a wide

spectrum of the officers serving in today's MHS. Therefore, this study entails the following officer specialties:

- Physicians (23 specialties)³
- Dentists
- Pharmacists
- Optometrists
- Clinical Psychologists
- Physician Assistants (PAs)
- Registered Nurses, including Certified Registered Nurse Anesthetists (CRNAs).⁴

Major findings and recommendations

General

Findings

In the last decade, 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 dollars, while maintaining patient satisfaction and

-
3. In phase I, we calculated total compensation comparisons for 24 physician specialties that included separate comparisons for diagnostic and therapeutic radiologists. The DMDC personnel tapes combine diagnostic and therapeutic radiologists into a single specialty, so for the remainder of this study we will analyze 23, versus 24, physician specialties.
 4. Also in phase I, we calculated the cash compensation of Advance Practice Nurses (APNs), which included family nurse practitioners, nurse midwives, and pediatric nurse practitioners. Unfortunately, the DMDC and Service tapes do not consistently account for these specialists, so they are not part of this analysis. Moreover, the billet, body, and readiness requirements provided by the Services did not portray the entire spectrum of APNs collectively. However, the Services currently do not report significant difficulty manning these billets.

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. We see this trend continuing as DoD attempts to develop a more performance-based health management plan designed to align operational incentives with management responsibility and accountability. Note, however, that the beneficiary population is aging, and this may place additional strain on the distribution of nursing and enlisted personnel between outpatient and inpatient settings within military treatment facilities (MTFs). This business focus has potentially changed the conditions and nature of work for many uniformed health care professionals.

The personnel planning process for uniformed health care professionals, in response to these cultural changes, has also sustained significant transformation and stress in the last decade. The Reagan Administration achieved large budget increases in the Defense Department, resulting in large billet increases within each of the military medical departments. *Readiness* was the focus of the 1980s, 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 whole, as their force structure was also deliberately decreased. As TRI-CARE evolved, the focus changed from growing surgically intense specialties to increasing the inventory of "primary care managers," such as family practice physicians, physician assistants, and nurse practitioners. The MHS's shift in focus to primary care mirrored the civilian sector's movements toward managed care.

By the middle to late 1990s, when the MHS billet structure began to stabilize, the civilian market conditions had also changed. Despite historical success in acquiring many health care professionals cheaply and quickly through the direct procurement pipeline, the military found itself in fierce competition with the private sector for health care professionals who were offering competitive salaries, tailored benefits, and signing bonuses. Moreover, the student debt load for most health care professionals has risen significantly in the last decade.

The Services have responded to these market changes with various and potentially costly accession programs. Personnel planning is an important business process and critical to DoD in meeting its workforce objectives in a cost-effective manner. Personnel plans and policies affect the manning, retention, and overall "health" of various uniformed health care professionals. The time it takes to "grow" certain specialists and DoD's ability to channel its inventory into required communities must be accounted for during this complex planning process. For some specialties, however, a predominant, or *bedrock*, accession source has failed to surface. When DoD is unable to establish a reliable and consistent accession source, we find that TMA and the Services often begin overemphasizing the importance of the military-civilian pay gap (which has long existed for several specialties) and initiating a wide array of special pay programs. We find that for several uniformed health care specialties, the major source of the manning difficulties stems from the need to improve the personnel planning process—*by accessing and/or training required specialists*—and creating a consistent and facile working environment for uniformed health care professionals with common values and objectives.

We also find that some of the medical special pay statutes are cumbersome and restrictive. Chapter 5 of Title 37 of the U.S. Code contains more than 19 separate special pays and incentives for uniformed health care professionals. Having so many special pay categories begets a patchwork of special pay and accession proposals that can become confusing and bureaucratic. We find the current language unnecessarily restrictive; it hampers DoD's, TMA's, and the Services' abilities to aggressively solve problem areas without legislation.

It is difficult to report a pervasive retention crisis for the vast majority of MHS health care professionals over the last decade because the Services have deliberately downsized several specialties and decremented training or accession pipelines. For some specialties, however, a significant attrition rate occurs before individuals reach retirement eligibility. We do find that the buying power for uniformed physicians and dentists has eroded over the last decade because the special pays have not been adjusted for inflation. We also find that it may be more cost-effective to provide more latitude and flexibility to TMA to structure accession and retention bonuses to

meet urgent or temporary shortfalls within a given specialty. For some uniformed health care professionals, the current uniformed compensation and accession bonuses are inadequate. Though overall we find that the MHS is able to meet its workforce objectives today, we offer findings and recommendations to strengthen its ability meet its workforce objectives in the future.

Recommendations

TMA and the Services must place greater emphasis on the quality of its personnel tapes. Although several important fields of information are either deficient or missing, *it is imperative that TMA, the Services, and DMDC meticulously maintain the initial active duty obligation, accession source, and correct duty status on each uniformed health care professional.* By correctly recording, isolating, and tracking these data fields, policy-makers can begin monitoring uniformed health care professionals' retention rates and establishing retention goals at critical military career junctures—when specialists are most likely to be at stay-leave military decision points based on accession source and career (training) patterns. In addition, greater emphasis must be placed on integrating these data with the personnel planning process to enable the Services to better forecast workforce losses and ultimately identify required accessions for the future. This is particularly important for physician specialties because of the time it takes to grow physician specialists. We find, for some specialties, that the current manning difficulties are simply a function of the Services not placing an adequate number of individuals in a training pipeline. Conversely, for some specialties, too many specialists have been acquired.

Although beyond the scope of this study, *a DoD assessment of the total life-cycle cost of its MHS accession programs is imperative.* This analysis should include the active duty obligation associated with the accession program and typical military career path to assess their cost and effectiveness in attracting and retaining desired health care professionals. To accurately determine the full cost of attaining and retaining the endstrength that exceeds the readiness requirement, the MHS must assess and account for the "training tail" required for each uniformed health care professional. This will strengthen the make-buy assessment decision process for the billet structure that exceeds the readiness requirement.

Moreover, we recommend that TMA, in conjunction with the Services, conduct a thorough, bottom-up review of its readiness and peacetime requirements to ensure that the most cost-effective profile is used within the direct care system. Following this review process, every effort should be made to fill each billet to optimize the MHS's ability to execute its force health protection and peacetime benefit missions.

We recommend that Congress consider streamlining the uniformed health care professionals' special pays into fewer categories. Currently, DoD must manage over 19 special pay programs, which could be consolidated into about 5 categories, and the fiscal control could remain intact at the DoD—versus the congressional—level. For other health care professionals, we recommend that Congress authorize a *nonstatutory health care professions' accession and retention bonus* that could encompass several specialties, as the need arises, meeting prestablished criteria. This added flexibility would improve TMA's and the Services' abilities to remedy problem areas by turning on and off funds for different specialties, as the market environment and manning difficulties dictate. Moreover, consideration should be given to allowing the Services added flexibility to invoke or suppress special pay initiatives to achieve desired workforce objectives.

Finally, MHS leaders must accept accountability for *cultivating an environment in which the attractive features of pursuing a military career predominate* by strengthening their internal business practices. TMA and the Services must better align all of their resources toward a common workforce objective of improving patient outcomes and productivity. The clinical excellence and productivity of individual uniformed health care professionals, as well as their management and administrative acumen, must be valued, emphasized, and recognized.

Physicians

Findings

In our analyses of 23 physician specialists, we have found a significant, and largely planned, decrease of physician inventories over the past decade. Despite this drawdown, projected inventories should be adequate to meet the readiness and manning requirements of the three Services in most cases for FY 2003. The most important exceptions are

anesthesiology, radiology, and gastroenterology—three specialties for which all three Services will have problems manning their billets. Given its higher manning requirements, the Army will have difficulty filling its billets in 19 of the 23 specialties we examined.

To assess the effect of the military-civilian pay gap on retention, we estimate duration models. More specifically, we examine the effect of the military-civilian pay gap on the number of years a physician spends on active duty as a fully trained specialist. We find no significant relationship between the military-civilian pay gap and career length for primary care specialties or for dermatology, neurology, emergency medicine, or physical medicine. We find a modest effect of pay on career length for surgeons, anesthesiologists, radiologists, pathologists, and psychiatrists, and a relatively large effect for the internal medicine subspecialists: gastroenterologists, cardiologists, and hematologists/oncologists. We find that the current uniformed medical corps special pays are inadequate, for some specialties, to confidently meet readiness and peacetime manning requirements.

Recommendations

Given our findings along with the changes in market conditions in the 1990s, we make the following recommendations:

- Increase all entitlement uniformed physician special pays by 20 percent to restore the buying power—the relative wages and earnings—of these special pays to their 1991 levels.
- Increase the cap on the Incentive Special Pay (ISP) by 25 percent and on the Multiyear Special Pay (MSP) by 43 percent. The caps on the ISP and MSPs have not been increased since their introduction, and a number of specialties, some of which pose manning and readiness problems, are at the ISP and MSP caps. We realize that such small increases in pay for certain problem specialties as anesthesiology and radiology will not be a panacea, but action should be taken to at least give DoD the option of increasing these pays.
- Increase Financial Assistance Program (FAP) accessions and introduce accession bonuses for direct procurement specialty accessions. This is likely to be a more cost-effective and quicker

way to increase inventories in some specialties, at least in the short run.

- Review entitlement special pays every 3 years to determine whether inflation adjustments are necessary.
- Authorize and use the Critical Skills Retention Bonus (CSRB) for physicians and target it to problem specialties.
- Add two factors to the uniformed physician annual pay review process—patient satisfaction and productivity.

Dentists

Findings

We conducted an in-depth analysis of the behavior of uniformed dentists over the last decade and found that the military had deliberately downsized its force structure. The forced downsizing makes it difficult to interpret retention trends, but we can state that uniformed-dentist retention has not improved over the last decade. Our analysis showed that all three Services are becoming increasingly reliant on the Armed Forces Health Professions Scholarship Program (AFHPSP). Because of the high dental student debt load and uniformed-civilian dentist pay gap, we expect that this trend will continue and that the AFHPSP will be the predominant accession source for uniformed dentists. We found that DoD has a significant shortage of mid-career (paygrade O-4) uniformed dentists. We show that increases in the uniformed-civilian dentist pay gap have a significant effect on retention, but the magnitude of the effect is small. The MHS was below readiness requirements for oral maxillofacial surgery and comprehensive/operative dentistry in FY 2001. We project that this will also be the case in FY 2003. We find that the current dental Additional Special Pay (ASP) is inadequate to meet the required force structure.

Recommendations

Given our findings, we offer the following recommendations:

- Increase Dental ASP and target the increases to junior dentists who are facing their first or second stay-leave military decisions.

We recommend that uniformed dentists who have less than 4, 4 to 8, and 9 or more years of service receive \$8,000, \$16,000, and \$18,000, respectively.

- To ensure a steady and reliable number of uniformed dentist accessions, continue to use the AFHPSP as the predominant accession source.
- We recognize that the current shortage of mid-career dentists (O-4s) cannot be solved with new accessions or with improved continuation rates of senior dentists (O-5s and O-6s). Our proposed ASP increase is designed to prevent this shortage from occurring in the future. As a short-term aid to help mitigate the current shortage, we recommend the following:
 - The MHS should explore expanding the Health Professions Loan Repayment Program (HPLRP) as a *retention tool* by offering to pay the student debt for eligible uniformed dentists facing their first stay-leave military decision.
 - We also recommend using the \$30,000 accession bonus to target experienced civilian dentists who could be accessed at more senior paygrades.
- Authorize and use the CSRB for oral maxillofacial surgeons and comprehensive/operative dentists.
- The MHS should review statutory and discretionary pays every 3 years to consider adjustments for inflation.

Other health care professionals

Pharmacists

We find that, although DoD is struggling to access and retain junior uniformed pharmacists, the MHS's projected FY 2003 manning will be near 90 percent, which exceeds the readiness requirement. Our analysis showed that the paygrade and years of experience for MHS pharmacists has increased slightly over the last decade, with the exception of a decrease in the percentage of O-5s. Even though Congress authorized a \$30,000 pharmacist signing bonus, only the Army and the Air Force have appropriated a \$10,000 accession bonus at this

time. We believe that the most significant long-term problem this community faces is the ability to access and retain junior uniformed pharmacists. We strongly recommend that the military departments and the Services collaborate to establish a reliable and predominant accession source for this community by appropriating the necessary funds to support the pharmacist signing bonus. To help reduce the shortage of junior pharmacists, the MHS should explore expanding the HPLRP as a *retention tool* by offering to pay the student debt for eligible uniformed pharmacists facing their first stay-leave military decision. The uniformed pharmacist special pay plan, scheduled for implementation in FY 2002, might be able to be held in abeyance if DoD concentrates on ensuring a reliable accession pipeline for this community. By so doing, it may negate the need to implement the pharmacist special pay plan.

Optometrists

In our analyses of uniformed optometrists, we have found an inventory decrease over the past decade, but the number of military optometrists exceeds the readiness requirement. Based on the Services' chronic inability to meet 90-percent manning thresholds, the historical poor retention of junior optometrists, the large uniformed-civilian pay gap at each military career juncture, the cost of personal service contracts for this specialty, and the rising student debt load, we find that the MHS will become increasingly reliant on 3- and 4-year AFHPSP or HPLRP quotas to meet its total accession requirements. Based on the above findings and the fact that each Service's control paygrade inventory is exceeding DoD guidelines (with the exception of the Air Force at paygrade O-6), we support the implementation of the Optometry Retention Bonus commencing in FY 2002, provided that DoD finds that uniformed optometrists are more cost-effective than their civilian counterparts for the billet structure in excess of the readiness requirement.

Clinical Psychologists

We find that the MHS clinical psychologist inventory has actually increased over the last decade, by about 18 percent. Although the percentage of O-4s is slightly less in FY 2000 than it was in FY 1991,

this has been countered by an increase in the percentage of O-5 and O-6 clinical psychologists. Although a uniformed-civilian pay gap exists for this specialty, at all military career junctures, each of the Services is using an active duty clinical internship program to attract qualified candidates. We find that the MHS as a whole will near 100 percent manning for this specialty by FY 2003 and that the inventory exceeds the readiness requirement. We recommend that the Army consider slightly increasing its clinical psychologist accessions in the out-years to reach 100 percent manning and that DoD evaluate its criteria for awarding board certification pay for this specialty to make it more consistent with other uniformed health care professionals.

Physician Assistants

Our analysis shows that the MHS has successfully revitalized and transitioned the Physician Assistant community from Warrant Officers to commissioned officers in the last decade. We also find that by FY 2003 the MHS as a whole will be significantly overmanned in this specialty, with a 120-percent billet fill rate, and that the inventory exceeds the readiness requirement. Moreover, because of the predominant accession source for uniformed Physician Assistants, an active duty enlisted commissioning program, the Services are finding it difficult to grow control paygrade officers into this specialty because many opt to retire and pursue other career options before being considered for promotion to senior paygrades. We recommend that further analysis be conducted to determine the most cost-effective accession source for this specialty in the long run now that the billet structure and inventory have stabilized.

General Registered Nurses

In our analysis, we have found a significant decrease in the uniformed nurses' inventory over the past decade. Despite this drawdown, the projected inventories, experience levels, and grade structure are adequate to meet the readiness requirement, and the overall FY 2002 MHS manning for uniformed nurses will be near 97 percent. In the the 1980s, the Services were able to directly procure (DP) the vast majority of their nursing accessions with little or no subsidization. Today, the Services have devised various subsidized programs, some of which are costly, to achieve their total uniformed nursing accession

requirements. In FY 2002, DPs will account for only about 55 percent of the total uniformed nursing accessions. We find that the DP program should be the most cost-effective means to achieve required uniformed nurse accessions and should be used as the predominant accession source by all three Services. In recognition of the increased demand for uniformed nurses through the DP program, the fierce competition in the private sector for nursing assets, and the continual drop in nursing school enrollments, we recommend that the uniformed nurse signing bonus be increased from \$5,000 to \$10,000 to ensure that the Services are able to achieve their total accession requirement.

Certified Registered Nurse Anesthetists (CRNAs)

We find that the MHS, as a whole, has increased its CRNA inventory in the past 6 years, whereas the Air Force has deliberately downsized its inventory during the same time period. Our analysis shows that uniformed CRNAs are getting younger. We project that this trend will continue because the Services are placing general nurses into this field at earlier stages of their military careers than in the past to achieve both peacetime and readiness requirements. This policy change widens the entry-level uniformed-civilian CRNA pay gap. We find that most uniformed CRNAs, based on the predominant accession source, career path, and lucrative civilian salaries, do not remain in the military upon reaching retirement eligibility. Overall, the MHS will be at 102 percent manning for this community and will meet its readiness requirements, but the Army has a slight deficit of inventory to meet its stated readiness requirement.

Historical perspective

Background

DoD is responsible for managing a large and complex health care system. Like its private-sector counterparts, DoD is grappling with how to control health care costs while improving patient access and outcomes. As we will see, there have been many changes over the years to the peacetime benefit itself, the mechanics of how that benefit is delivered, beneficiary demographic mix, and overall force structure. These changes have potentially affected the *conditions and nature of work* for many uniformed health care professionals working in the direct care segment of the MHS. As a result, DoD's business strategies, for the MHS as a whole, may become increasingly important to initially accessing, compensating, and ultimately retaining uniformed health care professionals in the future.

In the first phase of this study, we reported that successful private-sector health care organizations have developed pay and performance management programs that represent their new objectives and the desired behavior from its workforce. Reference [8] states the following:

They have created a compensation philosophy that integrates their values and business strategies, and aligned resources to achieve desired financial goals and patient outcomes.

DoD is attempting to build a more performance-based health management program that will better integrate its resources. When developing a health system plan, and the compensation strategy to support this plan, some basic questions must be asked:

- What services (benefits) will be provided?
- How will those benefits be administered?

- How will DoD pay for (fund) the benefits provided—and the technological advances for providing those services?
- How will DoD know success?
 - Beneficiary perceptions?
 - Using civilian benchmarks?
 - By controlling costs?
- What are the demographic mix and demands of MHS patients?
- Does DoD have the right mix of MHS professionals to achieve its twin missions?
 - Can DoD meet its readiness requirement?
 - How can DoD optimize the readiness force structure to meet its peacetime benefit mission?

Based on a plethora of previous CNA research, let's review some of the dimensions discussed above. As we briefly walk through history, we will highlight how these transformations may affect the working environment of MHS professionals.

Evolution of the military health care benefit

The military health care benefit, itself, is a congressionally authorized program. The level of the benefit is determined in general terms by the Congress; the actual implementation is left to DoD and the three Services [5, 9, 10]. Although the task of giving structure, shape, and definition to federal policy empowers DoD during the implementation of the benefit, it is limited by readiness requirements, congressional mandates, and funding.

The 1956 Dependents' Medical Care Act *officially* established a statutory basis for the availability of health care services to active duty dependents, retirees, and their dependents at military treatment facilities (MTFs). It also authorized the Secretary of Defense to contract with civilian health care providers for active duty dependents' medical care. Before that time, active duty members received first priority for health care at the MTF; their dependents were eligible for care on a space-available basis.

Since 1956, the peacetime mission of the military health care system has expanded significantly. Table 1 lists the covered services under the baseline benefit and services added over time. We do not include changes to covered services that resulted from advancements in technology and medical science, new treatments, new training curricula, and other innovations. In *general*, Congress has not legislated on coverage issues that are related to implementing new medical innovations in MTFs or in the general market.⁵

The largest, major change to the benefit occurred under the Military Medical Benefits Amendments of 1966 when Congress enacted a number of provisions expanding both MTF- and civilian-provided health services.⁶ The covered services added under the act essentially provided comprehensive health service coverage for all military beneficiaries and broadened the authority of the Services to contract with civilian providers to supplement MTF health care through a program commonly known as CHAMPUS.

In the 2001 National Defense Authorization Act, Congress enacted a landmark addition to the benefit, beginning 1 October 2002, requiring that TRICARE be extended to all DoD Medicare-eligible beneficiaries. Before this legislation, when DoD retirees and their dependents became eligible for Medicare at age 65, they lost their eligibility to enroll in TRICARE Prime or to seek reimbursement of health care costs through either TRICARE Extra or Standard. However, they were allowed to seek care and pharmacy refills from MTFs on a space-available basis.

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5. We offer an illustrative example. In 1984, Medicare spent nearly \$4 billion (in today's dollars) paying for the treatment of heart attacks. In 1998, it spent more than \$6 billion, even though the number of heart attacks fell almost 10 percent. Each heart attack cost Medicare nearly \$12,000 more in 1998 than in 1984. It appears that the widespread use of technologies was one of the main cost drivers. In 1984, only 10 percent of heart-attack patients had surgery of any sort. By 1998, more than half had at least one cardiac catheterization [11].
 6. Additional information regarding the evolution of the military health care benefit, its costs, and how the DoD health care benefit compares to the Federal Employee Health Benefit Plan (FEHBP) and other plans are contained in [5, 9, and 10].

Table 1. Military health care benefit, covered services by source of care

Baseline benefit	Added covered services
MTF	
Inpatient care	Dental (1960)
Outpatient care	Pharmacy (1966)
Acute care, medical	Mental health (1966)
Acute care, surgical	Diagnostic tests/services (1966)
Contagious diseases	Ambulance services (1966)
Immunizations	Durable medical equipment (1966)
Obstetrics	Physical exams (1966)
Emergencies	Immunizations (1966)
	Eye exams (1966)
	National Cancer Institute phased clinical trials (1996)
	National Cancer Institute prevention trials (1999)
	TRICARE For Life (2002)
Civilian providers	
Inpatient care (only for active-duty dependents)	Emergency care (1960)
	Nonemergency surgical (1960)
	Inpatient care, all beneficiary categories (1966)
	Outpatient hospital-based services (1966)
	Physician services, acute care (1966)
	Contagious diseases (1966)
	Obstetrics (1966)
	Mental health (1966)
	Diagnostic tests/services (1966)
	Ambulance services (1966)
	Durable medical equipment (1966)
	Medically necessary dental care (1966)
	Physical exams, only for active duty dependents living overseas (1966)
	Immunizations, only for active duty dependents living overseas (1966)
	Pharmacy (1966)
	Family planning (1970)
	Elective reconstructive surgery (1982)
	Wigs (1983)
	Liver transplant (1984)
	Eye exams (1985)
	Dependents' dental (1986)
	SIDS monitors (1988/89)
	Mammograms and Paps (1991)
	Expanded family counseling (1991)
	Hospice care (1992)
	Expanded dental for crowns, orthodontics, gold fillings, and dentures (1993)
	Mail-order pharmacy (1996)
	Routine physicals, preventive care (1996)
	Immunizations, preventive care (1996)
	TRICARE For Life (2002)

Two salient points about the evolution of the MHS benefit are important to our analysis. First, when Congress authorizes a new benefit, it naturally raises the MHS beneficiaries' expectations of what services will be provided both within and outside the MTF. These raised expectations often change the day-to-day work environment within an MTF. Second, we begin to see that the funding stream to the MHS direct care system—to implement newly authorized benefits and the technological innovations associated with delivering health care—is somewhat blurred. MHS health care professionals, at the MTF-level, sometimes feel caught in the middle of their patients' expectations and the ability to acquire the necessary resources to deliver those services. This “structural tension point” may add to the stress of the MTF health care professionals.

The transition to TRICARE

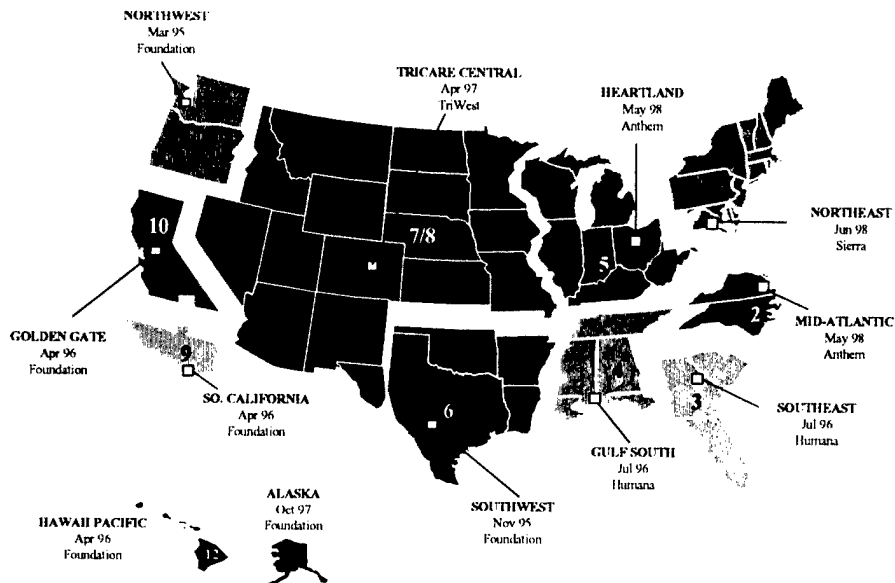
As we previously discussed, up until the mid-1990s, the military health care benefit consisted of two components. First, beneficiaries were eligible for care at MTFs. Most DoD-sponsored health care was provided this way. Second, beneficiaries who did not live near MTFs or who could not be treated at a local MTF because of nonavailability of care could use civilian providers of their choice and have the majority of their expenses reimbursed under CHAMPUS. The funding for the MTF was channeled through each of the three Services individually, and the funding for CHAMPUS was channeled through DoD. High medical cost inflation through the 1980s and the early success of managed care in controlling costs in the private sector led DoD to test alternative health care delivery and financing mechanisms and to change the way it delivers its health care benefit.

In 1994, after a series of demonstrations and evaluations, Congress mandated DoD to develop and implement “a nation-wide managed health care program for the military health services system” [12].

TRICARE was implemented nationwide between 1995 and 1998. It is a regionalized managed care program designed to deliver the DoD health care benefit. The country is divided into 11 geographical regions, as shown in figure 1, and an MTF commander in each region is designated as Lead Agent. The Lead Agents are responsible for

coordinating care within their regions. They ensure the appropriate referral of patients between the direct-care system and civilian providers and have oversight responsibility for delivering care to both active duty and non-active-duty beneficiaries.

Figure 1. TRICARE health service regions, lead agents, and contractors



In accordance with Congress's direction, DoD modeled the TRICARE program on HMO and other government types of plans offered in the private sector. The program offers three choices to CHAMPUS-eligible beneficiaries (active duty personnel are automatically enrolled in Prime at their nearest MTF):

- Enroll in an HMO-like option called TRICARE Prime⁷
- Use a network of civilian preferred providers on a case-by-case basis under TRICARE Extra

7. Under TRICARE, DoD also offers eligible beneficiaries in seven areas of the country the option of enrolling in the Uniformed Services Family Health Plan (USFHP), a comprehensive managed care plan implemented by DoD in the Uniformed Treatment Facilities, which were formerly a part of the Public Health Service.

- Receive care from nonnetwork providers under TRICARE Standard CHAMPUS.⁸

The primary goals of TRICARE include improving access to and quality of care while keeping beneficiary out-of-pocket costs at or below what they would have been under the traditional benefit. Congress also mandated that TRICARE cost no more to DoD than what the traditional benefit of MTF care and CHAMPUS would have cost.

The 104th Congress, through enactment of the National Defense Authorization Act for FY 1996, Section 717, directed the Secretary of Defense to arrange for an ongoing, independent evaluation of the TRICARE program [13-15].⁹ The legislation requires that the evaluation assess the effectiveness of the TRICARE program in meeting the original goals set forth by Congress and identifying noncatchment areas in which the health maintenance organization (HMO) option of the program (i.e., TRICARE Prime) is available or proposed to become available.

The FY 2000 evaluation, performed jointly by CNA and the Institute for Defense Analyses (IDA), covers eight Health Service Regions operating under TRICARE during FY 1998.¹⁰ The general evaluation

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8. Unlike many private-sector health care plans, DoD beneficiaries needn't enroll in order to use Extra or Standard. Those beneficiaries who do not enroll in PRIME can still seek care at MTFs on a space-available basis.
 9. The TRICARE evaluation project is an ongoing effort, conducted jointly by CNA and the Institute for Defense Analyses since 1998, that provides an annual report to the Congress as the program matures. When considering the results to follow, the reader should bear in mind that changes should be interpreted as occurring *under* TRICARE, not necessarily *because* of TRICARE.
 10. Only regions with at least one full year under TRICARE by the end of FY 1998 were included in the evaluation. The regions that satisfy this criterion are Regions 3 (Southeast), 4 (Gulf South), 6 (Southwest), 7/8 (Central), 9 (Southern California), 10 (Golden Gate), 11 (Northwest), and 12 (Hawaii). Regions 1 (Northeast), 2 (Mid-Atlantic), and 5 (Heartland) will be covered in next year's evaluation. Region 11 is being evaluated for the third time; Regions 3, 4, 6, and 9-12 for the second time; and Region 7/8 for the first time.

approach is to compare actual access, quality, and costs under TRICARE in FY 1998 with estimates of what those attributes would have been had TRICARE not been implemented. The evaluation of changes in access and quality of care used data from the 1994, 1996, 1997, and 1998 Health Care Surveys of DoD Beneficiaries.

These surveys sampled representative cross sections of all beneficiaries in each respective year. In the regions studied, access to health care generally improved under TRICARE. Table 2 summarizes the changes in access between 1994 and 1998 for all DoD beneficiaries in the regions studied.

Table 2. All evaluated regions and sources of care combined

Measure	Before TRICARE (FY 1994)	After TRICARE (FY 1998)
Realized access		
Use of preventive care		
BP check	0.81	0.91*
Dental care past year	0.60	0.68*
Flu shot last year	0.46	0.54*
Mammogram past year (50+)	0.68	0.71*
PAP test last year	0.69	0.66*
Prostate check past year (age 40+)	0.57	0.60*
Having a medical visit	0.81	0.91*
Use of emergency room	0.42	0.29*
Availability (satisfaction with)		
Access to care	0.72	0.80*
Access to hospital care	0.80	0.86*
Access to emergency care	0.79	0.82*
Access to specialists	0.65	0.76*
Access to information by phone	0.59	0.76*
Access to prescription services	0.85	0.88*
Obtaining care (satisfaction with)		
Ease of making appointment	0.67	0.88*
Wait time for an appointment	0.68	0.78*
Convenience of hours	0.81	0.87*
Convenience of treatment location	0.83	0.88*
Wait to see provider	0.65	0.74*

Note: Results exclude Regions 1, 2, and 5.

* Indicates statistically significant change ($p < 0.05$).

Three kinds of access measures were used to reach these conclusions: realized access, availability, and the process of obtaining care. Enrollees in TRICARE Prime (the HMO option) tended to be satisfied with their level of access.¹¹ The quality-of-care evaluation considered two major aspects of quality: meeting national standards, and quality of care as perceived by DoD beneficiaries. DoD has adopted as its standard the national health-promotion and disease-prevention objectives specified by the U.S. Department of Health and Human Services in *Healthy People 2000* [16]. Beneficiaries' perceptions of the quality of their health care under TRICARE were also examined. As table 3 shows, the general pattern of results suggests that most beneficiaries were satisfied with the quality of their care. The perceived quality was statistically higher in 1998 than in 1994.

Table 3. Measures of perceived quality of care—all evaluated regions combined (proportion of population satisfied with quality attribute)

Satisfaction measure	FY 1994	FY 1998*
Ability to diagnose	0.78	0.85
Administrative staff courtesy	0.79	0.93
Attention by provider	0.79	0.89
Explanation of medical tests	0.80	0.86
Explanation of procedures	0.81	0.87
Health care resources	0.56	0.70
Health care technical aspects	0.71	0.79
Outcome of health care	0.81	0.87
Overall quality of care	0.81	0.88
Skill of provider	0.83	0.89
Thoroughness of exam	0.79	0.87
Thoroughness of treatment	0.81	0.87
Time spent with provider	0.75	0.85

*Note: All differences between 1994 and 1998 perceived satisfaction levels were statistically significant ($p < 0.05$).

The implementation of TRICARE has many aspects that are beyond the scope of this study, but we believe it is important to note the

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11. Those enrolled with a military Primary Care Manager (PCM) tended to report greater levels of satisfaction with access than those enrolled with a civilian PCM. We will review this finding in more detail later in the physician section of this study.

following points for our analysis of selected uniformed health care professionals:

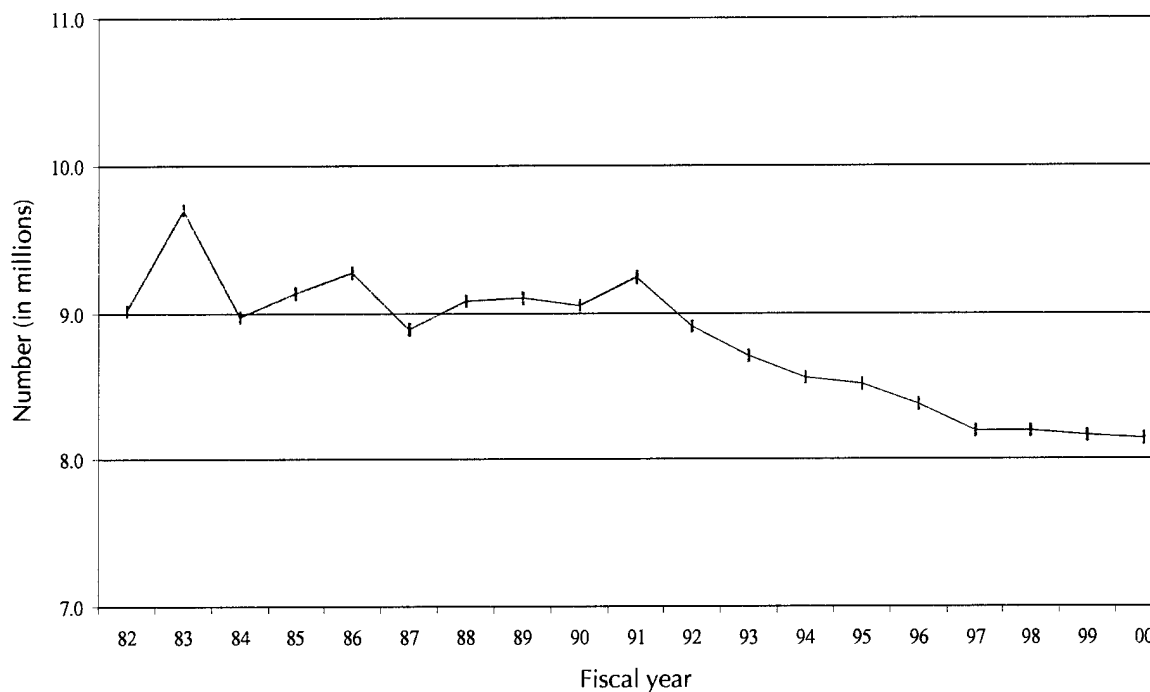
- Because DoD is trying to curb health care costs while increasing patient access and satisfaction, MTFs (and the health care professionals working within those facilities) are feeling added pressure to optimize the use of their resources and increase productivity. This focus has resulted in a new “business” culture within the direct care system from previous decades.
- Under TRICARE, each MTF’s level of achievement is increasingly being benchmarked and compared to private-sector counterparts.
- Budget constraints and rising medical inflation are increasing the “structural tension” between funding for the direct care system versus the monies required to support the managed care support contracts (for the care that cannot be provided within the MTFs).
- Although the two-part readiness mission, which consists of operational readiness and health readiness, is the primary basis for determining the required number of active duty MHS health care professionals, increasing emphasis and demands are being placed on MHS health care professionals for the peacetime benefit aspect of their duties.
- The TRICARE evaluation process provides a reasonable framework for assessing how well stated goals are being realized—the main tenets of private-sector compensation plans we discussed earlier. As we will discuss later in the physician section, findings from this annual evaluation provide us with a tool to begin isolating and evaluating MHS providers’ performance compared with their civilian counterparts.

Beneficiary demographic mix

Congress is responsible for defining those persons eligible to receive coverage under the military health care benefit. The basic beneficiary categories—active duty members, active duty dependents, retirees and their dependents, and survivors—have not changed significantly

over time. We obtained the available data on the eligible military population from 1982 to 2000 from the Program and Budget Oversight Office within the Health Budgets and Financial Policy Branch of OSD-(HA). Between 1982 and 1990, estimates of the total eligible military population were fairly steady at slightly over 9.0 million (see figure 2). During the 1990s, the total population slowly decreased to approximately 8.1 million.

Figure 2. Total eligible military beneficiaries, FY 1982–2000

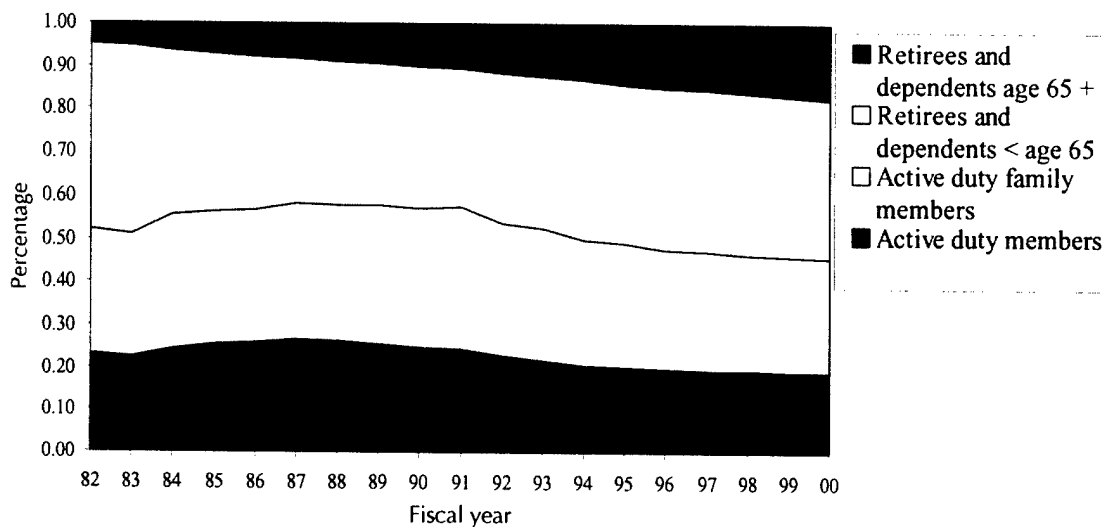


As the total number of military beneficiaries eligible for the military health care benefit decreased, the distribution among the four major beneficiary categories also has changed (see figure 3).

During the 1980s, active duty members and their dependents represented just under one-half of the eligible beneficiaries. During the 1990s, retirees and their dependents emerged as the larger segment of the population. We attribute the shift in the distribution to several factors. First, the military downsized its numbers of active duty personnel during the 1990s because of the end of the Cold War. Second,

the drawdown in active duty members has meant an increase in retirements. Plus, people are living longer and members of the baby-boom generation are reaching their senior years.

Figure 3. Distribution of eligible population by beneficiary type



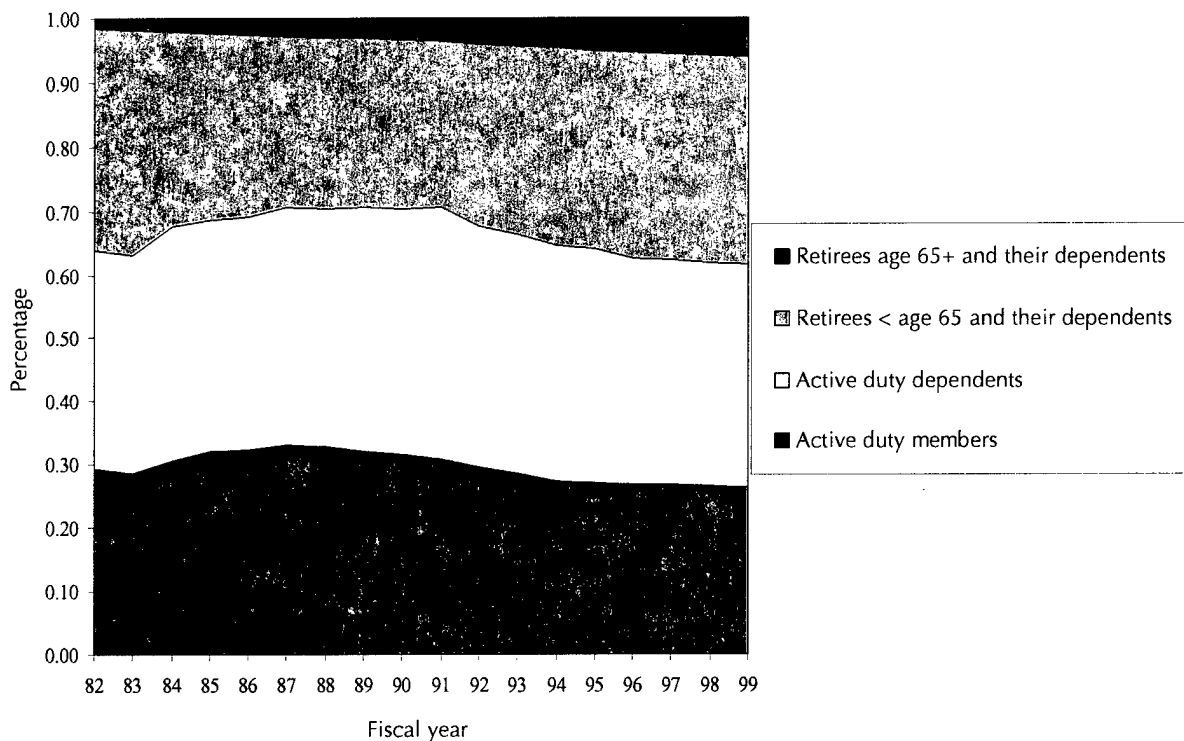
The shift in the distribution of the population is fairly dramatic and important because it affects health care use and costs. People who are younger tend to be healthier and less expensive in terms of their health care consumption. As people age, their health tends to deteriorate and they become more expensive in terms of the health care requirements.¹²

Note that not all DoD-eligible beneficiaries take advantage of their health care benefit. In figure 4, we show the projected distribution of eligible beneficiaries who have *used* their military health care benefit for FY 1982 through FY 1999. From FY 1982 through FY 1991, active duty members and their dependents consistently made up about 70 percent of the user population. This proportion decreased slowly during the 1990s to about 63 percent. A continued increase in the

12. TMA estimates that retirees who are 65 and over cost about 2.5 times more than the average per capita rate.

percentage of elderly users of the DoD health care benefit may translate to a higher cost per user if their rate of use is higher than that of current users.

Figure 4. Distribution of military health care system users by beneficiary status



The current DoD beneficiary mix is stable in size but aging. Examining the demographic mix reveals once again the structural tension between the readiness and peacetime benefit missions. The readiness requirement sometimes restricts the Services (and ultimately the MTF) from creating an optimum profile to meet the peacetime demands of its beneficiaries. Despite the readiness constraint, DoD and the Service medical departments will need to commit increasing shares of their resources to meet the demands of their aging patient population, particularly in light of the recent TRICARE-For-Life legislation. Some of the Services are exploring development of “geriatric product lines” and we see again how the *nature of work* for MHS professionals changes. Older patients tend to be sicker, need more services, and have longer inpatient stays. This demographic change will

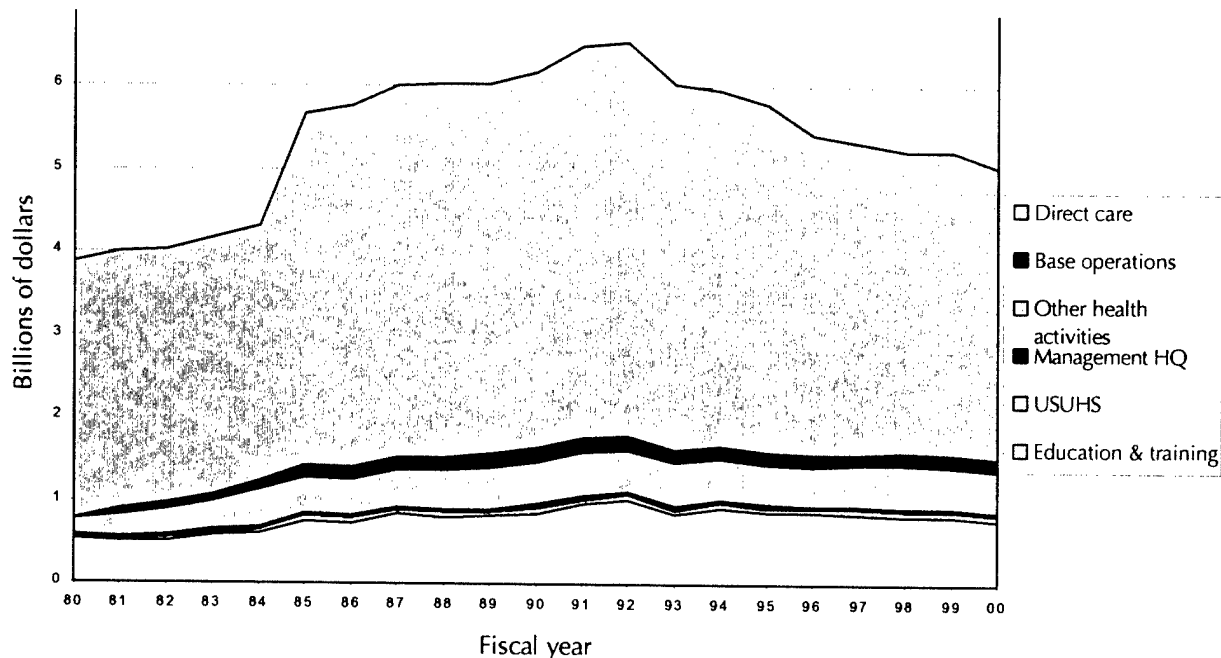
most likely create an additional burden and tension point, within MTFs, as they balance the distribution of nursing and enlisted staffs between ambulatory and inpatient settings.

MHS force structure

Focus of the 1980s was readiness

The Reagan Administration achieved large budget increases in the Defense Department. *Readiness* was the focus of the 1980s. Under this buildup, the military medical departments were directed to develop, field, and staff a number of new medical contingency platforms to support forces in theater. For example, in the Navy, these new contingency platforms included 21 fleet hospitals and 2 hospital ships. The readiness focus resulted in a surgically intense base of billet authorizations for physician specialties. Congress funded additional billets to staff the military medical readiness requirements in 1985, providing an increase of nearly 25 percent to the defense medical departments' military personnel (MILPERS) budget dollars (see figure 5).

Figure 5. Military medical department personnel budgets by major program, FY 1980-2000



Consolidation of defense health program resources

Although the increase in MILPERS funding in the mid-1980s provided additional billets, these funds were sometimes diverted to support and “grow the inventory” of other DoD communities. Congressional awareness of this problem resulted in the following language in the 1991 National Defense Authorization Act [17]:

To ensure that the department includes medical staffing requirements in its future planning scenarios, the committee directs the Secretary of Defense to provide to the Committees on the Armed Services of the Senate and House of Representatives, not later than March 1, 1991, a five-year plan on how medical capability will be maintained and protected during the force drawdown. This report should address both medical and support personnel—military and civilian.

On 14 December 1991, Program Budget Decision 742, *Consolidation of Defense Health Program (DHP) Resources*, brought under the control of the Assistant Secretary of Defense (Health Affairs) all medical resources except military personnel funds and resources in support of deployed medical units.¹³ During the programming years, the DHP programs for military manpower and includes the associated resources (e.g., dollars, endstrength) within the DHP profile. In the year of execution, those resources go to the military departments to fund the programmed endstrength. Most notable is that, in the budget and execution cycle, DHP endstrength is *additive* to the Services’ fiscal year guidance and endstrength controls [19].

The above policy sometimes raises another “structural tension point.” Concerns exist whether the military departments aggressively pursue filling all DHP billets because the dollars for those unfilled billets may “seep” to other needs within the Services during the year of execution (e.g., permanent change of station moves). The MILPERS dollars for

13. A 9 July 2001 memo from the Under Secretary of Defense for Personnel and Readiness [18] states:

Under the authority and direction of the ASD(HA), the TMA Executive Director manages all financial matters of the Department’s medical and dental programs.

unfilled DHP billets, in the year of execution, are not *fungible* back to the MHS or the Surgeons General.¹⁴ Conversely, the military departments sometimes question the need to fill peacetime benefit billets exceeding readiness requirements, particularly if those billets have been chronically undermanned. DoD is exploring the merits of establishing a reimbursable account so the DHP would pay the military departments only for the actual inventory realized during a given execution year. Several options are being explored that would create incentives to fill DHP billets.

The DoD Commission on Roles and Missions (CORM)¹⁵ and the Section 733 Study reviewed the MHS's readiness requirements. As we will see later in this study, for some specialties, a significant variance still exists between the Services' reported readiness requirements. We believe that it is in the best interest of DoD to validate the active component MHS readiness requirement, particularly in light of the two-MRC (Major Regional Conflict) and homeland defense issues currently being debated.

The next step is for the MHS and three Service medical departments to assess the endstrength (billets) in excess of the readiness requirement. When the 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. This validation process must include such factors as graduate educational requirements, patient demands based on demographic mix, direct care funding, and facilities.

14. The FY 2002 average officer programming rate (including permanent change of station) for the three Services is \$96,615. The Air Force rate is \$100,238, Navy is \$99,401, and Army is \$90,205.

15. 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" [19].

This validation process will help strengthen the trust and confidence within DoD and the three military departments that are achieving the most value for their health care dollar. Once it has been confirmed that the active duty billet structure that exceeds the readiness requirement is the most cost-effective means of providing that health care, every effort should be made to access and retain the inventory to fill each DHP billet.

The last phase of this validation would involve *optimally* distributing the MHS inventory to those MTFs where DoD can recapture as many patients as possible to minimize outlays to the managed care support contracts.

Inventory and infrastructure

Although the DoD beneficiary population decreased by about 10 percent over the last decade, the numbers of all types of active medical personnel, in general, have fallen more dramatically during that same time period (see table 4). This reduction in force was primarily driven by the general downsizing of the U.S. military and the direct care system [20].

Table 4. MHS active duty personnel, all services, FY 1991 and 2000

DoD MHS	FY91	FY00	Percentage change
All active duty MHS personnel	147,195	113,621	-23
All officer personnel	45,356	37,675	-17
Physicians	14,225	12,247	-14
Dentists	4,736	3,426	-28
Nurse Corps	13,048	10,448	-20
Medical Service	9,068	7,595	-16
Biomedical Sciences	2,563	2,504	-2
Army Medical Specialist ^a	474	917	+93
Veterinary Corps	446	408	-9
Warrant Officers	796	130	-84
All enlisted personnel	101,839	75,946	-25
Enlisted Medical	92,416	69,135	-25
Enlisted Dental	9,423	6,811	-28

a. The increase in Army Medical Specialists, and corresponding decrease in warrant officer numbers, is primarily a function of the decision in the early 1990s to commission Physician Assistants who were all previously warrant officers.

In FY 2000, there were 113,621 active duty MHS personnel compared with 147,195 a decade earlier, a 23-percent decrease.¹⁶ Active duty dentists and enlisted dental technicians have experienced the largest decrease in inventory, a 28-percent decrease in the last 10 years. The enlisted medical and nurse numbers fell by 25 and 20 percent, respectively, from FY 1991 to FY 2000. The medical officer active duty numbers have not fallen as rapidly, 14 percent.

The number of military medical centers and hospitals has also fallen dramatically since the early 1990s, largely because of Base Realignment and Closing (BRAC) actions and the general downsizing of the military. In FY 1992, there were roughly 150 military inpatient facilities worldwide, compared with 80 such facilities today. The three Services currently operate 58 inpatient facilities in the continental United States, of which 15 are large medical centers and 43 are community (general) hospitals (see table 5).

They also operate an additional 22 inpatient facilities in Europe and the Pacific and over 400 outpatient clinics worldwide. The number of clinics and ambulatory care centers has also fallen, but not as dramatically, partly because many of the smaller inpatient facilities have been converted to clinics over time.

Table 5. The three Services' worldwide inpatient facilities^a

Service	Number of facilities	Number of beds
Army	28	3,894
Air Force	28	1,547
Navy	24	1,605
Total MHS	80	7,136

a. Source: *U.S. Medicine Directory of Federal Treatment Facilities 2001*.

16. The reported numbers in our analysis in future sections of this document vary from the numbers reported above. The DMDC personnel tapes provided to us do not correspond precisely with the Health Manpower Personnel Data System (HMPDS) Reports because of duplicate records, and so on.

Conclusions

As we can see, there have been many changes to the benefit, the administration of that benefit, and the MHS force structure (and infrastructure) designed to deliver that benefit in the past decade. DoD is attempting to develop a more performance-based health management plan designed to align operational incentives with management responsibility and accountability. We feel that it is in DoD's best interest to design a long-term compensation philosophy that's aligned with these objectives. The following trends are worth noting for our upcoming analysis of selected uniformed health care professionals:

- The focus on readiness, in the 1980s, was replaced by productivity and patient outcomes in the late 1990s.
- Congress has expanded the benefit provided to eligible beneficiaries resulting in increasing expectations of the health care services that will be provided both within and outside the MTF.
 - The funding stream to implement these new services, particularly to the direct care system, is sometimes blurred and out of the span of control of the day-to-day providers working in MTFs.
- Increasing emphasis on optimization and better business practices is becoming integral to the direct care system—and ultimately to the uniformed health care professionals working within that system—based on:
 - DoD's desire to curb health care costs while improving patient access and satisfaction
 - Increasing pressure, under TRICARE, to recapture CHAMPUS dollars by increasing the productivity of MTFs
 - The performance of MTFs is increasingly being benchmarked to their civilian counterparts
 - Decreasing number of MHS uniformed health care professionals and MTFs to deliver that care
 - Aging beneficiary population mix who will place more demands (and costs) on the MHS.
- In the decade ahead, it appears that the MHS will place increasing pressure on its uniformed health care professionals' peacetime benefit role with respect to:

- Productivity
- Positive patient outcomes
- Benchmarking their performance against their private-sector peers.

We are now ready to turn our attention to the evaluation of selected MHS health care professionals. We conduct an in-depth analysis of 23 physician specialties and dentists because that is the major focus of the pay proposals being considered within DoD. We conduct a more limited analysis of the remaining health care professionals.

Physicians

Introduction

As we have discussed, the Military Health System (MHS) has experienced more than a decade of change. *Readiness* was the focus of the 1980s, resulting in significant billet growth with a surgically intense specialty profile. This was followed, in the early 1990s, by a deliberate downsizing of the military that did not spare many uniformed health care specialties, including physicians. By the mid-1990s, greater emphasis was being placed on productivity and patient outcomes. As we will see, these transformations have stressed the personnel planning process for uniformed physicians.

Are the uniformed physician specialists being adequately compensated? To answer this question, we first conducted a comparative analysis of compensation of 24 uniformed and private-sector *salaried* physician specialties at logical military career junctures [2, 3, 4].¹⁷ We found that a uniformed-civilian pay gap exists at every career juncture for all specialties considered. We also found large variation in the pay gap across specialties. The mere existence or absence of a pay gap, however, does not answer the question of the adequacy of pay. Because uniformed-civilian pay gaps have long existed for uniformed physicians, the answer lies in DoD's ability to achieve its MHS workforce objectives.

This phase of the study expands on our earlier findings to examine DoD's ability to meet its medical personnel requirements by considering general force structure, paygrade structure, billet authorizations, readiness requirements, experience, retention, and the effect

17. In the first phase of this study, we considered 24 physician specialties, which included separate analyses for diagnostic and therapeutic radiologists. The Defense Manpower Data Center (DMDC) data combine these 2 specialties into 1. Therefore, for the remainder of this study, we will analyze 23 rather than 24 specialties. For the results of the compensation comparison of selected uniformed and private-sector health care professionals, see phase I of this CNA study [2, 3, and 4].

of pay on retention. Given our findings, we also consider the adequacy of existing pay and accession bonuses. Finally, we discuss strategies for compensating physicians in the future and recommend ways the MHS can strengthen its personnel planning process.

Personnel planning

Understanding the process

Before we begin our in-depth analysis of the 23 physician specialties, we briefly describe how the MHS acquires its specialists. This step is critical to our analysis because we need to determine whether DoD's personnel planning process is adequate before we can understand the reason for reduced inventory levels: are they a function of decreased accessions or training outputs versus increased attrition rates? Furthermore, what is the most cost-effective approach, based on current retention trends, for the MHS to achieve its long-run requirements for high-quality, experienced personnel? As we will see, the personnel planning process for uniformed specialists is complex and integral to DoD meeting its workforce objectives.

It is crucial that policy-makers understand the predominant accession sources for military physicians, the active duty obligation associated with the accession source, and the typical specialty career pattern because it is the combination of these factors that ultimately determines a uniformed specialist's first stay-leave military decision. It is at these junctures that compensation, particularly for those specialties with large military-civilian pay gaps, becomes most important. DoD must structure its compensation strategies around these decision points.

Accession sources

A salient point for policy-makers to remember is that, based on the current accession sources and varying lengths of the training specialty programs, *it takes the military a long time to "grow" physician specialists*. 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.

Armed Forces Health Professional Scholarship Program (AFHPSP)

The predominant accession source for uniformed physicians is the Armed Forces Health Professional Scholarship Program. Under this program, DoD subsidizes medical students by paying their tuition, fees, and a monthly stipend of \$1,058 in return for 4-year active duty obligation.¹⁸ AFHPSP accessions are splintered into two categories: AFHPSP Direct and AFHPSP (Deferred).

AFHPSP Direct. The majority of AFHPSP medical school graduates are accessed into the military and begin an active duty internship (PGY-1) and completion of a full-time in-service residency (PGY-2) at a major medical center or family practice teaching facility.¹⁹ The program length varies by specialty. Table 6 displays the *predominant* MHS training length (including PGY-1) for each specialty. We also show the *most typical* “first” stay-leave military decision point based on this career path and assuming a 4-year AFHPSP active duty obligation. (Note: DoD changed its minimum terms of service and active duty obligation policy for medical corps officers in April 1988. Before 1988, in-house graduate medical education (GME)—residency and fellowships performed in MTFs while on active duty—was obligation neutral, with only a 2-year minimum service requirement. Afterward, in-house GME incurred a year-for-year obligation served concurrently with any obligation for medical school subsidization [21].)

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18. The active duty obligation is a function of how many years a person receives a subsidy—usually 4 years. DoD’s average annual outlay for each subsidized AFHPSP year is about \$38,000.
 19. Exceptions follow. Unlike the Army and Air Force, many Navy physicians serve 2 years as general medical officers (GMOs) before commencing residency. The Army and Air Force typically send physicians immediately into residency training following internship, and fellowship training commences right after residency training. Navy specialties requiring a fellowship (e.g., gastroenterology) are assumed to occur after a 2-year staff utilization tour in the primary specialty (e.g., internal medicine). The predominant profile for Army and Air Force physicians is nearly the same. The two exceptions are neurosurgery and otolaryngology: the Army residency programs are assumed to be 6 and 5 years, respectively, and the Air Force residency programs are assumed to be 5 and 4 years, respectively.

Table 6. Predominant MHS physician career profile
(based on 4-year AFHPSP direct accession)

Specialty	Program length (years)	First stay-leave decision point (years of service)
Anesthesiology	4	8
Cardiology	6	11
Dermatology	4	8
Emergency medicine	4	8
Family practice	3	7
Gastroenterology	6	12
General surgery	5	9
Hematology/oncology	6	11
Internal medicine	3	7
Neurology	4	8
Neurosurgery	7	13
Obstetrics/gynecology	4	8
Preventive medicine/ occupational health	3	7
Ophthalmology	4	8
Orthopedic surgery	5	9
Otolaryngology	6	12
Pathology	5	12
Pediatric	3	7
Physical medicine	4	7
Plastic reconstructive	5	13
Psychiatry	4	8
Radiology	5	9
Urology	6	11

AFHPSP (Deferred). Each year Health Affairs and the Services determine the number of PGY-1 and PGY-2 residents it can support in-house. Based on this constraint, a portion of the total AFHPSP medical graduates are deferred to complete their intern and residency in a civilian institution. Deferred AFHPSP individuals are not subsidized while attending their civilian training programs. Upon completion of their residency program, these individuals are accessed into the military with a 4-year active duty obligation.

Uniformed Services University of the Health Sciences (USUHS)

USUHS is a DoD-sponsored medical school, and each of the Services receive graduates from this program annually. The typical active duty

obligation for this accession is 7 years, and graduates begin an active duty internship (PGY-1) and complete a full-time in-service residency (PGY-2) at a major medical center or family practice teaching facility.

Financial Assistance Program (FAP)

The Services receive a small inventory of specialists through the FAP. The FAP allows the Services to access physicians in a civilian residency program: These specialists receive an annual grant of \$22,379 for each year subsidized as well as the same monthly stipend as AFHPSP students in return for an active duty obligation (ADO) commensurate with the length of time spent in training. The typical ADO is 3 to 4 years.²⁰

Direct procurement

The Services also access a small number of specialists via direct procurement, with no accompanying subsidization. The typical ADO for these specialists is 2 to 3 years.

Based on these varying accession sources and projected workforce losses,²¹ Health Affairs and the Services annually decide how to channel or "match" their AFHPSP (both Direct and Deferred) and USUHS accessions into various specialty residency and fellowship programs.

We are now ready to begin our analysis by examining the structure and changes in the medical corps over the past decade, with special emphasis on the 23 specialties on which we focused in phase I.

20. Because the DMDC data did not consistently disentangle FAP from other accessions, we were not able to run retention analyses on FAP accessions.

21. Projected workforce losses are normally based on historical loss rates for a given specialty. As we will discuss later, we feel that this process could be strengthened by accurately capturing and tracking the initial ADO of specialists based on accession source and training program length. Moreover, the number of years of total service a specialist has should be evaluated and included in this projection. For example, many USUHS students have prior enlisted and/or commissioned service before they begin medical school. This may make these specialists more likely than AFHPSP specialists to remain in the military until retirement.

Force structure

Overall medical corps inventory

The most striking change in the inventory of uniformed physicians during the 1990s was the dramatic reduction in their numbers (see table 7). As of FY 1991, there were 14,224 uniformed active duty physicians. By FY 2000, this number had dropped by 15 percent to 12,054. The Army saw the most dramatic decrease in its inventory, a 26-percent drawdown, whereas the Navy and Air Force experienced less substantial decreases of 8 and 9 percent, respectively.

Table 7. MHS medical corps inventory, by Service (FY 1991-2000)^a

Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	5,606	5,512	5,358	5,036	4,848	4,775	4,528	4,420	4,295	4,168
Navy	4,351	4,385	4,401	4,351	4,115	4,096	4,026	4,036	4,031	4,004
Air Force	4,267	4,379	4,300	4,238	4,214	4,180	4,118	4,092	3,940	3,882
MHS Total	14,224	14,276	14,059	13,625	13,177	13,051	12,672	12,548	12,266	12,054

a. The reported numbers in our analyses are based on the DMDC personnel tapes and may vary from HMPDS numbers [20] cited in earlier sections of this study due to discrepancies (duplicate records).

This drawdown of inventory varied not only across the three Services but across different specialties as well. In table 8, we present inventory levels in FY 1991 and FY 2000 for the 23 specialties that are the focus of our remaining analysis.

Note that the inventories of these specialists fell by an average of only 8 percent from a total of 7,375 in FY 1991 to 6,793 in FY 2000. While most of the specialties experienced losses, a few saw increases in their inventories. For instance, the inventories of family practice and emergency medicine physicians increased by about 33 and 53 percent, respectively. Still, some specialties that had significant inventories at the beginning of the decade experienced significant losses. The numbers of general surgeons fell by about 32 percent, pathologists by 27 percent, psychiatrists by 31 percent, and general internists by 21 percent. Among those specialties that had relatively small inventories in FY 1991, the numbers of neurosurgeons, gastroenterologists, and hematologists and oncologists all fell by 24 to 30 percent.

Table 8. MHS medical corps inventories, 23 selected specialties (FY91 and FY00)

Specialty	FY91	FY00	Percent change
All 23 specialties	7,375	6,793	- 7.9
Primary care specialties			
Family practice	1,066	1,416	+ 32.8
Pediatrics	769	653	- 15.1
Preventive medicine	362	214	- 40.9
General internal medicine	714	563	- 21.1
Internal medicine subspecialties			
Gastroenterology	98	75	- 23.5
Cardiology	112	115	+ 2.7
Hematology/oncology	78	55	- 29.5
Surgical specialties			
General surgery	625	426	- 31.8
OB/GYN	482	469	- 2.7
Ophthalmology	178	180	+1.1
Otorhinolaryngology	152	146	- 3.9
Neurological surgery	51	39	- 23.5
Orthopedic surgery	368	351	- 4.6
Plastic surgery	45	40	- 11.1
Urology	140	122	- 12.9
Other specialties			
Anesthesiology	407	320	- 21.4
Dermatology	128	117	- 8.6
Neurology	120	105	- 12.5
Pathology	365	265	- 27.4
Physical/occupational medicine	35	40	+ 14.3
Psychiatry	457	314	- 31.3
Radiology	388	409	+ 5.4
Emergency medicine	235	359	+ 52.8

Some of these losses may be indicative not of retention problems, but rather of business decisions made by the military departments or Services. For instance, although the inventory of Navy neurosurgeons has fallen by 25 percent since FY 1999, the number of authorized

billets has fallen by almost an equal amount. A consequence of this is that the percentage of manned neurosurgeon billets in the Navy fell only 3 percent—from 89 percent in FY 1991 to 86 percent in FY 2000. Also, as of FY 1991 the Navy was overmanning its psychiatry billets. Since then, the numbers of Navy psychiatrists and Navy psychiatry billets have fallen (by 20 and 11 percent, respectively), leaving Navy psychiatry billets roughly 100 percent manned in FY 2000.

Grade structure

In this section, we consider the paygrade distribution of medical corps officers. We do this because the military medical community is concerned that the medical corps inventory include an adequate percentage of experienced physicians. As a rule of thumb, DoD desires that physicians at paygrade levels of O-5 and higher make up roughly 25 to 30 percent of physician endstrength [22].²² Table 9 presents the paygrade distributions for FY 1991, FY 1995, and FY 2000 of primary care physicians, internal medicine subspecialists, surgeons, and other specialists that are listed in table 8.

The table shows that the paygrade distributions of these various specialty groups have remained stable throughout the 1990s. Only among primary care physicians has the medical corps experienced much of a change; even in this case, the change is only a slight move toward a younger force. Also note that, as of FY 2000, 32 percent of the primary care physicians, 49 percent of the internal medicine subspecialists, 37 percent of the surgeons, and 40 percent of the other specialists were O-5s or higher. Thus, for each group of specialties, the inventory of physicians appears neither too young nor too inexperienced.

22. The DoD memorandum states a goal of at least 25 to 30 percent of physician endstrength with an experience level of 5 to 12 years beyond initial specialty 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 above [22].

Table 9. Paygrade distributions (percentages) of four specialty groups

Specialty/grade	FY 1991	FY 1995	FY 2000
All 23 specialties			
O-3	20.0	21.3	21.6
O-4	42.8	41.8	42.1
O-5	20.2	21.7	21.4
O-6 and above	17.0	15.2	14.9
Primary care			
O-3	29.0	30.7	35.4
O-4	36.3	31.8	32.5
O-5	18.7	22.4	17.7
O-6 and above	16.0	15.1	14.4
Internal medicine subspecialties			
O-3	2.4	0.9	3.3
O-4	46.9	45.1	47.7
O-5	29.5	30.5	26.1
O-6 and above	21.2	23.5	22.9
Surgeons			
O-3	12.9	14.2	11.3
O-4	50.3	51.9	51.5
O-5	19.9	20.1	23.5
O-6 and above	16.9	13.8	13.7
Other specialists			
O-3	16.8	17.6	13.1
O-4	44.1	45.5	47.0
O-5	21.4	21.3	24.3
O-6 and above	17.7	15.6	15.6

Comparing force structure with requirements by specialty

So far, we have taken only a cursory look at MHS medical corps inventories. In this section, we consider the inventories of each of our 23 specialties in greater detail, examining trends and comparing projected inventories to future manning and readiness requirements. In doing so, we shed light on those areas that should concern the MHS most. When considering the historical numbers, note that the Air Force has “co-mingled” physicians in training with duty specialists in some of the years in the DMDC data. This has resulted in inflated end-strengths for some of their specialists. The FY 2001 inventory numbers that the Air Force provided us do not have this problem.

To project inventories out to FY 2003, we start with the Services' counts for each specialty for the end of FY 2001. The Services also provided us with the numbers of inventory gains they expect in FY 2002 and FY 2003. We calculated inventory losses for those two years by projecting historical attrition rates from the middle to late 1990s, using a 4-year moving-average model.²³ For example, our projected attrition rate for FY 2000 is the average of the attrition rates for FY 1996-1999. Our projected attrition rate for FY 2001 is the average of the actual attrition rates for FY 1997-1999 and the projected attrition rate for FY 2000. Likewise, our projected attrition rates for FY 2002 and FY 2003 were the averages of the attrition rates for the previous 4 years, FY 1998-2001 and FY 1999-2002, respectively. The three Services provided us with their FY 2001 manning levels, and FY 2003 billet and active component (AC) readiness requirements.

To shed light on the urgency of alleviating physician specialty shortages when they exist, we compare projected inventories to both manning and readiness requirements. A case in which a Service is not able to meet its readiness requirement would normally be viewed as a more urgent problem than a case in which it can meet its readiness requirement but fails to meet its manning requirement. However, we do not wish to downplay the importance to the Services of manning their billets. We assume, for all of the uniformed health care professionals included in this study, that it is important for DoD to meet both its readiness and manning requirements.

Note that the AC readiness requirements used in this study delineate the Services' requirements for "fully trained" specialists and do not capture the "training" requirement that is essential to the MHS growing its required specialists. The inventory and billet data do not include the "training tail" as well, so fair comparisons can be made to the status of each specialty that is congruent to the analysis used by DoD to assess the effectiveness of their special pay plans.

23. We calculated these historical attrition rates using DMDC data.

Primary care physicians

Family practice

Table 10 presents the inventory of family practice physicians by Service for FY 1991, FY 1996, and FY 2001, as well as our projections for FY 2003. It also presents each Service's manning and readiness requirements for FY 2003. Our projections indicate that the Navy will continue to see considerable growth in its family practice physician inventory. This will result mostly from continued efforts in training more family practice physicians in the next 2 years, and from an expectation that the relatively low attrition rates of the middle to late 1990s will continue. The Air Force's inventory will remain virtually unchanged (despite a large number of accessions) leaving it capable of meeting its manning and readiness goals. Our projections indicate that the Army will actually see more losses than gains over the next 2 years and will be hard pressed to man even 80 percent of its family practice billets in FY 2003. Despite this, we project that all three Services will meet their readiness requirements in FY 2003, with the Navy and Air Force doing so comfortably.

Table 10. Family practice historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	365	342	450	408	547	75	383	107
Navy	267	278	431	462	403	115	253	183
Air Force ^a	434	528	494	497	477	104	146	340
MHS	1,066	1,148	1,375	1,367	1,427	96	782	175

a. The Family Practice data for Air Force (AF) include only those physicians coded as AFSC 44F (General Family Practice) and exclude those coded as AFSC 48F (Family Practice Specialists). Although most of the 48F inventory draws family practice special pay, the Air Force reports that the duties and responsibilities of these specialists is significantly different from the 44F specialists.

Pediatrics

As we see in table 11, our projections indicate stability in pediatrician inventories for the Navy and the Air Force, and significant growth for the Army over the next 2 years. Much of the Army's growth will be from an expected 80 gains into the specialty in FY 2002 and FY 2003. The stability in the Navy and Air Force inventories is sensible, given

that either could meet its manning requirements in FY 2003 without growing its inventories at all. It is the Army, again, that will struggle to meet its manning requirements in FY 2003. The Army also has a very large readiness requirement relative to the other Services and will struggle to meet it in FY 2003, although it may be a better idea for the Army to rethink the number of pediatricians it actually needs to carry out its readiness mission. Finally, we project that the MHS as a whole will meet combined manning and readiness requirements.

Table 11. Pediatrics historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	311	212	180	205	258	79	225	91
Navy	184	112	199	202	174	116	65	311
Air Force	274	262	237	239	221	108	45	531
MHS	769	586	616	646	653	99	335	193

Preventive medicine/occupational health

Table 12 presents historical data and projections for preventive medicine physicians. The Navy should be able to meet its manning requirements in FY 2003, although it could be vulnerable to an unexpected increase in attrition. The Army and Air Force are likely to struggle to meet their manning goals, though they should meet their readiness requirements, as should the Navy. Finally, we project that the MHS as a whole will meet the combined readiness requirement and come close to meeting the combined manning requirement.

Table 12. Preventive medicine/occupational health historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	93	85	97	99	110	90	39	254
Navy	115	68	89	88	88	100	95	93
Air Force	N/A	12	24	22	38	58	2	1,100
MHS	362	165	210	209	236	89	136	154

General internists

We present historical inventories and future projected inventories and requirements for general internists in table 13. Some attrite from the military altogether. Others are lost from this specialty because they enter internal medicine subspecialty fellowship programs. In our projections, we accounted for both types of losses.

Table 13. General internal medicine historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	322	221	227	380	368	103	398	95
Navy	122	140	103	138	135	102	108	128
Air Force	270	228	137	131	186	70	133	98
MHS	714	589	467	649	689	94	639	102

As far as gains are concerned, the Army is especially trying to grow this inventory, with 244 expected accessions (from training and other sources) over the next 2 years. For its part, the Navy plans to access roughly 60 new general internists between FY 2001 and FY 2003. If the projections are correct, only the Air Force should have difficulty meeting its manning requirements in FY 2003, the Navy and Army will be at 102 to 103 percent of their requirements, and the Air Force at 70 percent of its requirement. Also, each Service should meet or at least nearly meet its readiness requirement.

Internal medicine subspecialties

Gastroenterology

As we see in table 14, a drawdown of gastroenterologists occurred over the past decade, but our projections indicate very little change in the three Services' inventories of these specialists between FY 2001 and FY 2003. The fact that none of the Services is planning for significant inventory gains during this time accounts for much of this. As a result, although all three Services should easily meet their readiness goals for FY 2003, they will struggle and most likely not meet their manning goals.

Table 14. Gastroenterology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	53	32	43	44	50	88	22	200
Navy	26	22	19	19	22	86	3	633
Air Force	19	16	17	16	21	76	3	533
MHS	98	70	79	79	93	84	28	282

Cardiology

Table 15 presents historical inventories for cardiologists, as well as our projections for FY 2003 and each Service's manning and readiness requirements for FY 2003. We project significant gains in inventory for the Navy and Air Force as a result of fairly aggressive training campaigns. The training of cardiologists, like the training of all internal medicine subspecialists, entails a fellowship, which is training beyond the general internal medicine residency. The Navy plans to train 12 new cardiologists over the next 2 years, while recent attrition trends indicate that it will lose only 7 cardiologists over this same period. The Air Force will train 16 new cardiologists over this time period while losing only 11. In contrast, the Army will likely experience fewer gains than losses. Given these projections, the Navy and Air Force should meet their manning requirements in FY 2003, albeit with little room to spare. It is unlikely that the Army will meet its manning goal. At the same time, each Service is expected to easily meet its readiness requirements, and the MHS as a whole should meet over 93 percent of its combined manning requirements.

Table 15. Cardiology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY 03	Billets FY03		Readiness	
					No.	%	No.	%
Army	53	44	54	50	66	76	29	172
Navy	31	21	23	28	25	112	13	215
Air Force	28	25	30	35	30	117	0	N/A
MHS	112	90	107	113	121	93	42	269

Hematology/oncology

Table 16 presents the historical inventories of hematologists/oncologists, as well as our projections for FY 2003 and each Service's manning and readiness requirements for FY 2003. Despite the fact that we expect to see a fairly high attrition rate among Air Force hematologists/oncologists, we still expect the inventory to grow slightly because of an expected 7 new accessions from fellowship training over the next 2 years. We also project little or no change in the Army and Navy inventories. In the Army's case, this is not good because it means that it will struggle to fill three-fifths of its billets and most likely not meet its readiness requirement. Both the Navy and Air Force can be expected to meet their manning requirements, and readiness is not an issue because neither Service has such a requirement for this specialty.

Table 16. Hematology/oncology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets		FY03		Readiness	
					No.		%		No.	%
Army	47	30	26	26	44		59		29	90
Navy	17	18	17	16	13		123		0	N/A
Air Force	14	21	12	14	14		100		0	N/A
MHS	78	69	55	56	71		79		29	193

Surgical specialties

General surgery

In table 17, we present the historical inventories of general surgeons, as well as our projections and the Services' requirements for FY 2003.

We project that each of the three Services will experience significant increases in their inventories of general surgeons over the next 2 years. This projection is mostly the result of expectations for a high rate of accessions from the training pipeline. For instance, the Army and Air Force expect to access 76 and 67 general surgeons, respectively. Given our projections, the Air Force should be able to meet both its manning and readiness requirements in FY 2003.

Table 17. General surgery historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	233	143	160	185	245	76	223	83
Navy	167	144	109	125	139	90	205	61
Air Force	225	191	146	167	130	128	100	167
MHS	625	478	415	477	514	93	528	90

The story is different for the Army and Navy. The Navy will likely have difficulties in meeting its manning goals for FY 2003, and it appears that it will have great difficulty in meeting its readiness requirements. This is somewhat misleading, however, because the Navy can substitute a certain percentage of OB/GYN physicians and urologists for general surgeons for readiness purposes. As we will see, we project that the Navy will exceed its OB/GYN readiness requirement by 64 physicians and its urology readiness requirement by 13 physicians. Adding these 77 physicians to its projected inventory of general surgeons yields a total of 202 surgeons toward a readiness requirement of 205. Therefore, the situation is not as dire as it may seem for the Navy.

Given its large manning requirement, it is unlikely that the Army will fill even 80 percent of its billets. It will also fail to meet its readiness requirement. This would hold true even if one were to substitute OB/GYN physicians and urologists because we expect the Army to exceed its readiness requirements for these two specialists by only 10 physicians in FY 2003. This number would not make up the entire readiness shortfall for general surgeons.

OB/GYN

In table 18 we present our findings for OB/GYN physicians. Despite the fact that we project the inventories of OB/GYN physicians to decrease over the next 2 years, each Service should still be able to meet its readiness requirement, although the Army will do so by only a small margin. We also expect the Navy and Air Force to be able to meet their manning requirements. The same cannot be said for the Army, which has a fairly high manning requirement compared to the other two Services. Our projections indicate that the Army will find it difficult to meet even three-quarters of its manning requirement in FY 2003.

Table 18. OB/GYN historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	201	143	180	153	212	72	151	101
Navy	100	116	132	130	124	105	66	197
Air Force	181	163	157	145	114	127	30	483
MHS	482	422	469	428	450	95	247	173

Ophthalmology

We present our findings for ophthalmologists in table 19. Our projections indicate a small increase in the Navy's inventory of these specialists over the next 2 years. On the other hand, we expect the Army's and the Air Force's inventories to fall slightly over this same period. Despite these trends, all three Services will comfortably meet their readiness requirements in FY 2003, and the Navy and Air Force should meet their manning goals. Again, the Army will experience a manning shortfall in FY 2003 but should be able to man about 88 percent of its ophthalmology billets. As a whole, the MHS will have more ophthalmologists than billets in FY 2003.

Table 19. Ophthalmology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	68	78	75	69	78	88	32	216
Navy	57	65	67	69	49	141	17	406
Air Force	53	59	35	32	32	100	10	320
MHS	178	202	177	170	159	107	59	288

Otorhinolaryngology

In table 20, we present historical inventories of otorhinolaryngologists (ENTs) by Service, as well as our projections for FY 2003 and each Service's manning and readiness requirements for FY 2003. Again, our projections indicate very little change in Navy and Air Force inventories of ENTs over the next 2 years and a fall in the inventory of Army ENTs. As of FY 2003, both the Navy and Air Force will

comfortably meet their readiness requirements, whereas the Army will not. This will occur in large part because the Army has a much higher readiness goal for FY 2003 than either of the other two Services. We also project that the Army and Air Force may have difficulty meeting their manning goals, although the Army will have the most difficulty. The Navy should meet its manning goals in FY 2003, but by a very close margin.

Table 20. Otorhinolaryngology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	50	45	55	44	69	64	54	81
Navy	52	58	49	48	48	100	15	320
Air Force	50	51	33	34	38	89	12	283
MHS	152	154	137	126	155	81	81	156

Neurosurgery

Table 21 presents historical inventories of neurosurgeons by Service, as well as our projections for FY 2003. We also present each Service's manning and readiness requirements for FY 2003. We project that the Army's inventory of neurosurgeons will fall over the next 2 years but that the Navy and Air Force inventories will stay about the same. Given our projections, only the Army is likely to have difficulty meeting its manning and readiness requirements in FY 2003.

Table 21. Neurological surgery historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	22	21	21	16	26	62	19	84
Navy	17	18	17	18	14	129	14	129
Air Force	12	14	8	8	9	89	6	133
MHS	51	53	46	42	49	86	39	108

Orthopedic surgery

We present our findings for orthopedic surgeons in table 22. Our projections indicate that the Navy's inventory of orthopedic surgeons will grow significantly by FY 2003—mainly because the Navy plans to gain 65 physicians in this specialty, mostly through its training pipeline, over the next 2 years. We expect that the Army's inventory will shrink significantly because it expects only 35 accessions over the next 2 years. If recent attrition rates continue, these gains will not be able to make up for expected losses. Finally, we expect the inventory of Air Force orthopedic surgeons to remain steady.

Table 22. Orthopedic surgery historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	151	123	176	144	214	67	118	122
Navy	118	108	104	129	133	97	96	134
Air Force	99	117	95	95	76	125	59	161
MHS	368	348	375	368	423	87	273	135

By FY 2003, we expect that each Service will comfortably meet its readiness requirement. The Air Force should meet, and the Navy should nearly meet, its manning goals. The only serious shortfall will occur in the Army, which has a very high manning goal for FY 2003. We expect that the Army will be able to man only two-thirds of its billets.

Plastic surgery

In table 23, we present historical inventories of plastic surgeons by Service, as well as our projections and each Service's manning and readiness requirements for FY 2003. Our projections indicate that the Army should be able to meet its readiness and manning requirement for plastic surgeons in FY 2003 but that the Navy will experience a shortfall for each of these requirements. The Air Force should be able to man most of its billets and does not have a readiness requirement for this specialty. The Navy, however, needs to increase its inventory in the short run.

Table 23. Plastic surgery historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	25	20	12	13	11	118	7	186
Navy	11	9	5	5	9	56	7	71
Air Force	9	15	13	10	12	83	0	N/A
MHS	45	44	30	28	32	88	14	200

Urology

Table 24 presents historical inventories of urologists by Service, as well as our projections and each Service's manning and readiness requirements for FY 2003. Our projections indicate that the inventory of urologists across the three Services will decrease by 14 percent over the next 2 years, with the Army and Air Force experiencing the greatest net losses. Despite these losses, each Service should comfortably meet its readiness requirements in FY 2003. As far as manning is concerned, the Air Force should exceed its FY 2003 goal. We expect that neither the Army nor the Navy will meet its manning goals, with shortfalls of 27 and 22 percent, respectively.

Table 24. Urology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	63	46	56	48	66	73	40	120
Navy	45	44	30	28	36	78	15	187
Air Force	32	42	45	37	24	154	8	463
MHS	140	132	131	113	126	90	63	179

Other specialties

Anesthesiology

In table 25, we present inventories, projections, and future manning and readiness requirements for anesthesiology. We project that both the Navy and the Air Force will see small increases in their inventories of anesthesiologists between FY 2001 and FY 2003, while the Army will continue to see a sharp decline. This is partially because (given the

sizes of their current inventories) the Navy and Air Force plan to gain more physicians in the specialty via the training pipeline. Comparing our projections to the manning and readiness requirements, it appears that all three Services will have difficulty manning their billets in FY 2003, although the Army and Air Force will have large enough inventories to meet their readiness requirements. The Navy has a much higher official readiness requirement and, despite the projected net gains over the next 2 years, will find it difficult to satisfy it.

Table 25. Anesthesiology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	141	131	114	92	149	62	58	159
Navy	163	148	120	129	138	93	144	90
Air Force	103	130	57	59	85	69	51	116
MHS	407	409	291	280	372	75	253	111

Dermatology

In table 26, we present inventories, projections, and future manning and readiness requirements for dermatology. Our projections indicate that the inventory of dermatologists will likely fall by 9 percent in the Army, rise by 10 percent in the Navy, and stay fairly constant in the Air Force. Given these projections, all three Services will meet their readiness requirements for FY 2003. Only the Army will experience a significant shortfall with respect to its manning requirements, as it will likely man about 82 percent of its billets. The Air Force will experience a slight shortfall with respect to its manning goal, but the shortfall is likely to be only by 4 physicians. The Navy should continue to meet its manning goals for dermatology in FY 2003.

Table 26. Dermatology historical inventories, projections, requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	63	51	58	53	65	82	33	161
Navy	37	43	40	44	39	113	10	440
Air Force	28	36	23	22	26	85	4	550
MHS	128	130	121	119	130	92	47	253

Neurology

Table 27 presents the historical inventories of neurologists by Service, as well as our projections and each Service's manning and readiness requirements for FY 2003. Our projections indicate very small decreases in the inventories of neurologists in the next 2 years. Therefore, each Service should meet its readiness requirement for FY 2003. At the same time, both the Air Force and Army will most likely not reach their manning goals; each Service will be able to man only 70 percent of its neurology billets. On the other hand, the Navy should be able to man its billets .

Table 27. Neurology historical inventories, projections, requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	66	50	42	40	55	73	39	103
Navy	26	33	30	29	29	100	11	264
Air Force	28	32	19	17	24	71	3	567
MHS	120	115	91	86	108	80	53	162

Pathology

Table 28 presents the inventory of pathologists by Service for FY 1991, 1996, and 2001, as well as our projections for FY 2003. We also present each Service's manning and readiness requirements for FY 2003. Our projections indicate that the Army will continue having problems manning its billets and meeting its readiness requirement in FY 2003. The Air Force will continue to see its inventory of pathologists fall, and will only fill 82 percent of its billets in FY 2003; on the other hand, it will have an inventory equal to about 850 percent of readiness. The Navy's inventory is likely to grow slightly over the next 2 years. In FY 2003, it should be able to meet its manning and readiness goals.

Table 28. Pathology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	181	129	99	90	124	73	126	71
Navy	91	88	83	86	83	104	39	221
Air Force	93	91	62	51	62	82	6	850
MHS	365	308	244	227	269	84	171	133

Physical Medicine

In table 29, we present inventories, projections, and future manning and readiness requirements for physical medicine. The Army has historically been the only Service with a significant corps of physical medicine physicians. Currently, the Army's inventory consists of 32 such physicians, and we estimate that this will not change in any significant way over the next 2 years. Given this projection, the Army should be able to man its billets in FY 2003 and meet its readiness requirement. Given the small numbers, the projections for the Navy and Air Force are bound to be somewhat imprecise, but the Navy plans to access 2 additional physicians over the next 2 years and should easily meet its manning and readiness requirements. The Air Force has no manning or readiness requirement for this specialty.

Table 29. Physical medicine historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	30	22	32	33	28	118	5	660
Navy	3	5	7	9	3	300	1	900
Air Force	2	3	1	1	0	N/A	0	N/A
MHS	35	30	40	43	31	139	6	717

Psychiatry

In table 30, we present historical inventories of psychiatrists, as well as our projections and each Service's manning and readiness requirements for FY 2003. We project that the inventory of Army psychiatrists will not change significantly over the next 2 years. This will leave the Army unable to meet its readiness requirement, although it should be able to man about 90 percent of its billets. Also, it may be able to substitute a certain percentage of fully trained clinical psychologists to meet this requirement. We estimate that the inventories for both the Navy and Air Force will grow over the next 2 years. We base our estimate on a relatively low historical attrition rate among psychiatrists in both Services and the addition of roughly 25 to 30 new accessions in each. Our results indicate that both Services will meet their readiness requirements in FY 2003. Also, the Navy should be able to meet its

manning goals, whereas the Air Force (like the Army) should come close to meeting its manning goals.

Table 30. Psychiatry historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	193	145	136	133	148	90	161	83
Navy	118	115	109	117	112	104	60	195
Air Force	146	118	64	72	79	91	28	257
MHS	457	378	309	322	339	95	249	129

Radiology

Table 31 presents historical inventories of radiologists by Service, as well as our projections and each Service's manning and readiness requirements for FY 2003. For radiologists, our projections indicate that each of the Services will have difficulties meeting its manning requirement for FY 2003. The Army will be able to fill only about 60 percent of its billets, while the Air Force will fill 70 percent of its billets and the Navy will be able to fill about 90 percent of its billets.

Table 31. Radiology historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	145	126	149	127	208	61	148	86
Navy	114	123	90	99	112	88	45	220
Air Force	129	175	123	97	136	71	32	303
MHS	388	424	362	323	456	71	225	144

The story is not as bleak when one considers readiness requirements, however. Both the Navy and the Air Force should be able to comfortably meet their readiness goals. The Army can currently meet its readiness goal, but we estimate that its inventory will fall by 14 percent over the next 2 years, leaving it no longer able to meet this goal by FY 2003.

Emergency medicine

In table 32, we present inventories, projections, and future manning and readiness requirements for emergency medicine. We project that the number of emergency medicine physicians will increase significantly in both the Navy and the Air Force. The Navy has historically experienced fairly low attrition among these physicians and plans to access 39 of them over the next 2 years. The Air Force has historically experienced slightly higher attrition among this group, but plans to gain 52 such physicians from its training pipeline over the next 2 years to more than offset its projected losses. Our results indicate that both Services should be able to meet their manning and readiness requirements in FY 2003.

Table 32. Emergency medicine historical inventories, projections, and requirements

Service	FY91	FY96	FY01	Proj. FY03	Billets FY03		Readiness	
					No.	%	No.	%
Army	66	91	136	117	188	62	172	68
Navy	51	81	126	142	87	163	102	139
Air Force	118	143	108	120	122	98	43	279
MHS	235	315	370	379	397	95	317	120

The story for the Army is quite different. We estimate that the number of emergency medicine physicians will fall significantly for this Service because of relatively high attrition. The Army also plans to access fewer of these physicians than either the Navy or the Air Force. At the same time, the Army has relatively high manning and readiness requirements for FY 2003. We estimate that, 2 years from now, the Army will be able to meet only 62 percent of its manning requirement and 68 percent of its readiness requirement.

Summary

In this section, we have compared projected inventories with future manning and readiness requirements for 23 specialties to determine which of these specialties should be causes of concern for the MHS and the three Services. We have found the following:

- In most cases, the Navy and Air Force should, at a minimum, meet their readiness requirements. The only exceptions are plastic surgery, anesthesiology, and, possibly, general surgery in the Navy.
- There are more cases in which the Army is likely not to meet its readiness requirement. These specialties are pathology, psychiatry, radiology, emergency medicine, general surgery, otorhinolaryngology, and neurological surgery. We also note that, in general (anesthesiology being a notable exception), the Army's readiness requirements are substantially higher than those of the other two Services.
- In a majority of cases, the Navy and the Air Force should also meet most of their manning requirements. Still, there are areas of concern:
 - Our estimates indicate that the Army will have difficulty meeting its manning goals in 19 of the 23 specialties.
 - All three Services are likely to have trouble meeting their manning requirements for anesthesiology, gastroenterology, and radiology.
 - Other specialties in which two of the three Services will have difficulty meeting their manning requirements include neurology (Army and Air Force), general surgery (Army and Navy), ENT (Army and Air Force), plastic surgery (Navy and Air Force), and urology (Army and Navy).

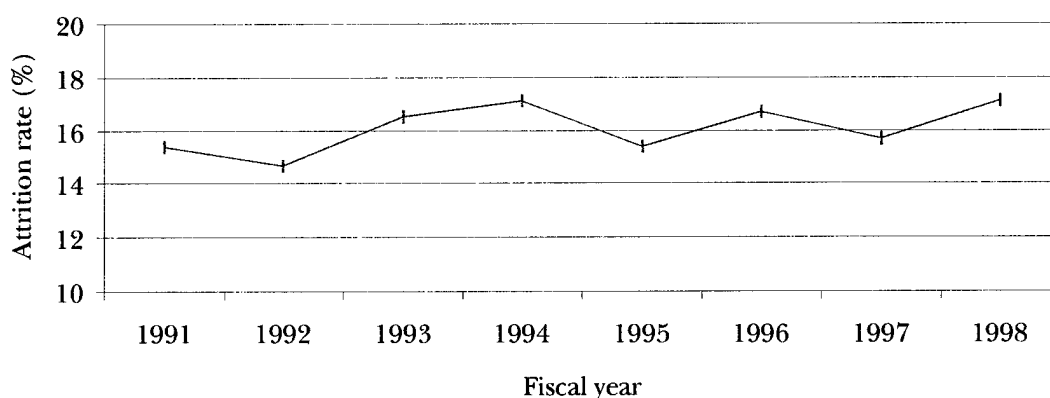
There are two ways in which the Services can meet their requirements in the future. One way is to bring more physicians into these specialties through their training pipelines or to access more fully trained specialists via the FAP. The main problems with training more specialists are the long lag associated with increasing the size of the training programs and increases in inventories of specialists. Another way is to improve the retention, or decrease the attrition, of those physicians who are already fully trained and on duty. In the remainder of this chapter, we focus on retention, with special emphasis on whether and how much increasing military physician pay would lower attrition.

Attrition of military physicians

Continuation rates

We begin our retention analysis by presenting some descriptive statistics on attrition and continuation rates from FY 1991 to FY 1998 for all physicians in our 23 specialties of interest. The attrition rate is the percentage of physicians on active duty at the beginning of a fiscal year who are no longer on active duty at the beginning of the next fiscal year. Figure 6 presents the attrition rates for FY 1991 through FY 1998. Overall, there has been a very slight upward drift in the attrition rate since FY 1991, but the change is not statistically significant. Since FY 1993, the trend has been especially flat, with the attrition rate fluctuating between 15.5 and 17 percent.²⁴

Figure 6. Attrition rates for 23 physician specialties, FY 1991-1998

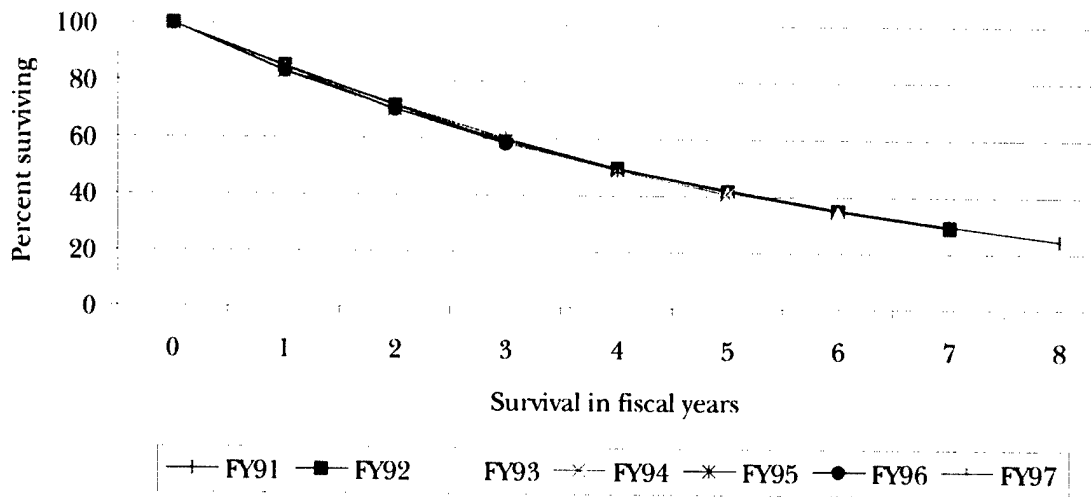


Another way of looking at this is to consider the survival of physicians over time. In figure 7, we show the survival of physicians who were on active duty as of the beginning of various fiscal years. For example, the FY 1991 survival curve plots the percentage of the 7,375 physicians

24. In the private sector, physician turnover in 1999 was about 10 percent [23]. Consequently, we think it might be very difficult for the military to reduce its physician attrition to less than 10 percent.

active in FY 1991 who were still in uniform in subsequent years, the FY 1992 survival curve plots the percentage of the 7,538 physicians active in FY 1992 who were still in uniform in subsequent years, and so on. Looking at these survival curves tells the same story—that physician attrition, or in this case continuation, did not change significantly over the past decade, at least in the aggregate.

Figure 7. Survival curves for 23 physician specialties, FY 1991-1997



Given the pay-gap results of the first phase of our study [2], it is somewhat surprising that aggregate attrition/continuation did not change significantly during the 1990s. In that first phase, we found that the military-civilian pay gaps widened significantly from FY 1991 to FY 2000 for all of the 23 specialties. Either these widening pay gaps have had little effect on retention or there have been structural changes that have affected aggregate retention. In other words, it could be that the widening pay gaps are causing increases in attrition, but that these increases are being offset by other factors. For instance, physicians accessed through the USUHS program have a longer active duty obligation after they finish residency training, 7 years, than those who are accessed through other channels. This longer active duty obligation is an especially important factor when looking at continuation. The percentage of USUHS accessions as a share of total active duty

physician inventory steadily climbed through the 1990s from 4 percent in FY 1991 to nearly 17 percent in FY 2000.

Another factor that may be affecting attrition/continuation in the aggregate is the variation in attrition rates across specialties. If those specialties with lower attrition make up a greater and greater percentage of the total inventory over time, increases in attrition across all specialties can be masked in the aggregate.

One additional factor that affects physician retention is change in civilian pay and business practices. As part of its Navy Provider Satisfaction Study, CNA interviewed over 300 Navy physicians [7]. Many of them were aware that the implementation of managed care had resulted in a loss of autonomy and income for many of their civilian counterparts. Several Navy specialists perceived that they have greater autonomy than civilian physicians. Payment systems imposed by managed care arrangements create a great deal of stress for civilian physicians, who must also continually adapt to new organization governance structures, increased oversight, shifting employment relationships, and insurance modifications. Although we are unable to quantify the effect of civilian pay and business practices in uniformed physician retention, we are cognizant that it might affect our later analysis of the effect of the military-civilian pay gap on retention.

Retention analysis

We now undertake a more in-depth analysis of those factors that affect retention. Here, it is important to understand the difference between retention and continuation. The retention rate is the percentage of *unobligated* physicians on active duty at the beginning of a fiscal year who are still on active duty at the beginning of the next fiscal year.²⁵ The continuation rate is the percentage of *all* physicians on active duty at the beginning of a fiscal year who are still on active duty at the beginning of the next fiscal year. Constant continuation rates can sometimes mask changes in retention when the share of the physician inventory that is obligated varies over time.

25. We define unobligated physicians as those specialists who have met their initial ADOs for training, based on accession source.

A model of military physician retention

The purpose of this section is to determine the influence of military-civilian pay gaps—while controlling for other factors—on the probability of leaving the military after serving one's initial active duty obligation (ADO). When we consider the career paths of military physicians from a dynamic perspective, we see that the lengths of their careers vary greatly. Some leave the military as soon as they've met their ADOs, whereas others remain in the military for their entire careers. How is this variance related to military and civilian pay and to the personal characteristics of these physicians?

Our model is relatively straightforward. We are interested in whether the military-civilian pay gap a physician faces is correlated with either a higher or lower rate of exit from the military at any given point in time, t , given that the physician has been unobligated for a defined period of time leading up to t . This rate of exit is known in the statistical literature as the hazard rate.²⁶ The hazard rate can be thought of as a function of time and of various other factors. For instance, one might think that a better-paying opportunity in the civilian sector would increase a military physician's hazard rate, or likelihood of leaving the military, all other things being equal. Also, it is possible that accession source may be important to the retention decision because certain accession sources introduce physicians more thoroughly to the military culture, increasing the likelihood that they will stay in the military after they have met their initial ADOs.

Given this framework, one can estimate the effect of military-civilian pay gaps and other factors on the attrition or survival of military physicians, using a duration model. We *planned* on identifying individuals who completed their initial ADOs between FY 1992 and FY 1996 and using information on their subsequent attrition behavior to estimate the model. As it turned out, this was impossible because of limitations of the DMDC data. We were unable to determine initial obligated service dates (OSD) for most of the physicians in the database because the OSD field on the DMDC was usually missing. In those cases in

26. In the context of this study, it is the attrition rate of unobligated physicians.

which the OSD field was not missing, it did not always contain the end-date of the physician's *initial* ADO. In many cases, the ADO was overwritten by the most recent reason for obligation, such as promotion or special pay contracts.

Given our difficulties in determining when physicians satisfied their initial ADOs, we used a second-best approach to examine retention. Instead of identifying physicians who completed their initial ADOs between FY 1992 and FY 1996, we identified physicians who were new entrants into each of our 23 specialties of interest between those years. To do this, we tracked and isolated physicians who either (1) went from not being in the data set in one year to being in a specialty the next or (2) went from being in training in one year to being in a specialty the next.

This approach is not perfect, but it has allowed us to make reasonable estimates, especially for the effect of the pay gap on retention. The ADO that any given physician must satisfy is correlated with his/her accession source. USUHS accessions typically have 7-year ADOs when they complete their residencies, AFHPSP direct accessions typically have 4- to 6-year ADOs (depending on specialty) when they complete their residencies, AFHPSP deferred accessions have 4-year ADOs when they complete their residencies, and direct accessions have 2-year obligations when they enter the military. By controlling for accession source in our duration analyses, we control for the typical ADOs that individual physicians must satisfy when they initially become specialists. However, this leads to difficulty in interpreting the effects of accession source. It is difficult to disentangle the effects of different ADOs and attachment to the force.

Basic cohort analyses

The data set we used in our analyses, therefore, describes the military careers of five different cohorts of physicians. These five cohorts consist of those physicians who entered 1 of the 23 specialties in each of the following five fiscal years:

- FY 1992 (1,462 accessions)
- FY 1993 (1,471 accessions)

- FY 1994 (1,188 accessions)
- FY 1995 (902 accessions)
- FY 1996 (933 accessions).

We do not consider cohorts accessed after FY 1996 because the latest data we have are from FY 2000 and we want to observe each cohort's survival or attrition behavior for at least 4 years. Also, we include only those physicians who were accessed through AFHPSP (both direct and deferred), through USUHS, or as direct accessions.

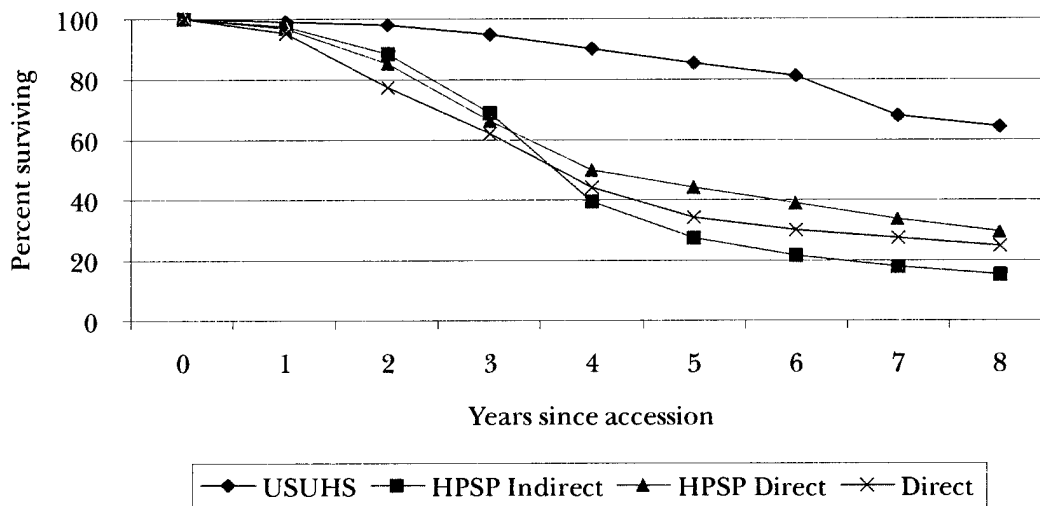
In table 33, we present the survival rates for each of our five cohorts of physicians. In the aggregate, it appears that short-term survival improved over time, at least for the first four cohorts. Five-year survival rates also generally improved over time. There can be many reasons for these improvements, such as the growing percentage of USUHS accessions or a change in the mix of specialists accessed. Also, in the late 1980s, DOD changed its minimum terms of services and active duty obligation policy for medical corps officers. Before that change, in-house graduate medical education was obligation-neutral, with only a 2-year minimum service requirement. Afterward, in-house GME incurred a year-for-year obligation (served concurrently with any obligation for medical school subsidization). This policy changed the involuntary obligation time and continuation of medical corps officers trained in-house [21]. As a result of this policy change, recent CNA research [23] showed that, although physician retention for Navy AFHPSP direct accessions was lower before residency training, it was higher after residency training.

Table 33. Physician cohort survival rates, all 23 specialties

Accession year	Percent surviving after							
	1 year	2 years	3 years	4 years	5 years	6 years	7 years	8 years
1992	97.7	85.6	66.0	44.0	34.5	29.7	24.6	21.8
1993	97.8	85.9	71.2	51.5	43.7	36.5	31.4	
1994	97.1	89.2	72.8	50.2	39.7	36.0		
1995	97.0	90.8	76.1	49.7	43.2			
1996	95.8	88.5	69.4	56.3				

Next we consider the effects of accession source and specialty group on retention. In figure 8, we present survival curves for physicians from our combined FY 1992 through FY 1996 cohorts, broken out by accession source. We see that those physicians who are accessed through USUHS have much higher survival rates than those accessed through the other three sources. There are two reasons for this. First, physicians who are accessed through USUHS leave their residency programs with a longer ADO (normally 7 years) than AFHPSP and direct accessions. Second, these physicians may stay in the military because of a greater attachment to the force due to prior military service before beginning USUHS. Because we could not determine physicians' OSDs, we could not easily disentangle these factors.

Figure 8. Survival of specialty physicians by accession source, all cohorts (FY 1992–1996)



In figure 8, we also see that AFHPSP direct accessions have higher survival rates than AFHPSP (indirect) deferred accessions, especially beyond the third or fourth year. By the fourth year after finishing their residencies, AFHPSP direct and deferred accessions have all met their ADOs. Why do the AFHPSP direct accessions start showing higher retention than AFHPSP deferred (indirect) accessions over time? First, it may be an indication that they develop more of an attachment to the force by doing their residency training in uniform.

Second, it could simply reflect the fact that AFHPSP direct accessions have fewer years to serve toward retirement when they leave their residency programs than AFHPSP deferred accessions.

Interestingly, the direct accessions display an attrition behavior that is similar to the behavior of AFHPSP accessions. Their long-term retention is slightly better than the long-term retention of the AFHPSP deferred accessions, but slightly worse than that of the AFHPSP direct accessions. Note that the short-term survival prospects of the direct accessions are the worst of the four main accession sources. We expect that this is primarily because they carry the shortest ADO, 2 years, when they enter their specialty.

In figure 9, we present survival curves for physicians from our combined FY 1992 through FY 1996 cohorts, broken out by specialty group. Here, we see that three of the specialty groups exhibit very similar retention patterns: the primary care physicians, the surgeons, and the "other" specialists (which include anesthesiologists, psychiatrists, radiologists, pathologists, dermatologists, neurologists, and physical and emergency medicine physicians). The specialty group that exhibits a different pattern comprises three internal medicine subspecialties: gastroenterology, cardiology, and hematology/oncology. The short-term survival prospects for these physicians are much lower than for the other types of physicians, and these poor early prospects carry through to very low long-term retention.

To determine whether retention varies by Service, we generated survival curves for Army, Navy, and Air Force physicians. We present these curves in figure 10. Here we see that short-term survival is slightly higher for Air Force physicians than for Army or Navy physicians.²⁷ Beyond the fourth year, however, Navy physicians clearly exhibit the highest retention. The long-term survival rate of the Air Force physicians does not differ significantly from that of the Army physicians.

27. This could result partly from the fact that in the DMDC data, physicians who are still in training are sometimes "co-mingled" with fully trained specialists.

Figure 9. Survival of physicians by specialty group, all cohorts

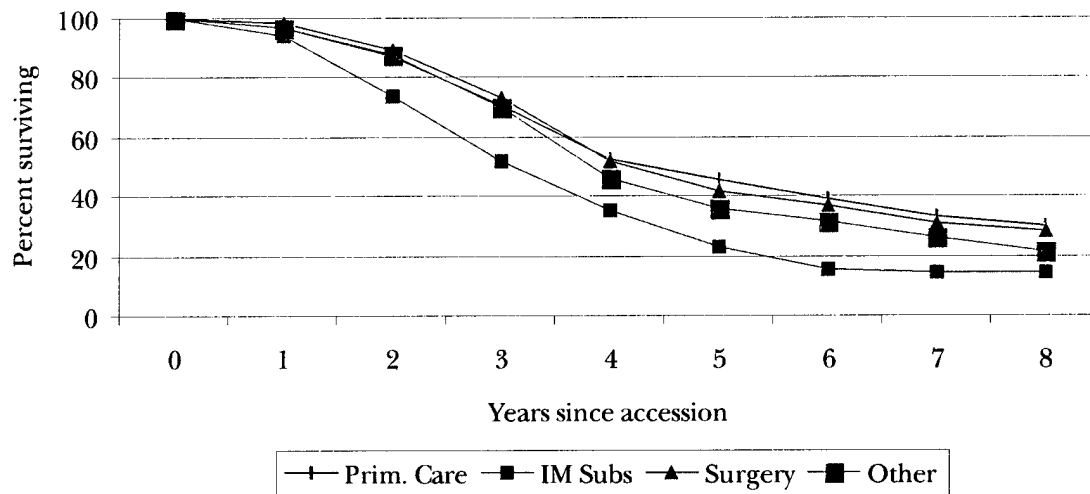
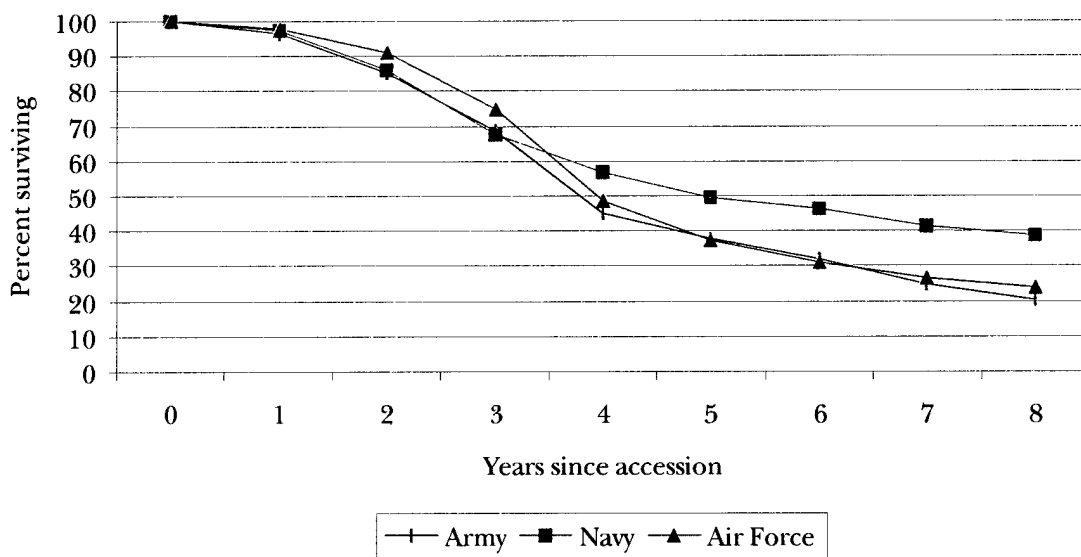


Figure 10. Survival of specialty physicians by service, all cohorts



We can draw the following preliminary inferences from our basic cohort analysis:

1. It appears that retention may have actually *improved* over the past decade, but there are too many factors involved to be certain of this result, given the simplicity of our analyses so far.
2. Survival varies across accession sources. Physicians accessed through the USUHS program exhibited much higher survival rates than those who were accessed either through AFHPSP (direct or deferred) or through direct accession.
3. Survival varies somewhat across specialty groups. Physicians accessed into gastroenterology, cardiology, and hematology/oncology exhibited much lower survival rates than physicians accessed into other specialties, especially in the short-term.
4. Although short-term survival is slightly better for Air Force physicians, long-term survival is significantly higher for the Navy than for the other two Services.

Duration model estimation

So far, we have described the retention behavior of our 5 cohorts of physicians accessed into 23 specialties from FY 1992 through FY 1996. In this section, we estimate the effect that differences in civilian and military pay, along with other factors, have had on this behavior. We first describe our data sources for civilian and military compensation. We then describe the hazard model we estimated, followed by a discussion of our results.

Earnings data. To assess the effect of the military-civilian pay gap on retention, we had to determine the specific gap that each physician in our six cohorts faced each year. We determined that the earnings data in the Health Manpower Personnel Data System were deficient. Many earnings variables were left unfilled; when they were filled, the values were often nonsensical. The HMPDS did, however, contain information on each physician's specialty, paygrade, and years of service for each year he or she was in the data set. Given information on the histories and structures of regular military compensation, additional special pay (ASP), variable special pay (VSP), board certification pay (BCP), incentive special pay (ISP), and multiyear

special pays (MSP), we estimated each physician's military compensation, based on his or her paygrade, years of service, and specialty.

We obtained data on civilian pay that had been furnished to TMA by the Hay Group.²⁸ The Hay Group calculated these data from proprietary databases representing 7,500 to 18,000 physician incumbents, working for *employer-based* health care organizations. We felt that comparisons to samples of salaried physicians were appropriate because the characteristics of the organizations reporting data most closely resemble the military environment.²⁹

To calculate the military-civilian pay gap, we used the consumer price index to inflate all earnings data to 1999 dollars and simply subtracted the estimated military earnings for each physician from the Hay estimates of civilian earnings in the same specialty.³⁰ Table 34 presents the average pay gap by cohort and fiscal year, to give the reader a sense of the size of the pay gaps. The average pay gap in the aggregate is very sensitive to the specialty-mix of the physician force in each cohort. The data indicate, however, that the pay gap has widened for more junior (in terms of years of practice) fully trained specialists.

Methodology. As we alluded to earlier, this study uses duration model analysis to estimate the effects of military-civilian pay differentials and other factors (accession source, gender, years to retirement, and branch of Service) on the attrition of military physicians.

28. The Hay Group is a benefits consulting firm that served as subcontractor for all physician cash and benefits compensation in the first phase of this study [2].

29. Salaries represented in the Hay Group data are not toward the high end of the civilian pay distribution. Some military physicians may be drawn to more lucrative settings with higher compensation, but these settings usually require the physician to incur a higher level of risk as well.

30. We wanted measures of the pay gap over time in "real" terms. For example, because of inflation, a \$25,000 pay gap measured in 1992 dollars would be greater than a \$25,000 pay gap measured in 1999 dollars because 1992 dollars are worth more in terms of purchasing power. If someone faced the same "nominal" pay gap in both years, we would not want to say that they faced the same "real" pay gap in both years.

Table 34. Military-civilian pay gaps (in thousands of 1999 dollars) by cohort and fiscal year

Fiscal year	Cohort				
	1992	1993	1994	1995	1996
1992	75.2				
1993	82.3	82.5			
1994	79.9	85.0	88.1		
1995	70.5	75.0	82.2	87.2	
1996	71.5	77.2	82.3	91.9	88.5
1997	60.1	68.1	71.1	79.7	80.2
1998	58.0	59.5	67.6	74.4	73.1
1999	55.4	56.3	61.2	70.1	64.2

We use an accelerated failure time model and model the hazard function using a log-logistic model.³¹ The results are not easy to directly interpret, but, given the results, one can predict expected post-residency career lengths. For instance, one can determine the effect of a \$10,000 decrease in the military-civilian pay gap using the following

31. If the effects of these factors did not vary over time (e.g., if Air Force physicians were always 50 percent more likely to attrite than Navy physicians no matter where they were on the survival curves), one could use a Cox proportional hazards model. The advantages are that one need not make parametric assumptions and the results are relatively easy to interpret, but we had to reject the proportional hazards model in favor of an accelerated failure time model.

Accelerated failure time models do not share these advantages of the proportional hazards model. First, one must make parametric assumptions concerning the shape of the baseline hazard. In our case, because the hazard tends to rise and then fall over time, we chose to model the hazard using a log-logistic model. The log-logistic hazard function is:

$$h(t) = \frac{\lambda^{\frac{1}{\gamma}} t^{1-\gamma}}{\gamma \left(1 + (\lambda t)^{\frac{1}{\gamma}} \right)}$$

The model is implemented by parameterizing $\lambda = e^{\mathbf{x}\beta}$, where $\mathbf{x}$ is a vector of explanatory variables and β is a vector of parameters indicating the effects of changes in the $\mathbf{x}$ variables on the hazard rate. In this case, the explanatory variables are the pay differentials, and information on accession source, gender, time to retirement, and branch of Service. The γ is a scale parameter estimated from the data.

method. The first step, after estimating the model, is to generate a predicted post-residency career length, using the existing pay gap data. The next step is to replace the existing data with new values equal to the existing pay gap values minus \$10,000. Using these new values, the next step is to generate a new predicted post-residency career length. This new measure indicates what the career length of physicians would be if the pay gap were to diminish by \$10,000. The final step is to compare the two post-residency career lengths.³²

In our analyses, we estimated separate models for each of the following specialties or groups of specialties:

- **Primary care physicians.** These include family practice and preventive medicine physicians, pediatricians, and general internists.
- **Internal medicine subspecialists.** These include gastroenterologists, cardiologists, and hematologists/oncologists.
- **Surgeons.** These include general, neurological, orthopedic, and plastic surgeons, as well as OB/GYN physicians, ophthalmologists, otorhinolaryngologists, and urologists.
- **Anesthesiologists.** We consider this specialty separately because of the special concerns over meeting future manning requirements across all three Services.
- **Radiologists and pathologists.** We separate these specialists because they provide ancillary services.
- **Psychiatry.**
- **Other specialists.** These include physical and emergency medicine physicians as well as dermatologists and neurologists.

We do this for two reasons. First, we have found that the effect of pay and other factors on the survival of military physicians varies across groups of specialties. Second, the ADOs by accession source also vary

32. One can similarly predict the effect of the pay gap on average retention. We prefer considering post-residency career length, especially because our results indicate that time-conditional attrition varies greatly over time within each cohort.

across specialties. For instance, the ADO for an AFHPSP directly accessed family practice physician in the Navy is 2 years, whereas the ADO for an AFHPSP directly accessed general surgeon in the Navy is 4 years. We did not want to pool across specialties that have different ADOs even when controlling for accession source. The way we have grouped the specialties in our analyses mitigates this problem. Refer to appendix A for descriptive statistics on all of the cohorts for each physician group.

Duration model results for primary care physicians. In table 35, we present the results of our model for primary care physicians. For this group of specialists, we find no relationship between military-civilian pay differentials and attrition. The pay gaps are smaller for this group of specialties than for the other specialties, averaging roughly \$45,000. They also vary significantly across cohorts. At the same time, the attrition behavior does not vary considerably across cohorts. Therefore, the results make sense if one considers the data. They also indicate that either the pay gaps are small enough that changes do not trigger significant changes in retention or primary care doctors are less sensitive to pay, making their stay-or-go decisions based on other factors.

Table 35. Effects of explanatory variables on the retention of primary care physicians

Variable	Significant effect on retention ^a
Pay gap	None
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	Positive
USUHS	Positive
Direct	Negative
Service (Comparison group: Air Force)	
Army	Negative
Navy	Negative
Years remaining toward retirement eligibility	Negative
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

We do find that many of our control variables have an impact. For instance, USUHS accessions have much lower attrition rates than any other types of accessions. One way of understanding the magnitudes of these effects is to consider expected post-residency career lengths.³³ Our results indicate that the expected post-residency career length of a USUHS primary care accession is 9.9 years, whereas the expected post-residency career lengths of the other types of accessions range from 4.1 years for direct accessions to 5 years for AFHPSP direct accessions.

We also find that attrition is lower among Air Force primary care physicians than among their counterparts in the Army and Navy. The expected post-residency career length of an Air Force primary care physician is about 6 years, whereas those of Army and Navy physicians are 5 and 5.25 years, respectively. The Navy doesn't fare as well as expected because it tends to outperform the Air Force and Army in the later years of a physician's career, whereas the duration model tends to put more weight on attrition behavior in the earlier years.

The years toward retirement result is also sensible. It indicates that, if physicians became fully trained specialists 1 year closer to retirement eligibility, expected post-residency career length would increase by a little over 2 months, from 5.5 to 5.7 years.

Duration model results for internal medicine subspecialists. In table 36, we present the results of our model for internal medicine subspecialists. Unlike the case of primary care physicians, the military-civilian pay differential is significantly related to retention. Our results indicate that a \$10,000 decrease in the pay gap for these subspecialists would increase expected career length by 19.5 percent, from 3.8 years to 4.5 years. Decreasing the gap by \$20,000 would increase expected career length by about 43 percent, to 5.4 years. The reader should note, however, that the interval estimate of the effect of the pay gap is wide. Specifically, the 95-percent confidence interval for the impact of the \$10,000 decrease in the pay gap ranges from an 11.6-percent increase

33. Statisticians refer to these as expected survival times. The expected career length we calculate is the expected length of a career after accessing into a specialty.

to a 28-percent increase in expected post-fellowship career length. The interval estimate for the \$20,000 decrease in the pay gap is even wider, ranging from 24.5 percent to 64 percent.³⁴

Table 36. Effects of explanatory variables on the retention of internal medicine subspecialists

Variable	Significant effect on retention ^a
Pay gap	Negative
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	Positive
USUHS	Positive
Direct	Negative
Service (Comparison group: Air Force)	
Army	Negative
Navy	Negative
Years remaining toward retirement eligibility	None
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

Figure 11 shows the effect of these decreases in the pay gap on the retention/survival of internal medicine subspecialists. Here we see a dramatic improvement in retention associated with the pay increases of \$10,000 and \$20,000.

Given an average pay gap of roughly \$65,000, we find that the elasticity of post-fellowship career length with respect to changes in the pay gap is 1.25.³⁵ This indicates that a 1-percent decrease in the pay gap would lead to a 1.25-percent increase in the post-fellowship career

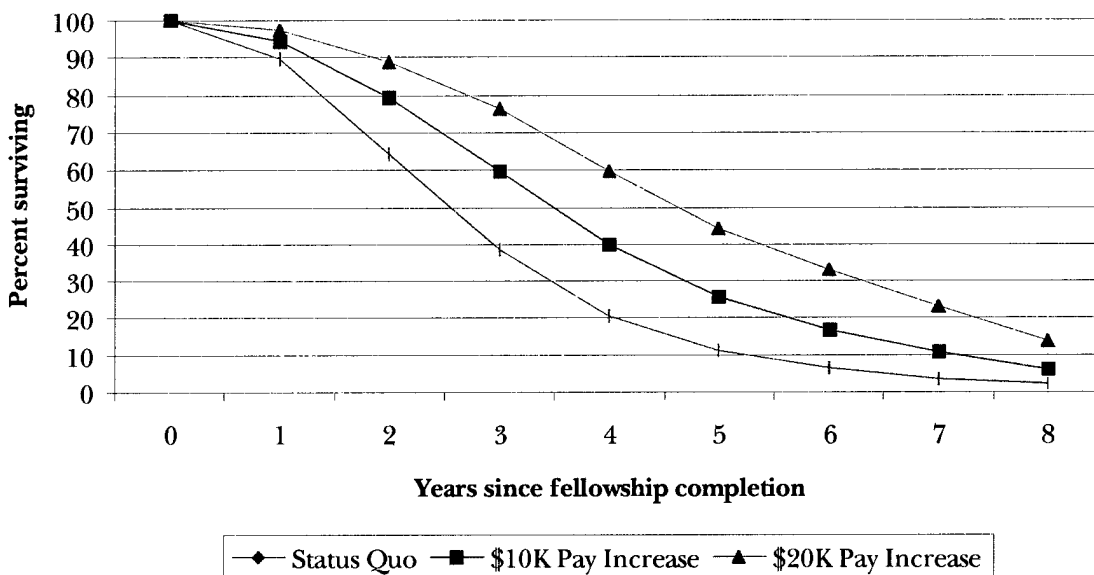
34. The main reason for the wide interval estimates is the small sample of internal medicine subspecialists with which we had to work. Our sample included 186 subjects spread out over 5 cohorts.

35. The elasticity in this case is defined as the percentage change in post-training career length (CL) given a 1-percent change in the pay gap (PG). It is written as:

$$\eta = \frac{\% \Delta CL}{\% \Delta PG}$$

length of an internal medicine subspecialist. Again, the reader should note that the 95-percent confidence interval for this elasticity estimate ranges from 0.72 to 1.76.³⁶

Figure 11. The predicted effect of pay increases on the retention of internal medicine subspecialists



Despite the wide confidence interval, the results do indicate that the effect of the pay gap on the decisions of internal medicine subspecialists is much larger than the effect on primary care physicians. Why do we find such a difference? These specialists complete additional specialized training beyond the general internal medicine residency, and one of the incentives for doing so may be to take advantage of better career opportunities in the civilian sector when their military careers are over. Also, because primary care physicians tend to earn less than

36. For each specialty group, we also calculated retention elasticities (i.e., the percentage change in the retention rate given a 1-percent change in the pay gap). These elasticities are smaller than the career length elasticities we report throughout this report. The retention elasticity with respect to the pay gap for internal medicine subspecialists is 1.13.

internal medicine subspecialists in the civilian sector, it is possible that those physicians who enter primary care specialties are less sensitive to changes in income. Therefore, one might expect the internal medicine subspecialists to be much more sensitive to changes in the military-civilian pay differential than primary care physicians.

Again, we find that many of our control variables have an impact as well. For instance, we again find that USUHS accessions have much higher survival rates than any other types of accessions. The results indicate that the expected post-fellowship career length of a USUHS internal medicine subspecialist accession is 5.6 years, whereas the expected post-fellowship career lengths of physicians from the other three accession sources range from 2.6 years for the direct accessions to 3.9 years for the AFHPSP direct accessions. We also find that the expected post-fellowship career lengths of Air Force internal medicine subspecialists exceed those of Army and Navy internal medicine subspecialists. Neither gender nor years remaining toward retirement eligibility were significant for this group of physicians.

Duration model results for surgeons. In table 37, we present the results of our model for surgeons. Again, we find that the military-civilian pay differential is related to retention, but the magnitude of the effect, although statistically significant, is much smaller than its effect on retention of internal medicine subspecialists. Our results indicate that a \$10,000 decrease in the pay differential for surgeons would increase expected career length by only about 3 percent, from 5.26 years to 5.41 years. A \$20,000 decrease would increase expected career length by only 6 percent to 5.56 years. Given that the pay gaps average \$110,000, this translates to an elasticity of 0.32, indicating very little sensitivity of post-residency career length to changes in the pay gap.³⁷ A 1-percent decrease in the pay gap would increase post-residency career length by only 0.32 percent. The 95-percent confidence interval estimate for this elasticity is much tighter than the estimate for internal medicine subspecialists, ranging from 0.22 to 0.40.

Figure 12 shows this result on the retention/survival of surgeons. Here we see that the magnitude of the impact of \$10,000 and \$20,000

37. The *retention* elasticity with respect to the pay gap for surgeons is 0.15.

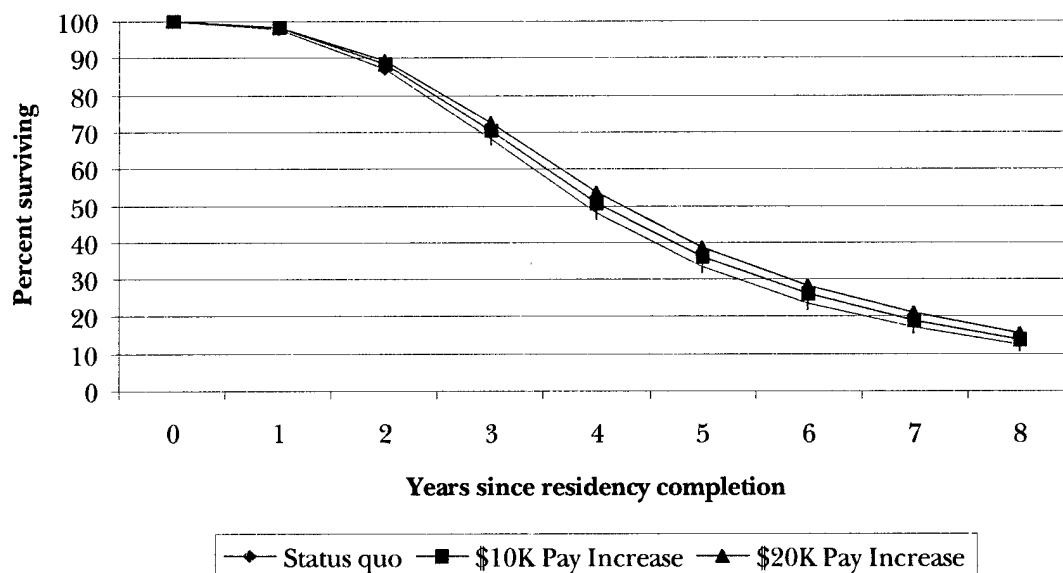
pay increases on the retention/survival of military surgeons is quite small. We believe this to be the case because of the magnitude of the pay gaps for these specialists. Pay increases of the magnitude we have considered here would be such a small percentage of the pay gap that the impact on behavior would be small.

Table 37. Effects of explanatory variables on the retention of surgeons

Variable	Significant effect on retention ^a
Pay gap	Negative
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	Positive
USUHS	Positive
Direct	None
Service (Comparison group: Air Force)	
Army	Negative
Navy	Negative
Years remaining toward retirement eligibility	Negative
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

Figure 12. The predicted effect of pay increases on the retention of surgeons



As far as our control variables are concerned, we again find that accession source matters. The expected post-residency career length of USUHS accessions is 8.6 years. This is 80 percent longer than the expected post-residency career length for AFHPSP direct accessions, which is 4.8 years. The direct accessions and AFHPSP deferred accessions have expected post-residency career lengths of about 4.3 years, or only half that of the USUHS accessions.

We also find that Service and years remaining toward retirement eligibility are statistically significant. As far as Service is concerned, our results indicate that Air Force surgeons have an expected post-residency career length of 5.7 years, which is 14 percent higher than the expected 5 years of Army and Navy surgeons. As for years remaining toward retirement eligibility, it is statistically significant, but the effect is very small. Our results indicate that, if surgeons completed training with 1 more year of service (if they were 1 year closer to retirement eligibility), expected post-residency career length would increase by only about 2.5 weeks, from 5.26 to 5.31 years.

Duration model results for anesthesiologists. In table 38, we present the results of our model for anesthesiologists. For this specialty, we again find a statistically significant relationship between the military-civilian pay gap and retention. The effect is fairly small, although slightly bigger than the effect on the retention of surgeons. Our results indicate that a \$10,000 pay increase for anesthesiologists would increase expected post-residency career length by about 4 percent, from 4.7 to 4.9 years. A \$20,000 pay increase would increase it by about 8 percent, to 5.1 years. Given that the pay gaps average \$108,000 for anesthesiologists, this translates to an elasticity of 0.44, again indicating modest sensitivity of post-residency career length to changes in the pay gap, although the point estimate of this elasticity is higher than it is for surgeons. A 1-percent decrease in the pay gap would increase post-residency career length by about 0.44 percent.³⁸

Still, the confidence interval estimate is very wide for this elasticity. The effect of the pay gap on post-residency career length is only

38. The *retention* elasticity with respect to the pay gap for anesthesiologists is 0.29.

significant at the 0.90 level, not at the 0.95 level. At the 95-percent confidence level, the interval estimate includes values that would lead one to determine that decreasing the pay gap would actually *decrease* career length. However, the upper bound on this interval estimate is 0.93, which would be indicative of a much stronger effect of pay on retention/continuation. Taking this a step further, we cannot conclude that the impact of the pay gap on career length is greater for anesthesiologists than for surgeons, in any statistically significant sense.

Table 38. Effects of explanatory variables on the retention of anesthesiologists

Variable	Significant effect on retention ^a
Pay gap	Negative ^b
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	None
USUHS	Positive
Direct	None
Service (Comparison group: Air Force)	
Army	Negative
Navy	Negative
Years remaining to retirement eligibility	Negative
Female (Gender comparison group: male)	None

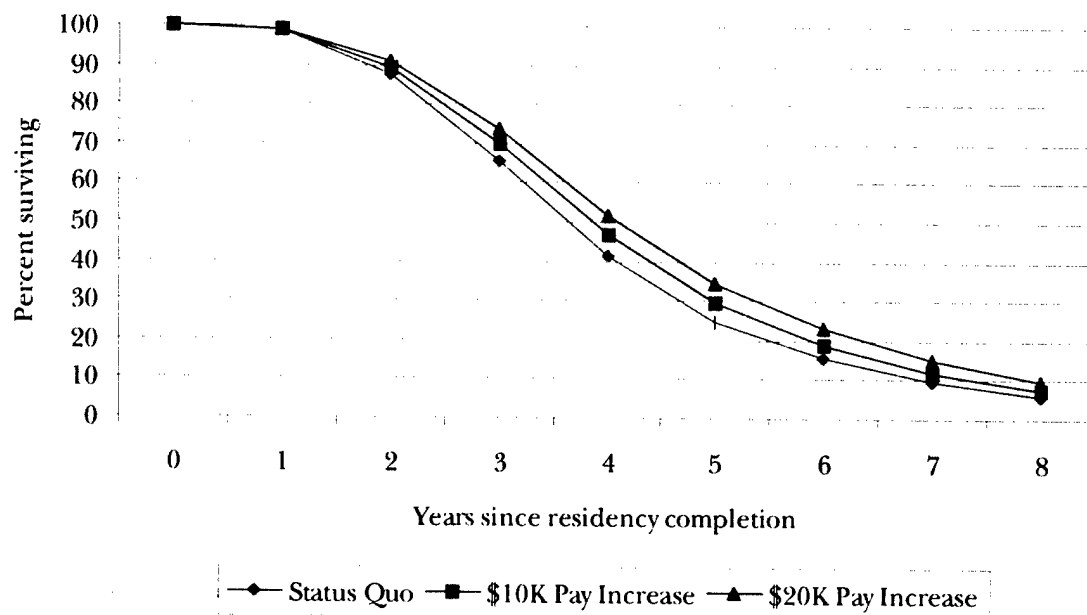
a. Level of significance is 0.95.

b. This is significant at only the 0.92 level.

In figure 13, we see that our model predicts that \$10,000 and \$20,000 pay increases would modestly increase the retention/survival of military anesthesiologists. Again, like the surgeons, the pay gaps among this specialty averaged over \$100,000, so we are not surprised to see a relatively small impact of pay increases in the \$10,000–\$20,000 range.

An interesting result here is that AFHPSP direct accessions do not display higher retention than either AFHPSP deferred accessions or direct accessions. USUHS accessions, however, still exhibit the highest retention rate. The expected post-residency career length of a USUHS accession is 6.6 years; for all other accession sources, it is about 4.3 years.

Figure 13. The predicted effect of pay increases on the retention of anesthesiologists



Again, the Air Force anesthesiologists tend to have longer careers after residency. The expected post-residency career length in the Air Force is 5.3 years, compared with the Navy and the Army, where they are 4.4 and 4.5 years, respectively. Finally, we again find a very small effect of years remaining toward retirement eligibility.

Duration model results for radiologists and pathologists. In table 39, we present the results of our model for radiologists and pathologists. We remind the reader that we have grouped radiologists and pathologists because they have the same residency lengths and are both ancillary specialists. In this case, we also find a statistically significant relationship between the military-civilian pay differential and retention. Our results indicate that a \$10,000 decrease in the pay gap for radiologists and pathologists would increase expected post-residency career length by about 6.5 percent, from 5.1 to 5.45 years. A \$20,000 decrease would increase it by about 13.5 percent, to 5.8 years. Given the average pay gap of \$100,000 for these specialists, we calculate an elasticity of 0.65, indicating that a 1-percent decrease in the pay gap

would lead to a 0.65-percent increase in post-residency career length.³⁹

Table 39. Effects of explanatory variables on the retention of radiologists and pathologists

Variable	Significant effect on retention ^a
Pay gap	Negative
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	None
USUHS	Positive
Direct	None
Service (Comparison group: Air Force)	
Army	Negative
Navy	None
Years remaining to retirement eligibility	Negative
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

The 95-percent confidence interval estimate of this elasticity is tighter than the one for anesthesiologists, but it is still rather wide, ranging from 0.38 to 0.93. One cannot conclude that the effect of pay on post-residency career length differs, in a statistically significant sense, between radiologists/pathologists and anesthesiologists or even between radiologists/pathologists and surgeons.

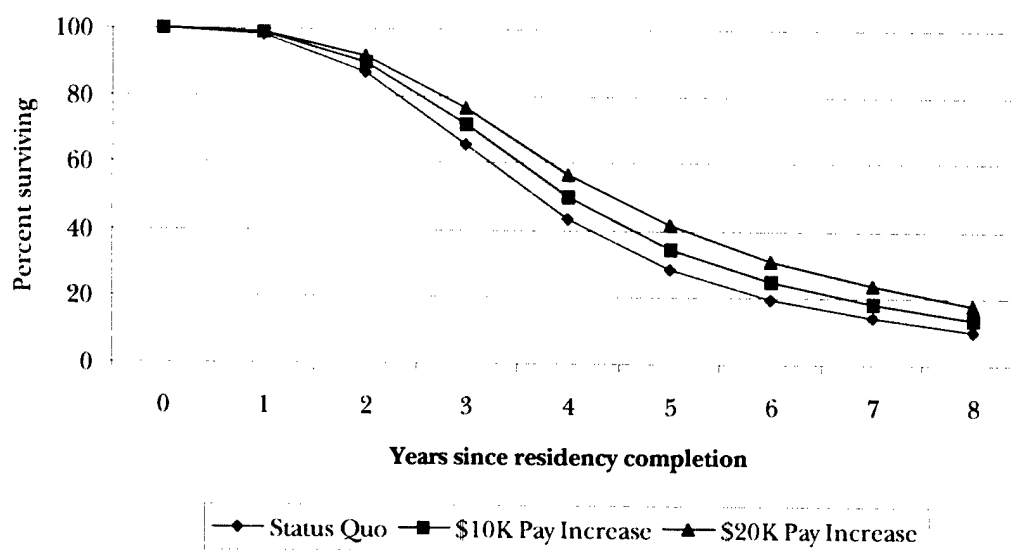
The effect on the survival curves is similar to what we saw for anesthesiology (see figure 14). Again, like the surgeons and anesthesiologists, the pay gaps for these two specialties were quite large; therefore, we are not surprised to see a relatively modest impact of pay increases in the \$10,000 to \$20,000 range.

Again, we find the interesting result that AFHPSP direct accessions do not display higher retention than either AFHPSP deferred (indirect) accessions or direct procurement accessions. We still find that USUHS accessions exhibit the highest retention rate. The expected

39. The *retention* elasticity with respect to the pay gap for radiologists/pathologists is 0.36.

post-residency career length of a USUHS accession is 8.5 years, whereas it is about 4.4 years for all other accessions. This is a difference of about 93 percent.

Figure 14. The predicted effect of pay increases on the retention of radiologists and pathologists



In terms of Service, we find that retention for Navy radiologists and pathologists does not differ from retention in the Air Force. Retention in the Army is lower. The average post-residency career for one of these specialists in the Air Force or Navy is 12 percent longer than that of one of these specialists in the Army—5.25 versus 4.7 years. We again find an effect of years to retirement eligibility on retention, but it is very small. Our results indicate that, if radiologists and pathologists came out of their residencies 1 year closer to retirement eligibility, expected career length would increase by only about 2.5 weeks, from 5.1 to 5.16 years.

Duration model results for psychiatrists. In table 40, we present the results of our model for psychiatrists. In this case, we find a statistically significant relationship between the military-civilian pay differential and retention. Our results indicate that a \$10,000 pay increase for psychiatrists would increase expected post-residency career length by

nearly 7 percent, from 5.1 to 5.45 years. A \$20,000 pay increase would increase it by nearly 14 percent to 5.8 years. Therefore, the effects would be about the same size as the effects of the pay increases on radiology and pathology retention.

Table 40. Effects of explanatory variables on the retention of psychiatrists

Variable	Significant effect on retention ^a
Pay gap	Negative
Accession source (Comparison group: AFHPSP Deferred)	
AFHPSP Direct	None
USUHS	Positive
Direct	None
Service (Comparison group: Air Force)	
Army	Negative
Navy	None
Years remaining to retirement eligibility	Negative
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

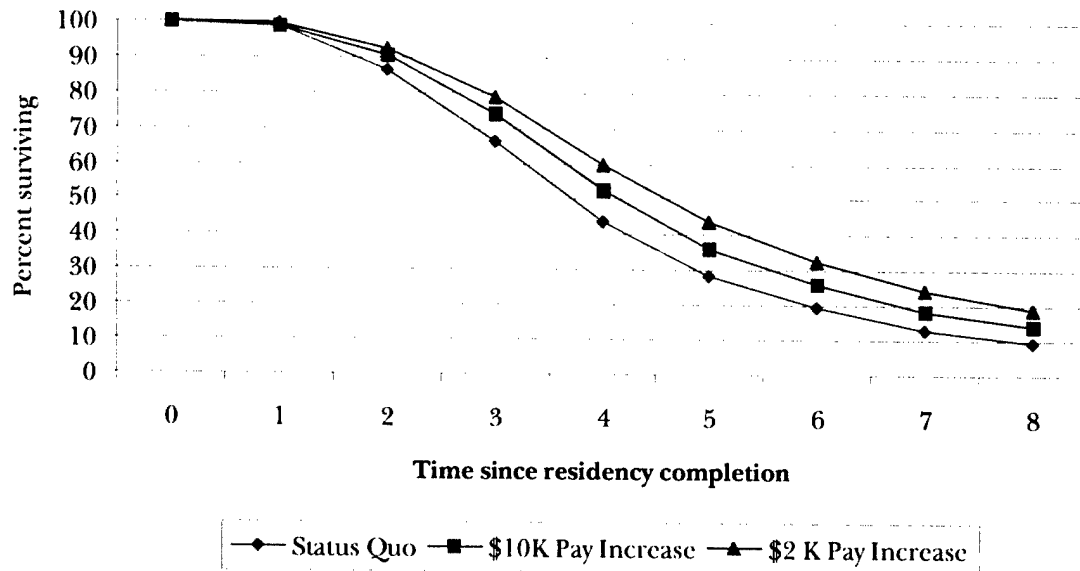
At the same time, these pay increases would make up a greater percentage of the existing average pay gap of roughly \$53,000 for psychiatrists than for radiologists and pathologists. Taking this into account, we calculate an elasticity of roughly 0.3 for psychiatrists, indicating that a 1-percent decrease in the military-civilian pay gap for these specialists would lead to a 0.3-percent increase in post-residency career length.⁴⁰ As with the other specialties, the 95-percent confidence interval for this elasticity is rather wide, ranging from 0.04 to 0.55. Therefore, although on the surface it appears that psychiatrists are less sensitive than anesthesiologists, radiologists, and pathologists to changes in the military-civilian pay gap, the difference in sensitivity is not significant statistically.

The effect on the survival curves is very similar to what we saw for radiology and pathology (see figure 15). Here we see a significant effect on survival. For instance, the \$10,000 pay increase would

40. The *retention* elasticity with respect to the pay gap for psychiatrists is 0.23.

increase the 5-year survival rate from about 28 to 36 percent, and the \$20,000 pay increase would improve this rate to about 44 percent.

Figure 15. The predicted effect of pay increases on the retention of psychiatrists



As far as accession source is concerned, we do not find significant differences in retention among those psychiatrists accessed through AFHPSP direct or AFHPSP deferred and those accessed directly. The USUHS accessions still exhibit the highest retention. The expected post-residency career length of a USUHS accession is about 7.9 years, which is about 75 percent higher than the 4.5-year expected career length of all other accessions.

As far as Service is concerned, we find that retention for Navy psychiatrists does not differ from retention in the Air Force. Retention in the Army is lower. The average post-residency career for an Air Force or Navy psychiatrist is 17 percent longer than that of an Army psychiatrist—5.5 as compared to 4.7 years. We find an effect of years to retirement eligibility on retention, but again it is very small. Our results indicate that, if psychiatrists finished their residencies 1 year closer to retirement eligibility, expected post-residency career length would increase by only about 8 weeks, from 5.1 to 5.25 years.

Duration model results for other specialists. In this section, we focus on the remaining specialists: dermatologists, neurologists, emergency medicine physicians, and physical medicine physicians. In table 41, we present the results of this model. For these specialists, we can find no significant relationship between the military-civilian pay differential and retention behavior, despite a relatively high average pay differential of roughly \$73,000. Even looking at some of these specialties separately (when the number of subjects is sufficient) does not yield any significant results. The reader should note, however that the standard error of the elasticity estimate is large, which is the reason why we find no significant effect. If we were to ignore this problem, we would generate a point estimate of the elasticity to be 0.14. Even if we assume this point estimate is significantly different from zero, it still indicates that these specialists are insensitive to pay changes.

Table 41. Effects of explanatory variables on the retention of remaining specialists

Variable	Significant effect on retention ^a
Pay gap	None
Accession source (Comparison group: AFHPSP Indirect)	
AFHPSP Direct	Positive
USUHS	Positive
Direct	None
Service (Comparison group: Air Force)	
Army	Negative
Navy	None
Years remaining to retirement eligibility	None
Female (Gender comparison group: male)	None

a. Level of significance is 0.95.

As was the case for the other specialties, we again find that many of our control variables have an impact. For instance, USUHS accessions have much lower attrition rates than any other types of accessions. Our results indicate that the expected post-residency career length of a USUHS accession into one of these specialties is 7.25 years, whereas the expected post-residency career lengths of the other types of accessions range from 3.8 years for direct accessions and AFHPSP deferred

accessions to 4.5 years for AFHPSP direct accessions. This means that a USUHS accession has a post-residency career that is 60 percent longer than that of an AFHPSP direct accession and 90 percent longer than that of a direct or AFHPSP indirect (deferred) accession.

The only other factor that was statistically significant in this model was Service. Here the expected post-residency career length of specialists in the Navy or Air Force is 27 percent longer than that of one of these specialists in the Army—4.7 as compared to 3.7 years. Neither years to retirement eligibility nor gender was significant in this model.

Summary of the effect of pay on retention

In table 42, we summarize the responsiveness of post-residency career length to changes in the pay gap. In the first two columns, we indicate the responsiveness of post-residency (or, in the case of internal medicine subspecialists, post-fellowship) career length to \$10,000 and \$20,000 decreases in the military-civilian pay gap. Better measures of this sensitivity, however, are the estimated ranges for the elasticities listed in the third column. These interval estimates indicate that, although there is variation among specialty groups, for the most part, the variation is not statistically significant.

Certainly, it appears that primary care physicians are the least sensitive to changes in the pay gap. This may be explained by the fact that, through self-selection, these physicians tend to be less concerned with income. For example, we already know that they have chosen the least lucrative subspecialty in the general field of medicine. Other specialists—including surgeons, psychiatrists, anesthesiologists, and radiologists and pathologists—appear to be sensitive to changes in the pay gap. Given the interval estimates for these specialists, it is fairly clear that all of these specialists are modestly sensitive to changes in the pay gap. Again, any variation in the elasticities among them is statistically insignificant. Finally, the internal medicine subspecialists appear to be the most sensitive to changes in the pay gap, although the 95-percent confidence interval estimate for the elasticity is fairly wide. For instance, one could not reject the assertion that the elasticity for the internal medicine subspecialists is the same as that for either anesthesiologists or radiologists/pathologists. Overall, the

average career-length elasticity for all 23 specialties considered in this study is 0.25.⁴¹

Table 42. 95-percent confidence interval estimates of the responsiveness of career length to changes in the pay gap

Specialty	Increase in expected career length (%)		Elasticity
	\$10,000 decrease in pay gap	\$20,000 decrease in pay gap	
Primary Care ^a	-2.2, 1.6	-4.5, 3.3	-0.10, 0.07
Internal Medicine Subspecialties	11.6, 28.0	24.5, 65.9	0.72, 1.76
Surgeons	2.0, 3.7	4.1, 7.6	0.22, 0.40
Anesthesiologists	-0.5, 8.8	-1.5, 18.3	-0.04, 0.93
Radiologists/ Pathologists	3.8, 9.3	7.8, 19.4	0.38, 0.93
Psychiatrists	1.0, 12.7	2.1, 27.0	0.04, 0.55
Other Specialists ^{a,b}	-1.6, 5.6	-3.3, 11.4	-0.12, 0.41

a. We found no significant impact of pay on retention for these specialties at the 0.90 level.

b. Other specialists include neurologists, dermatologists, emergency medicine physicians, and physical medicine physicians.

To further investigate and verify our results, we have compared our elasticity estimates with those from a study that CNA conducted in the late 1980s concerning the retention of Navy physicians [24]. That study was very similar to this one in that it estimated the relationship between the military-civilian pay gap and retention over a period of many years.⁴² The most important finding of the study was a statistically significant, but small, relationship between the pay gap and retention. It also found that the sensitivity of retention to the pay gap

41. The average retention elasticity for all 23 specialties is 0.14.

42. Note that, in this study, the researchers estimated retention elasticities like the ones we report in footnotes in this study. We compared our *retention* elasticities with those reported in the previous study [24].

varied by specialty ranging from less than 0.1 for primary care specialties to 0.72 for neurosurgeons. Comparing our *retention* elasticity estimates to these, we find that ours generally fall in this range, especially when we consider the confidence intervals. In short, the results of each study tell very similar stories. First, evidence suggests that decreasing the pay gap would have a positive, but small, impact on retention.⁴³ Second, the responsiveness to the military-civilian pay gap is not the same for each specialty, and primary care physicians are the least responsive of all of the physician groups.

In addition to comparing our results with those in previous research, we have also modeled the survival of Navy physicians after having met their initial residency active duty obligation. We were unable to do this for all three Services because of deficiencies in the DMDC data (see pages 66-67). Instead, we modeled the survival of physicians after exiting their residencies and/or fellowships. It is possible that we did not find a strong relationship between the pay gap and retention because of the limitations in the DMDC data.

For the Navy, however, we were able to identify each physician's initial residency obligated service date using data from the Bureau of Medicine Information System (BUMIS). Therefore, we were able to estimate a more precise retention model for Navy physicians. This model is very similar to the model which we estimated using the DMDC data, except that we now focus on the survival of Navy physicians who became unobligated any time from FY 1992 to FY 1998. We again controlled for such factors as accession source, gender, and years remaining to retirement. We estimated the model for all Navy physicians first and then estimated separate models for primary care physicians, surgeons, anesthesiologists, radiologists and pathologists, psychiatrists, and other specialists (dermatologists, emergency medicine physicians, neurologists, and physical medicine physicians).⁴⁴ We were not

43. In a related study [25], researchers found a modest effect of the Medical Officer Retention Bonus (MORB) on retention in FY 1989.

44. Using the BUMIS data—because we modeled the survival of physicians starting with their initial residency obligated service date—we were able to estimate the model for all specialties pooled together. We could not do this using the DMDC data (see pages 75-76).

able to estimate a separate model for internal medicine subspecialists because of a small sample size.

The 95-percent confidence interval elasticity estimates we obtained using the BUMIS data are even wider than their counterparts obtained using the DMDC data. Still, the fact that the point estimates obtained using BUMIS data all fall well within the 95-percent confidence intervals obtained using DMDC data provides more evidence that the DMDC data problems did not seriously bias our results.

In summary, we have found the following:

- There is no significant relationship between the military-civilian pay gap and career length for primary care specialties, such as family practice, pediatrics, preventive medicine, or general internal medicine. The same is true for dermatology, neurology, emergency medicine, and physical medicine.
- There is a statistically significant relationship between the military-civilian pay gap and career length for surgeons, but this effect is very small. A \$10,000 pay increase would improve expected post-residency career length by only about 3 percent. This indicates an elasticity of 0.32. In other words, decreasing the pay gap by 1 percent would increase career length by 0.32 percent.
- There is a statistically significant relationship between the military-civilian pay gap and career length for anesthesiologists, radiologists, pathologists, and psychiatrists. This relationship is similar to the one we found for surgeons. A \$10,000 pay increase would improve expected post-residency career length by about 4 to 7 percent among these specialists. The elasticities for these specialties range from roughly 0.3 to 0.65, although none are significantly different from the elasticity that we found for surgeons.
- The strongest relationship between the military-civilian pay gap and career length was found for internal medicine subspecialists. A \$10,000 pay increase would improve expected post-residency career length by nearly 20 percent among these specialists. This indicates an elasticity of 1.25. But the interval

estimate for this elasticity ranges from 0.72 to 1.78 and it is not significantly different from the elasticities we found for anesthesiologists or radiologists and pathologists.

- On average, military physicians are modestly sensitive to changes in the military-civilian pay gap. The average career-length elasticity across all of the specialties considered in the preceding analysis is 0.25.
- Accession source has an impact on career length. USUHS accessions typically have much longer post-residency careers than any other types of accessions. This is not surprising, given the longer active duty obligations these accessions carry. Of course, because of the cost of producing a physician under USUHS, this does not necessarily indicate that the Services should increase the number of USUHS accessions. It will be important, in the future, to consider the higher costs of USUHS accessions along with the benefits of better retention.
- For some of the specialties, we found that AFHPSP direct accessions had longer careers after residency than either direct accessions or AFHPSP indirect accessions.
- We found that, for most specialties, military physicians who were closer to retirement eligibility had statistically higher retention, but the magnitude of the effect was generally very small.
- Gender did not affect retention in any of our models.
- The Army typically has the lowest retention and the Air Force typically has the highest retention, especially in the initial years after residency training.

Assessing special pay proposals

Methodology

Before moving on to our assessment of specific physician special pay proposals, we summarize in table 43 what we've found so far. We list those specialties for which we project at least one Service will have a significant readiness and/or manning problem in FY 2003. We break these out by the effect that the military-civilian pay gap has on

retention. In parentheses we list the Services that will have problems, using A for Army, N for Navy, and AF for Air Force. As an example, we found that the Army will have significant problems meeting its readiness and manning goals for general surgeons in FY 2003. At the same time, we found a modest effect of pay on retention for this specialty. We expect the Army to have similar problems meeting its cardiology requirements in FY 2003. In this case, however, we found a stronger relationship between pay and retention, indicating that increased pay may be a more effective solution to this manning problem than it would be for general surgeons.

Table 43. Effect of pay on retention crossed with areas of concern for manning and readiness

Effect of pay	Significant readiness problem	Significant manning problem
None	Emergency medicine (A)	Neurology (A, AF) Family practice (A) Pediatrics (A) Dermatology (A) Emergency Medicine (A) General Internal Med. (AF) Preventive Medicine (AF)
Modest	General surgery (A, N) Plastic surgery (N) Otorhinolaryngology (A) Neurosurgery (A) Anesthesiology (N) Pathology (A) Radiology (A) Psychiatry (A)	General surgery (A) ^a Plastic surgery (N, AF) Otorhinolaryngology (A) Neurosurgery (A) Urology (A, N) Orthopedic surgery (A) OB/GYN (A) Ophthalmology (A) Anesthesiology (A, N, AF) Pathology (A, AF) Radiology (A, N, AF)
Large		Gastroenterology (A, N, AF) Cardiology (A) Hematology/oncology (A)

a. The Navy's readiness requirement for general surgery (205) is much larger than its number of authorized billets (139).

In considering the current pay proposals, we focus on how our projections of FY 2003 physician inventory would change if pay increases were to be in place starting at the beginning of FY 2002. We focus on

projections for those specialties for which our models predict at least some effect of pay on retention. For example, we do not generate new projections for primary care specialists because we found that pay would not have a significant effect on retention. As another example, we do not report projections for Air Force or Navy cardiologists because we have determined that both of these Services should meet their requirements for this specialty without any changes being made.

Proposal 1: Increase entitlement special pays

Under this proposal, all entitlement special pays would be increased by 20 percent. These pays include additional special pay (ASP), variable special pay (VSP), and board certification pay (BCP). The ASP is currently \$15,000 and is paid to all military physicians who are not in residency training. The VSP varies by years of service. We include the values of the VSP for typical military physicians in table 44.

Table 44. Current variable special pay values

Years of service	Variable special pay
1	\$1,500
2-5	\$5,000
6-7	\$12,000
8-9	\$11,500
10-11	\$11,000
12-13	\$10,000
14-17	\$9,000
18 and above	\$8,000

The BCP also varies over time. To be eligible, physicians must be board certified. Physicians receive the following annual amounts, depending on the number of years they have been board certified:

- \$2,500 for 1 or 2 years
- \$3,500 for 3 or 4 years
- \$4,000 for 5 or 6 years
- \$5,000 for 7 to 10 years
- \$6,000 for more than 10 years.

The values of these special pays have not changed in nominal terms since 1990, meaning they have lost about one-quarter of their value over the past 11 years. The idea of increasing these special pays is to bring them back into line with what they were in 1990 in real terms.

The effect on physician inventories of the proposed increase in entitlement special pays would be negligible. Using our duration model results, we found that a 20-percent increase in these pays would raise pay by \$6,600 at most. This increase would decrease attrition among surgeons by about 3 percent, by 5.5 percent for anesthesiologists, by 8 percent for radiologists/pathologists, and by 9 percent for psychiatrists. We did find a large effect among internal medicine subspecialists, whose attrition would fall by about 20 percent. These decreases in attrition translate into very small increases in projected inventories for FY 2003 (table 45). Overall, it would increase the inventories in these undermanned specialties by 2.5 percent—from 1,859 to 1,903. Therefore, it is extremely unlikely that increasing the entitlement special pays by 20 percent would be of much help to the Services in solving their specific short-run manning and readiness problems.

Table 45. Changes in projected FY 2003 inventories due to 20-percent increase in entitlement special pays^a

Specialty	Army		Navy		Air Force	
	Original projection	New projection	Original projection	New projection	Original projection	New projection
General surgery	185	187	125	126		
Plastic surgery	—	—	5	5	10	11
Otolaryngology	44	45				
Neurosurgery	16	16				
Urology	48	49	28	28		
OB/GYN	153	155				
Ophthalmology	69	69				
Orthopedic surgery	144	146				
Pathology	90	92			51	53
Anesthesiology	92	95	129	131	59	61
Radiology	127	131	99	101	97	100
Psychiatry	133	137				
Gastroenterology	44	46	19	20	16	17
Cardiology	50	53				
Hematology/oncology	26	29				

a. The change in projected FY03 inventories for all undermanned specialties was from 1,859 to 1,903.

Proposal 2: Increase caps on discretionary special pays

Under this proposal, the cap on the incentive special pay (ISP) would be increased by 25 percent, from \$36,000 to \$45,000, and the cap on the multiyear special pay (MSP) would be increased by 43 percent, from \$14,000 to \$20,000. This proposal looks more promising for two reasons:

1. It would increase the authority for pays that can be better targeted to specialties where there are more serious manning and readiness problems.
2. Certain specialties, such as anesthesiology and radiology, are being compensated at the current ISP and MSP caps and are experiencing manning and readiness difficulties.

The drawback of this proposal is that, given our earlier results on the sensitivity of retention to pay, we would not expect this to greatly improve the situation for either anesthesiologists or radiologists, for example.⁴⁵

Increasing the caps—and paying anesthesiologists at the new caps over the next 2 years—would increase the total inventory projected for FY 2003 from 284 to 298. This is an increase of only 14 anesthesiologists, and it would do little to ease the manning shortages. At the same time, this would cost DoD roughly \$4.4 million over the next 2 years, assuming that new accessions in FY02 and FY03 were not eligible for the discretionary pays yet. That's a savings of about \$315,000 per additional anesthesiologist retained above and beyond current salary costs, again over 2 years.

The story is very similar for radiologists. Increasing their pay to the new caps would increase the total inventory projected for FY 2003 from 329 to 350. This increase of 21 radiologists would be quite welcome, but the cost would be \$5.7 million over 2 years. This amounts to \$270,000 per radiologist saved above and beyond current salary costs.

45. We focus here on anesthesiologists and radiologists because their discretionary special pays are already at the current caps, and each specialty is currently undermanned across all three Services.

These types of results make sense when one considers the sizes of some of the pay gaps, especially among those physicians who are at the caps of the incentive special pays. Anesthesiologists in the military typically make roughly \$100,000 less than their counterparts in the private sector. A \$9,000 to \$15,000 raise (depending on how many years the physician decides to sign on for) is unlikely to change the retention behavior of many of these physicians. The story is very similar for other physicians who are being paid at the current caps, such as radiologists, neurological surgeons, orthopedic surgeons, and other surgical subspecialists.

It is also interesting to note that the current caps leave plenty of room to increase the discretionary special pays for those specialists who are most likely to be sensitive to a pay increase: gastroenterologists, cardiologists, and hematologists/oncologists. We focus on gastroenterologists here because this is the subspecialty for which we project manning shortages for all three Services. Using the results of our duration model, we find that increasing the gastroenterology to the current cap—from \$23,000 to \$36,000—would increase projected FY 2003 inventories from 79 to 87, allowing all three Services to man their billets at least at 90 percent. The cost would still be high, roughly \$1.13 million, or \$140,000 per physician saved above and beyond current salary costs.

Proposal 3: Grant accession bonus authority

Under this proposal, money would be put aside to provide bonuses to fully trained specialists who access into the armed services. Currently, under the FAP, the DHP offers \$36,000 per year in grants and stipends to medical residents in exchange for a 4-year active-duty obligation at the completion of training. This proposal would expand the ways in which the Services could access fully trained physicians into the military. Our results on the expense of retaining additional military physicians indicate that this might be a more cost-effective way to increase inventories in some specialties, at least in the short run.

Proposal 4: Index entitlement special pays

Under this proposal, the ASP, VSP, and BCP would be increased each year by the rate of increase in regular military compensation. The motivation behind this is the notion that these pays lose their value in

real terms over time in the absence of indexing, leading to reduced pay parity and widening pay gaps. Because indexing these special pays would have a negligible effect on retention, while placing a binding constraint on the Services, we recommend that these pays be reviewed every 3 years to determine if inflation adjustments are necessary.

Proposal 5: Offer critical skills retention bonus (CSRB)

Another potential way to improve retention is to offer bonuses to military personnel in specialties for which the Services have difficulty meeting manning or readiness requirements. In many ways, this is like increasing the ISP and MSPs, except that this money would come from another source. One drawback is that the MHS would have to compete with line communities for funds from a limited CSRB budget. Another is the \$200,000 per career limit. Still, authorizing the CSRB for physicians would be very useful because it would allow the Service medical departments to at least compete for funds that would allow them to offer much bigger incentives to physicians in problem specialties. As we have found, in many cases, it will take much more money than is authorized through the current special pays to affect retention in any meaningful way.

Recommendations on current pay proposals

In this section, we have evaluated several proposed changes to physician special pays. Given the results of our retention analyses, we have estimated the potential impact of some of these proposals on future physician inventory levels. Our recommendations follow:

- We recommend a 20-percent increase in entitlement special pay despite the fact that increasing entitlement special pays would have only a marginal effect on retention and projected inventories. This 20-percentage-point increase in *all* the entitlement special pays would bring them back into line with what they were worth in comparison to civilian sector norms in FY 1991. We support this increase as well because we believe that the nature and conditions of work have changed over the last decade and that increasing emphasis will be placed on productivity and patient outcomes.
- We recommend increasing the cap on the ISP by 25 percent to \$45,000 and on the MSP by 43 percent to \$20,000. These caps

have not been increased since their introduction, and a number of specialties, some of which pose manning and readiness problems, are at the caps. Note, however, that such small increases in pay for certain problem specialties, such as anesthesiology and radiology, will not be a panacea. Increasing retention by even small amounts will cost a significant amount of money.⁴⁶

- Based on our results on the expense of retaining additional military physicians, we recommend giving DoD accession bonus authority.
- Because indexing entitlement special pays would have a negligible effect on retention while placing a binding constraint on the Services, it is our recommendation that these pays be reviewed every 3 years to determine if inflation adjustments are necessary.
- Authorize the CSRB for physicians. It would allow the Service medical departments to compete for funds that would allow them to offer much bigger incentives to physicians in problem specialties. But we are concerned whether the military departments will want to share their CSRB funds with the MHS.

An alternative: Future physician compensation strategies based on performance

Background

As we discussed in earlier sections of this study, DoD is attempting to build a more performance-based health system that will better

46. We have also considered the possibility of doing away with the ISP and just offering 2-, 3-, and 4-year MSPs. These new MSPs would have the ISP values rolled into them. For instance, anesthesiologists face the following choices: (1) attrite, (2) reenlist for 1 year and take the ISP at \$36,000 per year, (3) reenlist for 2 years and take the ISP and the 2-year MSP at \$48,000 per year, (4) reenlist for 3 years and take the ISP and 3-year MSP at \$49,000 per year, or (5) reenlist for 4 years and take the ISP and 4-year MSP at \$50,000 per year. The advantage of taking away choice 2 is that it would help with personnel planning. The problem is that many physicians who are on the margin might decide to leave rather than sign a multiyear contract. Our sense is that this would be the case, given that most physicians do not take the MSPs, but our data were not rich enough to consider this in any detail.

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 physicians are unhappy with their working environment and compensation, the likelihood of their embracing, let alone leading, these new programs significantly diminishes. Conversely, DoD does not want to retain all clinicians, but it does want to retain the ones who embrace the values and objectives of increasing productivity while maintaining positive patient outcomes.

What pay practices are being used in the private sector for physicians?

As we reported in the first phase of this study, it helps DoD to be aware of the pay practices being used for the private-sector physician because the MHS may be more likely to lose those physicians that believe that this type of compensation structure would benefit them more than the one the military uses. Successful health care organizations have developed pay and performance management programs that reflect their values and business strategies, and a flexible job evaluation system that is indicative of the new structures, teams, and work processes. These employers have also communicated their expectations and organizational objectives to all employees.⁴⁷

The most common reasons for adopting new compensation plans are as follows:

- Encourage and reward improvements in productivity and quality
- Align pay with business results

47. In addition to monitoring the civilian pay practices, DoD must closely track nationwide trends. When CNA conducted the Provider Satisfaction Study (and interviewed over 300 Navy physicians), many were aware that the implementation of managed care had resulted in a loss of autonomy and income for many of their civilian counterparts. Several Navy physicians reported taking a "wait and see" posture, by signing 1-year ISP contracts, to see if the current patients' rights bill would be successful in creating a more facilitating environment for all physicians.

- Focus attention on changing goals and/or performance
- Reduce the “entitlement” element of current pay increases
- Communicate new internal values to employees.

Three trends are worth noting:

- Performance of an organization or department, and quality⁴⁸ were the most commonly used measures in Health Maintenance Organizations (HMOs) in 1999 for determining physician payouts [26].
- Blue Cross of California, one of the nation’s largest health insurers, recently announced that it would pay bonuses to doctors serving its HMO members based on patient satisfaction and other quality standards [27].
- Several health care organizations are adopting an economic profit metric, such as the relative value unit (RVU),⁴⁹ as a key measure of performance [28].

What can the MHS use to measure physician performance?

DoD, in the decade ahead, will place increasing pressure on its uniformed health care professionals’ peacetime benefit role with respect to productivity, positive patient outcomes, and benchmarking their performance against their private-sector peers. Let’s now briefly review two existing sources that may help the MHS begin evaluating the collective performance of its uniformed providers and possibly developing a component of compensation based on these factors.

48. Most private-sector managed care organizations use the Health Plan Employer Data and Information Set (HEDIS) to measure quality. HEDIS is a collection of performance measures set by the National Committee for Quality Assurance.

49. Since 1 January 1992, Medicare has paid for physician services under section 1848 of the Social Security Act (the Act). The Act requires that payments under the fee schedule be based on national uniform relative value units (RVUs) based on the resources used in furnishing a service.

TRICARE annual evaluation

As we reported earlier, the TRICARE annual evaluation process provides a reasonable framework for assessing how well stated goals are being realized [15]. Findings from the FY 2000 annual evaluation provides DoD a tool to begin isolating and evaluating MHS providers' performance compared with their civilian counterparts.⁵⁰

Table 46 shows that those enrolled with a military PCM generally had more favorable attitudes and perceptions of access and quality of health care received. In general, more people are enrolled with military PCMs (75 percent) than their civilian counterparts in the same health plan.

Table 46. Primary Care Manager (PCM) type and Prime enrollee perceptions of TRICARE (proportion of subgroup satisfied—1998, all evaluated regions combined)

Measure ^a	Civilian PCM	Military PCM
Satisfaction with:		
Access to health care if needed	0.74	0.80
Ease of making appointments	0.79	0.77
Outcome of health care	0.84	0.87*
Overall quality of care	0.86	0.88
Believe that:		
Prime improves access to care	0.70	0.74*
Prime improves access to preventive care	0.72	0.75*
It is easier to see specialist under Prime	0.42	0.53*
It is easier to get phone advice under Prime	0.61	0.72*
Prime saves money for care	0.76	0.78*
Would recommend Prime to a friend	0.76	0.88*

a. Proportions based on those expressing an opinion other than "don't know."

* Statistically significant difference; $p < 0.05$.

Relative value units

Medicare has moved to a physician reimbursement scheme based on the resources used in the provision of specific professional services.

50. Data for the comparison come from the 1998 DoD beneficiary survey.

For more than 10,000 physician services, an RVU can be calculated that, when adjusted geographically for a local market basket of costs and then multiplied by a *conversion factor*, leads to the payment for the services performed.

The major benefit of using the RVU is that it has always been difficult to quantify the complexity of the services offered to patients and/or the degree of resources required in providing that service. A measure that does this is an extremely valuable tool. For that reason, both in the civilian health care field as well as more recently within DoD, organizations analyzing the work content of its providers have been turning to the RVU.

In an ongoing study for OASD/HA and TMA, CNA is calculating the professional component of total RVUs (not weighted by the conversion factor) in order to compare the values across specialties, across facilities, or between the direct care system and CHAMPUS. Without going through all of the complications needed to address issues of comparability between the direct care and CHAMPUS data, one basic rule we followed was to weight the procedure with the highest RVU "score" by 100 percent and all others by 50 percent. This simple rule is currently used by HA when it calculates RVUs for the direct care system and also approximates the method used by the Centers for Medicare and Medicaid Services (previously known as HCFA) in its rules for civilian providers submitting claims for payments.⁵¹

Table 47 provides some examples of the total RVU (i.e., the sum of the work, practice expense, and malpractice components) for a

51. A given health care record can show multiple procedures that were provided, even on a single visit. On the DoD standard ambulatory data record (SADR), the provider must fill in a Current Procedure Terminology (CPT-4 code) from the evaluation and management (E&M) chapter but can also add 4 other procedure codes. Therefore, one might find a CPT-4 from the E&M chapter as well as 1 or more from the surgical chapters. On the professional file of the Health Care Service Record (HCSR) used to document provider CHAMPUS claims, there can be as many as 25 procedures associated with a single visit. *The norm is much less, but the point is that there are often more than 1.* Do all procedures count equally? The answer is no, and there are other factors that can reduce the RVU even further. Modifiers are often associated with specific codes that can change the value. There is an adjustment for multiple procedures (modifier 51) that can signify changing the payment for the services provided.

selected number of specialties. The values shown are benchmarks from a survey of physicians undertaken by the Medical Group Management Association (MGMA). They are based on a combination of ambulatory and hospital encounters as well as inpatient and outpatient surgeries.

Table 47. Medical Group Management Association total RVUs by specialty

Specialty	Percentile		
	25th	Median	75th
Allergy	4,966	7,718	9,211
Cardiology	10,886	14,596	19,563
Dermatology	9,531	12,031	16,052
Family practice	5,438	6,658	8,366
Gastroenterology	11,637	13,421	16,007
General surgery	9,024	10,901	13,715
OB/GYN	9,169	12,248	14,655
Orthopedic surgery	10,823	14,126	17,885
ENT	9,415	12,442	15,291
Pediatrics	6,359	7,642	9,453
Urology	9,061	12,198	15,130

As we indicated earlier, to determine payment, one would have to adjust for geographical cost differences and then multiply by the conversion factor, but the basic pattern would still be obtained. Thus, in general, the median cardiologist would receive more than twice that of an allergist, a bit more than dermatologists, and about the same as an orthopedic surgeon. However, we've included in the table the 25th and 75th percentiles to provide a range for each specialty. Not every gastroenterologist will have a higher RVU, and therefore higher remuneration, than every cardiologist or pediatrician. It depends on the nature of the work they are performing. Those physicians performing less complex or resource-intensive work are likely to receive less.

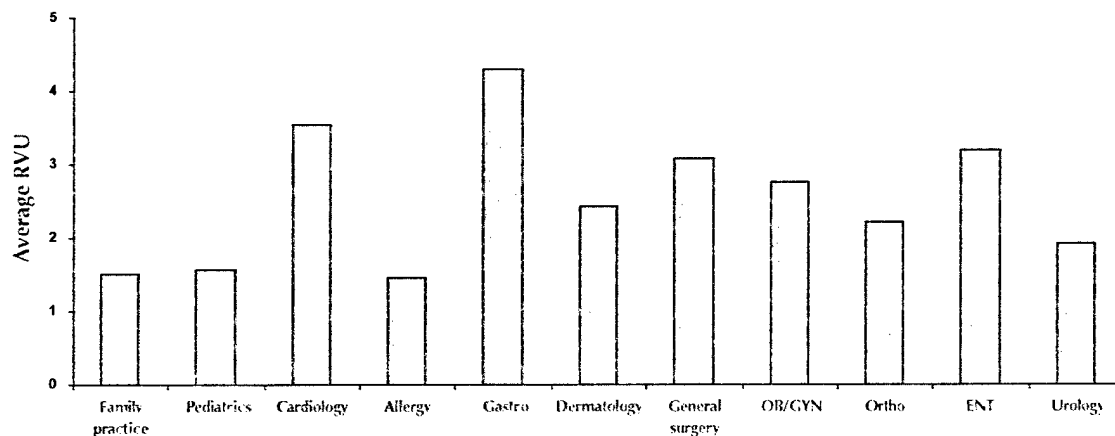
In our work, we didn't follow the benchmarks precisely because we did not want to include inpatient surgery in our calculation of the RVU.⁵² CNA created an RVU measure of the outpatient workload of

52. It would be difficult, if not impossible, to do because the direct care inpatient records have the ICD-9 procedure codes, not the CPT-4 codes.

physicians and non-physician providers both in the direct care system and CHAMPUS. Because there are no full-time-equivalent physician counts in CHAMPUS, we created an average RVU by calculating the outpatient totals and then dividing by the sum of all visits (in the direct care system, all visits would be defined as a hospital encounter because of the nature of an MTF) plus procedures.

Figure 16 presents an example of our calculated RVU values for Naval Medical Center (NMC), San Diego. These values show the relative differences across specialties derived from the combination of visits and procedures undertaken by San Diego physicians. The pattern is similar to what we show in table 46. Gastroenterologists have the highest RVU value, followed closely by cardiologists. We do see some slight difference in the patterns observed in table 46. Orthopedic surgeons at San Diego have a lower average RVU value than do ENT physicians or OB/GYNs. One can't presume that the orthopedic surgeons don't want to perform the more complex procedures. To some extent, they see more sprains and low-back strains than in the civilian world, so they may have a lower RVU than their civilian counterparts. Moreover, one might expect general surgeons at a large teaching facility to see less complex cases because of the availability of subspecialists, such as colon-rectal and cardiothoracic surgeons.

Figure 16. Naval Medical Center, San Diego RVU values, by specialty



We feel that the MHS should begin exploring whether it wants to provide its health care professionals, in the aggregate, special bonuses based on productivity and patient satisfaction outcomes.

Conclusions

In response to DoD's desire to build a more performance-based health management program, we recommend adding two factors to the uniformed physician annual pay review process—patient satisfaction and productivity.⁵³ Why? Because it conveys to both frontline physicians and policy-makers the concept of *value* of achieving workforce objectives and begins integrating DoD's compensation philosophy with performance.

Physician data management

As we discussed earlier, many of the data fields contained in the DMDC historical tapes were missing or deficient. It is imperative that the services and DMDC meticulously maintain several data fields to enable them to effectively monitor physician retention. It is critical that the following uniformed physician data fields be accurately captured and maintained:⁵⁴

- Accession source
 - Active duty obligation associated with accession source
 - Any additional active obligation from any other subsidized program
- Residency or fellowship training program length
 - Active duty obligation associated with training program.

53. Congress authorizes the DoD to offer financial incentives to uniformed physicians to attract and retain the desired force structure. A policy board, the Flag Officer Review Board, annually reviews physician manning, civilian income data, and MHS requirements to determine the MSP and ISP plan rates that will be offered to uniformed physicians.

54. Many of these data fields are currently missing or are overwritten.

We also recommend that TMA and the Service Special Pay Officers track and record the number of eligible uniformed specialists accepting (and for what length) or declining MSP contracts. This information should be reported to the medical corps personnel planners annually as it is a potential signal of an individual specialist's military career intentions. Moreover, this process would provide DoD and policy-makers quantifiable data on the effectiveness of its existing compensation strategies.

By correctly recording, isolating, and tracking these data fields, policy-makers can begin monitoring uniformed physician retention. This will allow DoD and the Services to:

- Establish a retention rate goal—at critical military career junctures—when a specialist is most likely to be at stay-leave military decision points based on the predominant accession source and career (training) pattern.
- Closely track and record retention rates at the individual's stay-leave decision to determine if the retention goal is being met.
- Strengthen their projections of the number and types of residency or fellowship "starts" that are needed to be placed in the "training pipeline" today to meet tomorrow's needs.
- Adjust their special pays and accession sources—based on the retention results for a particular specialty or accession program—to shape the retention and force structure needs that are not being met with the current compensation or accession plan.

Findings

Our analyses of 23 military physician specialties led to the following findings:

- The number of uniformed physicians in these specialties fell by 8 percent from FY 1991 to FY 2000, but the paygrade distribution stayed fairly constant over this same time period.
- In comparing projected inventories to future manning and readiness requirements, we found three problem areas:

- The Army is unlikely to meet its readiness requirements in emergency medicine, general surgery, otorhinolaryngology, neurosurgery, pathology, radiology, and psychiatry.
- The Navy is unlikely to meet its readiness requirements in general surgery, plastic surgery, and anesthesiology.
- All three Services are unlikely to meet manning requirements in anesthesiology, radiology, and gastroenterology.
- We find no significant relationship between the military-civilian pay gap and career length for such primary care specialties as family practice, pediatrics, preventive medicine, or general internal medicine. The same is true for dermatology, neurology, emergency medicine, and physical medicine.
- There is a statistically significant relationship between the military-civilian pay gap and career length for surgeons, but this effect is very small. A \$10,000 pay increase would improve expected post-residency career length by only about 3 percent.
- There is a statistically significant relationship between the military-civilian pay gap and career length for anesthesiologists, radiologists, pathologists, and psychiatrists. The magnitude of this effect is larger than the one we found for surgeons. A \$10,000 pay increase would improve expected post-residency career length by about 4 to 7 percent among these specialists.
- The strongest relationship between the military-civilian pay gap and career length is for internal medicine subspecialists. A \$10,000 pay increase would improve expected post-residency career length by nearly 20 percent among these specialists. One should note, however, that this effect is not estimated very precisely. It is still highly likely that the pay gap matters more to these specialists than to other specialists.
- On average, military physicians are modestly sensitive to changes in the military-civilian pay gap. The average career-length elasticity across all of the specialties considered in the preceding analysis is 0.25.

- Accession source has an impact on career length. USUHS accessions typically have much longer careers after residency than any other types of accessions. For some of the specialties, AFHPSP direct accessions had longer post-residency careers than either direct accessions or AFHPSP deferred (indirect) accessions.
- Military physicians who are closer to retirement eligibility have statistically higher retention, but the magnitude of the effect is generally very small.
- There is no relationship between gender and retention.
- The Army typically has the lowest retention and the Air Force typically has the highest retention, especially in the initial years after completion of training.

Recommendations

Given the results of our analyses, we make the following recommendations regarding current military physician pay proposals and alternatives, as well as data management:

- Although increasing entitlement special pays would have only a marginal effect on retention and projected inventories, we recommend an increase of 20 percent. Such an increase would bring these special pays back into line with what they were worth in comparison to civilian sector norms in FY 1991.
- We recommend increasing the cap on the ISP by 25 percent to \$45,000 and on the MSP by 43 percent to \$20,000. The caps on the ISP and MSPs have not been increased since their introduction, and a number of specialties, some of which pose manning and readiness problems, are at the ISP and MSP caps. We note, however, that such small increases in pay for certain problem specialties, such as anesthesiology and radiology, will not be a panacea. Increasing retention by even small amounts will cost a significant amount of money.
- Grant accession bonus authority for physicians. Our results on the expense of retaining additional military physicians indicate that increasing FAP accessions or offering a large signing bonus

to trained specialists might be a more cost-effective way to increase inventories in some specialties, at least in the short run.

- Because indexing entitlement special pays would have a negligible effect on retention while placing a binding constraint on the Services, it is our recommendation that these pays be reviewed every 3 years to determine if inflation adjustments are necessary.
- Authorize the CSRB for physicians. This would be very useful because it would allow the Service medical departments to compete for funds that would allow them to offer much bigger incentives to physicians in problem specialties.
- In response to DoD's desire to build a more performance-based health management program, we recommend adding two additional factors into the uniformed physician annual pay review process—patient satisfaction and productivity. It conveys to both frontline physicians and policy-makers the concept of *value* of achieving workforce objectives and begins integrating DoD's compensation philosophy with performance.
- The DMDC data are deficient for determining active duty obligations. To establish retention rate goals, track retention rates, and adjust special pays and accession sources to better meet their goals, it is imperative that the Services and DMDC meticulously maintain several data fields to enable them to effectively monitor physician retention. It is critical that the following uniformed physician data fields be accurately captured and maintained:
 - Accession source
 - Active duty obligation associated with accession source
 - Any additional active obligation from any other subsidized program
 - Residency or fellowship training program length
 - Active duty obligation associated with training program.

Let's now focus our attention on assessing the retention and adequacy of special pays and accession bonuses for the dental corps.

Dentists

Introduction

In phase I of the Health Professions' Retention-Accession Incentive Study (HPRAIS), we compared cash compensation of uniformed dentists to dentists' earnings in the private sector.⁵⁵ Our analysis showed that the uniformed-civilian pay gap existed at every career juncture and that this pay gap was greater for specialists than for general dentists.⁵⁶

Phase II expands on the findings of phase I and examines the MHS's ability to meet its dental corps personnel requirements by looking at retention patterns, accessions, years of experience, billet authorizations, readiness requirements, paygrade distribution, and the effect of pay on retention. Given the findings of phase II, we explore in phase III the adequacy of existing special pays and accession bonuses. To do this, we first examine the structure of and changes in the dental corps over the last decade.

Force structure

Inventory

One striking change in the dental corps over the last decade is the dramatic planned reduction in the size of the MHS dentist corps. The number of uniformed dentists fell from 4,736 in FY 1991 to 3,416 by

55. Reference [2] contains the results of the compensation comparisons of selected uniformed and private-sector dentists.

56. Reference [2] shows that military-civilian pay gaps of approximately \$35,000, \$34,000, and \$48,000 exist for general dentists with 1-5, 6-10, and 11-15 years of practice, respectively. For dental specialists with 11-15 years of practice, the pay gap is about \$87,000.

FY 2000, a 28-percent reduction in total inventory (see table 48).⁵⁷ The Army experienced the most significant drawdown, a 40-percent decrease in inventory over the past 10 years. Air Force dentists declined by 25 percent, and the Navy experienced the smallest reduction at 19 percent.

Table 48. MHS dental corps inventory, by Service (FY 1991 through FY 2000)

Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	1,622	1,573	1,429	1,278	1,133	1,094	1,045	1,012	1,002	976
Navy	1,665	1,590	1,503	1,464	1,387	1,344	1,329	1,336	1,331	1,351
Air Force	1,449	1,380	1,270	1,201	1,165	1,120	1,120	1,174	1,125	1,089
MHS Total	4,736	4,543	4,202	3,943	3,685	3,558	3,494	3,522	3,458	3,416

As shown in table 49, the drawdown in each Service is not equally spread between specialists and general dentists. Overall, the number of specialists in the MHS fell 13 percent, while the number of general dentists fell 38 percent. Only in the Air Force was the decline in the number of specialists and general dentists the same—25 percent for each between FY 1991 and FY 2000. In the Army, the number of specialists fell 29 percent, while the number of general dentists fell even more, 54 percent, over the same period. Only in the Navy was the number of specialists greater in FY 2000 than in FY 1991. Over this period the number of Navy specialists grew 27 percent from 522 to 662. Despite the growth in the number of Navy specialists, the number of general dentists in the Navy fell 40 percent between FY 1991 and FY 2000.

In addition to the variation in the overall percentage drawdown in the dental corps for each Service, the percentage drawdown varies by specialty as well. The number of endodontists in the Army and the Air Force fell 22 and 58 percent, respectively, while it increased 5 percent in the Navy. Similarly for pedodontists, the number fell 57 percent in the Army and 17 percent in the Air Force, while it rose 7 percent in

57. The reported numbers in our analysis are based on the DMDC personnel tapes and, because of discrepancies (e.g., duplicate records), may vary from the HMPDS number cited in earlier sections of this study.

the Navy. Overall, the Navy had five specialties with greater end-strength in FY 2000 than in FY 1991. The Army had one specialty with greater endstrength, and the Air Force had no specialties with greater endstrength in FY 2000 than in FY 1991.

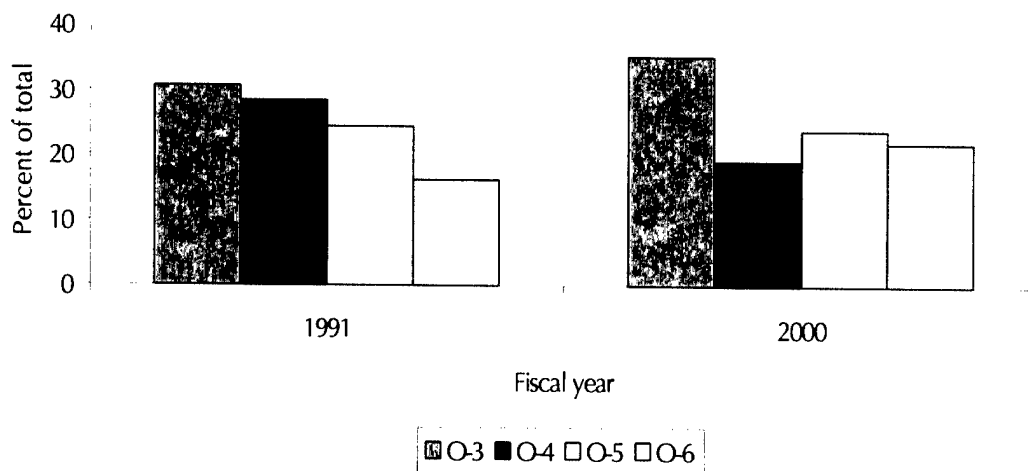
Table 49. MHS dental corps inventory, by Service and specialty (FY 1991 and FY 2000)

Service and specialty	Specialists								Total special.	General dentists
	Endo.	Oral path.	Oral surg.	Ortho.	Pedo.	Perio.	Prost.	Comp. oper.		
MHS total										
FY 1991	165	62	254	124	106	239	346	649	1,945	2,791
FY 2000	131	45	245	82	62	178	222	729	1,694	1,722
Percent chg.	-21	-27	-4	-34	-42	-26	-36	12	-13	-38
Army										
FY 1991	68	24	87	79	74	81	149	347	909	713
FY 2000	53	15	93	33	32	57	90	274	647	329
Percent chg.	-22	-38	7	-58	-57	-30	-40	-21	-29	-54
Navy										
FY 1991	59	27	103	14	14	84	105	116	522	1,143
FY 2000	62	24	109	24	15	68	87	273	662	689
Percent chg.	5	-11	6	71	7	-19	-17	135	27	-40
Air Force										
FY 1991	38	11	64	31	18	74	92	186	514	935
FY 2000	16	6	43	25	15	53	45	182	385	704
Percent chg.	-58	-45	-33	-19	-17	-28	-51	-2	-25	-25

Grade structure

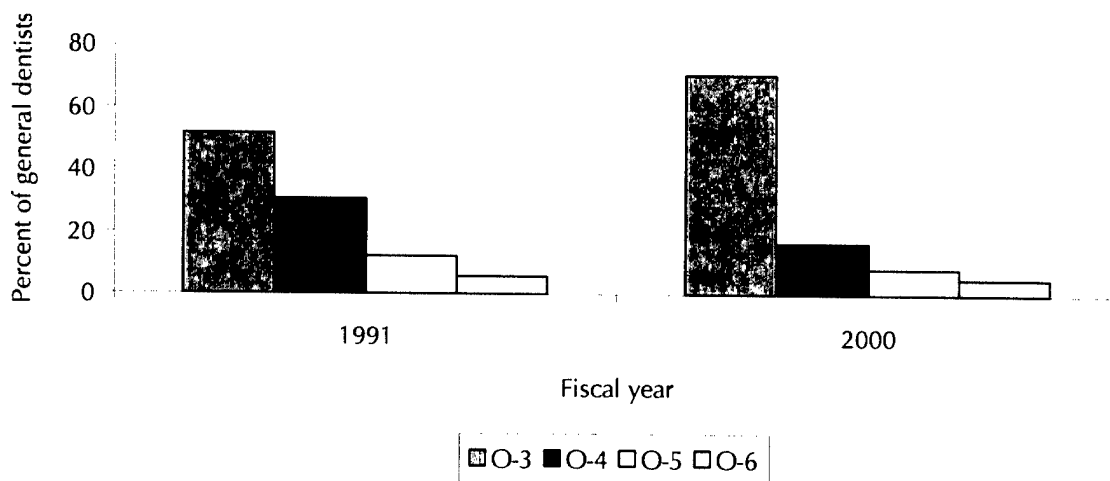
One potential problem that could inhibit the Services' ability to effectively meet both their peacetime benefit and readiness requirement is an incorrect paygrade distribution of dental officers. While the dental corps met its readiness requirements in FY 2001, the current distribution of dental officers is a signal of the Services' ability to meet their requirements in the future. Figure 17 shows the paygrade distribution of the dental corps in FY 1991 and FY 2000. Clearly, the paygrade distribution of MHS dentists has shifted substantially over the past decade as seen by the increase in the percentage of O-3s and O-6s. Given that the percentage of O-5s is essentially unchanged between FY 1991 and FY 2000, the increases in the percentage of O-3s or O-6s are offset entirely by the reduction in the percentage of O-4s.

Figure 17. MHS dental corps total inventory, by paygrade (FY 1991 versus FY 2000)



While the distribution of the dental corps by paygrade presents important information regarding changes in the distribution between FY 1991 and FY 2000, it does not convey the complete story. To see why, consider figure 18, which shows the paygrade distribution of general dentists.

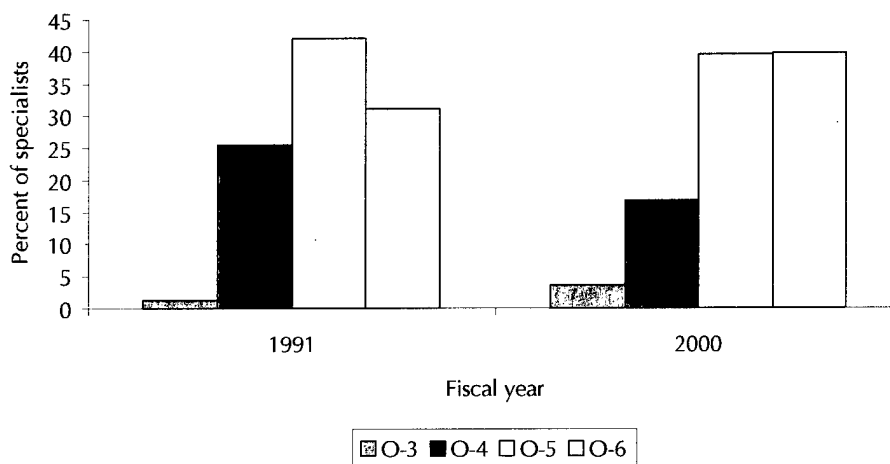
Figure 18. MHS general dentist inventory, by paygrade (FY 1991 versus FY 2000)



For general dentists, the paygrade distribution in FY 2000 compared to FY 1991 shows that the percentage of O-4s, O-5s, and O-6s has decreased over the decade, while the percentage of O-3s has increased from 52 percent to 70 percent. Hence, the distribution of uniformed general dentists is getting younger.

In contrast to general dentists, the distribution of specialists is aging (see figure 19). Examination of the paygrade distribution of specialists shows that the distribution in FY 2000 is more heavily weighted to O-5s and O-6s than it was in FY 1991.

Figure 19. MHS specialty dental corps inventory, by paygrade (FY 1991 versus FY 2000)



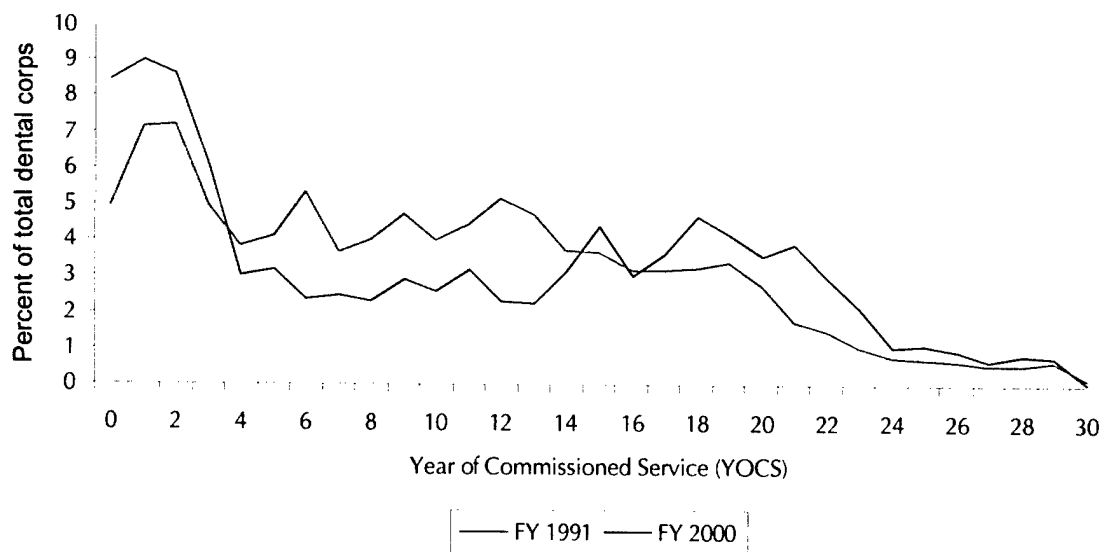
These distributions highlight another important issue: for general dentists and specialists, the percentage of the corps in the O-3 paygrade has increased, while the percentage of O-5 and O-6 dental officers has changed only slightly. Essentially, the majority of the changes in the distribution are a result of a reduction in the percentage of the corps that is O-4s and the fact that the Services have begun accessing more dentists through the Armed Forces Health Professions Scholarship Program (AFHPSP). Moreover, as senior MHS dental specialists (O-6s) approach mandatory retirement, this distribution shows that the Services may find it increasingly difficult to meet their targeted specialty

manning levels unless they can persuade enough junior dentists to begin residency programs, and ultimately remain in the military.

Years of experience

In addition to looking at changes in the paygrade distribution, another way to understand what the dental corps looks like is to evaluate its distribution by years of commissioned service (YOCS).⁵⁸ This distribution tells the same story as the paygrade distribution, but in more detail. The FY 1991 distribution of the dental corps by YOCS shows that the largest percentages of the dental corps have just a few years of commissioned service, with the percentage decreasing fairly consistently as YOCS increase (see figure 20).

Figure 20. MHS dentist corps inventory, by YOCS (FY 1991 versus FY 2000)^a

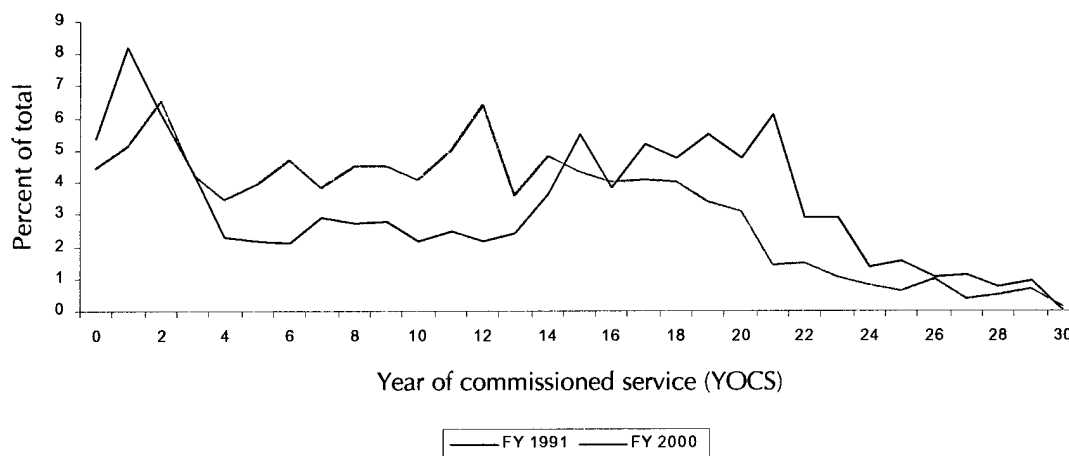


a. In FY 2000, there are a substantial number of Navy dentists in the DMDC data for whom we can't compute their YOCS. To account for them in the profile, we spread these dentists across the YOCS in a manner consistent with the profile of the Navy dental corps in previous fiscal years.

58. The YOS and YOCS distributions are very similar.

This pattern, however, is not the case in FY 2000 where the distribution has a “trough” between about 4 and 13 YOCS, suggesting that the dental corps has become very junior or very senior with little in between. Because uniformed dentists are most typically O-4s with 7 to 12 YOCS, this is consistent with our earlier findings, which showed an increase in the percentage of the dental corps that was junior (O-3s) or senior (O-5s or O-6s). Closer examination of this trend shows that the trough is most pronounced in the Army (see figure 21).

Figure 21. Army dental corps inventory, by YOCS (FY 1991 versus FY 2000)



Retention analyses

Survival (continuation) rates

One of the factors that may affect the Services' ability to meet their future dental personnel requirements is a change in the attrition rate. Figure 22 plots the survival curves of uniformed dentists for the last decade. Survival rates measure the percentage of dentists on active duty at the beginning of a fiscal year who remain on active duty into the next fiscal year.

For example, the FY 1991 survival curve plots the percentage of the 4,736 dentists who were still in uniform in subsequent years. Based on

the survival curves for the dental corps from FY 1991 through FY 1999, one may conclude that the continuation rate of the dental corps has not changed significantly over the past decade. Similarly, the annual attrition rate of the dental corps has not changed in any discernible way over the past decade (see figure 23).

Figure 22. MHS dental corps survival curves (FY 1991 through FY 1999)

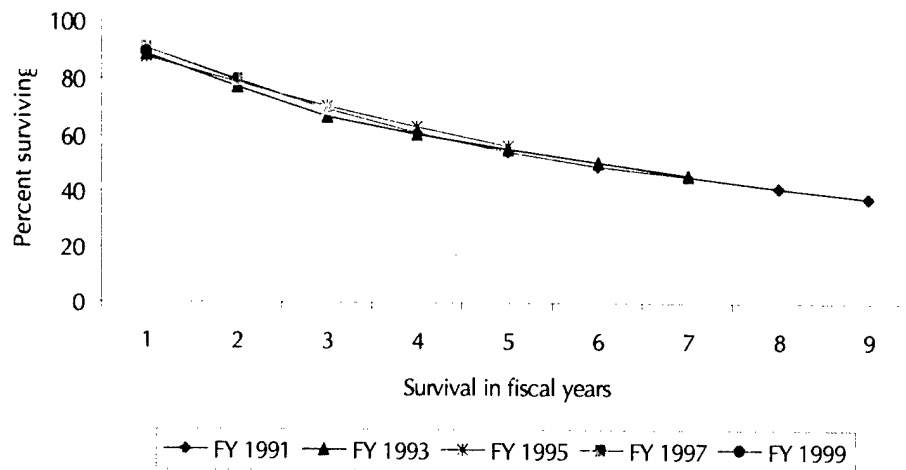
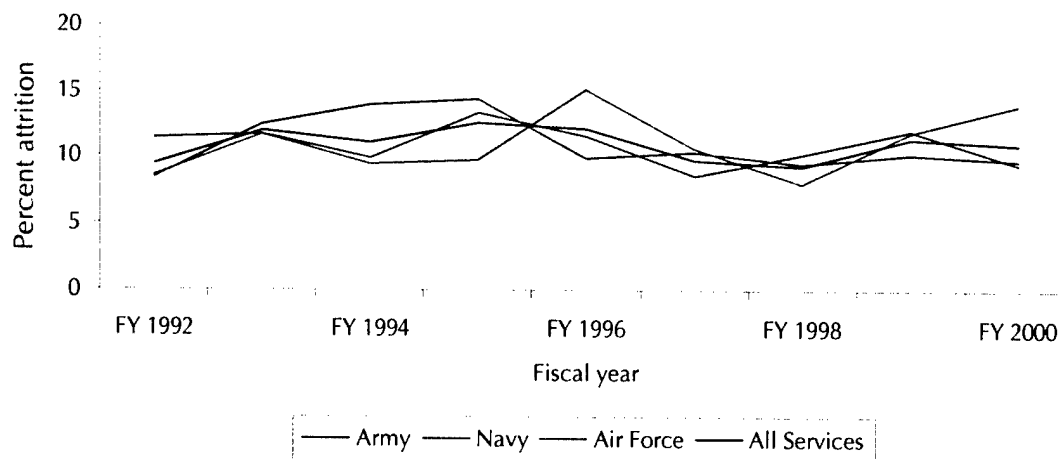
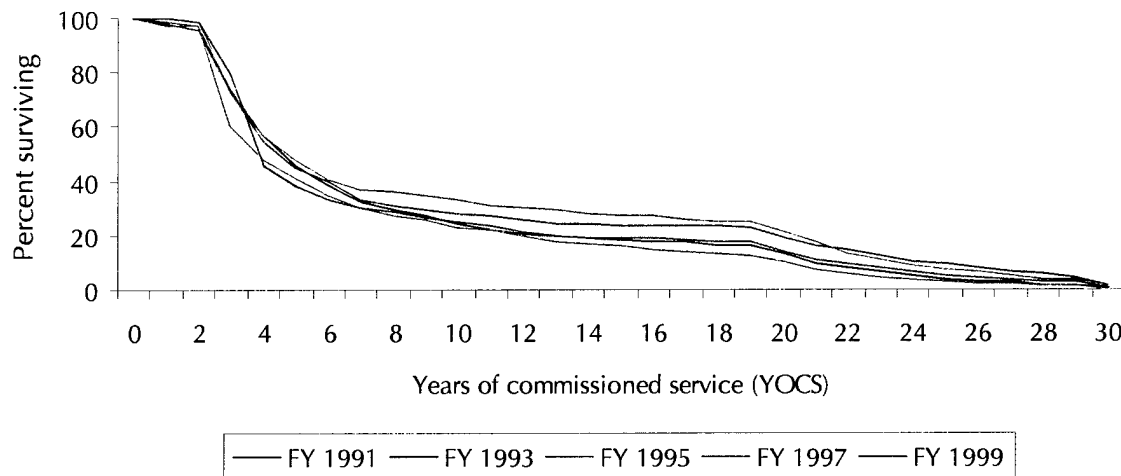


Figure 23. MHS dental corps attrition rates, by Service (FY 1991 through FY 2000)



These “top line” or force survival rates are general enough that they may mask what is occurring on a more detailed level. To explore this issue, consider survival curves by YOCS as shown in figure 24.

Figure 24. MHS dental corps survival rates, by YOCS (FY 1991 through FY 1999)



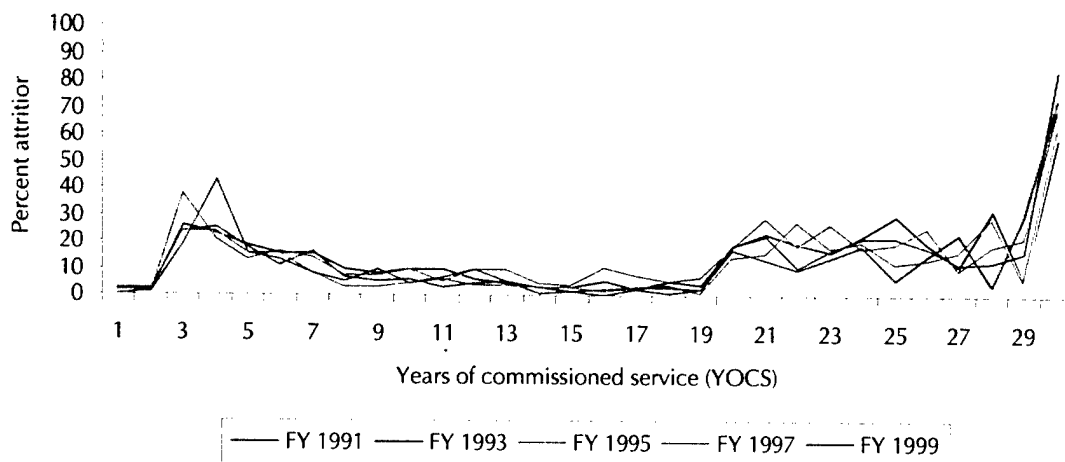
First, note that dentists who leave the military typically do so in the first 8 years; the survival curve beyond 8 years is very flat until retirement. We infer from this that the decision to remain in the military, for many, has already been made for those dentists with more than 8 years.

Second, comparison of the survival curves for FY 1991 and FY 1999 shows that survival in the first few YOCS was better in FY 1999 than in FY 1991. We feel that this finding is probably a result of the Services' increasing reliance on AFHPSP accessions. But, other than the first few YOCS, the FY 1999 survival curve is consistently below the FY 1991 survival curve by about 3 to 5 percent. That said, we cannot directly conclude that it has become more difficult to retain military dentists now than a decade ago because there is no consistent or systematic yearly change in the survival curves over the last decade. Also, the deliberate downsizing of the MHS dentists inventory in the early 1990s complicates what is really happening with retention. Despite this, if we consider only the FY 1991 and FY 1999 survival curves and ignore those in other years, we still cannot say that it has become

more difficult to retain all dentists over the past decade. To see why this is the case, let's look at attrition rates by YOCS.

Figure 25 plots attrition rates for MHS dentists by YOCS for various fiscal years between 1991 and 1999. In general, the attrition rates are logical in that attrition is low in the first couple of years, when the dentists are still satisfying their initial active duty obligation (ADO), and then it increases and begins to steadily decline until the 20-YOCS juncture. At this point, the attrition rate predictably jumps as uniformed dentists become eligible for retirement.

Figure 25. Aggregate MHS dental corps attrition rates, by YOCS (FY 1991 through FY 1999)



With the exception of the third and fourth years of commissioned service, attrition rates are generally the same for each year between FY 1991 and FY 1999. In 1995, there is a substantial increase in attrition in the third YOCS and in 1999 a similar increase in attrition in the fourth YOCS.⁵⁹ However, because the changes in attrition for the third and fourth years of commissioned service haven't consistently

59. For the years under review, there is substantial variation in the attrition rates for dentists with more than 20 years of commissioned service. However, we are not concerned with explaining this variation because these personnel have been retained. Also, the attrition rate in these years may vary widely because the sample sizes tend to be small.

increased between FY 1991 and FY 1999, we cannot conclude definitively that retention has degraded over this period.

Retention rates

Given the preceding review of the dental corps as a starting point, we now undertake a more in-depth analysis of retention. For the purpose of this analysis, we make a distinction between retention and continuation. As discussed earlier in the physician section of this report, retention is defined as keeping a person beyond the initial ADO (i.e., the officer has the ability to choose between staying in or leaving the military). Continuation rates simply report whether an officer remained on active duty for the next fiscal year.

Methodology

Ideally, retention analysis should be conducted using the *initial* obligated service date (OSD). However, we were unable to get accurate OSDs from the DMDC data for two reasons. The OSD field was typically blank, and it did not always contain the date of the initial ADO. In many cases, the initial ADO was overwritten by the most recent reason the officer may be obligated (promotion, pay contract, etc.).

We used the next best approach to examine uniformed dentists' retention. We created a longitudinal data file that isolates new dental corps accessions in FY 1992 through FY 2000 by assuming that, if an officer did not exist in the DMDC data in the previous year, that dentist is a new accession. We identified those accessed into specialty training in the same manner by tracking and ultimately isolating dentists who migrate from being coded as a general dentist (or dentist in residency training) to a new specialty code in subsequent years.⁶⁰

While this approach is not perfect, we felt that it allowed us to make reasonable estimates. Those accessed as general dentists typically have an ADO of 3 to 4 years, depending on the accession source. For general dentists who undertake residency training and become

60. Because our reported numbers of accessions are consistent with the service representatives' own data, we are confident that our approach was reasonable and fairly captured new accessions.

specialists, the typical ADO is 2 to 3 years.⁶¹ One notable exception is oral maxillofacial surgeons, who carry a 4-year ADO based on the length of the residency program for that specialty.

Cohort analysis

Based on the methodology above, we examined the FY 1992–1996 accession cohorts. The FY 1997–2000 cohorts were not examined because insufficient time has passed to reasonably evaluate retention. Before we consider whether retention has changed over these cohorts, we consider other factors that may affect retention.

One such factor is gender. If men and women attrite at different rates, gender is a potential concern because women now account for a larger share of dental school graduates than in the past.⁶² Figure 26 shows the 4-year retention patterns of men and women for the FY 1992–1996 cohorts. Overall, a slightly higher percentage of men than women were in uniform after 4 years. This finding holds true for the Army and Air Force, but not for the Navy. Given the variability in these survival rates, it does not appear that gender influences dentists' retention in any significant way.

In table 50, we consider retention, by Service. Although it is difficult to state conclusively how the Services fared in relation to one another, we can make the following observations: (1) Four years or more after accession, retention of general dentists is about the same for all Services, (2) the Army retains a larger percentage of specialists than the other Services, and (3) after 3 or more years in a specialty, all of the Services retain a higher percentage of specialists than general dentists.

61. Comprehensive/operative dentists, endodontists, public health dentists, pedodontists, and orthodontists have 2-year residencies. Periodontists, prosthodontists, and oral pathologists have 3-year residencies.

62. In phase I of our study, we reported that the American Dental Association estimated that about 38 percent of the 1998/99 total dental graduates were women [2]. In 1972, women accounted for 1 percent of dental school graduates [29].

Figure 26. Four-year survival rate by Service and gender (Cohorts: FY 1992 through FY 1996)

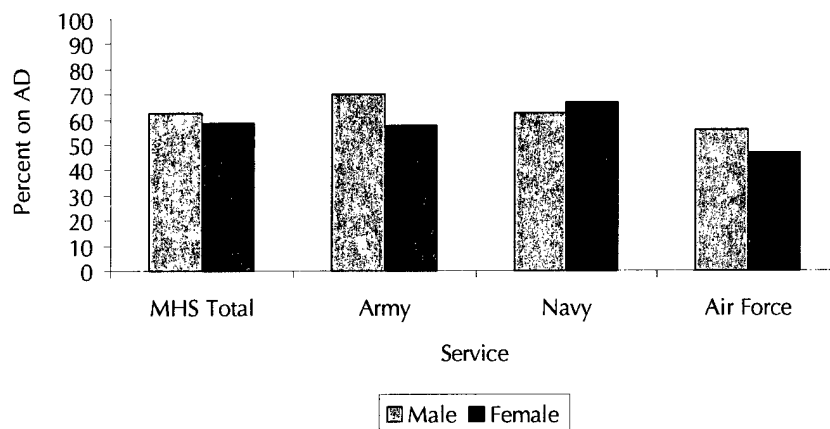
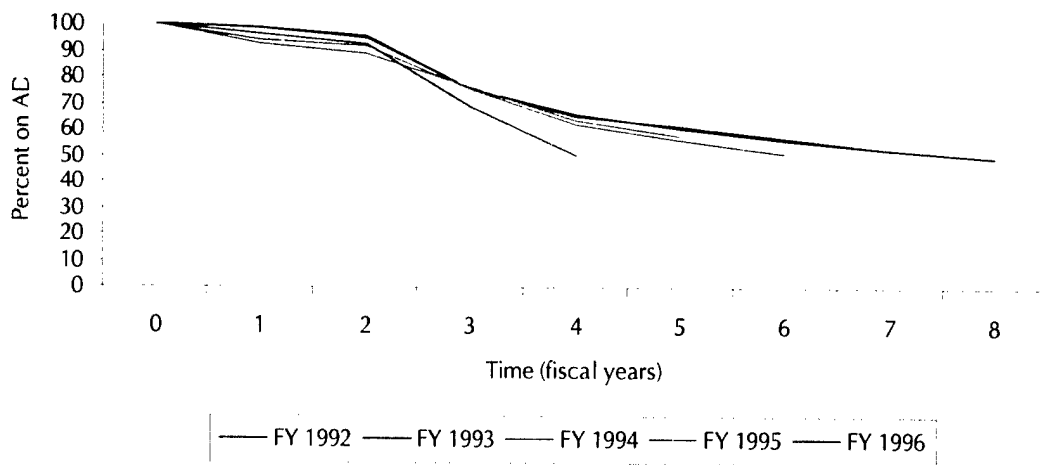


Table 50. MHS dental corps cohort survival rates, by Service and specialty (FY 1992 through FY 1996)

Specialty & Service	Percent surviving after							
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr
All specialties	96	92	74	62	57	52	49	45
Army	96	92	74	68	63	60	57	55
Navy	95	92	78	63	57	51	47	43
Air Force	97	93	68	54	50	48	44	40
General dentists	96	94	67	50	44	38	34	31
Army	94	89	61	53	47	43	39	36
Navy	96	95	73	51	43	36	33	31
Air Force	99	96	64	47	42	39	34	28
Specialists (excl. oral)	95	90	85	77	74	71	68	67
Army	100	98	96	91	91	90	88	85
Navy	93	90	84	76	71	66	62	61
Air Force	94	85	76	69	68	65	63	63
Oral surgery	99	91	83	75	72	70	65	54
Army	100	95	87	87	77	70	70	70
Navy	98	90	84	73	73	73	65	46
Air Force	100	90	71	57	57	57	57	57

The reason for the higher retention rate for specialists may not be completely obvious, but it seems reasonable to assume that graduate dental educational opportunities help to retain general dentists past their initial ADO. Dentists accessed into specialties are typically military general dentists who have remained in the military following their first stay-leave decision at the end of their initial ADO. Hence, specialists should have higher retention than general dentists because they have already demonstrated some commitment to the military. In addition, retention of specialists is greater than that of general dentists because specialists who are completing the ADO associated with their specialty training are closer to retirement than general dentists completing their initial ADO. To consider the issue of whether retention has changed, we compared the retention patterns of each cohort between FY 1992 and FY 1996 (see figure 27).

Figure 27. Aggregate MHS dental corps survival rates, by cohort year (FY 1992 through FY 1996)



At first glance, this figure supports the idea that retention in FY 1996 is lower than in FY 1992 because the 4-year survival rate for the FY 1996 cohort is 50 percent versus 65 percent for the FY 1992 cohort. For two reasons, however, caution should be used in making this conclusion. First, aggregate retention rates by cohort may vary because of

the mix of general dentists and specialists in the cohort. Second, if retention has truly degraded over time, we would expect each cohort subsequent to the FY 1992 cohort to fare worse than it. Review of the 4-year survival rate for the FY 1993 through FY 1995 cohorts shows that they fared approximately the same as the FY 1992 cohort, with survival rates between 63 and 66 percent.

Table 51 examines cohort retention by specialty for each cohort between FY 1992 and FY 1996. The data in this table show a mixed retention picture. For example, the 3- and 4-year survival rates for general dentists are better for the FY 1995 than the FY 1992 cohort; however, the FY 1992 cohort fared better than the FY 1996 cohort. Also, for the 4- and 5-year survival rates for oral maxillofacial surgery, the FY 1994 cohort has higher survival rates than the FY 1992 cohort.

Table 51. Aggregate MHS dental corps cohort 4-year survival rates, by specialty (FY 1992 through FY 1996)^a

Specialty and cohort	Percent surviving after							
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr
General dentists								
FY 1992	98	95	66	54	49	43	38	35
FY 1993	98	96	64	54	46	39	36	
FY 1994	92	92	70	53	44	39		
FY 1995	97	96	74	55	48			
FY 1996	95	92	63	39				
Specialists (excl. oral)								
FY 1992	98	93	89	83	79	77	75	74
FY 1993	99	97	93	85	84	83	78	
FY 1994	97	91	84	77	77	71		
FY 1995	89	84	78	70	65			
FY 1996	100	96	87	80				
Oral surgery								
FY 1992	100	97	91	81	78	78	72	59
FY 1993	100	89	85	78	78	74	70	
FY 1994	100	100	91	86	82	77		
FY 1995	95	87	82	68	66			
FY 1996	100	85	65	62				

a. We combined specialties for the retention analysis because the small size of the cohorts by specialty does not allow for meaningful analysis and inference. We did separate oral maxillofacial surgery from the other specialties, however, because those surgeons have a 4-year residency compared with 2 to 3 years for all other specialties. This difference may cause the oral maxillofacial surgeons to behave differently than the other specialists.

Findings—retention analyses

We can draw several inferences from the preceding analysis.

1. Retention does not differ systematically by gender.
2. Retention rates of general dentists are lower than those for specialists.
3. Retention for each Service is approximately the same for general dentists; for specialists, however, the Army seems to retain a higher percentage than the Navy or Air Force.
4. We cannot definitively say that retention has degraded over time as a result of the variability of the survival curves by cohort. However, it does seem reasonable to conclude (based on the evidence) that retention has not improved over this period. This conclusion is also supported by the upward variability in the attrition rate in the third and fourth years of commissioned service as shown previously in figure 25.

Effect of pay on retention

Earnings

This section examines how pay affects retention. To do this, we obtained reasonable earnings estimates of civilian and military dentists.

Civilian earnings

We based our estimates of civilian earnings on the American Dental Association's (ADA's) survey of income of dentists in private practice [30, 31]. Average net income is reported for general dentists and specialists.⁶³ Average net income figures for 1992 through 1998 are reported in table 52.⁶⁴

63. Average net income by individual specialty is not available.

64. The earnings analysis requires estimates of civilian dental earnings from 1991 through 2000. Earnings in 1991, 1999, and 2000 were estimated based on the civilian earnings from 1992 through 1998 adjusted for changes in the dental component of the consumer price index for all urban consumers.

Between 1992 and 1998, the average real net income of civilian dentists has risen by 4.5 and 3.8 percent per annum for general dentists and specialists, respectively. Consequently, even if military compensation of dental officers was constant in real terms over this period, there would be a significant reduction in pay parity.

Table 52. Average net income from private practice dentistry^a

Fiscal year	General dentists			Specialists		
	Current \$	2000 \$	% change	Current \$	2000 \$	% change
1992	98,140	120,489	-----	153,410	188,345	-----
1993	107,780	128,772	6.9	159,430	190,482	1.1
1994	117,610	136,752	6.2	177,590	206,494	8.4
1995	122,860	139,220	1.8	191,890	217,442	5.3
1996	124,960	137,385	-1.3	196,670	216,225	-0.6
1997	133,430	143,694	4.6	197,920	213,145	-1.4
1998	147,850	156,791	9.1	221,510	234,906	10.2
Per annum growth	-----	-----	4.5	-----	-----	3.8

a. Sources: American Dental Association [30, 31].

Note: Income figures are trended to 2000 dollars using the Consumer Price Index.

Military compensation

Ideally, we would have used actual military compensation of each dentist; however, this was not possible because information on earnings was missing in the DMDC personnel tapes in most cases. As an alternative, military compensation has been estimated based on the individual's paygrade, YOS, and specialty status. Military compensation is composed of regular military compensation (RMC), statutory compensation, and discretionary pay.⁶⁵ Only cash compensation is considered in this analysis. We excluded military benefits because they are difficult to quantify and our estimates of civilian compensation do not contain any benefits information.⁶⁶

65. Our historical estimates of RMC do not include adjustments for the tax advantage associated with the portion of military compensation that is non-taxable.

66. Dentists who are self-employed don't have benefits.

Statutory compensation for MHS dentists consists of variable special pay (VSP), additional special pay (ASP), and board certification pay (BCP). The amount of these entitlement pays depends largely on years of service. ASP is given to those who agree to remain on active duty for at least one year. Generally BCP is available only to those who are board certified in a specialty; however, general dentists who complete the Advanced Education in General Dentistry (AEGD) program may receive BCP.⁶⁷

Discretionary compensation consists of the dental officer multiyear retention bonus (DOMRB) pay plan. The DOMRB provides up to \$14,000 of additional annual income to dental officers below paygrade O-7 with at least 8 years of service who agree to remain on active duty for 2 to 4 years. Instituted in FY 1998, the DOMRB was available only to oral maxillofacial surgeons. In FY 1999, eligibility was expanded to specialists in endodontics, orthodontics, and periodontics. Also, eligibility was given to five other specialties with a maximum award of \$12,000 annually. Further, DOMRB eligibility was given to general dentists who completed advance clinical practice training.

Although every effort was made to accurately estimate military compensation, the lack of information in the DMDC personnel tapes required us to make some assumptions. First, no data existed regarding which individuals took advantage of ASP by agreeing to remain on active duty for at least one year. Second, no data indicating which dentists were board certified were available. And, third, the DMDC personnel tapes contained no data about which dentists entered into 2- to 4-year contracts to receive the DOMRB.

Despite the lack of individual specific information regarding those who were eligible for and took advantage of the statutory and discretionary pays, the Services provided general information. This information shows the number eligible for and the number of takers of the special pays. In FY 1998, for example, 81 percent of eligible Army dentists took the ASP. Similarly, 99 percent of eligible Navy dentists took the BCP in each year between FY 1996 and FY 1998. As for DOMRB,

67. The AEGD program is a 2-year, ADA-certified residency in general dentistry.

76 percent of eligible Army dentists took it in FY 1999. In the Navy, 69, 73, and 82 percent of eligible dentists took the DOMRB in FY 1998, FY 1999, and FY 2000, respectively. As of October 2001, 89 percent of eligible Air Force dentists took the DOMRB.

Because we cannot determine the exact amount of special pay for each dentist based on available information, our approach was to estimate the maximum potential pay a uniformed dentist could receive given the dentist's characteristics. To understand the reason we made this assumption, consider an MHS dentist who opts not to take some or all special pays. This dentist's decision to remain in the military would have more to do with the maximum pay the dentist could receive (given that he/she decided to stay in the military) than the pay the dentist is currently receiving. To put it a little differently, every dentist should know that he/she can receive ASP simply by giving a 1-year commitment. If a given dentist decides to forgo ASP, the logical inference is that this dentist is seriously considering leaving military service in the next year. At the very least, these dentists are keeping their civilian options open to the fullest extent possible and are not completely committed to a career in the military. Therefore, it is reasonable to conclude that potential military pay (and not actual pay) is the appropriate benchmark when considering a stay-leave decision.

Figures 28 and 29 show the percentage of military compensation accounted for by RMC, statutory pay (VSP, ASP, and BCP), and discretionary pay (DOMRB) for FY 1991 through FY 2000 for general dentists and specialists, respectively, who have 10 YOS and are O-4s.

For both general dentists and specialists, the proportion of military pay accounted for by these types of pay was relatively constant from FY 1991 through FY 1997, although RMC accounted for a slightly higher percentage of compensation in FY 1997 than in FY 1991. This change is the result of inflationary devaluation of statutory compensation over this period. Beginning in FY 1998, the percentage of compensation coming from statutory and discretionary pays substantially increases.

Figure 28. Fraction of cash compensation for MHS general dentists (paygrade 0-4 with 10 YOS)

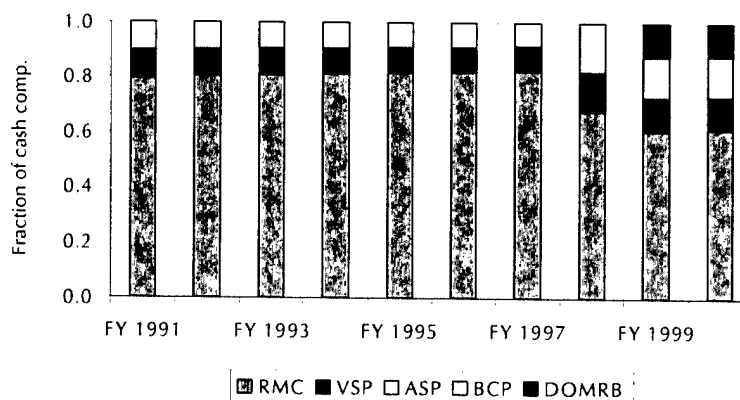
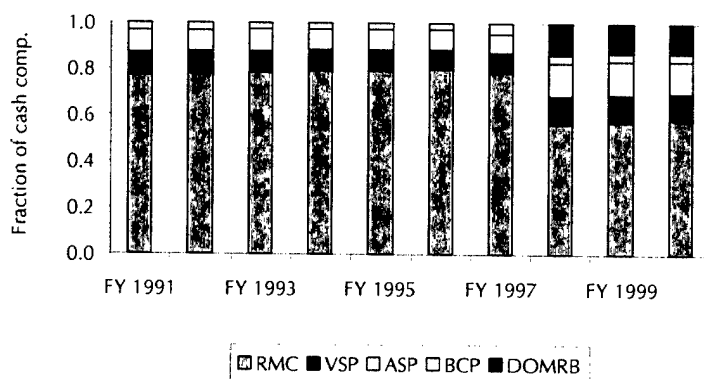


Figure 29. Fraction of cash compensation for MHS specialists (paygrade 0-4 with 10 YOS)



Military versus civilian compensation

Even more important for retention than military earnings is the relative parity between military and civilian compensation. Table 53 shows the military to civilian earnings ratio for various YOCS for FY 1991 through FY 2000. Pay parity for general dentists is lower in FY 2000 than in FY 1991 regardless of the YOCS. For example, in 1991, a general dentist with 5 YOCS made 55 percent of average civilian earnings. By 2000, this general dentist's military earnings dropped to 41 percent of average civilian earnings. For specialists, there is a drop in pay parity over this period, although it is less severe than the drop

for general dentists. Also, the uniformed-civilian pay gap in 2000 dollars is substantial, averaging approximately \$69,000 for general dentists and \$113,000 for specialists.

Table 53. MHS/civilian dentists earnings ratio by years of commissioned service

Fiscal year	General dentists by YOCS						Specialists by YOCS					
	5	10	15	20	25	Avg	5	10	15	20	25	Avg
1991	.55	.64	.74	.85	.92	.55	.38	.43	.51	.58	.63	.51
1992	.53	.62	.72	.82	.90	.54	.38	.42	.49	.57	.61	.49
1993	.49	.58	.67	.77	.85	.52	.37	.41	.49	.56	.61	.49
1994	.46	.54	.63	.71	.80	.49	.34	.37	.45	.51	.56	.45
1995	.45	.53	.62	.70	.78	.46	.33	.35	.42	.48	.53	.43
1996	.46	.54	.62	.70	.78	.48	.32	.35	.42	.48	.52	.42
1997	.47	.53	.59	.67	.75	.48	.34	.37	.43	.50	.54	.45
1998	.43	.54	.63	.69	.75	.47	.31	.40	.46	.50	.54	.46
1999	.41	.53	.59	.68	.75	.44	.31	.44	.49	.54	.58	.50
2000	.41	.54	.62	.71	.80	.45	.30	.43	.48	.54	.57	.49
Pay gap (\$1,000s)	70.2	57.9	46.9	38.7	27.5	69.2	139.3	124.8	113.5	101.8	93.6	112.6

Figures 30 and 31 compare military and civilian compensation for general dentists and specialists from FY 1991 through FY 2000. In both cases, RMC in real terms is roughly constant over the years; hence, any significant changes in military pay are changes in statutory and discretionary pays. From FY 1991 through FY 1997, real military compensation of general dentists decreased slightly because of the inflationary devaluation of statutory pays over this period. There was a similar devaluation in the real military compensation of specialists from FY 1991 through FY 1996.

In contrast to the essentially flat military compensation from FY 1991 through FY 1997, civilian dentists' net income rose consistently. Our findings show that the increase in civilian earnings resulted in a reduction in pay parity. In FY 1998 and FY 1999, pay parity was restored to approximately the FY 1991 level by the increases in statutory and discretionary compensation. However, the pay ratio in FY 2000 is less than in FY 1999 because of the inflationary devaluation of statutory and discretionary pays.

Figure 30. MHS to civilian dentist cash compensation comparison for general dentists (for pay-grade O-4 and 10 YOCS)

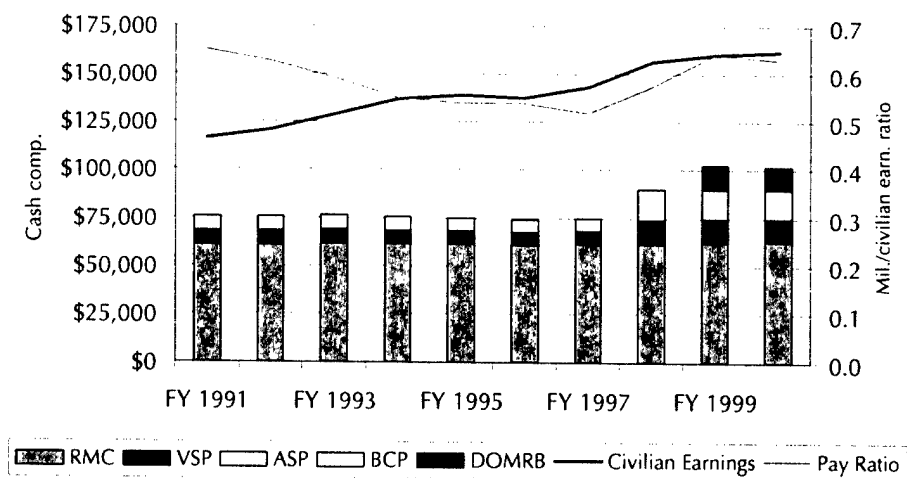
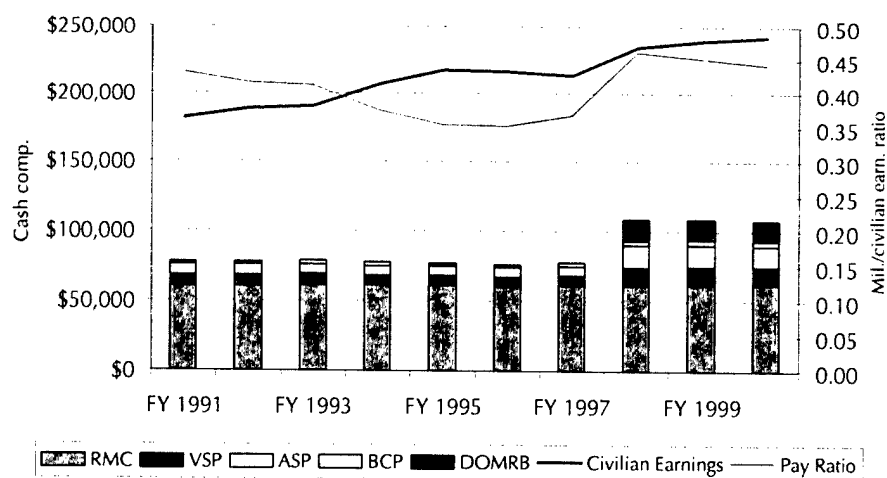


Figure 31. MHS to civilian dentist cash compensation comparison for specialists (for paygrade O-4 and 10 YOCS)



Method for assessing the effect of pay on retention

Given these estimates of civilian and military compensation, this study uses survival analysis over time to estimate how pay affects uniformed

dental corps' retention. Through survival analysis, we estimate the attrition rate or hazard function of a given population.

Specifically, we use an accelerated failure-time model that allows the attrition rate associated with each explanatory variable to either accelerate or decelerate over time.⁶⁸ Also, in modeling the hazard rate of dentists, it is important to use a functional form that resembles their attrition rate over time, which is low in the first few years of service, followed by higher attrition that gradually decreases over time until retirement.⁶⁹

Note that, in conducting this analysis, we consider only dentists who have fewer than 20 years of service. More specifically, we are interested in how pay affects the retention of dentists with fewer than 10 years of service and those with fewer than 5 years of service. The reason for this is that we are more concerned with determining the impact of pay on retention than on continuation.⁷⁰

68. An alternative to the accelerated failure-time model is the proportional hazards model, which relies on the assumption that the impact of the explanatory variables on the hazard rate remains constant over time. Statistical tests reject the proportional hazard assumption; hence, we have used an accelerated failure-time model.

69. A hazard function that has this type of distribution is the lognormal distribution. The associated hazard function is:

$$h(t) = \frac{1}{t\sigma\sqrt{2\pi}} e^{\left(\frac{-1}{2\sigma^2}(\ln(t) - X\hat{\alpha})^2\right)} \cdot \frac{1}{1 - \Phi\left(\frac{\ln(t) - X\hat{\alpha}}{\sigma}\right)},$$

where h is the hazard rate, t is time, σ is the standard deviation, X is the vector of control variables, β is the vector of coefficients for the control variables, and Φ is the normal cumulative distribution function.

70. Although our emphasis is on dentists with few YOS, it doesn't mean that we believe continuation of senior dentists is unimportant. We don't focus on senior dentists because their continuation rates are high; consequently, we believe they have been retained. For instance, as shown in figure 24, the survival curve for dentists is flat beginning about 8 YOCS, meaning that very few dentists leave the military after this point.

To get the most accurate estimates possible of the effect of pay on retention, the regression analysis controlled for several variables that may be correlated with attrition. These variables are gender, service, rank, years remaining until retirement, and whether the dentist was undergoing training. Ideally, accession source would be controlled for because it is reasonable to believe that retention patterns vary systematically by accession source, but we don't do this because the accuracy of the accession source as shown in the data is questionable.⁷¹

We measured the effect of pay on retention in terms of the pay gap (in 2000 dollars) between civilian and military cash compensation. It is inappropriate to just use actual earnings for military dentists because what is important in a stay-leave decision is not actual military compensation but the difference between military and civilian compensation. Given this model and the control variables discussed, we now turn to the results of the model.

Results

We report the estimated impact of pay on retention as the percentage increase in the hazard (attrition) rate given a \$10,000 increase in the pay gap. Overall, the results show that a \$10,000 increase in the pay gap leads to a 7.2-percent increase in the attrition rate (see table 54). This means that if the attrition rate were 10.0 percent, a \$10,000 reduction in the pay gap would reduce the attrition rate to 9.3 percent. To put it another way, a \$10,000 reduction in the pay gap will reduce an attrition rate of 10.0 percent by 0.7 percentage point (10.0 minus 9.3), not 7.2 percentage points. The initial inference we draw from this result is that a \$10,000 increase in pay would not have a dramatic effect on improving retention.

That said, extreme caution should be applied in using aggregate attrition rates. Clearly, for dental officers nearing retirement, the annual attrition rate may be 3 percent or less, whereas new accessions might

71. For example, the accession source for 1,761 of the 7,151 dentists in the DMDC data changed at some point between FY 1991 and FY 2000. Also, the mix of accession sources in the data in FY 1999 and FY 2000 is out of line with what the services are reporting as their principal accession sources for those fiscal years.

have an attrition rate of 30 percent. In these cases, a \$10,000 reduction in the pay gap leading to a 7.2-percent reduction in the attrition rate will reduce attrition rates of 3 and 30 percent to 2.8 and 28.0 percent, respectively. (Note that the percentage-point changes in these attrition rates are 0.2 and 2.0 percentage points, *not* 7.2 percentage points.) In short, the data show that increasing pay at any level will improve retention, but the greatest improvements in retention will come from those officers with few years of service because they may still be in the process of making a stay-leave decision. For those nearing retirement, that decision is long past.

Table 54. Responsiveness of the dentist attrition rate to changes in the pay gap

YOS group	Percentage change in the dentist attrition rate associated with a \$10,000 increase in the military-civilian pay gap ^a				Elasticity ^b
	Army	Navy	Air Force	MHS Total	
Less than 5 YOS	16.6	15.3	16.4	16.0	1.46 (1.32, 1.56)
Less than 10 YOS	12.2	11.8	13.5	12.4	1.13 (1.00, 1.25)
Less than 15 YOS	9.8	9.9	11.7	10.4	0.96 (0.84, 1.07)
Less than 20 YOS	6.5	6.8	8.5	7.2	0.65 (0.54, 0.76)
5 but less than 20 YOS	1.1	2.5	2.6	1.9	0.17 (0.02, 0.31)

a. These estimates represent percentage changes, not percentage-point changes, in attrition rates. For example, if the attrition rate were 10.0 percent, a 7.2-percent increase in the attrition rate implies that attrition would increase to 10.72 percent, *not* 17.2 percent.

b. The figures in the parentheses represent the lower and upper bounds of the 95-percent confidence interval. For those with less than 5 YOS, for example, the 95-percent confidence interval is 1.32 to 1.56, meaning that statistically there is a 95-percent probability that the "true" elasticity falls between 1.32 and 1.56.

The initial estimate of a 7.2-percent increase in the attrition rate given a \$10,000 increase in the pay gap is based on regression analysis using all dental officers with fewer than 20 years of service. If the sample is reduced to those with fewer than 15, fewer than 10, or fewer than 5 years of service, the commensurate change in the attrition rate for a \$10,000 increase in the pay gap is 10.4, 12.4, or 16.0 percent, respectively. Similarly, if the sample includes only those with at least 5 but

less than 20 YOS, the change in the attrition rate for a \$10,000 increase in the pay gap is 1.9 percent. Combining these results shows that, if dentists remain in the military following their initial ADO or ADO associated with residency training, the percentage impact of pay on continuation is small (1.9 percent) compared to the percentage impact of pay at stay-leave junctures early in the careers of dental officers (16.0 percent).

Table 54 also reports the elasticity of the attrition rate with respect to the military-civilian pay gap. The elasticity estimates are all statistically significant and fall as years of service increase. For dentists with less than 5 years of service, the elasticity estimate is 1.46. This means that a 1-percent increase in the military-civilian pay gap leads to a 1.46-percent increase in the attrition rate. For dentists with at least 5 but less than 20 years of service, the elasticity is only 0.17, meaning that a 1-percent increase in the military-civilian pay gap leads to only a 0.17-percent increase in the attrition rate. Hence, pay gap reductions have substantially more impact on the attrition rate of junior dentists than senior dentists.

Comparing the elasticity of the attrition rate with respect to the military-civilian pay gap for physicians and dentists, we see that dentists are more responsive to pay than physicians. Specifically, the overall elasticity of physician specialists is 0.14 compared to 0.65 for dentists. This means that a 1-percent decrease in the military-civilian pay gap leads to a 0.65-percent decrease in the attrition rate of dentists compared with only a 0.14-percent decrease in the attrition rate of physicians. A potential reason why dentists are more responsive to pay changes than physicians has to do with the civilian employment opportunities of dentists and physicians.

Although both dentists and physicians in the civilian sector may be sole proprietors, in partnerships, employees of health maintenance organizations, or contract employees, a higher percentage of physicians than dentists are salaried employees. In 1998, for instance, 8.0 percent of dentists were either non-owner dentists or independent contractors, whereas 37.7 percent of physicians were employees or independent contractors [31, 32]. As a result, a much higher percentage of dentists than physicians are self-employed in one form or another.

The principal difference between self-employed and salaried employees is that those who are self-employed must bear the income risk associated with self-employment; salaried employees do not have this income risk. A dentist or a physician may have the option of buying into a practice, but this again does not remove the inherent risk of being self-employed. If a dentist or a physician does not want to invest in an existing practice, the individual may start a practice, but this option will likely have more risk than being associated with an already established practice. Because dentists' predominant option is self-employment, military pay increases may entice a higher percentage of them than physicians to stay because their potential earnings in civilian employment are less certain than salaried physicians. Simply put, the dentists retained by the MHS are likely more risk averse than those who attrite.

In reporting the results of this analysis, it is worth noting that the effects of the control variables on attrition make sense. Gender does not significantly affect attrition. This finding is consistent with our retention analysis of the FY 1992-1996 cohorts. As expected, we found that O-4s, O-5s, and O-6s attrited at a significantly lower rate than O-3s. Similarly, those with many YOS remaining until retirement had higher attrition rates than those with few years remaining until retirement. Finally, dentists in training had lower attrition than those who were not in training, which is primarily a function of their obligated status for graduate dental education.

Adequacy of military compensation

The analysis in the previous section shows the degree to which pay increases retention, but it does not answer the question of whether compensation is adequate. This section explores the issue of adequate compensation. As discussed in the beginning of this report, compensation is adequate if the MHS is able to fill its peacetime billets and its readiness requirements with the correct skill mix, and with the right years of experience. We begin with a review of the Services' ability to meet peacetime billet authorizations.

Billet authorizations

Table 55 shows the actual FY 2001 dental corps endstrength for each Service. Comparing FY 2001 endstrength against billets shows that the Army, Navy, and Air Force filled about 88, 98, and 90 percent of their billets, respectively.⁷² This table also shows our endstrength projections through FY 2003. Projected gains in FY 2002 and FY 2003 are as reported to CNA by the Services. Losses by specialty are based on Service-specific attrition rates by specialty and years of service (based on the HMPDS data over the last decade).

Combining projected gains and losses gives future endstrength, as shown in table 55. Comparing projected endstrength with billets, we see that the Navy should fill 99 percent of its billets in FY 2003, the Air Force should fill 88 percent, and the Army should fill 85 percent. Hence, the percent manning in FY 2003 compared to FY 2001 is slightly better in the Navy and a little worse in the Army and Air Force.

We felt that it was important to better understand whether the MHS's ability to meet its dental workforce objectives was improving or declining, so we compared the projected manning levels in FY 2003 to what the Services had 10 years earlier. In FY 1993, the percent manning in the MHS as a whole was 93 percent compared to a projected 91 percent in FY 2003.⁷³

In the Army, projected percent manning in FY 2003 is higher than in FY 1993—85 percent compared to 84 percent. Similarly, the projected percent manning in the Navy is 99 percent in FY 2003, which is greater than the 94 percent manning it had in FY 1993. In contrast to the Army and Navy, the Air Force has lower projected manning in FY 2003 (88 percent) than in FY 1993 (105 percent).

72. We gratefully acknowledge the assistance of Service representatives who gave us invaluable support and provided the actual FY 2001 inventory, billet authorizations, and active component readiness "duty" requirements (excluding training).

73. The dental corps billets, by Service for FY 1993, were obtained from the FY 1993 HMPDS Report [20].

Table 55. Projected MHS dentist manning, by Service (FY 2001 through FY 2003)^a

Service and fiscal year	Projected beginning strength	Projected gains	Projected losses	Projected endstrength	Billets	Percent manning
MHS Total						
2001 (actual)				3,329	3,599	92
2002 (proj.)	3,329	353	373	3,309	3,609	92
2003 (proj.)	3,309	357	381	3,285	3,607	91
Army						
2001 (actual)				1,004	1,138	88
2002 (proj.)	1,004	100	118	986	1,138	87
2003 (proj.)	986	100	120	966	1,138	85
Navy						
2001 (actual)				1,340	1,369	98
2002 (proj.)	1,340	151	125	1,366	1,377	99
2003 (proj.)	1,366	135	146	1,355	1,374	99
Air Force						
2001 (actual)				985	1,092	90
2002 (proj.)	985	102	130	957	1,094	87
2003 (proj.)	957	122	115	964	1,095	88

a. Each Service provided the actual FY 2001 endstrength, projected gains, and billets for each fiscal year. Projected losses and endstrength for FY 2002 and FY 2003 are based on Service-specific attrition rates by specialty and years of service (based on the HMPDS data over the last decade).

Readiness requirements

The Services' abilities to fill billet authorizations is an important metric of the adequacy of compensation, but a more critical metric is the MHS's ability to meet its readiness requirements. Table 56 shows the dental corps readiness requirements, by specialty, for the MHS as a whole and for each Service individually.

Comparing readiness requirements to the FY 2001 endstrengths shows that each Service is currently meeting its overall readiness requirement. Based on predicted endstrength, we estimate that in FY 2003 the MHS overall, and each Service individually, will continue to meet readiness requirements in FY 2003.⁷⁴ Despite meeting overall

74. Note that each Service projects having an adequate inventory to meet its FY 2003 readiness requirements.

readiness levels in FY 2001, the MHS as a whole was below readiness levels in oral maxillofacial surgery and comprehensive/operative dentistry.⁷⁵ And, projections for FY 2003 indicate that shortfalls in these two specialties will continue.

Table 56. Comparison of projected FY 2002 and FY 2003 MHS dentist inventory and readiness requirements (by Service and specialty)^a

Readiness requirement and inventory	Endo.	Oral path.	Oral surg.	Ortho.	Pedo.	Perio.	Prost.	Public health	Comp. oper.	Gen. den.	Total
MHS Total											
Readiness req.	79	20	255	63	59	97	164	9	641	1,021	2,408
Actual FY 2001	115	43	212	83	63	174	212	22	557	1,848	3,329
Proj. FY 2002	121	42	222	77	60	174	206	22	563	1,822	3,309
Proj. FY 2003	120	39	224	73	59	164	196	23	556	1,831	3,285
Army											
Readiness req.	31	10	109	28	26	33	69	7	237	369	919
Actual FY 2001	48	13	93	31	31	56	85	9	265	373	1,004
Proj. FY 2002	51	12	97	27	28	57	80	8	247	379	986
Proj. FY 2003	50	11	97	25	25	54	73	8	228	395	966
Navy											
Readiness req.	39	10	131	19	19	48	81	2	329	502	1,180
Actual FY 2001	48	24	73	22	16	66	75	11	128	877	1,340
Proj. FY 2002	52	25	79	22	17	69	76	12	151	863	1,366
Proj. FY 2003	53	24	81	21	19	67	75	13	165	837	1,355
Air Force											
Readiness req.	9		15	16	14	16	14		75	150	309
Actual FY 2001	19	6	46	30	16	52	52	2	164	598	985
Proj. FY 2002	18	5	46	28	15	48	50	2	165	580	957
Proj. FY 2003	17	4	46	27	15	43	48	2	163	599	964

a. Obviously, there are more dental specialties than those shown in this table. We have put dentists into one of the above specialties in the same manner as the DMDC does when compiling its annual HMPDS book [20]. For example, what the DMDC classifies as oral pathology in the Navy includes oral pathology (1780) and oral diagnosis (1745). In addition, DMDC uses "general dentists" as a catchall for dentists not classified elsewhere. Active duty dentists in training are also included in the general dentists category. These endstrength projections are the same projections used to compare endstrength to billets and accessions into each specialty from the population of general dentists who are estimated to continue at the same rate that prevailed over the last decade.

75. Previous CNA research [33] noted that, beginning in FY 1990, the data indicated a possible downturn in retention for oral surgeons.

As for each Service, we project that the Air Force will not have a shortfall in any specialty in FY 2003. At the same time, we project the Army will have shortfalls in oral maxillofacial surgery, orthodontics, pedodontics, and comprehensive/operative dentistry. And the Navy will have shortfalls in oral maxillofacial surgery, prosthodontics, and comprehensive/operative dentistry. The reason the Air Force fares better than the other Services in meeting readiness levels is that its readiness requirements to billets ratio is 0.28 compared to 0.81 for the Army and 0.86 for the Navy.

Dental corps distribution

In addition to meeting its billet and readiness requirements, the dental corps needs the “right” experience distribution, which requires having some notion of what constitutes the ideal experience distribution. For purposes of this analysis, we use an estimate of the *notional dental corps profile* to assess what the dental corps should look like by years of service. The Air Force provided this *notional profile*.⁷⁶

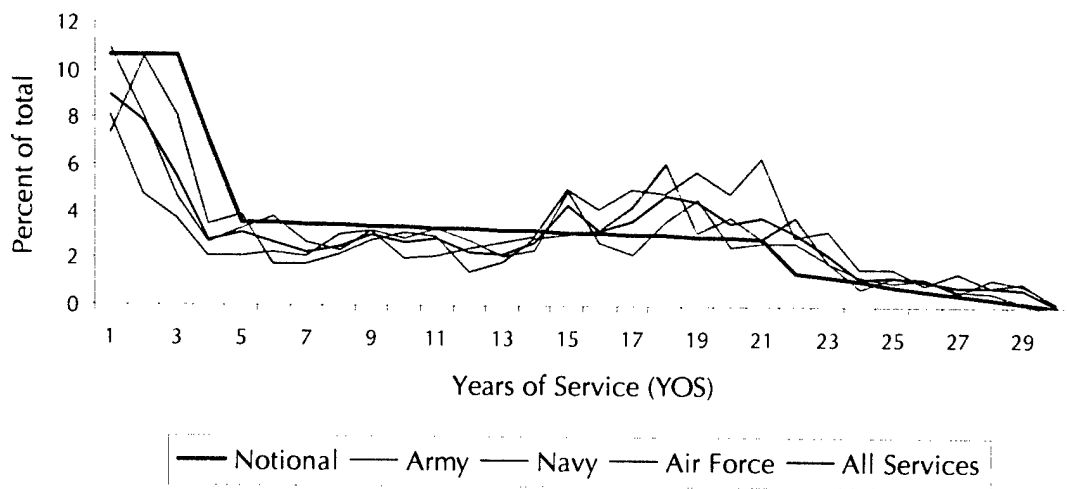
In preparing this report, we requested input from each Service regarding its *ideal* force structure, but the Air Force was the only branch to provide this information. Consequently, we have used the Air Force’s ideal for all three Services. Comparing an ideal profile to the actual force profile is useful from a planning perspective to see how the structure of the dental corps matches up with what each Service would like it to be. Figure 32 makes this comparison by YOS.

Review of this figure shows that each Service is under the notional force structure from the 5- to 14-year-of-service junctures. Also, each Service is generally above the notional profile for 15 years of service or more. To put it another way, there is a “trough” in the dental corps between 5 and 14 years of service, indicating that the dental corps is either very junior or very senior with little in between. The force

76. This profile assumes 120 accessions per year. At year 4, one-third of these attrite, leaving 80; in year 5, one-half of these attrite, leaving 40. In years 7 through 21, we assume that one dentist attrites every other year. At year 22, half the remaining dentists retire, and then two dentists retire every year through 30 years. The profile in percentage terms is exactly the same regardless of the number of accessions at the start.

structure of each Service is heavily weighted toward the O-5 and O-6 paygrades. This has the potential to cause major shortages of dentists as the personnel in these paygrades move toward retirement. This finding is also consistent with previous CNA analyses [34], which found that the Navy dental corps “needs to retain fewer officers with high YOS while raising gains and retaining more officers at the 3-year point.”

Figure 32. MHS notional ideal dental corps force structure versus FY 2000 actual force, by YOCS^a



a. Because the notional profile puts dentists neatly into 30 bins for 1 through 30 YOS, it doesn't compare well to the actual profile for the first three YOS because in reality the actual dental corps has a significant number of dentists with zero YOS. Also, in FY 2000, there are a substantial number of Navy dentists in DMDC data for whom we can't compute their YOS. To account for them in the profile, we spread these dentists across the YOS in a manner consistent with the profile of the Navy dental corps in previous fiscal years.

Findings

The preceding analysis indicates that, over the next few years, military compensation may not be adequate for the following reasons:

- First, we project that the MHS overall will not meet its readiness requirements for oral maxillofacial surgery and comprehensive/operative dentistry. For the Army, we project that the MHS will not meet its readiness levels for oral maxillofacial surgery,

orthodontics, pedodontics, and comprehensive/operative dentistry. For the Navy, we project that it will not meet readiness levels for oral maxillofacial surgery, prosthodontics, and comprehensive/operative dentistry.

- Second, each Service currently has a shortage of O-4 or mid-career dentists, which suggests that the current compensation structure fails to provide enough incentive to retain these dental officers beyond the entry level.

Special pay proposals

Given the findings regarding the adequacy of pay, we now examine current special pay proposals.

\$30,000 direct accession bonus

One of the original objectives of this study was to evaluate the effectiveness of the current \$30,000 direct accession bonus for dentists. New accessions are eligible for this bonus if they have not received any other subsidization from the military and they agree to a 4-year active duty obligation. Unfortunately, we were not able to thoroughly evaluate the \$30,000 accession bonus because the DMDC accession source data aren't reliable and we don't have information on who took the \$30,000 bonus.

Although we have not been able to evaluate the accession bonus directly with statistical analysis, it is unlikely that it will be very effective in attracting new applicants for several reasons:

- The average debt of graduating dental students in 1999 was \$99,608, which is up 18.5 percent from the 1998 figure of \$84,089. Also, the 1999 average debt was 166 percent higher than the 1980 average debt of \$37,404 in 1999 dollars [35].
- Entry-level uniformed-civilian pay gaps make it difficult to choose the military and still pay back such a large amount of debt with O-3 military compensation.
- As discussed in phase I of this study, projected workforce shortages in the civilian sector (due to a large number of retiring

dentists) may potentially reduce the cost of buying a dental practice and may also increase civilian dental earnings [2].

- The Air Force only had 28 direct accessions in FY 2001, far short of its goal of 120. This is another indication that the \$30,000 retention bonus will not be a very effective accession tool.⁷⁷

All of these factors combined suggest that the \$30,000 direct accession bonus will not be sufficient to attract the required candidates.⁷⁸ Current military accession trends show that the vast majority of accessions are AFHPSP accessions, which essentially eliminate dental school debt. Specifically, in FY 2000, 71, 56, and 77 percent of accessions in the Army, Navy, and Air Force, respectively, were AFHPSP accessions. As we reported in phase I of this study, we feel that the military will increasingly rely on the AFHPSP to meet its dental corps accession goals.

FY 2003 ASP proposal

A proposal submitted to the Unified Legislation Board (ULB) requests that MHS dental officers' ASP be increased by \$15,000 for FY 2003. ASP is currently \$4,000 for dentists with fewer than 3 years of service, \$6,000 for at least 3 years but fewer than 10 years, and \$15,000 for 10 or more years. Hence, if the ULB request were enacted, dental ASP in FY 2003 would be \$19,000 for dentists with fewer than 3 years of service, \$21,000 for at least 3 years but fewer than 10 years, and \$30,000 for 10 or more years.

77. The Army and Navy reported attaining only about 20 direct dental accessions in FY 2001.

78. Although the accession bonus may be inadequate to meet direct accession goals, we make no recommendation to change it because data are not available on which to base a recommendation. Also, the issue is more complex than just increasing the bonus; the Services must consider the cost and benefits of any change. For example, if the current bonus helps the Services directly access 50 dentists, the cost (excluding recruiting costs) is \$1,500,000 (\$30,000 x 50). Suppose that the bonus is increased to \$40,000, causing direct accessions to increase to 60 at a cost of \$2,400,000. This means that the 10 additional accessions cost \$900,000, or \$90,000 each. Whether this cost is lower than other accession sources depends on the cost of accessing and retaining dentists by each accession source.

Over the last decade, the attrition rates of those with fewer than 3 years, 3 to 9 years, and 10 to 19 years were 11.46, 13.71, and 4.77 percent, respectively. Based on the preceding regression analysis, a \$15,000 increase in ASP would reduce the attrition rates of these groups to 9.24, 11.56, and 4.64 percent, respectively.⁷⁹ Note that the \$15,000 ASP increase changes the attrition rate by only 0.13 percentage point (4.77 - 4.64) for those with 10 to 19 years. This is logical because these dentists seem to have already made the decision to stay in the military.

Although we project an increase in retention as a result of the proposed ASP, the magnitude of the change is not large. This is likely a result of the sheer size of the pay gaps. For example the pay gaps of a typical general dentist and a typical specialist with 5 years of commissioned service are approximately \$70,000 and \$139,000, respectively. Although a \$15,000 increase in ASP will reduce the attrition rate, we should not expect dramatic changes in retention because pay gaps of \$55,000 and \$124,000 remain.⁸⁰

Critical skills retention bonus (CSRB)

Another potential way to improve retention is to offer bonuses to personnel in specialties for which the MHS has difficulty meeting billets and readiness requirements. As pointed out in previous sections, the oral maxillofacial surgery specialty is below the readiness requirement for the MHS as a whole. Oral maxillofacial surgeons are a little bit different from all other specialists because their residency training is 4 years rather than 2 or 3 years. As a consequence, their average civilian net income is greater than other specialists [29].

79. We estimated attrition rates given a \$15,000 ASP increase using the regression results that indicate a \$10,000 increase in the pay gap leads to a 16.0-, 12.4-, and 1.9-percent increase in the attrition rate for groups with 1-2, 3-9, and 10-19 YOS, respectively.

80. We also reviewed the results of a 2000 survey of Army and Air Force dentists who made the decision to leave the military. Although part of this survey dealt with compensation issues, the survey's design rendered its results not meaningful for the questions explored in our analysis.

In addition to oral maxillofacial surgeons, it is projected that in FY 2003 the MHS will continue to have difficulty meeting its readiness requirement for comprehensive/operative dentistry. Retention of existing dental officers in these specialties can obviously be improved by giving critical skills retention bonuses (CSRBs) to these specialties. In addition to improved retention, the CSRB may encourage those entering specialty training to consider choosing one of these specialties over specialties for which the MHS has less difficulty meeting its readiness requirement. In addition to the potential benefits of the CSRB, there are some limitations to its use. These include career limits of \$200,000, limited to those with 24 YOS or less, lack of OSD implementation policy, and lack of funding.

For general uniformed dentists who are completing their initial ADO and making a stay-leave decision, we recommend that the DoD explore using the Health Profession Loan Repayment Program (HPLRP) as a retention tool. This program may prove useful in helping the Services "recruit from within" their existing inventory by offering to pay the student debt for eligible uniformed dentists. Moreover, because this program is controlled by TMA and the Services, it may increase the likelihood of funds being targeted to health care professions versus the CSRB, which places dentists in direct competition with line communities.

Future dentist compensation strategies based on performance

As discussed earlier, we feel it is time for the MHS to explore adding two factors to the uniformed physician annual review process—productivity and patient outcomes. This idea comes from the private sector, which has begun using this strategy to align incentives, increase productivity, improve patient satisfaction, and manage demand. Because the vast majority of civilian dentists work in private practice, their behavior is primarily driven by economic incentives. This is an important point for MHS dentists as well. The military does not want to retain only the most risk-averse dental officers; the Services want to retain productive dentists who are committed to positive patient outcomes.

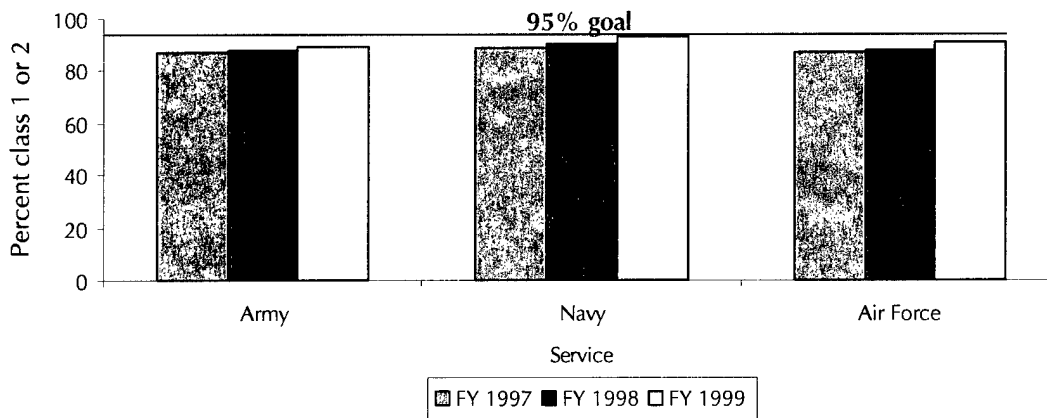
We believe that the most logical place to begin evaluating the overall performance of MHS dentists is the dental readiness classification

system because it focuses on the force health protection of the armed forces, demonstrates the constraints within the MHS to deliver dental care, and has stated objectives so one can measure improvement or decline. The dental readiness classification system has four segments:

- Dental class I—patients do not require dental treatment or evaluation within 12 months.
- Dental class II—oral conditions exist, but the examining dentist does not expect a dental emergency within 12 months. (Note: classes I and II are worldwide deployable.)
- Dental class III—patients have oral conditions that, if not treated, are expected to result in dental emergencies within 12 months.
- Dental class IV—patients who require dental examinations.

Figure 33 shows the Services' FY 1997 through FY 1999 track record in achieving the stated objective of having 95 percent of the armed forces in a class I or II status. We feel that the dental readiness classification posture is a reasonable aggregate starting point for evaluating the performance and productivity of MHS dentists and should be included in the annual uniformed dental pay review process.

Figure 33. MHS dental readiness classification posture, classes I and II (FY 1997–1999)^a



a. Source: OASD(HA).

Findings

Our analysis of uniformed dentists' retention, manning and readiness requirements, the effect of pay on retention, and review of the pending special pay proposals led to the following findings:

1. The size and structure of the dental corps has changed significantly over the last decade. The uniformed dentist inventory has become more junior and more senior with fewer mid-career dentists.
2. All of the Services have a shortage of mid-career (O-4) dentists, but the problem is most pronounced in the Army. This gap will make it more difficult for the Services to meet billet authorizations and readiness requirements as senior dentists retire and if the Services are unable to meet accession goals.
3. We find that the landscape has significantly changed from the 1980s when the vast majority of military dentists were directly accessed without any subsidization. In the mid-1990s, the \$30,000 direct accession bonus proved somewhat effective in meeting accession requirements. But by the late 1990s, the predominant accession source for MHS dentists had become the AFHPSP because of the increasing student debt load and uniformed-civilian dentist pay gap. We predict that the Services will increasingly rely on AFHPSP to enable the Services to consistently and reliably attract dentists into the military.
4. Although there are indications that retention has degraded over the last decade, we cannot definitively say that retention has declined, mainly because of the variability in retention from year to year throughout the last decade. However, it is reasonable to conclude that retention from FY 1991 to FY 2000 has certainly not improved.
5. Our survival analysis shows that the attrition rate of uniformed dentists, who have fewer than 5 YOS, increases 16.0 percent given a \$10,000 increase in the pay gap. This means that, for dentists with 4 YOS with an attrition rate of 17.95 percent, a \$10,000 reduction in the pay gap will reduce the attrition rate to 15.48 percent. For uniformed dentists with at least 5 but

fewer than 20 YOS, the attrition rate increases only 1.9 percent given a \$10,000 increase in the pay gap. Applying this figure to dentists with 15 years of service with an attrition rate of 2.05 percent means that a \$10,000 reduction in the pay gap will lower the attrition rate to 2.01 percent.

6. We find that reducing the uniformed-civilian dentist pay gap by \$10,000 results in improved retention and continuation. But even with a \$10,000 increase in military dental special pays, a huge pay gap still exists (\$59,000 for general dentists and \$103,000 for specialists).
7. Our projections show that the MHS will have slightly lower percent manning in FY 2003 (91 percent) than it did 10 years earlier (93 percent).
8. The projections also show that all Services will meet their overall readiness requirement in FY 2003.
9. We find that the current uniformed dental ASP special pay is inadequate to meet required force structure objectives.

Recommendations

Given the findings and results of our preceding analysis, we provide the following recommendations regarding military compensation of dentists.

AFHPSP accessions

To provide the Services with reliable and consistent accessions, the Services should plan to meet the majority of their total dental accessions through the AFHPSP because it has become increasingly difficult to acquire dentists through the direct accession pipeline.

ASP increase

The current uniformed dental ASP should be increased. Table 57 presents our ASP proposal—designed to improve uniformed dentist retention. Our proposal targets the group for which compensation increases will have the most impact on improving uniformed dentist

retention (those facing stay-leave decisions). Our rationale for this proposal compared to current ASP and the ASP proposal submitted to the ULB is based on the compensation profile, the predominant accession source, and the where ASP increases will have the most impact on retention.

Table 57. CNA ASP proposal compared to current ASP and ULB ASP

YOS	Current ASP	Proposed ASP submitted to ULB for FY 2003	YOS	CNA proposed FY 2003 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

Compensation profile

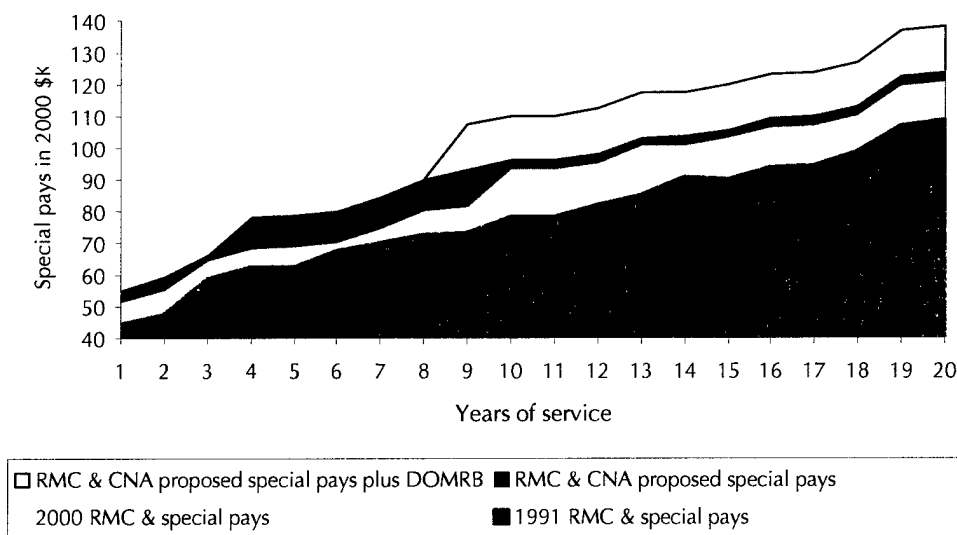
To see how our special pay proposal compares to historical and current real compensation (RMC, VSP, ASP, and BCP), we compare FY 1991 compensation to FY 2000 compensation and compensation with CNA's proposed ASP (see figure 34).⁸¹ Note that all pays in figure 34 are given in 2000 dollars and that the FY 2000 compensation as well as CNA's compensation proposal exclude DOMRB. We excluded DOMRB because it didn't exist in FY 1991.

The blue area represents FY 1991 real compensation, and the yellow and blue areas combined represent FY 2000 real compensation. Another way to interpret this figure is that the yellow area represents the increase in real compensation between FY 1991 and FY 2000. We observe that for all years of service, compensation in real terms is greater in FY 2000 than in FY 1991. We also observe that the compensation increase between FY 2000 and FY 1991 for those with 10 or more years of service is at least twice what it is for those with 9 or fewer years of service. (This comparison would be even more striking if

81. Because RMC is based on rank, we assumed promotions to O-4, O-5, and O-6 at 6, 12, and 18 years of service, respectively.

DOMRB were included.) In short, real compensation increases between FY 1991 and FY 2000 were directed largely at those with 10 or more years of service, with smaller increases going to those facing stay-leave decisions (those with 4 to 9 years of service). This is consistent with the “trough” or “hole” in the FY 2000 dental corps profile that exists for O-4s—a hole that didn’t exist in FY 1991.

Figure 34. FY 1991, FY 2000, and CNA proposed special pays in 2000 dollars



The red area in figure 34 represents the increase in real compensation between CNA’s compensation proposal and FY 2000 compensation. As stated previously, CNA’s proposal targets those facing stay-leave decisions with the largest increase, but it *never* generates a compensation profile that pays more to those with fewer years of service. Thus, it preserves the hierarchical structure of military compensation. Also, note that CNA’s proposal restores the compensation profile to approximately the same shape as the FY 1991 profile by making up for the smaller increase that was given to those with 4 to 9 years of service compared to the increase given to those with 10 or more years of service between FY 1991 and FY 2000.

As previously mentioned, the blue, yellow, and red areas in figure 34 don’t include DOMRB. If DOMRB is included, the potential

compensation of dental officers is increased by the amount shown in the green area. Because DOMRB is only available to those with at least 8 years of service, it increases the hierarchical structure of dental pay and rewards those who make a commitment to the military.

Predominant accession source

The MHS needs to structure its compensation plans around its predominant accession source—the AFHPSP. In recognition of the predominance and importance of this accession source, we propose changing the YOS groups used to determine ASP. We propose instituting a fewer-than-4-years group (rather than the current group of fewer than 3 years). The proposal submitted to the ULB would pay ASP of \$19,000 to those with 0 to 2 years and \$21,000 to those with 3 years. Dentists are normally obligated in this period because of 3- or 4-year AFHPSP (or direct accession with accession bonus). Paying a substantially increased ASP will most likely not improve retention because these dentists are already obligated.

Impact on retention

The ULB proposal would increase ASP to \$30,000 from \$15,000 for those with 10 or more years. This would have a minimal impact on retention for those with 10 to 19 YOS. Our analysis shows that it would reduce their attrition rate only 0.13 percentage point from 4.77 to 4.64 percent.

CNA's proposal provides some improvement in ASP for all groups, but it provides the greatest increases for mid-career dentists (O-4s), which is the precise group that the MHS has the most difficulty retaining. 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 eight years of service, that dentist seems to have made the decision to remain in the military. Therefore, CNA's proposal increases ASP from \$6,000 to \$16,000 for those with at least 4 but fewer than 9 years of service. ASP also increases for those with fewer than 4 years of service and for those with 9 or more years of service. Additionally, these proposed ASP increases preserve the hierarchical structure of ASP and adjust for inflation.

To see the impact of our ASP proposal, consider the average 8-year survival rate of 29.2 percent between FY 1991 and FY 1999. If Congress enacts our ASP proposal, we project that the 8-year survival rate will increase 10 percent, or 2.9 percentage points, from 29.2 to 32.1 percent.

Note that in making this ASP recommendation, we also considered the potential impact that changes in VSP, BCP, and DOMRB would have on improving retention. Our analysis shows that changes in BCP or DOMRB would have a negligible impact on retention of the target group (those with at least 4 but fewer than 9 years of service) because BCP is available only to board-certified specialists (certification typically occurs at 10 years of service) and DOMRB is available only to those with at least 8 years of service. Hence, increases in either the BCP or DOMRB would provide no additional compensation to dentists facing a stay-leave decision at the end of their initial ADO.

Increasing the VSP would have an impact on retention because it can be targeted to those facing this stay-leave decision, but it would be less cost effective than increasing ASP. The reason is that VSP is given to all dentists, including residents who are under obligation, whereas ASP is not given to residents.⁸²

82. One criticism of the current ASP structure is that officers must give up ASP during residency. Hence, the cost of the residency to the officer is the loss of ASP and the ADO associated with the residency program. However, in addition to costs, there are benefits. These benefits stem from the accumulation of human capital acquired during residency. If an officer chooses to remain in the military, the residency training is rewarded through BCP and DOMRB and improved promotion opportunities to the degree that specialty training is rewarded by promotion boards. Similarly, if a dentist chooses to leave the military, the residency training is rewarded through higher average net income of dental specialists compared to general dentists. If residents weren't required to give up ASP during residency, total compensation of residents would be greater than that of other dental officers of equal rank and YOS because of the human capital acquired during residencies.

Target experienced dentists

Our proposed changes to ASP are designed as a long-term solution to the current problem of a "hole" in the profile of dentists that exists for mid-career dentists. Note that our ASP proposal won't immediately remedy the hole, but it will reduce its occurrence in the future. In addition, this hole cannot be filled with new accessions or by improving retention of senior dentists (O-5s and O-6s).

As a short-term way to help fill in the hole, we recommend that the services use the \$30,000 accession bonus to target experienced dentists who could access as O-4s. We recognize that this will be difficult given the current uniformed-civilian pay gap, but any dentists who can be assessed as O-4s will help alleviate the current problem. We also recommend that the MHS explore expanding the Health Professions Loan Repayment Program (HPLRP) as a *retention tool* by offering to pay the student debt for eligible uniformed dentists facing their first stay-leave military decision.

Critical skills retention bonus

The critical skills retention bonus may help the Services meet readiness requirements in specialties that are below readiness levels. This is certainly the case for oral maxillofacial surgery, which is currently below readiness requirements in two of the Services. It may also be helpful to meet the MHS's readiness requirement in comprehensive/operative dentistry, which is also below its readiness level.

We feel that a better and more effective solution for oral maxillofacial surgeons is to group these specialists under the physician compensation program based on their extensive training program and the fact that their retention is closer to some of the physician surgeon specialties.

Inflationary adjustments

Statutory and discretionary pays should be reviewed every 3 years to consider adjustments in special pays for inflationary changes. Failure to make any adjustments in these pays for inflation will result in reduced pay parity and widening pay gaps even if civilian compensation does not increase in real terms. We recommend a review for

inflation every 3 years rather than an annual adjustment due to the difficulty such a binding constraint would place on the Services.

Track initial OSD

To gain a better understanding of retention, we strongly recommend that the initial obligated service date and accession source be strictly maintained and not overwritten with new obligated service dates resulting from special pay contracts or promotion advancement. Failure to isolate the initial OSD and accession source dates makes it extraordinarily difficult to more effectively evaluate retention, the effect of pay on retention, and the return on investment for costly AFHPSP quotas. By taking this management action, the MHS will be able to better understand retention patterns and how to address them.

Let's now turn our attention to the remaining other uniformed health care professionals to assess the adequacy of their current special pays and accession bonuses, when applicable.

Other health care professionals

Introduction

In phase I of this study, we compared *cash compensation* (excluding benefits) between selected uniformed and private-sector health care professionals. Our comparative analyses revealed the following:⁸³

- A significant uniformed-civilian compensation gap exists for optometrists and clinical psychologists at all career junctures, ranging from 13 to 29 percent.
- A 16-percent uniformed-civilian compensation gap exists for pharmacists at the entry level, narrows to 9 percent at the mid-junior juncture, and then reaches parity at later career junctures.⁸⁴
- Uniformed Certified Registered Nurse Anesthetists (CRNAs) experience a 10-percent compensation gap with their private-sector counterparts at the entry level, but recover and exceed civilian compensation at later points.
- Uniformed cash compensation for Physician Assistants, Registered Nurses, and APNs meets or exceeds their private-sector equivalents at all career junctures.

We found that the MHS relies heavily on several types of subsidized accession programs to initially attract these health care professional applicants to the military, or a particular specialty, and meet its total accession requirements. *This is a major change from the 1980s when the*

83. Reference [2], a February 2001 CNA report that documents phase I of this study, contains results of the compensation comparison of selected uniformed and private-sector health care professionals.

84. Preliminary 2001 civilian pharmacist salary surveys indicate that incomes may be on the rise in certain geographic regions and work settings because of increased demand for these specialists.

vast majority of MHS non-physician accessions were directly procured without any subsidization. Examples of subsidies being used include the Armed Forces Health Professional Scholarship Program (AFHPSP), enlisted upward mobility, in-service graduate training programs, and accession bonuses. Our analysis shows this trend continuing, and potentially increasing, for the following reasons:

- Increased student debt load
- Entry-level pay disparities for many specialties
- A dwindling number of health care professional graduates resulting in a decreased applicant pool for some specialties.

We now review the other health care professionals to determine their ability to fill both their peacetime and active component readiness requirements with the right people, and the right years of experience from today's force and future accessions.

Pharmacists

Inventory

As table 58 shows, the number of MHS pharmacists fell from 607 in FY 1991 to 502 in FY 2000. Upon closer examination, however, we see that it's the Army that has experienced the dramatic planned draw-down of active duty (AD) pharmacists—a 44-percent decrease—in the past decade, with a commensurate decrease in billets. On the other hand, the Navy has actually increased its AD inventory by a little under 3 percent, and the Air Force has experienced only about a 5-percent decrease in its pharmacy endstrength during the same time period.⁸⁵

85. Although this study does not include civilians, we remind the reader that, along with AD personnel, nearly 33,000 civilians work within the MHS's direct care system. For example, the FY 1999 Health Manpower Personnel Data System Report showed the Army employing 352 full-time equivalent (FTE) pharmacists, while the Navy had about 94 and the Air Force 23.

Table 58. MHS pharmacist inventory, by Service (FY 1991-2000)

Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	218	209	173	158	148	143	143	140	134	122
Navy	149	154	146	137	152	163	160	149	148	153
Air Force	240	259	260	245	235	247	250	256	243	227
Total	607	622	579	540	535	553	553	545	525	502
Percentage of females— total MHS	14%	17%	21%	22%	25%	27%	29%	30%	30%	30%

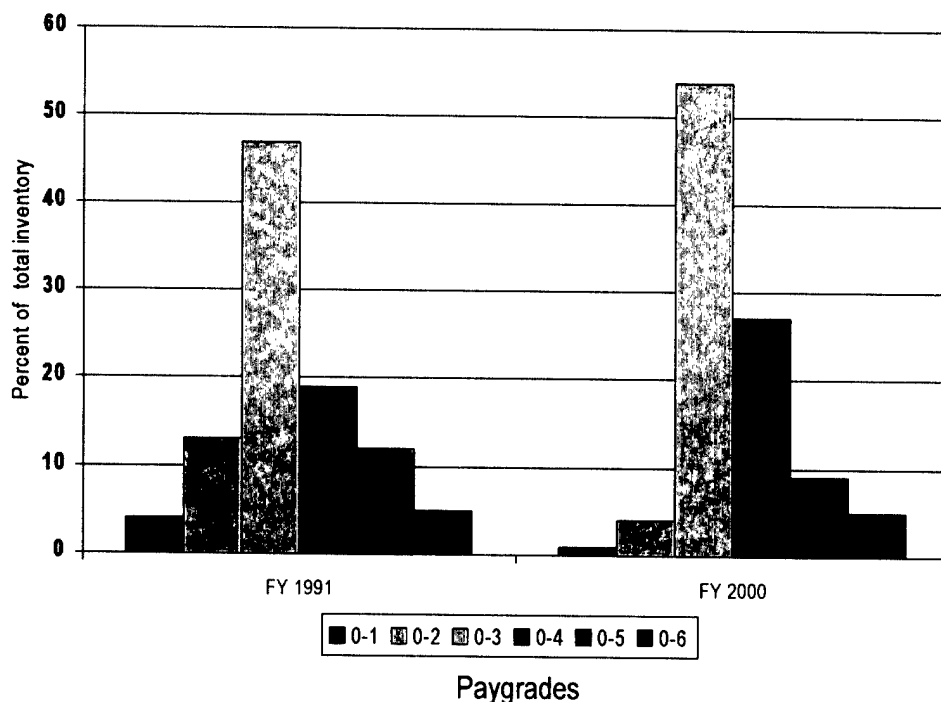
Table 58 also shows that, while the total number of MHS pharmacists has declined over the last decade, the percentage of females serving in this specialty has more than doubled. This percentage increase of females is consistent with our earlier findings, during phase I of the study, that women made up 63 percent of nationwide pharmacy degree graduates in 1999.

Grade structure

An important dimension in evaluating the MHS's ability to meet its workforce objectives is paygrade. Moreover, paygrade distribution—and the likelihood of being promoted—is an important factor to young MHS health care professionals when considering their first stay-leave military decision.

Figure 35 shows the distribution of the paygrade inventory of MHS pharmacists in FY 1991 and FY 2000. As expected, the percentage of O-1 and O-2 pharmacists has decreased over the last decade. The most typical MHS pharmacist accession today receives 4 years' entry grade credit and is accessed as an O-3 based on possession of a Doctor of Pharmacy (PharmD) degree. We also find that the percentage of O-4 MHS pharmacists has increased over the last decade from about 19 percent in FY 1991 to 27 percent in FY 2000. However, there has been a slight decrease in the percentage of O-5s, during the same time period, from 12 percent in FY 1991 to about 9 percent in FY 2000. The percentage of O-6 pharmacists has remained relatively unchanged at 5 percent. Overall, it appears that the MHS pharmacist workforce is aging slightly.

Figure 35. MHS pharmacist total inventory, by paygrade (FY 1991 versus FY 2000)



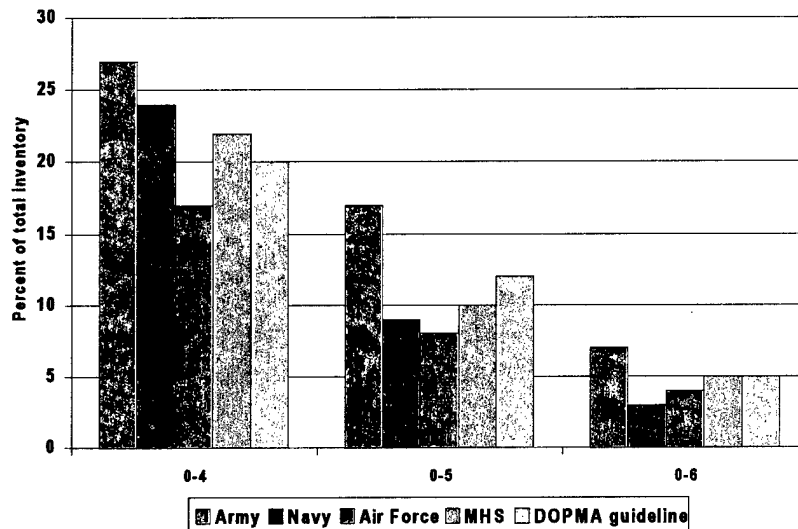
In 1980, Congress passed the Defense Officer Personnel Management Act (DOPMA), which stipulates (i.e., controls) the percentage of inventory that may be promoted to paygrades O-4 through O-6. On average, the DOPMA guidelines for the allowable percentage of inventory for a given officer community are 5 percent for O-6, 12 percent for O-5, and 20 percent for O-4.⁸⁶ In figure 36, we look at the average *control* paygrade distribution, as a percentage of the total pharmacy inventory, by service, for the last decade.

Figure 36 shows that the Army has a larger percentage of control grade inventory than the other two services, for this particular specialty, and has historically exceeded the DOPMA guidelines. The Navy also exceeds DOPMA guidelines for paygrade O-4 but is slightly below the guideline for paygrades O-5 and O-6. The Air Force is

86. The guidelines presented are predominant patterns congruent with DOPMA. Each military department has its own promotion policy. For example, a particular 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 grade force structure.

below DOPMA guidelines, for this particular specialty, at each paygrade.⁸⁷

Figure 36. Average percentage of control paygrade pharmacist inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines



At this juncture, we discuss one of the philosophical differences in the military departments about managing its control grade inventory. *The Army has decided to control its paygrade structure by specialty.* The Army has established, and primarily promotes to, a paygrade requirement for each specialty while living within the total DOPMA guidelines for a particular corps/designator. *The Navy and Air Force control their paygrade structure for the community as a whole, not by specialty.* They do not establish promotion quotas, by specialty, but select “the best

87. As we discussed in phase I of this study, the MHS is increasingly accessing other health care professionals as O-3s, in addition to physicians and dentists, because of the educational program length for so many specialties. For many specialties, a uniformed-civilian pay gap also exists, making them potentially difficult to access initially and to retain in the military. Although beyond the scope of this study, we feel that the existing DOPMA policies should be evaluated for several MHS health care specialties in conjunction with the life-cycle cost of accessions.

qualified officer" from the pool of officers eligible for selection to promotion in a given fiscal year. Both approaches have strong points. The Army believes that its system works best because it helps ensure that today's inventory has the right specialist with the right grade to meet its objective force model requirements. The Navy and the Air Force prefer their process because it allows them the flexibility to select people who have already demonstrated the ability, or have the most potential, to serve in command or staff positions requiring strong leadership and keen judgment.

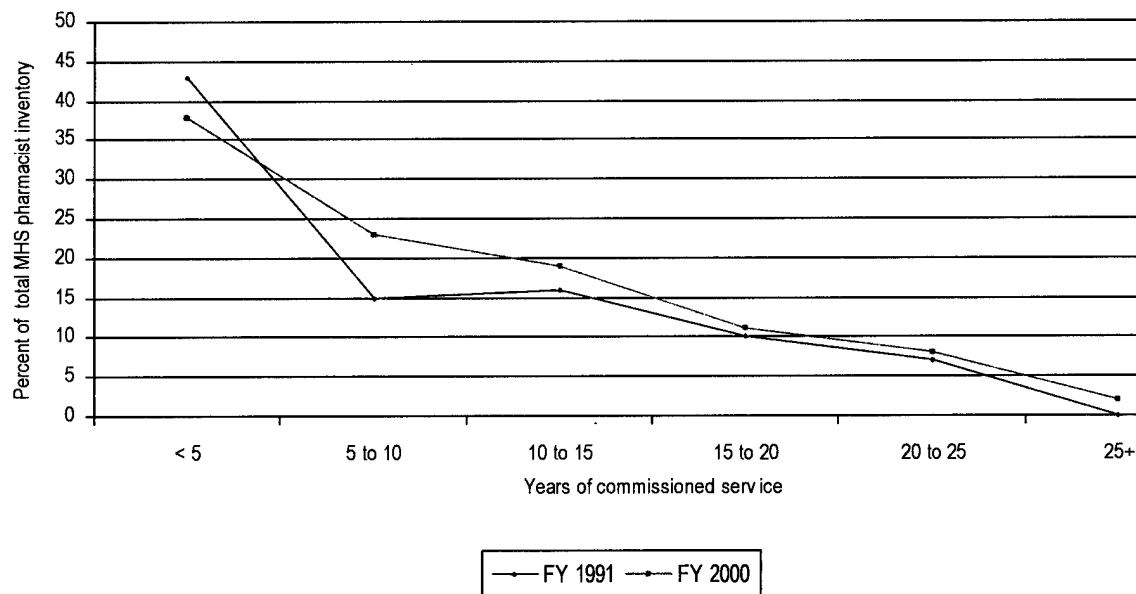
Regardless of which approach is used, we believe that the Services must recognize and reward *clinical excellence*, in addition to management skills, particularly for promotion to paygrades O-4 and O-5. We think that the Army's promotion policy sends a clearer signal to its junior front-line clinicians on the importance of their profession and the probability of being promoted to control grades, which may be one of the reasons its pharmacist inventory is more senior than that of the other two Services. Moreover, the Air Force may want to consider tailoring its O-4 and O-5 promotion board precepts, for this particular specialty, to raise its senior pharmacist paygrade inventory nearer DOPMA guidelines.

Years of experience

Another important dimension to evaluating the effectiveness of a specialty's force structure is years of commissioned service (YOCS). In figure 37, we show the YOCS for total MHS pharmacists in FY 1991 and FY 2000.⁸⁸ The YOCS distribution is consistent with the paygrade results reported earlier and reflects the percentage increase in paygrades O-3 and O-4. Note the decline of about 5 percent in the number of officers with under 5 YOCS from FY 1991 to FY 2000. We will now explore this issue in more detail.

88. The distribution of the MHS pharmacists by years of service (YOS) is congruent with the YOCS pattern shown. This does not surprise us because the majority of military pharmacists are accessed immediately following graduation from pharmacy school.

Figure 37. MHS pharmacist inventory, by YOCS and percentage (FY 1991 versus FY 2000)



Accession and attrition trends

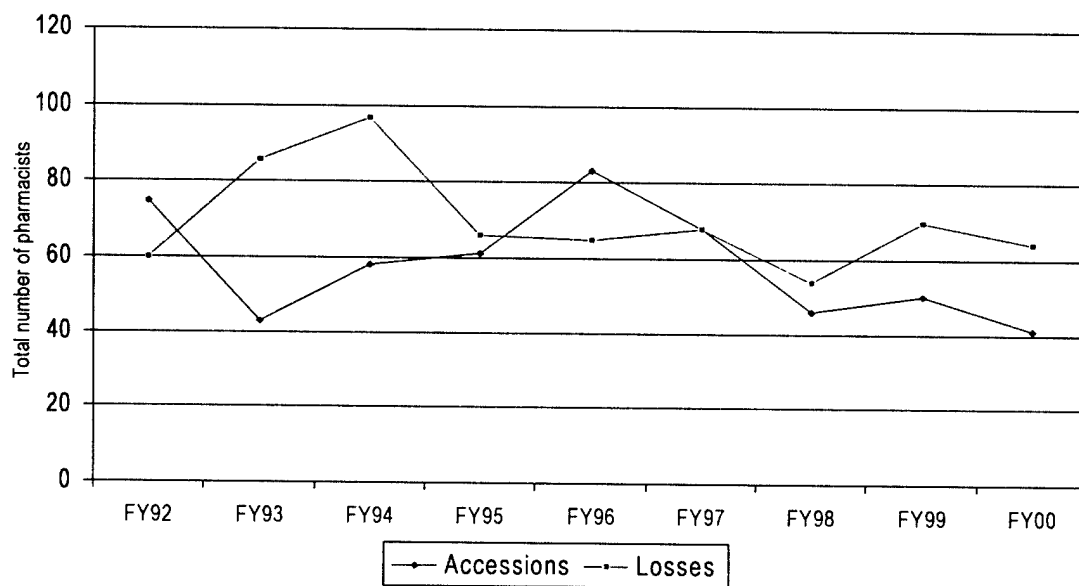
We now explore the accession and attrition trends for military pharmacists. Because of DMDC data limitations, we were unable to isolate the accession source for pharmacists. We also had to create a longitudinal data file that isolates new pharmacist accessions in FY 1992 through FY 2000 by assuming that, if an officer did not exist in the DMDC data in the previous year, that person is a new accession. We used a similar approach to determine losses.⁸⁹

Figure 38 provides the number of MHS pharmacy accessions and losses from FY 1992 to FY 2000. As expected, we see that the number of losses exceeded the workforce accessions in the early 1990s as the Army deliberately downsized its pharmacist inventory. In FY 1996, this trend reversed and the accessions exceeded the losses, primarily

89. Based on discussions with Service representatives and comparison of our results with previous HMPDS reports, we believe we have reasonably captured both accessions and losses for the communities reported.

driven by a high number of Air Force accessions. (The MHS accessed 83 pharmacists in FY 1996: 14 for the Army, 24 for the Navy, and 45 for the Air Force.) As the decade closed, however, the pattern of more losses than accessions returned.

Figure 38. MHS pharmacist accessions and losses (FY 1992 through FY 2000)



To better understand this issue, we compared the *average* YOCS distribution of the *losses* who left the military with less than 5 YOCS in FY 1992–1999 and FY 2000. Figure 39 shows that junior pharmacists who left the military in FY 2000 did not remain on active duty as long as the historical pattern. Previously, about 40 percent of losses had less than 5 YOCS; in FY 2000, this group had grown to 60 percent. Our analyses lead us to believe that the MHS is having a more difficult problem retaining junior pharmacists today than in the past.

Retention

As part of our analysis, we want to determine whether the retention behavior of uniformed pharmacists has changed over the last decade. We explore this topic by examining the continuation patterns for MHS pharmacists over the last decade. Figure 40 plots the survival (continuation) curves of uniformed pharmacists for the last decade.

Figure 39. MHS pharmacist losses, by < 5 YOCS and percentage of total (average FY 1992–1999 versus FY 2000)

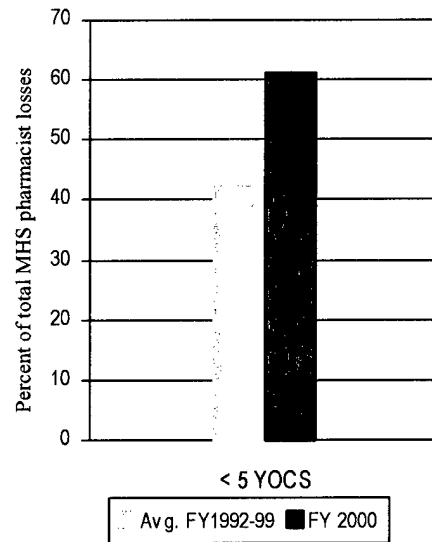
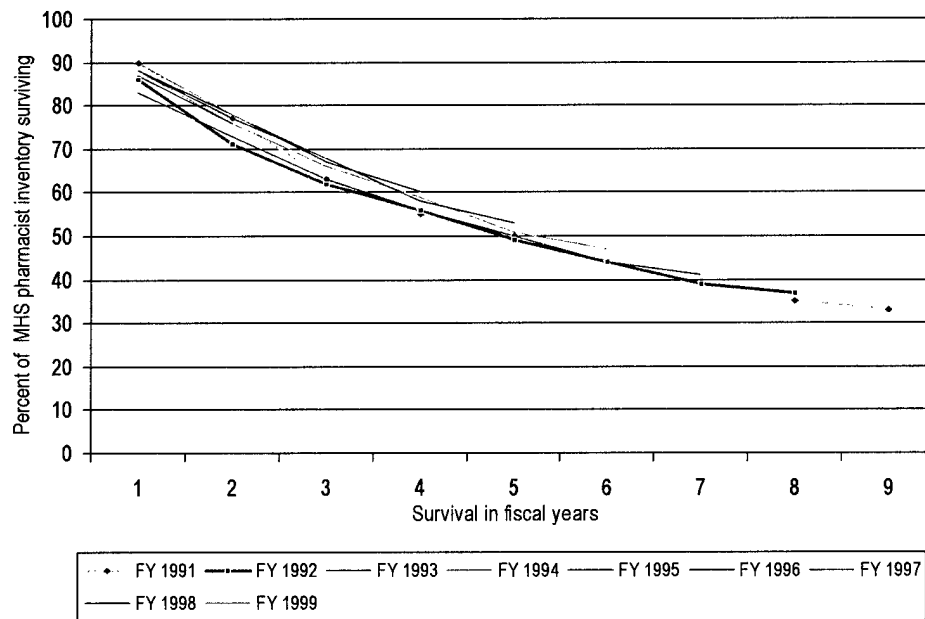


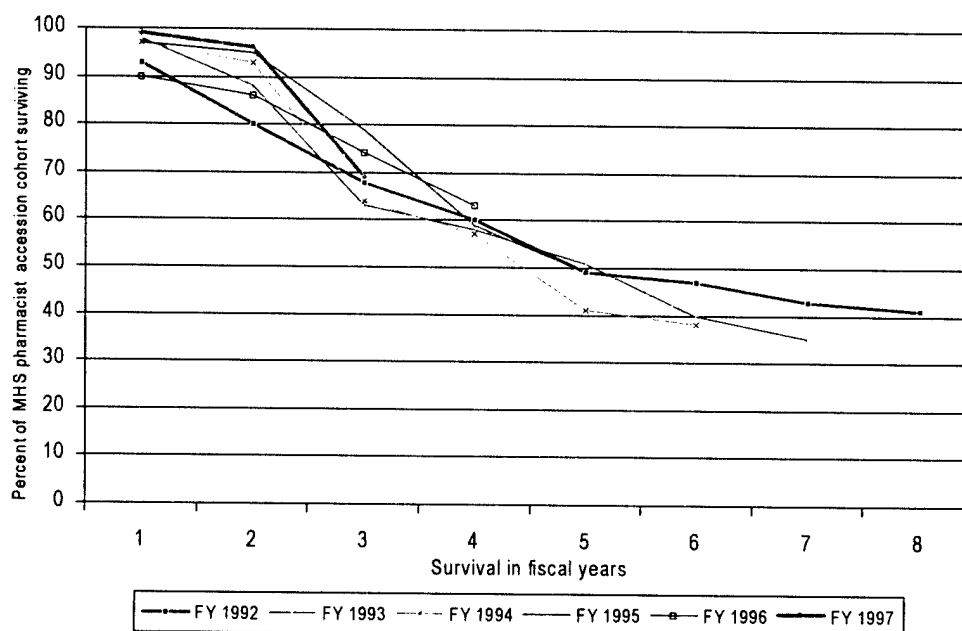
Figure 40. MHS pharmacist survival curves (FY 1991 through FY 1999)



Of the 607 MHS pharmacists who were on active duty in FY 1991, 201 remained on active duty through FY 2000.⁹⁰ We see that the continuation rates in FY 1993 and FY 1994 were lower, showing the effect of the Army's drawdown, but overall there has been no marked change in the aggregate retention over the last decade. The average, aggregate annual loss rate for this specialty is 12.5 percent.

Based on our previous analysis, we know that the MHS is having some difficulty retaining junior pharmacists. To provide insight into this problem, we constructed the FY 1992–1997 MHS pharmacy accessions and track the survival of these cohorts in figure 41.

Figure 41. MHS pharmacist survival curves (accession cohorts FY 1992 through FY 1997)



90. Continuation rates measure the percentage of pharmacists on active duty at the beginning of a fiscal year who remain (continue) on active duty into the next fiscal year.

We find a slight downward trend that is getting somewhat steeper. Of the 61 pharmacists accessed in FY 1995, only 31 remained on active duty through FY 2000. This trend supports our earlier findings that the military is having some difficulty retaining junior pharmacists.

Manning

As we have previously discussed, determining adequate compensation lies in DoD's ability to achieve its workforce objectives. We now evaluate the MHS's ability to meet both its peacetime and readiness requirements for pharmacists.⁹¹

In table 59, we display the projected endstrength, billets, and readiness requirements for each Service. The MHS will have 486 active duty pharmacists in its inventory at the end of FY 2001. The projected gains and losses for FY 2002 and FY 2003 are also included based on the Services' historical accession and loss trends.⁹²

Table 59. Projected MHS pharmacist manning, billets, and readiness requirements, by Service (FY 2001–2003)

	Army	Navy	Air Force	MHS
FY 2001 endstrength	128	157	201	486
FY 2002/3 projected gains	32	37	48	117
FY 2002/3 projected losses	24	33	36	93
FY 2003 projected endstrength	136	161	213	510
FY 2003 billets	154	160	256	570
Projected FY 2003 billet fill rate	88%	101%	83%	89%
Readiness requirement	121	65	46	232
Projected FY 2003 readiness fill rate	112%	248%	463%	220%

91. We gratefully acknowledge the assistance of many Service representatives who gave us invaluable support and provided information on the FY 2001 inventory, billet authorizations, and readiness requirements for their communities that allowed this analysis to be conducted.

92. The projected gains assume that the Army and the Air Force continue to fund only a \$10,000 signing bonus and that the Health Professions Loan Repayment Program (HPLRP) is only available as an accession tool.

As we can see, the billet authorizations vary by Service, with the Air Force at 256, followed by the Navy at 160, and the Army at 154. The order is reversed when we look at the readiness requirement, with the Army at 121, followed by the Navy at 65, and the Air Force at only 46. The projected manning for the Navy looks good, whereas the Army will be manned at only 88 percent of its billet requirements. The Air Force is experiencing the largest manning shortfall—83 percent—but it will have over 70 more AD pharmacists than the Army. We note that the projected FY 2003 MHS pharmacist endstrength of 510 well exceeds the readiness requirement. This projected endstrength, however, is predicated on forecasted losses and the Services' ability to achieve their accession goals. This naturally leads us to our assessment of the adequacy of pharmacy accession bonus.

Pharmacist accession bonus

In the 1980s, the Services' predominately met their pharmacist accession quotas, without any subsidization, through the direct procurement pipeline. Unfortunately for the military, by the 1990s, the market had changed and each of the Services was struggling to devise ways to meet accession quotas. The chronic inability of the Services to achieve the required pharmacy accessions and the rising pharmacy student debt load, in conjunction with increasing education program lengths, prompted Congress in FY 2001 to authorize a \$30,000 pharmacist accession bonus. At this time, however, only the Army and the Air Force have appropriated a \$10,000 signing bonus. The Navy has not elected to appropriate the bonus.⁹³

As we will see, the Services have devised a variety of methods to help achieve their required pharmacy accessions while awaiting full implementation of the \$30,000 signing bonus:

93. As discussed in the historical perspective section, "structural tension points" sometimes exist between the military departments and the MHS. The MHS relies on the military departments to appropriate (i.e., execute) accession bonuses. Because of many competing priorities for manpower dollars, there can be a significant lag time between the authorization of an accession bonus and the appropriation of funding.

- The Navy's predominant pharmacist accession source is the Health Services Collegiate Program (HSCP), which has proved successful in achieving desired quotas.⁹⁴ However, line Navy recently informed BUMED that it may not continue to support this program because of funding and endstrength issues. BUMED would like to supplement the HSCP program with two to four direct procurement accessions yearly.
- The Army accessed 13 pharmacists in FY 2001: 8 from the Health Professions Loan Repayment Program (HPLRP), 4 who received a combination of HPLRP and accession bonus, and 1 direct accession.⁹⁵ The Army will try to use a blend of the HPLRP and \$10,000 accession bonus to meet its accession goal of 16 in FY 2002, pending the additional funding of the signing bonus.
- The Air Force is having the most difficulty achieving its required accessions, largely because it is trying to grow its AD pharmacist inventory from 201 to 256 by FY 2003. In FY 2001, the Air Force accessed 17 pharmacists: 10 direct accessions, 5 AFHPSP, and 2 from Reserve Officers Training Corps. The FY 2001 recruiting goal for direct procurements was 64, and the goal for FY 2002 is 55. However, the Air Force has already begun expanding the use of the AFHPSP to meet its total accession requirements. In FY 2002, it will access 12 AFHPSP graduates.

It is difficult to assess the adequacy of the \$30,000 pharmacist signing bonus because it hasn't been fully implemented. The arguments for continuing to subsidize pharmacy accessions in the future follow:

- Each of the Services' existing reliance on subsidized accession programs to currently access pharmacists

94. HSCP accessions are subsidized during the last 2 years of a pharmacy school by being paid junior enlisted pay while they are in school in return for a 3-year ADO after finishing school.

95. The HPLRP provides qualified candidates reimbursement up to \$25,173 annually for student debt loans. The HPLRP was designed as an accession tool and the funding for this program is at the expense of the AFHPSP/FAP budget. The MHS is evaluating whether to use this program as a "retention" tool by offering to pay student debt loans for active duty specialists making a stay-leave military decision.

- The Air Force's inability to achieve direct procurement goals, particularly in light of its desire to increase inventory levels
- The increasingly high pharmacy school student debt load
- The uniformed-civilian pharmacy entry-level pay gap.

We recommend that the military departments and MHS policy-makers collaborate to appropriate the necessary funds for the uniformed pharmacist signing bonus so that DoD will have a *predominant accession source* for this community and be confident of achieving required accessions.

Pharmacist special pay proposal

Ideally, before any special pay plan is generated, we believe that DoD should:

1. Validate its readiness requirement for a particular specialty.
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 predominant accession source, including the active duty obligation associated with that program, to ensure a consistent and reliable throughput of new gains that takes into account student debt load and private-sector compensation.⁹⁶

96. From the Services' perspective, AFHPSP and HPLRP accessions have major advantages. First, AFHPSP accessions provide more reliability to the personnel planning process. Second, graduates may be assigned anywhere because their schooling has been subsidized. One difficulty with signing bonuses, however, is that the military must not only attract a quality candidate, it must also offer a geographic location (i.e., duty station) that will satisfy the person. Third, funding for these programs resides within the DHP, so the Services aren't reliant on the military departments. AFHPSP and HPLRP are expensive, however, and increasing demand will be placed on quotas for these programs.

4. Establish a retention rate goal—at critical military career junctures—when a specialist is most likely to be at stay-leave military decision points based on the predominant accession source and career pattern.⁹⁷
5. Closely track and record retention rates at the stay-leave military decision to determine if the retention goal is being met.
6. Develop and fully exhaust retention bonus alternatives.
7. Based on a particular specialty's retention trends, initiate or adjust special pays to shape the retention and force structure needs not being met with the current compensation plan.

In addition to Congress authorizing a signing bonus in FY 2001, a separate uniformed pharmacist special pay plan was authorized and is scheduled to be appropriated in FY 2002 (see table 60).

Table 60. MHS FY 2002 pharmacist special pay plan

YOS	Current amount
<3	\$3,000
3-6	\$7,000 ^a
6-8	\$7,000
8-12	\$12,000
12-14	\$10,000
14-18	\$9,000
>18	\$8,000

a. Pharmacists undergoing internships are not eligible for special pay.

Certainly, this special pay plan is not based on the MHS's ability to meet its pharmacists' readiness role because the inventory exceeds

97. As discussed earlier, the Army used a blend of the HPLRP and signing bonus to access four pharmacists in FY 2001. The ADO for these specialists is 8 years. If the Army continues to use this program successfully, it will alter the historical retention behavior of its junior pharmacists.

that requirement by over 200 percent.⁹⁸ We have also found that the paygrade and years of experience distribution for MHS pharmacists has actually increased over the last decade, with the exception of a slight decrease in the percentage of O-5s. Moreover, the projected billet fill rate for MHS pharmacists is slightly less than 90 percent. **Policy-makers should note the salient point of this analysis**—*when a reliable and predominant accession source is achieved (as the Navy has accomplished for pharmacy), the manning difficulties are significantly diminished.* The potential long-term significant problem this specialty is facing is the need to attract and retain junior pharmacists.

In addition to the aggressive accession campaign discussed earlier, we recommend *expanding the use of the HPLRP as a retention tool* to eliminate the student debt load for those pharmacists who are at their first stay-leave military juncture.⁹⁹ Our survival curve analysis shows that, once MHS pharmacists survive to the 8-years-of-service juncture, their continuation in the military stabilizes. The current data do not support the need for such a robust special pay at this time. We strongly recommend that the current uniformed pharmacist special pay be held in abeyance and that the Under Secretary of Defense (Personnel and Readiness) closely monitor this community because it illustrates many of the “structural tension points” that exist in DoD today. If DoD, the Services, military medical departments, and TMA work together to establish a reliable accession pipeline for this community, the need for the special pay plan may be eliminated. *If these agencies fail to work together to resolve several issues for this community, a retention bonus will most likely be required for this specialty if DoD decides it wants to fill all of its AD billets.*

As we discussed in the first phase of this study, the role of pharmacists, both in the private sector and in the military, is critical to the delivery of cost-effective and high-quality health care. Uniformed pharmacists

98. The Army and Navy report contracting for about 70 full-time equivalent (FTE) pharmacists, at an average rate of about \$42/hour, or a little over \$86,000 per contract. The FY 2002 average officer programming rate (including permanent change of station) for the Services is \$96,615.

99. The Army may want to explore the critical skills retention bonus for pharmacists based on its projected manning shortfalls.

will have increasing civilian job opportunities—offering competitive salaries—in the near term. *The Kaiser Daily News* recently reported that 6 percent of pharmacist positions (about 6,500) at U.S. chain stores are vacant. A recent American Hospital Association survey report indicated that 21 percent of hospital pharmacist positions (about 12,600) are unfilled. DoD must remain cognizant of these trends because the pharmacists play a critical and expanding role in the health care delivery process. The last decade produced an explosion of pharmacological agents designed to prevent and treat disease, increasing pressure to control formulary costs while satisfying beneficiary expectations and meeting the day-to-day prescription refill demands.

As we have previously discussed, a significant variance exists between the Services on their active component (AC) readiness requirements and their use of civilian pharmacists (both civil service and contract). The bottom-line question for DoD (in terms of this community and several others) is:

What is the most cost-effective way to provide these services, after the readiness requirement threshold has been achieved?

Once that question is answered, the military departments, TMA, and the Services must work together closely to develop an integrated personnel planning process that includes a reliable accession pipeline, effective promotion planning, and targeted retention bonuses (as necessary) to achieve the desired inventory.

We are now ready to conduct a cursory review of the remaining health care professionals. Many of the issues we just explored in the pharmacist section are equally applicable to these next communities as well.

Optometrists

Inventory

The number of MHS optometrists fell from 479 in FY 1991 to 364 in FY 2000, a 24-percent decrease (see table 61). The Air Force experienced the sharpest inventory decline, a 30-percent reduction, followed by the Army and the Navy, at 23 and 15 percent, respectively. Although the total number of MHS optometrists has declined over

the last decade, the percentage of females serving in this specialty has doubled, from 10 to 20 percent, in the same time period.

Table 61. MHS optometrist inventory, by Service (FY 1991-2000)

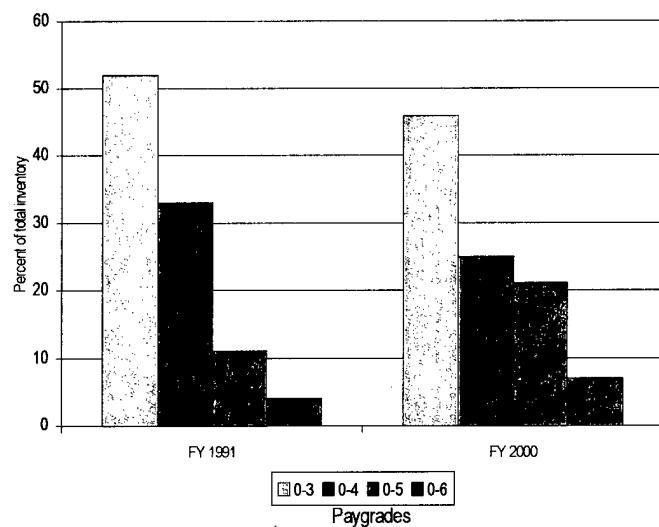
Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	151	158	145	139	132	122	121	115	120	116
Navy	127	124	130	125	117	115	119	113	111	108
Air Force	201	202	196	190	182	177	159	152	146	140
Total	479	484	471	454	431	414	399	380	377	364
Percentage of females—total MHS	10%	14%	18%	17%	19%	20%	21%	21%	20%	20%

Grade structure

Paygrade is an important factor in evaluating the MHS's ability to meet its workforce objectives. Figure 42 shows the distribution of the paygrade inventory of MHS optometrists in FY 1991 and FY 2000. We can see that the percentage of O-3 optometrists has dropped slightly in the last decade from 51 to 46 percent. The most dramatic decline has occurred in paygrade O-4, from 33 percent of the total inventory in FY 1991 to only 25 percent in FY 2000. When we look at paygrades O-5 and O-6, however, the trend is reversed as the percentage of O-5s has risen almost 10 percent in the last 10 years, from 11 to 21 percent, and the percentage of O-6s has increased from 4 percent in FY 1991 to 7 percent in FY 2000.

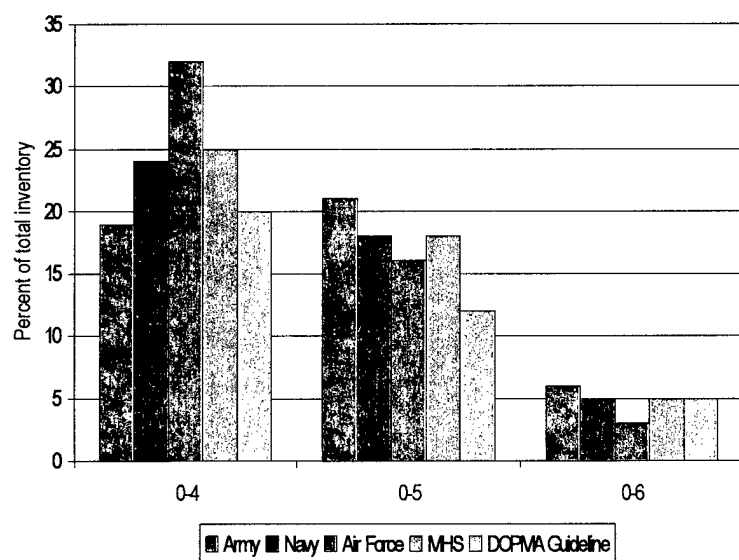
Let's now compare the average control paygrade distribution, as a percentage of the total optometrist inventory, by Service, for the last decade. Figure 43 shows that the MHS, as a whole, meets and normally exceeds DOPMA guidelines at all paygrades. Moreover, the Services are usually within DOPMA guidelines at all paygrades, with the exception of the Air Force at paygrade O-6.

Figure 42. MHS optometrist total inventory, by paygrade (FY 1991 versus FY 2000)^a



a. The Army reported a small percentage of optometrists as O-2s in FY 1991–1992, so we added them to the O-3 grade for clarity. Because the current minimum educational requirement to practice as an optometrist is an accredited Doctor of Optometry degree, a uniformed optometrist's paygrade upon entering active duty is O-3.

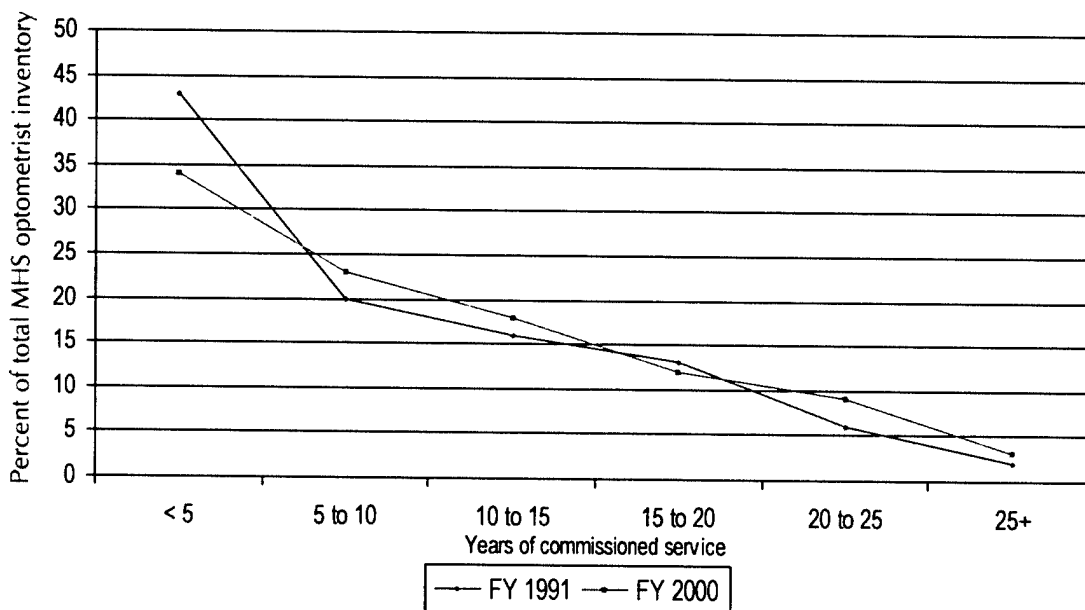
Figure 43. Average percentage of control paygrade optometrist inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines



Years of experience

Another important dimension to evaluating the effectiveness of a specialty's force structure is years of commissioned service (YOCS). In figure 44, we show the YOCS for total MHS optometrists in FY 1991 and FY 2000.¹⁰⁰ The YOCS distribution shows that MHS optometrists, as a whole, are getting slightly older and that a larger percentage of this specialty is remaining past 20 years of service compared with a decade ago. Notice the slope of the FY 2000 continuation curve. It does not "level off" until 15 to 20 YOCS, which may indicate that uniformed optometrists may be more likely to continue to consider civilian opportunities and that failure of selection to promotion to O-5 affects optometrist continuation in the military.

Figure 44. MHS optometrist inventory, by YOCS and percentage (FY 1991 versus FY 2000)



100. The distribution of the MHS optometrists by years of service (YOS) is congruent with the YOCS pattern—no surprise because most military optometrists are accessed right after graduation from optometry school.

Accessions and attrition trends

We now explore the accession and attrition trends for military optometrists over the last decade (see figure 45). We were disappointed that the DMDC accession source data limitations did not allow us to isolate the accession source for optometrists.¹⁰¹ This information is critically important for this specialty because the military must subsidize their optometrist accessions—a significant change from the 1980s.

Figure 45. MHS optometrist accessions and losses (FY 1992–2000)

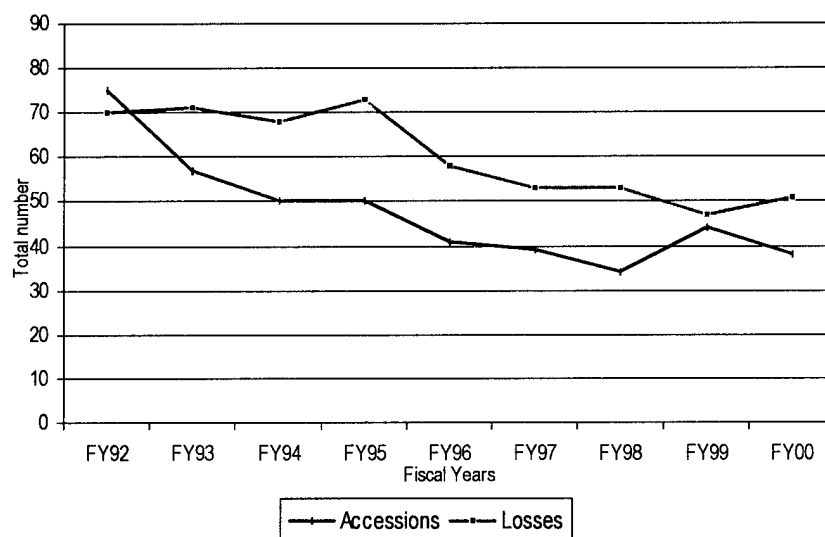
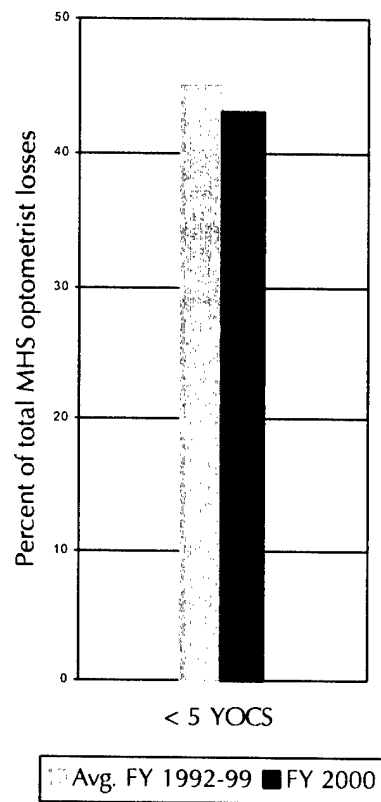


Figure 45 provides the number of MHS optometrist accessions and losses for FY 1992–2000. The total number of losses exceeds the number of gains each year since FY 1993. The losses peaked between FY 1993 and FY 1995 during the military downsizing.

¹⁰¹ We created a longitudinal data file that isolates new optometrist accessions in FY 1992–2000 by assuming that any officer who did not exist in the DMDC data in the previous year is a new accession. We used a similar approach for losses. Based on discussions with Service representatives and comparison of our results with previous HMPDS reports, we believe we have reasonably captured accessions and losses for these communities.

Let's now compare the *average* YOCS distribution of the *losses* who left the military, with less than 5 YOCS, between FY 1992 and FY 1999 with those who left in FY 2000 (see figure 46). These data show that the military continues to struggle with retaining junior optometrists and that a little less than half of total losses occur before 5 YOCS.

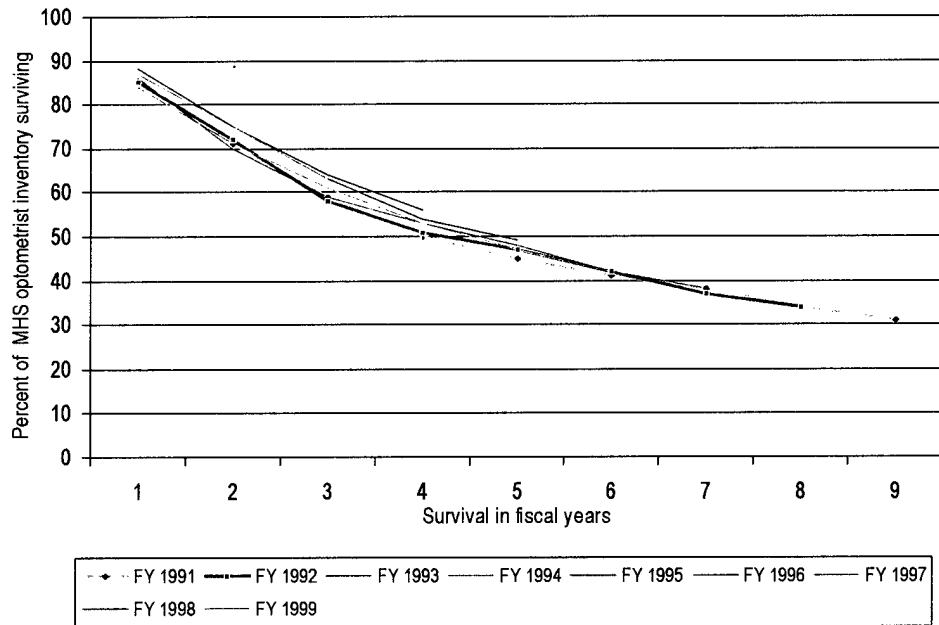
Figure 46. MHS optometrist losses, by < 5 YOCS and percentage (average FY 1992–1999 versus FY 2000)



Retention

To determine whether the retention behavior of optometrists has changed over the last decade, we examine the continuation patterns for MHS optometrists over the last decade. Figure 47 plots the survival (continuation) curves of uniformed optometrists. Of the 479 MHS optometrists who were on active duty in FY 1991, 364 remained on active duty through FY 2000. The average, aggregate annual loss rate for this specialty is 14 percent.

Figure 47. MHS optometrist survival curves (FY 1991–1999)



We constructed the FY 1992–1997 MHS optometrist accessions and track the survival of these cohorts in figure 48.

Figure 48. MHS optometrist survival curves (accession cohorts FY 1992–1997)

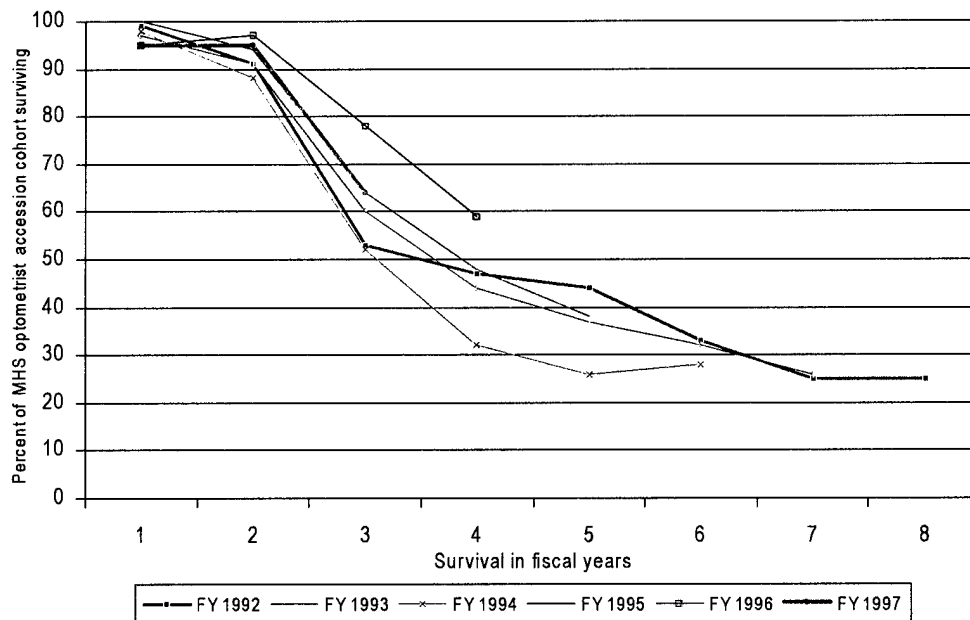


Figure 48 shows a sharp downward trend at the end of the initial active duty obligation. Of the 75 optometrists accessed in FY 1992, only 19 remained on active duty through FY 2000. This trend shows that the military is having some difficulty retaining junior optometrists. Two likely reasons for this difficulty are the large uniformed-civilian optometrist pay gaps, at all military career junctures, and the high student debt load for this specialty. We will discuss this issue in more detail later in the study.

Manning

As we have previously discussed, determination of adequate compensation lies in DoD's ability to achieve its workforce objectives. We now evaluate the MHS's ability to meet both its peacetime and readiness mission requirements for optometrists.

In table 62, we display the projected endstrength, billets, and readiness requirements for each Service. The MHS will have about 355 active duty optometrists in its inventory at the end of FY 2001. The projected gains and losses for FY 2002 and FY 2003 are also included based on the Services' historical accession and loss trends. The billet authorizations vary by service, with the Air Force at 155, followed by the Army at 133, and the Navy at 127. The readiness requirement also varies by Service with the Army at 83, followed by the Navy at 57, and the Air Force at 26. We project the FY 2003 MHS manning for optometrists will be 87 percent; this shortfall is consistent among the Services. The projected FY 2003 MHS optometrist endstrength of 362 significantly exceeds the readiness requirement.

Table 62. Projected MHS optometrist manning, billets, and readiness requirements, by Service (FY 2001–2003)

	Army	Navy	Air Force	MHS
FY 2001 endstrength	108	104	143	355
FY 2002/3 projected gains	29	34	28	91
FY 2002/3 projected losses	22	29	33	84
FY 2003 projected endstrength	115	109	138	362
FY 2003 billets	133	127	155	415
Projected FY 2003 billet fill rate	86%	86%	89%	87%
Readiness requirement	83	57	26	166
Projected FY 2003 readiness fill rate	139%	191%	531%	218%

All three Services have difficulty accessing optometrists through the direct procurement pipeline because there is no accession bonus for this specialty. In FY 2001, the Air Force had a direct procurement recruiting goal of 41 and achieved only 7. The Army and the Navy don't set high direct procurement recruiting goals because of the dismal track record in attaining optometrists through this accession source. All three Services have begun relying on the AFHPSP as the predominant accession sources, but quotas are limited.

In the first phase of this study, we showed that the uniformed-civilian optometrist pay gap hovers around 28 percent throughout all career points and that the average debt load for optometry school is around \$100,000. Personal service contracts for optometrists do not appear to be a viable or economical option. The Services report only 13 optometry contracts in existence today, and the average cost is about \$112,320 per FTE, which exceeds the average FY 2002 officer programming rate by about \$16,000.

Based on the inability of each Service to meet 90-percent manning thresholds, the historical poor retention of junior optometrists, the large uniformed-civilian pay gap, the cost of personal service contracts, and the rising student debt load pay gap, we find that the MHS will become increasingly reliant on 3- and 4- year AFHPSP or HPLRP quotas to meet its total optometrist accession and billet requirements. We do not think that in the long run a signing bonus will allow the MHS to consistently and reliably access required optometrists.

Optometry retention bonus

There is a proposal to implement an optometrist retention bonus (ORB) beginning 1 October 2001 for those eligible officers who:

- Have been on active duty for a period of not less than 1 year
- Are not under any obligation for any other government subsidized program, such as AFHPSP or HPLRP
- Are not undergoing an initial internship or residency program.

An annual 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.

Like pharmacists, the MHS optometrist inventory exceeds its readiness requirements by a significant degree—over 200 percent. Again, the bottom-line question for DoD to answer (for this community and several others) is: What is the most cost-effective way to provide these services, after achieving the readiness requirement threshold?¹⁰²

In addition, we believe that expanding the use of the HPLRP as a “retention tool,” to eliminate the student debt load for those optometrists who are at their first stay-leave military juncture, should be aggressively explored. In addition, we feel that optometrists should be considered for CSRBs, although it is our understanding that the dollars to fund this program are constrained.

Our analysis shows that the ORB has merit for the following reasons:

- We project that the MHS will become more reliant on 3- and 4-year AFHPSP quotas because of the \$100,000 optometry student debt load. Therefore, an aggressive effort should be made to retain optometrists to reduce the need for this costly accession source.
- AFHPSP has become the predominant accession source for this specialty, and we see that trend continuing.
- A 27- to 31-percent uniformed-civilian optometrist pay gap exists at all military career junctures.
- With the exception of the Air Force at paygrade 0-6, the Services’ control grade inventories are exceeding DOPMA guidelines, so the promotion component of compensation for uniformed optometrists has virtually been exhausted for this community.

¹⁰²We believe that a separate in-depth analysis—although beyond the scope of this study—needs to be conducted, for all the communities included in this report, to determine the life-cycle and replacement costs for each specialty.

- Our analysis shows that optometrist losses have exceeded gains every year in the last decade, even in periods when the military was not deliberately downsizing its force.
- Our survival analysis shows that the MHS optometrist community has difficulty retaining optometrists, particularly junior officers.
- Each Service is predicted to be below a 90-percent manning level in FY 2003, and the MHS as a whole will be only 87 percent manned.
- The average cost of personalized service contracts currently exceeds the average officer FY 2002 programming rate.
- The ORB focuses on “non-obligated” optometrists and obliges the officer to a 2-year commitment, which will strengthen the assignment and distribution process.
- The existing Optometry Special Pay—an entitlement program—hasn’t been increased since its inception almost three decades ago. This authority provides AD optometrists \$1,200 per year. We think that the ORB is a better tool than this authority and can be better targeted to increase retention.

DoD has a continuing need for qualified optometrists to satisfy mission requirements worldwide and provide primary eye and vision care. MHS optometrists are independent, licensed, health care providers who examine, diagnose, treat, and manage diseases and disorders of the visual system, the eye, and associated structures, as well as diagnose related systemic conditions in Service members, their family members, retirees, and other eligible beneficiaries. MHS optometrists are also conducting clinical and medical research in such areas as improving night vision goggles for aviators, developing ophthalmic laser protection for the visual system, identifying hypobaric and hyperbaric effects on vision, and determining the operational impact of refractive surgery on our soldiers, sailors, airmen, and Marines.

If DoD finds that uniformed optometrists are more cost-effective than their civilian counterparts, we support the ORB.

Clinical psychologists

Inventory

We now look at one of the specialties that has grown over the last decade. The number of MHS clinical psychologists increased from 397 in FY 1991 to 470 in FY 2000, about an 18-percent increase (see table 63). The Navy experienced the sharpest inventory incline, a 31-percent increase, followed by the Air Force at 22 percent. The Army's inventory has remained relatively steady throughout the decade. Table 63 also shows that the percentage of females serving as active duty clinical psychologists has more than doubled over the last decade, from 14 percent in FY 1991 to 32 percent in FY 2000.

Table 63. MHS clinical psychologist inventory, by Service (FY 1991-2000)

	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	109	109	103	92	101	106	115	111	105	109
Navy	102	120	130	126	124	123	115	118	122	134
Air Force	186	196	195	198	197	207	207	216	218	227
Total	397	425	428	416	422	436	437	445	445	470
Percentage of females—total MHS	14%	20%	26%	26%	29%	28%	29%	31%	33%	32%

Grade structure

Figure 49 shows the distribution of the paygrade inventory of MHS clinical psychologists in FY 1991 and FY 2000. As we can see, the percentage of O-3 clinical psychologists is steady at 60 percent. Although the percentage of O-4s is slightly less in FY 2000 than it was FY 1991, this has been countered by an increase in the percentage of O-5 and O-6 clinical psychologists.

Let's now compare the average control paygrade distribution, as a percentage of the total clinical psychologist inventory, by Service, for the last decade. Figure 50 shows that the MHS, as a whole, meets and usually exceeds DOPMA guidelines at all paygrades except O-6. Moreover, the Army and the Navy are exceeding or meeting DOPMA

guidelines at all paygrades. The Air Force is slightly below DOPMA guidelines at paygrades O-5 and O-6.

Figure 49. MHS clinical psychologist total inventory, by paygrade (FY 1991 versus FY 2000)

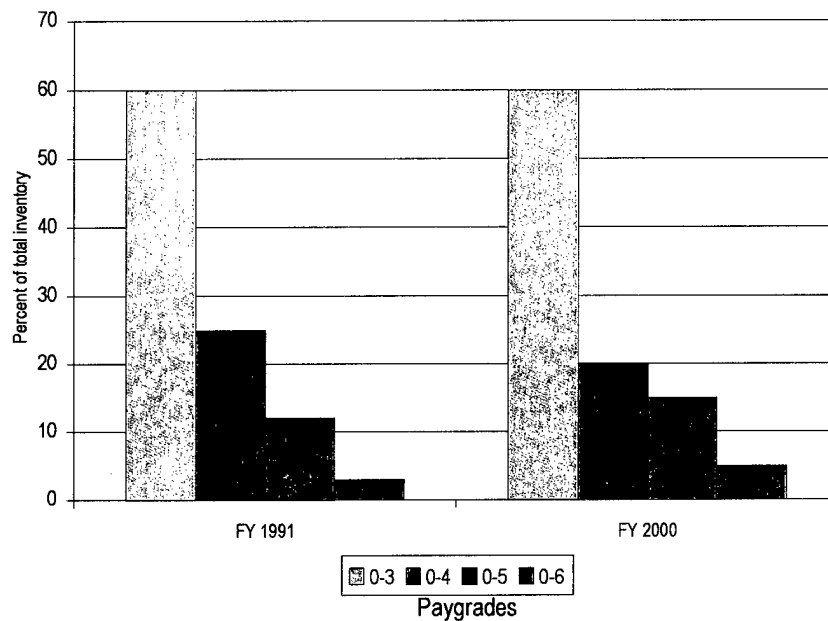
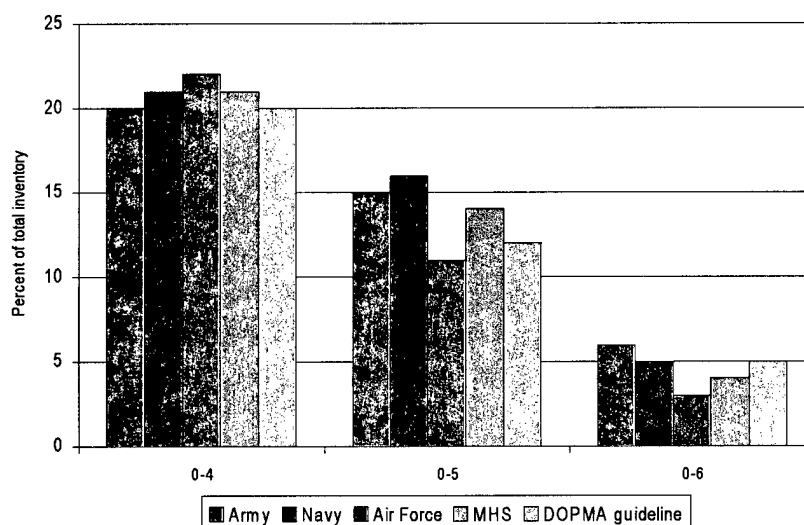


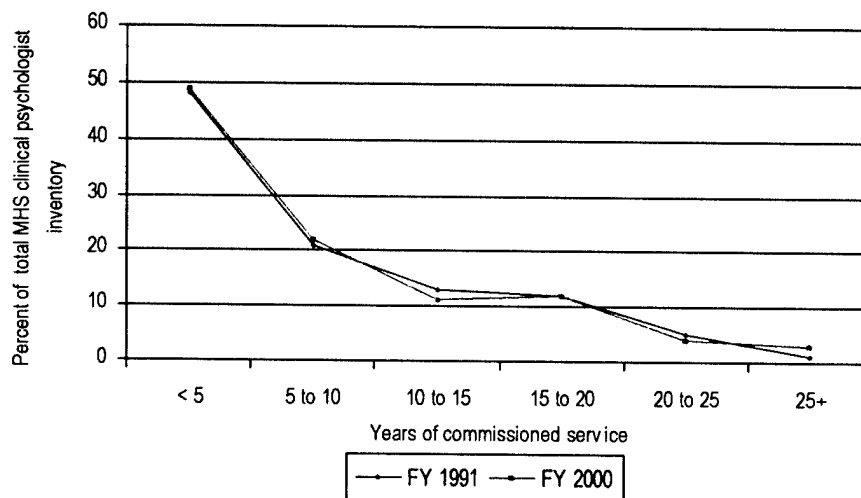
Figure 50. Average percentage of control paygrade clinical psychologist inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines



Years of experience

Another important dimension to evaluating the effectiveness of a specialty's force structure is years of commissioned service (YOCS). In figure 51, we show the YOCS for total MHS clinical psychologists in FY 1991 and FY 2000. The YOCS distribution shows that MHS clinical psychologists, as a whole, have a steady community. The data suggest that, once uniformed clinical psychologists reach the 10- to 15-year-of-service juncture, many stay until 20 years of service.

Figure 51. MHS clinical psychologist inventory, by YOCS and percentage (FY 1991 vs. FY 2000)

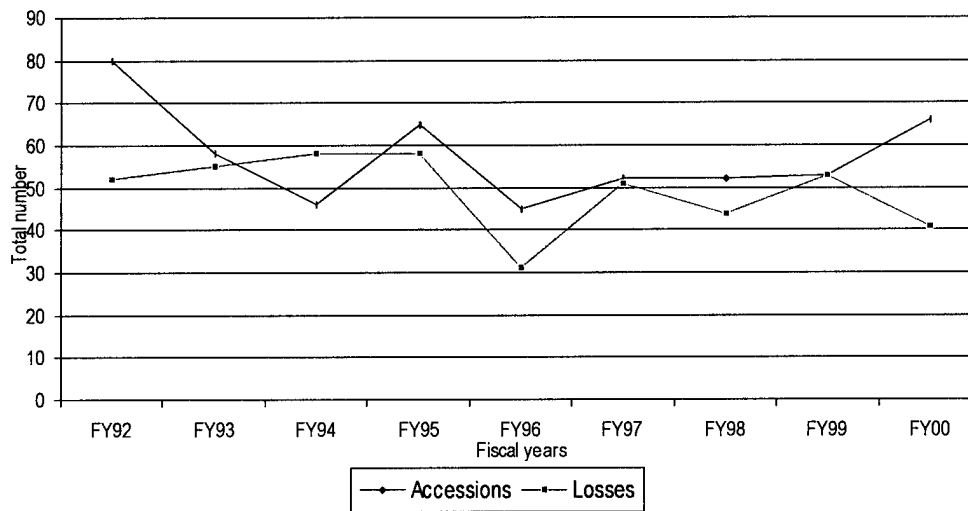


Accessions and attrition trends

Let's now look at the accession and attrition trends for military clinical psychologists over the last decade. Figure 52 provides the number of MHS clinical psychologist accessions and losses from FY 1992 to FY 2000. As expected, the total number of gains usually exceeds the number of losses each year because this community has grown over the last decade. The primary accession source for uniformed clinical psychologists is direct procurement with a guaranteed active duty clinical internship program (CIP). The ADO is 3 years upon completion of the CIP. However, the Army has gone almost

exclusively to the AFHPSP to meet its accession requirements in conjunction with the CIP. All of the Services report extreme difficulty in directly procuring fully trained clinical psychologists. This makes the CIP very important to this specialty.

Figure 52. MHS clinical psychologist accessions and losses (FY 1992–2000)



Retention

We study the retention behavior of clinical psychologists by looking at the continuation patterns. Figure 53 plots the survival (continuation) curves of uniformed clinical psychologists and shows a very steady community. Of the 416 uniformed clinical psychologists who were on active duty in FY 1994, 190 are still on active duty in FY 2000. It appears that many clinical psychologists begin to make their decision to stay in the military as early as the 4-year-of-service juncture. The average, aggregate annual loss rate for this specialty is 12 percent.

We constructed the FY 1992–1997 MHS clinical psychologist accessions and track the survival of these cohorts in figure 54. In contrast to the optometrists and pharmacists, we don't see as sharp a downward trend at the end of the typical initial active duty obligation. This trend shows that the military is having more success in retaining junior uniformed clinical psychologists than it was having a decade ago.

Figure 53. MHS clinical psychologist survival curves (FY 1991–1999)

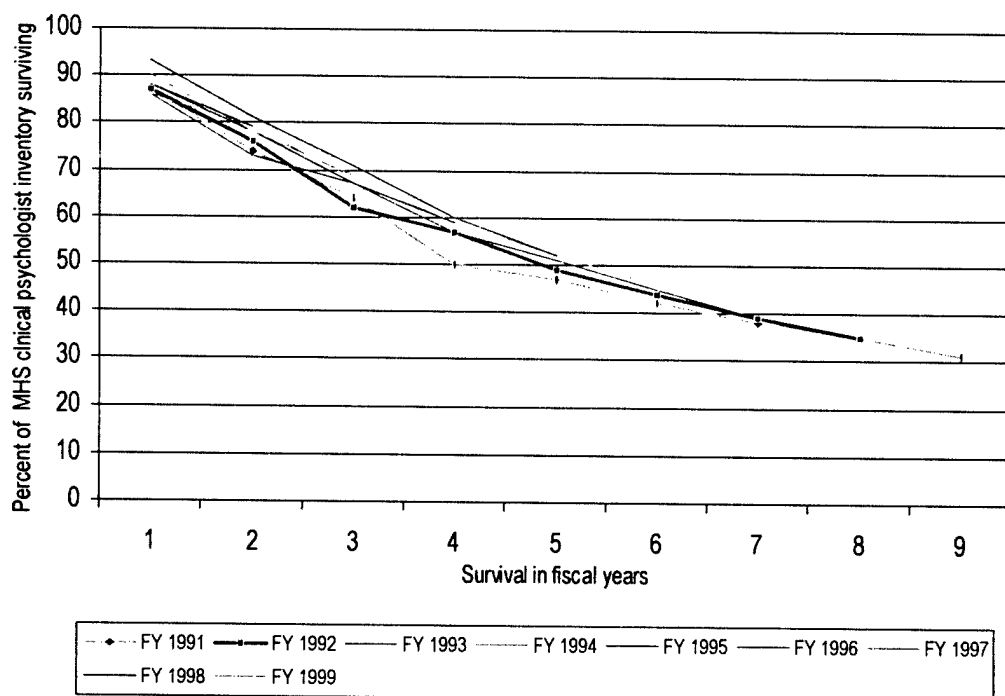
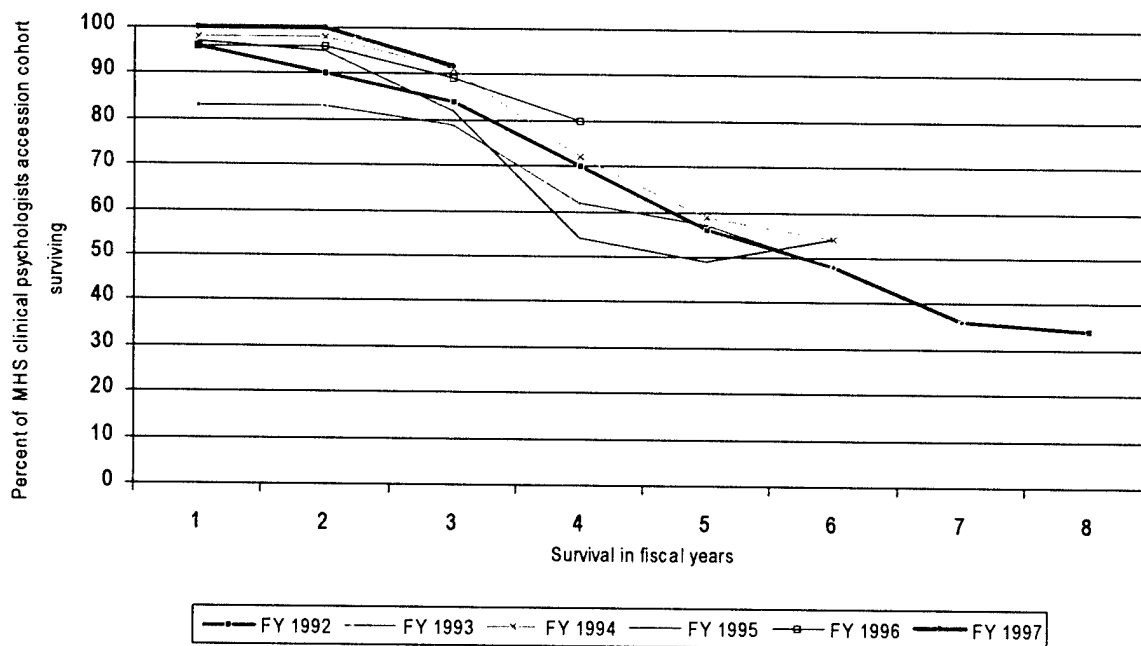


Figure 54. MHS clinical psychologist survival curves (accession cohorts FY 1992–1997)



Manning

In table 64, we display the FY 2003 projected endstrength, billets, and readiness requirements for each Service. The MHS will have about 452 active duty clinical psychologists in its inventory at the end of FY 2001. The projected gains and losses for FY 2002 and FY 2003 are also included based on the Services' historical accession and loss trends. The Air Force has the largest number of billets at 236, followed by the Navy at 129, and the Army at 103. The readiness requirement also varies by Service with the Navy at 89, followed by the Army at 88, and the Air Force at 53. The projected FY 2003 MHS manning (billet fill rate) for clinical psychologists is almost 100 percent.

Table 64. Projected MHS clinical psychologist manning, billets, and readiness requirements, by Service (FY 2001–2003)

	Army	Navy	Air Force	MHS
FY 2001 endstrength	91	135	226	452
FY 2002/3 projected gains	20	31	44	95
FY 2002/3 projected losses	20	30	37	87
FY 2003 projected endstrength	91	136	233	460
FY 2003 billets	103	129	236	468
Projected FY 2003 billet fill rate	88%	105%	99%	98%
Readiness requirement	88	89	53	230
Projected FY 2003 readiness fill rate	103%	153%	440%	200%

We have no major findings to report for this specialty at this time. Although a military-civilian clinical psychologist pay gap exists, the MHS has demonstrated the ability to “grow” this specialty over the last decade, it has an ample inventory of clinical psychologists to meet its readiness requirements, and the overall MHS billet fill rate for this specialty looks good. The Army, however, may want to consider slightly increasing its accession numbers to meet its peacetime billets. Moreover, we reiterate our earlier recommendation (during phase I of this study) that DoD assess its current criteria for awarding AD clinical psychologists board certification pay to allow more parity with other MHS specialties.

Physician Assistants

Inventory

We now turn our attention to one of the MHS's newest commissioned officer specialties. Historically, Physician Assistants (PAs) were Warrant Officers (WOs), but in the early 1990s DoD made a decision to commission these health care professionals. The number of MHS PAs has increased about 7 percent from 1,093 in FY 1991 to 1,170 in FY 2000 (see table 65). In FY 2000, the Army and the Air Force combined account for 81 percent of the total MHS PA inventory, and the Navy accounts for about 19 percent. Table 65 also shows that the percentage of females serving as active duty PAs has doubled over the last decade, from 8 percent in FY 1991 to 16 percent in FY 2000.

Table 65. MHS Physician Assistant inventory, by Service (FY 1991–2000)

Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	554	492	505	468	473	471	481	461	472	503
Navy	147	174	192	195	200	187	208	232	234	223
Air Force	392	430	442	446	460	440	424	423	451	444
Total	1,093	1,096	1,139	1,109	1,133	1,098	1,113	1,116	1,157	1,170
Percentage of females—total MHS	8%	10%	12%	13%	12%	14%	14%	15%	16%	16%

Grade structure

Figure 55 shows the distribution of the paygrade inventory of MHS PAs in FY 1991 and FY 2000. We can see the effect of this community's conversion from WOs to commissioned officers in the last decade. WO PAs were given the option of converting to a commissioned officer paygrade, based on their seniority, or eventually attriting from the military.¹⁰³ Figure 55 also shows that all the WO PAs have either attrited or been absorbed into the commissioned ranks. In figure 56 we compare the average control paygrade distribution, as a percentage of the total PAs, by Service, for the last decade.

¹⁰³For example, a Navy WO PA at paygrade CWO-4 would have been allowed to convert to a paygrade O-3 with 2 years time in grade.

Figure 55. MHS Physician Assistant total inventory, by paygrade (FY 1991 versus FY 2000)

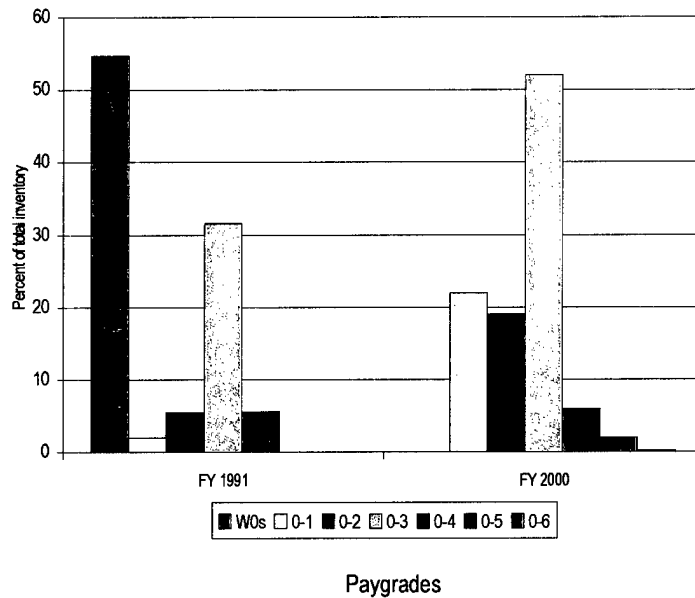
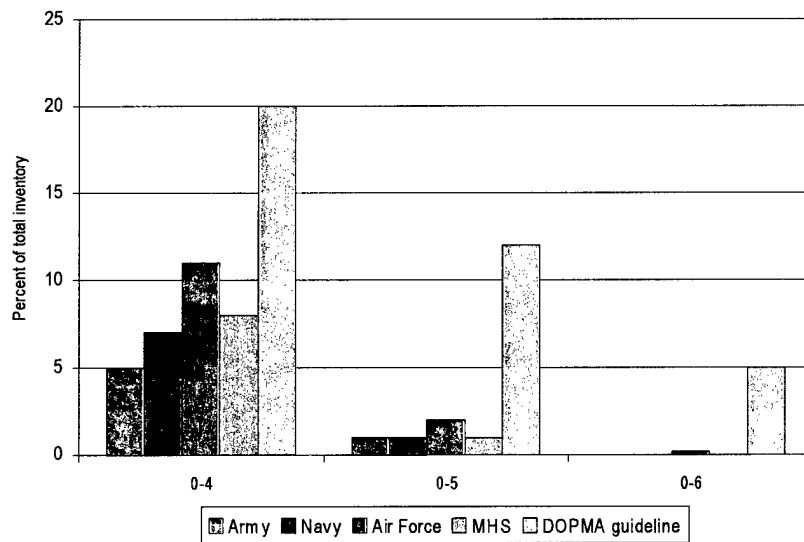


Figure 56. Average percentage of control paygrade Physician Assistant inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines



We find that the new officer community is below DOPMA guidelines, at all paygrades. This is not completely surprising because of the WO PA transition, but it does show that the MHS is not retaining a significant number of PAs past paygrade O-4. The Air Force has the largest average percentage of O-4 officers at 11 percent, followed by the Navy at 7 percent, and the Army near 5 percent. The data show that the Air Force has one O-6 PA. As we continue our analysis of this community, we will explain why the MHS is having difficulty retaining PAs into the control grades.

Years of experience

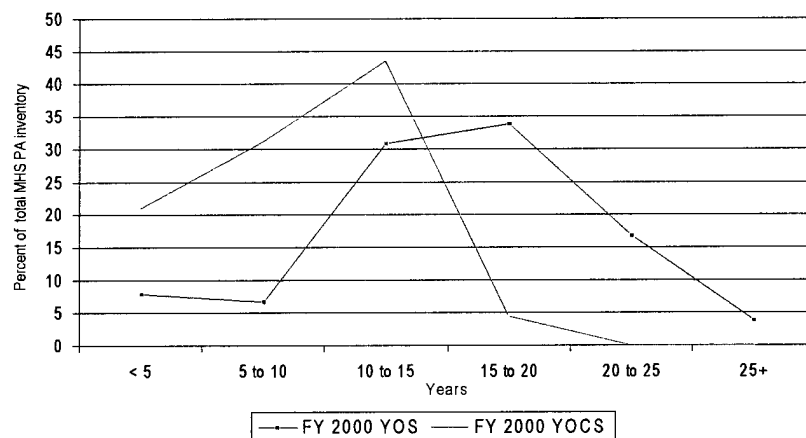
Another important aspect of evaluating the effectiveness of a specialty's force structure is experience. The MHS PAs are interesting because the vast majority have prior enlisted service, but, as we have already seen, many do not stay past their obligation to retire as commissioned officers. The predominant accession path for MHS PAs is through the active duty enlisted commissioning program at the Inter-service Physician Assistant Program (IPAP) at Ft. Sam Houston, Texas.¹⁰⁴ Individuals entering this program typically have several years of enlisted service and are paid their full enlisted salaries while attending the 2-year IPAP in return for a 4-year ADO. Upon completion of IPAP, students are commissioned as O1-Es.

In figure 57, we contrast the years of service (YOS) and the YOCS for the total MHS PA inventory in FY 2000. The YOS distribution reflects the prior enlisted experience of uniformed PAs, and the YOCS distribution is consistent with our earlier findings that most PAs attrite once they reach retirement eligibility.¹⁰⁵

104. The Navy is not as reliant on the IPAP as the other two Services and supplements its total PA accession requirements with HSCP and direct procurement accessions.

105. Although the active duty obligation for IPAP is 4 years, the military departments typically require enlisted personnel to serve 10 YOCS before they are eligible to separate as a commissioned officer. During periods of forced downsizing, however, this policy was relaxed to 8 YOCS for retirement eligibility.

Figure 57. MHS Physician Assistant inventory, by YOS and YOCS and percentage (FY 2000)



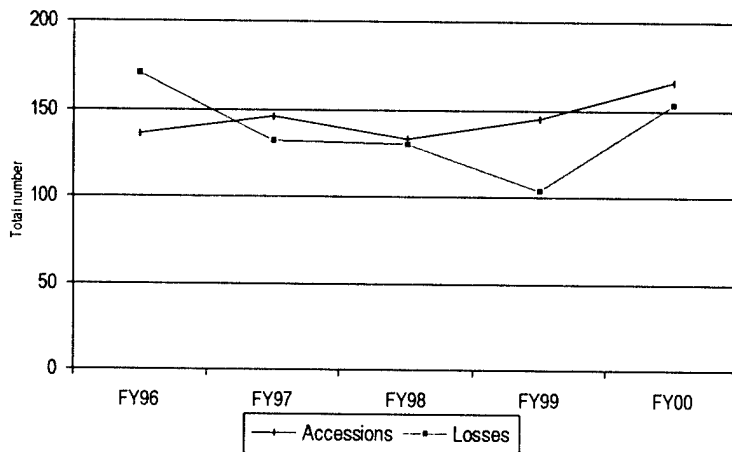
The uniformed PA community illustrates the concept of present value decision-making that we discussed during phase I of this study for military physicians.¹⁰⁶ From an economic perspective, when faced with the decision to continue with a particular career path or choose another path, one should compare the stream of future cash and benefits of each option rather than look at just a single point in time. At the first stay-leave military decision juncture, 4 YOCS, it is more lucrative for the vast majority of uniformed PAs to remain in the military than pursue a civilian career. At the second military career juncture, 10 YOCS—which typically corresponds to 20 YOCS for most uniformed specialists—the majority of uniformed PAs find that the economic advantage of their military retirement and civilian career options outweighs the benefits of remaining in the military for additional years of service (i.e., active duty compensation and increased retirement pay).

106. Present value is a convenient way to compare two different income streams. The present value tells what the value of a future stream of payments would be worth if it were paid in one lump sum *today*.

Accession and attrition trends

Figure 58 provides the number of MHS PA accessions and losses from FY 1996 to FY 2000. As expected, the total number of gains exceeds the number of losses in recent years because of the deliberate effort to grow this community in the last decade. The workforce losses also capture the WO PAs who converted to commissioned officer status and later attrited from the military.

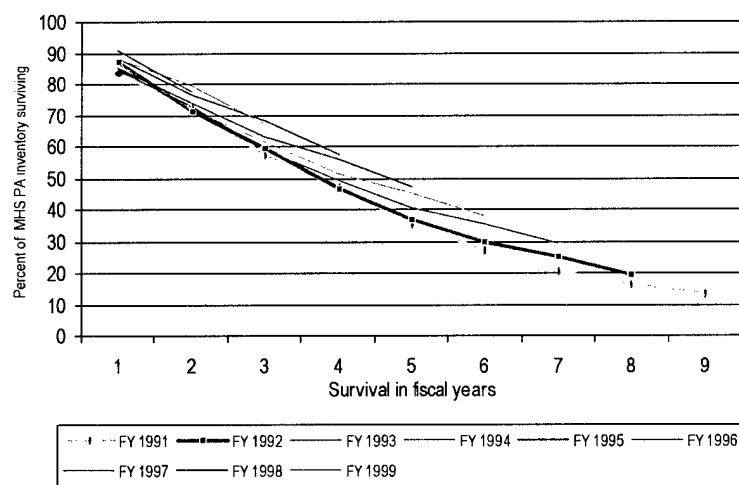
Figure 58. MHS Physician Assistant accessions and losses (FY 1996–2000)



Retention

Turning to the retention behavior of uniformed PAs over the last decade, figure 59 plots their survival (continuation) curves. The continuation rate pattern is consistent with our earlier findings that many uniformed PAs are choosing to retire at the first opportunity. The average, aggregate annual loss rate for this specialty is 13 percent.

Figure 59. MHS Physician Assistant survival curves (FY 1991–1999)



Manning

In table 66, we display the projected endstrength, billets, and readiness requirements for each Service. The MHS will have about 1,200 active duty PAs in its inventory at the end of FY 2001. The projected gains and losses for FY 2002–FY 2003 are based on the Services' historical accession and loss trends. The Army has the largest number of billets, followed by the Air Force and the Navy. The Army's readiness requirement is just above its billet authorizations at 534, followed by the Navy at 154, and the Air Force at 37. The total MHS PA inventory far exceeds the readiness requirement. The projected FY 2003 MHS manning for PAs is about 120 percent, with none of the Services having difficulty filling their billets.

Table 66. Projected MHS Physician Assistant manning, billets, and readiness requirements, by Service (FY 2001–2003)

	Army	Navy	Air Force	MHS
FY 2001 endstrength	572	231	397	1,200
FY 2002/3 projected gains	146	49	100	295
FY 2002/3 projected losses	90	46	119	255
FY 2003 projected end strength	628	234	378	1,240
FY 2003 billets	530	233	269	1,032
Projected FY 2003 billet fill rate	118%	100%	141%	120%
Readiness requirement	534	154	37	725
Projected FY 2003 readiness fill rate	118%	152%	1,022%	171%

The MHS PA community illustrates two salient points. First, the predominant accession source, for any community, is the major determinant to that particular specialty's retention behavior. The IPAP accession source leads most active duty PAs to serve the minimum time in commissioned service and then retire.¹⁰⁷ It will be difficult for the Services to grow control paygrade inventory for this community, with its current predominant accession source, because of the latitude of those serving to retire and pursue other career options. It appears that many uniformed PAs leave the military before even being considered for selection to O-4.

Second, the Inter-Service Physician Assistant Program has been an important and valuable accession source for uniformed PAs in the last decade because of the MHS's decision to revitalize and grow this community. Now that this community is nearing a steady state, DoD should assess its reliance on IPAP in the long run. There are certainly advantages to "home growing" any community, particularly from the enlisted ranks. The Army's billet structure for this community is operationally focused, and having uniformed PAs with previous military experience has its advantages. Most Navy and Air Force PAs work in MTF settings. The benefits of IPAP should be weighed against the costs of this program. This validation process would allow DoD to make the best business decision, based on both cost and quality, to achieve its required PA accessions in the future. As we learned in the first phase of this study, the forecast is for a growing pool of civilian PA graduates, whose demographic characteristics closely resemble the type of enlisted candidates currently graduating from IPAP.

General Registered Nurses

Inventory

During phase I, we briefly explored the general nursing community because we wanted to ensure that DoD was aware of the predicted workforce shortage for this profession. We now turn to assessing the adequacy of the \$5,000 accession signing bonus for uniformed

107. Under DOPMA promotion flow point guidelines, a due course commissioned officer will usually be considered for promotion to paygrade O-4 within 11 YOCS (+/- 1 year).

nurses. In concert with DoD's policy of forced downsizing, table 67 shows that the number of military nurses declined 20 percent over the last decade from 13,106 to 10,434. The Army experienced a 29-percent decrease, followed by the Air Force with a 23-percent decrease, and the Navy with only a 3-percent decline. In FY 2000, the Air Force accounts for 39 percent of total uniformed nurses, followed by the Army at 31 percent, and the Navy at 30 percent.

Table 67. MHS total nurses, by Service (FY 1991–2000)^a

Service	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	4,629	4,554	4,478	4,225	4,121	3,893	3,481	3,194	3,245	3,278
Navy	3,206	3,448	3,475	3,338	3,370	3,332	3,322	3,223	3,125	3,110
Air Force	5,271	4,956	4,857	4,867	4,797	4,828	4,644	4,528	4,170	4,046
Total	13,106	12,958	12,810	12,430	12,288	12,053	11,447	10,945	10,540	10,434
Percentage of males—total MHS	20%	23%	26%	26%	27%	28%	29%	30%	31%	32%

a. The reported numbers in our analyses are based on the DMDC personnel tapes and, because of discrepancies (duplicate records), may vary from HMPDS numbers cited in earlier sections of this study.

Table 67 also shows that the percentage of *males* serving as active duty nurses has increased over the last decade from 20 percent in FY 1991 to 32 percent in FY 2000.

Grade structure

Figure 60 shows the distribution of the paygrade inventory of MHS nurses in FY 1991–2000. We see that the percentage of O-1s and O-2s has dropped slightly, but that of O-3s has risen from 38 percent in FY 1991 to 42 percent in FY 2000. The percentage of O-4 uniformed nurses has also dropped slightly, whereas the uniformed nurses have some minor advances in the percentage of O-5 and O-6 officers.

In figure 61, we compare the average control paygrade distribution as a percentage of the total uniformed nurses, by Service, for the last decade. We find that the percentage of uniformed nurses, for the MHS as whole, is below DOPMA guidelines at each paygrade. Congressional support in the mid-1990s and a concerted effort by the Services are improving the situation, but shortfalls still exist at the O-5 and O-6 paygrades. Of particular concern is the fact that the percentage of O-5 Air Force nurses is a little under 8 percent.

Figure 60. MHS nurses total inventory, by paygrade (FY 1991 versus FY 2000)

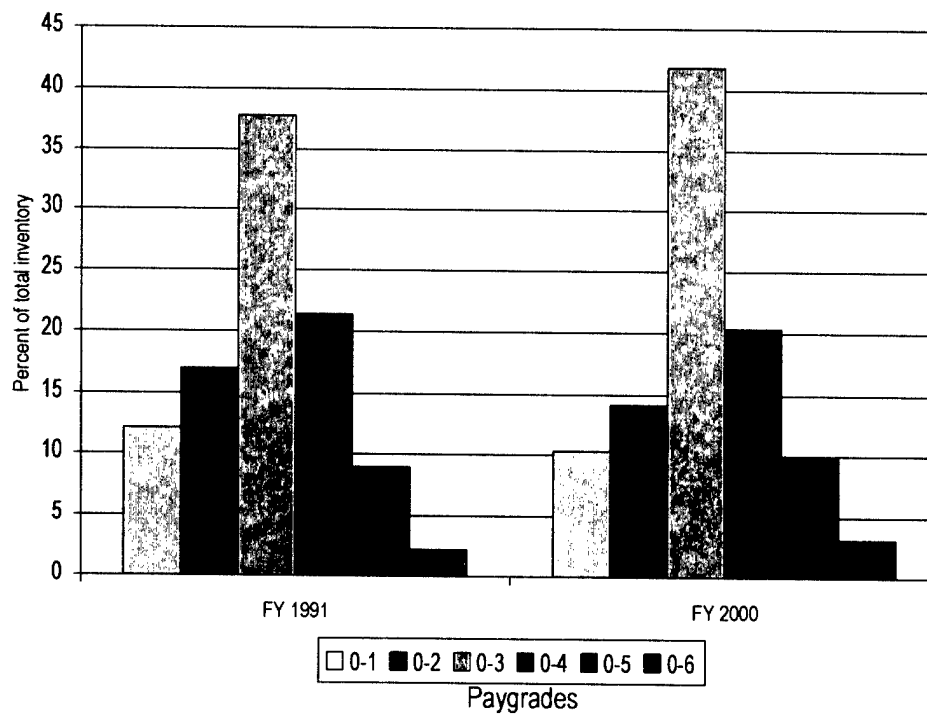
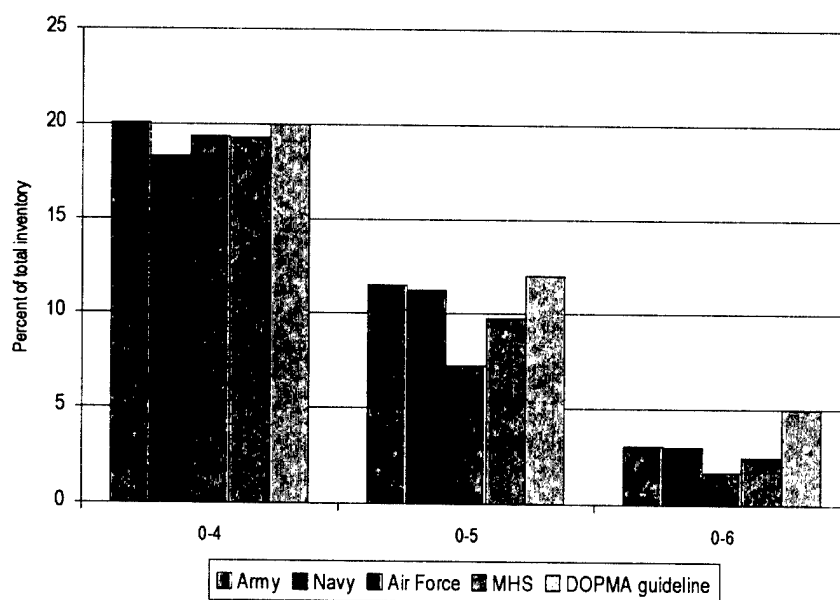


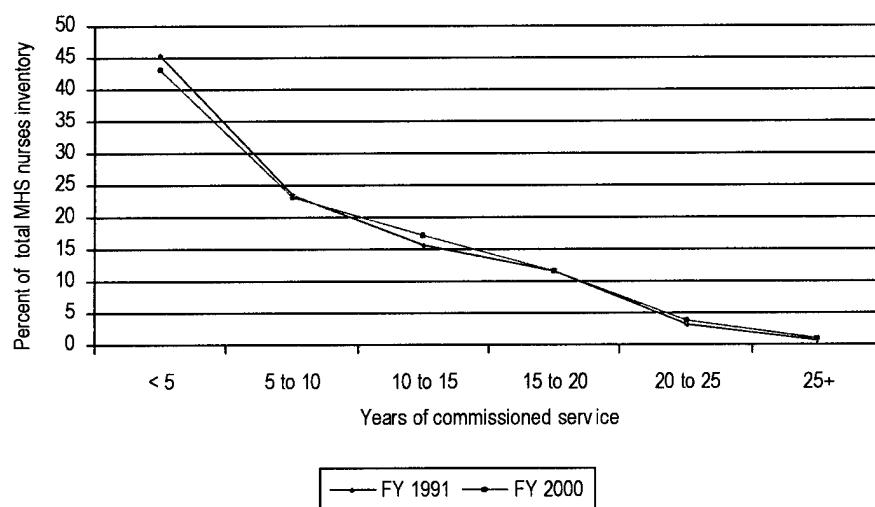
Figure 61. Average percentage of control paygrade MHS nurses inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines



Years of experience

Years of commissioned service is an important factor in evaluating the effectiveness of a specialty's force structure. In figure 62, we show the YOCS for total MHS nurses in FY 1991 and FY 2000. The YOCS distribution shows that the experience level for this community has remained relatively consistent over the last decade, despite the large inventory decreases.

Figure 62. MHS nurses inventory, by YOCS and percentage (FY 1991 versus FY 2000)



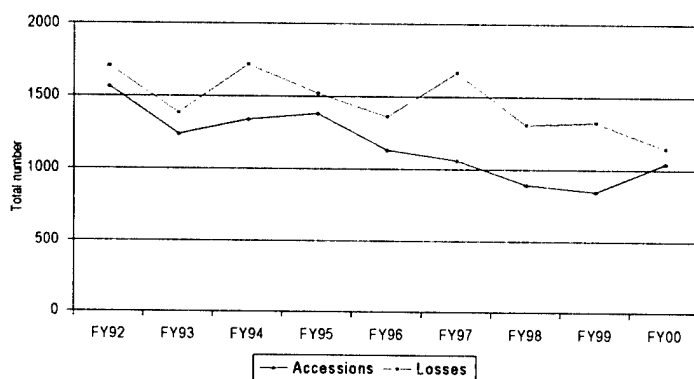
Accession and attrition trends

We now want to explore the accession and attrition trends for military nurses over the last decade. Unfortunately, because of the DMDC data limitations, we couldn't isolate the accession source for nurses. We had to create a longitudinal data file that isolates new uniformed nurse accessions in FY 1992–2000 by assuming that any officer who did not exist in the DMDC data in the previous year is a new accession. We used a similar approach to determine losses.¹⁰⁸

108. Based on discussions with Service representatives and comparing our results with previous HMPDS reports, we believe we have reasonably captured both accessions and losses for the communities reported.

Figure 63 shows that the number of losses has exceeded the gains throughout the decade, which isn't surprising based on the deliberate downsizing of this community. What concerns us is that the trend has continued from FY 1998 through FY 2000. Also note the volume of gains and losses that occurs annually within this community. From FY 1992 through FY 2000, there have been approximately 10,498 gains and 13,158 losses within the uniformed nursing community.

Figure 63. MHS nurse accessions and losses (FY 1992–2000)



Retention

Let us turn to the retention behavior of uniformed nurses over the last decade by examining the continuation patterns. Figure 64 plots the survival (continuation) curves of military nurses and is consistent with our earlier findings that, despite a marked inventory decline, the community as a whole has remained fairly steady. The average annual attrition rate for uniformed nurses is about 12 percent.

We know that the MHS has experienced a slight reduction in the percentage of very junior paygrade nursing officers. To determine whether this is more a function of retention or accession difficulties, we constructed the FY 1992–1997 MHS nurse accessions. Figure 65 tracks the survival of these cohorts. We find a slight downward trend. It appears that a fairly significant number of uniformed nurses opt to leave the military at the 3- to 4- year-of-service juncture. During the

deliberate downsizing, the military may have encouraged that behavior because the slope in more recent years is not as steep.

Figure 64. MHS nurse survival curves (FY 1991–1999)

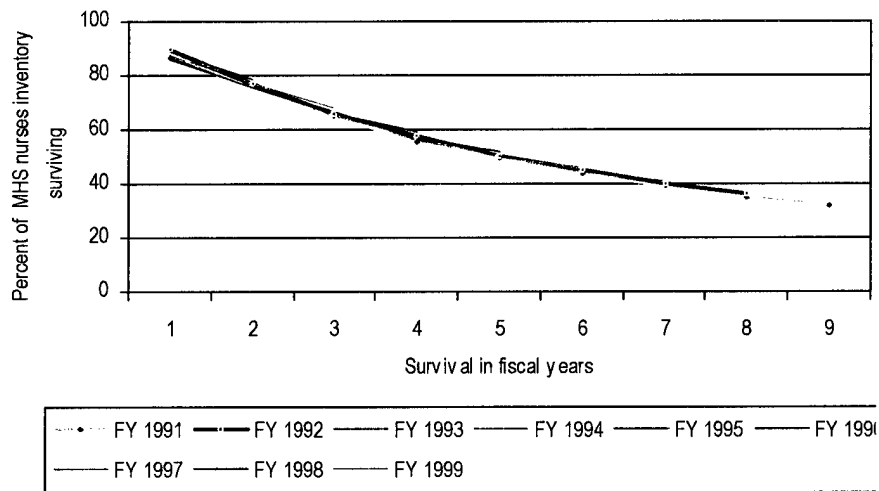
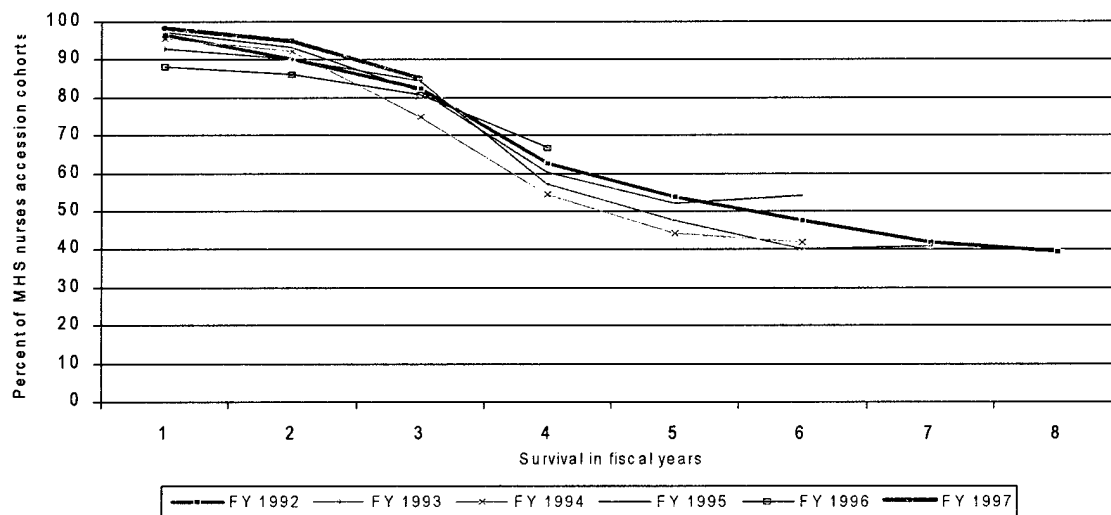


Figure 65. MHS nurse survival curves (accession cohorts FY 1992–1997)



Manning

Let's look at the projected manning and direct procurement (DP) accessions for uniformed nurses, by Service, to attain a better understanding of this community.

Army

In FY 2000, the Army had a DP nursing goal of 115 and only 91 were accessed, but the 91 DPs accounted for only 33 percent of total accessions.¹⁰⁹ The FY 2001 DP goal was 145, and it is projected that only 105 will be accessed. The 105 DP accessions will account for about 60 percent of total accessions. In FY 2002, the Army has a requirement for 200 DP accessions but has been authorized only 160 signing bonuses. The DPs will account for 60 percent of their total accession requirements.

The projected manning for Army nurses in FY 2001 is about 97 percent—3,263 bodies versus 3,381 billets. The projected manning in FY 2002 will be about 96 percent—3,251 bodies versus 3,381 billets. The active component readiness requirement for Army nurses is 3,296.

Navy

In FY 2000, the Navy fully met its DP nursing goal of 90 although only 85 signing bonuses were authorized; 83 nurses received an accession bonus, whereas 7 nurses either declined or were ineligible for the accession bonus. The 85 DPs accounted for only 36 percent of total accessions. The FY 2001 DP goal of 85 was fully achieved, but the 85 DP accessions will account for only about 30 percent of total accessions. In FY 2002, the Navy has a DP goal of 115, which accounts for only about 38 percent of total accession requirements.

The projected manning for Navy nurses in FY 2001 is about 100 percent—3,160 bodies versus 3,159 billets. The projected manning in FY 2002 will be very close to 100 percent—3,160 bodies versus 3,174

109. As we reported in the first phase of this study, each of the Services uses a mix of other subsidized programs, such as ROTC and enlisted commissioning programs, to meet its total accession requirements. Although these accession programs have merit, their cost-effectiveness compared with the DP pipeline must be considered.

billets. The active component readiness requirement for Navy nurses is 2,558.

Air Force

In FY 2000, the Air Force had an original DP nursing goal of 219 but accessed only 124.¹¹⁰ The 124 DP accessions accounted for 68 percent of total FY 2000 accessions. The FY 2001 DP goal was 259; 173 were accessed, which accounted for about 67 percent of total accession requirements. The Air Force's FY 2002 DP goal is 265, which represents about 70 percent of its total nursing accession requirement.

The projected manning for Air Force nurses in FY 2001 is about 94 percent—3,841 bodies versus 4,091 billets. The projected manning in FY 2002 will drop to about 92 percent—3,772 bodies versus 4,091 billets. The active component readiness requirement for Air Force nurses is 2,048.

Nurse accession bonus

Like so many of the uniformed health professionals analyzed in this study, it has been a unique decade for military nurses. Let's review what we have found:

- The Army and the Air Force have experienced significant decreases in their total inventories over the last decade, a 29- and 23-percent decline, respectively. The Navy nurse inventory declined only about 3 percent during the same time period.
- In FY 2000, the Air Force had about 30 percent more active duty nurses than the Navy and 23 percent more than the Army. But the Air Force nursing inventory has been steadily dropping since FY 1994, and that trend is continuing through FY 2002.
- The average percentage of control paygrade nurses is below DOPMA guidelines for O-5s and O-6s. Of particular concern is the percentage of O-5 Air Force nurses, which is a little under 8 percent.

110. The Air Force decremented its original goal from 219 to 169. Note that the Air Force makes a concerted effort to split its DP goals into acquiring a certain portion of nurses with experience as well as new graduates.

- Despite a significant downsizing, the experience level and retention behavior remains remarkably stable for uniformed nurses; however, a consistent downward trend is evident in the survival rate of junior nurses at the 3- to 4-year-of-service juncture.
- The total MHS nursing manning in FY 2002 will be about 97 percent. We project that the Air Force will be at 92 percent manning in FY 2002, the Army at 96 percent, and the Navy at 100 percent.
- The military uses some form of subsidization for the vast majority of its accessions—a major change from a decade ago when the Services were able to directly procure their required accessions with little or no subsidization.
- In FY 2002, DP accessions will account for only about 55 percent of the total uniformed MHS nursing accessions. Each of the Services uses a gamut of subsidized accession programs to meet the total accession requirement. The total average cost of these programs far exceeds \$5,000 per accession.
- The Air Force (to a great extent) and the Army (to a lesser degree) are not meeting their DP goals.
- All of the Services would like to access some specialized nurses (critical care, obstetrics, experienced clinic managers, etc.), but the current signing bonus limits their success.

Although the Services should be commended for devising various subsidized strategies to achieve their total nursing accession requirements through a tumultuous decade, we recommend that DoD, the military departments, and the Services work together to *establish the DP pipeline as the predominant accession source for each Service*. We believe that the DP program remains the most cost-effective approach in meeting required uniformed nursing accession requirements. We understand that this transition will take time, but we believe that by the end of the decade each Service should be able to acquire at least 70 percent of its total uniformed nursing accessions through the DP program because it remains the most economical avenue to access quality nursing applicants. We recognize and actively support that each of the Services will have some unique requirements and diversity

within their respective accession programs. However, the MHS will always require a significant throughput of nursing accessions. It is in DoD's best interest to access these professionals in the most cost-effective manner and capitalize on the synergy of triservice recruiting campaigns and fully market the uniformed nursing salary advantage over the private sector.

As we reported in the first phase of our study, DoD must be alert to the following changing demographics in the private sector:

- By the end of the decade (2010), the U.S. Department of Health and Human Services is predicting that only 635,000 registered nurses will be available to fill nearly 1.8 million slots.
- Of the 2.1 million nurses currently in the nursing workforce, only 9 percent are younger than age 30.
- The American Association of Colleges of Nursing reports that in the fall of 1999 entry-level bachelor of science nursing enrollment fell by 4.6 percent—dropping for the fifth year in a row.

Based on these indicators, the average demand for over 1,200 uniformed nurses annually, and the importance of this community to the delivery of high-quality and cost-effective health care, we recommend that the uniformed nurse signing bonus be increased from \$5,000 to \$10,000 to ensure that the Services have the necessary recruiting tools to achieve their total nursing accession requirements and to enable them to decrease their reliance on more costly accession programs. This enhanced signing bonus and the current cash compensation advantage that the military offers over the private sector should allow the MHS to meet its nursing workforce objectives.¹¹¹

111. During phase I of this study, we compared the cash compensation between uniformed service and private-sector registered nurses. At the time of that report, the 2000 HRSA nursing income survey was unavailable. We have subsequently received those data and include the results in appendix B. The inclusion of those data did not notably change any of our previous findings.

Moreover, we recommend conducting an in-depth analysis of the MHS nursing community to allow specialty problems to be better identified. We recommend that this analysis include civil service and contract nurses serving within the MHS, as well as uniformed nurses.

Certified Registered Nurse Anesthetists (CRNAs)

Inventory

We end our analysis of uniformed health care professionals with CRNAs.¹¹² Table 68 shows a mixed story among the Services on the direction of this community over the past 6 years. The Army and the Navy have incrementally increased their CRNA inventory levels, whereas the Air Force has downsized its CRNA workforce during the same time period. We find that, in FY 2000, the Army accounted for 46 percent of the MHS CRNA inventory, followed by the Air Force with 30 percent, and the Navy with 24 percent.

Table 68 shows that the majority of uniformed CRNAs are male. The percentage of females in this profession is increasing, however; 39 percent of the FY 2000 total inventory is female.

Table 68. MHS total CRNAs, by Service (FY 1994–2000)

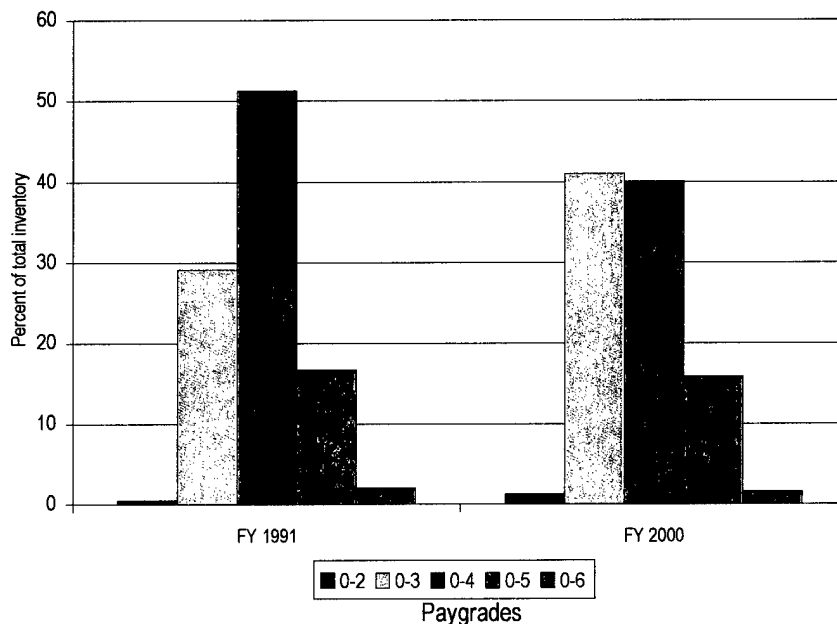
Service	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Army	203	208	221	221	218	232	243
Navy	69	90	85	94	116	120	130
Air Force	245	239	223	211	200	180	160
Total	517	537	529	526	534	532	533
Percentage of males—total MHS	70%	67%	65%	61%	61%	57%	61%

¹¹²The DMDC tapes and HMPDS reports do not consistently or accurately disentangle fully trained and student CRNAs for each of the Services. To overcome this problem, we used a combination of data supplied by the Services and the DMDC tapes to conduct a limited analysis. The data presented in tables 68 and 69 reflect *fully trained CRNAs* and do not capture the nurses that are in training to become CRNAs.

Grade structure

Figure 66 shows the distribution of paygrade inventory of MHS CRNAs in FY 1991 and FY 2000. It is not surprising that CRNAs are somewhat senior because the predominant accession source for this specialty is sending qualified applicants from the general uniformed nursing pool to a 2-year graduate school and paying their tuition, books, and active duty salaries. The typical ADO following school subsidization is 4 years.

Figure 66. MHS CRNA total inventory, by paygrade (FY 1991 versus FY 2000)

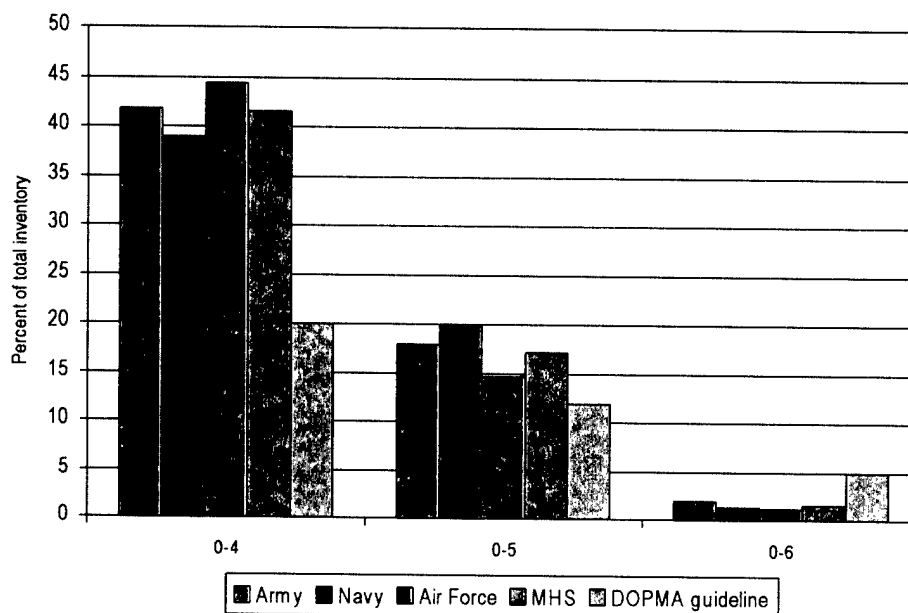


We find that the percentage of O-3 officers has increased over the last decade from 30 to 41 percent. Conversely, the percentage of O-4 CRNAs has decreased from 51 percent in FY 1991 to 40 percent in FY 2000. There has been no significant change in the percentage of O-5 and O-6 officers serving in this specialty in the last decade. Overall, it appears that uniformed CRNAs are getting younger.

In figure 67, we look at the average *control* paygrade distribution, as a percentage of the total CRNA inventory, by Service, for the last decade.

The figure shows that all three Services exceed the DOPMA guideline, for this specialty, at paygrades O-4 and O-5. We suspect that all three Services attempt to promote as many qualified candidates from this specialty as possible. The MHS should closely monitor this community because of awareness of the uniformed-civilian pay gap that exists for this specialty at the junior entry-level, current anesthesiology manning difficulties, and the critical readiness role of these professionals (in addition to their peacetime benefit mission role).

Figure 67. Average percentage of control paygrade MHS CRNA inventory, by Service and total (FY 1991–2000) versus DOPMA guidelines

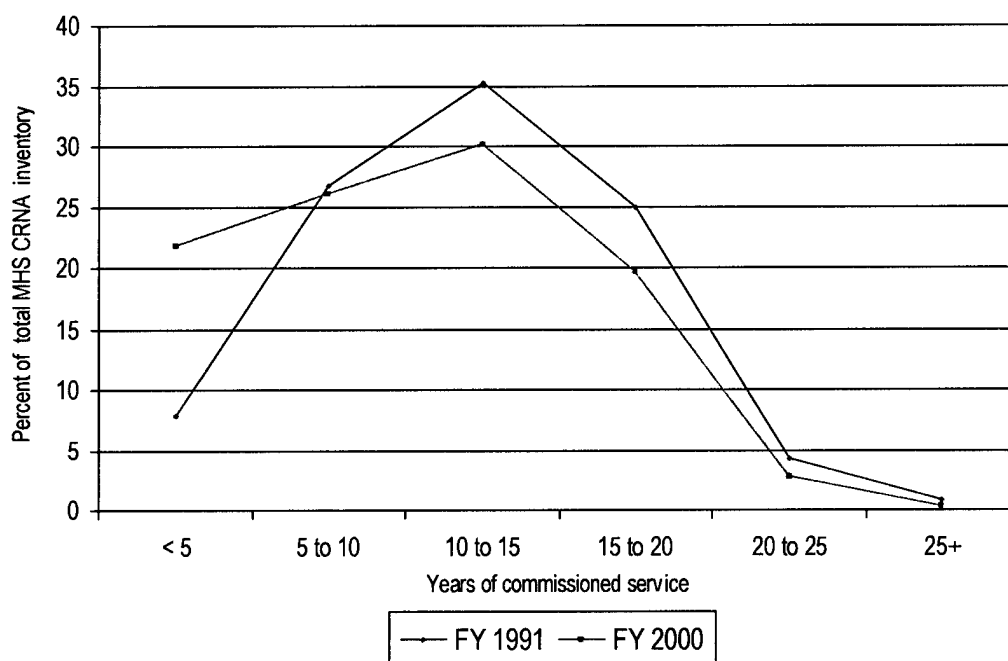


As we have discussed earlier in this study, however, the predominant accession source and career path, for any community, is the major determinant of that particular specialty's retention behavior. It will be difficult for the Services to grow O-6 control paygrade inventory for this community, with its current predominant accession source, because of the latitude of those serving to retire and pursue other career options. It appears that many uniformed CRNAs leave the military before even being considered for selection to O-6.

Years of experience

Another important element to consider in evaluating the effectiveness of a specialty's force structure is experience. In figure 68, we show the YOCS for total MHS CRNAs in FY 1991 and FY 2000. The data confirm our earlier analysis that the uniformed CRNA community is getting more junior. We find that there are more uniformed CRNAs with less than 5 YOCS and a reduced percentage of personnel at each YOCS juncture than a decade ago.

Figure 68. MHS CRNA, by YOCS and percentage (FY 1991 versus FY 2000)

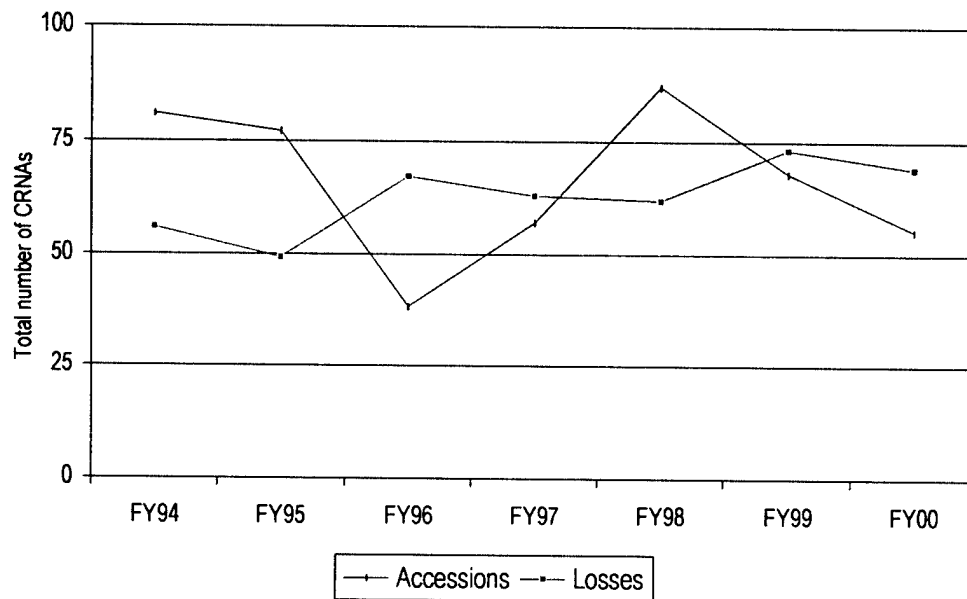


We find that the percentage increase in junior uniformed CRNAs, in the last decade, could be a positive sign because it could result in the Services acquiring more *years of practice* from these CRNAs before they retire. However, if the Services must send general nurses into CRNA training programs early in their military careers, uniformed CRNAs may opt to leave the military upon completion of their active duty obligation for schooling—and before reaching retirement eligibility—to take advantage of the lucrative civilian market for these health care professionals.

Accession and attrition trends

We now want to explore the accession and attrition trends for military CRNAs for the past 6 years. Figure 69 shows the total MHS gains and losses for uniformed CRNAs from FY 1994 through FY 2000. The variations reflect the efforts by the Services to increase and decrease their inventory levels. Figure 69 does show the Services' ability to increase the accession pipeline for CRNAs when needed.

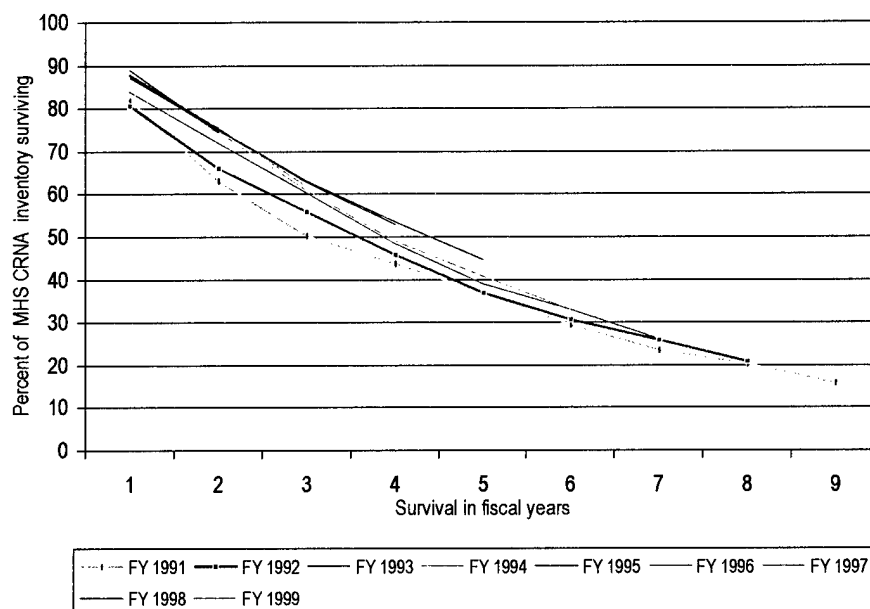
Figure 69. MHS CRNA accessions and losses (FY 1994–2000)



Retention

Let's now turn our attention to the retention behavior of uniformed CRNAs over the last decade by examining the continuation patterns. Figure 70 plots the survival (continuation) curves of military CRNAs and is consistent with our earlier findings that most uniformed CRNAs stay past their initial active duty of 4 years. Because the Air Force was deliberately downsizing its CRNA inventory in 1990s, it is difficult to assess whether retention for uniformed CRNAs, and for the MHS as a whole, has improved or declined throughout the decade.

Figure 70. MHS CRNA survival curves (FY 1991–1999)



In phase I of this study, we found that uniformed CRNAs experience a 10-percent uniformed-civilian pay gap, at the entry level, but recover and exceed the civilian compensation at later career junctures. This cash compensation comparison was predicated on the assumption that uniformed CRNAs predominately begin practicing their new profession at the 10-YOCS juncture. The data show that the Services have begun placing general nurses into CRNA graduate programs earlier in their military careers in an effort to meet manning requirements.

The result of this career path change is that the uniformed-civilian CRNA pay gap is wider at the entry level because many uniformed CRNAs will not be making O-4 compensation, under this new career path, until 2 to 3 years after completing their CRNA training. If the Services continue to place general nurses into CRNA education programs earlier in the careers, the entry-level uniformed-civilian CRNA pay gap widens to about 16 percent. It is critical for TMA and the Services to determine and monitor the retention rate of uniformed CRNAs at their first military stay-leave decision point—post-CRNA graduate training—to evaluate how many of these people are

choosing to remain in the military. Based on these data and findings, the uniformed CRNA incentive special pay may need to be adjusted to retain an adequate number of these professionals and reduce the number of annual training throughputs required. The average annual attrition rate for uniformed CRNAs is about 14 percent.

Manning

In table 69, we display the projected endstrength, billets, and readiness requirements for each Service. We project that in FY 2003 the MHS as a whole will have about 560 CRNAs in its inventory—a 102-percent manning rate.

Table 69. Projected MHS CRNA manning, billets, and readiness requirements, by Service (FY 2001–2003)^a

	Army	Navy	Air Force	MHS
FY 2001 endstrength	239	144	156	539
FY 2002/3 projected gains	54	45	40	139
FY 2002/3 projected losses	48	25	45	118
FY 2003 projected endstrength	245	164	151	560
FY 2003 billets	244	134	169	547
Projected FY 2003 billet fill rate	100%	122%	89%	102%
Readiness requirement	263	154	93	510
Projected FY 2003 readiness fill rate	93%	106%	162%	110%

a. The data presented in tables 68 and 69 reflect *fully trained CRNAs* and do not capture the nurses that are in training to become CRNAs.

Although the Army will be fully manned, it is slightly short of meeting its readiness requirement of 263. The Navy will meet its readiness requirement but exceeds its billet level by 22 percent.¹¹³ The Air Force CRNA inventory far exceeds its readiness requirement but will only be about 90 percent manned. Overall, this community seems to be in good shape as the new decade begins.

¹¹³ We recommend that the Army and the Navy increase their CRNA billet file to a level at least equal to the readiness requirement.

Findings and recommendations

Overall

The personnel planning process for uniformed health care professionals has also undergone significant transformation and stress in the last decade. By the middle to late 1990s, when the MHS billet structure began to stabilize, the civilian market conditions had also changed. Despite historical success in acquiring many other health care professionals cheaply and quickly through the direct procurement pipeline, the military found itself in fierce competition with the private-sector employers offering competitive salaries, tailored benefits, and signing bonuses. Moreover, the student debt load for most other health care professionals has risen significantly in the last decade. The Services have responded with various and potentially costly programs. For some specialties, however, a predominant (or *bedrock*) accession source has failed to emerge. We do not find a pervasive retention crisis for the vast majority of MHS other health care professionals.

To gain a better understanding of retention, we strongly recommend that the initial obligated service date and accession source be strictly maintained and not overwritten with new obligated service dates resulting from promotion advancement or other personnel transactions. Failure to isolate the initial OSD and accession source dates makes it extraordinarily difficult to more effectively evaluate retention, the effect of pay on retention, and the return on investment for costly AFHPSP and HPLRP quotas. By taking this management action, the MHS and the Services will be able to better understand retention patterns and how to address them.

Pharmacists

We find that, although DoD is struggling to access and retain junior uniformed pharmacists, the MHS's projected FY 2003 manning will be 94 percent, which exceeds the readiness requirement. Our analysis showed that the paygrade and years of experience for MHS pharmacists has increased slightly over the last decade, with the exception of a decrease in the percentage of O-5s. Although Congress

authorized a \$30,000 pharmacist signing bonus, only the Army and the Air Force have appropriated a \$10,000 accession bonus at this time. We feel that the most significant long-term problem this community faces is the ability to access and retain junior uniformed pharmacists. We strongly recommend that the military departments and the Services collaborate to establish a reliable and predominant accession source for this community by appropriating the necessary funds to support the pharmacist signing bonus. To help reduce the shortage of junior pharmacists, the MHS should explore expanding the HPLRP as a *retention tool* by offering to pay the student debt for eligible uniformed pharmacists facing their first stay-leave military decision. The uniformed pharmacist special pay plan, scheduled for implementation in FY 2002, might be able to be held in abeyance if DoD concentrates on ensuring a reliable accession pipeline for this community. By so doing, it may negate the need to implement the pharmacist special pay.

Optometrists

In our analyses of uniformed optometrists, we have found an inventory decrease over the past decade, but the number of military optometrists exceeds its readiness requirements. We base our finding that the MHS will become increasingly reliant on 3- and 4- year AFHPSP or HPLRP quotas to meet its total accession requirements on the following:

- The Services' chronic inability to meet 90-percent manning thresholds
- The historical poor retention of junior optometrists
- The large uniformed-civilian pay gap at each military career juncture
- The cost of personal service contracts for this specialty
- The rising student debt load.

Based on these findings and the fact that each of the Services' control paygrade inventories is exceeding DoD guidelines (with the exception of Air Force at paygrade O-6), we support the implementation of the Optometry Retention Bonus commencing in FY 2002, provided

that DoD finds that uniformed optometrists are more cost-effective than their civilian counterparts for the billet structure in excess of the readiness requirement.

Clinical Psychologists

We find that the MHS clinical psychologist inventory has actually increased over the last decade, by about 18 percent. Although the percentage of O-4s is slightly less in FY 2000 than it was in FY 1991, this has been countered by an increase in the percentage of O-5 and O-6 clinical psychologists. Although a uniformed-civilian pay gap exists for this specialty, at all military career junctures, each of the Services is using an active duty clinical internship program to attract qualified candidates. We find that the MHS as a whole will near 100 percent manning for this specialty by FY 2003 and that the inventory exceeds the readiness requirement. We recommend that the Army consider slightly increasing its clinical psychologist accessions in the out-years to reach 100 percent manning. Moreover, we repeat our earlier recommendation that DoD assess its criteria for awarding board certification pay for AD clinical psychologists.

Physician Assistants

Our analysis shows that the MHS has successfully revitalized the Physician Assistant community and made the transition from Warrant Officers to commissioned officers in the last decade. We also find that by FY 2003 the MHS as whole will be significantly overmanned in this specialty with a 120-percent billet fill rate, and that the inventory exceeds the readiness requirement. Moreover, because of the predominant accession source for uniformed Physician Assistants, an active duty enlisted commissioning program, the Services are finding it difficult to grow control paygrade officers into this specialty because many opt to retire and pursue other career options before being considered for promotion to senior paygrades. We recommend that further analysis be conducted to determine the most cost-effective accession source for this specialty in the long run now that the billet structure and inventory have stabilized.

General Registered Nurses

In our analysis, we have found a significant decrease in the uniformed nurses' inventory over the past decade. Despite this drawdown, the projected inventories, experience levels, and grade structure are adequate to meet the readiness requirement, and the overall FY 2002 MHS manning for uniformed nurses will be near 97 percent. In the 1980s, the Services were able to directly procure (DP) the vast majority of their nursing accessions with little or no subsidization. Today, the Services have devised various subsidized programs, some costly, to achieve their total uniformed nursing accession requirements. In FY 2002, DPs will account for only about 55 percent of the total uniformed nursing accessions. We find that the DP program should be the most cost-effective means to achieve required uniformed nurse accessions and should be used as the predominant accession source by all three Services. In recognition of the increased demand for uniformed nurses through the DP program, the fierce competition in the private sector for nursing assets, and the continual drop in nursing school enrollments, we recommend that the uniformed nurse signing bonus be increased from \$5,000 to \$10,000 to ensure that the Services are able to achieve their total accession requirement.

Certified Registered Nurse Anesthetists

We find that the MHS, as a whole, has increased its CRNA inventory in the past 6 years and that the Air Force has deliberately downsized its inventory during the same time period. Our analysis shows that uniformed CRNAs are getting younger, primarily because of training general nurses earlier in their careers to become CRNAs to achieve both peacetime and readiness requirements. This policy change widens the entry-level uniformed-civilian CRNA pay gap. We find that most uniformed CRNAs, based on the predominant accession source, career path, and lucrative civilian salaries, do not remain in the military upon reaching retirement eligibility. Overall, the MHS will be at 102 percent manning for this community and meet its readiness requirements, but the Army has a slight deficit of inventory to meet its stated readiness requirement.

Conclusions

This concludes our analyses of uniformed health care professionals. DoD is at a critical crossroad. The past decade has been unique and filled with many challenges. The future holds new challenges and opportunities for DoD to improve the cost-effectiveness of its workforce, productivity, and patient outcomes within the MHS.

Although we don't find a pervasive retention crisis for most uniformed health care professionals, some specialties are experiencing a significant turnover rate. The MHS must refine and strengthen its personnel planning process to enable it to routinely monitor whether the manning shortfalls are a function of increased attrition or the lack of a cost-effective and reliable accession program.

We do find that—for some specialties—the current uniformed compensation and accession bonuses are inadequate. Although overall we find that the MHS is able to meet its current workforce objectives, we offer findings and recommendations to strengthen its ability meet its future workforce objectives. DoD, TMA, military departments, and the individual Service military and medical departments must work together to create and foster a culture that reinforces retention of uniformed health care professionals every day.

Appendix A: Descriptive statistics for physician cohorts included in the duration analyses

In tables 70 through 76 we present descriptive statistics for the physician cohorts used in the duration model analyses of physician retention.

Table 70. Descriptive statistics for primary care physician cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	509	552	455	294	349
Specialty					
Family practice	41.2%	41.7%	35.2%	43.5%	46.4%
Pediatrics	18.5%	22.5%	17.6%	15.6%	18.9%
Preventive medicine	5.5%	6.3%	9.5%	7.1%	4.9%
General internal medicine	34.8%	29.5%	37.85	33.7%	29.8%
Accession source					
USUHS	8.1%	8.0%	8.8%	16.7%	12.0%
AFHPSP direct	30.5%	18.3%	40.7%	36.1%	41.5%
AFHPSP deferred	40.5%	62.7%	38.9%	39.8%	39.5%
Direct	21.0%	11.1%	11.6%	7.5%	6.9%
Gender					
Female	19.4%	22.3%	20.0%	23.5%	25.8%
Service					
Army	32.0%	28.4%	37.1%	46.6%	8.3%
Navy	18.3%	19.9%	23.1%	15.3%	49.0%
Air Force	49.7%	51.6%	39.8%	38.1%	42.7%

Table 71. Descriptive statistics for internal medicine subspecialist cohorts, FYs 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	62	51	24	14	29
Specialty					
Cardiology	45.2%	49.0%	41.7%	28.6%	62.1%
Gastroenterology	35.5%	27.5%	29.2%	57.1%	13.8%
Hematology/oncology	19.4%	23.5%	29.2%	14.3%	24.1%
Accession source					
USUHS	6.5%	5.9%	20.8%	14.3%	6.9%
AFHPSP direct	40.3%	31.4%	29.2%	35.7%	37.9%
AFHPSP deferred	45.2%	58.8%	50.0%	42.9%	44.8%
Direct	8.1%	3.9%	0.0%	7.1%	10.3%
Gender					
Female	3.2%	11.8%	8.3%	14.3%	13.8%
Service					
Army	40.3%	47.1%	4.2%	71.4%	20.7%
Navy	24.2%	25.5%	41.7%	7.1%	62.1%
Air Force	35.5%	27.4%	54.2%	21.4%	17.2%

Table 72. Descriptive statistics for surgical specialist cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	408	412	339	242	260
Specialty					
OB/GYN	20.1%	25.7%	19.8%	21.9%	21.9%
Ophthalmology	9.6%	8.0%	9.1%	10.7%	10.8%
Otorhinolaryngology	9.1%	8.7%	10.9%	6.2%	9.2%
General surgery	30.4%	29.4%	29.2%	24.8%	20.0%
Neurological surgery	3.2%	2.9%	2.1%	3.7%	5.4%
Orthopedic surgery	20.8%	18.5%	20.4%	22.7%	22.3%
Plastic surgery	2.2%	1.5%	2.7%	0.8%	1.2%
Urology	4.7%	5.3%	5.9%	9.1%	9.2%
Accession source					
USUHS	9.1%	11.4%	10.3%	12.8%	12.7%
AFHPSP direct	29.7%	26.0%	28.9%	29.8%	40.4%
AFHPSP deferred	52.5%	57.3%	51.3%	52.9%	39.6%
Direct	8.8%	5.3%	9.4%	4.5%	7.3%
Gender					
Female	9.6%	13.8%	13.3%	16.1%	14.2%
Service					
Army	33.1%	30.1%	36.0%	40.1%	10.0%
Navy	30.9%	31.6%	31.9%	18.2%	56.5%
Air Force	36.0%	38.3%	32.2%	41.7%	33.5%

Table 73. Descriptive statistics for anesthesiologist cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	98	92	73	52	66
Accession source					
USUHS	8.2%	12.0%	13.7%	11.5%	18.2%
AFHPSP direct	22.4%	27.2%	19.2%	25.0%	34.8%
AFHPSP deferred	57.1%	57.6%	65.8%	59.6%	40.9%
Direct	12.2%	3.3%	1.4%	3.8%	6.1%
Gender					
Female	8.2%	7.6%	13.7%	9.6%	15.2%
Service					
Army	27.6%	29.3%	39.7%	34.6%	3.0%
Navy	48.0%	34.8%	28.8%	21.2%	62.1%
Air Force	24.5%	35.9%	31.5%	44.2%	34.8%

Table 74. Descriptive statistics for radiology and pathology cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	113	127	109	98	89
Specialty					
Pathology	31.9%	30.7%	21.1%	30.6%	32.6%
Radiology	68.1%	69.3%	78.9%	69.4%	67.4%
Accession source					
USUHS	4.4%	11.8%	11.0%	11.2%	14.6%
AFHPSP direct	19.5%	26.0%	35.8%	22.4%	30.3%
AFHPSP deferred	63.7%	49.6%	44.0%	61.2%	46.1%
Direct	12.4%	12.6%	9.2%	5.1%	9.0%
Gender					
Female	11.5%	15.7%	17.4%	16.3%	15.7%
Service					
Army	38.1%	31.5%	33.9%	38.8%	7.9%
Navy	25.7%	33.8%	33.9%	20.4%	50.6%
Air Force	36.3%	34.6%	32.1%	40.8%	41.6%

Table 75. Descriptive statistics for psychiatry cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	74	68	42	33	28
Accession source					
USUHS	4.1%	13.2%	16.7%	6.1%	10.7%
AFHPSP direct	21.6%	32.4%	16.7%	30.3%	53.6%
AFHPSP deferred	51.4%	48.5%	64.3%	54.5%	28.6%
Direct	23.0%	5.9%	2.4%	9.1%	7.1%
Gender					
Female	27.0%	20.6%	21.4%	15.2%	14.3%
Service					
Army	32.4%	32.4%	40.5%	63.6%	10.7%
Navy	28.4%	25.0%	16.7%	6.1%	60.7%
Air Force	39.2%	42.6%	42.9%	30.3%	28.6%

Table 76. Descriptive statistics for other specialty cohorts, FY 1992 through FY 1996

	Cohort				
	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
Cohort size	143	120	105	83	94
Specialty					
Emergency medicine	56.6%	64.2%	69.5%	65.1%	58.5%
Dermatology	27.3%	19.2%	14.3%	18.1%	29.8%
Neurology	13.3%	14.2%	11.4%	13.2%	9.6%
Physical Medicine	2.8%	2.5%	4.8%	3.6%	2.1%
Accession source					
USUHS	7.7%	10.0%	13.3%	9.6%	11.7%
AFHPSP direct	24.5%	36.7%	24.8%	38.6%	38.3%
AFHPSP deferred	53.8%	45.8%	55.2%	44.6%	38.3%
Direct	14.0%	7.5%	6.7%	7.2%	11.7%
Gender					
Female	14.0%	10.0%	21.0%	15.7%	19.1%
Service					
Army	31.5%	38.3%	26.7%	43.4%	13.8%
Navy	25.2%	30.0%	30.5%	21.7%	50.0%
Air Force	43.4%	31.7%	42.8%	34.9%	36.2%

Appendix B: Uniformed and private-sector registered nurse cash compensation comparisons

CNA Uniformed and private-sector registered nurse cash compensation comparisons

Registered Nurse (MHS vs Private Sector)					Average Income By Years of Practice	
	Entry	Jr. Midpoint	Sr. Midpoint	Top	MHS	Civilian
	Level	Level	Level	Level		
Years of Practice	1-3	4-10	11-15	16-20		
MHS	\$45,603	\$58,775	\$69,842	\$84,482	\$38,131	\$34,333
Civilian	\$36,167	\$43,572	\$50,905	\$57,155	\$50,585	\$38,572
% Variance (MHS/Civ)	126%	135%	137%	148%	\$58,775	\$42,944
Civilian Calculation:					\$69,842	\$43,245
Percentile	25th	50th	75th	90th	Average Income By Practice Setting	
Warren	\$41,378	\$46,216	\$52,842	\$59,215	MHS (6-10 YOF)	\$58,775
RN Survey	\$31,124	\$41,500	\$51,874	\$62,250	Acute Care	\$43,124
HRSA: BSN only	\$36,000	\$43,000	\$48,000	\$50,000	Amb Care/HMC	\$41,514
Avg	\$36,167	\$43,572	\$50,905	\$57,155	Comm/HH	\$42,545
					Health Ins/Scho	\$39,484
					ExtCare/Psy	\$43,767
					MD Office	\$36,479

Data Sources:

1/Warren Surveys: The HMO Salary Survey: Spring 2000. Rockford, IL 61114. 815.877.8794 www.demarcowarren.com Position: Staff RN
of Plans 131 # of Persons 15,878 10th \$36,500 25th \$41,378 Mean \$47,323 75th \$52,842 90th \$59,215

2/RN Magazine: 1999 Earnings Survey. Conducted by Medical Economics Research Services. Sample = 6,400 RNs w/response rate of 40% (2,558).
RN Magazine Survey did not publish percentile data except for mean and median. However the following salary detail was published for nurses working in acute care hospitals and used as percentile information.

	Income '99	Income '00*
22% of respondents made \$29,999 or less	\$29,999	\$31,124 Assumed 25th percentile
50% of respondents made \$40,000 or less	\$40,000	\$41,500 Assumed 50th percentile
76% of respondents made \$49,999 or less	\$49,999	\$51,874 Assumed 75th percentile
89% of respondents made \$60,000 or less	\$60,000	\$62,250 Assumed 90th percentile

Note: when hourly rate provided multiplied by 2,080 hours for annual income.

Avg Income By Practice Setting			Avg Income By Yrs of Experience			Average Annual Pay By Specialty		
	Income '99	Income '00*		Income '99	Income '00*		Income '99	Income '00*
Acute Care	\$41,010	\$42,548	<3 yrs	\$35,340	\$36,665	OR	\$46,592	\$48,339
Amb Care/HMO	\$36,075	\$37,428	3-5 yrs	\$37,730	\$39,145	OBG newborn	\$46,072	\$47,800
Comm/HH	\$38,545	\$39,990	6-10 yrs	\$39,410	\$40,888	Amb Surg, Ou	\$45,344	\$47,044
Health Ins/School	\$40,065	\$41,567	11-15 yrs	\$39,990	\$41,490	ED	\$43,576	\$45,210
ExtCare/Psy	\$39,840	\$41,334	16+	\$42,380	\$43,969	ICU/CCU	\$42,952	\$44,563
MMD Office	\$35,160	\$36,479				Med/Surg	\$40,872	\$42,405
Average Annual Pay by Hospital Bed Size			Avg Income By Education			Avg Income By Position		
	Income '99	Income '00*		Income '99	Income '00*		Income '99	Income '00*
500+ Beds	\$46,280	\$48,016	Diploma	\$40,350	\$41,863	Staff Nurse	\$37,850	\$39,269
300-499 Beds	\$47,112	\$48,879	Assoc	\$39,125	\$40,592	Charge Nurse	\$43,920	\$45,567
100-299 Beds	\$45,448	\$47,152	BSN	\$40,230	\$41,739	Head Nurse	\$45,070	\$46,760
< 100 Beds	\$40,144	\$41,649						
*Data adjusted by the BLS: Employment Cost Index: the average of Wages and Salaries for hospitals and health services.								
*Adjustment Index used in calculation is: 2000 = 3.75%.								
3/3/2000 National Sample Survey of RNs (Preliminary Findings). Bureau of Health Professionals, Health Resources and Services Administration (HRSA).								
Highest education level attained = BSN (2000 data)								
Employment Setting			Hospital Setting			Mean		
Practice Setting	% of BSNs	25th	Mean	Median	75th	Mean	Median	
Hospital	64%	\$37,000	\$47,300	\$45,000	\$55,000	ICU	\$46,100	\$45,000
Nursing Home	5%	\$36,900	\$46,200	\$43,700	\$52,000	Step-down	\$44,000	\$42,000
Nurse Educ	1%	\$37,000	\$45,300	\$40,000	\$53,000	Gen./Spec	\$43,700	\$42,000
Std Health	5%	\$28,900	\$37,400	\$35,000	\$43,000	Outpatient	\$48,900	\$48,600
Pub Hlth Comm	13%	\$36,800	\$45,100	\$42,600	\$52,000	Operating Rm	\$55,400	\$50,000
Occ Health	2%	\$38,000	\$49,000	\$45,000	\$60,000	P-A Recovery	\$50,000	\$50,000
Amb Care n/own	8%	\$35,300	\$45,600	\$43,000	\$54,000	L & D	\$43,000	\$40,000
Ins. Claims	2%	\$42,500	\$50,600	\$49,000	\$56,000	ER	\$45,900	\$45,000
						Home Health	\$47,400	\$45,000
						Hospice	\$33,100	\$34,000
						Diagnostic	\$44,700	\$45,000

*Data adjusted by the BLS: Employment Cost Index: the average of Wages and Salaries for hospitals and health services.

*Adjustment Index used in calculation is: 2000 = 3.75%.

3/ 2000 National Sample Survey of RNs (Preliminary Findings), Bureau of Health Professionals, Health Resources and Services Administration (HRSA). Highest education level attained = BSN (2000 data)

** Used the 25th percentile for < 3 yrs "Average Income By Yrs of Practice".

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