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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 2010		2. REPORT TYPE		3. DATES COVERED 00-00-2010 to 00-00-2010	
4. TITLE AND SUBTITLE An Analysis of the Populations of the Air Force's Medical and Professional Officer Corps				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) RAND Corporation, 1776 Main Street, P.O. Box 2138, Santa Monica, CA, 90407-2138				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 92	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

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TECHNICAL REPORT

An Analysis of the Populations of the Air Force's Medical and Professional Officer Corps

Edward G. Keating, Hugh G. Massey,
Judith D. Mele, Benjamin F. Mundell

Prepared for the United States Air Force

Approved for public release; distribution unlimited



RAND PROJECT AIR FORCE

The research described in this report was sponsored by the United States Air Force under Contract FA7014-06-C-0001. Further information may be obtained from the Strategic Planning Division, Directorate of Plans, Hq USAF.

Library of Congress Cataloging-in-Publication Data

An analysis of the populations of the Air Force's medical and professional officer corps / Edward G. Keating ... [et al.].

p. cm.

Includes bibliographical references and index.

ISBN 978-0-8330-4951-3 (pbk. : alk. paper)

1. United States. Air Force—Officers—Recruiting, enlistment, etc. 2. United States. Air Force—Medical personnel—Recruiting, enlistment, etc. 3. United States. Air Force—Personnel management. I. Keating, Edward G. (Edward Geoffrey), 1965-.

UG793.A53 2010

358.4'13320973—dc22

2010018164

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Published 2010 by the RAND Corporation

1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138

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Preface

This technical report emanates from a RAND Project AIR FORCE study entitled “Retention Bonus Elasticities.” This fiscal year 2009 study was sponsored by the Director of Force Management Policy, Deputy Chief of Staff, Manpower and Personnel (AF/A1P). The study’s objective was to examine prospective changes to Air Force compensation policies, with the goal of improving accessions and retention. The research reported here was performed within the Manpower, Personnel, and Training Program of RAND Project AIR FORCE.

As the project evolved, the focus became to characterize how the Air Force’s seven medical and professional officer corps (the Biomedical Sciences Corps [BSC], the Chaplain Corps, the Dental Corps, the Judge Advocate General [JAG] Corps, the Medical Corps, the Medical Service Corps [MSC], and the Nurse Corps) have been faring in terms of accessions and retention. What challenges are these different corps facing? What are similarities and differences in the corps’ statuses?

Related RAND Corporation documents include the following:

- *Air Force Physician and Dentist Multiyear Special Pay: Current Status and Potential Reforms*, by Edward G. Keating, Marygail K. Brauner, Lionel A. Galway, Judith D. Mele, James J. Burks, and Brendan Saloner, MG-866-AF, 2009.
- *Retention of Volunteer Physicians in the U.S. Air Force*, by Victoria Daubert, R-3185-AF, 1985.
- *I Want You! The Evolution of the All-Volunteer Force*, by Bernard D. Rostker, MG-265-RC, 2006.

This research is intended to be of interest to Air Force and other Department of Defense (DoD) personnel involved with military manpower policy.

RAND Project AIR FORCE

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Summary

The U.S. Air Force has seven medical and professional officer corps: the BSC, the Chaplain Corps, the Dental Corps, the JAG Corps (attorneys), the Medical Corps (physicians), the MSC, and the Nurse Corps. The purpose of this report is to provide an analysis of all seven Air Force medical and professional officer corps and their relative statuses with regard to end strengths, accession levels, promotion flow, and attrition since the late 1970s. We find that recent accession and retention trends have been most adverse in the Air Force's Nurse Corps.

An Overview of the Populations of the Air Force's Medical and Professional Officer Corps

The analyses presented in this report are built around Air Force Personnel Center annual inventories that have been transmitted to RAND. As of when this research was undertaken, RAND had such annual snapshots from September 30, 1975, through and including September 30, 2008. Because of data irregularities in early years, we have largely used 1978–2008 data in this analysis.

The Nurse Corps has traditionally been the largest Air Force medical and professional corps, but, in 2007, its population fell below the Medical Corps' for the first time since 1978. (See pp. 3–4.)

Since 1978, the Chaplain and Dental Corps have declined in rough parallel to the Air Force's overall active-duty population. By contrast, the other corps, except the Nurse Corps, were larger in 2008 than they were in 1978, despite the considerable diminution in the active-duty Air Force's overall size since 1978. (See pp. 4–5.)

Accessions and Retention in the Air Force's Medical and Professional Officer Corps

The Medical Corps has typically had high accession rates, while Chaplain Corps accession rates have been the lowest among the seven corps. Medical Corps officers have been least likely to serve 20 years in their corps; chaplains have been most likely to do so. (See pp. 7–9.)

Service in the Air Force prior to entering the medical and professional corps has been most common in the MSC and BSC and least common in the Dental Corps. Attrition between years 15 and 20 of corps service appears to be, at least in part, explained by precorps Air Force service. (See pp. 10–12.)

Promotions in the Air Force's Medical and Professional Corps

Nurses, MSCs, and BSCs often accessed as second lieutenants (O-1s) and first lieutenants (O-2s), while dentists almost always accessed as captains (O-3s) and a number of physicians accessed above O-3. (See pp. 13–14.)

Physicians who enter Air Force service having already completed residency training at a civilian medical center typically receive “constructive credit” for their years in residency training. As a result, they are considered for O-3 to major (O-4) promotion after a few years of O-3 service, far earlier than is typically the case for any other type of officer. (See p. 16.)

Among the seven corps, O-3 nurses were least likely to ever become O-4s. Also, along with chaplains, nurses had the longest average duration as an O-3, conditional on being promoted to O-4. (See p. 16.)

MSC officers tended to receive the O-4 to lieutenant colonel (O-5) promotion a year sooner than other corps' officers. Only about 25 percent of Medical Corps O-4s became O-5s because many physicians' service obligations expired after a few years of service as an O-4. (See pp. 16–17.)

Dentists were the only population in which more than half of the corps' O-5s became colonels (O-6s). The O-5 to O-6 promotion was least common among nurses. O-5 JAGs and MSCs tended to be promoted a year earlier than other corps' O-5s. (See pp. 17–18.)

By the 20th year in their corps, most physicians, dentists, and JAGs have been promoted to O-6. By contrast, less than 2 percent of nurses have become O-6s by their 20th year in the Nurse Corps. Nurses generally have entered at lower ranks, have spent more time as lieutenants, and have been less likely to be promoted. When nurses have been promoted, they have not been promoted as quickly as, for instance, MSCs have been promoted. (See pp. 17, 19.)

Recent Trends in the Air Force's Medical and Professional Officer Corps

Since 2000, every corps has had a greater average annual attrition rate than average annual accession rate, implying that each corps was smaller on September 30, 2008, than it was on September 30, 1999. (See pp. 21–22.)

In a steady state, a corps would have the same number of accessions and departures in a given year. This equivalence would imply that the corps' population equals its number of annual accessions divided by its attrition rate. A corps with more accessions can tolerate a higher attrition rate.

Using 2000–2008 accession-level and attrition-rate averages, the Nurse Corps' estimated steady-state population is 19 percent below its actual September 30, 2008, level. The Nurse Corps appears to be the corps most likely to shrink further in the future. (See pp. 23–24.)

The finding that the Nurse Corps is most likely to shrink in the future is preserved using 2001–2008 and 2002–2008 accession-level and attrition-rate averages. (See pp. 24–25.)

Challenges Using Authorization Data

We were hopeful that authorization data would be central to our inquiry. However, as our project progressed, we grew increasingly concerned about the authorization data and what they mean.

One troubling aspect of the authorization data is that there have consistently been many more chaplains than authorized, dating back to 1980. When an overage is so consistent, we cannot help but assume the Air Force needs more chaplains than authorized. (See p. 28.)

It seems terribly peculiar to us that all seven corps had a 0–10-percent overage consistently through the 1980s, but, then, around 1990, a great variance in the actual-to-authorized (or “manning”) ratio emerged and has persisted since then. (See pp. 28–29.)

Authorizations appear to be unstable when disaggregated to the rank level. For example, for many years, there were considerably more O-5s in the Nurse Corps than authorized (in 1992, almost 90 percent more). Since then, it appears Nurse Corps O-5 authorizations were increased to ratify the actual number of O-5s in the Nurse Corps (rather than actual levels being adjusted to move toward authorized levels). Authorized Nurse Corps O-5s do not appear to have been a stable statement of how many O-5 nurses the Air Force wanted to have. (See pp. 29–30.)

Given our doubts about what the authorization data mean, we are more inclined to believe insights from actual population trends.

Conclusions

The Air Force and the DoD put considerable effort into determining how recruiting and retention investments are made. There are several high-level questions to consider. First, is there a problem—i.e., is there a military population whose recruiting or retention outcomes have been undesired? Second, assuming there is a population that has had undesired outcomes, how best should problems be addressed? Would there be greater return, for instance, in devoting incremental resources to recruiting or retention?

The Air Force is unlikely to be indifferent across points on an isoquant of accession levels and attrition rates consistent with a given steady-state population size. If the Air Force wants a youthful workforce, a combination of high accessions and high attrition would be preferred. Conversely, if training is expensive or experience is highly valued (or both), a low accession/low attrition outcome is probably preferred. A high accession outcome requires greater recruiting resources; a low attrition outcome requires greater retention resources. (See p. 33.)

This report suggests that the Air Force medical and professional corps with the most-adverse population trends is the Nurse Corps. On the other extreme, the MSC and the JAG Corps appear to have stable populations. (See p. 33.)

Given our concerns about Air Force authorization data, the analysis technique set forth in this report is better suited to characterizing military populations’ current statuses and recent trends than it is to attaching normative interpretation to those statuses and trends. (See pp. 33–34.)

Acknowledgments

The authors appreciate the assistance of John Park, Lt Col William Foster, Lt Col Helen Meisenhelder, and Maj James Cordeiro of AF/A1PF. We also appreciate insights from Col Grant Hartup of AF/SG1D, Col Donnalee Sykes of AF/SG1N, Lt Col Susan Jano of AF/SG1A, Lt Col Janice Langer of AF/SG1, and Lt Col Terry Mathews of AF/SG1D. Former RAND colleague Col James J. Burks, now of the Office of the Secretary of Defense (Health Affairs), also assisted our research. Lt Col Mathews provided a number of useful insights on physician-assistant careers, while John Reilly provided insights on JAG careers.

We received helpful reviews of an earlier version of this report from Peter Schirmer and Albert H. Schroetel.

We appreciate the assistance of our RAND colleagues, including program director Al Robbert and deputy program director Bart Bennett. Beth Asch and Brendan Saloner provided constructive comments on earlier versions of this report. Lt Col D. Scott Guermonprez provided insight on the MSC. Lt Eric Jesse provided research assistance. Carl Rhodes orchestrated the RAND internal-review process. Christopher Dirks provided administrative assistance. Jane Siegel prepared the manuscript. Nora Spiering edited this document. Steve Weprin assisted with the publication process.

While this research project was ongoing, Al Robbert's administrative assistant, Susan Bowen, passed away. We miss her greatly.

Of course, remaining errors are solely the authors' responsibility.

Abbreviations

AFPC	Air Force Personnel Center
AFSC	Air Force Specialty Code
B.A.	bachelor of arts
B.S.	bachelor of science
BSC	Biomedical Sciences Corps
CMDB	Consolidated Manpower Database
CMDS	Command Manpower Data System
DoD	United States Department of Defense
DOPMA	Defense Officer Personnel Management Act
FY	fiscal year
HPSP	Health Professions Scholarship Program
JAG	Judge Advocate General
M.A.	master of arts
M.D.	doctor of medicine
MPES	Manpower Programming and Execution System
M.S.	master of science
MSC	Medical Service Corps
O-1	second lieutenant
O-2	first lieutenant
O-3	captain
O-4	major
O-5	lieutenant colonel
O-6	colonel

O-7	brigadier general
PAF	Project AIR FORCE
Ph.D.	doctor of philosophy
USU	Uniformed Services University of Health Sciences

Introduction

Since the advent of the all-volunteer force, one of the foremost challenges of the United States Air Force and United States Department of Defense (DoD) has been recruiting and retaining an adequate number of medical and professional officers. Most often, this challenge is centered on attracting and retaining physicians in the Air Force's and other services' Medical Corps.¹ But, in fact, the Air Force has seven "nonline" corps or, as we prefer to call them, medical and professional officer corps.² Along with physicians in the Medical Corps, there are the Biomedical Sciences Corps (BSC), the Chaplain Corps, the Dental Corps, the Judge Advocate General (JAG) Corps (attorneys), the Medical Service Corps (MSC), and the Nurse Corps. For each of these corps, there are highly similar jobs in the private sector, so attracting and retaining these corps' officers is a constant challenge. The purpose of this report is to provide an analysis of all seven Air Force medical and professional officer corps and their relative statuses with regard to end strengths, accession levels, promotion flow, and attrition since the late 1970s.

All the personnel we study in this analysis are military officers. There are no enlisted members in any of these corps.

In fiscal year (FY) 2008, RAND conducted an analysis of the Air Force's Medical and Dental Corps, discussed in Keating et al. (2009). In FY2009, the Air Force asked RAND to analyze all seven medical and professional officer corps. This report presents our findings.

In the body of this report, we analyze all seven officer corps together, offering comparisons between them across a number of dimensions. The body of this report includes a presentation of a methodology that parsimoniously summarizes the corps' relative statuses. In particular, we present evidence that recent accession and attrition trends are most adverse in the Air Force's Nurse Corps, suggesting incremental recruiting and retention resources be allocated to that corps.

The report also provides separate appendixes (A–G) for each medical and professional officer corps. These appendixes provide information specific to those corps. The appendixes are primarily intended for readers interested in a specific Air Force medical or professional officer corps without any direct comparison with other officer corps. Given the BSC's heterogeneity and the elevated level of challenges we find in the Nurse Corps, there is more depth presented in Appendix A (BSC) and in Appendix G (Nurse Corps) than is provided in the other five

¹ Rostker, 2006, notes that concerns about physicians were one of the foremost arguments against the abolition of conscription. There is a sizable literature on the DoD's attraction and retention of physicians. See, for instance, Daubert, 1985; U.S. General Accounting Office (now U.S. Government Accountability Office), 1995; Brannman et al., 2003; Levy, Christensen, and Asamoah, 2006.

² Oxford University Press, 2001, defines *line officer* as follows: "in the U.S. Army, a combat arms officer serving in a line unit; in the U.S. Navy, an officer other than an officer of the Supply, Medical, Judge Advocate, or other specialist corps."

appendixes. (The Dental and Medical Corps were examined in our earlier publication, Keating et al., 2009.)

An Overview of Air Force Medical and Professional Officer Corps' Populations

The analyses presented in this report are built around Air Force Personnel Center (AFPC) annual inventories that have been transmitted to RAND. These inventories provide annual demographic snapshots of individuals serving in the Air Force as of September 30 (the end of the DoD's FY). The snapshots include information that varies annually, such as each individual's rank and Air Force Specialty Code (AFSC—both duty and primary), as well as permanent characteristics, such as accession source and gender. The annual snapshots can be linked over time, so we can observe how an individual's Air Force career has evolved.¹

As of when this research was undertaken, RAND had such annual snapshots from September 30, 1975, through and including September 30, 2008. For the most part, we do not use the 1975–1977 snapshots, as those older data exhibit irregularities, such as implausibly large population swings. Instead, we largely use September 30, 1978, through September 30, 2008, data.² We therefore have 31 years of observations.

There are two types of career censoring in our data. Some individuals' Air Force careers started before September 30, 1977, so we only observe later years of their careers. Other individuals were still serving as of September 30, 2008, so we are not observing the final years of their careers. Of course, many individuals joined the Air Force after September 30, 1977, and left it before September 30, 2008, so we observe the entirety of their Air Force careers.

Figure 2.1 presents the seven Air Force medical and professional officer corps' populations between September 30, 1978, and September 30, 2008.

The Nurse Corps has traditionally been the largest Air Force medical and professional corps, but, in 2007, its population fell below the Medical Corps' for the first time since 1978. The BSC has long been the third-largest medical and professional officer corps. The Chaplain Corps has been the smallest Air Force medical and professional officer corps since 1978.

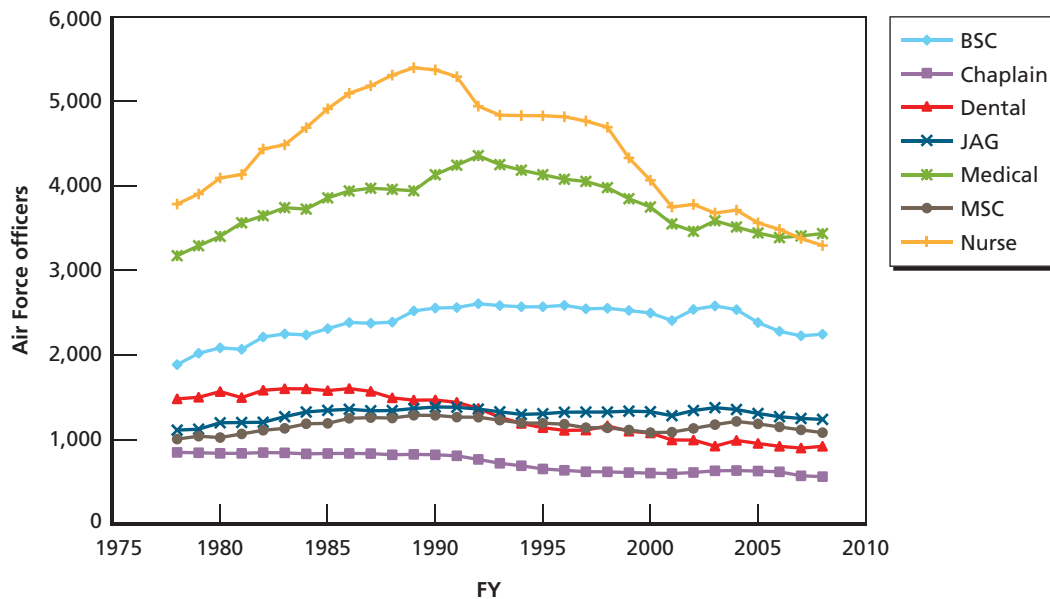
On March 31, 1980, the Air Force Veterinary Corps was disbanded and its veterinarians transferred into the BSC.³ To simplify the analysis, we count 1978 and 1979 Veterinary Corps officers as being in the BSC.

¹ The AFPC tracks individuals by Social Security number. When, however, RAND researchers access these data, the Social Security numbers have been one-to-one scrambled or encrypted. Hence, while we can track an individual over time, we do not have sensitive Social Security number data in our spreadsheets.

² Tacitly, we use the 1975–1977 data also, in that we tally individuals who entered the Air Force in 1978 and later. We identify someone as entering in a given year based on his or her not having been in the Air Force personnel data in any preceding year.

³ See Air Force Medical Service, 2005.

Figure 2.1
Air Force Medical and Professional Officer Corps' Populations, 1978–2008



RAND TR782-2.1

Figure 2.2 uses the same data as Figure 2.1 but normalizes each corps', as well as the overall active-duty Air Force's,⁴ September 30, 1978, population to 1.0.

Since 1978, the Chaplain and Dental Corps have declined in rough parallel to the Air Force's overall active-duty population. By contrast, all the other corps, except the Nurse Corps, were larger in 2008 than they were in 1978, despite the considerable diminution in the Air Force's active-duty population since then.

Figure 2.3 is a similar portrayal, except that it normalizes each corps', as well as the overall active-duty Air Force's, September 30, 1990, population to 1.0.

As of September 30, 2008, the Dental and Nurse Corps had population declines since 1990 closest to the decline in the Air Force's overall active-duty population (though the Nurse Corps' population tracked proportionally above the total active-duty Air Force population through the 1990s). Each of the corps has shrunk since 1990, but other corps' diminutions have not been proportional to the decline in the size of the active-duty Air Force.

As shown in Figure 2.4, six of the seven officer corps have historically been primarily male, with the Nurse Corps being the exception. Each of the corps, including the Nurse Corps, has trended toward greater gender parity. The BSC has been the second-most-female medical and professional officer corps. The Chaplain Corps has had the lowest female representation.

⁴ The total active-duty Air Force tally was pulled from the Air Force Personnel Center, 2010.

Figure 2.2
Air Force Medical and Professional Officer Corps' Populations, 1978–2008, with 1978 Normed to 1.0

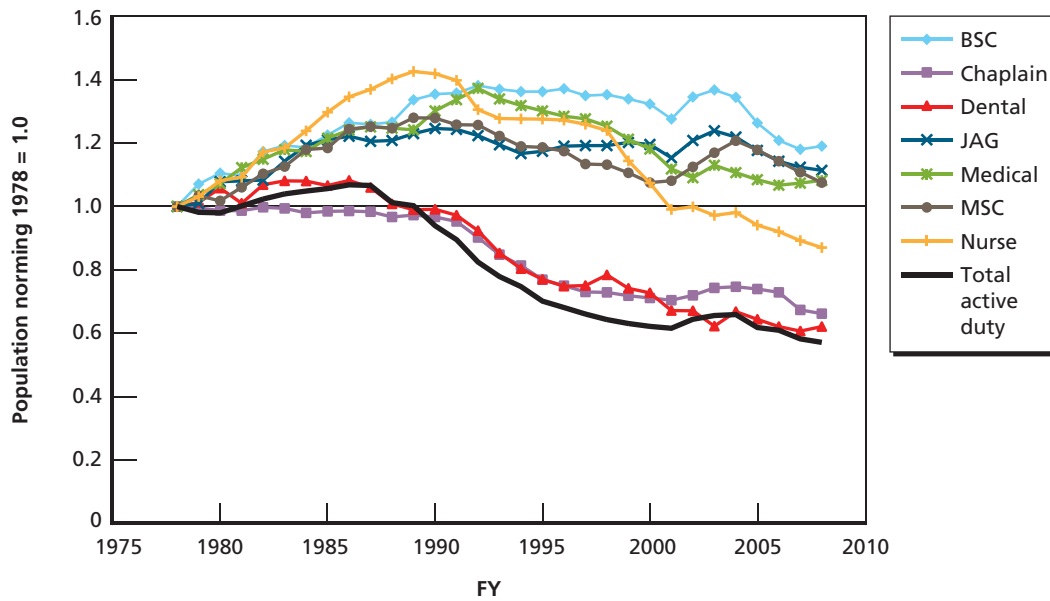


Figure 2.3
Air Force Medical and Professional Officer Corps' Populations, 1990–2008, with 1990 Normed to 1.0

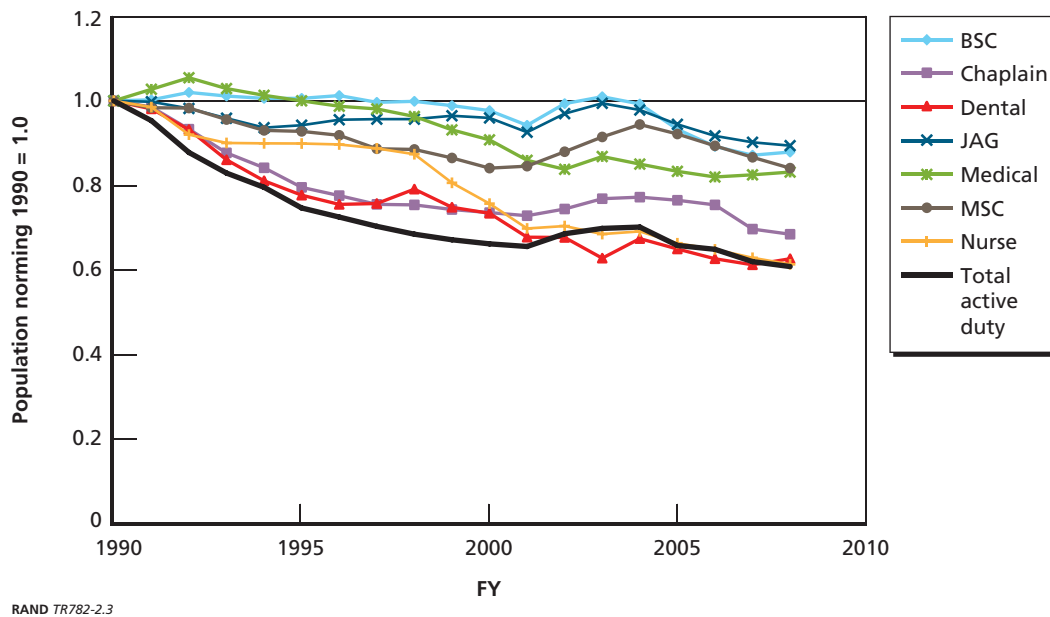
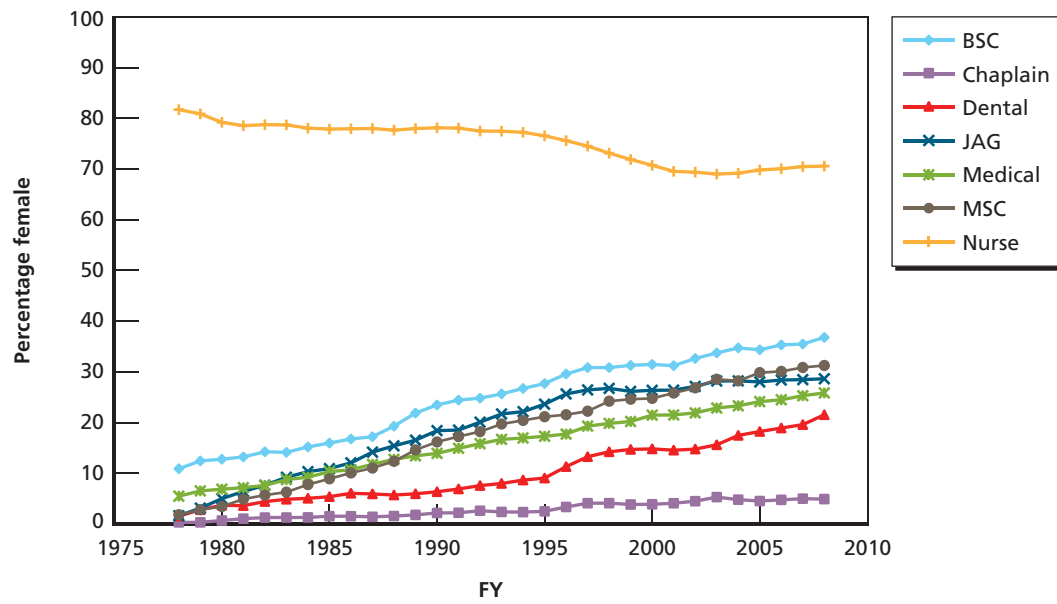


Figure 2.4
Air Force Medical and Professional Corps' Female Percentages, 1978–2008



RAND TR782-2.4

Accessions and Retention in the Air Force Medical and Professional Officer Corps

In this chapter, we discuss the medical and professional officer corps' accession and retention patterns.

Figure 3.1 plots year-to-year accession totals by corps. Accession totals have been highly variable from year to year. It is hard to see patterns in a display such as this.

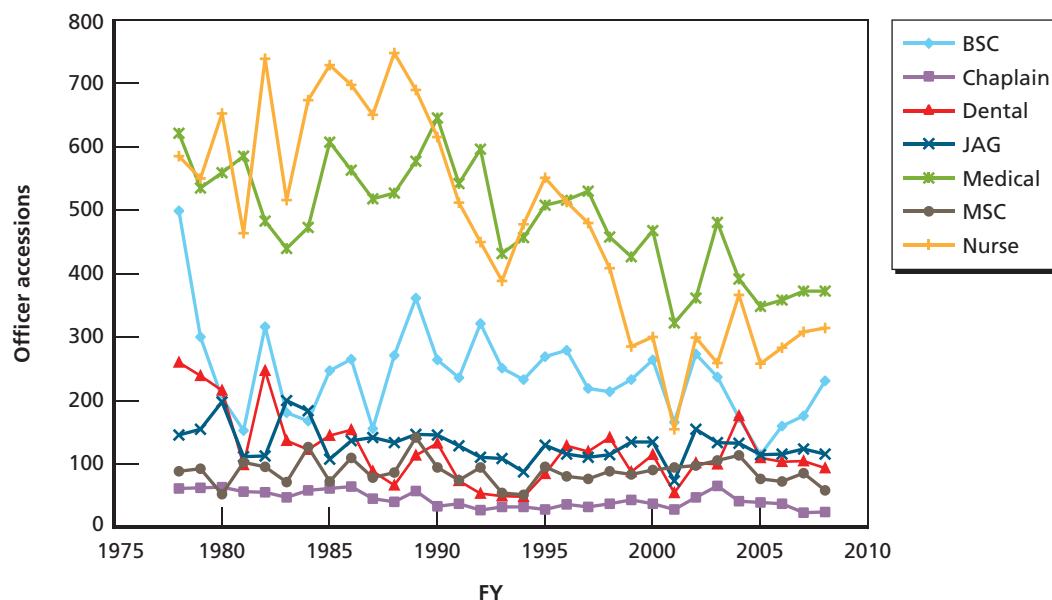
In this report's Appendixes A–G, we separately display each line in Figure 3.1. There are some patterns in these data, e.g., generally downward trends in Medical and Nurse Corps accessions. Corps-specific time trends are hard to see in Figure 3.1, however.

To reduce the level of noise in the portrayal, Figure 3.2 shows different corps' average annual accession percentages (accessions in Year t divided by corps population size in Year $t-1$) in nine-year blocks.

While Figure 3.2 remains noisy, we see the Medical Corps has typically had high accession rates, while the Chaplain Corps accession rates have been much lower.

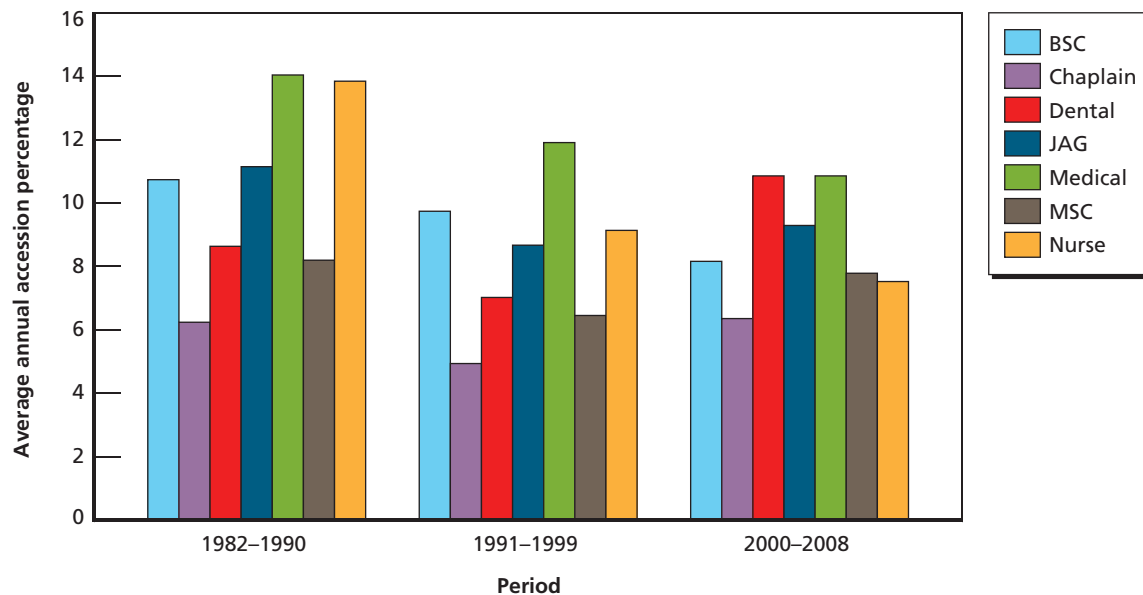
The ways individuals access into these corps vary. As we discussed in Keating et al. (2009), the Medical Corps and, starting in the 1990s, the Dental Corps get the majority of their acces-

Figure 3.1
Air Force Medical and Professional Corps' Annual Accessions, 1978–2008



RAND TR782-3.1

Figure 3.2
Air Force Medical and Professional Corps' Average Annual Accession Rates in Nine-Year Blocks



RAND TR782-3.2

sions through the Health Professions Scholarship Program (HPSP). Under HPSP, the Air Force pays for an individual's medical or dental school in exchange for a one-for-one (post-residency, in the case of the Medical Corps) service obligation. For example, if the Air Force paid for four years of medical school, the physician owes four years of service to the Air Force after completion of his or her residency training. (Dentists do not generally undertake residency training before commencing Air Force service, but the obligation is still one for one.) A fair number of veterinarians and optometrists (both in the BSC) also access through the HPSP.

A key point about HPSP accessions is their lengthy gestation period. If a new medical school student signs up for HPSP, it would be four years before he or she started residency training at a military medical center. If the new physician instead received residency training at a civilian medical center, it could be nearly a decade between when the individual made a commitment to HPSP and the commencement of his or her Air Force service.

Gestation periods are three or four years for HPSP dentists and others who do not get residency training. Likewise, physicians who access through the civilian residency-subsidizing Financial Assistance Program typically access three or four years after their initial commitment to Air Force service.

For most other types of medical and professional officers, there is no (or only a few months') gestation period. An individual might, for instance, complete nursing school and then be recruited "off the street" into the Air Force. There are a handful of other corps' officers with longer gestation periods—e.g., they attended the Air Force Academy. There are also, as discussed later in this chapter, a fair number of MSC officers (and BSC physician assistants—see Appendix A) with prior enlisted ties to the Air Force. To a first approximation, however, BSC, Chaplain, JAG, MSC, and Nurse Corps officers are hired on a "spot market" with only a few months (not years) between commitment and accession, while dentists and, especially, physicians generally have much longer lags.

Figure 3.3 looks at officers who entered the seven medical and professional corps between 1978 and 1989 and plots their rates of retention in those corps over time. (We can only go through 1989 entrants, as we want to observe 20 years of data and September 30, 2008, is our last inventory.) Chaplains have had the highest retention, while MSCs have been second highest.

By the ten-year point, physician retention has been the lowest among the seven medical and professional corps. In Keating et al. (2009), we discuss how physician retention is somewhat higher in the first eight years or so because of physicians doing residency training at military medical centers. As noted, years spent as a medical resident at a military medical center do not count toward educational obligation (e.g., HPSP) fulfillment, so these physicians end up with longer Air Force careers before they are allowed to leave.

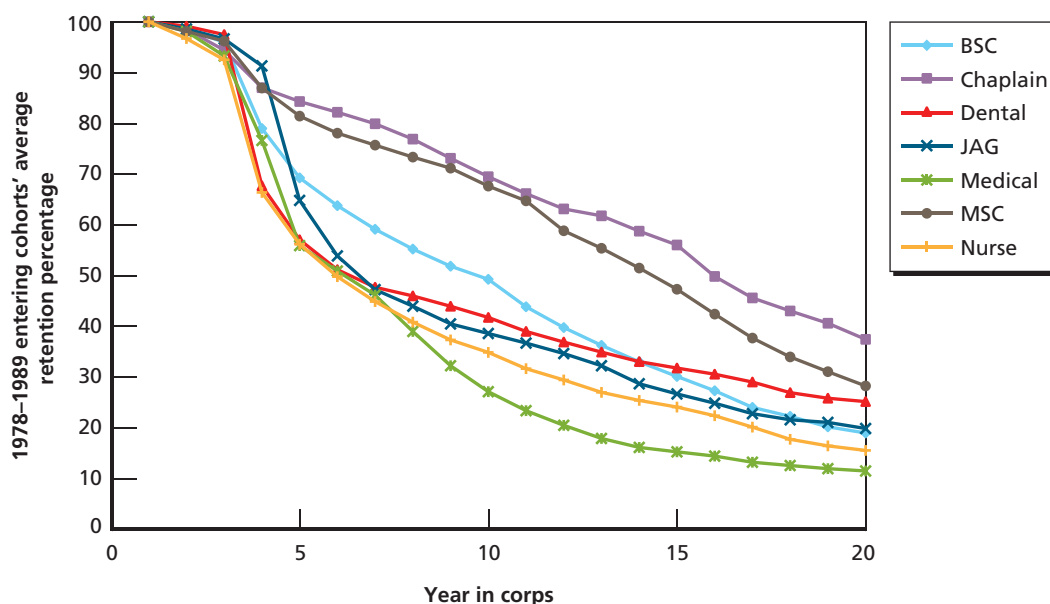
Another observation on Figure 3.3 is that corps' populations continue to fall through years 15–20 of corps service. Superficially, this is a curious result, as we do not expect an officer to leave the Air Force close to, but without achieving, the 20 years of service required for military-retirement eligibility.

A major explanation for this phenomenon is officers who had military experience prior to joining their current medical or professional corps. We term this *precorps service*.

Precorps service can occur in different ways. An individual could serve as an officer in another medical or professional corps or in the line of the Air Force prior to joining his or her current medical or professional corps. A nurse who later joins the MSC would be an example of such a path.

Alternatively or additionally, an individual could serve as an enlisted member of the Air Force prior to becoming an Air Force officer. Those enlisted years count toward 20-year retirement eligibility.

Figure 3.3
1978–1989 Medical and Professional Corps' Entrants' Retention Percentages



An individual could also serve while attending the Air Force Academy or the Uniformed Services University of Health Sciences (USU). This case, however, does not interest us for current purposes, as years spent at the academy or the USU do not count toward retirement credit.

An individual could also serve as an officer or enlisted servicemember in the Air Force Reserve or in another branch of the U.S. military. The AFPC data we utilized do not, however, give us visibility of such service.

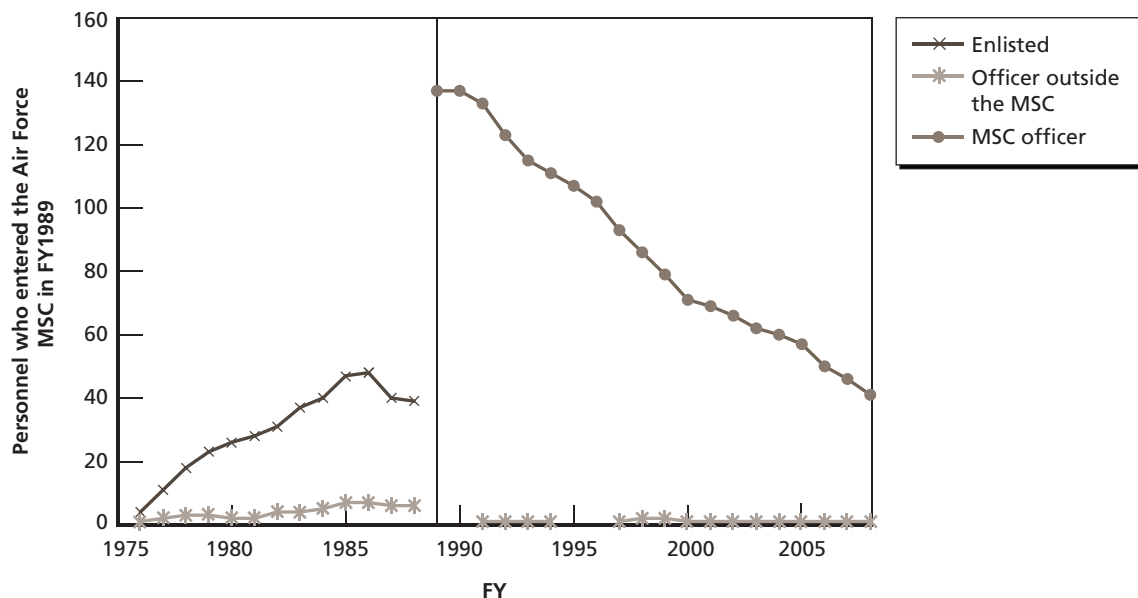
Another problem with our data is that we only see Air Force active-duty enlisted service back to 1976 and officer service back to 1975. Hence, we are missing Air Force service that occurred prior to those years. Therefore, our estimates of precorps service are lower bounds. Some individuals had longer precorps service than we observe, and other individuals had precorps service that we do not observe at all.

As an illustration of precorps experience, Figure 3.4 focuses on the 137 officers who entered the MSC in 1989. In the years preceding their becoming MSC officers, a number of these individuals served as officers outside the MSC or, more commonly, as enlisted members of the Air Force.

After their 1989 entrance into the MSC, attrition began so that, for instance, only 79 of the 137 were still MSC officers as of September 30, 1999. Two had become Air Force officers outside the MSC,¹ but most attrition was out of Air Force service altogether.

Table 3.1 shows estimates of the percentages of the corps' 1978–2008 entrants with precorps enlisted, officer, and both enlisted and officer experience. Precorps experience has been most common in the MSC and the BSC. Over half of officers who entered the MSC between 1978 and 2008 had precorps experience, more often enlisted.

Figure 3.4
Precorps Experience of 1989 MSC Entrants



RAND TR782-3.4

¹ One was a USU student in 1999, later to join the Medical Corps. This officer was in a preventive-medicine specialist residency program, AFSC 44B1, as of September 30, 2008. The other was an “unclassified officer,” AFSC 96U0, as of September 30, 1999. That individual’s Air Force career ended during FY2000.

Table 3.1
Percentage of 1978–2008 Entering Officers with
Precorps Air Force Experience

Corps	Enlisted Only	Officer Only	Both	Total
BSC	23.8	4.0	1.0	28.9
Chaplain	9.2	3.3	0.5	13.0
Dental	1.5	1.1	0.1	2.7
JAG	2.6	13.3	1.8	17.7
Medical	1.4	3.0	0.5	4.9
MSC	36.9	8.2	5.3	50.4
Nurse	8.7	0.3	0.4	9.3

NOTE: Numbers may not total due to rounding.

JAGs ranked third among medical and professional corps in terms of precorps experience. Unlike the MSC and BSC, most JAG precorps experience was as an Air Force officer, not as an enlisted member of the Air Force.

Table 3.2 shows the corps' entrants' average conditional (for those who had precorps experience) and unconditional (for the whole entrant population, including those without precorps experience) years spent as enlisted servicemembers and officers prior to joining their corps.

If individuals had precorps enlisted service, it typically lasted three to seven years. Enlisted experience was sufficiently common among MSC officers that the average MSC officer had almost three years of enlisted service, even though over half had no years of enlisted service.

Precorps officer experience, when it occurred, tended to be somewhat briefer than precorps enlisted service. Only in the JAG and MSC did the average entering officer have more than 0.5 years of precorps officer service.

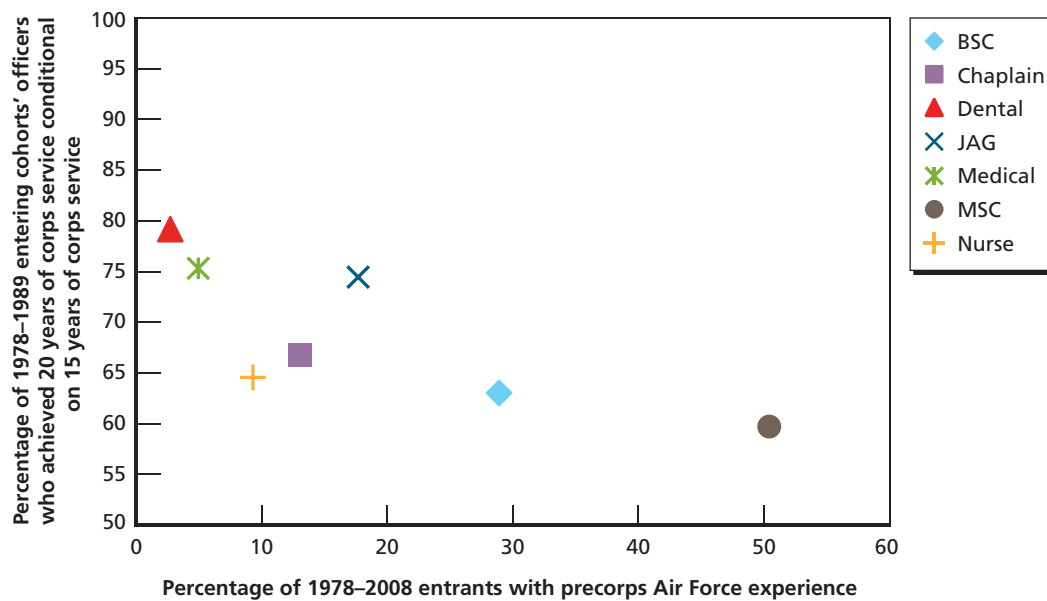
Figure 3.5 compares the corps' precorps-experience percentages with their diminution in retention between years 15 and 20 of corps service. The MSC is the corps with the most precorps Air Force experience (over 50 percent). It is also the corps that has had the fewest 15-year officers achieve 20 years of MSC service (less than 60 percent). By contrast, the Dental Corps had the fewest officers with precorps Air Force experience (less than 3 percent) but the most 15-year officers (nearly 80 percent) who achieved 20 years of Dental Corps service.

While having precorps Air Force experience is not the sole explanation for corps' attrition between years 15 and 20, Figure 3.5 suggests it is one explanation for the observed phenomenon.

Table 3.2
1978–2008 Entering Officers' Conditional and Unconditional
Average Years of Precorps Air Force Experience

Corps	Enlisted Conditional	Enlisted Unconditional	Officer Conditional	Officer Unconditional
BSC	7.0	1.7	5.2	0.3
Chaplain	6.0	0.6	5.7	0.2
Dental	4.4	0.1	2.7	0.0
JAG	3.2	0.1	4.9	0.7
Medical	4.2	0.1	4.6	0.2
MSC	6.8	2.9	4.2	0.6
Nurse	6.1	0.6	3.0	0.0

Figure 3.5
Relationship Between Corps' Levels of Precorps Experience and Years 15–20 Retention
Percentages



Promotions in the Air Force Medical and Professional Officer Corps

When this project commenced, RAND had the pleasure of meeting with a number of Air Force nurses to hear about their careers. In the course of those conversations, it became clear that promotions were an important issue to these officers. Nurse promotion concerns are long-standing: Rostker et al. (1993) refers to the “nurse problem.”¹ We set out, therefore, to quantify general patterns in promotions across the seven Air Force medical and professional officer corps.

There is an important interrelationship between officer retention and officer promotion. For example, an officer must serve long enough at a rank to be considered for promotion.² With the distinct exception of captain (O-3) physicians who received civilian residency training, consideration for promotion from O-3 to major (O-4), O-4 to lieutenant colonel (O-5), and O-5 to colonel (O-6) does not typically occur until after an officer serves for five years at a rank. So, retention of at least five years in grade is ordinarily required for these promotions. (By contrast, the promotions from second lieutenant [O-1] to first lieutenant [O-2] and O-2 to O-3 usually occur within a few years of service at the lower rank.)

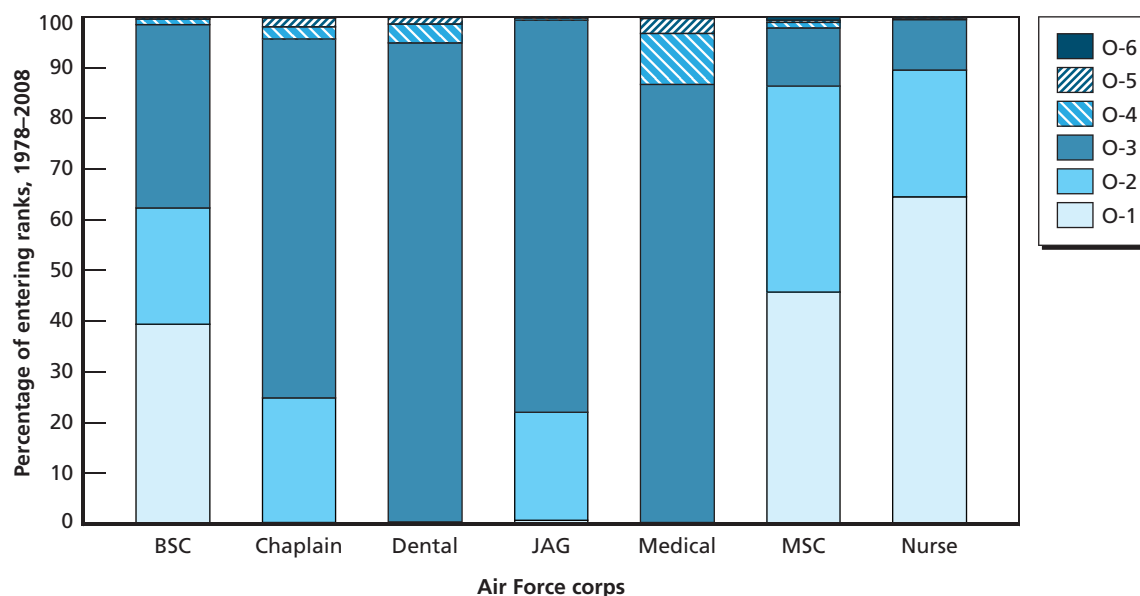
Promotion probability and timing also feed back in the opposite direction: An officer who perceives his or her promotion opportunities to be poor is more likely to depart Air Force service, perhaps even prior to official consideration for promotion. In a study of enlisted personnel, Buddin et al. (1992) found considerable reductions in retention for populations with slowed promotions. So, an officer needs long-enough retention for consideration for promotion, while, simultaneously, the officer must perceive high-enough probability of timely promotion to induce retention. Causality runs in both directions.

In considering promotions in the Air Force medical and professional officer corps, it is logical to start with tabulation of the ranks at which the officers’ corps careers commenced. Figure 4.1 breaks up the ranks at which officers have accessed into the various corps between 1978 and 2008. Nurses, MSCs, and BSCs often accessed as O-1s or O-2s, while dentists almost always accessed as O-3s and a number of physicians accessed above O-3.

¹ Rostker et al., 1993, notes that defining the “nurse problem” is, itself, challenging. One view is that service-manning documents have too few higher-grade requirements for nurses, causing poor promotion opportunities. Another view of the “problem” is that personnel managers have to treat the line “unfairly” by allocating a proportionately greater number of field grades to the Nurse Corps than is authorized. “This is sometimes expressed as nurses ‘taking’ field-grade positions that ‘belong’ to the line” (p. 45).

² We use *rank* and *grade* as synonyms in this exposition. We tend to prefer *rank*, but the term *time-in-grade* is often used to describe how many years an officer spends at a given rank.

Figure 4.1
Medical and Professional Corps' Ranks upon Accession



One might view Figure 4.1's accession ranks as proxies for years of education upon entrance, with, for instance, nurses typically just having bachelor's degrees, while physicians have M.D.'s and sometimes residency training prior to entering Air Force service. The DoD's general philosophy on "constructive service credit" is that an officer who begins service after having obtained graduate education enters at the rank that would typically be held by an officer who entered the service immediately after completion of undergraduate studies and who served for as many years as the entrant's graduate education. See, for instance, U.S. Department of Defense (1996). However, "constructive service credit" years do not count toward 20-year pension eligibility, whereas an officer who entered immediately after undergraduate education and served that many years in the military would have accrued that many years toward pension eligibility.

Average entering ranks can differ across officers with prior enlisted and precorps officer experience versus those without such precorps experience. (We computed average entering rank as a simple arithmetic average, e.g., 1.0 for an O-1, 2.0 for an O-2, etc. The minimum possible average would be 1.0 if every entrant entered as an O-1.) In Table 4.1, we present officers' average entering ranks, differentiating across precorps experience categories.

In the Dental, JAG, and Medical Corps, precorps experience of either sort made little difference: Their average entrant was roughly an O-3. In the other four medical and professional corps, having precorps officer experience markedly increased the average rank at which an officer entered the corps. An officer who entered the MSC, for instance, having served as an officer elsewhere, on average entered at a higher rank than a typical MSC entrant. On the other hand, corps entrants with prior enlisted experience typically entered their corps at lower average ranks. Prior enlisted entrants were typically O-1s or O-2s when they entered the BSC, MSC, or Nurse Corps.

Not surprisingly, given their entering ranks, nurses, MSCs, and BSCs spent the longest periods as lieutenants (ranks O-1 and O-2). Table 4.2 shows the average years 1978–2007

Table 4.1
Officers' Average Entering Rank With and Without
Precorps Air Force Experience

Corps	With Enlisted Experience	With Officer Experience	No Precorps Experience
BSC	1.4	2.9	2.2
Chaplain	2.5	3.1	2.8
Dental	3.0	3.2	3.1
JAG	2.8	3.0	2.7
Medical	3.1	3.1	3.2
MSC	1.5	2.5	1.8
Nurse	1.3	1.9	1.5

entrants spent at those ranks, excluding any precorps service at those ranks. Virtually no dentists or physicians spent time as O-1s or O-2s in the Dental or Medical Corps because they entered these corps as O-3s or higher.³

Table 4.2 shows that nurses, MSCs, and BSCs have often spent several years as a lieutenant prior to becoming a captain, while the other corps' officers typically have not.

The promotion from O-3 to O-4 is an administratively important one. BSCs, chaplains, JAGs, MSCs, and nurses are subject to the Defense Officer Personnel Management Act (DOPMA). DOPMA places limitations on the number of O-4s, O-5s, and O-6s serving in the military, including the Air Force. Dentists and physicians, however, are exempted from DOPMA. Rostker et al. (1993) present a retrospective assessment of DOPMA.

Figure 4.2 portrays the timing and probability of the different corps' O-3s being promoted to O-4. Figure 4.2 is based on the promotion histories of officers who entered their

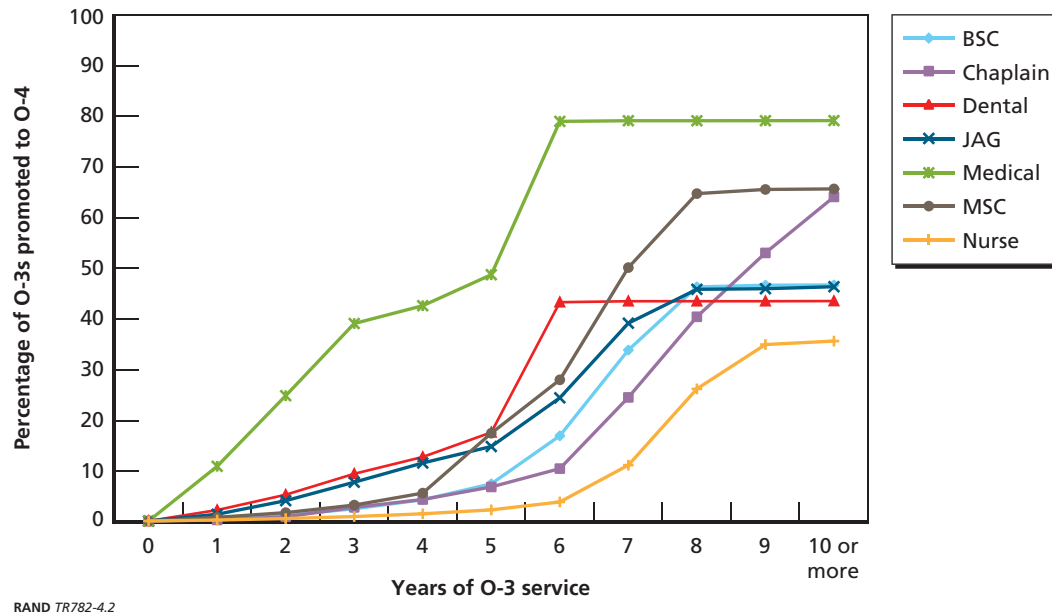
Table 4.2
Average Years Spent as a Lieutenant,
1978–2007 Entrants

Corps	O-1	O-2	Lieutenant Total
BSC	0.7	1.1	1.8
Chaplain	0.0	0.3	0.3
Dental	0.0	0.0	0.0
JAG	0.0	0.2	0.3
Medical	0.0	0.0	0.0
MSC	0.8	1.6	2.3
Nurse	1.1	1.5	2.6

NOTE: Numbers may not total due to rounding.

³ Our definition of being in the Medical Corps excludes individuals still in medical school. USU students, for instance, are O-1s, but we do not count USU students as being in any medical or professional corps.

Figure 4.2
Timing and Probability of O-3 Promotion to O-4, by Corps



respective corps between 1978 and 2007.⁴ On the horizontal axis, we present the years the officers served as O-3s prior to being promoted to O-4. The vertical axis presents the cumulative percentage of the corps' O-3s to be promoted to O-4. The difference between the tops of the lines on the right and 100 percent is the percentage of each corps' O-3s never to be promoted to O-4.

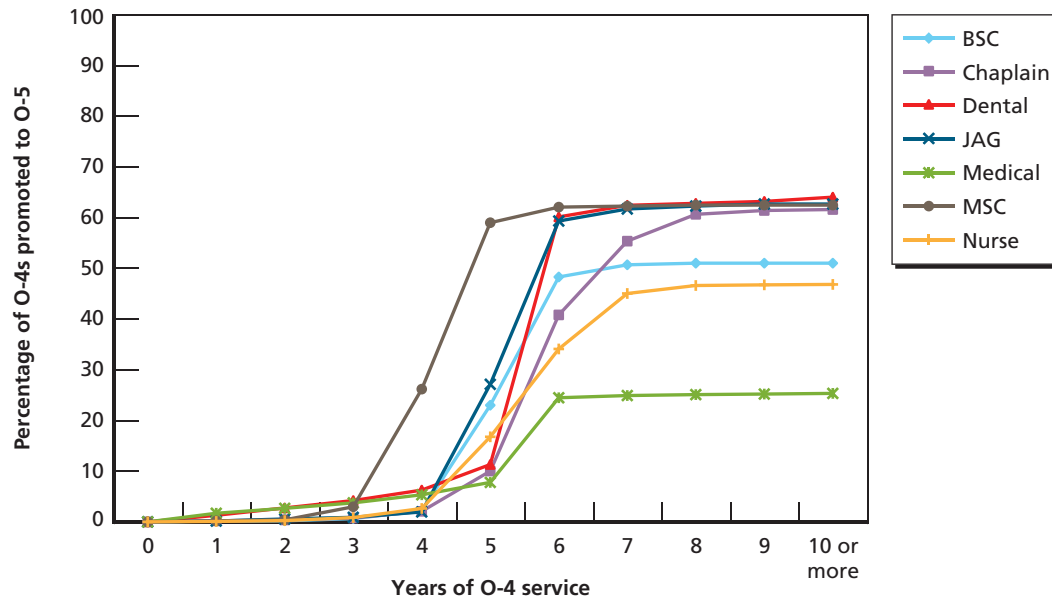
Physicians stand out in Figure 4.2. As alluded to earlier, physicians who enter Air Force service having already completed residency training at a civilian medical center typically receive "constructive credit" for their years in residency training. As a result, they are considered for (and generally receive) O-3 to O-4 promotion after a few years of O-3 service, far earlier than is typically the case for any other type of officer.

Figure 4.2 also illustrates the "nurse problem." Among the seven corps, O-3 nurses were least likely to ever become O-4s. Also, along with chaplains, they had the longest average duration as an O-3 conditional on being promoted to O-4 (almost eight years).

Figure 4.3 provides the same type of portrayal but for the O-4 to O-5 promotion. It shows that MSC officers tended to receive the O-4 to O-5 promotion a year sooner than other corps' officers. Figure 4.3 also shows that only about 25 percent of Medical Corps O-4s became O-5s. This phenomenon emanates from the fact many physicians' service obligations (most notably from HPSP) expire after a few years of service as an O-4. As discussed in Keating et al. (2009), the norm has been for 80 percent or more of Air Force physicians to depart at their first opportunity to do so. In this case, poor promotion opportunities are not a culprit. In

⁴ Our analysis, however, does not consider officers in the Air Force as of September 30, 2008, at their current rank. Consider, for instance, a physician who was an O-4 as of September 30, 2008. Assuming he or she entered the Medical Corps as an O-3, we would observe how long he or she was an O-3 and that he or she was promoted from O-3 to O-4. We would not, however, observe his or her duration as an O-4 nor an outcome as to whether this physician left the Air Force before being promoted to O-5.

Figure 4.3
Timing and Probability of O-4 Promotion to O-5, by Corps



fact, as shown in Figure 4.4, two-thirds of Medical Corps officers who served at least five years as an O-4 were promoted. But most O-4 physicians never served long enough to be considered for promotion to O-5.

In aggregate, about 47 percent of O-4 nurses became O-5s versus 25 percent of O-4 physicians. But, conditional on at least five years of O-4 service, the physician promotion rate was 67 percent against 57 percent of O-4 nurses.

Finally, Figure 4.5 provides the timing and probability portrayal for the O-5 to O-6 promotion.

Dentists were the only population in which more than half of the corps' O-5s became O-6s. The O-5 to O-6 promotion was least common among nurses. O-5 JAGs and MSCs tended to be promoted a year earlier than other corps' O-5s.

As shown in Figure 4.6, by the 20th year in their corps, most physicians, dentists, and JAGs have been promoted to O-6. By contrast, less than 2 percent of nurses have been promoted to O-6 by their 20th year in the Nurse Corps. The preceding figures and tables suggest reasons for this result. First, as shown in Figure 4.1 and Table 4.2, nurses generally have entered at lower ranks, so they have spent more time as lieutenants. Second, as shown in Figures 4.2 and 4.5, nurses have been least likely to be promoted from O-3 to O-4 and from O-5 to O-6. Third, as shown in Figures 4.2, 4.3, and 4.5, when nurses have been promoted, they have not been promoted as quickly as, for instance, MSCs have been promoted. As shown in Table 4.2, MSCs also typically spent time as lieutenants, but they have "caught up" to, for instance, chaplains, with comparatively rapid O-4 to O-5 and O-5 to O-6 promotions.

Figure 4.4
Aggregate and Five-Year Conditional Probability of O-4 Promotion to O-5, by Corps

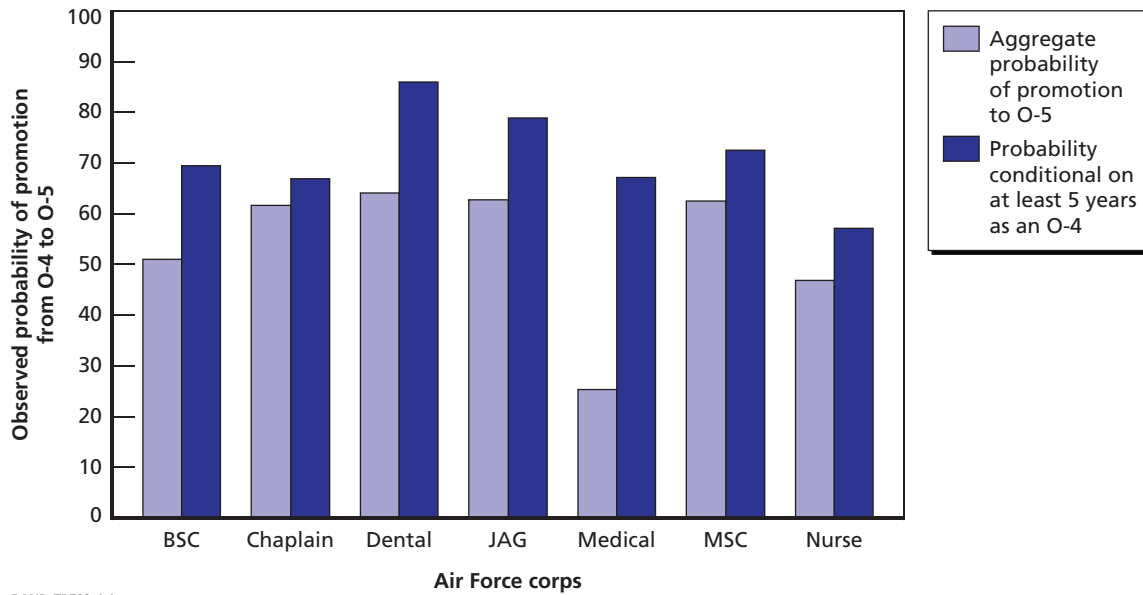


Figure 4.5
Timing and Probability of O-5 Promotion to O-6, by Corps

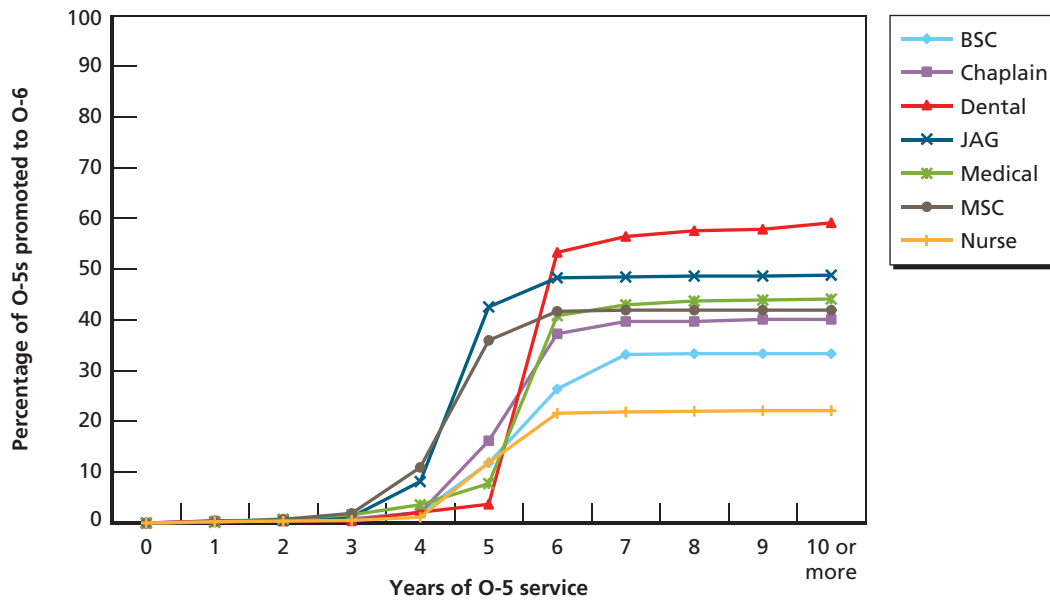
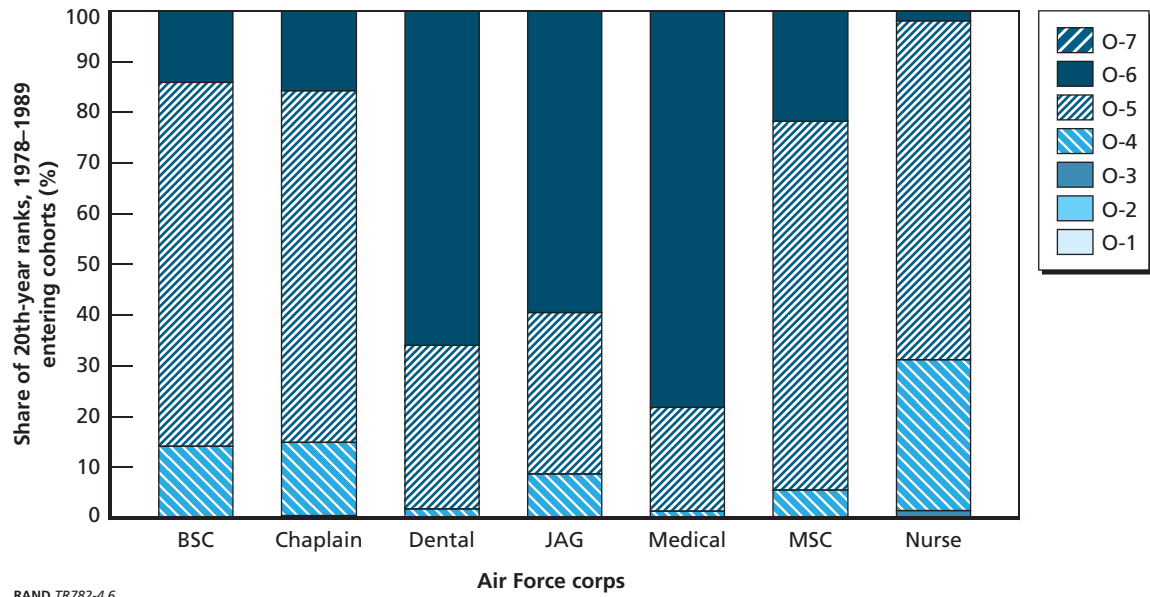


Figure 4.6
Medical and Professional Corps' Ranks at 20 Years of Corps Service



Air Force Medical and Professional Officer Corps' Recent Trends

As shown in Figure 5.1, since 2000, each corps had a greater average annual attrition rate than average annual accession rate.¹ By definition, therefore, all the corps were smaller on September 30, 2008, than they were on September 30, 1999.

An icon on the 45-degree line in Figure 5.1 would depict a corps with equal average annual accession and attrition rates.

Suppose a corps were in a steady state—i.e., its population was constant over time. In a steady state, the baseline population multiplied by the attrition rate (i.e., the number of departing officers) equals the number of accessing officers:

$$\text{Departing_Officers} = \text{Steady_State_Population} * \text{Attrition Rate} = \text{Accessions}.$$

¹ The average annual accession percentages displayed in Figure 5.1 are

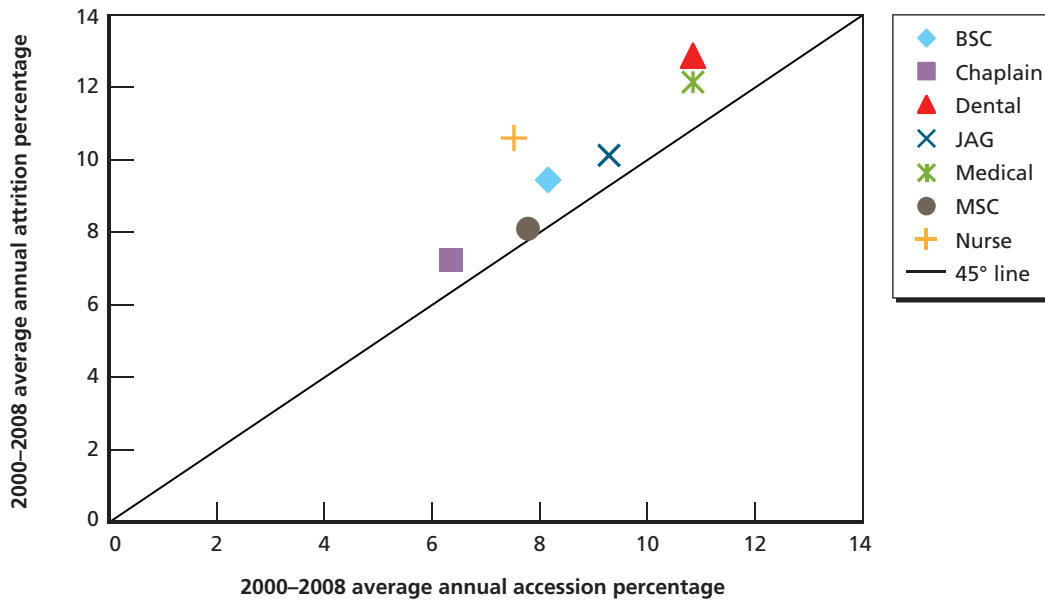
$$\frac{\sum_{t=2000}^{2008} \text{Accessions}_t}{\sum_{y=1999}^{2007} \text{Corps_Population}_y}.$$

The numerator is the sum of 2000–2008 accessions; the denominator is the sum of the corps' populations between 1999 and 2007. Similarly, the average attrition rate is

$$1 - \frac{\sum_{t=2000}^{2008} \text{Retained}_t}{\sum_{y=1999}^{2007} \text{Corps_Population}_y},$$

where Retained_t refers to the number of officers in the corps in Year $t - 1$ who are still in the corps in Year t . These averages are weighted in the sense that years with larger corps populations have greater influence on the nine-year averages.

Figure 5.1
Corps' Average Annual Accession and Attrition Percentages, 2000–2008



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Or, put differently, the corps' steady-state population equals its number of annual accessions divided by its attrition rate:

$$\text{Steady_State_Population} = \frac{\text{Accessions}}{\text{Attrition_Rate}}.^2$$

Figure 5.2 shows three Nurse Corps–related lines or isoquants. On the highest line, we have connected the possible combinations of annual accessions and attrition rates consistent with a steady-state Nurse Corps population of 2,500. The line slopes up; i.e., if the Nurse Corps has more accessions, it can tolerate greater attrition. The lower isoquants in the figure are for greater Nurse Corps steady-state populations of 3,000 and 3,500. To have a greater steady-state population, the Air Force needs either more Nurse Corps accessions or a lower average annual attrition rate (or both).

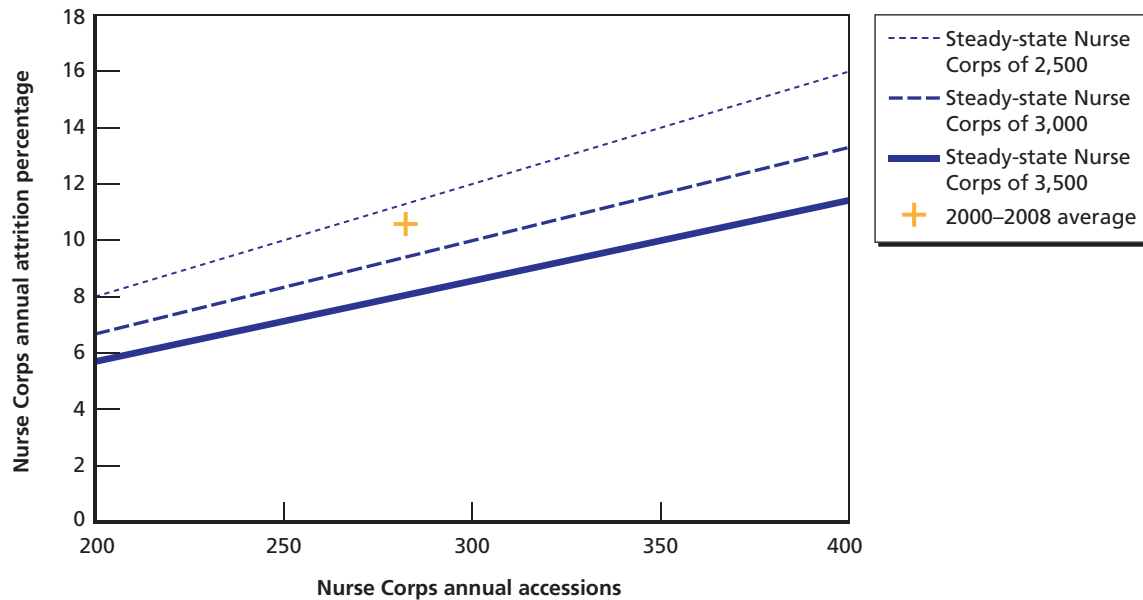
We have also superimposed an icon in Figure 5.2 showing the Nurse Corps' 2000–2008 average accession and attrition combination (282.4 accessions, 10.6-percent attrition). This

² Using the same logic, one could likewise derive the equivalence

$$\text{Steady_State_Population} = \frac{\text{Departing_Officers}}{\text{Accession_Rate}}.$$

Under this formulation, observing an arithmetically greater number of departing officers, given an accession rate, would imply that the steady-state population must be larger. Or, having a lower accession rate with a given arithmetic number of departing officers would imply that the steady-state population must be larger. While we present accession rates in Figure 3.2, we think it is more intuitive to speak of accession levels (as in Figure 3.1) and attrition rates. A population steady-state formula will always have a level in the numerator and a rate in the denominator.

Figure 5.2
Air Force Nurse Corps Steady-State Population Isoquants



2000–2008 combination is consistent with a steady-state Nurse Corps size of 2,667 nurses. However, the actual September 30, 2008, Nurse Corps population was 3,300 nurses. It would appear that, absent some changes in accession levels or attrition rates, the Nurse Corps will shrink in the future.

For example, starting with a population of 3,300 nurses, 10.6-percent attrition would imply that 2,951 nurses would remain for the next year. Adding in the 282 accessing nurses would result in a Nurse Corps population of 3,233. Repeating the process with 10.6-percent attrition and 282 accessions, there would be 3,173 nurses the following year. By the sixth year, the population would fall below 3,000, on its way to the implied steady state of 2,667 nurses.

The Nurse Corps' estimated steady state of 2,667 officers is only about 81 percent of its September 30, 2008, population, so the Nurse Corps' estimated steady-state population is 19 percent below its actual 2008 level. As shown in Table 5.1, the Nurse Corps' implied steady-state differential is proportionally greater (in absolute-value terms) than observed in any other medical or professional officer corps. Unless accessions increase or the attrition rate decreases, the Nurse Corps appears to be most likely to shrink further in the future.

Table 5.1's projection of a 19.2-percent decline in the size of the Nurse Corps does not imply that there has been anything wrong with recent years' Nurse Corps personnel policies. As requirements change and cohorts of different sizes work through their careers, we expect changes in accession levels and attrition rates over time. Instead, the way to interpret Table 5.1 is that if the accession levels and attrition rates observed over the last nine years continued indefinitely, the corps' population sizes would change in accord with the right-most column. Perhaps such an outcome would be acceptable. Or perhaps plans are already in place to alter accession levels or attrition rates going forward.

While we are fond of Table 5.1, findings can be sensitive to seemingly arbitrary decisions defining an epoch. In Table 5.2, we repeat the analysis but using 2002–2008 as the baseline

Table 5.1
2000–2008 Implied Steady State Against Actual September 30, 2008, Populations

Corps	2000–2008 Average Accessions	2000–2008 Average Attrition Percentage	Implied Steady- State Population	September 30, 2008, Population	Percentage Differential
BSC	199.4	9.4	2,114	2,249	–6.0
Chaplain	38.9	7.2	538	562	–4.3
Dental	106.8	12.9	830	921	–9.9
JAG	122.4	10.1	1,211	1,240	–2.3
Medical	385.7	12.1	3,178	3,441	–7.7
MSC	88.8	8.1	1,098	1,083	+1.4 ^a
Nurse	282.4	10.6	2,667	3,300	–19.2

^a There is no contradiction between the MSC having a slightly greater average attrition rate (8.1 percent) than average accession rate (7.8 percent) over 2000–2008 in Figure 5.1 and Table 5.1 suggesting the 2008 MSC population of 1,083 is slightly below its implied steady state of 1,098. The reason is that the implied steady state is based on the 8.1-percent attrition rate but an average accession level of 88.8 MSC officers per year. An average of 88.8 officers per year accessing into a 1,083-officer MSC translates into an 8.2-percent accession rate. (The 88.8 officers accessing annually represented a lower average accession rate over 2000–2008 because the MSC was somewhat larger over much of the period.) Figure 5.2 and Table 5.1, and our methodology more generally, use accession levels but attrition rates.

Table 5.2
2002–2008 Implied Steady State Against Actual September 30, 2008, Populations

Corps	2002–2008 Average Accessions	2002–2008 Average Attrition Percentage	Implied Steady- State Population	September 30, 2008, Population	Percentage Differential
BSC	195.0	9.0	2,168	2,249	–3.6
Chaplain	40.4	7.4	544	562	–3.2
Dental	113.0	13.0	872	921	–5.3
JAG	127.6	10.2	1,252	1,240	+1.0
Medical	383.1	11.5	3,341	3,441	–2.9
MSC	87.6	7.7	1,142	1,083	+5.4
Nurse	298.1	10.0	2,977	3,300	–9.8

period rather than 2000–2008. All of the results are more optimistic when the 2002–2008 period is used as the baseline, though our finding that the Nurse Corps is most at risk for future population declines remains.

We caution against using this procedure on too brief a time frame, e.g., one year's data. In Table 5.3, we reprise the procedure using 2008 accession and attrition data only. The Dental Corps had an unusually low attrition year in 2008, so the calculus suggests that corps will grow considerably in the future. Conversely, the MSC had an unusually small number of accessions in 2008. If that low level of accessions were to continue, the MSC would shrink considerably. Fortunately, a more than one-third decline in the size of the MSC seems far-fetched.

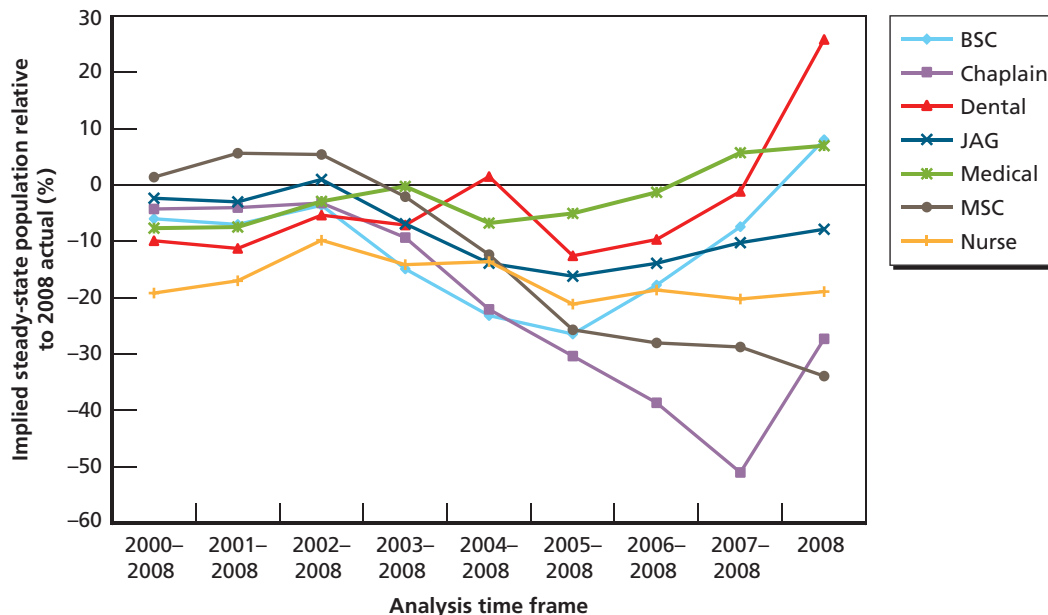
Table 5.3
2008 Implied Steady State Against Actual September 30, 2008, Populations

Corps	2008 Accessions	2008 Attrition Percentage	Implied Steady-State Population	September 30, 2008, Population	Percentage Differential
BSC	231	9.5	2,430	2,249	+8.0
Chaplain	25	6.1	409	562	-27.3
Dental	94	8.1	1,159	921	+25.8
JAG	116	10.2	1,143	1,240	-7.9
Medical	372	10.1	3,681	3,441	+7.0
MSC	59	8.2	716	1,083	-33.9
Nurse	314	11.7	2,676	3,300	-18.9

For this sort of analysis to be sensible, the user must have a view as to the most-appropriate time window to analyze. As shown in Table 5.3, use of only one year is clearly insufficient; i.e., year-specific idiosyncrasies can lead to spurious results. But going back too many years would bring in data that may no longer be germane. The years 2000 and 2001 were not good for these corps' accessions and attrition, so using those years leads to a more-pessimistic portrayal. We do not have an easy answer for how the analysis epoch should be defined. It seems reasonable, as in comparing Tables 5.1 and 5.2, to test the robustness of findings to reasonable changes in the analysis time frame.

In Figure 5.3, we display the percentage differentials for the different corps found by usage of different analysis time frames. We would certainly suggest results are more stable and reasonable in the left side of Figure 5.3, where more years of data are employed.

Figure 5.3
Corps' Steady-State Population Differentials Using Different Analysis Time Frames



This chapter's analysis has been conducted at the corps level. The analysis can be further disaggregated. In Appendix A, we disaggregate BSC specialties. However, as analysis becomes more granular, one is increasingly prone to results such as Table 5.3's, where a few officers' decisions can have large-scale ramifications on the estimates.

Challenges Using Authorization Data

When this study commenced, we were hopeful authorization data would be central to our inquiry. Clearly, for example, the downward trend we observe and project to continue in the Nurse Corps has a different normative interpretation if the Air Force currently has more nurses than it wishes. As our project progressed, however, we grew increasingly concerned about the authorization data and what they mean.

In this chapter, we provide background information on the authorization data. Then we present some analyses of these data that cause us to question the data's value for our purposes.

Background on the Authorization Data

RAND has been receiving data on manpower requirements and authorizations on a regular basis since the early 1990s in the form of end-of-FY extracts from the Command Manpower Data System (CMDS) and, more recently, the Manpower Programming and Execution System (MPES). (The MPES replaced the CMDS in 2005.) The extracts we receive are referred to as the Consolidated Manpower Database (CMDDB) and are a compilation of Unit Manpower Documents for all units in the active-duty Air Force, the Air Force Reserve, and the Air National Guard. The data include both unfunded manpower requirements and funded manpower authorizations; our analyses are based on the funded manpower authorizations only. Data for years earlier than 1993 come from a set of "historical CMDDBs," which are end-of-FY extracts going back to FY1980.

Over the span of FY1980–FY2008, we believe that the CMDDB data represent a fairly consistent and accurate picture of Air Force manpower authorizations for the active component. The data are products of Headquarters Air Force guidance as to overall funded authorizations and detailed implementation of that guidance by major command manpower offices. There are authorizations at the level of unit, suborganization, functional account, AFSC, and grade, as well as other data elements indicating various educational, experiential, and other requirements for each individual position. The CMDDB data are dynamic in response to changes in force structure, organization, funding, and guidance over time.

In contrast to the annual personnel snapshots RAND received from the AFPC, CMDDB data do not include authorizations for most nonpermanent party students, trainees, patients, and prisoners. Also, general officers (O-7s and higher) all have the AFSC 90G0 (0002 under the pre-1994 AFSC system), so one cannot determine from the CMDDB data which positions were intended for general officers with medical or professional backgrounds. Consequently, as illustrated in Table 6.1 (which appears later in this chapter), when we compare actual personnel

levels with authorized levels, we must remove those actual personnel who are currently in-duty AFSCs (e.g., students, general officers) that would not be tallied in the CMDB authorization data.

An additional issue is that our personnel snapshots include transients (officers moving between locations) who would not count against unit-level authorizations. Therefore, we expect to see somewhat more actual officers than authorized, since some of our actual officers were likely transient when the annual personnel snapshots were taken.

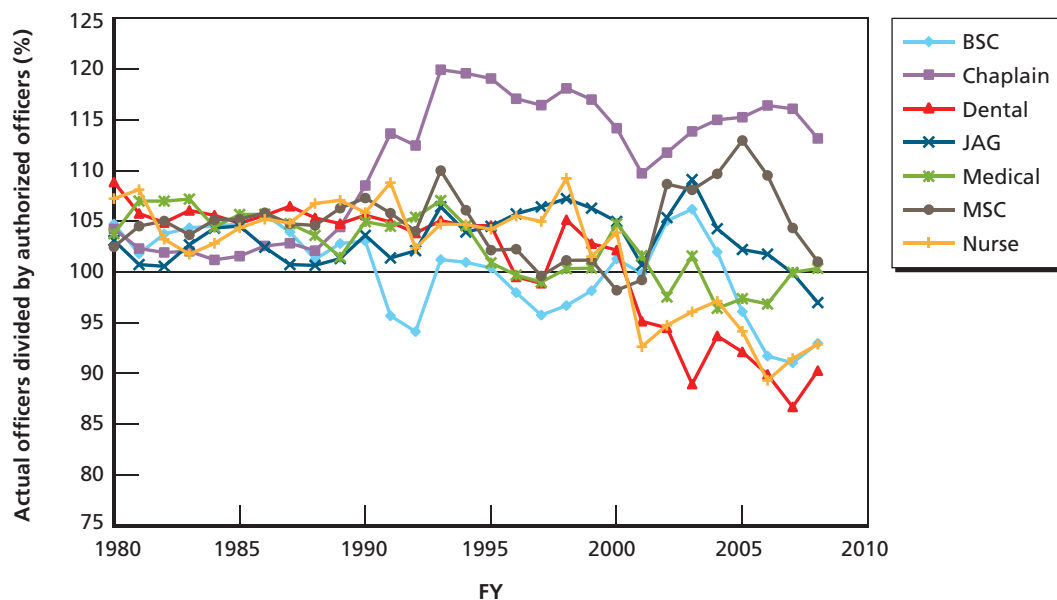
Concerns About the Authorization Data

Figure 6.1 plots the ratios over time of actual officers to authorized officers in the seven medical and professional corps. These ratios correct for the personnel data–authorization data mismatch discussed in the previous section.

Several aspects of Figure 6.1 trouble us. First, as discussed in Appendix B, there have consistently been many more chaplains than authorized. When an overage is so consistent, we cannot help but assume the Air Force needs more chaplains than authorized. We suspect the observed number of chaplains is a better measure of demand than the authorized number of chaplains. Indeed, we were told the Air Force is short of Catholic chaplains, notwithstanding the aggregate chaplain population being consistently above authorized levels.

Second, it seems terribly peculiar to us that all seven corps had a 0–10-percent overage consistently through the 1980s, but, then great variance in the actual-to-authorized (or “manning”) ratio emerged around 1990 and has persisted since then. We can only conclude that there was a large-scale change in the meaning of authorizations around 1990—e.g., they went from more or less ratifying the status quo to being more independent of actual levels in

Figure 6.1
Corps' Populations as a Percentage of Authorized Levels



recent years. (The 1980s' 0–10-percent overage could be explained, at least in part, by transient officers.)

Authorization data can also look peculiar when further disaggregated. For instance, authorization tallies are available not only by corps but by rank within corps. Unfortunately, Nurse Corps rank authorizations, for example, appear to have been quite unstable.

Figure 6.2 compares the actual number of Nurse Corps O-5s with authorized levels. For many years, there were considerably more (in 1992, almost 90 percent more) lieutenant colonels in the Nurse Corps than authorized. Starting in the mid-1990s, the number of Nurse Corps O-5 authorizations was increased, so 2008 was the first year since 1980 with fewer O-5s in the Nurse Corps than authorized. Note, however, that it appears Nurse Corps O-5 authorizations were increased to ratify the actual number of O-5s in the Nurse Corps (rather than actual levels being adjusted to move toward authorized levels).

We are not suggesting there was anything untoward about the number of Nurse Corps lieutenant colonels between 1980 and 2007. The Nurse Corps' lieutenant colonel total may have been perfectly reasonable given, for instance, the need to have adequate promotion opportunities. (As it is, Chapter Four presented evidence of Nurse Corps promotion challenges.) The authorization structure took many years to catch up to this reality, however.

Figure 6.2's increase in the number of O-5 Nurse Corps authorizations was not caused by overall growth in the Nurse Corps over this period. Instead, the overall number of Nurse Corps authorizations peaked in 1990 and has declined by roughly 30 percent since then. As shown in Figure 6.3, whereas O-5s used to represent less than 4 percent of Nurse Corps authorizations, their relative share more than doubled to over 9 percent of Nurse Corps authorizations in 2008.

Authorized Nurse Corps O-5s certainly do not appear to have been a stable statement of how many O-5 nurses the Air Force wanted to have.

Figure 6.2
Actual and Authorized Nurse Corps Lieutenant Colonels

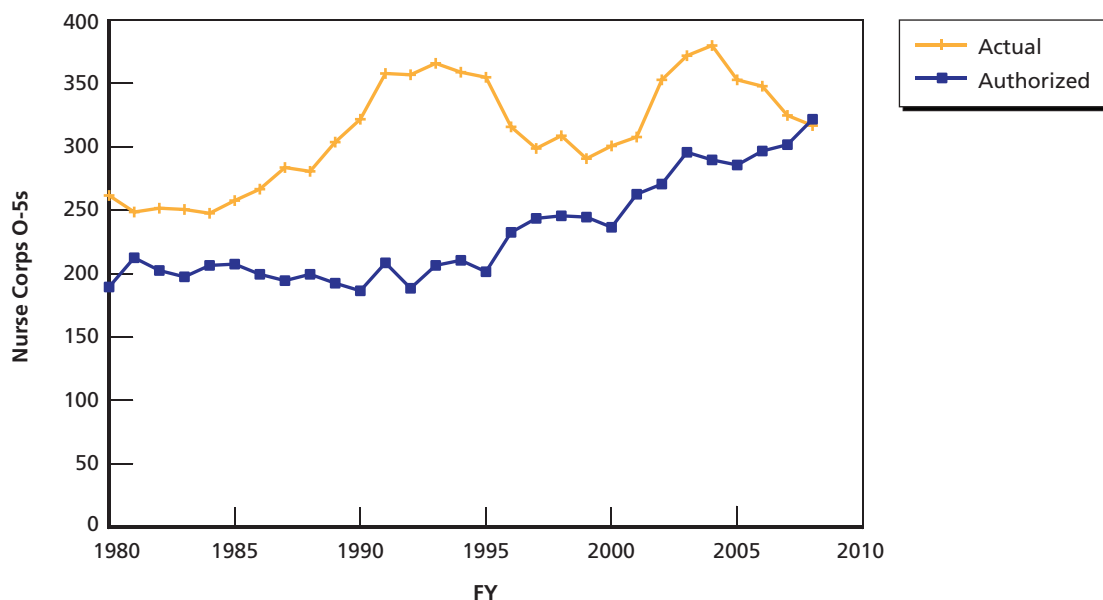
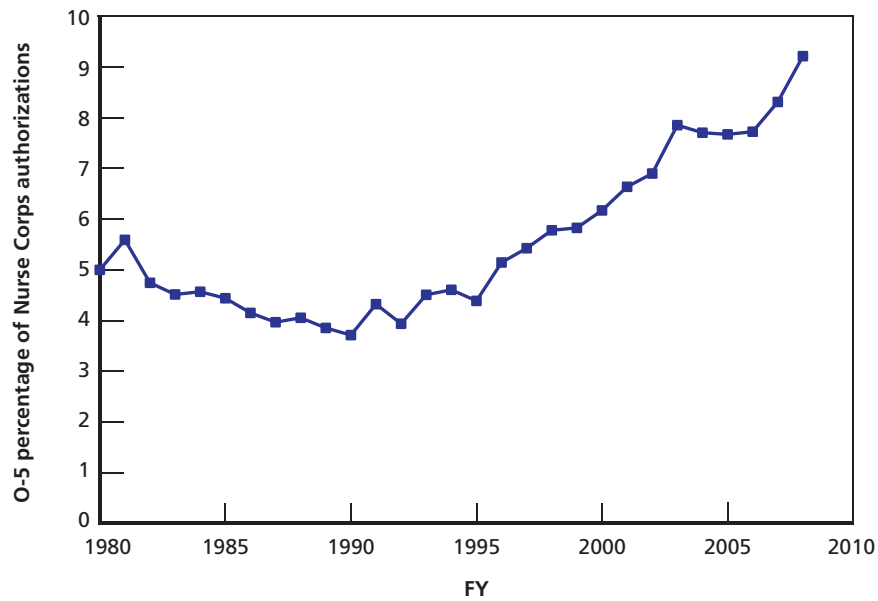


Figure 6.3
Nurse Corps Lieutenant Colonel Authorizations as a Percentage of Total Nurse Corps Authorizations



One can take the data in Tables 5.1 and 5.2 and supplement them with 2008 authorization data. We have done so in Table 6.1. The third column from the right, Authorization-Adjusted September 30, 2008, Population, has been added because some of the officers in the September 30, 2008, overall population were in-duty AFSCs, such as students or general officers, that do not match our authorization data. (See the discussion at the beginning of this chapter.) The more-valid comparison, therefore, is between the Authorization-Adjusted September 30, 2008, Population column and the 2008 Authorized Population column. This comparison finds the greatest current deficit among dentists, with nurses and BSCs also being sizably below authorized levels. Note, however, that the authorization data suggest the Medical

Table 6.1
Implied Steady-State, Actual, and Authorized 2008 Populations

Corps	Table 5.1 2000–2008 Implied Steady-State Population	Table 5.2 2002–2008 Implied Steady-State Population	September 30, 2008, Population	Authorization- Adjusted September 30, 2008, Population	2008 Authorized Population	Actual/ Authorized Percentage Differential
BSC	2,114	2,168	2,249	2,179	2,343	–7.0
Chaplain	538	544	562	546	485	+13.2
Dental	830	872	921	876	970	–9.7
JAG	1,211	1,252	1,240	1,204	1,241	–3.0
Medical	3,178	3,341	3,441	3,373	3,360	+0.4
MSC	1,098	1,142	1,083	1,053	1,042	+1.1
Nurse	2,667	2,977	3,300	3,251	3,499	–7.1

Corps is almost exactly in balance, but Table 5.1's 2000–2008 implied steady-state projection raises considerable concerns about the Medical Corps' future.

Given our doubts about what the authorization data mean, we are more inclined to believe insights from actual population trends, such as those shown in Tables 5.1 and 5.2.

Conclusions

The Air Force and the DoD put considerable effort into determining how recruiting and retention investments are made. There are several high-level questions to consider. First, is there a problem—i.e., is there a military population whose recruiting or retention outcomes have been undesired? Second, assuming there is a population that has had undesired outcomes, how best should problems be addressed? Would there be greater return, for instance, in devoting incremental resources to recruiting or retention? Within recruiting, there are myriad possible avenues from which to choose (e.g., accession bonuses, additional recruiters, advertising). (Dertouzos, 2009, argues that, for the Army, advertising compares favorably with recruiters and increasing bonuses in terms of the marginal cost of an enlistment contract.) Likewise, with retention, there are different types of bonus options—e.g., bonuses that require multiyear service commitments versus those that do not.

In Chapter Five, we portrayed isoquants connecting combinations of accession levels and attrition rates consistent with a given steady-state population level. The Air Force is likely not indifferent between the points on such an isoquant. If the Air Force wants a youthful workforce, a combination of high accessions and high attrition would be preferred. Conversely, if training is expensive or experience is highly valued (or both), a low accession/low attrition outcome is probably preferred.

A high accession outcome would require a heavy emphasis on recruiting resources. A low attrition outcome would require a heavy emphasis on retention resources.

At what point will “enough be enough”—i.e., an appropriate but not excessive level of recruiting and retention investments has been made? While we often focus on problems and shortfalls, one must acknowledge that eventually investments in recruiting and retention would hit a point of diminishing marginal value to the Air Force, the DoD, and the taxpayer.

This report’s analysis is intended to shed light on some of these questions. In particular, Chapter Five’s steady-state analysis provides some insights. Tables 5.1 and 5.2 agree that the Air Force medical and professional corps with the most-adverse population trends is the Nurse Corps. The tables also concur that the Dental Corps has the second-most-adverse trends. The tables disagree on the Medical Corps, with Table 5.1 finding it declining third-most proportionally while Table 5.2 finds the Medical Corps to be declining only slightly.

Chapter Five’s methodology also suggests when “enough is enough”: We found the MSC and, to a lesser extent, the JAG Corps to be stable. It does not appear, based on the data we analyzed, that special steps are needed to address these populations (unless, of course, the very low MSC accession total for 2008 that disrupted Table 5.3 is felt to be persistent).

Unfortunately, while Chapter Five’s methodology assesses the stability of a corps’ population, it does not address the question of how many personnel the Air Force needs in each corps.

As discussed in Chapter Six, Air Force authorization data seem problematic to us. For example, dating back to 1980, the Air Force has had sizably more chaplains than authorized. We can only conclude that the Air Force's actual need for chaplains must exceed its authorized levels. When a population is maintained in an "overage" for nearly three decades (if not longer—we only have authorization data back to 1980), we must surmise that the Air Force has ratified or revealed a preference for a level of chaplain manning that is officially "excessive" according to the authorization data.

We conclude, therefore, that the analysis technique set forth in this report is better suited to characterizing military populations' current statuses and recent trends than it is to attaching normative interpretation to those statuses and trends.

The Air Force's BSC Population

In this appendix, we examine personnel trends in the Air Force's BSC.

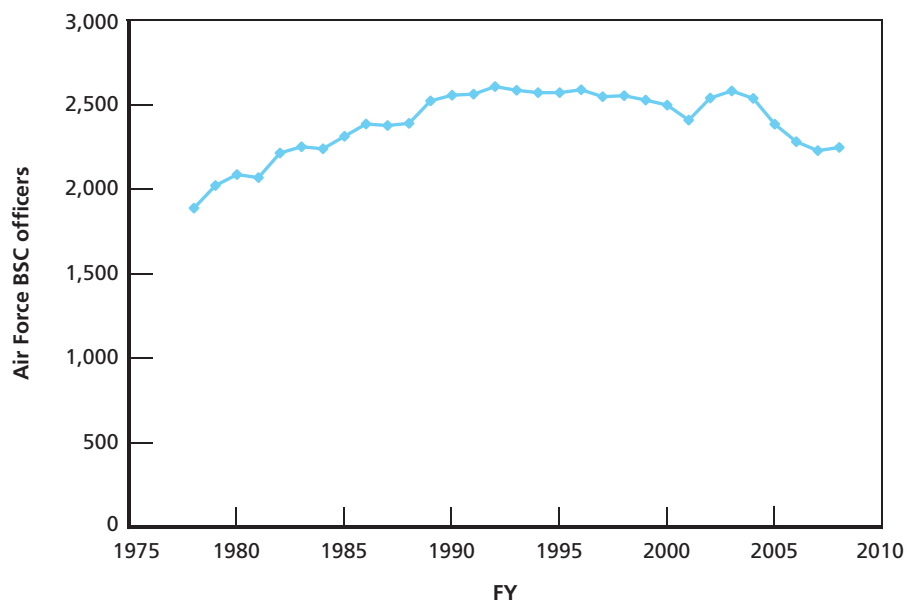
Figure A.1 shows the number of Air Force officers in the BSC. The BSC's post-1978 population peak was in 1992 at 2,610 officers. The population was stable in a narrow range through the 1990s and into this decade. However, the BSC's population has dipped in recent years.

The recent dip in the BSC's population has put the corps' population below authorized levels since 2005, as shown in Figure A.2.

Figure A.3 shows BSC annual accession totals. Accessions into the corps were unusually low in 2005. There has been, perhaps, a moderate downward trend in BSC accessions dating back to the 1990s, but considerable year-to-year accession variability makes trend analysis difficult. Accessions have ramped up since 2005.

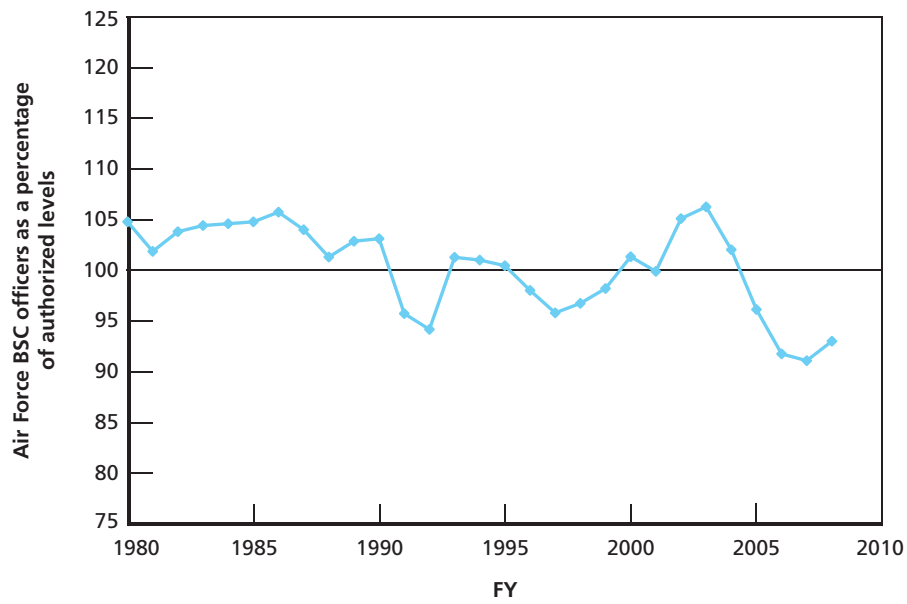
Figure A.4 shows the BSC's annual attrition rates. Attrition was very low in 2002, but the rate has returned to historically normal levels since then. BSC attrition tended to be lower in the 1980s than it has been since then.

Figure A.1
Air Force BSC Population



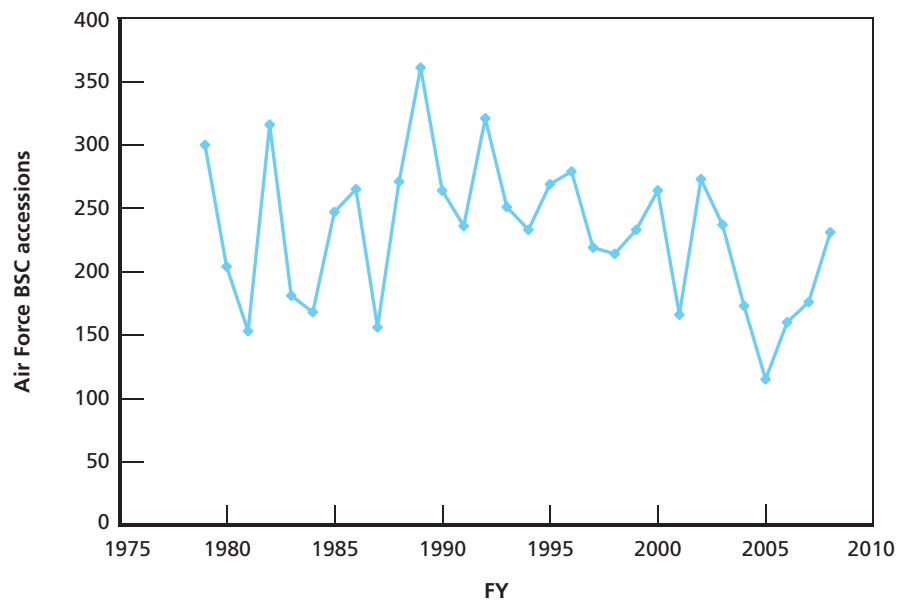
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Figure A.2
Air Force BSC Population as a Percentage of Authorized Levels



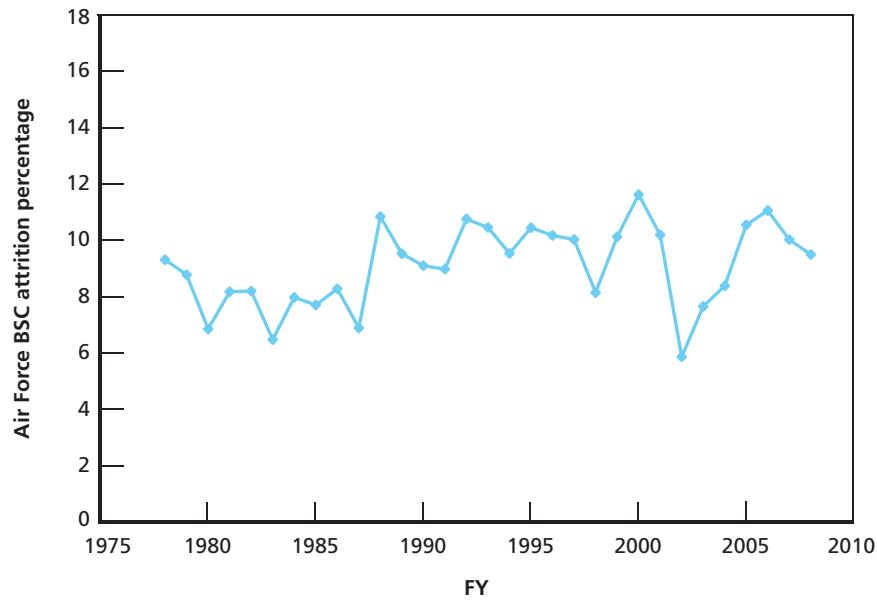
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Figure A.3
Air Force BSC Annual Accessions



RAND TR782-A.3

Figure A.4
Air Force BSC Annual Attrition Percentages



As discussed in Chapter Five, the BSC's current population trend appears to be moderately downward (e.g., -3.6 percent using a 2002–2008 baseline or -6.0 percent using a 2000–2008 baseline).

Perhaps more so than any other medical or professional officer corps, the BSC is a very heterogeneous population with many different functions and career paths. In Table A.1, we present the 2008 BSC population broken out by AFSC.

Table A.2 displays 2008 data on the highest academic degree BSC officers attained by specialty. There is considerable heterogeneity in these officers' educational backgrounds. For example, the majority of clinical psychologists hold Ph.D.'s, whereas that credential is less common in other BSC specialties.

A caveat on Table A.2 is that education variables have a reputation for being underreported in DoD personnel-data systems (e.g., eight optometrists are alleged to have only undergraduate degrees). It is not clear that updates to officers' educations are being fully captured, so reported education levels are likely a lower bound.

Figure A.5 depicts the specialties' population trends (aggregating the small specialties as "Other"). Traditionally, physician assistants were the largest BSC specialty, but their population has been surpassed by bioenvironmental engineers in recent years.¹

Figure 4.1 showed that roughly comparable numbers of BSC officers entered as O-1s, as O-2s, and as O-3s. As shown in Figure A.6, entering ranks were very different across specialties. Clinical psychologists, optometrists, podiatrists, and public-health officers typically

¹ In Figure A.5 and throughout this appendix's analysis, health physicists (what had been AFSC 43Y and 917xx under the pre-1994 AFSC system) are folded into the bioenvironmental engineering total, reflecting a career-field merger that occurred during FY2008. Also, veterinarians (AFSCs 43R and 43V, as well as their pre-1994 predecessor 99xxx AFSCs) are folded into the public-health total.

Table A.1
2008 BSC Specialty Populations

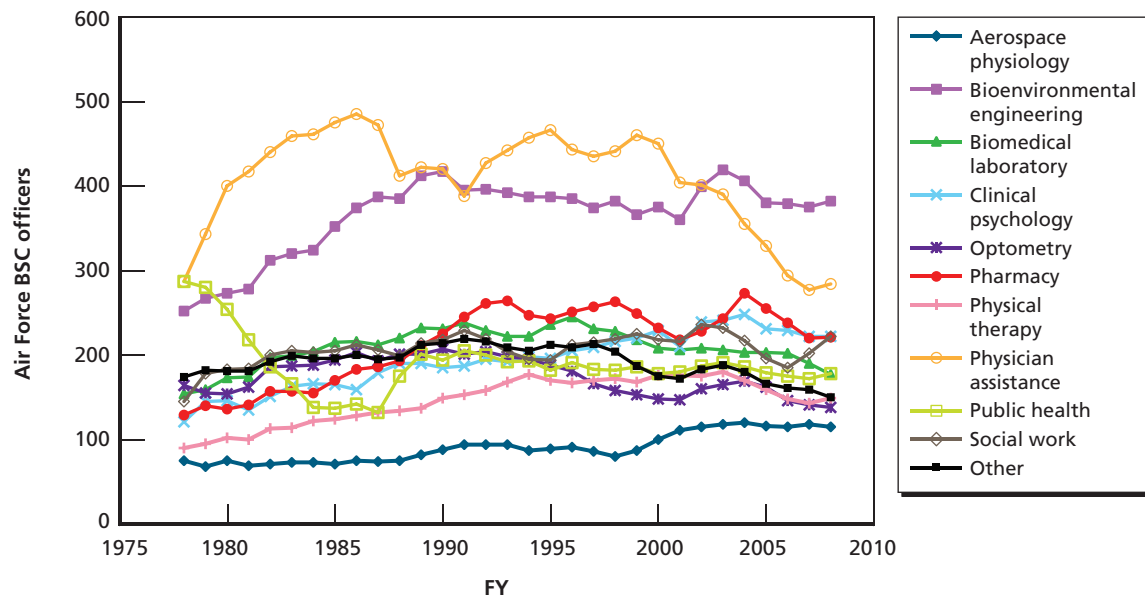
Specialty	AFSC	September 30, 2008, Population
Aerospace physiology	43A	116
Audiology/speech pathology	42N	41
Bioenvironmental engineering	43E	383
Biomedical laboratory	43T	178
Clinical psychology	42P	223
Dietitian	43D	59
Medical entomology	43M	15
Occupational therapy	42T	19
Optometry	42E	139
Pharmacy	43P	222
Physical therapy	42B	150
Physician assistance	42G	285
Podiatry	42F	17
Public health	43H	179
Social work	42S	223
BSC total		2,249

Table A.2
2008 BSC Specialties' Highest Degree Attainment

Specialty	B.A./B.S.	M.A./M.S.	Professional Degree	Ph.D.	Other	Total
Aerospace physiology	44	61	3	7	1	116
Audiology/speech pathology	5	23	4	9	0	41
Bioenvironmental engineering	138	198	15	26	6	383
Biomedical laboratory	73	90	2	13	0	178
Clinical psychology	16	57	21	126	3	223
Dietitian	11	41	1	2	4	59
Medical entomology	0	8	1	6	0	15

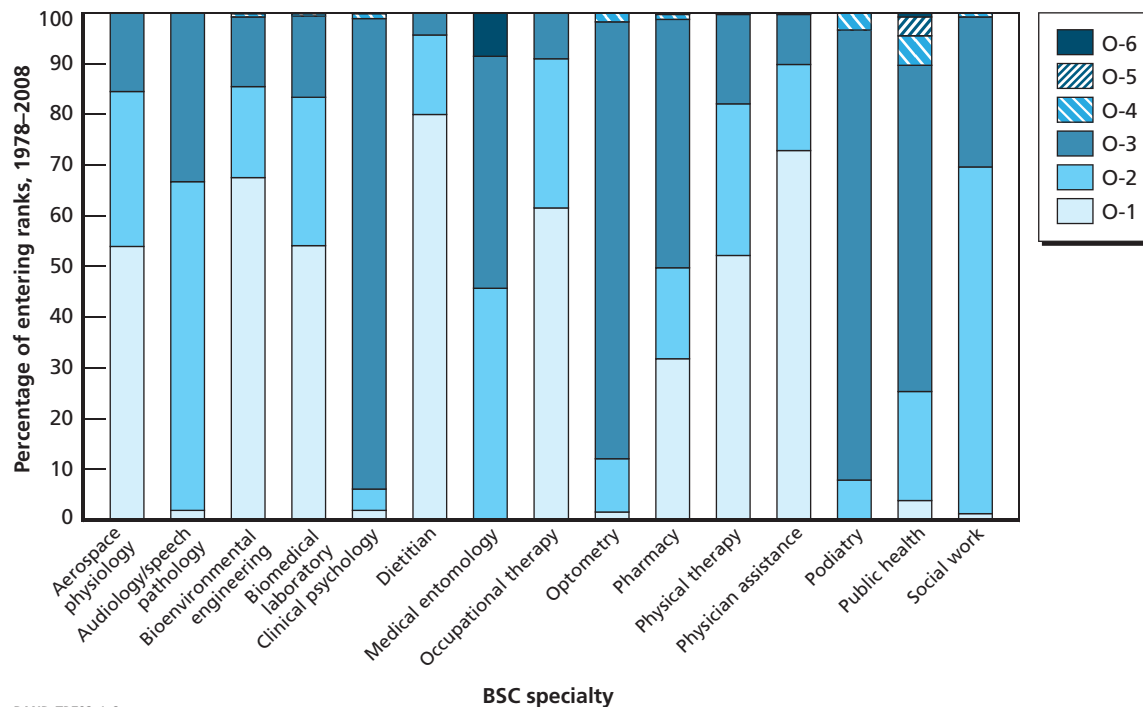
Table A.2—Continued

Specialty	B.A./B.S.	M.A./M.S.	Professional Degree	Ph.D.	Other	Total
Occupational therapy	6	13	0	0	0	19
Optometry	8	0	126	0	5	139
Pharmacy	16	3	192	6	5	222
Physical therapy	16	84	8	41	1	150
Physician assistance	33	193	3	1	55	285
Podiatry	0	0	17	0	0	17
Public health	14	72	89	3	1	179
Social work	6	195	3	15	4	223
BSC total	386	1,038	485	255	85	2,249

Figure A.5
BSC Specialties over Time

RAND TR782-A.5

Figure A.6
BSC Entering Ranks, by Specialty



RAND TR782-A.6

entered as O-3s—i.e., they had advanced graduate degrees.² Audiologists/speech pathologists and social workers typically entered as O-2s, consistent with their having master's degrees. Many other BSC specialties entered as O-1s, consistent with having a bachelor's degree.

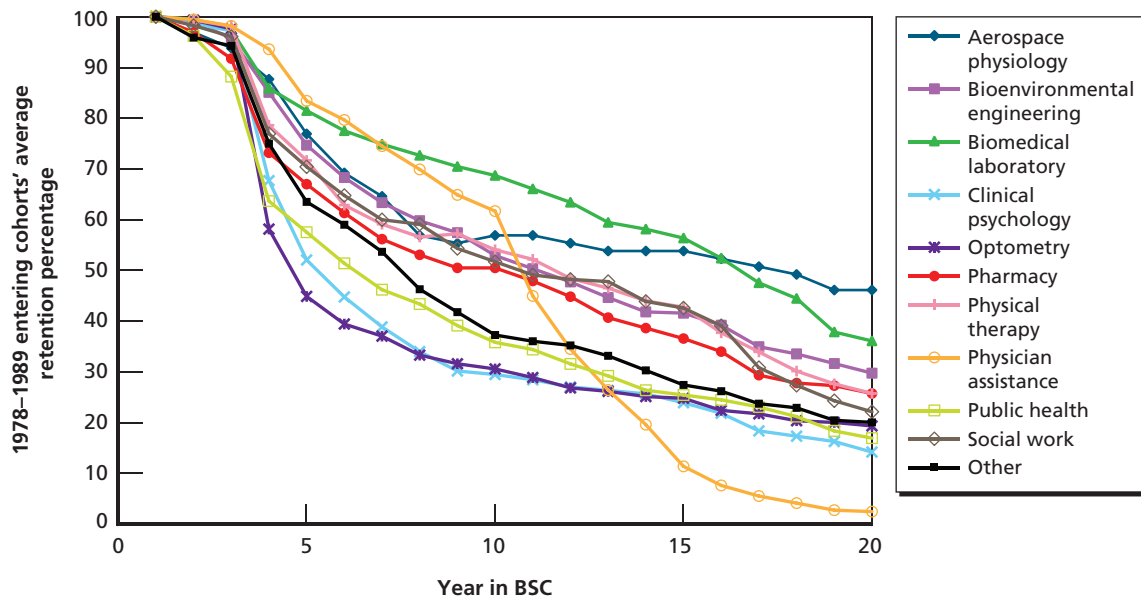
Using 1978–1989 entering-cohort data, Figure A.7 depicts the retention rate for each large BSC specialty as a function of the number of years in the BSC. The biomedical-laboratory and physician-assistance specialties had the highest retention rates in the first ten years, but physician-assistant retention fell dramatically after ten years of BSC service. In later years, aerospace-physiologist retention climbs to the top of the list.

The dramatic decline in physician-assistant retention after ten years of BSC service is driven by DoD pension rules. At least ten years of commissioned service is required to receive an officer's pension. An officer with prior enlisted experience who retired prior to ten years of officer service would receive a pension based on the highest 36 months of his or her active-duty enlisted base pay. See Department of the Army Retirement Services (2006). As shown in Table A.3, physician assistants have been far more likely to have prior enlisted experience than other BSC specialties, so this pension rule is disproportionately applicable to them.

Table A.3 shows estimates of the percentages of the BSC's specialties' 1978–2008 entrants with pre-BSC enlisted, officer, and both enlisted and officer experience. Over 80 percent of 1978–2008 entering physician assistants had prior enlisted experience. Indeed, this pattern appears to have been accentuated in recent years. Almost 90 percent of physician assistants in the BSC as of September 30, 2008, had prior enlisted experience.

² Note, however, that Table A.2 presents 2008 BSC officers' recorded highest academic degree attained. That degree attainment may be greater than the degree the officer had when he or she first entered the BSC.

Figure A.7
BSC Retention, by Specialty



RAND TR782-A.7

Table A.3
Percentage of 1978–2008 Entering Officers with Pre-BSC Air Force Experience

Specialty	Enlisted Only	Officer Only	Both	Total
Aerospace physiology	20.4	15.5	5.3	41.2
Audiology/speech pathology	4.9	2.9	1.0	8.8
Bioenvironmental engineering	11.6	8.8	1.2	21.6
Biomedical laboratory	23.5	4.3	1.5	29.3
Clinical psychology	2.8	2.7	0.3	5.8
Dietitian	4.3	1.3	0.9	6.5
Medical entomology	0.0	22.9	2.9	25.7
Occupational therapy	15.4	0.0	0.0	15.4
Optometry	2.3	3.0	0.2	5.4
Pharmacy	6.0	1.3	0.3	7.5
Physical therapy	10.1	2.0	1.5	13.5
Physician assistance	81.2	0.5	0.8	82.4
Podiatry	1.1	1.1	0.0	2.3
Public health	4.7	12.0	2.0	18.8
Social work	11.0	2.5	0.8	14.2

NOTE: Numbers may not total due to rounding.

Aerospace physiologists and biomedical laboratory officers were the specialties in which prior enlisted experience was second-most common, but their prior enlisted rates were comparatively modest, at around 25 percent. Prior officer experience has been most common in the small medical entomology specialty.

Table A.4 shows the specialties' entrants' average conditional (for those who had pre-BSC experience) and unconditional (for the whole entrant population, including those without pre-BSC experience) years spent as enlisted and officers prior to joining the BSC. From 1978 through 2008, physician-assistant entrants averaged over six years of enlisted service prior to joining the BSC, even including the roughly 20 percent of them without any prior enlisted service. The 2008 physician-assistant population had an even more marked pattern, averaging almost ten years of prior enlisted experience, even including the few without any prior enlisted experience. In no other BSC specialty is pre-BSC experience remotely as prominent.

Table A.4
1978–2008 Entering Officers' Conditional and Unconditional Average
Years of Pre-BSC Air Force Experience

Specialty	Enlisted Conditional	Enlisted Unconditional	Officer Conditional	Officer Unconditional
Aerospace physiology	7.1	1.8	3.6	0.8
Audiology/speech pathology	4.3	0.3	2.3	0.1
Bioenvironmental engineering	5.4	0.7	4.3	0.4
Biomedical laboratory	7.1	1.8	3.4	0.2
Clinical psychology	3.4	0.1	5.6	0.2
Dietitian	4.3	0.2	3.2	0.1
Medical entomology	20.0 ^a	0.6	8.2	2.1
Occupational therapy	4.9	0.8	NA	0.0
Optometry	3.4	0.1	3.7	0.1
Pharmacy	4.4	0.3	6.3	0.1
Physical therapy	5.7	0.7	3.6	0.1
Physician assistance	7.4	6.1	2.3	0.0
Podiatry	4.0	0.0	6.0	0.1
Public health	8.8	0.6	9.5	1.3
Social work	6.2	0.7	3.7	0.1

^a Only one medical entomologist who entered the BSC between 1978 and 2008 had prior enlisted experience. This individual had, as it turns out, 20 years of prior enlisted service.

Table A.5 reprises the Table 5.1 format but focuses instead on the 15 specialties and how they might evolve. Table A.5 suggests that, among the larger specialties, the physician-assistant population is the most likely to decline in the future. (We do not take the alarming occupational-therapy projection very seriously, given the extraordinarily small number of officers involved in that projection.) Indeed, the physician-assistant value in Table A.5 (–18.9 percent) is very close to what Table 5.1 suggested for the Nurse Corps (–19.2 percent) using the same years' data and methodology.

We warn that relatively small sample sizes lie behind Table A.5. As we disaggregate the BSC, we are looking at increasingly small populations, roughly an order of magnitude less, even for the larger specialties, than those we analyzed in Table 5.1. Hence, Table A.5's results are especially vulnerable to swings based on the idiosyncrasies of the decisions of a relatively small number of officers. We would not recommend running a version of Table A.5 covering fewer years than 2000–2008.

The reason Table A.5 projects adverse population evolution for physician assistants is that physician-assistant accessions were down sharply in 2001–2007. As shown in Figure A.8, there

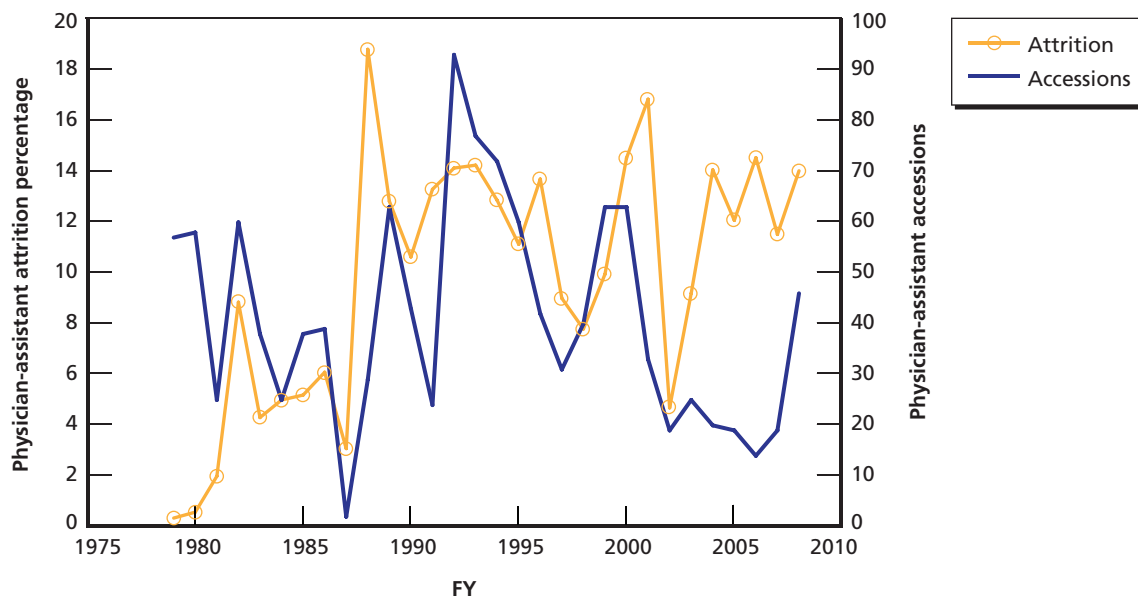
Table A.5
2000–2008 Implied Steady State Against Actual September 30, 2008, BSC Specialty Populations

Specialty	2000–2008 Average Accessions	2000–2008 Average Attrition Percentage	Implied Steady- State Population	September 30, 2008, Population	Percentage Differential
Aerospace physiology	10.3	7.6	135	116	+16.7
Audiology/speech pathology	3.4	8.6	40	41	–2.8
Bioenvironmental engineering	33.6	8.4	401	383	+4.8
Biomedical laboratory	11.1	7.3	151	178	–15.0
Clinical psychology	24.7	10.6	232	223	+4.0
Dietitian	5.2	9.3	56	59	–4.7
Medical entomology	1.0	5.9	17	15	+12.5
Occupational therapy	0.4	5.3	8	19	–55.8
Optometry	12.8	9.4	137	139	–1.8
Pharmacy	22.2	10.5	212	222	–4.5
Physical therapy	9.2	6.8	136	150	–9.3
Physician assistance	28.7	12.4	231	285	–18.9
Podiatry	1.4	10.7	14	17	–20.2
Public health	13.8	8.7	158	179	–11.6
Social work	21.4	10.1	213	223	–4.5

was an uptick in physician-assistant accessions in 2008. However, the 2000–2008 average accession level of about 29 physician assistants does not sustain its current size given typical attrition levels.

Figure A.8 also shows that recent years' physician-assistant attrition levels have not been unusual, i.e., they have been in the range of 12–15 percent. The sharp decline in the number of BSC physician assistants depicted in Figure A.5 has been fundamentally driven, we believe, by the large-scale decline in physician-assistant accessions. As we discuss in more depth in Appendix G, we also believe the decline in the size of the Air Force Nurse Corps has been driven by reduced accessions. We argue that these populations have accession more than retention challenges.

Figure A.8
Physician-Assistant Accessions and Attrition



RAND TR782-A.8

The Air Force's Chaplain Corps Population

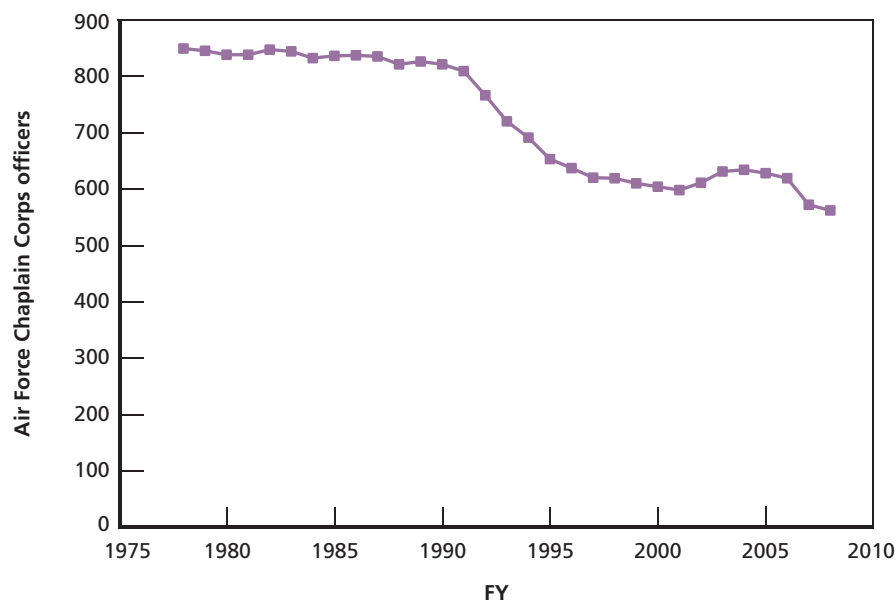
In this appendix, we provide an overview of personnel trends in the Air Force's Chaplain Corps.

Figure B.1 shows the number of Air Force officers in the Chaplain Corps. As noted in Figure 2.2, the Chaplain Corps' population has fairly closely tracked the overall size of the Air Force since 1978. The Chaplain Corps shrunk markedly during the early 1990s drawdown of the Air Force. While the population increased somewhat earlier this decade, a downward trend has resumed in recent years.

As shown in Figure B.2, the Air Force has consistently had more chaplains than authorized. One explanation for Figure B.2 is that it appears some chaplains hold 52R3 primary and duty AFSCs while actually being students. However, even excluding officers whose operating locations or commands suggest they may be students, there appears to be systematic multiple billeting of officers against positions in the Chaplain Corps.

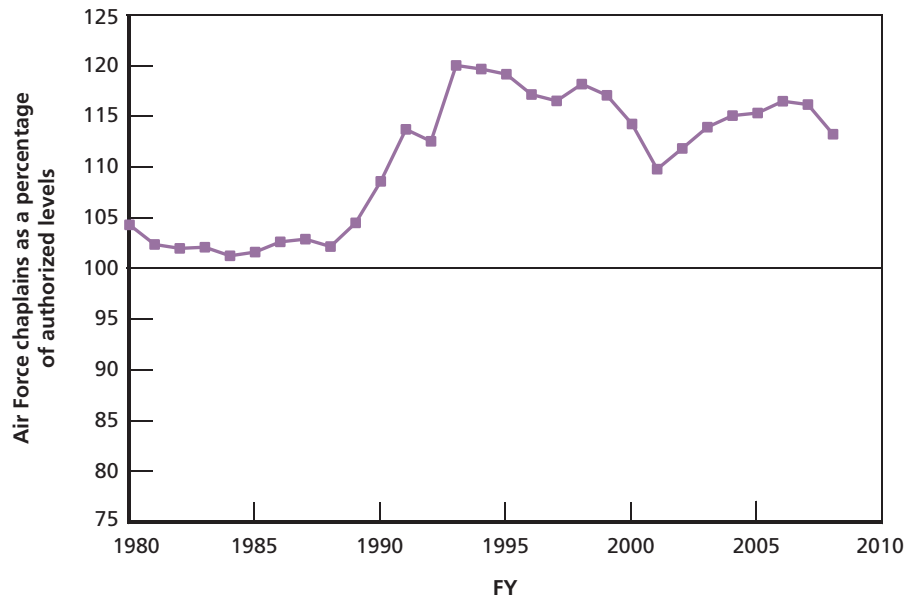
Figure B.3 shows chaplain annual accession totals. Accessions were high in 2003, but, not surprisingly, the Air Force has accessed fewer chaplains per year since the early 1990s drawdown. It is also important to note the small scale of Air Force chaplain accessions. The Chap-

Figure B.1
Air Force Chaplain Corps Population



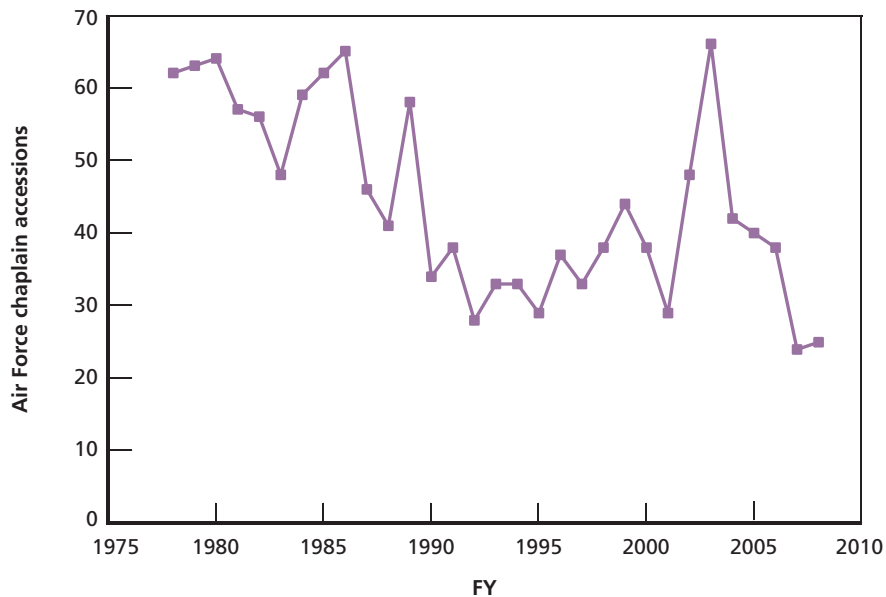
RAND TR782-B.1

Figure B.2
Air Force Chaplain Corps Population as a Percentage of Authorized Levels



RAND TR782-B.2

Figure B.3
Air Force Chaplain Corps Annual Accessions

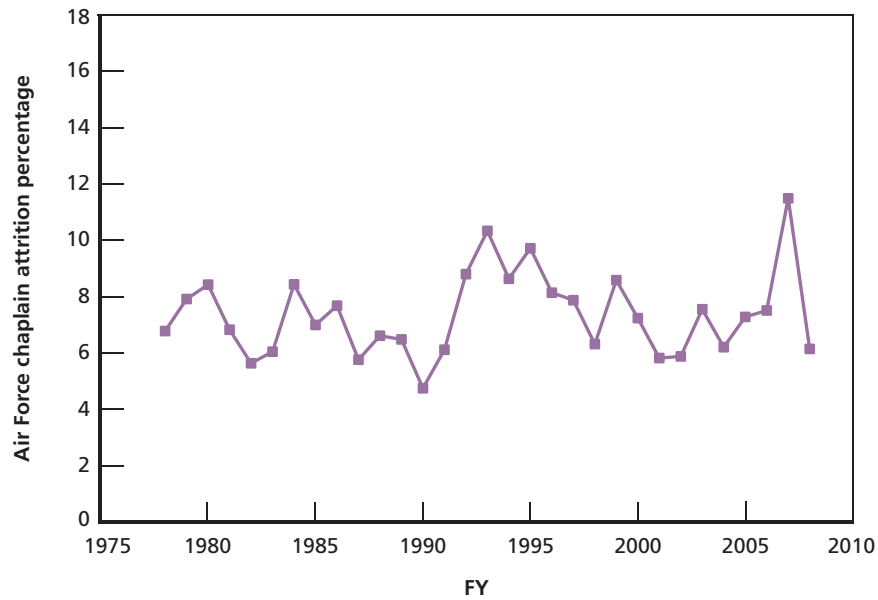


RAND TR782-B.3

lain Corps is the Air Force's smallest medical and professional corps, and it is a corps that tends to have both low accessions and low attrition.

Figure B.4 shows the Chaplain Corps' annual attrition rates. The 11.5-percent attrition rate in 2007 was unusually high. More typically, including 2008, chaplain attrition has been in the 6–8-percent range.

Figure B.4
Air Force Chaplain Corps Annual Attrition Percentages



RAND TR782-B.4

As discussed in Chapter Five, the Chaplain Corps' current population trend appears to be slightly downward (e.g., -3.2 percent using a 2002–2008 baseline or -4.3 percent using a 2000–2008 baseline).

The Air Force's Dental Corps Population

In this appendix, we provide an overview of personnel trends in the Air Force's Dental Corps. We presented a much more detailed discussion of the Dental Corps in Keating et al. (2009). This appendix's discussion is more superficial but does contain September 30, 2008, data not available when the 2009 analysis was undertaken.

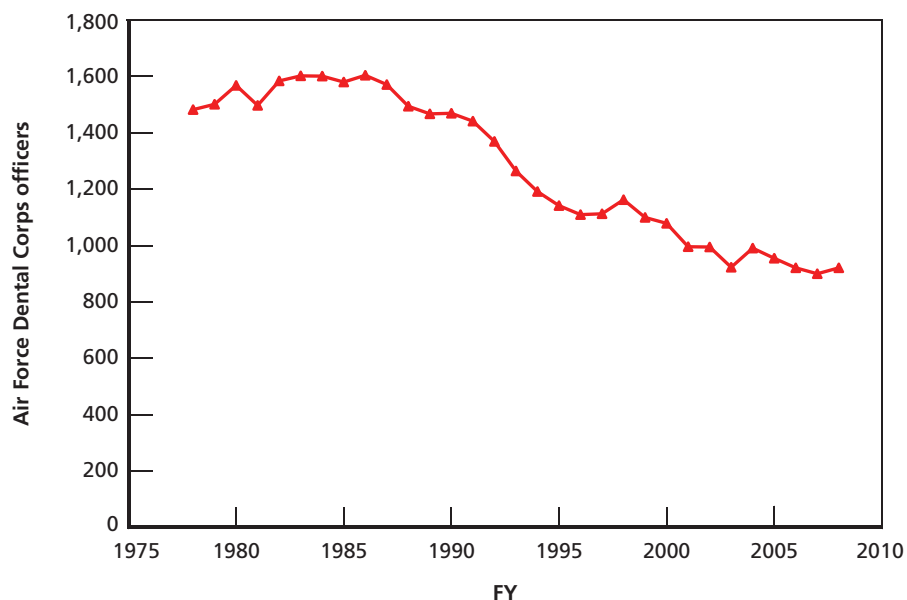
Figure C.1 shows the number of Air Force officers in the Dental Corps. Since peaking at 1,605 dentists in 1986, the population has consistently drifted downward.

The Dental Corps' population has been below authorized levels since 2001, as shown in Figure C.2.

Figure C.3 shows Dental Corps annual accession totals. Accessions have varied considerably from year to year without an obvious trend in recent years.

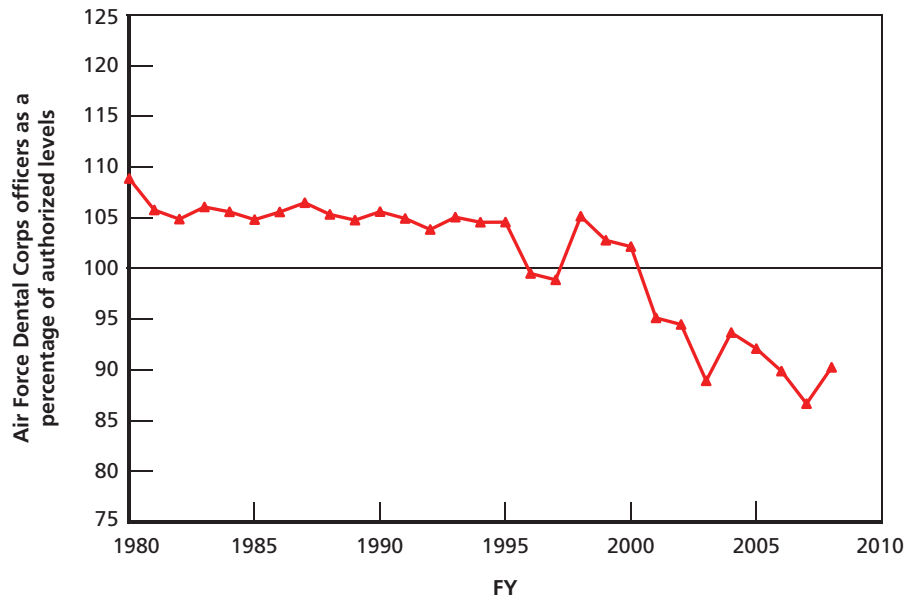
Figure C.4 shows the Dental Corps' annual attrition rates. In Keating et al. (2009), we noted a generally adverse trend in Dental Corps attrition rates. But FY2008, whose data we did not have for our previous analysis, proved to be a very low attrition year.

Figure C.1
Air Force Dental Corps Population



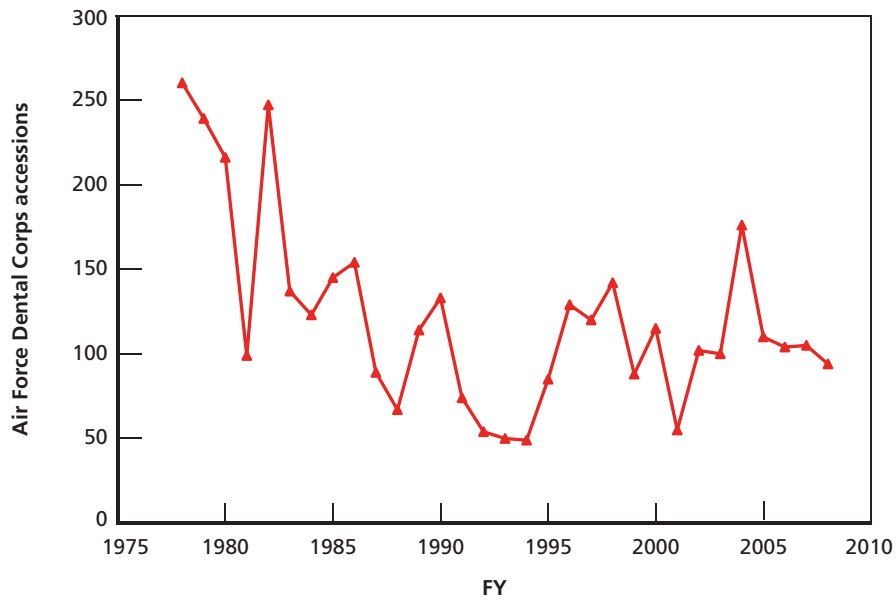
RAND TR782-C.1

Figure C.2
Air Force Dental Corps Population as a Percentage of Authorized Levels



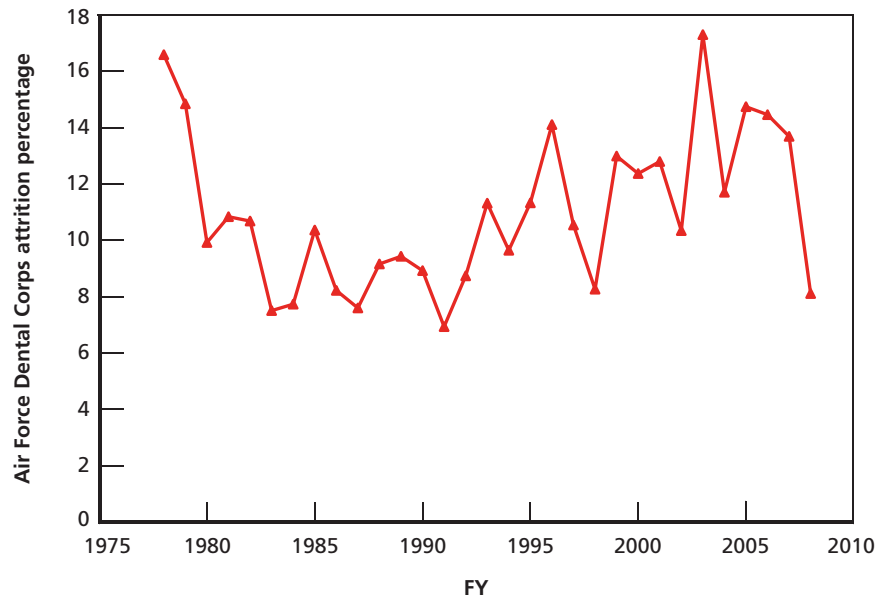
RAND TR782-C.2

Figure C.3
Air Force Dental Corps Annual Accessions



RAND TR782-C.3

Figure C.4
Air Force Dental Corps Annual Attrition Percentages



As discussed in Chapter Five, the Dental Corps' current population trend appears to be downward (e.g., -5.3 percent using a 2002–2008 baseline or -9.9 percent using a 2000–2008 baseline).

The Air Force's JAG Corps Population

In this appendix, we provide an overview of personnel trends in the Air Force's JAG Corps.

Figure D.1 shows the number of Air Force officers in the JAG Corps. The population has been remarkably stable since the mid-1980s, though it has declined somewhat in recent years.

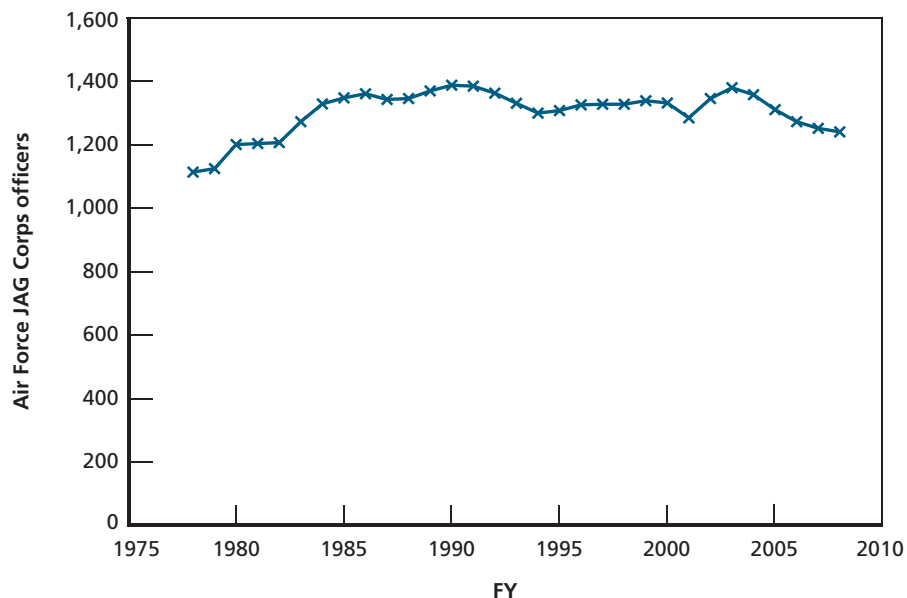
According to much of the data, the Air Force had somewhat more JAG officers than authorized. However, in 2007 and 2008, the actual number of JAG officers fell slightly below authorized levels, as shown in Figure D.2.

Figure D.3 shows JAG annual accession totals. Accessions were poor in 2001, but, in general, accessions have been trendless.

Figure D.4 shows the JAG Corps' annual attrition rates. JAG Corps attrition rates have been somewhat elevated since 2004, though the rate declined in 2008.

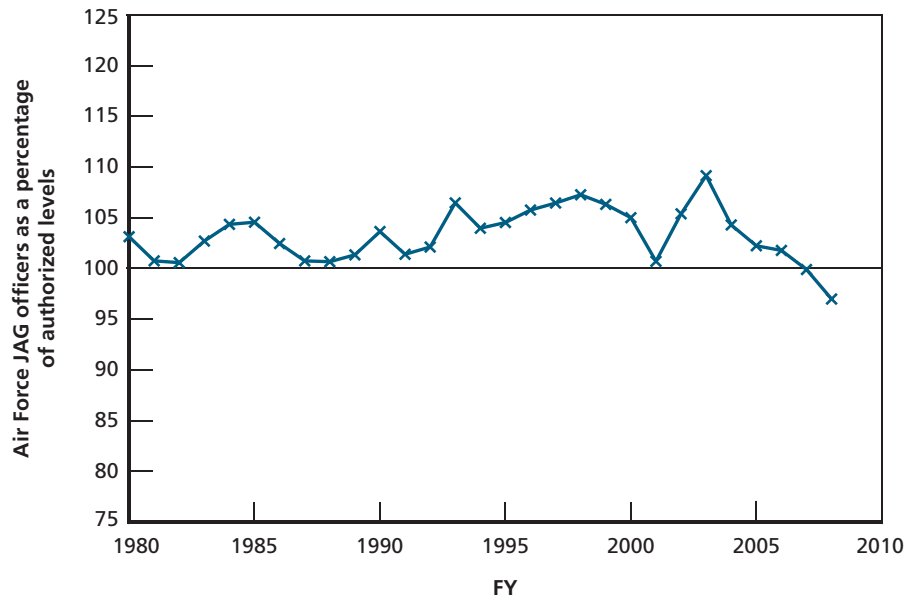
As discussed in Chapter Five, the JAG Corps' current population trend appears to be quite stable (e.g., +1.0 percent using a 2002–2008 baseline or –2.3 percent using a 2000–2008 baseline).

Figure D.1
Air Force JAG Corps Population



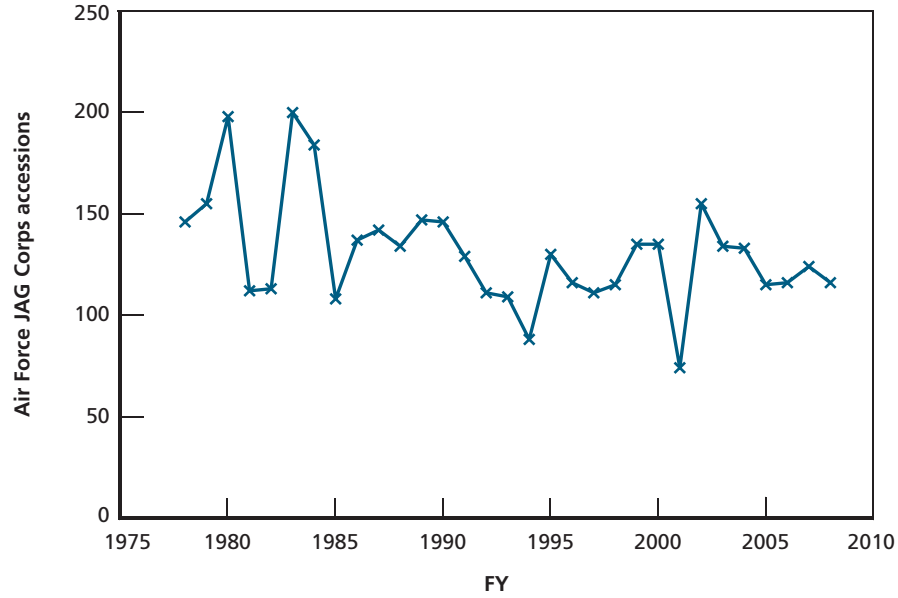
RAND TR782-D.1

Figure D.2
Air Force JAG Corps Population as a Percentage of Authorized Levels



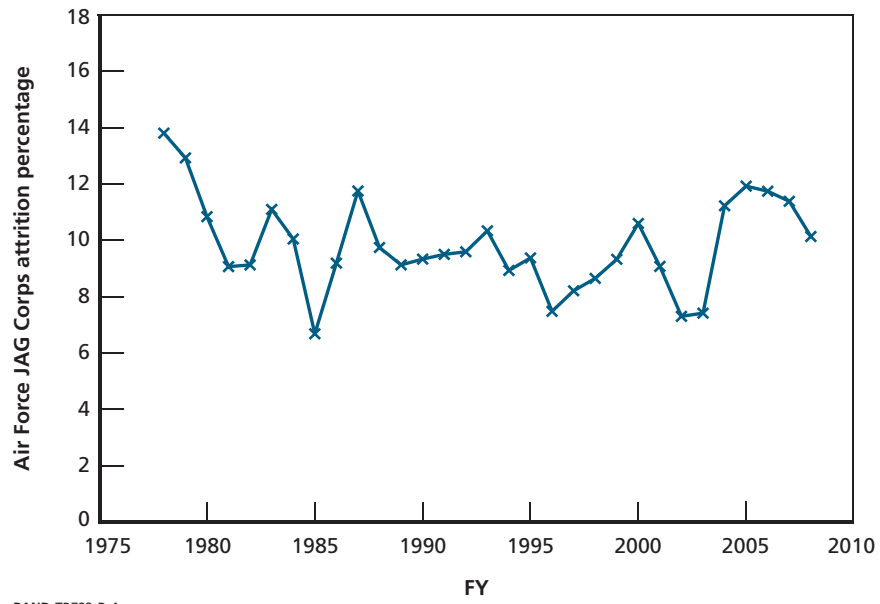
RAND TR782-D.2

Figure D.3
Air Force JAG Corps Annual Accessions



RAND TR782-D.3

Figure D.4
Air Force JAG Corps Annual Attrition Percentages



The Air Force's Medical Corps Population

In this appendix, we provide an overview of personnel trends in the Air Force's Medical Corps. We presented a much more detailed discussion of the Medical Corps in Keating et al. (2009). This appendix's discussion is more superficial but does contain September 30, 2008, data not available when the 2009 analysis was undertaken.

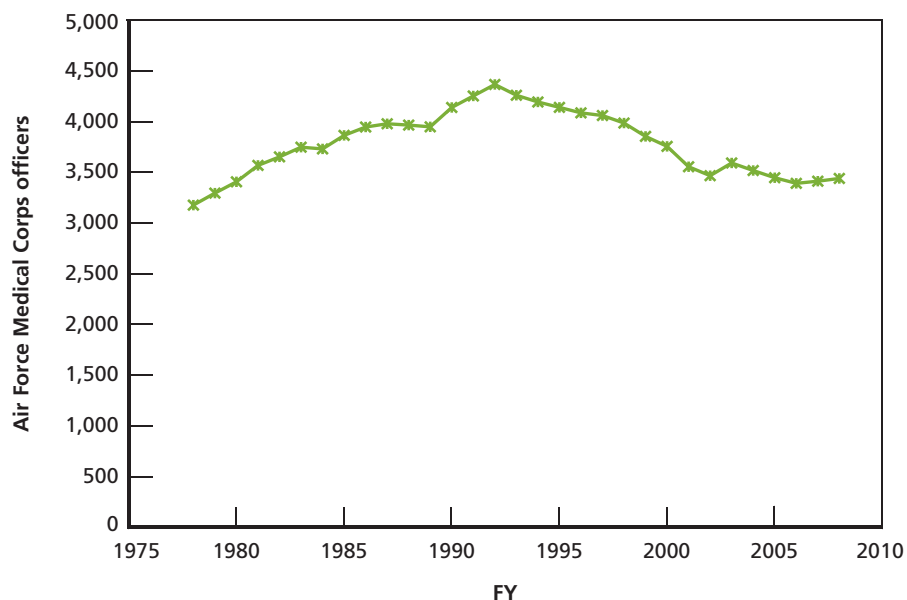
Figure E.1 shows the number of Air Force officers in the Medical Corps. The Medical Corps' post-1978 population peak was in 1992. It drifted downward through the rest of the 1990s.

Through the 1980s into the mid-1990s, there were more Medical Corps officers than authorized. Since the mid-1990s, the Medical Corps' population has bounced above and below the authorized level, as shown in Figure E.2.

Figure E.3 shows Medical Corps annual accession totals. In Keating et al. (2009), we expressed concern that there has been a downward drift in Medical Corps accessions since 1990. The 2008 accession total of 372 physicians equaled the 2007 accession total.

Figure E.4 shows the Medical Corps' annual attrition rates. Both 2007 and 2008 were very good years with unusually low Medical Corps attrition.

Figure E.1
Air Force Medical Corps Population



RAND TR782-E.1

Figure E.2
Air Force Medical Corps Population as a Percentage of Authorized Levels

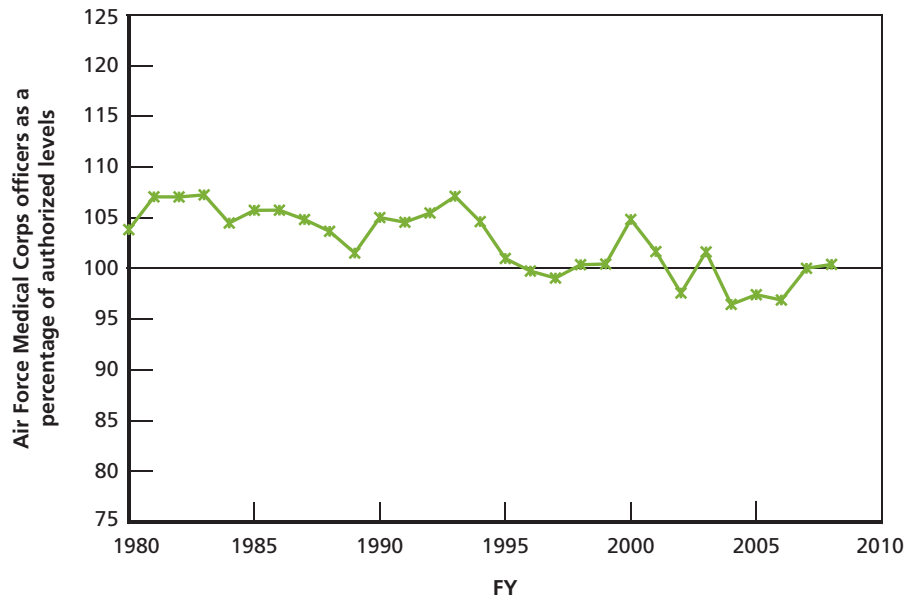


Figure E.3
Air Force Medical Corps Annual Accessions

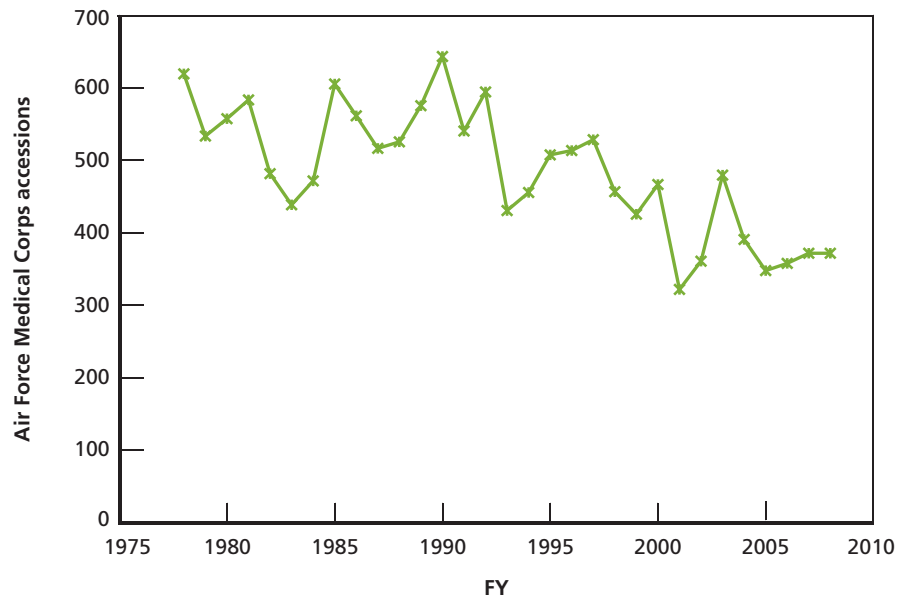
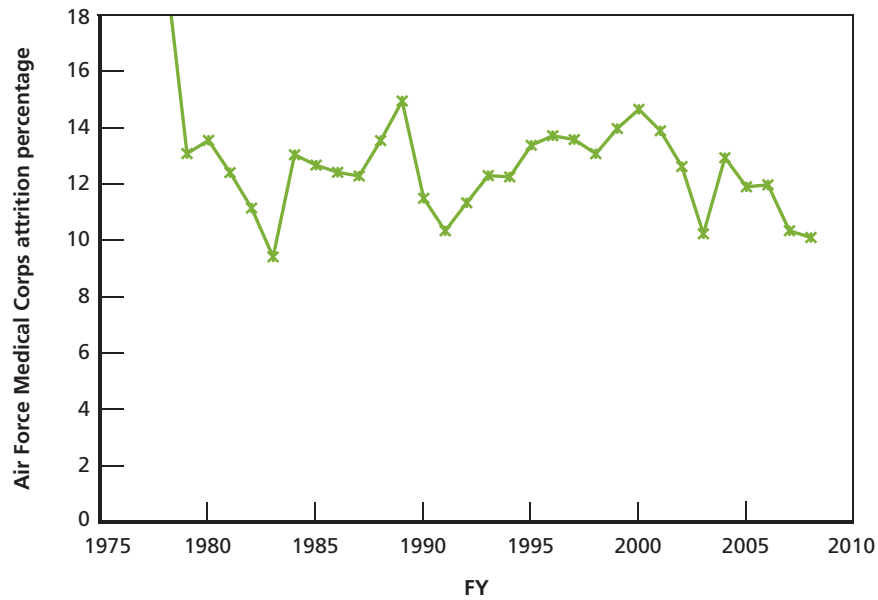


Figure E.4
Air Force Medical Corps Annual Attrition Percentages



As discussed in Chapter Five, the Medical Corps' current population trend appears to be moderately downward (e.g., -2.9 percent using a 2002–2008 baseline or -7.7 percent using a 2000–2008 baseline).

The Air Force's MSC Population

In this appendix, we provide an overview of personnel trends in the Air Force's MSC.

Figure F.1 shows the number of Air Force officers in the MSC. This population's post-1978 peak was in 1989 at 1,289. The population drifted downward through the 1990s but increased early in this decade. More recently, it has declined since 2004.

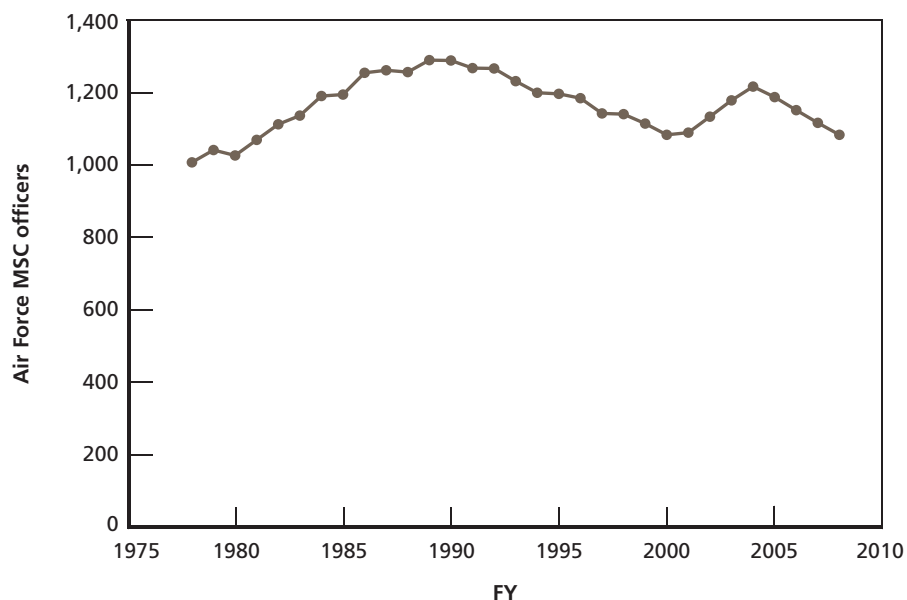
Historically, as shown in Figure F.2, there have been more MSC officers than authorized. The recent decline in the MSC population has moved the total closer to the authorized level.

Figure F.3 shows MSC annual accession totals. There was an upward trend in accessions from 1997 to 2004, but MSC accessions have fallen more recently.

Figure F.4 shows the MSC's annual attrition rates. The MSC had an attrition trough in 2002, 2003, and 2004. Attrition has returned to more historically normal levels recently.

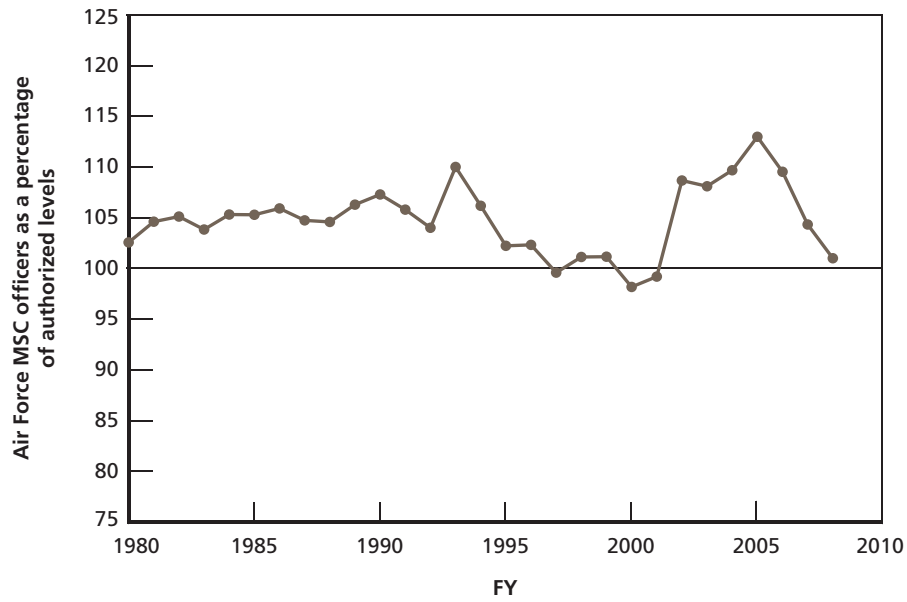
In Chapter Five, we found that the MSC has the most-favorable population trends of any of the seven medical and professional corps (e.g., +5.4 percent using a 2002–2008 baseline or +1.4 percent using a 2000–2008 baseline). The only caveat we would put on that finding is that 2002–2004 were unusually low attrition years for the MSC. If those very good years are

Figure F.1
Air Force MSC Population



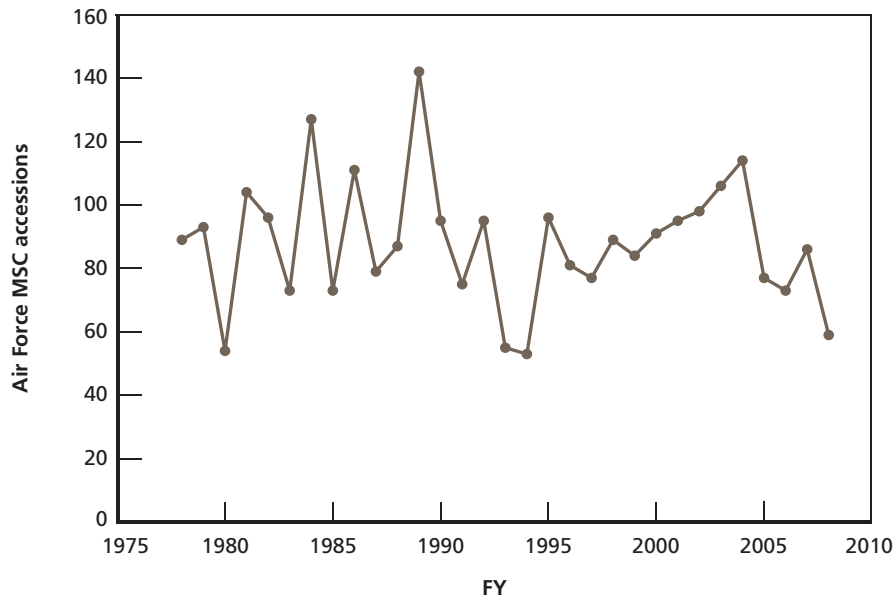
RAND TR782-F.1

Figure F.2
Air Force MSC Population as a Percentage of Authorized Levels



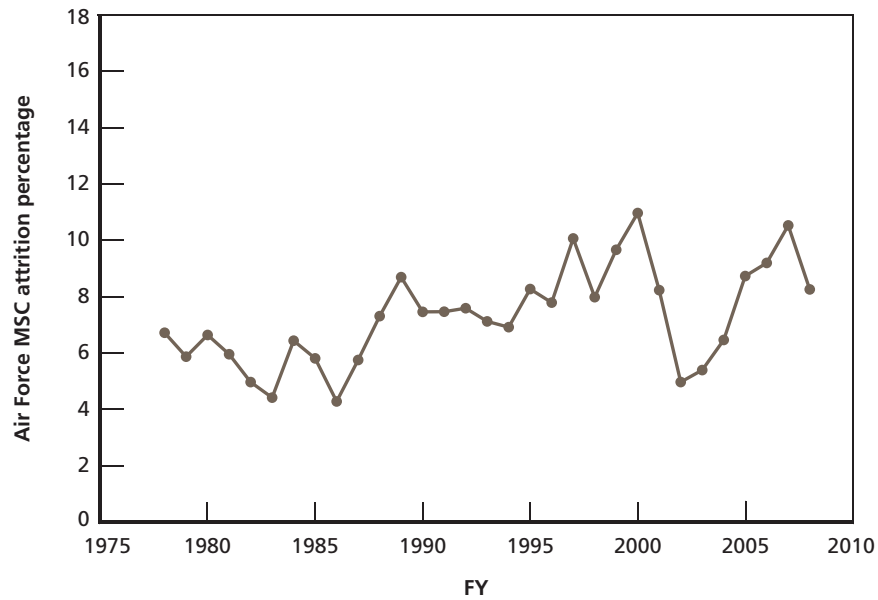
RAND TR782-F.2

Figure F.3
Air Force MSC Annual Accessions



RAND TR782-F.3

Figure F.4
Air Force MSC Annual Attrition Percentages



not considered, the projection for the future evolution of the MSC would not be so optimistic. The MSC performs very poorly in Figure 5.3 if one uses a 2005–2008 analysis time frame or briefer period.

The Air Force's Nurse Corps Population

In this appendix, we provide a discussion of personnel trends in the Air Force's Nurse Corps.

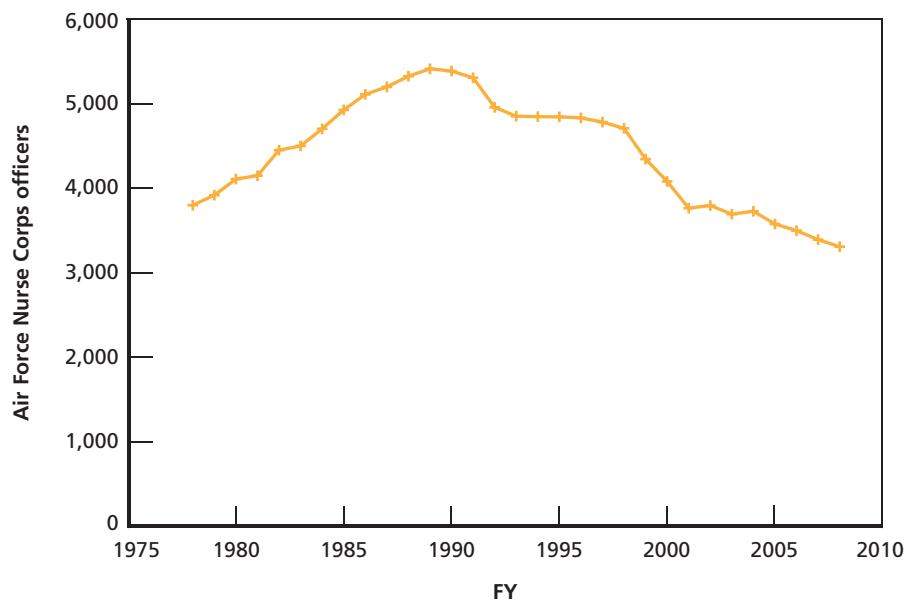
Figure G.1 shows the number of Air Force officers in the Nurse Corps. The Nurse Corps' post-1978 population peak was in 1989; it has declined by nearly 40 percent since then.

Between 1980 and 2000, there were more nurses in the Air Force than authorized. The opposite has been true since 2001, as shown in Figure G.2.

As noted in Figure 2.4, the Nurse Corps is the only Air Force medical and professional corps that is majority female. As shown in Figure G.3, there were increases in the Nurse Corps' male percentage in the late 1970s and again in the late 1990s. Since 2000, it has stabilized, with about 30 percent of the Nurse Corps officers being male.

Figure G.3 also shows the Nurse Corps' male percentage has been far above levels found in the civilian sector. According to the National Sample Survey of Registered Nurses conducted by the Department of Health and Human Services' Bureau of Health Professionals, the percentage of civilian nurses who are male rose from under 2 percent in 1977 to almost 6 percent in 2004.¹

Figure G.1
Air Force Nurse Corps Population



RAND TR782-G.1

¹ See U.S. Department of Health and Human Services, no date.

Figure G.2
Air Force Nurse Corps Population as a Percentage of Authorized Levels

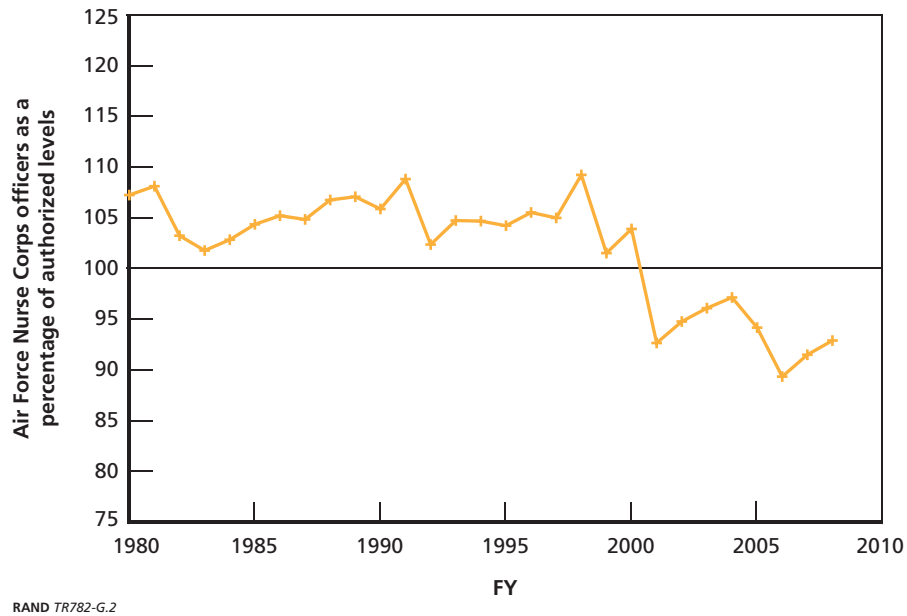
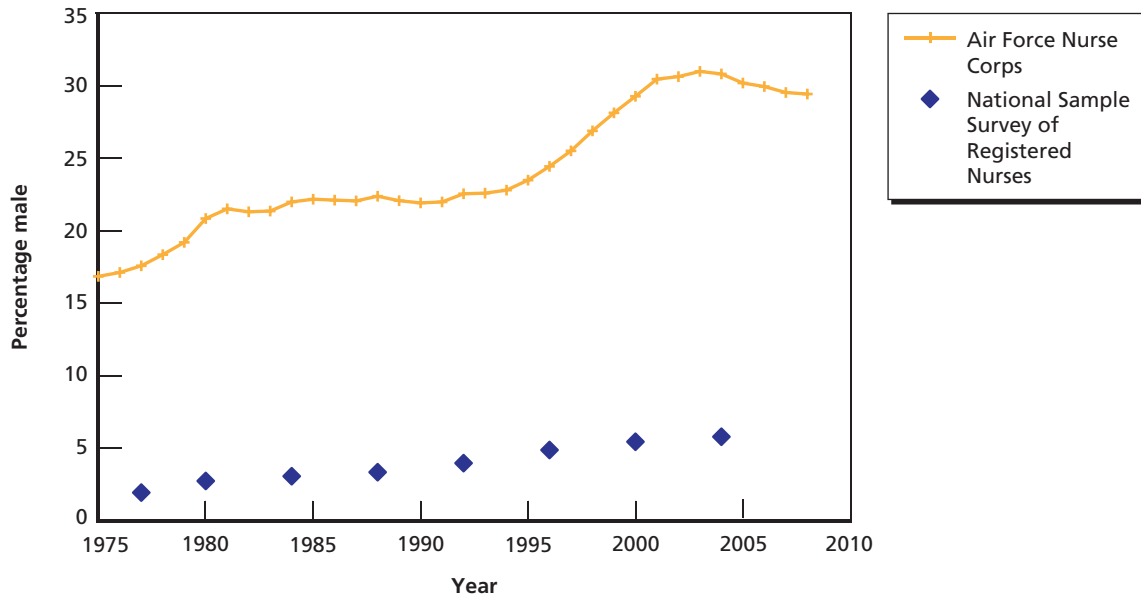


Figure G.3
Air Force Nurse Corps Male Percentage Against Private-Sector Levels



The Nurse Corps' males are highly nonuniformly distributed across nursing specialties. Table G.1 shows the percentage of 2008 Nurse Corps officers who were males by duty AFSC. The majority of Air Force nurse anesthetists as of September 30, 2008, were male, and the male percentage was above 40 percent for emergency/trauma nurses, critical-care nurses, operating-room nurses, and flight nurses. By contrast, only 4 percent of obstetrics nurses were male.

Figure G.4 shows Air Force Nurse Corps annual accession totals. Nurse Corps accessions dropped sharply in the 1990s relative to the 1980s and in this decade relative to the 1990s. Accession levels have since stabilized, but at a much lower level than was seen in the earlier data.

Figure G.5 shows the Nurse Corps' annual attrition rates. Attrition was high in 1992, 1999, and 2000; 2002 was a low attrition year. Attrition rates have risen since 2002 but remain within a historically normal range. As discussed in Chapter Five, the Nurse Corps' current population trend appears to be the most adverse of any of the medical or professional corps (e.g., -9.8 percent using a 2002-2008 baseline or -19.2 percent using a 2000-2008 baseline).

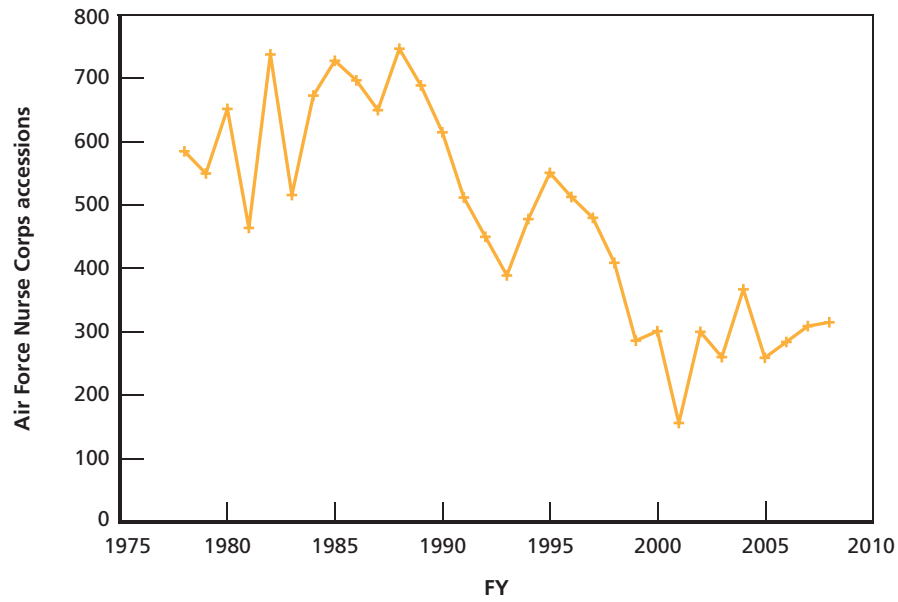
We think there is little chance that reduced Nurse Corps attrition, by itself, will stabilize the Nurse Corps' population. Figure G.6 again displays the Nurse Corps' annual attrition percentages, but it also displays the roughly 8.6-percent annual attrition rate that would be necessary for the Nurse Corps to have a steady-state size of 3,300 nurses (its September 30, 2008, population) in conjunction with the 2000-2008 average of about 282 accessions per year. Only once during the postconscription era did Nurse Corps attrition fall below 8.6 percent (it was 7.1 percent in 2002).

If the Air Force wants the Nurse Corps to stabilize at 3,300 nurses (or some greater total), we conclude the accession diminution displayed in Figure G.4 must be, at least in part, reversed.

Table G.1
Percentage of 2008 Air Force Nurse Corps
Officers Who Were Male, by Duty AFSC

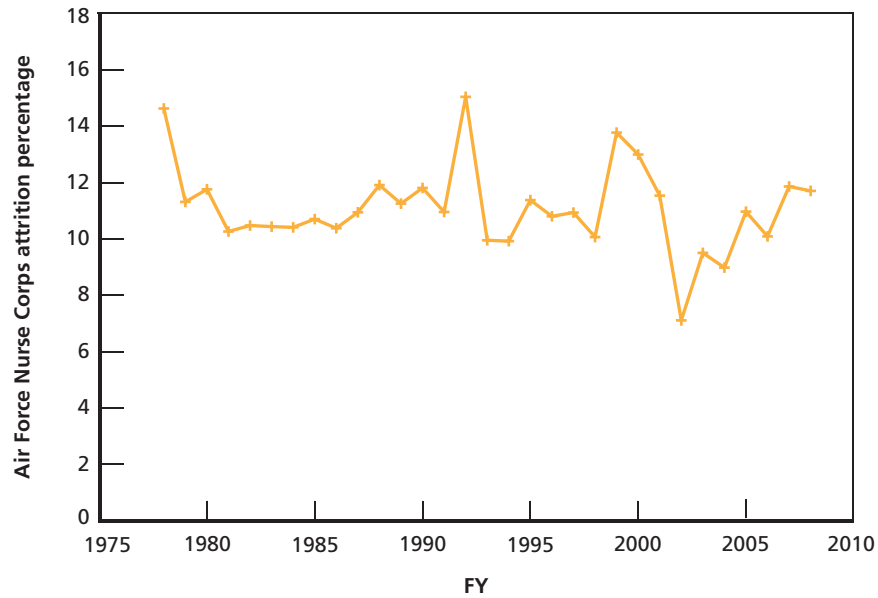
Specialty (Duty AFSC)	Percentage
Clinical nurse (46N)	24.4
Critical-care nurse (46NE)	46.3
Obstetrics clinical nurse (46NG)	4.1
Nurse administrator (46A)	20.5
Operating-room nurse (46S)	43.8
Flight nurse (46F)	42.9
Emergency/trauma nurse (46NJ)	49.1
Nurse anesthetist (46M)	66.0
Other	21.0

Figure G.4
Air Force Nurse Corps Annual Accessions



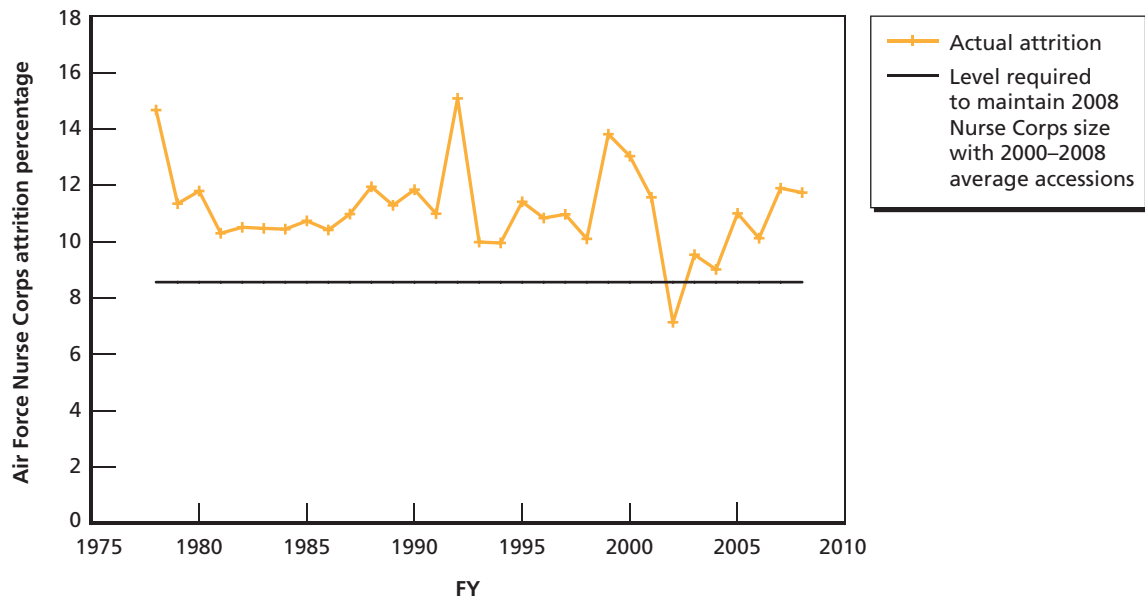
RAND TR782-G.4

Figure G.5
Air Force Nurse Corps Annual Attrition Percentages



RAND TR782-G.5

Figure G.6
Air Force Nurse Corps Annual Attrition Percentages and Level Required to Maintain 2008 Nurse Corps Size with 2000–2008 Average Accessions



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