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# Demographic Representation in the Bureau of Medicine and Surgery: Civilian Trends and Comparisons

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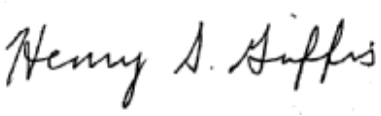

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# Contents

# Executive summary

The U.S. Navy's goal of being demographically representative of the U.S. population grows out of a long history of theory and practice regarding the appropriate composition of government entities—especially the military—in a democracy. The Bureau of Medicine and Surgery (BUMED) is not currently meeting this representation goal for officers. Relative to the U.S. population, officers in Navy Medicine are:

- More male
- More non-Hispanic white and Asian and Pacific Islander
- Less non-Hispanic black and Hispanic.

BUMED's failure to meet its representation goals reflects a lack of representation in the civilian recruiting pool. This pool is diversifying across all demographic dimensions, but its relative lack of representation in the past, combined with continued population diversification, means that representation remains a moving target for civilian medical professions as well as for BUMED.

Three demographic trends within the civilian equivalent of the Navy Medicine officer labor force affect representation trends:

1. It is aging, particularly among white non-Hispanic men.
2. It is increasingly female.
3. Its foreign-trained component is growing, as is the share of non-citizens.

All three trends are making the civilian recruiting pool more representative of the population as a whole. However, representation for Hispanics and for non-Hispanic blacks still lags, reflecting choke-points throughout the process of education. And there are concerns about supply shortages if the aging of the population increases

demand. Such constraints would increase competition for demographically diverse personnel.

Compared with this changing civilian pool, officers in Navy Medicine are disproportionately male, except for dentists. In terms of race and ethnicity, Navy dentists are close to parity with civilian dentists, with blacks and Hispanics slightly overrepresented and Asians and Pacific Islanders slightly underrepresented. Navy nurses are also close to parity with civilian nurses, except for Asians and Pacific Islanders. The comparison with the civilian equivalent of the Navy's Medical Services Corps is weaker, given the difficulty of matching occupations, but this group also seems relatively representative. Compared with civilian doctors, Navy doctors are the least representative in terms of race and ethnicity; all racial and ethnic groups are underrepresented, especially Asians.

Citizenship differences affect these comparisons in two ways. First, noncitizens in the civilian equivalent of Navy Medicine are disproportionately Asian, leading to their underrepresentation when Navy Medicine officers are compared with the civilian medical labor force. Second, relative to the U.S. population, Asians are overrepresented in the civilian medical labor force, so the fact that Navy Medicine is not representative of civilian medicine actually makes it more representative of the U.S. population.

Citizenship and other specifically Navy requirements, such as a Bachelor of Science degree for Registered Nurses, call into question the choice of appropriate benchmarks for measuring representation in Navy Medicine. From a recruiting perspective, a realistic benchmark might be the college-educated citizen labor force under age 35, especially since this population is increasingly diverse. Alternatively, the business case literature for representation among health personnel suggests that an appropriate benchmark would be the Navy's patient pool, which has a different racial/ethnic mix than the population as a whole.

The business case for representation among medical professionals, combined with actual or potential shortages in some fields, means that civilian employers are competing with Navy Medicine for demographically diverse personnel. The Navy can pursue two strategic

directions simultaneously. First, it can expand its share of the existing recruiting pool by such initiatives as increasing career flexibility to potentially improve recruiting and retention, increasing the civilian component of Navy Medicine, and considering noncitizens or facilitating citizenship for them. Second, it can expand the recruiting pool internally, through such efforts as the Seaman-to-Admiral-21 program, and externally, by partnering with agencies and organizations that have a direct mandate for improving access to education and raising completion rates.

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# Introduction

## Tasking

To create a total force that fully leverages and values the diversity inherent in the Navy's makeup, the Chief of Naval Operations (CNO) laid out a three-phase plan to develop leaders who reflect the Navy's ethnic makeup, gender mix, and cultural diversity. These three phases are: assessment, decisive action, and sustainment and accountability.

As part of the assessment phase of the plan, the CNO and the Chief of Naval Personnel asked all Navy communities to provide demographic diversity baselines and evaluations of diversity health in terms of the following five elements of diversity:

- Overall diversity
- Career path diversity
- Promotion diversity
- Reenlistment diversity
- Diversity in assignment to key/nominative billets.

In addition, they asked each community to provide a 3-year plan with diversity goals and evaluation metrics for which leadership can be held accountable. The Deputy Chief of Staff, Human Resources (M1) asked CNA to assist with the initial diversity assessment for the Department of the Navy's Bureau of Medicine and Surgery. This paper and related activities support that effort.[1]

1. A detailed baseline assessment for each of the four officer corps in Navy Medicine is provided under separate cover.

## Background and issues

Recognizing that the United States is “a nation whose demographic makeup continually changes, reflecting the influx of new immigrants and the growth of minority populations,” the U.S. Navy Diversity Policy asserts: “To the degree we truly represent our democracy, we are a stronger, more relevant armed force” [1]. Reaching this moving target, however, depends on similar representation in the civilian world from which the Navy recruits.

Such representation is notably elusive in the U.S. civilian health care labor force, and civilian employers share BUMED’s representation concerns and goals. Notably, the U.S. Department of Health and Human Services (HHS) has made a business case for matching the demographic characteristics of patients and health care providers [2]. In addition to improving health care for such populations as the rural poor that are currently underserved and to increasing the size of the provider pool, HHS finds that an array of health care outcomes can be improved when provider demographics become more representative of patient demographics.

This paper discusses civilian demographic trends and issues that directly affect the composition and size of the recruiting pool for BUMED and thus indirectly affect the process of achieving demographic diversity in the Navy's health care forces. It then assesses the current state of BUMED representation as measured against an array of relevant civilian benchmarks.

For these BUMED purposes, we define demographic diversity along only two dimensions: race / ethnicity and gender. Other demographic characteristics, such as age or education, are important components of diversity in most organizations, and contribute both positively and negatively to organizational outcomes, as a voluminous research literature shows [3]. However, important organizational characteristics of military service (such as youthful entry and promotion from within), as well as the education requirements for its health service practitioners, mean that seeking representation along these dimensions is not a goal of BUMED.

# Arguments for population representation

## Current Navy goals[2]

To ensure that the racial/ethnic mix of Navy leadership comes to reflect the racial/ethnic mix of the U.S. population, Navy policymakers have set a representation goal that acknowledges the long time frame required to grow senior leaders in a closed personnel system. Looking 30 years to the future, the Navy's goal is to develop a 2037 Flag pool that is racially and ethnically representative of the projected 2037 population. Since overall retention rates of Navy officers do not vary significantly by race/ethnicity, this goal translates to addressing the racial/ethnic profile of the 2012 officer accession cohort. This goal applies to Navy officers as a group, as well as to individual officer communities, such as the four officer corps in Navy Medicine.

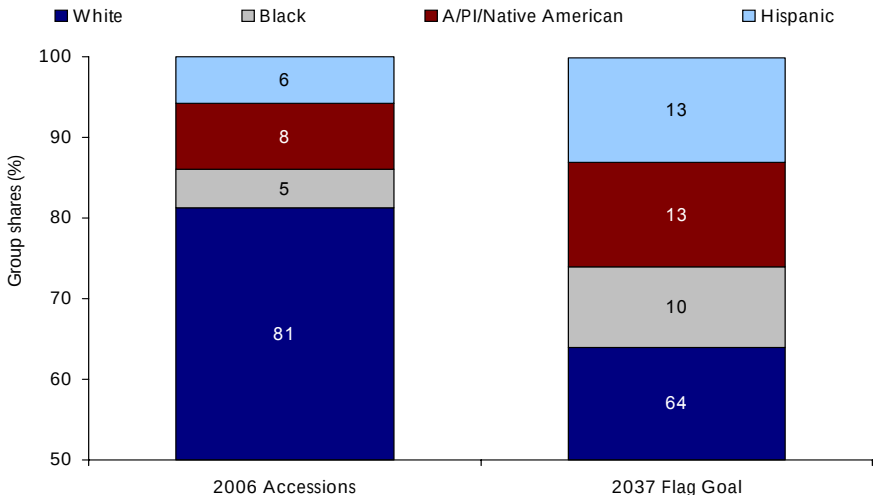
Figure 1 compares the actual racial/ethnic profile of 2006 accessions from the U.S. Naval Academy (USNA) and the Navy Reserve Officer Training Corps (ROTC) program with the desired 2012/2037 profile. Assuming that the number of accessions remains relatively constant, these changes in racial/ethnic accession shares translate to the following changes in numbers of accessions by racial/ethnic group:

- 295 fewer white accessions
- 94 more black accessions
- 78 more Asian, Pacific Islander, and Native American accessions
- 123 more Hispanic accessions.[3]

2. The Navy Diversity Directorate (N134) provided information for this section, which follows the race/ethnic reporting guidelines described in the 17 July 2007 memorandum from the Chief of Naval personnel.

3. For the Navy's diversity goal, whites, blacks, Asians, Pacific Islanders, and Native Americans may be Hispanic. Throughout the rest of the paper, however, we will consider only non-Hispanic members of these groups.

Figure 1. 2006 officer accessions[a] vs. the 2037 Flag pool goal[b,c]




a. These data apply to accessions from the U.S. Naval Academy and graduates from the Navy Reserve Officer Training Corps.
b. These shares apply to both the 2037 Flag pool and the 2012 accession cohort.
c. Source: The Navy Diversity Directorate (N134).

No similar representation goal exists for gender, and the reasons no such goal has been set are complex. At one level, there is general social acceptance of the notion that women have lower service propensity than men. As a result, there is little expectation that the Navy will achieve either the 50-50 male-female split that would be representative of the population or the 53-47 male-female split that would be representative of the college-educated labor force.[4] At the same time, the retention rates of women in the Navy's Unrestricted Line communities are lower than those of men. Given the costliness of low retention, there is a perceived need to resolve the female retention issue before making a greater effort to increase female accessions in the Navy overall.

Of course, there is some interaction of gender and race / ethnicity. As this paper shows, medical occupations are becoming "feminized," and this is occurring at different rates for different racial and ethnic

4. The 53-47 split for the college-educated labor force comes from the 2006 Current Population Survey.

groups. Thus, even without a gender representation goal, gender is an important factor for meeting the racial/ethnic goals. Due to data limitations, however, this paper does not directly address the impact of gender on the race/ethnicity goals for Navy Medicine.

## Historical arguments

The concept of population representation by race and gender has been a goal of the Armed Services during the careers of virtually all currently active Servicemembers. Its philosophical foundations are rooted in a long literature regarding the proper composition of government employees in a democracy (footnote 3 of [4] cites an array of writers). The argument for representation in the U.S. Government is based on the need to demonstrate that all citizens are included, and are seen to be included, among those who develop, implement, or evaluate public policy. This was an important evolution from the colonial rulers, who customarily awarded "good" jobs to favorites and filled "bad" jobs—often by force—with the disenfranchised.[5]

This legitimacy and access argument has a particular resonance for the Armed Services. According to [5], the issue of representation in the military has existed as long as the Nation and represents "the legitimate concerns of the populace" about the motives and allegiances of its Armed Forces. "In a democracy, it is believed that a broadly representative military force is more likely to uphold national values and to be loyal to the government—and country—that raised it" (p. 2). Indeed, this reasoning underlies Americans' longtime resistance to a professional military.

A corollary argument is the democratic value of equalizing the risk of injury and death that is uniquely characteristic of military service in wartime. This concern has reemerged with the war in Iraq, echoing the factually incorrect perception that blacks and the poor were overrepresented among the casualties of the Vietnam War [6]. At that time, college students, who were likely to be both affluent and white,

5. Naval history in this regard includes Roman galley slaves and press-ganged crews during the Napoleonic wars.

could receive draft deferments, and the public feared that the burden of service was not being fairly shared.

In peacetime, arguments about legitimacy and burden-sharing have tended to be overshadowed by an employment-based fairness argument. The antidiscrimination movement that began in the 1960s specifically made equal access to "good" jobs a major goal. The 1964 Civil Rights Act required U.S. Government agencies to redress the underrepresentation of women and racial and ethnic minorities in their workforces, and the Civil Service Reform Act of 1978 set a goal of representational parity for all occupations and pay levels [4].

Meanwhile, until recently, adherence to traditional gender roles excluded gender from military discussions about population representation based on fairness, legitimacy, or access. Female representation in the military was limited to 2 percent until the Vietnam War, and increasing it was not seriously considered until the draft ended in 1973, motivated in part by concerns about recruiting enough male volunteers [5]. Subsequent statute repeal and policy change opened many Navy jobs, especially in warfare specialties, to women in 1995.[6]

Federal directives now stress keeping discrimination out of federal workplaces and assuring equal opportunities for all the employees within them [7]. Representation is an important tool in measuring these goals. For instance, the absence of, say, a representative proportion of Hispanic lawyers in an agency might result from recruiting at law schools that do not have many Hispanic students. Note that this kind of analysis measures representation against an appropriate pool, as we do in comparing the BUMED workforce against the civilian medical labor force. Meanwhile, demographic trends continue to diversify the civilian labor force, particularly among the ages that the military targets for recruitment. Thus, the increasing diversity of the recruiting pool provides added support for increasing representation.

6. Some Navy assignments are still barred to women. For example, women do not serve on submarines.

## Business case arguments

In addition to the Navy's overarching diversity goal, there is a fairly well established business case for having a medical workforce be representative of a patient pool. This case has been developed in part to support initiatives toward meeting a perceived need for population representation among health care providers. In particular, recent Supreme Court decisions on the use of demographic benchmarks for school enrollments called into question programs that have been undertaken to affirmatively increase the number of minorities in health professions. Consequently, the U.S. Health Resources and Services Administration (HRSA) has sought evidence as to whether demographic diversity among health professionals makes a real difference for health care in an increasingly diverse population [2].

Specifically, HRSA sought evidence that achieving demographic representation among health professionals will lead to improved health outcomes, according to four separate hypotheses:

1. *The service patterns hypothesis:* that demographically diverse health professionals are more likely to serve racial and ethnic minority and socioeconomically disadvantaged populations, thereby improving their access to care and, in turn, their health outcomes
2. *The concordance hypothesis:* that demographic similarities between patients and practitioners will improve the quality of their relationships, thereby increasing vulnerable populations' use of health care and, in turn, their health outcomes
3. *The trust-in-health-care hypothesis:* that greater demographic diversity in the health care workforce will increase vulnerable populations' trust in the health care delivery system, and thereby increase their propensity to use services that lead to improved health outcomes
4. *The professional advocacy hypothesis:* that demographically diverse health professionals will be more likely to provide leadership and advocacy for policies and programs aimed at improving health care for vulnerable populations, thereby increasing

health care access and quality and, ultimately, health outcomes for those populations.

The HRSA-supported researchers found and reviewed publicly available empirical studies for the first three hypotheses, but not the fourth. This evidence supported the first two hypotheses, and was inconclusive regarding the third one. Thus, it supported the general notion that improved health professional representation may lead to improved public health, primarily through greater access to care for underserved populations and better interactions between patients and health professionals.

The investigation of the second hypothesis—concordance—is directly relevant to BUMED's pursuit of diversity. In particular, the evidence that increased use of same-race/ethnicity physicians is based in part on preference is telling. Indeed, the majority of the studies assessed found that race concordance was associated with better interpersonal care, as reported by the patient. There seemed to be some support for the effect of concordance on more objective criteria as well. For instance, a study of quality of care for patients with human immunodeficiency virus (HIV) infection in a large national cohort found that white patients received protease inhibitors earlier than African-Americans but that, among patients with race concordant providers, this disparity was eliminated.

Another relevant study [2] audiotaped doctor-patient encounters to analyze the quality of communication. This study found that race concordance was associated with longer visits and measurably better communication. It also found greater patient satisfaction with the visit.

> Notably, however, the authors found that the differences in communication and the differences in patients' ratings of the visit were independent of each other; i.e., accounting for the differences in communication did not explain any of the differences in patients' ratings of their doctors. This finding is important in that it illustrates that race concordance is associated not only with better communication but also with other unmeasured aspects of the doctor-patient encounter that give rise to higher patient ratings of health care quality.

Thus, while communication training for health professionals might improve the quality of care for minority patients, it would be "unlikely to serve as a substitute for increasing the number of minority health professionals, which would increase minority patients' ability to see race concordant providers if they choose to" [2, p. 13].

Finally, the HRSA study found some evidence that race concordance improves health outcomes, especially mental health outcomes. Although most of the studies reviewed dealt with conditions that are less likely to occur among people serving in the military, their suggestion that race concordance is helpful should not be dismissed. For instance, these conditions had a common denominator of personal sensitivity, such as substance abuse or a disfiguring skin condition. It may well be that race concordance improves health outcomes by providing an increased comfort level with regard to interpersonal aspects of care, which can be determining in delicate circumstances.

The business case findings suggest that, in addition to addressing the general concerns about the mismatch between the demographics of Navy personnel and the U.S. population, meeting representation goals may help meet broad BUMED goals regarding the quality of health care within the Service. Specifically, achieving a demographic concordance between the Navy's medical providers and its patient pool may improve the frequency of seeking medical care. It may also improve the quality of provider/patient communication, thus making access more productive in health terms. And, by increasing demographic representation among medical decision-makers, it could ensure that demographic differences in treatments are fully considered.

## Underlying demographic dynamics

Before we address demographic trends in the civilian health care labor force, we explain how basic demographic dynamics are reshaping the population in important ways. To a certain extent, these dynamics make the relevant recruiting pool different from the population and thus affect initiatives to attain demographic representation in BUMED.

Racial/ethnic diversity has increased in the U.S. population over the past half-century. A few years after the creation of the All-Volunteer Force (AVF), the 1980 census reported that one-fifth of the U.S. population belonged to minority racial and ethnic groups; now one-third do [8, 9]. Every population subgroup grew in size over this quarter-century, white non-Hispanic included, but the minority population grew faster than the majority, partly from higher fertility rates in general and partly from higher levels of immigration. (Note that official population figures contain people who are not citizens, whether they are legal immigrants or illegal aliens.)

Between 1996 and 2006, the white non-Hispanic share of the population declined from 72.4 to 66.7 percent. Over the same period, the Hispanic share rose from 10.8 to 14.7 percent, to become the Nation's largest minority population. The population share of non-Hispanic blacks declined slightly, from 12.5 to 12.1 percent, while the share of non-Hispanic Asians rose from 3.6 to 4.4 percent.[7] "Others," including American Indians and people who reported more than one race, rose from 0.8 to 2.1 percent.[8]

Basic demographic dynamics—fertility, mortality, and immigration—make this diversity most pronounced among young people. As of 2006, fully 42 percent of Americans under age 18 belonged to minorities. In addition to immigration, this skewing of diversity toward the youthful end of the spectrum reflects racial and ethnic differences in births per woman.

In 2005, the U.S. total fertility rate was 2.05 children per woman age 15 to 44, over her lifetime. But decomposing the rate for population subgroups reveals considerable variation. The rate was 1.7 for American Indian women, 1.8 for non-Hispanic whites, 1.9 for Asian Americans ("Asian or Pacific Islander"), and 2.0 for non-Hispanic blacks [10]. In contrast, the Hispanic rate was 2.8—nearly one child more

7. For ease of reading, we use the general term "Asians" to refer to the population that includes both Asians and Pacific Islanders, as the latter is a very small group.

8. We describe the data sources and racial and ethnic origin classifications in the next section.

than the other subgroups. This high Hispanic rate makes U.S. fertility higher than in virtually all other industrialized nations in Europe, North America, and Asia, including China [11].

Meanwhile, the impact of immigration can be seen in the changing size of a given cohort in successive censuses. For instance, the cohort of Americans age 15 to 19 in 1990 had grown by 9 percent when it was measured 10 years later, in 2000. Since the additional numbers come from net migration (immigration minus emigration), and immigration has been heavily minority, the racial and ethnic diversity of the cohort increased over the decade. Specifically, there was little change in the numbers of non-Hispanic whites or blacks in that cohort during the 1990s, but there was considerable change among other groups. The 1990 census counted a little over 2 million Hispanics age 15 to 19, whereas the 2000 census counted 3.4 million Hispanics age 25 to 29. Similar growth took place among Asians, the other large component of immigration.

As a result of these and other demographic dynamics, including ongoing improvements in life expectancy, there is considerable variation in the age composition of population subgroups. In 2005, the average age of the American population was 36. Average ages by subgroup follow [12]:

- Non-Hispanic whites—40
- Hispanics—27
- Non-Hispanic Asians—34.5
- Non-Hispanic blacks—31
- American Indians and Native Hawaiians and other Pacific Islanders—30.

These pronounced age differences mean that the civilian labor force is not fully representative of the population as a whole since minority populations are younger than the majority. However, the labor force is subject to the same dynamics, as more diverse young cohorts successively replace less diverse older cohorts. Between 1996 and 2006, the white non-Hispanic share of the labor force declined from 79.7 to 69.2 percent. Over the same period, the Hispanic share rose from 9.4

to 13.5 percent, the non-Hispanic black share from 10.9 to 11.0 percent, and the share of non-Hispanic Asians from 3.4 to 4.6 percent [9].

Racial and ethnic differences in women's labor force participation also affect the gender composition of the civilian workforce. Overall, women make up a much larger proportion of the civilian labor force than they used to, largely because more of them combine work with raising children. From 1975 to 2005, the labor force participation rate of women with school-age children (6 to 17) rose from 55 to 77 percent [13]. Over the same period, women with preschool-age children increased their labor force participation from 39 to 63 percent.

This change occurred for many reasons. For instance, as the fertility rates show, one- and two-child families have become the norm for non-Hispanic women, compared with the large families of the past. In addition, the proportion of women who do not have children has increased, though the great majority still have children sometime in their lives. However, probably the biggest factor in women's increased labor force presence has been the interaction between women's rising education attainment levels and the costs (both direct and indirect, as in forgoing employment) of raising children. In 1970, only 11 percent of civilian female workers (ages 25 to 64) had completed 4 or more years of college; this share had tripled by 2005 [13]. (Note that, because of the longer time now spent to attain a diploma, starting in 1992 this measure shifted from number of years in college to the highest degree achieved.)

With this understanding of the basic trends that are diversifying both the population and the broad labor force, we turn to describing how the demographic portrait of Navy-relevant medical occupational groups changed between 1996 and 2006. We also signal important trends that may continue to transform these groups.

# Representation and demographic dynamics

In this section, we document and discuss trends in the U.S. "Navy-relevant health labor force," by race and gender, informed by projections as relevant and available. We focus on trends that are relevant to demographic diversity in the civilian medical communities that parallel BUMED communities, including how they differ from trends in the population as a whole and the college-educated labor force. Our primary interest is in proximate causes for the observed demographic trends among BUMED officers, both as a whole and in the four different corps that encompass the wide array of Navy medical specialties. Our secondary interest is in potential implications for the recruitment and retention of medical personnel. Where appropriate, we also describe relevant underlying societal causes that others have studied.

After providing descriptions of the data, we present current demographic snapshots of naval medical personnel, by BUMED officer corps. Then we discuss the demographic dynamics that underlie trends in general and occupation-specific civilian benchmarks.

## Data sources and definitions

### Civilian data

For a focus on demographic characteristics (e.g., race/ethnicity) by related socioeconomic characteristics (e.g., education attainment), demographers cross-tabulate large national databases where the individual is the unit of interest. The most suitable one for this purpose is the decennial census since, as a complete count of the universe, one can be confident of the accuracy of such tabulations as "the educational attainment of 15- to 19-year-olds by race and ethnic origin."

For this research, data from the 2000 decennial census are out of date. However, a new data source, the American Community Survey (ACS), now gathers the program-related data that the census previously

collected via a "long" form sent to about one-fifth of U.S. households, rather than the "short" form sent to all other households.[9] This survey is designed to replace the decennial long form data collection; it is essentially a large "rolling" census that cumulates program-related data over 5 years that are equivalent to what the census collected once every 10 years. We use this data source to develop various snapshots of the U.S. population, labor force, and health care occupations. Because it is a rolling snapshot, we combine data for 3 years—2003 to 2005—to yield a sample that is large enough to draw a demographic profile of specific health care occupations.

Since the ACS is new, we cannot use it to analyze trends. We do this using data from the 1996 and 2006 Current Population Survey (CPS), a sample survey of 60,000 households conducted monthly by the Census Bureau for the Department of Labor to measure employment, unemployment, and labor force participation. Each March, the survey gathers detailed demographic information about its respondents. Since the information is limited to that which is needed for analyzing the U.S. labor force, we supplement it where necessary with data from other sources. However, those sources tend to be counts (such as institutional records of enrollment), rather than microdata, and thus are not subject to cross-tabulation.

For both purposes, snapshot and trend, we compare Navy-relevant medical occupations (NRMOs) with suitable civilian benchmarks: population, civilian labor force, and the college-educated civilian labor force. Our benchmark analyses focus overall and separately on four officer groups (Medical, Dental, Nurse, and Medical Services Corps), not on Navy Medicine's enlisted personnel—hence, our use of the college-educated civilian labor force as a benchmark. Many civilian nurses lack Bachelor's degrees, but such a degree is required of Navy officers; thus, the civilian equivalent of the Nurse Corps would not be an appropriate benchmark for the Navy Nurse Corps.

9. The Office of Management and Budget regularly reviews the geographically detailed data that federal agencies need to carry out their programs. These census types of data are required for programs that are targeted at specific places, such as aid to public schools that have large concentrations of immigrant children.

Since the Navy does not use the same occupational classifications as the civilian databases, we developed a cross-walk between Navy medical subspecialties and civilian occupations. (See the appendix.) This enabled us to develop tabulations of NRMOs for both snapshots and trends. For some occupations, however, there were too few CPS participants of particular racial / ethnic minority groups to be able to analyze trends in race / ethnicity. For example, the 2000 census found only around 5,000 black dentists, so it was not surprising that a survey of 60,000 households did not happen to include any.[10] Where samples were too small to yield reliable estimates, we limit our discussion.

Due to the small size of the sample of individual health care occupations in both data sets, we adopted the following classifications to maximize our ability to analyze occupational trends by race and ethnic origin: *Hispanic* refers to any survey respondent who indicated Hispanic ethnicity, regardless of race; *white, non-Hispanic* refers to non-Hispanic, white only; *black, non-Hispanic* refers to non-Hispanic, black only; and *Asian/Pacific Islander, non-Hispanic* refers to non-Hispanic, Asian / Pacific Islander only (for simplicity, we often refer to this group as *Asian).* This leaves a residual group of *other/unknown*—non-Hispanics of any race not included above (such as American Indians), non-Hispanics of multiple race, and unknowns. Because this latter group is too small to analyze for health care occupations, it is omitted from the subsequent analysis.

The small sample size also precludes tabulating occupations simultaneously by gender and race and Hispanic origin. This would be useful because an increase in racial and ethnic diversity in some occupations may be largely due to more women from a particular subgroup.

## Navy data

We drew on several Navy data sources to create demographic snapshots of various Navy populations. Records from the Enlisted and

10. The United States had 114 million households in 2006, and over 302 million people, so we view CPS estimates of fewer than 75,000 in any particular group, such as a particular minority group in a particular medical specialty, as not reliable.

Officer Master Files (EMF and OMF) were used to create an all-Navy profile. For a snapshot of the potential patient pool for Navy care providers, we used data from the M2 to create demographic profiles of enrollees at Navy Medical Treatment Facilities (MTFs). Finally, for our detailed looks at officers in Navy Medicine, we merged data from the OMF with data from BUMED's Manpower Information System (BUMIS).

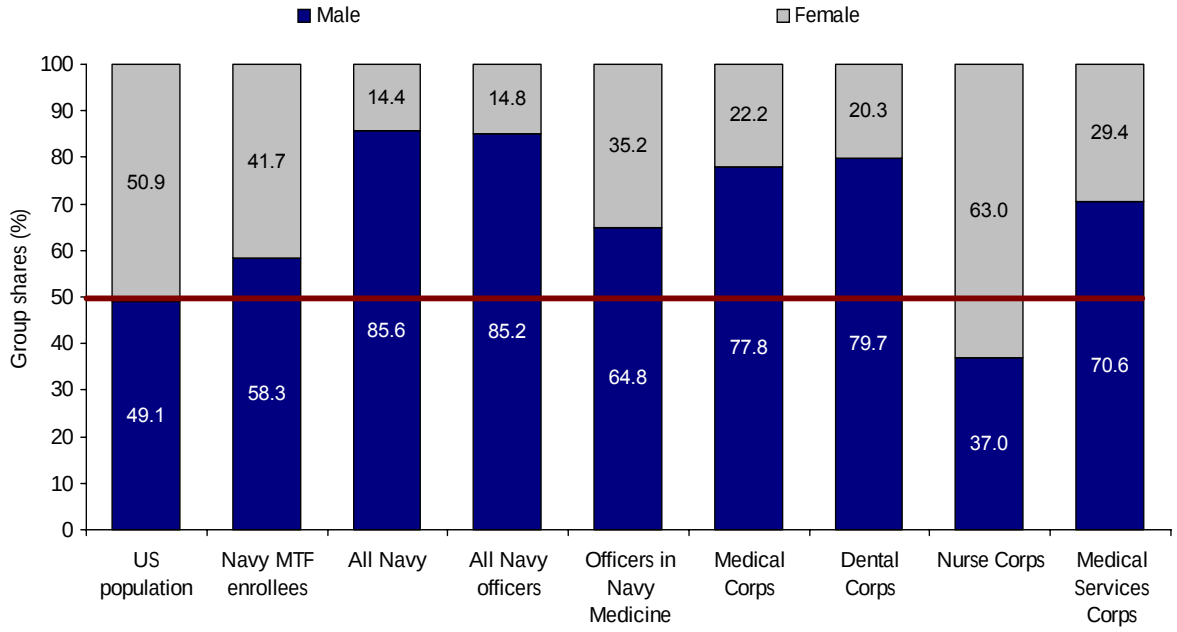
## Current representation, by BUMED officer corps

This subsection discusses the extent to which Navy Medicine's officer corps are currently representative of the U.S. population and the Navy's patient pool (i.e., Navy MTF enrollees). Overall, the data show that the Navy is not meeting either its broad goal of population representation or the more narrow business case goal of patient population representation.

Figure 2 shows that officers in Navy Medicine are significantly more female than all Navy officers or the Navy as a whole. However, they are not representative of either the U.S. population or the potential patient pool. Little more than a third of officers in Navy Medicine are female, compared with half the U.S. population and 42 percent of Navy MTF enrollees. Relative to both benchmarks, the Medical Corps, the Dental Corps, and the Medical Services Corps are all more representative in terms of gender than Navy officers as a whole. In contrast, women are overrepresented in the traditionally female Nurse Corps.

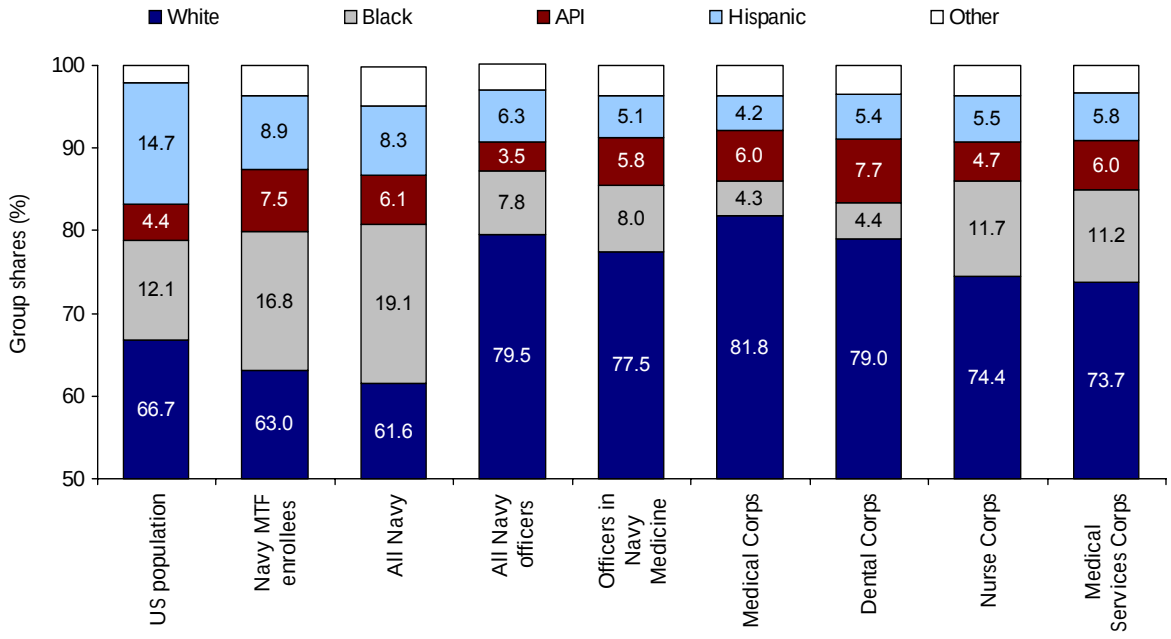
Figure 3 shows that the racial/ethnic profiles of the two benchmarks are different, relative to the U.S. population. Non-Hispanic blacks and Asians are overrepresented among Navy MTF enrollees, and Hispanics are underrepresented. (As we describe elsewhere in this paper, the Nation's Hispanic population is least likely to meet the education and citizenship requirements for joining the Navy.) Therefore, officers in Navy Medicine are disproportionately non-Hispanic white and Asian compared with the population, but only disproportionately non-Hispanic white when compared with the potential patient pool. Relative to the patient pool, non-Hispanic blacks are especially underrepresented in the Navy Medicine communities.

Figure 2. 2005 gender profiles: Navy Medicine vs. U.S. population/Navy benchmarks[a]




a. Sources: U.S. population from ACS, 2003-05 average; all Navy from EMF and OMF; enrollees at Navy MTFs from the M2; Navy Medicine personnel from OMF data merged with data from BUMIS.

Figure 3. 2005 racial/ethnic profiles: Navy Medicine vs. U.S. population/Navy benchmarks[a]




a. Sources: U.S. population from ACS, 2003-05 average; all Navy from EMF and OMF; enrollees at Navy MTFs from the M2; Navy Medicine personnel from OMF data merged with data from BUMIS.

Representation of racial/ethnic subgroups varies by component corps, reflecting the underrepresentation of non-Hispanic blacks and Hispanics in education attainment that we discuss later. The Medical Corps and Dental Corps are most disproportionately non-Hispanic white relative to both the U.S. population and MTF enrollees. Representation of non-Hispanic blacks and Hispanics is also lowest in these two corps. Population overrepresentation of Asians in the Medical Corps and Dental Corps brings the Asian share of both corps closer to the patient share. In contrast, the Nurse Corps and Medical Services Corps approach population representation for non-Hispanic blacks but not for Hispanics. Neither of these corps, however, is representative of the Navy's patient pool.

These representation profiles are as much, if not more, a product of civilian trends as they are of Navy recruiting and retention. In the following subsection, we trace the demographic dynamics that underlie the civilian part of the representation ratios.

## Demographic trends in the population, the labor force, and Navy-relevant medical occupations

### Overview

The increasing racial and ethnic diversity of the population makes achieving population representation among Navy medical professionals a moving target. The target moves all the more because, as we described in the introduction, demographic diversity varies across age groups. So does education, particularly for health care occupations, which typically require a professional degree. Thus, civilians working in Navy-relevant medical occupations are not representative of the population as a whole. Hence, understanding how the interplay among trends in these characteristics affects the pipelines for and supplies of potential recruits is key to making effective diversity policy, whether the goal is to be representative of the overall population or the quite different recruiting population.

We can see these trends at work by comparing the demographics of the population with the demographics of the college-educated labor

force, first for the all-age labor force (table 1) and then for the more relevant subset that is age 35 and under (table 2). We first review trends in all NRMOs in this context; subsequently, we address demographic trends in the four corps and how they differ from trends in the overall NRMOs, as well as the population and the college-educated labor force.

Table 1. Civilian benchmarks for NRMOs, all ages, 1996 and 2006[a]

| | | Non-Hispanic | | | | | |
|---|---|---|---|---|---|---|---|
| Benchmark | Total | White | Black | A/PI | Hispanic | Men | Women |
| | | | **1996** | | | | |
| Total population | 100.0 | 72.4 | 12.5 | 3.6 | 10.8 | 48.9 | 51.1 |
| CELF[b] | 100.0 | 83.7 | 6.5 | 5.9 | 3.6 | 55.2 | 44.8 |
| NRMOs[c] | 100.0 | 82.4 | 6.2 | 8.0 | 3.0 | 41.1 | 58.9 |
| | | | **2006** | | | | |
| Total population | 100.0 | 66.7 | 12.1 | 4.4 | 14.7 | 49.1 | 50.9 |
| CELF[b] | 100.0 | 77.6 | 7.7 | 8.0 | 5.6 | 52.6 | 47.4 |
| NRMOs[c] | 100.0 | 74.5 | 8.1 | 11.3 | 5.0 | 36.8 | 63.2 |

a. Source: [9].
b. The college-educated labor force (CELF) is the total labor force that has attained a B.A. or higher level of education. Labor force is defined as the "experienced" labor force; that is, it includes both employed and unemployed.
c. Navy-relevant medical occupations (NRMOs) are civilian medical occupations that can be matched to Navy occupations.

First we address the all-age college-educated labor force (CELF). Between 1996 and 2006, the CELF became more demographically diverse: each minority group accounted for a larger share, as did women. As table 1 shows, Asians joined non-Hispanic whites in having a presence in the college-educated labor force that exceeded their presence in the population as a whole. Other minority groups were less well represented among the college educated, but the shortfall diminished over the decade. As a result, the majority population continued to be overrepresented, but to a lesser extent.

Focusing more tightly, the most relevant trends for this research are the trends among NRMOs. As we described earlier, the portrait for each year does not have the clarity one would like since the survey sample, although representative of the population as a whole, is small for specific occupations. However, since this research focuses on

trends over time, comparing fuzzy snapshots taken a decade apart still yields useful information. In 2006, white non-Hispanics accounted for 75 percent of civilian workers in NRMOs, down from 82 percent in 1996. All minority groups have an increased share of such workers.

The share of women in NRMOs increased as well, exceeding 60 percent in 2006. Holding the Navy to this benchmark, however, would miss an important difference in the relative composition of civilian and Navy medical populations. That is, doctors and dentists account for nearly half of the Navy's health care professionals, compared with less than a fifth of the civilian counterpart. In a mirror image, over half of civilian NRMOs are in occupations found in the Navy's Medical Service Corps, compared with less than a quarter of Navy medical professionals. Thus, as a group, civilian NRMOs are disproportionately female compared with the Navy; put another way, the Navy's occupational composition is disproportionately male, according to the occupational portraits we describe next. Nevertheless, a shift toward more women characterizes virtually all NRMOs, as well as the group as a whole.

The CELF and the NRMO civilian benchmarks are less demographically diverse than the population as a whole but more diverse than they were a decade ago. An important reason for this is the role of demographic dynamics in diversifying the population. We have described how these dynamics make the population increasingly diverse at younger ages. We now constrain this analysis to the labor force age 35 and under, from which the Navy is most likely to recruit.[11] Table 2 shows the same demographic trends as table 1, but for the younger members of each civilian labor force of interest. Limiting the comparisons to the younger labor force reveals essentially the same patterns as the all-age population comparison, but they are more pronounced for civilian workers in NRMOs.

In this younger labor force, racial and ethnic minorities increased their share of NRMOs by fully 10 percentage points between 1996 and 2006—a considerable movement of this diversity benchmark from 20 to 30 percentage points. At the same time, women increased their

11. We use the "experienced" labor force as a civilian benchmark: this includes both employed and unemployed.

share by 5 percentage points, accounting for 70 percent of these workers in 2006. This suggests that health care occupations are becoming increasingly feminized, as younger women take advantage of a broader array of opportunities than previous generations had.

Constraining the benchmarks to the labor force age 35 and under (table 2) highlights a continued shortfall of most minorities in NRMOs, as well as the large overshoot by Asians. Although all minority groups increased their share of NRMOs over the decade, they increased their presence in the college-educated labor force as well. In particular, the Hispanic share of that labor force under age 35 grew by almost 50 percent. In contrast, the black non-Hispanic share of that labor force grew only slightly, compared with a much larger increase in the black share of NRMOs. These representation trends are influenced by related trends in immigration and education, to which we now turn.

Table 2. Civilian benchmarks for NRMOs, ages 35 and under, 1996 and 2006[a]

| | | Non-Hispanic | | | | | |
|---|---|---|---|---|---|---|---|
| Benchmark | Total | White | Black | A/PI | Hispanic | Men | Women |
| | | | **1996** | | | | |
| Total population | 100.0 | 71.4 | 12.0 | 3.7 | 12.2 | 54.3 | 45.7 |
| CELF[b] | 100.0 | 81.5 | 6.6 | 6.8 | 4.9 | 50.6 | 49.4 |
| NRMOs[c] | 100.0 | 79.8 | 6.5 | 9.3 | 4.1 | 35.4 | 64.6 |
| | | | **2006** | | | | |
| Total population | 100.0 | 62.9 | 12.2 | 4.6 | 18.2 | 54.7 | 45.3 |
| CELF[b] | 100.0 | 72.5 | 8.7 | 10.1 | 7.3 | 47.7 | 52.3 |
| NRMOs[c] | 100.0 | 69.2 | 8.5 | 13.6 | 6.8 | 30.3 | 69.7 |

a. Source: [9].
b. The college-educated labor force is the total labor force that has attained a B.A. or higher level of education. Labor force is defined here as the "experienced" labor force; that is, it includes both employed and unemployed.
c. Navy-relevant medical occupations are civilian medical occupations that can be matched to Navy occupations.

## Underlying trends

### Immigration

Although each minority subgroup accounted for a greater share of NRMOs age 35 and under in 2006 than in 1996, Asians had the largest

increase in share, followed by Hispanics. Obviously, immigration contributed to this relative shift, and that raises the question of noncitizens in assessing the relevant civilian recruiting pool. However, identifying noncitizens among the population age 35 and under, by race and ethnic origin, for a small set of occupations is not possible with this data set, so we limit this discussion to the broad civilian labor force at all ages.

Noncitizens made up nearly 10 percent of the total civilian labor force in 2006, compared with 7 percent in 1996. However, they made up a smaller share of NRMOs—7.2 percent, only slightly higher than the 6.3 percent they accounted for in 1996. Over half of the noncitizens in this occupationally restricted group were Asians, a quarter were non-Hispanic white, and an eighth were Hispanic. Over the decade, noncitizen Asians in these occupations grew by an estimated 60,000, and the number of Hispanics grew by an estimated 30,000. These substantial numbers may complicate recruiting to meet representation goals.

**Education**

Since poorly educated youth are less likely to be in the formal labor force at all, much less to be employed in the occupations from which BUMED recruits, the usual population and labor force benchmarks are too general for this discussion, given the differential education patterns of the Nation's minority groups. The 35 and younger CELF is a more realistic benchmark because it reflects both the increasing demographic diversity of young adults, due to population change, and their demographically different education and participation patterns.

In 2006, the white non-Hispanic share of this labor force was 9 percentage points lower than it was a decade earlier (see table 2). All minority groups increased their share of this workforce over the decade. In addition, women increased their share by more than 2 percentage points, and now account for over half of this labor force.

Since a college degree is a basic requirement for health care professionals, as well as for Navy officers, these trends suggest that demographic representation in these occupations for Hispanics and also non-Hispanic blacks can be viewed either as a glass half full or a glass half empty. Considerable progress has been made, but these two population subgroups still lag full representation, due in part to multiple

education-related bottlenecks. The Council on Graduate Medical Education (COGME) is one of many organizations that have investigated the relative scarcity of these minority populations in medicine, concluding that "the greatest barrier to URM [underrepresented minorities] admission to medical school is the low applicant pool of URM college graduates resulting from high attrition rates in high school and low enrollments in college" [14]. COGME finds a general consensus that barriers to education for these minority groups, who are disproportionately poor, begin at early ages and worsen as education progresses. At the college level, which individuals and their families have to finance, people who must earn or borrow to gain the requisite funds are discouraged. Ultimately, an occupation such as medicine that requires several years of expensive postgraduate studies becomes less attractive than less costly alternatives.

Studying education patterns that predict successful entry into medical school, Cooper [15[12]] observes little difference by race among those who follow this traditional pattern: "…college enrollment soon after high school rather than many years later, entry into four-year colleges rather than two-year colleges, attendance full-time rather than part-time, continual rather than intermittent enrollment, and persistence through the four-year college curriculum" (p. 870). (Presumably this pattern applies to success in qualifying for other medical specialties that require postgraduate degrees.) This similarity suggests a strong family income bias in terms of education choices since this pattern occurs at upper income levels for all races, as found in Department of Education longitudinal studies cited by Cooper.[13] A smaller share of blacks and Hispanics come from upper income

12. Cooper's analysis is based on data from the Department of Education's National Center for Educational Statistics (NCES), the Census Bureau, and the Association of American Medical Colleges (AAMC) [15, p. 2].

13. By following the same people over many years, longitudinal surveys enable researchers to distinguish the relative impact of different factors. In addition to family income, other predictors of successful education trajectories are whether English is spoken in the home, the level of the parents' education, and whether the household contains one or two parents. All of these characteristics vary for minority race and ethnic populations.

families, and blacks and Hispanics are less likely to follow this education trajectory.

In contrast, Asians are more likely to follow this successful trajectory even at lower levels of family income. Parental levels of education, and parental expectations in particular, are usually cited to explain this difference. Per capita, the percentage of Asian women who obtain Bachelor's degrees is a third higher than it is for white women; the rate for Asian men is half again as high as for white men [15].

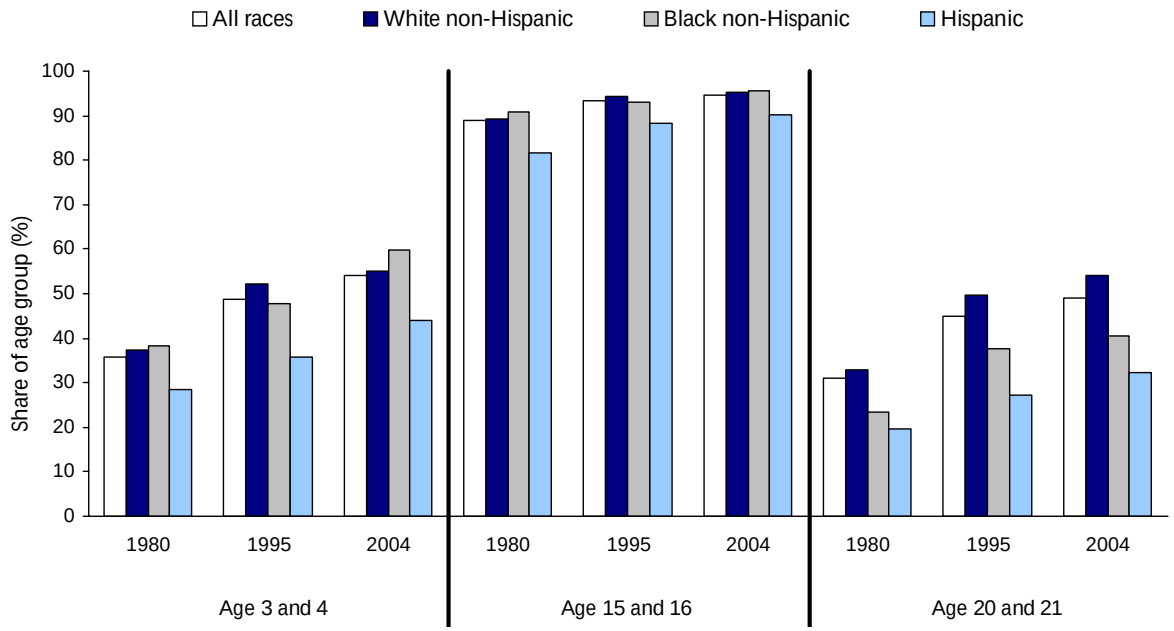
It is easier to think of strategies to address the financial barriers to attaining higher education, as a way to increase minority representation, than to retrospectively change parenting. Such strategies can encompass ways to rectify income deficits, such as assistance with tuition and living expenses, for those otherwise capable of following the traditional track. And they can address minority deficits in meeting standardized test criteria, from the secondary to the postgraduate level, by promoting or assisting nontraditional methods of achieving the same end.

Figure 4 shows the evolution of enrollment for key school-age populations over the past quarter-century for Hispanics and non-Hispanic blacks, compared with non-Hispanic whites. (Note that "where enrolled" is not specified, such as high school or college level, since our interest here is in demographic differences in simple participation rather than the pattern of participation.) Although enrollment rates have risen for all population subgroups, differences by race and ethnicity persist. At ages 15 and 16, generally high school ages, enrollment rates continue to be similar for blacks and whites but lower for Hispanics. At ages 20 and 21, when people tend to be in college, blacks continue to be less likely than whites to be enrolled, and Hispanics continue to lag blacks. In short, despite higher enrollment rates at both high school and college ages for blacks and Hispanics in 2006, compared with 1996, similar increases for whites mean that the demographic pattern of the pipeline did not change.

We next narrow our focus to full-time enrollment, reasoning that its association with entry into medical school may extend to other medical specialties. Table 3 presents 1996 and 2006 full-time enrollment snapshots for civilian youth ages 15 to 19 and 20 to 24, highlighting

enrollment at the level that is the norm for those ages—in high school for the younger group, and in college for the older one.[14]

Figure 4. Percentage of age group enrolled by race and ethnic origin, selected years[a]




a. Source: U.S. Department of Education, "Digest of Education Statistics," 2005, Table 6, based on unpublished tabulations of the 2005 Current Population Survey.

Full-time enrollment increased between 1996 and 2006 for almost all demographic groups. However, Hispanic males are least likely, and Asian women are most likely, to be enrolled in high school full-time at ages 15 to 19. Asian women are most likely to be full-time college students at ages 20 to 24; Hispanic men are least likely. In each racial/ethnic group, women are more likely than men to be full-time college students. Indeed, according to this data set, the proportions of non-Hispanic black and Hispanic men ages 20 to 24 who were enrolled full-time in college declined slightly over the last decade.

14. That is, some in the younger group will have started college, and many in the older one will have finished it and gone on to other pursuits rather than pursuing the additional education usually required for professional health care occupations.

Table 3. Full-time (FT) school enrollment by age, sex, and race/ethnicity, 1996 and 2006[a]

| | Total | White non-Hispanic | Black non-Hispanic | A/PI non-Hispanic | Hispanic |
|---|---|---|---|---|---|
| **Both sexes** | | | | | |
| Age 15 to 19 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| High school FT 1996 | 47.9 | 47.9 | 50.1 | 52.9 | 44.4 |
| High school FT 2006 | 50.8 | 51.6 | 50.0 | 52.1 | 48.1 |
| Age 20 to 24 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| College FT 1996 | 25.7 | 27.7 | 23.4 | 42.5 | 13.7 |
| College FT 2006 | 29.0 | 33.0 | 25.3 | 45.6 | 14.3 |
| **Men** | | | | | |
| Age 15 to 19 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| High school FT 1996 | 50.0 | 49.9 | 52.5 | 60.5 | 45.1 |
| High school FT 2006 | 51.9 | 52.9 | 52.2 | 51.7 | 47.5 |
| Age 20 to 24 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| College FT 1996 | 25.1 | 27.3 | 22.4 | 40.8 | 13.7 |
| College FT 2006 | 27.0 | 31.7 | 21.7 | 43.0 | 12.1 |
| **Women** | | | | | |
| Age 15 to 19 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| High school FT 1996 | 45.7 | 45.7 | 47.7 | 45.8 | 43.7 |
| High school FT 2006 | 49.7 | 50.1 | 47.9 | 52.5 | 48.7 |
| Age 20 to 24 years | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| College FT 1996 | 26.2 | 28.2 | 24.3 | 44.1 | 13.7 |
| College FT 2006 | 30.9 | 34.2 | 28.7 | 48.3 | 16.7 |

a. Source: [9].

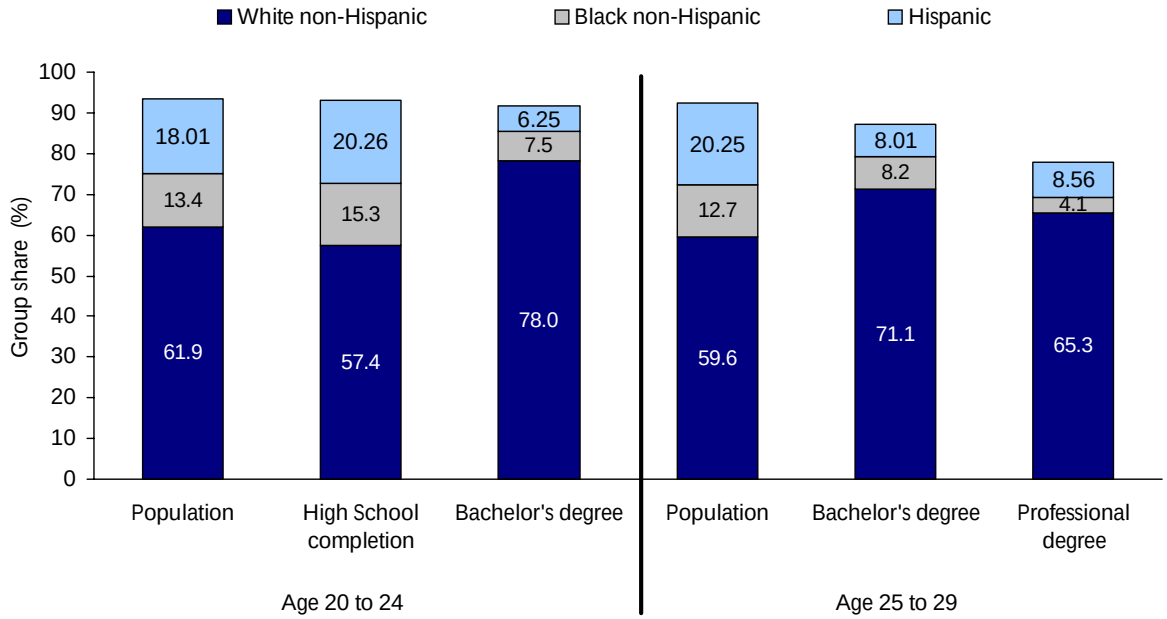
Since many enrollees do not complete their education programs, we examine demographic differences in education attainment. Figures 5 and 6 show the highest level of education attained by Americans in two different age groups in 2005—ages 20 to 24 and 25 to 29.

Figure 5 shows that blacks and Hispanics in their early twenties were disproportionately (compared with their population benchmark) likely to report high school completion as their highest education attainment in 2005, while whites were disproportionately likely to report a Bachelor's degree.[15] Although a slightly higher proportion of Hispanics (and the same proportion of blacks) in their late

15. There were too few Asians in this sample to publish results.

twenties that year reported that a Bachelor's degree was their highest education attainment, their population benchmark had also increased by the same number of percentage points. Meanwhile, the proportion of whites who reported that a Bachelor's degree was their highest level of education declined, reflecting their greater enrollment in graduate and professional education.

Figure 5. Highest level of education attained by the U.S. population ages 20-24 and 25-29, by race and Hispanic origin, 2005[a, b]



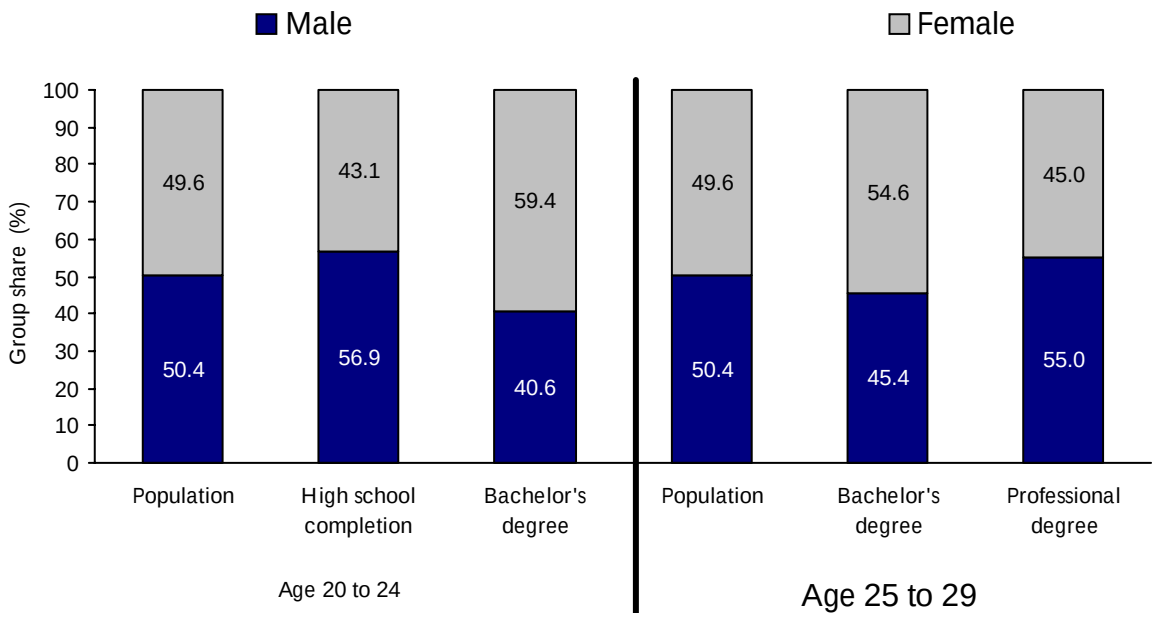

a. Source: U.S. Department of Education, "Digest of Education Statistics," 2005, Table 9, based on unpublished tabulations of the 2005 Current Population Survey.
b. Percentages do not add to 100 since the chart excludes non-Hispanic Asians, Pacific Islanders, and Other races.

Both Hispanics and non-Hispanic blacks make up a little ground in their later twenties, perhaps reflecting greater efforts, whether financial or other, to acquire the resources necessary to attain a diploma. (See [16] for a comprehensive comparison by gender and race/Hispanic origin for an array of factors related to gaining the qualifications for medical school.)

Turning to gender differences, figure 6 shows that men are decidedly more likely than women in their early twenties to report that their

education stopped with high school completion. This difference moderates for those age 25 to 29, though men are still less likely than women that age to report that a Bachelor's degree marked their highest level of education attained.[16]

Figure 6. Highest level of education attained by the U.S. population ages 20-24 and 25-29, by gender, 2005[a]




a. Source: U.S. Department of Education, "Digest of Education Statistics," 2005, Table 9, based on unpublished tabulations of the 2005 Current Population Survey.

Demographic differences in enrollment and completion have obvious implications for the demographic composition of student bodies, especially for advanced degrees. In 2005, a record high 28 percent of the population age 25 and older had at least a Bachelor's degree [17].[17] However, the immigration of large numbers of Hispanics and lesser numbers of Asians affects the racial/ethnic snapshot of the

16. Similar numbers of both men and women in this age group reported attainment beyond the Bachelor's degree.

17. This level was first attained in 2004, and continued in 2006.

college-educated population, particularly the age group of 25 to 29, which accounts for the majority of the Navy's new medical, and particularly dental, officers.

Table 4 shows that the number of Hispanics age 25 to 29 who hold advanced degrees almost doubled over the past decade. However, this improvement in no way kept pace with the increase in Hispanics' share of the population that age. To simplify, the influx of Hispanic immigrants, seen in the swelling of that age group over its size a decade earlier (4,087,734 Hispanics age 25 to 29 in 2006, compared with 2,433,250 age 15 to 19 in 1996), vastly increased the numbers of Hispanics without a college education. In contrast, the Asian population this age also grew by immigration (1,132,869 Asians age 25 to 29 in 2006, compared with 701,652 age 15 to 19 in 1996), but, for this group, the bulk of the population growth took place among degree holders, whether immigrant or native born.

**Workplace**

Two workplace trends cause concern to civilian employers in many NRMOs and may affect the Navy's success in achieving demographic representation. Both are related to changes in the overall supply of health care personnel.

First, since most of these professions are increasingly female, the greater tendency of women to work part-time and/or part-year is a cause of concern for some key medical occupations, such as physicians, because it reduces the number of work hours of a given number of workers. However, according to our tabulations of the Current Population Survey, NRMOs as a whole are experiencing no marked trend toward proportionately fewer full-time workers. Women increased their presence in these occupations by 4 percentage points between 1996 and 2006. In both years, women in these occupations were far more likely to work full-time than were women in the labor force as a whole—10 percentage points more likely in 1996 and 7 percentage points more likely in 2006. However, in both years, nearly 80 percent of women in Navy-relevant occupations worked full-time, so the shift of more women into these jobs made little difference.

Table 4. Racial and ethnic distribution of the college-educated civilian population, ages 25 to 29, 1996 and 2006[a]

| | Table total | White non-Hispanic | Black non-Hispanic | A/PI non-Hispanic | Hispanic |
|---|---|---|---|---|---|
| | | | **1996** | | |
| Total ages 25–29 | | | | | |
| Number | 19,461,519 | 13,306,801 | 2,544,536 | 875,314 | 2,611,672 |
| Percentage | 100% | 68% | 13% | 4% | 13% |
| Bachelor's degree | | | | | |
| Number | 4,317,745 | 3,450,416 | 325,602 | 306,858 | 229,202 |
| Percentage | 100% | 80% | 8% | 7% | 5% |
| Advanced degree | | | | | |
| Number | 92,655 | 751,780 | 46,234 | 129,683 | 32,801 |
| Percentage | 100% | 78% | 5% | 13% | 3% |
| Total college educated | | | | | |
| Number | 5,280,400 | 4,202,196 | 371,836 | 436,541 | 262,003 |
| Percentage | 100% | 80% | 7% | 8% | 5% |
| | | | **2006** | | |
| Total ages 25–29 | | | | | |
| Number | 20,137,799 | 11,976,321 | 2,563,611 | 1,132,869 | 4,087,734 |
| Percentage | 100% | 59% | 13% | 6% | 20% |
| Bachelor's degree | | | | | |
| Number | 4,429,475 | 3,207,873 | 397,505 | 446,975 | 326,303 |
| Percentage | 100% | 72% | 9% | 10% | 7% |
| Advanced degree | | | | | |
| Number | 1,289,556 | 901,370 | 82,321 | 226,064 | 61,162 |
| Percentage | 100% | 70% | 6% | 18% | 5% |
| Total college educated | | | | | |
| Number | 5,719,031 | 4,109,243 | 479,826 | 673,039 | 387,465 |
| Percentage | 100% | 72% | 8% | 12% | 7% |

a. Source: Current Population Survey, March 1996 and 2006. Percentages do not total 100 because small population groups are omitted.

A related concern is the impact of aging on many of these occupations since older male doctors, and dentists in particular, have been likely to cut back their work hours as they near the ends of their careers. Between 1996 and 2006, there was a very slight increase in part-time work among men working in NRMOs. As we will discuss later, demographic trends that result in more part-time workers can

contribute to shortages in particular occupations. Such shortages would inevitably affect Navy Medicine.

Second, trends in civilian income may affect the relative attractiveness of military service relative to civilian employment. It is difficult to assess income trends for NRMOs because civilian health care is undergoing intensive efforts to control costs. In addition, recent history shows that, for one reason or another, incomes tend to decline or grow more slowly when occupations shift toward a more female composition. The causal relations are not clear—whether, for example, women do a poorer job of bargaining with employers, or whether a field becomes feminized because men who seek high-earning occupations begin to find other fields more promising. Answering such questions is beyond the scope of this paper.

There are data problems in making demographically based income comparisons as well. Since questions on income are subject to high rates of no response on federal surveys, the data that are cross-tabulated by demographic characteristics are "top-coded"—meaning they do not reflect very high incomes. This is particularly relevant for high-earning occupations, such as physicians and dentists.

Mindful of these caveats, we observe that annual median earnings (from wages, salaries, and self-employment) in NRMOs increased 15 percent between 1996 (in 2006 dollars) and 2006, compared with a 5-percent increase for the labor force overall and a 3-percent increase for both the college-educated labor force (CELF) and workers in all professional occupations. Thus, it appears that over all Navy-relevant occupations, already high civilian earnings may be outpacing increases in other fields. Civilian earnings for these occupations continue to be higher for men than for women. They also continue to be higher for Asians and lower for Hispanics [9]. Given the aging of workers in NRMOs, these differences may, in part, reflect longer job tenure; again, determining the extent to which this is true is beyond the scope of this paper.

Although these broad demographic patterns are common across the civilian equivalent of BUMED communities, there are important differences by occupation, so we now turn to trends within specific occupational communities.

# Employment trends in specific occupations/Navy health care communities

## Civilian doctors

Navy doctors represent a wide range of medical specialties, all of which are included in a single civilian occupational category, "Physicians and Surgeons," in our civilian tabulations. (See the appendix; we will use the general term *doctors* here.) It is quite likely that the composition of specialties is different in the civilian world. In addition, doctors make up a much smaller share of NRMOs than they do of BUMED officers—only around 15 percent compared with nearly 40 percent. However, the trends that affect representation among civilian doctors are our focus, and, although there may be demographic differences by specialty, the bulk of Navy doctors are in fields that represent the bulk of civilian doctors.

The demographic composition of civilian doctors has changed markedly in 10 years, essentially becoming more Asian. In 1996, fully 10 percent of civilian doctors under 35 were Asian, compared with 7 percent of the CELF that age; by 2006, the Asian share of civilian doctors had risen to nearly 30 percent among workers 35 or younger, compared with 10 percent of the same-age CELF. The share of other minorities also increased, with the result that white non-Hispanics accounted for only 54 percent of youthful civilian doctors in 2006.

In table 5, the 1996 and 2006 CPS samples of blacks and Hispanics are not large enough to produce reliable estimates for a particular year; here, however, we are interested in the trend over time. We show recent findings of the larger American Community Survey (ACS), averaged over 3 years, to solidify the current portrait of demographic diversity. For instance, the CPS comparison suggests that the proportion of blacks increased both among doctors and in the CELF over the last decade, but the ACS average suggests that the level of the CPS estimates may be too high.[18]

18. Both surveys measure people currently in the labor force; thus, these numbers are different from counts kept by professional associations or licensing agencies.

Table 5. Civilian Medical Corps-equivalent labor force, 1996 and 2006[a]

| | Total[b] | White non-Hispanic | Black non-Hispanic | A/PI non-Hispanic | Hispanic | Men | Women |
|---|---|---|---|---|---|---|---|
| **1996** | | | | | | | |
| All ages | | | | | | | |
| CELF | 100.0 | 83.7 | 6.5 | 5.9 | 3.6 | 55.2 | 44.8 |
| Doctors, CPS | 100.0 | 84.0 | 4.4 | 7.4 | 3.6 | 80.0 | 20.0 |
| Age 35 and under | | | | | | | |
| CELF | 100.0 | 81.5 | 6.6 | 6.8 | 4.9 | 50.6 | 49.4 |
| Doctors, CPS | 100.0 | 78.5 | 7.2 | 10.1 | 4.3 | 66.7 | 33.3 |
| **2006** | | | | | | | |
| All ages | | | | | | | |
| CELF | 100.0 | 77.6 | 7.7 | 8.0 | 5.6 | 52.6 | 47.4 |
| Doctors, CPS | 100.0 | 71.1 | 5.5 | 17.3 | 5.8 | 71.2 | 28.8 |
| Doctors, ACS | 100.0 | 71.4 | 4.9 | 17.2 | 5.3 | 70.1 | 29.9 |
| Age 35 and under | | | | | | | |
| CELF | 100.0 | 72.5 | 8.7 | 10.1 | 7.3 | 47.7 | 52.3 |
| Doctors, CPS | 100.0 | 54.2 | 9.8 | 27.5 | 8.3 | 53.5 | 46.5 |
| Doctors, ACS | 100.0 | 61.2 | 6.0 | 25.6 | 5.6 | 56.7 | 43.3 |

a. Sources; March 1996 and 2006 Current Population Survey; American Community Survey, 2003-05 average.
b. Percentages of race and Hispanic origin do not sum to 100 because we do not show the small share of "Others."

The shift to more Asians among civilian doctors contributed to the second notable trend, the rise in women's share of this traditionally male-dominated occupation. In 1996, this trend was visible in the younger labor force: women accounted for one in three civilian doctors in the labor force age 35 and under, compared with only one in five at all ages. Just 10 years later, women accounted for nearly half of young doctors in the labor force, and nearly 30 percent at all ages. Nearly a fourth were Asian—in absolute numbers, over 50,000 of them—compared with around 30,000 for all other minority women combined.

From the Navy's perspective, these two diversifying trends (more Asians and more women among doctors in the civilian labor force) are challenging. First, a relatively large share of Asian doctors in the labor force are not citizens. In 1996, fewer than 10,000 Asian doctors in the labor force were noncitizens; by 2006, however, this number had quadrupled. Indeed, there were 1.5 times as many Asian as

non-Hispanic white doctors among noncitizens in the 2006 labor force, and the number of noncitizen Asian doctors exceeded the number of Asian native-born doctors in the labor force. Overall, the recruiting pool for civilians is less diverse once we take citizenship into account: it has proportionately fewer women and members of all minority races.

Second, among civilian doctors, women are less likely than men to work full-time. In 2006, only 81 percent of female doctors reported working full-time, compared with 94 percent of male doctors. Common sense suggests that women who do not work full-time are unlikely to consider joining the active-duty Navy.

**Pipeline trends**

The number of U.S. medical school matriculants and graduates has been relatively stable for the past quarter-century, but they have become more demographically diverse. Minorities accounted for nearly two in five applicants in 2004, according to the American Association of Medical Schools, with Asians accounting for almost half of them.[19]

Increasing demographic diversity at the entry level has a stock-and-flow effect on the overall physician labor force, given the relative lack of such diversity at the exit, or retirement, level. That is, retirement flows increase demographic representation by withdrawing a disproportionate share of non-Hispanic white males from the workforce. This phenomenon will continue because one in three active male doctors is age 55 or older, compared with one in eight active female doctors [19]. Similar age-based patterns will continue to increase the share of minority physicians, even absent relative increases in their numbers.

19. AAMC also reports that blacks and Hispanics are more likely than whites and Asians to work to secure financing between Bachelor's degree and medical school [18, p. 39], supporting concerns about the impact of proportionately fewer resources available to members of these two minority populations.

Looking ahead, a recent forecast of the demographics of potential medical school applicants modeled the interaction of population and education trends, from primary school through to medical school application [20]. The study's focus was the potential effect of a policy to increase the number of physicians by expanding the capacity of the Nation's medical education, as in the 1960s. The analysis reviewed the various education transitions along the pipeline from elementary school to medical school graduation to estimate the numbers and characteristics of those who emerge at the far end. An important contextual factor is the relatively slow population growth among the Nation's youth, which amplifies the impact of shifts in both population and education choices by demographic subgroups. This makes it advisable to follow the movement in per capita trends as well as the trend in absolute numbers.

Looking at gender patterns, the per capita participation of men at the baccalaureate level has trended downward from a peak in the mid-1990s while remaining steady for women, meaning that population growth continues to increase the absolute numbers of women (but not men) in college.[20] The study also documents a progressive shift from men to women at the postsecondary level over the last quarter-century. For instance, [20] reports a decline since 1985 in the proportion of male college graduates who apply to medical school, and a decline in absolute numbers dating from 1975. The broad downward trend in men seeking professional (including medical) degrees is offset by an increased trend in men getting business degrees, primarily M.B.A.'s. Although women have also increased their presence in business schools, this has come at the expense of seeking degrees in education. But, although women show an increased interest in attending medical school, they are still less likely to apply than men.

Putting all these trends together, [20] projects that the number of men applying to medical school will be no larger in 2020, when the first grade students of the study reach application age, than it is now and that the number of female applicants will increase slowly. As a result, the author projects that in 2020 women will account for 57

20. Women achieved parity with men in total numbers in 1981 [20].

percent of medical school applicants, up from 49 percent in 2000. These projections imply that medicine is moving in the direction of an increasingly female profession in the United States and that, other things equal, this trend increases the Nation's requirements for doctors since female doctors take more time for family responsibilities than male doctors do.

Reference [20]'s parallel investigation of race and ethnicity among medical school applicants highlights the well-known link between barriers in one's early education (including the impact of differential education, involvement, and expectations by parents) and later academic success [15]. Those who successfully navigate the education obstacle course can find that inadequate finances discourage them from acting on an interest in medical school. This is particularly noticeable for blacks and Hispanics, especially boys, but applies to lower income whites as well. Reference [15] also notes the decline in black and Hispanic applications to medical school that followed the removal of affirmative action programs in several states.

Modeling the link between college completion and medical school applications, [20] makes the following projection: By 2020, Asians, who will amount to only one-sixth the combined population share of non-Hispanic blacks and Hispanics, will account for as many medical school applicants as those two groups. Thus, other things equal, the growing share of minorities among the young adult population will have a dampening effect on the pipeline of new doctors. This effect is amplified by the overall shift in applicants from men to women since women are less likely than men to apply to medical school within every racial group. Based on current patterns, [15] projects that women will account for 55 percent of white and Asian applicants in 2020, nearly 60 percent of Hispanic applicants, and almost 70 percent of black non-Hispanic applicants [15, p. 873].

Given the well-documented link between family resources and education costs on one hand and the acquisition of a Bachelor's degree under the conditions that favor medical school application on the other, the shift to a more demographically diverse U.S. population in one sense means a relatively smaller pool of potential medical school applicants, other things equal. Although policies could produce

some improvements, the relative resource inadequacies of Americans entering the education pipeline lead the author of [15] to conclude that "the yield of medical school applicants will not be sufficient to allow significant expansion of medical school capacity, and the racial and ethnic composition of the physician workforce will remain at serious discordance with the characteristics and needs of the population overall" (p. 874).

**Supply outlook**

The dominant question relating to civilian doctors is whether the Nation is confronting a potential shortage. If so, the implications for recruiting and retaining Navy doctors are obvious, and recruiting goals may take priority over diversity goals, especially if the supply of black and Hispanic doctors continues to lag.

Three recent national estimates suggest an emerging shortfall of doctors, largely due to an expected increase in demand from the Nation's aging Baby Boomers. HRSA [21] recently estimated a shortfall of 55,000 doctors in 2020, largely in non-primary-care specialties. COGME [22] recommended an additional 3,000 medical graduates by 2015 to meet an estimated shortfall of 85,000 doctors in 2020. And, in 2004, a private consulting firm projected a shortage of 90,000 to 200,000 doctors, due to organizational and policy-driven inefficiencies as well as an aging population [23]. A recent CNA study [24] substantiates these findings as well as those discussed below.

An authoritative study done for HRSA reports a general consensus that "overall physician supply per capita will remain relatively stable over the next 15 years" [19]. That is, the full-time equivalent (FTE) physician labor force is expected to grow at the same rate as the population, "resulting in a relatively constant FTE patient care physician per 100,000 population ratio of approximately 259" [19, p. 13]. However, the HRSA projections anticipate that the aging of the Baby Boomers will increase requirements for physicians engaged in patient care to 281 per 100,000 [19, p. 24], suggesting a coming shortfall for these specialties. These projections are strictly demand driven—based on demographic change (primarily aging) in health care consumers—and assume no change in current patterns of health care delivery, such as greater use of nonphysician care.

Such status quo assumptions are a normal feature of projections, which are scenarios of what will happen if the current policy environment is unchanged, given such known changes as the aging of the Baby Boomers. Past projections of doctor shortages have led to policy changes, such as the expansion of the Nation's medical schools, an increase in government funding for medical education, and the creation of policies and programs that encouraged immigration of foreign-trained doctors in the 1960s. By the end of the 1970s, the success of these policy changes led to projections of doctor surpluses. Although current projections contain more questions than answers for public policy, they contain much useful information about trends in the number and characteristics of doctors in the civilian labor force.

In particular, current projections from HRSA have implications for the evolving demographics of both doctors and patients [19]. That is, as well as taking account of the aging of the Nation's large Baby Boom generation, the HRSA projections assume a continuation of current rates of U.S. population growth. Although unforeseen events and trends might alter these rates, this is a reasonable assumption and implies continued diversification of the population through immigration. (Note that immigration accounts for roughly half of current U.S. population growth; the other half is due to improving mortality, i.e., "delayed" deaths relative to past patterns, as births continue to occur at the population replacement rate.)

Current demographic trends indicate that immigrants will come largely from non-European countries. Although economic development and related declines in fertility may reduce immigrant flows from some countries, that is not the outlook for others, mostly in Asia and Africa. High fertility rates tend to go hand in hand with insufficient growth in jobs, so many young adults who have the resources to migrate in search of improved opportunities, such as medical school graduates, will do so.

Currently, one in four doctors in U.S. residency programs graduated from foreign medical schools, and HRSA points out that large numbers remain here after completing their training [19]. This situation essentially begs the question of whether the United States will have

enough doctors to meet the demands of a growing and aging population because, absent policy changes, such as increasing medical school graduates or rationalizing health care delivery, the United States can probably continue to rely on foreign-born doctors to meet any shortfall. Such a situation has obvious implications for U.S. Navy recruitment, given its citizenship requirements.

HRSA includes two other demographic trends in its model: the aging of doctors as a whole and the increasing share of female doctors. Since older doctors and female doctors have historically worked fewer patient-care hours, on average, than other doctors, these demographic trends mean that the FTE supply of doctors is growing slightly slower than the number of active doctors, thus worsening any projected shortfall.[21] These trends also have obvious implications for Navy recruitment, as they suggest a relative diminution in the supply of young, full-time doctors to recruit.

## Civilian dentists

Navy dentists represent a wide range of specialties, all of which are included in a single occupational category, "Dentists," in our civilian tabulations. (See the appendix.) Because the great majority of Navy dentists are general practitioners, it is unlikely that compositional contrasts affect a representation comparison. However, like the Navy dentist workforce, the civilian dentist labor force is small, amounting to fewer than 180,000 in 2006 according to estimates based on the Current Population Survey.[22] Consequently, we cannot reliably make comparisons by individual racial and ethnic subpopulation; thus, we limit ourselves to broad statements about representation trends. In

21. The HRSA study finds that female doctors tend to spend about 15 percent less time in patient care than male doctors, after adjusting for age, specialty, and other relevant factors [19, p. 9]. This difference parallels the difference in full-time versus part-time work that the CPS reports.

22. Another set of figures comes from a regular census of dentists conducted by the American Dental Association (ADA), which includes dentists who are inactive as well as active. Based on the 2004 census [25], the association estimated that there were 228,875 dentists in the United States that year, of whom 175,705 were professionally active.

addition, the different current estimates based on the 1-year CPS sample and the larger 3-year rolling ACS sample shown in table 6 caution us to focus on the 10-year trend, not on current levels.

Table 6. Civilian Dental Corps-equivalent labor force[a]

| | Total | White non-Hispanic | Minority race/ ethnicity | Men | Women |
|---|---|---|---|---|---|
| | | **1996** | | | |
| All ages | | | | | |
| CELF | 100.0 | 83.7 | 16.3 | 55.2 | 44.8 |
| Dentists, CPS | 100.0 | 95.7 | 4.3 | 78.7 | 21.3 |
| Age 35 and under | | | | | |
| CELF | 100.0 | 81.5 | 18.5 | 50.6 | 49.4 |
| Dentists, CPS | 100.0 | 96.2 | 3.8 | 70.7 | 29.3 |
| | | **2006** | | | |
| All ages | | | | | |
| CELF | 100.0 | 77.6 | 22.4 | 52.6 | 47.4 |
| Dentists, CPS | 100.0 | 85.0 | 15.0 | 81.6 | 18.4 |
| Dentists, ACS | 100.0 | 80.9 | 19.1 | 80.6 | 19.4 |
| Age 35 and under | | | | | |
| CELF | 100.0 | 72.5 | 27.5 | 47.7 | 52.3 |
| Dentists, CPS | 100.0 | 76.8 | 23.2 | 60.4 | 39.6 |
| Dentists, ACS | 100.0 | 66.0 | 34.0 | 63.5 | 36.5 |

a. Source: [9]; American Community Survey, 2003-05 averaged.

The entry of women into dentistry is the major diversity trend for this traditionally male-dominated health care profession. Among all dentists, women account for only about 20 percent, far below their share of the college-educated labor force. However, among younger dentists, women's share is much higher, rising from 30 percent of civilian dentists age 35 and under in 1996 to 40 percent in 2006.

The American Dental Association conducts a regular census of dentists, which allows a closer look at the demographic characteristics the ADA tracks. Results of this census focus the picture of the shifting gender composition of dentists. The 2004 census [25] found that the mean age of professionally active dentists was 50.7 for men (up from

49.8 in 2002) and with 41.1 for women (up from 40.3 in 2002). This contrast reflects recent trends because 34.7 percent of "new" professionally active dentists (i.e., dental graduates from the previous 10 years) in 2004 were female (up from 33.2 percent in 2002), compared with only 18.3 percent of all professionally active dentists.

Although the small survey sample prevents a detailed examination of racial and ethnic diversity, the data suggest a marked inflow of Asians, especially among younger dentists. These observations are supported by the ADA's most recent published census of dentists, which asked respondents to identify their race and indicate whether they were of Hispanic origin [25]. In 2004, only 2 percent (2,600) said they were African-American, and 3.4 percent (4,440) said they were Hispanic, well below their representation in the population, and somewhat below their representation among the labor force with degrees beyond the Bachelor's level. In contrast, 88 percent were white and 8 percent were Asian, well above their population representation. However, Asian representation is in line with their presence in the labor force of advanced degree holders.

**Pipeline trends**

The ADA considers that, "[i]deally, the dental workforce should reflect the ethnic and cultural diversity of the general population" [26, p. 6]. However, contrasting the racial and ethnic characteristics of projected growth in the U.S. population with the characteristics of dental school enrollees, the ADA expects underrepresentation in the field to worsen:

> Today's dental workforce is not representative of the ethnic composition of the population. Furthermore, enrollment in dental schools and participation in the allied dental fields from minority populations is far below what is desirable in trying to achieve balance with the present and future ethnic distribution of the public. It is imperative that efforts be made to increase the participation of the growing minority groups into the dental profession. [26, p. 10]

The ADA suggests such efforts as outreach programs in K–12 educational environments, community outreach efforts, public education programs, mentorship associations, scholarships, and other incentive

programs. Such initiatives could offer the Navy and other military services partnership opportunities to make the availability of military scholarships and other incentive programs more widely known.

The other significant trend affecting demographic diversity in the dental labor force is that dentists are aging. This trend is taking place in the U.S. labor force as a whole, as the large Baby Boom generation is succeeded by smaller generations. That is, any occupation that is not receiving a larger share of young people than in the past is aging. Since the Nation's supply of dentists has not changed, new entrants simply replace retirees rather than expanding the dentist labor force. Thus, women will account for a larger share of dentists as older predominantly male dentists retire. This will happen soon, the age composition of the male and female dental labor forces suggests. Only 6.9 percent of women dentists were over age 55 in 2004, compared with 37.6 percent of male dentists [25].

With large numbers of mostly white non-Hispanic dentists approaching retirement age, racial and ethnic diversity among dentists will be largely determined by the characteristics of people qualifying for the profession. Looking at dental school applicants and first-year enrollees, Asians accounted for almost all of the considerable increase among minorities during the last two decades of the 20th century [27]. These authors find that, although more black and Hispanic applicants applied, their numbers of first-time first-year enrollees actually decreased.

Moving further along the pipeline, recipients of first professional degrees in dentistry (D.D.S. or D.M.D.) became more demographically diverse in the last 10 years, according to Department of Education data. Women's share of these degrees increased 10 percentage points between school years 1993–94 and 2003–04, reaching 39 percent. The total number of degrees awarded to U.S. residents (native and alien) increased by over 20 percent, so relatively slow growth in the numbers of black and especially Hispanic graduates kept the black share of dental degree recipients level and decreased the Hispanic share slightly. Meanwhile, the number of Asian graduates increased by 65 percent, so, despite their increased numbers, white non-Hispanics amounted to a much smaller share of recipients [28].

Thus, although new dentists are more demographically diverse, they are still not representative as a group. Using the CELF as a benchmark, Asians continue to be overrepresented among new dental D.D.S. or D.M.D. recipients, and women continue to be underrepresented, despite the relative increase in their presence. Meanwhile, underrepresentation has widened for blacks and Hispanics. Acknowledging these trends, the ADA has recommended that dental education "include training in cultural competency, as well as the necessary knowledge and skills to deal with diverse populations" [25, p. 20].

**Supply outlook**

Interaction among labor force, pipeline, and supply trends suggests that achieving demographic representation among dentists will become even more difficult. As we observed in our discussion of civilian doctors, the trend toward an older, more female dental workforce has an impact on the supply of dentists as well as on representation because a larger percentage of women practice part-time and older dentists tend to practice fewer hours than their younger counterparts. In 2006, fully 30 percent of civilian female dentists worked part-time, compared with fewer than 20 percent of female doctors [9].

A recent CNA analysis forecasts a coming shortage of dentists, though not as great as the shortages expected for some physician specialties and for nurses [24, p. 53]. This analysis assesses trends in both the supply of dentists and changes in the demand for them, such as that brought about by an aging population. Shortage or no, the current race/ethnicity patterns among new dental graduates suggests that representation will not be easily achieved, whether in the Navy or in the civilian sector. Successfully recruiting dentists is also likely to take priority over achieving demographic goals, especially since simply having adequate service seems to be in doubt: According to HRSA, "Not only is the pipeline for dentists on shaky ground, but also concerns about the public access to dental services abound" [29, p. 54.]

The ADA does not agree with the government's "shaky ground" assessment, asserting that "[s]ubject to a sound, market-based dental care economy, there will be a continuing flow of well-qualified applicants to dental education" [26, p. 108]. However, it does agree with concerns about access to services, particularly in underserved areas,

recommending that dentists be encouraged to serve them. Recall that the HRSA diversity business case study cited research findings that medical practitioners from underserved minorities are more likely to practice in underserved areas. The ADA makes the same connection and foresees that, absent vigorous proactive initiatives to increase enrollment, underrepresentation among future dentists may worsen access to dental services. Acknowledging that the costs of dental education, and thus student indebtedness, will rise absent "extraordinary" intervention by government, the ADA worries that:

> Due to student indebtedness, talented students from lower-income families and under-represented minorities may shy away from dental careers.…The direct and indirect negative effects may result in reduced access to oral health care for families of lower socioeconomic status. [26, p.109]

Meanwhile, the ADA expects that "women students will continue to constitute about 40 percent of dental school enrollees, although market place changes could cause this percentage to increase slowly" [26, p. 109]. Presumably, "market place changes" refer to changes in the appeal of dentistry compared with other high-earning occupations. For instance, the American Dental Education Association has hypothesized that an "abundance of financially rewarding career opportunities fueled by the robust U.S. economy, a reluctance by college students to assume more educational debt, an unfavorable view of healthcare careers in the light of managed care and declining federal reimbursement, and assumptions about the difficulty of gaining admittance to dental school" were behind recent downturns in dental school applications and enrollment [27, p. 867].

## Civilian nurses

The civilian health care workforce with a college or advanced degree is the key benchmark for the Navy's Nurse Corps since all Navy nurses have earned at least a B.S. and many have Master's and doctoral degrees.[23] Imposing this education threshold, nurses make up about the same relative share of the college-educated civilian and Navy health care workforces. There are three groups of specialties in the

23. In our data set, about one-third of Navy nurses have advanced degrees.

Navy's Nurse Corps: Nurses, Nurse Practitioners, and Non-nursing occupations (see the appendix). The civilian data identify two groups of nurses: Licensed Practical and Vocational Nurses, and Registered Nurses (RNs).[24] Since the former does not require a college degree and since RNs account for 98 percent of the civilian college-educated nursing workforce, RNs are the focus of this demographic analysis.[25]

Demographic trends are diversifying the civilian nurse labor force. This profession has been overwhelmingly female since its inception in the 19th century, when women had few other career opportunities. The opening of virtually all careers to women in the latter part of the 20th century has transformed the relative attractiveness of nursing as a profession. It is probably safe to say that the influx of women into the medical and dental professions just described includes women who would have become nurses in earlier times.

The most striking (though not surprising) demographic difference between college-educated RNs and the CELF is its gender profile. Table 7 shows that in 2006, 91 percent of the college-educated RN labor force was female—slightly lower than in 1996, reflecting the arrival of some men into the field. This trend looks likely to continue because in 2006 more than 10 percent of college-educated nurses in the civilian labor force, under age 35, were men.

This labor force has also become more racially and ethnically diverse, roughly in line with the CELF as a whole. In 2006, however, it contained slightly more Asians than did the broad college-educated labor force, though this trend is not as marked as it is for doctors and dentists. There was also considerable representation of other minority groups, in contrast to the profile of doctors and dentists. (Noncitizens in this labor force are predominantly Asians, though non-Hispanic whites have a considerable presence as well.

24. Since the civilian data do not include a separate category for nurse practitioners, we assume that they are included in the RN category.

25. In the 2006 CPS data, 18 percent of RNs with a B.A. also had an advanced degree. In the 2003–05 ACS snapshot, 25 percent of RNs with a B.A. also had an advanced degree. Thus, by both measures, civilian RNs are less likely than Navy nurses to have advanced degrees.

Table 7. Civilian nurse[a] portrait, 1996 and 2006[b]

| | Total[c] | White non-Hispanic | Black non-Hispanic | A/PI non-Hispanic | Hispanic | Men | Women |
|---|---|---|---|---|---|---|---|
| | | | | **1996** | | | |
| All ages | | | | | | | |
| CELF | 100.0 | 83.7 | 6.5 | 5.9 | 3.6 | 55.2 | 44.8 |
| Nurses, CPS | 100.0 | 81.7 | 7.8 | 8.7 | 1.7 | 6.2 | 93.8 |
| Age 35 and under | | | | | | | |
| CELF | 100.0 | 81.5 | 6.6 | 6.8 | 4.9 | 50.6 | 49.4 |
| Nurses, CPS | 100.0 | 82.6 | 7.0 | 7.8 | 2.5 | 5.1 | 94.9 |
| | | | | **2006** | | | |
| All ages | | | | | | | |
| CELF | 100.0 | 77.6 | 7.7 | 8.0 | 5.6 | 52.6 | 47.4 |
| Nurses, CPS | 100.0 | 76.2 | 8.7 | 10.1 | 4.3 | 8.9 | 91.1 |
| Nurses, ACS | 100.0 | 76.5 | 9.1 | 9.9 | 3.4 | 9.1 | 90.9 |
| Age 35 and under | | | | | | | |
| CELF | 100.0 | 72.5 | 8.7 | 10.1 | 7.3 | 47.7 | 52.3 |
| Nurses, CPS | 100.0 | 74.4 | 6.3 | 11.4 | 6.7 | 10.8 | 89.2 |
| Nurses, ACS | 100.0 | 73.6 | 8.3 | 12.5 | 4.1 | 10.2 | 89.8 |

a. This is a portrait of Registered Nurses only.
b. Source: [9]; American Community Survey, 2003-05 averaged.
c. Percentages of race and Hispanic origin do not sum to 100 because we do not show the small share of "Others."

An increasing share of the broad RN labor force (i.e., including those who lack a college degree) belongs to minority racial/ethnic subgroups; indeed, minorities accounted for virtually all the growth in this labor force between 1996 and 2000.[26] However, the broad RN population is less diverse, both in gender and race/ethnicity, than college-educated RNs. In 2004, an HRSA survey of all RNs found that only 10 percent identified themselves as belonging to one or more

26. Several decades of concern over the adequacy of the Nation's supply of nurses has yielded an extensive data collection, legislated by Congress and funded by HHS, that provides more detailed knowledge of trends over the past 30 years. This survey is conducted by private contractors and thus lacks the full resources of federally conducted surveys, such as the CPS. For instance, the many respondents who failed to provide full information about race and ethnic origin were not recontacted. This makes detailed comparisons between the two data sets inadvisable.

minority groups, and Hispanics in particular were not well represented relative to their population share [30]. The broad RN workforce is also more female than the college-educated subset. In 2004, men made up little more than 5 percent of the broad RN labor force, even though their numbers and share have been growing.

Thus, it seems as if the broad trend to attaining a college education contributes to increasing demographic diversity among RNs. Doctors and dentists need to finance a lengthy and expensive post-baccalaureate education, but access to a Bachelor's degree is much more affordable. Indeed, the lengthening of the average duration of a B.A. education reflects in part the need of so many students, particularly those from low-income backgrounds, to finance it by working. Since a B.A. is not required for RNs, nurses can work as nurses while continuing their formal education. Thus, although the college-educated RN workforce is more representative than the broad RN workforce, it also includes many who are attaining their credentials somewhat later in life.

**Pipeline trends**

Overall, the most significant demographic trend among civilian nurses is aging. This is relevant from a representation standpoint because older generations of RNs are disproportionately white. The average age of the broad RN labor force reached 46.8 years in 2004, up from 44.3 in 1996. Fully 25 percent of all RNs were over age 54 in 2004, while fewer than 10 percent were under 30 years of age [30]. The civilian labor force as a whole is aging, as the exceptionally large generations born between 1946 and 1964 are now in their later working years. However, shifting opportunities for women probably account at least partially for this trend among RNs because fewer young women are entering the RN population. As a result, the share of all RNs under age 35 has declined precipitously: from 41 percent in 1980 to 16 percent in 2004 [30].

Despite fewer younger RNs, an increasing share possesses the higher educational qualifications the Navy seeks. Overall, fewer nurses are receiving their initial nursing education in diploma/credential programs; more are getting it in associate and baccalaureate or higher degree programs. In 2004, only 25 percent of all RNs had come into

the profession via certificate/diploma programs (compared with 63 percent in 1980), while the share starting off with baccalaureate or higher degree programs rose from 17 to 31 percent [30].

Income trends may also contribute to the aging of the broad RN population: HRSA suggests that older nurses may be returning to the labor force in response to higher salaries and reported shortages [30]. The agency found that real (inflation-adjusted) earnings rose faster between 2000 and 2004 than in any similar period since it began tracking RN trends in 1984—up 14 percent. This is larger than the 5-percent increase among the civilian college-educated RN labor force between 1996 and 2006 [9].[27] HRSA also found that, since the inception of its study, the highest proportion of licensed RNs was actually employed in nursing in 2004 (as opposed to some other occupation)—about 83 percent.

Thus, the RN pipeline contains a mixed message for the Navy. On one hand, an increasing share of RNs is college-educated as well as more diverse. On the other hand, these younger, more demographically diverse RNs represent a smaller share of the overall RN population. Here, the Navy's closed personnel system may work against its diversity goals.

**Supply outlook**

Supply shortages have bedeviled employers of RNs for many years, and a number of efforts have been made to address them. CNA recently assessed the impact of current trends on the future RN labor force, assuming that RN supply and demand were in equilibrium in 2004, and estimated a shortfall of nearly 700,000 RNs by 2024 [24]. This is lower than the 1 million RN shortfall by 2020 projected by HHS's Bureau of Health Professions in 2004, in part because the latter projection has a 1996 base as well as different assumptions about the determinants of supply and demand. The two driving factors for this shortfall are both demographic: U.S. population growth and the aging of the RN labor force.

27. HRSA did not adjust its earnings calculations for the changing educational mix of the RN population or for other compositional changes.

On the supply side, CNA assumes that the nursing profession will continue to attract the same share of the potential recruiting pool (women age 20 to 44) as it does now, and that the age distribution of entrants will not change. It also assumes no change in the 80 percent of qualified RNs who are employed in nursing. Thus, simple population growth (including immigration of foreign-trained nurses) drives CNA's labor supply projection. However, the increasing share of new RNs who are taking longer educational routes into nursing slows their entry into the workforce and thus tempers the effect of population growth on supply. (A related issue is that the same aging and retirement trends that will affect the supply of nurses also affect nursing faculty.)

Obviously, the Nation can continue to rely on foreign-born, foreign-trained nurses to boost its supply of nurses. In 2005, about 15 percent of the people who passed the examination required to become licensed as a nurse were graduates of foreign institutions [24]. Increasing this proportion could ease supply shortages nationally but will not grow the Navy recruiting pool.

On the demand side, simple population growth increases the overall demand for health care services, while the aging of the population increases age-specific use of such services. Nondemographic factors also play a role. For instance, increases in income and/or insurance coverage can increase access to health services among currently underserved populations. Or technological advances and staffing patterns can improve nursing productivity (e.g., by substituting one type of health practitioner for another type).

Regardless of projection characteristics, the general consensus is that there is a nursing shortage now and that it will likely worsen [24]. How much it will worsen will depend on such factors as trends in nursing incomes. CNA notes that nurses are paid a roughly equivalent amount in military and civilian life, while doctors and dentists earn more by remaining civilian. If civilian RN incomes were to increase significantly, it would put the Navy at a recruiting disadvantage. In any case, the aging of the profession, and competition among employers for a constrained supply of practitioners, suggest that BUMED will find it difficult to recruit nurses from any demographic group, let alone

expand demographic representation. It also suggests that BUMED will be challenged to retain the nurses that it succeeds in recruiting.

## Medical Services-equivalent labor force

The Medical Services-equivalent labor force consists of a disparate group of specialties, ranging from health care managers to highly specialized practitioners. Like dentists, no one of them is large enough to reliably compare trends by individual racial and ethnic subpopulation. And they are too disparate to analyze as a group. Hence, table 8 simply shows the trends in minority and female representation between 1996 and 2006.

Health care practitioners are the largest Navy group in this broad category and one of the largest civilian groupings as well. This category includes optometrists, pharmacists, audiologists, podiatrists, and other practitioner specialties that require advanced professional education and certification. (See the appendix.)

This grouping is relatively diverse, and increasingly so. In 2006, the minority share of civilians in these occupations exceeded the minority share of the college-educated labor force. There were enough Asian-Americans in this workforce that year to benchmark them against the CELF: there are almost three times as many Asians in these occupations as in the benchmark, and they account for almost half of the minority members of the civilian health care practitioner labor force.

Ten years earlier, white non-Hispanics were overrepresented in this grouping, and there were relatively few blacks and Hispanics. But the trend toward racial and ethnic diversity was already visible in the labor force under age 35. This trend has continued, and in 2006 each minority racial group had substantially more health practitioners.

Meanwhile, there is a marked trend toward female predominance in these fields. In 1996, women accounted for 57 percent of civilians in these occupations, and this ratio rose to 63 percent by 2006. Among practitioners under age 35, women accounted for 72 percent in 1996, and 70 percent in 2006, suggesting that this trend may have leveled off, although replacement of older practitioners by younger ones will continue to feminize these fields.

Table 8. Civilian Medical Services-equivalent labor force, 2006 and 1996[a]

| Occupation group | White non-Hispanic | Women |
|---|---|---|
| **1996** | | |
| All ages | | |
| CELF | 83.7 | 44.8 |
| Psychologists | 85.6 | 57.5 |
| Health scientists | 82.8 | 23.0 |
| Health care practitioners | 86.2 | 56.8 |
| Technical | 71.8 | 67.8 |
| Management | 91.1 | 62.5 |
| Miscellaneous | 77.6 | 63.9 |
| Age 35 and under | | |
| CELF | 81.5 | 49.4 |
| Psychologists | 89.2 | na |
| Health scientists | 75.1 | na |
| Health care practitioners | 82.8 | 72.0 |
| Technical | 73.8 | 67.0 |
| Management | 81.1 | na |
| **2006** | | |
| All ages | | |
| CELF | 77.6 | 47.4 |
| Psychologists | 90.6 | 65.9 |
| Health scientists | 72.7 | 39.1 |
| Health care practitioners | 73.8 | 62.8 |
| Technical | 70.9 | 74.2 |
| Management | 84.0 | 56.3 |
| Age 35 and under | | |
| CELF | 72.5 | 52.3 |
| Psychologists | 84.1 | na |
| Health scientists | 66.8 | 48.7 |
| Health care practitioners | 69.3 | 69.6 |
| Technical | 72.7 | 79.2 |
| Management | 83.7 | na |

a. Source: [9].

This trend also interacts with the trend in race/ethnicity of these occupations. For instance, women accounted for 70 percent of new degrees in pharmacy and optometry awarded to Asians in the 2003-04 academic year [28].

Since this grouping covers several different health care fields, it is not surprising that they differ among themselves according to racial and ethnic diversity. Although comparative statistics on the civilian labor force in these fields are lacking, HRSA has gathered data on new diploma recipients from a variety of sources that give a sense of current directions of representation. For instance, HRSA reports that Asians make up a large share of current optometrist/optician and pharmacy graduates relative to their share of the college-educated workforce: 27 and 24 percent, respectively. New graduates in several of these fields are disproportionately non-Hispanic white, including physical, occupational, and hearing and speech therapy, along with physicians' assistants. And women account for the majority of new graduates in all the fields mentioned here except podiatry [31].

Podiatry is one field in which each minority is well represented among new graduates compared with their presence in the college-educated labor force under age 35. Pharmacy graduates include a representative selection of black non-Hispanics. Otherwise, blacks and Hispanics are generally underrepresented among new graduates in these fields, even after accounting for their lesser educational attainment and their relative youth.

Health care scientists compose the largest share of the civilians who work in occupations that parallel the Navy's Medical Service Corps, though they represent only 11 percent of that corps. These physical and life scientists include biological, environmental, and space scientists. Given the Navy's specialized needs, the occupational composition of this grouping is not the same in the civilian world. (See the appendix.) However, the fundamental requirement of an advanced professional degree suggests that demographic differences in educational attainment and other relevant representation influences are likely to shape both civilian and military health scientist labor forces.

In 2006, white non-Hispanics accounted for a smaller share of health care scientists than they did of the civilian CELF—73 percent,

compared with 78 percent. Asians accounted for the great majority of the minority share—about 80 percent, well above their share of the CELF. There are too few blacks and Hispanics in the survey sample to reliably benchmark their membership in this occupational group; compared with 1996, however, their numbers grew.

Since U.S. universities educate many foreign scientists, constraining the analysis to citizens changes the representation portrait considerably. In 2006, health scientists included more noncitizens than any other NRMO, and fully 80 percent of them were Asian. Limiting the comparison to native-born health scientists increases representation for white non-Hispanics, making them overrepresented, relative to the CELF, at 90 percent.

Meanwhile, health-related scientists are the only occupational group in the Medical Services-equivalent labor force that is dominated by men—61 percent, compared with 52 percent of the CELF. However, this is a considerably smaller share than it was in 1996, when men accounted for 77 percent of this labor force. The beginning of this shift was visible in 1996, with women accounting for a greater share of young health scientists than of this labor force as a whole. By 2006, women accounted for nearly half of these civilian scientists age 35 and under.

Psychologists are not very numerous in BUMED, and most of them are clinical psychologists; thus, the match to civilian psychologists is relatively straightforward. (See the appendix.) They are also a small civilian occupational group (not much larger than dentists), so we limit our discussion of trends in race and Hispanic origin from the Current Population Survey sample. This occupational group is the most "white" of any civilian labor force segment analyzed in this paper. In 2006, over 90 percent were white non-Hispanic, compared with 77 percent of the CELF.

Here again, educational and related resource choke points probably account for the limited presence of traditionally underrepresented minorities in this field, where virtually all practitioners possess an advanced degree. However, in contrast to the health-related physical and life scientists discussed earlier, there is a limited Asian presence in this field, relative to the Asian share of advanced degree recipients.

In this occupation, English-language skills are paramount, and the Asian psychologists in the 2006 CPS sample were either naturalized citizens or noncitizens, not native born.[28]

Meanwhile, women accounted for two-thirds of civilian psychologists in 2006, a considerable increase over the previous decade. Since 69 percent of degree recipients in this field in the 2003-04 academic year were female, women seem likely to continue to predominate in this field [28].

Health care technical occupations (other than doctors, dentists, and nurses) include medical and laboratory technicians and technologists, and medical records and health information technicians. (See the appendix for the occupational cross-walk we made to the civilian labor force.) These occupations account for about 5 percent of both BUMED Navy officers and the civilian NRMO labor force.

As a group, these occupations contained the highest share of minorities within the civilian Medical Services-equivalent workforce. Recall that, to match Navy officer requirements, we limit our comparisons to people with college degrees. Thus, the profile we derive does not represent the complete civilian workforce in this occupational group. In addition, the reduced size of this group does not allow us to examine differences within minority groups.

There has been a significant increase in degrees awarded in these fields over the past decade. Blacks and Asians both surpass their representation in the broad population among recent degree winners among medical and clinical laboratory technologists and technicians, as do blacks for medical records and health information technicians. Whites and Hispanics fall short, but not by very much [31].

This occupational category is now the most heavily female of the civilian Medical Services-equivalent labor force—75 percent, up from 68 percent in 1996. Currently, this mirrors the pattern of new degree

28. This is not to say that there are no native-born Asian psychologists in the country, simply that there are so few that a random selection of 60,000 American households did not find any.

recipients among medical and clinical laboratory technologists and technicians. However, new degree recipients in medical records and health information technician were over 90 percent female in the 2003-04 academic year [31].[29]

Management is a relatively small segment of the civilian NRMO labor force, compared with BUMED administrators (see the appendix). Among civilians, they are disproportionately white non-Hispanic—84 percent, compared with 77 percent of the CELF in 2006. However, they are considerably more representative than they were in 1996, when white non-Hispanics accounted for 91 percent of civilian medical and health services managers.

In terms of gender, the male share of civilian health care managers rose from 37.5 percent in 1996 to 43.7 percent in 2006. In this occupational grouping, the choice of benchmark is crucial. In 2006, female medical and health service managers fell short of their NRMO benchmark but exceeded their benchmark among the college-educated labor force. In 1996, female managers exceeded both benchmarks. These trends suggest that gender representation trends reside within the health care industry, rather than in different occupational or educational choices before entering the industry.

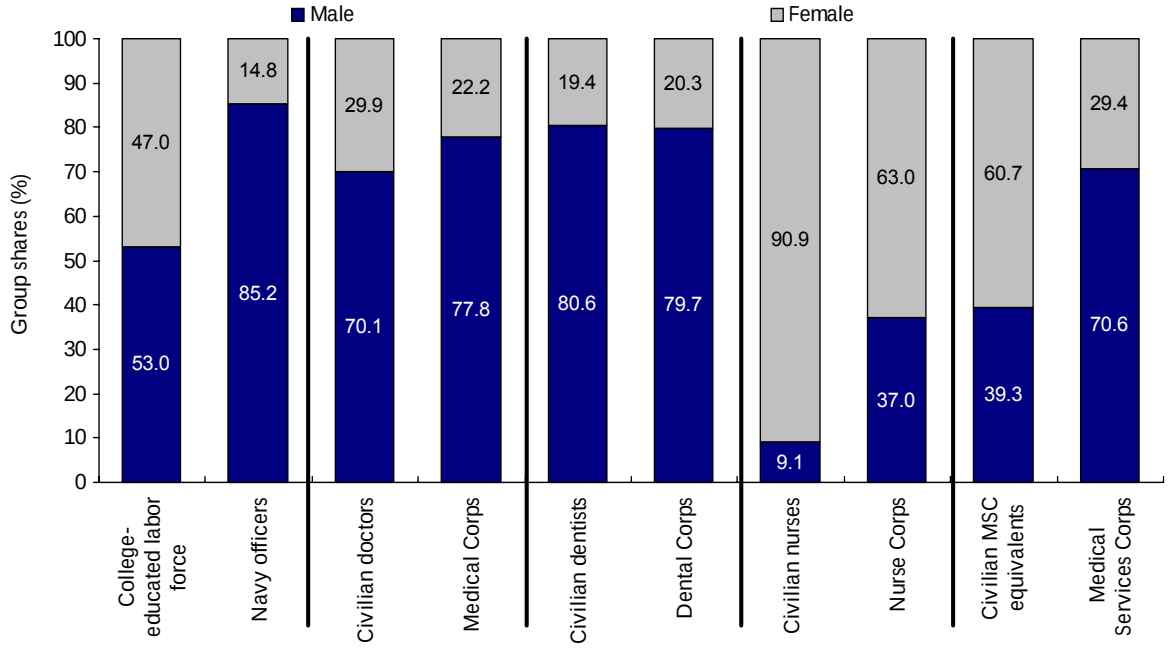
## Navy civilian comparisons overall and by corps

Understanding the dynamics underlying diversity trends in the civilian medical labor force helps us interpret demographically detailed Navy-civilian comparisons of medical personnel, first by gender and then by race and Hispanic origin.

Figure 7 compares the gender profiles of officers in Navy Medicine with the profiles of matching civilian medical occupations. Note that Navy officers are disproportionately male relative to the college-educated labor force. Within this context, Navy physicians, nurses, and members of the Medical Services Corps (MSC) are also disproportionately male, but to smaller and varying degrees.

29. These data do not adjust for citizenship status, which is particularly important for Hispanics since immigrants in this population have a relatively low level of educational attainment.

Figure 7. Gender profiles: Navy medical personnel vs. civilian medical personnel, by corps[a]




a. Sources: Civilian occupation data from American Community Survey (ACS), 2003-05 average; Navy Medicine personnel from OMF data merged with data from BUMED's Manpower Information System (BUMIS), files from FY84 through FY06.

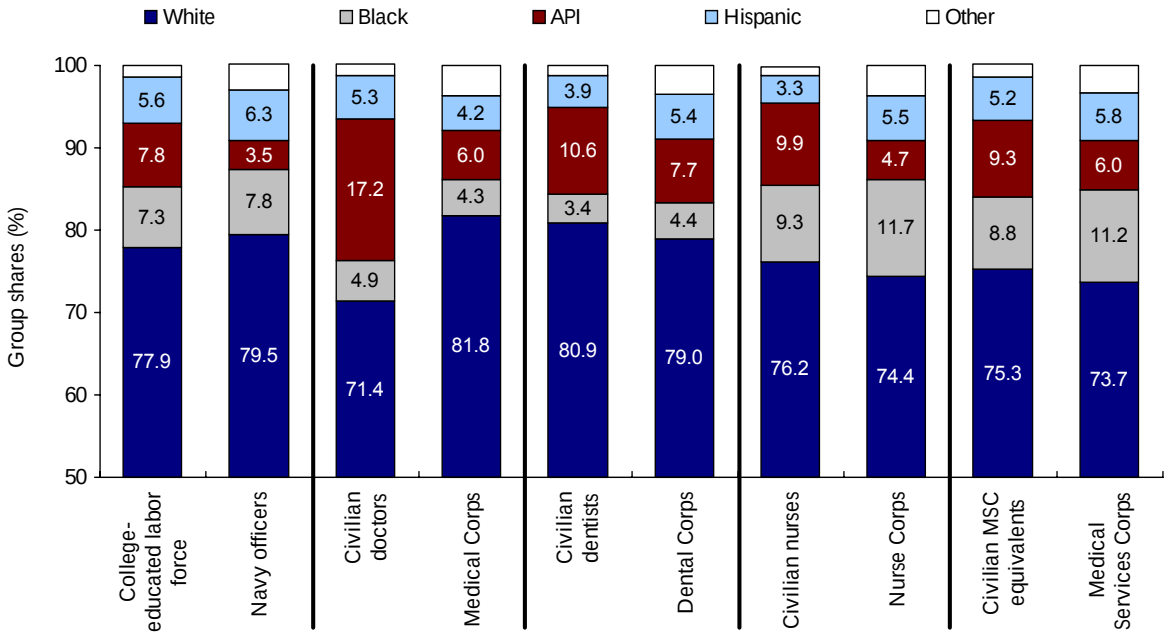
On one hand, among officers in Navy Medicine, men are most overrepresented in the Nurse Corps, relative to civilians.[30] And men are least overrepresented in the Medical Corps. On the other hand, women are most underrepresented among MSC officers, compared with their predominantly female civilian equivalents, and least underrepresented in the Medical Corps. Navy dentists follow a different pattern: relative to civilian dentists, women are actually slightly overrepresented among officers in the Dental Corps.

Figure 8 compares the racial/ethnic profiles of Navy Medicine with the profiles of matching civilian medical occupations. As with the gender profiles, we provide context by comparing all Navy officers to the college-educated labor force, finding that Navy officers are nearly

30. Another way of looking at the gender mix in the Nurse Corps is to note that the Navy has been successful in attracting men into an otherwise female-dominated profession.

representative in terms of racial/ethnic diversity. The main difference is the underrepresentation of Asians among Navy officers. As we discussed earlier, many Asians in the college-educated labor force are not U.S. citizens, so the Navy's citizenship requirements produce a slight overrepresentation of other racial/ethnic groups among Navy officers. The Navy does, of course, include many representatives of the Asian population. Indeed, the visible overrepresentation of Asians among medical professionals is the explanation for Navy Medicine's superior representation, relative to Navy officers as a whole, in regard to both the population and the patient pool.

Figure 8. Racial/ethnic profiles: Navy medical personnel vs. civilian medical personnel, by corps[a]




a. Sources: Civilian occupation data from American Community Survey (ACS), 2003-05 average; Navy Medicine personnel from OMF data merged with data from BUMED's Manpower Information System (BUMIS), files from FY84 through FY06.

Compared with civilian doctors, Navy doctors are disproportionately white; all other groups are underrepresented, especially Asians. Compared with civilian dentists, blacks and Hispanics are slightly overrepresented among Navy dentists, while white non-Hispanics are slightly

underrepresented and Asians are more so. The representation patterns for the Nurse Corps and the MSC are generally the same as the pattern for dentists: blacks and Hispanics are slightly overrepresented, whereas non-Hispanic whites and Asians are underrepresented—Asians, substantially so. Recall that in 2006, over half of the noncitizens among all these Navy-relevant civilian occupations were Asian, compared with one-quarter non-Hispanic white and one-eighth Hispanic.

# Summary and implications

## Representation assessment

We used four benchmarks to assess representation in Navy Medicine: the U.S. population, the potential Navy patient pool, occupation-specific civilian labor forces, and all Navy officers.

Each of these benchmarks is important for different reasons. The U.S. population is an important benchmark because of the significance of representation in a democracy, and it marks the Navy's representation goal. The patient pool is an important benchmark because the business case for diversity in health care finds that representation can produce superior outcomes. The civilian labor forces are important benchmarks because demographic differences in U.S. education attainment produce unrepresentative recruitment pools. Navy officers constitute an important contextual benchmark for Navy Medicine within the Navy.

Relative to the U.S. population, the Navy MTF enrollees are somewhat less non-Hispanic white, while Navy officers are considerably more non-Hispanic white. For officers in Navy Medicine, there is considerable difference between the component corps: the Medical and Dental Corps are distinctly less representative of the U.S. population, as well as of the naval population they serve, than the Nurse and Medical Service Corps. Except for Hispanics, the two latter groups are quite representative of both the U.S. population and Navy MTF enrollees.

Relative to occupation-specific civilian labor forces, with the exception of dentists, each corps is more "male." In terms of race / ethnicity, Navy dentists are close to parity with civilian dentists; blacks and Hispanics are slightly overrepresented and Asians and Pacific Islanders slightly underrepresented. Navy and civilian nurses are also close to parity, except for Asians and Pacific Islanders. The comparison with

the civilian equivalent of the Navy's Medical Services Corps is weaker, given the difficulty of matching occupations, but this group also seems relatively representative. Compared with civilian doctors, Navy doctors are the least representative in terms of race and ethnicity, with all racial and ethnic groups underrepresented, especially Asians.

Relative to all Navy officers, officers in Navy Medicine are slightly more representative in terms of gender. This is true across all four corps, not just the traditionally feminine Nurse Corps. In terms of race and ethnic origin, Navy Medicine's slight representation superiority over the broad Navy officer corps combines overrepresentation of Asians with underrepresentation of Hispanics.

## Civilian trends

Civilian medicine is diversifying along with the population, but its relative lack of diversity in the past, combined with continued population diversification, means that it is still not fully representative. Indeed, these dynamics make demographic representation a moving target and call for careful consideration of appropriate benchmarks.

Three demographic trends stand out in terms of affecting the Navy's diversity goals:

- The civilian equivalent of the Navy Medicine officer labor force is aging, particularly among non-Hispanic white men.
- The civilian equivalent of the Navy Medicine officer labor force is increasingly female.
- The foreign-trained component of the civilian equivalent of the Navy Medicine officer labor force is growing, as is the share composed of noncitizens.

All three trends are making the civilian recruiting pool more demographically representative, but the third trend is increasing diversity in a way that is hard for the Navy to tap under its current policy of requiring citizenship for all of its officers. In addition, the interaction between increases in both gender and racial and ethnic diversity suggests that disproportionate recruiting of men will keep the Navy from diversifying as quickly as the civilian labor force.

Two other civilian trends may complicate meeting the Navy's diversity goals. First, although virtually all components of the civilian equivalent of Navy Medicine officers are becoming more diverse in terms of race and Hispanic origin, there is a lag in population representation for Hispanics and for non-Hispanic blacks that reflects a set of choke points throughout the education process, largely attributable to income disparities but also to different expectations from parents and community.

Second, there are concerns that the supply of civilian medical personnel may tighten, given growing civilian demand due to the overall aging of the population. Such supply constraints would increase civilian competition for appropriately trained personnel, especially since achieving population representation is a goal for civilian medicine as well. Increased demographic representation within the recruiting pool will not help Navy Medicine meet its diversity goals absent sufficient numbers to meet both Navy and civilian needs.

## Policy implications

Demographic trends in the population as a whole are largely not subject to policy change. However, trends in the appropriately educated civilian labor force usually are subject to policy change. This statement applies to both the characteristics of the civilian labor supply and how the Navy recruits from it. Thus, there are two avenues of response to civilian trends from a representation perspective. One addresses how to recruit the people Navy Medicine wants from the changing supply of appropriately educated personnel; the other addresses how to increase the supply of appropriately educated personnel Navy Medicine wants.

As summarized above, the civilian trends suggest that the officer-equivalent medical labor force is diversifying, but not rapidly enough or in sufficient volume to allow Navy Medicine to rely on simple momentum to achieve population representation throughout the rank hierarchy. Some of these changes challenge the traditional Navy / military career model. This career begins with entry of U.S. citizens into the medical labor force and continues unbroken to midlife. It assumes willingness to change residence frequently (compared

with the civilian norm), as well as a full-time, full-year commitment throughout. These career requirements are less appropriate to the increasingly older, more female, and more foreign civilian medical labor force from which the Navy recruits.

Thus, taking full advantage of the increasingly representative recruiting pool seems to call for policy changes to increase Navy Medicine's ability to accommodate a wider array of preferences. After all, the current requirements were developed by a less diverse Navy. Policy changes, such as increased family-friendliness or more off/on ramps, have been considered to attract women, and the Navy has already asked majority and minority groups about the desirability of such changes in the Navy career. (Such options tend to be viewed positively as long as those who avail themselves of them are not penalized).

To tap the growing numbers of Hispanics and Asians in medical occupations, as well as people with low propensity for military service and those who would prefer part-time work, the Navy should give serious consideration to such relevant policy changes as lateral entry to attract older recruits, recruiting noncitizens and/or facilitating citizenship for noncitizens, and employing more civilian personnel. However, highly specialized medical personnel tend to have ample career opportunities in civilian life, compared with the broad Navy recruiting pool. Thus, in Phase 2 of the Navy's Diversity Strategy (which calls for a focused analysis of deficient areas), BUMED could survey a representative selection of recruiting targets. The goal of the survey would be to elicit what might make Navy service more attractive to diverse candidates, and identify representation-related barriers that BUMED can modify. In other words, ongoing changes in both medical personnel and medical careers make developing an understanding of representative mental models a prerequisite for considering policy changes.

Policy changes to increase the supply of demographically diverse entrants that the Navy wants to recruit are easier to conceptualize but harder to operationalize. Because attaining an advanced professional degree in the United States requires considerable personal resources, racial and ethnic resource differences produce a gap between population representation and representation in the college-educated

labor force. This gap is particularly wide for the most highly educated medical professions, such as doctors or dentists, and these officers are the least representative in Navy Medicine.

Dealing with this problem at the root level is a matter of national will. However, whether ameliorating financial deficits or supporting non-traditional education tracks, carefully targeted programs could improve the overall supply of medical personnel as well as increase its racial and ethnic diversity. Such efforts could include more education assistance directed to the enlisted ranks (e.g., the Sailor-to-Admiral-21 program) and partnering with educational institutions that show creativity in addressing shared diversity goals.

Obviously, partnership with federal agencies that share similar concerns, such as the Department of Education and the Department of Health and Human Services, is worthwhile. The former has a direct mandate to improve access to education and completion rates, while the latter has made a business case for increasing the representation of blacks and Hispanics in medicine. In addition, developing increased flexibility within BUMED in response to different preferences, as suggested here, could offer creative solutions to help meet both diversity and recruiting goals.

Finally, this report has offered a variety of benchmarks for measuring representation in Navy Medicine and has demonstrated their implications in relation to civilian demographic dynamics. Choosing the most appropriate benchmark is sensitive to Navy and BUMED goals and strategies. These goals and strategies both shape and are shaped by diversity trends within and outside the Navy because they affect the Navy's patient population as well as the medical recruiting pool. As part of the Navy's Diversity Strategy, BUMED already assesses demographic diversity in reference to assignment, career path, promotion, and retention as well as overall diversity. It would be beneficial for BUMED's diversity efforts to add a regular assessment of the appropriate benchmark for measuring representation, so it can align both representation and recruiting and retention strategies to the nation's changing diversity.

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# Appendix: Navy–civilian occupation mapping

For each officer corps in Navy Medicine, we list the subspecialties of officers on duty in 2006 and show how these subspecialties map to civilian occupations identified in the ACS (see tables 9 through 12).

Table 9. Navy–civilian occupation mapping: Medical Corps

| Specialty | On duty in 2006 | ACS Occupation(s) (ACS Code) |
|---|---|---|
| Anesthesiology | 181 | Physicians and surgeons (3060 29-1060) |
| Dermatology | 49 | |
| Emergency Medicine | 169 | |
| Family Practice | 459 | |
| Flight Surgery | 296 | |
| General Medicine | 613 | |
| Health Care Management | 3 | |
| Internal Medicine | 375 | |
| Medical Ethics | 0 | |
| Neurological Surgery | 23 | |
| Neurology | 35 | |
| Nuclear Medicine | 2 | |
| Obstetrics/Gynecology | 158 | |
| Ophthalmology | 63 | |
| Orthopedics | 180 | |
| Otolaryngology | 79 | |
| Pathology | 89 | |
| Pediatrics | 194 | |
| Preventive Medicine | 90 | |
| Preventive Medicine, Aerospace | 67 | |
| Psychiatry | 129 | |
| Radiology | 173 | |
| Sports and Physical Medicine | 6 | |
| Surgery | 235 | |
| Undersea Medicine | 92 | |
| Unknown/Other | 0 | |
| Urology | 42 | |
| **All** | **3,802** | |

Table 10. Navy–civilian occupation mapping: Dental Corps

| Specialty | On duty in 2006 | ACS Occupation(s) (ACS Code) |
|---|---|---|
| Comprehensive Dentistry | 121 | |
| Dental Education Programs | 0 | |
| Dental Science and Research | 3 | |
| Dentistry (General) | 378 | |
| Endodontics | 60 | |
| Health Care Management | 2 | |
| Maxillofacial Prosthetics | 11 | |
| Operative Dentistry | 20 | |
| Oral Medicine/Oral Diagnosis | 9 | Dentists |
| Oral Pathology | 10 | (3010 29-1020) |
| Oral and Maxillofacial Surgery | 100 | |
| Orthodontics | 24 | |
| Pediatric Dentistry | 20 | |
| Periodontics | 62 | |
| Prosthodontics | 57 | |
| Public Health Dentistry | 9 | |
| Temporo-mandibular Disorders | 14 | |
| Unknown/Other[a] | 158 | |
| **All** | **1,058** | |

a. There is an unusually large number of personnel with an "Unkown/Other" subspecialty in the 2006 data. Comparing the 2006 and 2005 data, the main difference is in the number of officers with the subspecialties of General Dentistry and Oral and Maxillofacial Surgery.

Table 11. Navy–civilian occupation mapping: Nurse Corps

| Specialty | On duty in 2006 | ACS Occupation(s) (ACS Code) |
|---|---|---|
| Ambulatory Care Nursing | 27 | |
| Cardiovascular Nursing | 0 | |
| Coronary Care Nursing | 0 | |
| Critical Care Nursing | 193 | |
| Emergency/Trauma Nursing | 189 | |
| Medical Intensive Care Nursing | 0 | |
| Medical Nursing | 0 | |
| Medical/Surgical Nursing | 549 | |
| Neonatal Intensive Care Nursing | 27 | |
| Newborn Nursing | 0 | |
| Nurse Anesthesia | 186 | |
| Obstetrical Nursing | 0 | |
| Oncology Nursing | 0 | |
| Orthopedic Nursing | 0 | |
| Pediatric Nursing | 49 | |
| Perinatal Nursing | 209 | Registered nurses[a] |
| Perioperative Nursing | 257 | (3130 29-1111) |
| Post-Anesthesia Care Nursing | 0 | |
| Professional Nursing | 780 | |
| Psychiatric Nursing | 64 | |
| Surgical Intensive Nursing | 0 | |
| Surgical Nursing | 0 | |
| Adult Health Nurse Practitioner | 0 | |
| Family Nurse Practitioner | 66 | |
| OB/GYN Nurse Practitioner | 20 | |
| Pediatric Nurse Practitioner | 24 | |
| Nurse Midwife | 29 | |
| Education | 25 | |
| Education and Training Specialist | 31 | |
| Health Care Management | 24 | |
| Nursing/Health Care Administration | 63 | |
| Manpower Systems Analysis | 17 | |
| **All** | **2,829** | |

a. The civilian data identify nurses based on their professional credential rather than their medical specialty. Our data did not indicate the nursing credential earned by Navy nurses. Since a Bachelor's degree is a requirement for service as a Navy officer and since registered nurses (RNs) account for 98 percent of the civilian college-educated nursing workforce, we used RN as the matching occupation code for the Nurse Corps.

Table 12. Navy–civilian occupation mapping: Medical Services Corps

| Specialty | On duty in 2006 | ACS Occupation(s) (ACS Code) |
|---|---|---|
| **Psychologists** | | |
| Aerospace Experimental Psychology | 31 | Psychologists (1820 19-3030) |
| Child Psychology | 7 | |
| Clinical Psychology | 105 | |
| Medical Psychology | 2 | |
| Neuropsychology | 2 | |
| Research Psychology | 17 | |
| **Physical and Life Scientists** | | |
| Aerospace Physiology | 92 | Biological scientists (1610 19-1020); Medical scientists (1650 19-1040); Astronomers & physicists (1700 19-2010); Atmospheric & space scientists (1710 19-2021); Chemists & materials scientists (1720 19-2030); Environmental & Geo-scientists (1740 19-2040); Physical scientists, all other (1760 19-2099) |
| Physiology | 13 | |
| Biochemistry | 33 | |
| Entomology | 36 | |
| Epidemiology | 1 | |
| Immunology | 3 | |
| Parasitology | 2 | |
| Toxicology | 3 | |
| Virology | 0 | |
| Environmental Health | 79 | |
| **Health Care Practitioners** | | |
| Optometry | 128 | Optometrists (3040 29-1041) |
| Podiatry | 19 | Podiatrists (3120 29-1081) |
| Clinical Dietetics | 37 | Dieticians & Nutritionists (3030 29-1031) |
| Pharmacy Clinical | 15 | Pharmacists (3050 29-1051) |
| Pharmacy General | 100 | |
| Physician Assistant | 196 | Physician assistants (3110 29-1071) |
| Audiology | 21 | Audiologists (3140 29-1121) |
| Occupational Therapist | 21 | Occupational therapists (3150 29-1122) |
| Physical Therapist | 76 | Physical therapists (3150 29-1123) |
| Radiation Health | 55 | Radiation therapists (3200 29-1124) |
| Radiation Specialist | 18 | |
| **Healthcare Technical Occupations** | | |
| Computer Technology | 25 | Clinical lab technologists & technicians (3300 29-2010); Health practitioner support technicians (3410 29-2050); Miscellaneous health technologists & technicians (3530 29-2090); Medical records and health information technicians (3510 29-2071) |
| Medical Technology | 83 | |
| Medical Data Systems Administration | 9 | |

Table 12. Navy–civilian occupation mapping: Medical Services Corps (continued)

| Specialty | On duty in 2006 | ACS Occupation(s) (ACS Code) |
|---|---|---|
| **Management and administration** | | |
| Health Care Administration | 547 | Medical and health services managers (0350 11-9111) |
| Patient Administration | 103 | |
| **Miscellaneous** | | |
| Operations Research | 11 | Operations research (1220 15-2031) |
| Social Worker | 30 | Social workers (2010 21-1020) |
| Material Logistics Support Management | 14 | Logisticians (0700 13-1081) |
| Medical Logistics Administration | 114 | |
| Manpower Systems Analysis | 30 | |
| Industrial Hygiene | 122 | |
| Medical Construction Liaison | 18 | |
| Education and Training Specialist | 10 | |
| Plans, Operations and Medical Intelligence | 99 | |
| Unknown/Other | 36 | |
| **All** | **2,363** | |

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