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Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel

A Component of the Defense Lifestyle Assessment Program (DLAP)

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The views, opinions, and findings contained in this report are those of the authors and should not be construed as an official Department of Defense position, policy, or decision, unless so designated by other official documentation.

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Preface and Acknowledgments

For more than 20 years, the Department of Defense (DoD) has collected information regarding behavioral and health readiness of active duty military personnel through the Survey of Health Related Behaviors Among Military Personnel. In 2005, DoD initiated the *Department of Defense Lifestyle Assessment Program (DLAP)*, which incorporates the active-duty health behaviors study and expands the scope to include the National Guard and Reserves, as well as other special studies, the first of which will examine unit-level influences on alcohol and tobacco use. Findings from the program will provide information on the fitness of the force, including estimates of alcohol, drug, and tobacco use; nutrition and physical activity; and critical assessments of emotional stress and other issues. Data will be used to assess and document potential health and lifestyle issues pertaining to personnel, to track health-related trends, and to identify high-risk groups and areas needing additional screening or intervention. Results will help leaders better understand the nature, causes, and consequences of substance abuse and health practices in the military and to evaluate and guide programs and policy.

The 2005 DoD Survey of Health Related Behaviors Among Active Duty Military Personnel was conducted by RTI International (RTI) under the sponsorship of the Office of the Assistant Secretary of Defense (Health Affairs) and the TRICARE Management Activity (Health Program Analysis and Evaluation Directorate). The 2005 active duty survey is the ninth in a series of DoD surveys conducted since 1980 and has two broad aims for active duty military personnel: (a) to continue the survey of substance use and (b) to assess progress toward selected *Healthy People 2010* objectives. Findings from the study have significance for understanding a wide range of health-related behaviors among military personnel. They will also help identify both the common needs of the Active Force and the distinct needs of each Service.

Many individuals contributed to the success of this study. Among DoD and military Services personnel, special appreciation is due to Ms. Kim Frazier, Lieutenant Colonel Nancy Fagan, Lieutenant Colonel Lorraine Babeu, Dr. Michael Peterson, and Ms. Lynn Pahland who provided valuable guidance and facilitated conduct of the study. We also wish to thank Lieutenant Colonel Lorraine Babeu, Dr. Michael Peterson, Lieutenant Colonel Nancy Fagan, Colonel Ronald Shippee, Colonel Joyce Grissom, Colonel Robert Ireland, and Ms. Amii Kress for their review and suggestions on the manuscript. We also acknowledge Dr. David Tornberg, Dr. William Winkenwerder, Jr., and Dr. David Chu for their interest and continuing support of the survey.

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Mr. Joseph Gfroerer and Mr. Arthur Hughes of the Substance Abuse and Mental Health Services Administration, Office of Applied Studies, provided access to the data from the 2004 National Survey on Drug Use and Health to enable military and civilian comparisons of substance use. Under subcontract to RTI, Data Recognition Corporation printed, shipped, and received the questionnaires. It also performed the optical scanning of the questionnaires and provided a data file for the analysis.

Many RTI staff members in addition to the report authors contributed significantly to the success of this project by composing the questionnaire, constructing the sampling frames for the Services, coordinating data collection activities, tabulating data, completing various data processing tasks, and editing and formatting the report. In particular, Ms. BeLinda Weimer coordinated questionnaire development, Mr. Russ Vandermaas-Peeler led the data collection task, and Mr. Nathan Gill coordinated day-to-day activities with the field sites. Dr. Laurel Hourani had major responsibility for the analyses. Ms. Kristine Rae Olmsted and Mr. Michael Witt oversaw all data management activities and produced the data estimates, and Mr. Scott Scheffler led the sampling and weighting tasks. Members of the RTI field teams are commended for accomplishing their data collection tasks under rigorous travel and scheduling demands. Finally, thanks are due to Ms. Lauren Mine, Ms. Sharon Barrell, Ms. Carol Offen, Mr. Richard Straw, and Ms. Laura White, who copyedited and proofread the report, and to Ms. Catherine Boykin and Ms. Roxanne Snaauw, who completed the enormous word processing requirements.

Robert M. Bray, Ph.D.
Project Director

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Executive Summary

This report presents the primary results of the 2005 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel. This study is the ninth in a series of surveys of active-duty military personnel conducted in 1980, 1982, 1985, 1988, 1992, 1995, 1998, 2002, and 2005 under the direction of the Office of the Assistant Secretary of Defense (Health Affairs). All of the surveys investigated the prevalence of alcohol use, illicit drug use, and tobacco use, as well as negative consequences associated with substance use. The 1985 through 1992 surveys also covered an expanded set of health behaviors and related issues. In 1995 and 1998, health behavior questions were revised and items were added to assess selected *Healthy People 2000* objectives. In addition, questions were added to examine the mental health of the active force, specific health concerns of military women and military men, oral health, and gambling behaviors. The 2002 and 2005 surveys continued the general focus of the 1998 survey and expanded it to include *Healthy People 2010* objectives. They also augmented the items on exercise, nutrition, and mental health and added new items on dietary supplement use, risk taking and impulsive behavior, job satisfaction, deployment, and religiosity/spirituality.

The eligible population for the 2005 survey consisted of all active-duty military personnel except recruits, Service academy students, personnel absent without official leave (AWOL), and personnel who had a permanent change of station (PCS) at the time of data collection. The final sample consisted of 16,146 military personnel (3,639 Army, 4,627 Navy, 3,356 Marine Corps, and 4,524 Air Force) who completed self-administered questionnaires anonymously. Participants were selected to represent men and women in all pay grades of the active force throughout the world. Data were collected primarily from participants in group sessions at military installations; they were obtained by mail for those not attending the sessions. The overall response rate was 51.8%. The data were weighted to represent all active-duty personnel.

Selected key findings from the 2005 survey are noted below. ***In interpreting and understanding the findings, three points should be considered: (a) The data and results are self-reported findings that may differ from information in official records or other objective data sources; (b) some questionnaire items comprise screeners suggestive of possible substance abuse or mental health issues; results from these screeners may suggest the need for further evaluation but do not represent a formal clinical diagnosis; and (c) in reporting the findings, the term "significant" is often used. This term refers to statistical significance resulting from statistical tests of differences that were conducted.***

Substance Use and Negative Effects

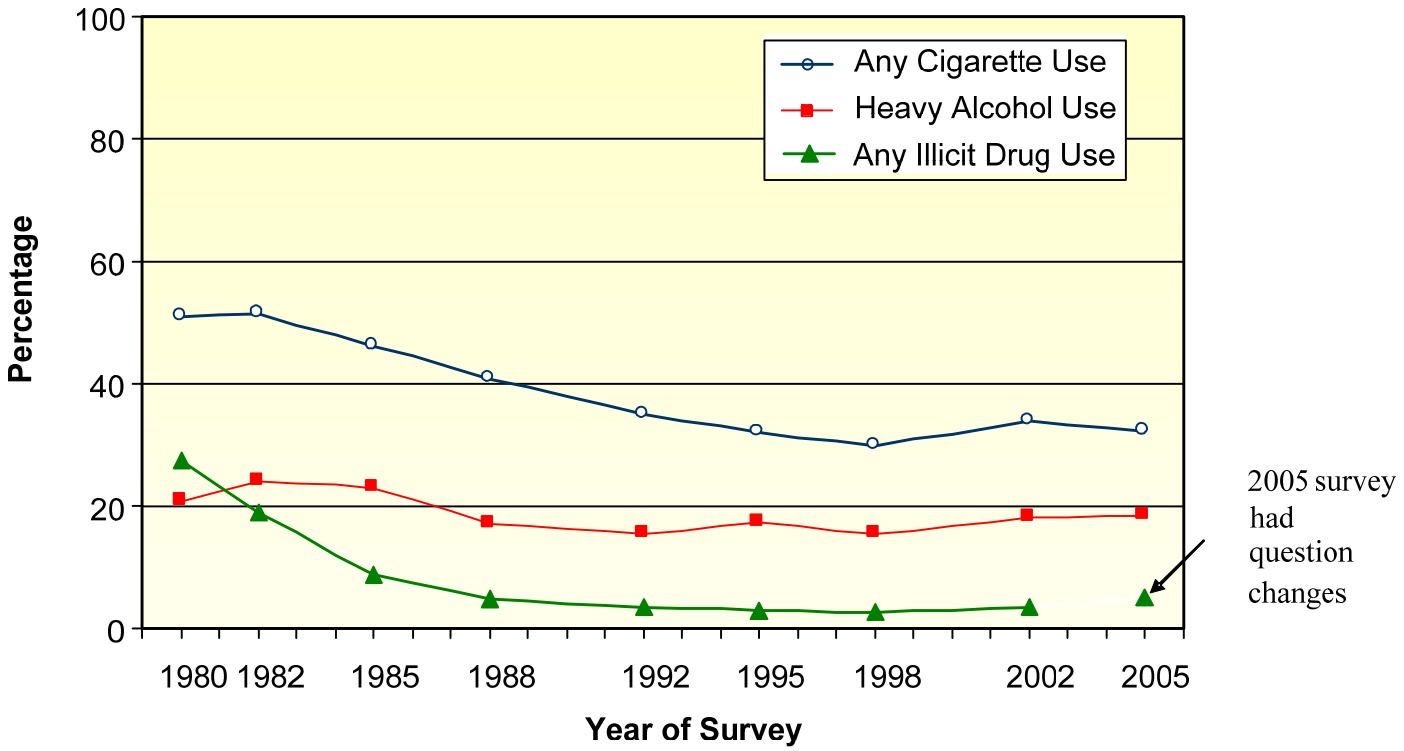
Overall Trends

The 2005 survey obtained data on alcohol, tobacco, and illicit drug use to assess prevalence rates of the use of these substances among military personnel. These data were combined with data from prior surveys to examine trends in substance use and negative effects of alcohol use from 1980 to 2005. For illicit drug use, the 2005 data were not included in the trend because of some changes in question wording. Rather they are noted as a separate data point for 2005. In addition, comparisons were made between military and civilian data. The findings showed progress in many areas but also identified issues needing further attention.

Figure ES.1 presents the trends over the nine DoD surveys of the percentage of the total active force during the past 30 days who engaged in heavy alcohol use, any illicit drug use, and any cigarette use.

- As shown in Figure ES.1, there has been a statistically significant downward trend in past-month use of cigarettes and illicit drugs over the years for the total DoD. Cigarette smoking decreased significantly from 51.0% in 1980 to 32.2% in 2005, and use of any illicit drugs decreased significantly from 27.6% in 1980 to 3.4% in 2002 (the rate for

Figure ES.1 Trends in substance use, past 30 days, total DoD, 1980-2005



2005 was 5.0% but was not comparable to the prior data because of wording changes in the questionnaire). In contrast, the change for heavy alcohol use (five or more drinks per typical drinking occasion at least once a week) from 20.8% in 1980 to 18.5% in 2005 was *not* statistically significant.

- Comparisons of findings between the 2002 and 2005 surveys showed a statistically significant decrease in the rate of heavy cigarette use (13.1% to 11.0%) but no significant change for heavy alcohol use (18.1% to 18.5%) or any cigarette use (33.8% to 32.2%). Comparisons were not made for illicit drug use in the past 30 days.

Alcohol Use

The following findings were not adjusted for age or other sociodemographic distribution differences among the Services or over time:

- From 2002 to 2005, the Army showed a nonsignificant change in heavy drinking (because of large standard error), from 18.8% to 24.5% (a 30% increase). This difference was consistent with a statistically significant increase in ounces of ethanol consumed for the Army and may signal a pattern of increasing heavy alcohol use in the Army. This is reflected by a statistically significant increase in heavy alcohol use in the Army from 1998 (17.2%) to 2005 (24.5%). The other Services and DoD showed no statistically significant changes from 2002 to 2005.
- The rate of binge drinking (consuming five or more drinks on the same occasion at least once during the past 30 days) was 44.5% among military personnel. For most military personnel, the data indicate that binge drinking is a social occasion.
- Serious consequences of alcohol use showed a statistically significant decrease from 17.3% in 1980 to 6.7% in 1998, showed a statistically significant increase to 9.6% in 2002, and showed no significant change between 2002 and 2005 (8.1%). Productivity loss showed a statistically significant decrease from 26.7% in 1980 to 13.6% in 1998, a statistically significant increase to 17.3% in 2002, and a statistically significant decrease between 2002 and 2005 to 13.2%.
- A new screener of alcohol dependence used in the 2005 survey, the Alcohol Use Disorders Identification Test (AUDIT), indicated that 2.9% of military personnel had symptoms that could likely lead to alcohol dependence.

Illicit Drug Use

- Any illicit drug use in the past 12 months was similar to the pattern for past-30-day use but at higher levels. Drug use showed statistically significant decreases for the total DoD and each of the Services between 1980 and 2002. The 12-month rate for 2005 was 10.9% and the 30-day rate was 5.0%.
- After adjusting for sociodemographic differences among the Services, estimated rates of past-month illicit drug use were lower for the Marine Corps but remained about the same for the other Services. After the adjustments, estimated rates of drug use for the Army (6.8%) and Marine Corps (5.1%) were significantly higher than for the Air Force (3.1%). Adjusted rates suggest that sociodemographic differences among the Services partially explain Service differences in drug use rates.
- In 2005, 3.3% of military personnel reported nonmedical use of analgesics and 1.3% reported use of marijuana in the previous month. Except for marijuana use and nonmedical use of analgesics, 30-day use of all other individual drugs was 1% or less.

Tobacco Use

- Cigarette smoking remains a common behavior for a third of military personnel. There were no statistically significant changes between 2002 and 2005 in the prevalence of any past-month smoking for any of the four Services. However, the prevalence of any smoking in the Army (38.2%) was higher in 2005 than at any point since 1988 and has shown a statistically significantly increase since 1998 (31.1%).
- Among past-year smokers in 2005, 66.8% tried to quit or quit successfully in the previous 12 months. An estimated 23.1% of current smokers indicated that they planned to quit within the next 30 days, and an additional 40.0% reported an intention to quit within the next 6 months.
- The prevalence of past-month smokeless tobacco use showed a statistically significant increase from 12.2% in 2002 to 14.5% in 2005. Personnel in the Marine Corps had the highest prevalence of use (22.3%), and those in the Air Force had the lowest (9.2%). The Army was the only Service that showed a statistically significant increase in smokeless tobacco use from 2002 (14.0%) to 2005 (18.8%).

Military-Civilian Comparisons

Standardized comparisons showed substantial differences between substance use patterns of military personnel and civilians (using data from the 2004 National Survey on Drug Use and Health). After adjusting for sociodemographic differences between military and civilian populations, findings showed the following:

- Military personnel overall were significantly more likely to drink heavily than were their civilian counterparts (16.1% vs.12.9%). However, the differences in heavy drinking varied by age group. Military personnel aged 18 to 25 showed significantly higher rates of heavy drinking (24.8%) than did civilians (17.4%), whereas rates of heavy drinking for personnel aged 26 to 55 (9.7%) were not statistically different than those of their civilian counterparts (9.5%).
- Military personnel were significantly less likely than civilians to have used any illicit drug in the previous 30 days (4.6% vs. 12.8%). This pattern held across both age groups (18 to 25; 26 to 55) and for males and females for the total DoD.
- Overall, military personnel were as likely as civilians to smoke cigarettes (30.1% vs. 28.9%). Cigarette smoking among military men and women aged 18 to 25, however, was significantly higher than among their civilian counterparts (men, 42.4% vs. 37.6%; women, 29.2% vs. 25.8%).

Overall findings indicated that the military made steady and notable progress from 1980 to 2005 in combating substance use and its associated problems. However, there is room for considerable improvement in some areas, particularly in reducing heavy alcohol use, binge drinking, cigarette smoking, and smokeless tobacco use.

Progress Toward **Healthy People 2010** ***Objectives***

A variety of *Healthy People 2010* objectives were assessed in the 2005 survey. The objectives that were measured were classified into three groups for presentation and discussion:

1. substance use objectives (cigarette smoking, smokeless tobacco, binge drinking, illicit drug use)

2. health promotion objectives (weight, exercise, diet, blood pressure, cholesterol, seat belt use, helmet use, condom use)
3. women's health objectives (Pap tests, substance use during pregnancy)

Table ES.1 summarizes most of these objectives and the corresponding prevalence rates from the 1995 to 2005 surveys for these behaviors. Key findings are as follows:

- Overall, in 2005, the military met or exceeded 7 of the 19 key *Healthy People 2010* objectives (obesity, vigorous exercise, seat belt use, helmet use for motorcycles, Pap tests ever received, Pap tests received in the past 3 years, and no alcohol use during pregnancy).
- The 12 objectives that were not met were cigarette smoking, smokeless tobacco use, binge drinking, any illicit drug use, healthy weight, food intake (fruits and vegetables), blood pressure awareness, blood pressure control, cholesterol checks, condom use, and no cigarette use during pregnancy.
- Overweight based on Body Mass Index (BMI) (greater than or equal to 25.0) was also measured, because of the military's interest in it, although it is not a *Healthy People 2010* objective. Consistent with what is being observed nationwide, overweight based on BMI increased significantly from 58.3% in 2002 to 61.6% in 2005 for persons aged 20 or older. This finding continues a trend of statistically significant increases in overweight based on BMI for a decade from 1995 (50.0%) to 2005 (60.5%). BMI has some limitations that may be accentuated among military personnel. Muscled individuals with an accumulation of lean body mass and a BMI at or above 25 may be classified as overweight even though their percentage body fat is in a healthy range.

Overall, by 2005, the military met about 37% of the 19 *Healthy People 2010* objectives examined here. The areas where objectives have been met are those for which military regulations help ensure compliance with the desired behaviors (exercise, obesity, seat belt use, helmet use).

Healthy Behaviors and Healthy Lifestyles

- Approximately 10% of military personnel eat three or more servings of fruit and vegetables a day.
- In the total DoD, 60.3% of military personnel took dietary supplements at least once a week in the previous 12 months.
- About 4% of military personnel (3% of males and 7% of females) reported a sexually transmitted disease (STD) in the previous year.
- Overall, 7.1% of sexually active personnel reported that they had or caused an unintended pregnancy in the previous year.
- Approximately 75% of military personnel reported getting less than 7 hours of sleep on average per night. Air Force personnel get significantly more sleep per night than personnel from other Services.

Stress and Mental Health

The 2005 DoD survey examined a variety of mental health issues among military personnel, including stress; coping mechanisms; screening criteria for symptoms of anxiety, depression, and posttraumatic stress disorder (PTSD); suicidal ideation and attempt; relationships between alcohol use and mental health issues; and perceptions of the potential career impact of mental health counseling.

Stress

- Higher percentages of military personnel rated their jobs (32.5%) as more stressful than their personal lives (18.9%). The most frequently indicated stressors for both men and women were being away from family (16.6%), deployment (13.4%), and increases in work load (12.9%). Overall work and family stress levels have not changed significantly since 2002.
- Personnel reporting high levels of perceived work stress were more likely to work below their normal performance level (38.2 %) than those in the moderate/low-stress group (20.4%). Not coming to work on 4 or more days in the previous year because of illness or injury was twice as common in the high-stress group (7.8%) as in the moderate/low-stress group (3.7%).

Table ES.1 **ACHIEVEMENT OF SELECTED *HEALTHY PEOPLE 2010* OBJECTIVES, TOTAL DOD, 1995-2005**

Characteristic/Group	2010 Objective[a]	Civilian Estimates	Year of Survey 1995	1998	2002	2005
Cigarette Smoking, Past 30 Days	12.0%	24.0%	31.9	29.9	33.8	32.2
Smokeless Tobacco Use, Past 30 Days						
Males aged 18-24	N/A	N/A	21.9	19.0	17.1	21.6**
All personnel	0.4%	2.6%	13.2	11.7	12.2	14.5**
Binge Drinking, Past 30 Days	6.0%	16.6%	N/A	N/A	41.8	44.5
Any Illicit Drug Use, Past 30 Days	2.0%	5.8%	3.0	2.7	3.4	
Any Illicit Drug Use, Past 30 Days	2.0%	5.8%				5.0
Overweight Based on BMI[b]—*2005 Dietary Guidelines*						
Under age 20	N/A		1.8	1.2	1.9	6.9**
Aged 20 or older	N/A	N/A	51.2	55.2	58.3	61.6**
Total	N/A	N/A	48.6	52.9	55.3	57.9
Overweight Based on BMI[b]—*1998 National Heart, Lung, and Blood Institute (NHLBI) Guidelines*						
Under age 20	N/A	N/A	28.1	31.6	36.5	45.1**
Aged 20 or older	N/A	N/A	51.2	55.2	58.3	61.6**
Total	N/A	N/A	50.0	54.2	57.2	60.5**
Obesity Based on BMI[b]—*Healthy People 2010*						
Aged 20 or older	15%	23%				12.4†
Healthy Weight Based on BMI[b]—*Healthy People 2010*						
Aged 20 or older	60%	42%	47.9	44.0	40.7	37.2**
Vigorous Physical Activity, Past 30 Days						
All personnel	≥30%	23%	65.4†	67.7†	70.2†	
All personnel (Refined definition)						57.6†
Food Intake—Fruits and Vegetables						
Fruits ≥ 3 times/day—All personnel	75%	28%				7.7
Vegetables ≥ 3 times/day—All personnel	50%	49%				9.5
Blood Pressure, Checked Past 2 Years and Know Result						
All personnel	≥95%	90%	76.3	80.4	77.9	78.2
Taking Action to Control High Blood Pressure						
Personnel with history of high blood pressure	≥95%	82%	49.3	46.5	49.0	54.7**
Cholesterol Checked, Past 5 Years						
All personnel	≥80%	67%	60.1	62.4	56.3	57.2
Hospitalization for Injuries, Past 12 Months						
All personnel	N/A	N/A	3,388	3,271	3,625	2,679**
Seat Belt Use						
All personnel	≥92%	69%	90.6	91.4	92.1†	91.8†
Helmet Use, Past 12 Months						
Motorcyclists	≥79%	67%	71.0	75.9	82.1†	84.4†
Bicyclists	N/A	N/A	22.8	44.2	51.9	56.3
Condom Use at Last Encounter						
Sexually active unmarried personnel	≥50%	23%	40.4	41.8	42.1	45.6**
Pap Test						
Ever received	97%	92%	97.1†	97.8†	98.4†	97.8†
Received in past 3 years	90%	79%	95.2†	95.9†	97.2†	97.0†
Substance Use During Last Pregnancy						
No alcohol use	94%	86%	85.2	85.8	89.9	94.8**,†
No cigarette use	99%	87%	83.9	85.8	88.5	89.9

Note: The table displays percentages of military personnel by survey year who reported the characteristic shown in each row of the table. The exceptions to this are the estimates for hospitalization for injuries, which is expressed per 100,000 personnel.

N/A: Not applicable.

**Comparisons between 2002 and 2005 are statistically significant at the 95% confidence level.

†Met or exceeded *Healthy People 2010* objective.

[a]Department of Health and Human Services. (2000, November). *Healthy People 2010: Understanding and improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.

[b]BMI means Body Mass Index.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995 to 2005.

Coping

- The most commonly used strategies for coping with stress were using a problem-solving approach (81.0%), seeking social support (74.1%), and engaging in a physical activity (61.5%) or a hobby (61.2%). More than a quarter of military personnel, however, commonly used alcohol or tobacco to cope with stress, daily pressures, and feelings of depression. More males than females reported using alcohol (29.9% vs. 21.8%) and cigarettes (27.7% vs. 22.6%) as coping behaviors. Females were more likely than males to use eating as a coping strategy (50.8 % vs. 42.5%).

Mental Health

- The self-reported prevalence of symptoms indicating a need for further evaluation among military personnel was 12.7% for anxiety and 22.3% for depression. Only 8.1% of military personnel met criteria for serious psychological distress as measured by the K-6 mental health screen, and 6.7% met screening criteria for needing further evaluation for past 30-day PTSD as measured by the PTSD Checklist-Civilian (PCL-C). A small percentage of personnel had seriously considered or attempted suicide before joining the Service (7.7% and 2.9%, respectively).
- Personnel who met screening criteria for anxiety or depression symptoms self-reported "a lot" of stress associated with work and with family. Productivity loss was higher among personnel reporting suicidal ideation or in need of further evaluation for anxiety or depression than it was among those who did not meet criteria for needing this evaluation.
- Compared with nondrinkers, heavy users of alcohol were more likely to have perceived a lot of stress at work (41.1% vs. 28.4%) or in their family (24.7% vs. 15.3%), were more likely to report symptoms of anxiety (17.5% vs. 10.1%) and depression (31.2% vs. 19.1%), and were more likely to report limitations in activities on 11 or more days as a result of poor mental health (4.8% vs. 2.0%). Heavy drinkers were also more likely than those who drank less to have met criteria for serious psychological distress and to have had a history of suicidal ideation or physical or sexual abuse.
- Roughly 18% of personnel had perceived a need for mental health care in the 12 months before the survey, and about 15% received this care.
- A large portion (44.1%) of personnel perceived that seeking mental health counseling would probably or definitely damage their career, and those who did not receive mental health services were more likely than those who received services to believe that counseling would damage a military career (63.2% vs. 47.9%).

Other Specific Issues

The 2005 DoD survey also investigated several other specific issues that may affect the health of the active force: (a) women's health issues, including stress associated with being a woman in the military; (b) status of oral health; (c) deployment issues; (d) job satisfaction; and (e) religiosity/spirituality.

Women's Health Issues

- About 35% of women reported a "great deal" or a "fairly large amount" of stress associated with being a woman in the military. Women in the Marine Corps had the highest prevalence rate (49.3%), followed by women in the Army (40.0%), Navy (35.0%), and Air Force (30.3%). Rates were higher among women who were younger, less educated, married without a spouse present, enlisted, and serving on assignments outside the continental United States.
- Nearly 17% of military women reported that they had been pregnant within the previous year, and 92% reported receiving their first prenatal care in their first trimester. Women without a college degree and enlisted women were less likely to have received prenatal care in their first trimester.
- About 95% of all military women who were pregnant in the previous 5 years abstained from drinking alcohol during their most recent pregnancy. Drinking during pregnancy appeared to be more common among officers (11.1%), older women (9.6%), women with a college degree (9.3%), and Marines (9.2%). About 90% of military women who were pregnant in the previous 5 years reported no cigarette use during their most recent pregnancy. Women who smoked were more likely to be aged 34 or younger and to be enlisted, and they were less likely to have a college degree.

Oral Health

- An estimated 81% of all military personnel had a dental check-up in the previous 12 months. Of all military personnel across the total DoD, about a third had been required to have dental work done in the previous 12 months before they could be deployed at sea or in the field. Approximately 17% of all personnel, since joining the military, had lost a permanent tooth or teeth because of one or more of the following problems: gum disease, cavities, a mouth injury, or some other problem. Of those personnel who did not have a dental check-up in the previous 12 months, almost 18% had not done so because they could not get time off from work.

Deployment

- In the total DoD, 56.3% of personnel had been deployed in the past 3 years, 7.3% of personnel reported being unable to deploy in the previous 12 months, and another 2.6% returned early from deployment. Injuries, training, and family problems were the most frequently cited reasons for being unable to deploy.
- Personnel who had deployed *within the past 3 years* reported higher percentages of work and family stress, mental health symptoms and suicide attempts, heavy alcohol use and dependence, illicit drug use, and tobacco use and dependence than those who had not deployed. In contrast, only stress at work and substance use were associated with theater of operation.
- Of personnel who were deployed *in the previous year*, 13.6% reported that they began or increased their alcohol use since deployment, and 17.1% that they stopped or decreased their alcohol use since deployment. A reported 10.3% began smoking cigarettes or increased their smoking since deployment and 12.4% reported quitting or smoking less.
- An estimated 6.1% of personnel began using or used more smokeless tobacco since deployment; similarly 6.3% began/increased their cigar or pipe use. In contrast, 8.2% reported quitting or using less smokeless tobacco and 10.3% quit or reduced cigar or pipe smoking. The Army had the largest percentage of deployment-related new or increased substance users.
- Almost 20% of deployed personnel reported more conflict or arguments in the previous year with their spouse, fiancé, boyfriend, or girlfriend since deployment, and 14.4% reported a divorce or separation since deployment. Approximately 16% of deployed personnel reported arguing less or getting along better after deployment.

Job Satisfaction

- Overall, 66.2% of military personnel indicated that they were either “satisfied” or “very satisfied” with their current work assignment. Satisfaction was highest in the Air Force (73.7%) and lowest in the Army (57.9%). Air Force personnel were most likely to indicate that they would be “likely” or “very likely” to choose to remain on active duty if given the choice (64.4%), followed by the Navy (54.1%), Army (44.4%), and Marine Corps (43.5%).

Religiosity/Spirituality in the Military

- An estimated 20% of military personnel self-reported being highly religious or spiritual. More than half (54%) had a medium level of religiosity/spirituality, and about a fourth of personnel had low religiosity/spirituality. Highly religious/spiritual personnel were statistically less likely than those reporting low religiosity/spirituality to report substance use or perceive “a lot” of stress in their family, to need further evaluation of depression or anxiety, or to indicate that they had seriously considered suicide in the year before the survey.

Maintaining the health of the active force is an important factor contributing to mission readiness. The findings noted above and other related findings are discussed in greater detail in this report. The report also describes the methodologies used to develop these estimates and suggests areas in need of attention to address key health issues that the military faces in the early 21st century.

Chapter 1: Introduction and Background

This report presents findings from the 2005 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel, conducted by RTI International (RTI) of Research Triangle Park, North Carolina. It describes trends in substance use during the 25 years between 1980 and 2005, health behaviors related to selected *Healthy People 2010* objectives (U.S. Department of Health and Human Services [DHHS], 2000), and progress toward achieving health-related goals set forth by DoD. For this report, *substance use* includes use of alcohol, illicit drugs (illegal drugs or prescription drugs used without a doctor's prescription or in greater amounts than prescribed, or for the feelings they caused), and tobacco (cigarettes, smokeless tobacco, pipes, and cigars).

This study is the ninth in a series of surveys of military personnel across the world, conducted in 1980, 1982, 1985, 1988, 1992, 1995, 1998, 2002, and 2005 under the guidance of the Office of the Assistant Secretary of Defense (Health Affairs) (OASD [HA]). All of the surveys have assessed the prevalence of alcohol use, illicit drug use, and tobacco use, as well as adverse consequences associated with substance use. Beginning in 1985, the surveys examined the effects of health behaviors other than substance use on the quality of life of military personnel. In 1988, this aspect was broadened in line with DoD health promotion objectives to include information about knowledge of and attitudes toward acquired immunodeficiency syndrome (AIDS). In 1992, in collaboration with DoD and the Services, RTI broadened this aspect of the survey even further to give greater emphasis on nutrition and health risks, knowledge, and beliefs about AIDS transmission. The 1992 survey also examined other special issues, including the impact of Operations Desert Shield and Desert Storm on substance use rates and the effects of problem gambling in the military. In 1995, the health behavior questions were revised and items added to assess selected *Healthy People 2000* objectives; the mental health of the force; and specific health concerns of military women, including stress, pregnancy, substance use during pregnancy, and receipt of health services. In 1998, some of the health behavior questions were revised and items added to assess oral health, men's health, and gambling behavior. The 2002 survey was revised to reflect the continuing need for the Services to better understand substance use and mental health issues. Specifically, the assessment of alcohol dependence was broadened to reflect symptomatology consistent with diagnostic criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV*) (American Psychiatric Association [APA], 1994), and items were added to assess selected *Healthy People 2010* objectives, risk taking and impulsiveness, reasons for limiting drinking, spiritual practices, anxiety, suicide ideation, and expectancies or beliefs about smoking. In 2005, revisions were made to the alcohol use items to be consistent with items from the Alcohol Use Disorders Identification Test (AUDIT), questions were added to assess nicotine dependence, questions on illicit drug use were revised to add descriptions of drug use categories, and questions were added on sexual enhancers. Further, questions were added to better assess nutrition and overweight, use of complementary or alternative medicine treatments, serious mental illness, and deployment and its effects.

This chapter discusses the relevance of health promotion to the military, along with background on the DoD survey series, objectives for the 2005 survey, and findings from other studies of the prevalence of substance use and other health-related behaviors among military personnel.

1.1 Organization of the Report

This report describes substance use and other health-related behaviors among active-duty U.S. military personnel throughout the world in 2005. The general methodology for the 2005 survey is presented in Chapter 2, including sampling design, instrument development, data collection procedures, survey performance rates, sample participants and military population characteristics, key definitions and measures, analysis techniques, variability and suppression of

estimates, and strengths and limitations of the data. Chapter 3 provides an overview of trends in substance use and other health-related behaviors for the total DoD population, including DoD-level findings for selected *Healthy People 2010* objectives. Trend analyses presented in Chapter 3 compare findings from the 2005 DoD survey with findings from the eight previous surveys conducted worldwide for DoD.

The next three chapters describe the prevalence, trends, correlates, and comparisons with the civilian population of rates of alcohol use (Chapter 4), illicit drug use (Chapter 5), and tobacco use (Chapter 6). Chapter 7 examines healthy lifestyles and disease prevention, including measures of overweight, obesity, and underweight; food intake and use of dietary supplements; blood pressure and cholesterol screening; and behaviors related to fitness and cardiovascular disease risk reduction. Chapter 8 examines other health-related behaviors, including injuries and injury prevention, sleep habits, perceived health, risk-taking behavior, and sexually transmitted disease (STD) risk reduction and unintended pregnancy. Included is an assessment of progress toward Healthy People 2010 objectives for each of these areas. In connection with findings on STD risk reduction, more detailed information is presented on military personnel's condom use.

Chapter 9 focuses on stress and mental health, including coping mechanisms and sources of stress, indicators of anxiety and depression, screening for serious psychological distress and need for further evaluation of possible posttraumatic stress disorder (PTSD), suicidal ideation and attempt, relations between mental health problems and alcohol use, and utilization of mental health services. Chapter 10 discusses special military health topics, including military women's health, perceived stress associated with being a woman in the military, pregnancy, and maternal and infant issues. In addition to women's health issues, Chapter 10 explores oral health, deployment-related problems, job satisfaction, and the relationship between behavioral health and religiosity or spirituality.

Several appendixes have been included for readers interested in details about the survey's sampling and analysis methodologies, the study questionnaire, and additional data tables. Appendix A describes the sampling design for the 2005 survey, and Appendix B contains a discussion of sample weighting and estimation procedures. Appendix C presents information to help readers use estimates of sampling errors and to clarify the suppression rule used with the estimates. Appendix D contains a set of supplemental tables that augment data reported in the main text. Appendix E provides a detailed discussion of the alcohol summary measures used in this report. In Appendix F, the technical details of the survey's approach to standardization and to multivariate analyses are described. Appendix G lists the DoD survey liaison officers who oversaw and coordinated the survey efforts at each of the participating installations. Finally, Appendix H contains a copy of the instrument for the 2005 survey.

1.2 Health Promotion and the Military

1.2.1 Background and Relevance

In the United States, public health measures, such as improved sanitation, better housing conditions, improved nutrition, immunizations, and development of antibiotics, have been largely responsible for reductions in deaths due to infectious diseases that were common in the early part of the 20th century. In 1900, for example, the major causes of death were infectious diseases, such as influenza, pneumonia, diphtheria, and tuberculosis (Public Health Service, [PHS], 1979). In contrast, the current major causes of death in the United States are chronic diseases. For example, nearly two-thirds of all deaths in the United States in 2000 were caused by heart disease, cancer, or stroke; unintentional injuries were the fifth leading cause of death in the United States in 2000, after heart disease, cancer, stroke, and chronic lower respiratory diseases, such as bronchitis and emphysema (Minino & Smith, 2001). In 2000, among adolescents and young adults aged 15 to 24, however, unintentional injuries were reported as the leading cause of death, followed by homicides and suicides (Minino & Smith, 2001).

In 2000, AIDS fell to 18th among the leading causes of death for all Americans; for adolescents and young adults, AIDS was the 10th leading cause of death (Minino & Smith, 2001). Although male-to-male sexual contact remains the most common mode of transmission, the largest increase in AIDS cases occurred through heterosexual contact with an infected partner (Centers for Disease Control and Prevention [CDC], 1997c). Even though the death rate from AIDS is decreasing, the number of people infected with the AIDS virus is not, indicating a need to strengthen prevention efforts.

Although these diseases and injuries may sometimes be caused by environmental conditions (e.g., occupational exposure to a known carcinogen, such as asbestos), many of these problems are related to "lifestyle" factors, such as cigarette smoking, lack of exercise, fat and cholesterol intake, alcohol use (including driving while impaired), nonuse of seat belts, and risky sexual behaviors (e.g., having multiple sexual partners not using condoms). In particular, the Surgeon General considers tobacco use to be the most important preventable cause of death and disease in the United States (Office on Smoking and Health, 1989). More than one in four deaths in the United States each year can be attributed to alcohol, illicit drug, or tobacco use (Horgan, Marsden, & Larson, 1993). Cirrhosis of the liver, which is often associated with chronic heavy alcohol use, was the eighth leading cause of death among persons aged 18 to 65 in 2000 (Minino & Smith, 2001). In 2001, alcohol was also involved in about 41% of motor vehicle fatalities, and over one-third of these fatalities had blood alcohol concentrations of 0.10% or greater, at or above the legal level of intoxication in most states (National Highway Traffic Safety Administration [NHTSA], 2002).

In addition, cancer screening procedures, such as Pap tests, can detect potentially malignant cell growths early in their development. Thus, although cervical cancer is a major cause of cancer-related deaths among women (CDC, 1993, 1994a), such deaths can be prevented if the cancer is detected early (CDC, 1998a; PHS, 1991).

Just as these health-related behaviors are of relevance to society in general, they also are of interest and concern to DoD and the Services for a number of reasons. First, the health-related behaviors and habits that military personnel acquire or receive reinforcement to maintain during their time in the military can sow the seeds for the kinds of chronic diseases described above, or reduce the risk of these diseases. Even though the military force is composed primarily of young, healthy individuals, behaviors such as cigarette smoking and heavy alcohol use can lead to serious health problems later in life. Research has shown that Air Force recruits who were smokers reported higher alcohol use, more frequent binge drinking, greater smokeless tobacco use, and less physical activity (Haddock, Klesges, Talcott, Lando, & Stein, 1998). Conversely, military personnel can still maintain behaviors that promote health, such as vigorous physical exercise, long after they are discharged. Effective management of stress, depression, and other mental health problems also can contribute to healthier military personnel.

Second, poor health practices among military personnel, including heavy alcohol use and illicit drug use, interfere with the DoD mission of maintaining a high state of military readiness among the armed forces. For example, abuse of alcohol or illicit drugs can impair work performance or pose a danger to others if personnel are either under the influence of alcohol or other drugs or recovering from the effects of these drugs when carrying out their military jobs. Moreover, alcohol and other drug abuse can create personal or family problems, which in turn can interfere with job performance.

Third, DoD considers any use of illicit drugs by military personnel to be abuse and grounds for dismissal from the Services. The rationale for this policy is that the defiance of laws prohibiting use of illicit drugs can have a potentially deleterious effect on military discipline, even if the effects or consequences of such use are minimal.

For these reasons, DoD has been placing increased emphasis on health promotion since the mid-1980s. The remainder of this chapter briefly describes DoD health promotion policies and discusses health objectives for the nation and the military and their relevance to the 2005 DoD survey.

1.2.2 DoD Health Promotion Policies

DoD has had a long-standing interest in the health and well-being of its members. Indeed, having ready access to a comprehensive health care program at little or no cost to members has long been viewed as an important benefit of military life (Stanley & Blair, 1993). Health promotion efforts in the military emerged as an outgrowth of drug and alcohol abuse problems that surfaced in the 1970s. In response to reports of widespread drug abuse among troops during the Vietnam War, and in recognition of the significance of the alcohol abuse problem in the Services, the DoD issued a policy directive in March 1972 (Directive No. 1010.2 [DoD, 1972]) that set forth prevention and treatment policies for alcohol abuse and alcoholism among military personnel. Other DoD policy directives (e.g., DoD Directive Nos. 1010.3 and 1010.4 and Instruction Nos. 1010.5 and 1010.6 [DoD, 1985b, 1980a, 1980b, 1985a, respectively]) and programs provide for the following:

- assessment of the nature, extent, and consequences of substance use and abuse in the military (DoD, 1980a, 1985b, 1997c);
- prevention programs designed to deter substance abuse, which include both education and drug urinalysis testing (DoD, 1980b);
- treatment and rehabilitation programs designed to return substance abusers to full performance capabilities (DoD, 1985a); and
- evaluation of drug urinalysis programs and treatment and rehabilitation programs (DoD, 1985b, 1997c).

In 1986, DoD established a formal, coordinated, and integrated health promotion policy (DoD Directive No. 1010.10) designed to improve and maintain military readiness and the quality of life of DoD personnel and other beneficiaries (DoD, 1986a). This directive defined health promotion as activities designed to support and influence individuals to manage their own health through lifestyle decisions and self-care. It identified six broad program areas: smoking prevention and cessation, physical fitness, nutrition, stress management, alcohol and other drug abuse prevention, and hypertension prevention.

Smoking prevention and cessation programs aim to create a social environment that supports abstinence and discourages use of tobacco products, thereby creating a healthy working environment. The programs also seek to provide smokers with encouragement and professional assistance to stop smoking. Information on the health consequences of smoking is presented to personnel when they enter the military, as part of routine physical and dental examinations, and at the time of a permanent change of station (PCS). Personnel are prohibited from smoking during basic training and, in some Services, during part of their next phase of technical or advanced training. In early 1994, DoD issued Instruction No. 1010.15, mandating a smoke-free workplace (DoD, 1994). Under this instruction, smoking is banned indoors in all DoD workplaces. Policy related to smoking in clubs, eating facilities, and living facilities, such as bachelor's quarters, is still governed by DoD Directive 1010.10, which permits smoking areas to be designated if adequate space is available for nonsmokers and ventilation is adequate to provide them with a healthy environment (DoD, 1986a).

Physical fitness programs aim to encourage and assist military personnel to establish and maintain the physical stamina and cardiorespiratory endurance necessary for good health and a productive lifestyle. Programs that integrate fitness activities into normal work routines and community activities are encouraged.

Nutrition programs aim to encourage and assist military personnel to establish and maintain dietary habits that contribute to good health, prevent disease, and control weight. The weight control aspect of health promotion overlaps with the goals of physical fitness programs discussed above, but nutrition programs also provide information about the nutritional value of foods and the relationship between diet and chronic disease.

Stress management programs aim to reduce environmental stressors and to help target populations cope with stress. Commanders are to develop leadership practices and work policies that promote productivity and health and to offer education to military personnel on stress management techniques.

Alcohol and other drug abuse prevention programs aim to prevent the misuse of alcohol and other drugs, eliminate the illegal use of such substances, provide counseling or rehabilitation to abusers who desire assistance, and provide education to various target audiences about the risks associated with drinking. (This policy supplements earlier alcohol and drug abuse prevention policy.)

Hypertension prevention programs aim to identify hypertension early, provide information about control and lifestyle factors, and provide treatment referral where indicated.

As a response to this health promotion directive, the individual Services established their own health promotion programs consistent with DoD policy to meet the distinctive problems and needs of their members.

In 1991, DoD set forth a comprehensive military policy on the identification, surveillance, and administration of military personnel infected with HIV (DoD Directive No. 6485.1 [DoD, 1991]). The policy provides for testing of military members and candidates for accession and establishes procedures for dealing with those who test positive for HIV. In addition, the military is providing extensive education about how HIV is transmitted and how to prevent transmission.

After the publication of *Healthy People 2000* (PHS, 1991), the DoD identified a subset of objectives of most relevance to the military. In 2000, *Healthy People 2010* was published and includes goals and objectives for the improved health of the nation (DHHS, 2000). These objectives have, in part, focused attention on specific health-related behavior changes that are desirable to achieve during the present decade. The next section discusses these objectives for the nation and the military in greater detail.

1.2.3 Healthy People 2010 and the Military

Beginning with *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* (PHS, 1979) and continuing in 1980 with *Promoting Health/Preventing Disease: Objectives for the Nation* (PHS, 1980), the federal government adopted a national health agenda. Broadly speaking, the agenda is aimed at taking steps to prevent unnecessary disease and disability and to achieve a better quality of life for all Americans. These initial efforts were followed by *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (PHS, 1991) and *Healthy People 2010: Understanding and Improving Health* (DHHS, 2000).

The purpose of *Healthy People 2000*, which set out health objectives to be achieved by the year 2000, was to commit the nation to the attainment of three broad goals during the 1990s:

- increase the span of healthy life for Americans
- reduce health disparities among Americans
- achieve access to preventive services for all Americans

Accordingly, measurable goals or targets were set forth across 28 areas, broadly grouped into four categories (health promotion, health protection, preventive services, and surveillance and data systems).

Healthy People 2010 aims to continue to improve the health of individuals, communities, and the nation through the following two goals:

- increase the quality and years of healthy life for all Americans
- eliminate health disparities among segments of the population

Health promotion strategies relate to personal choices made in a social context that reflect an individual's lifestyle and therefore influence prospects for future health. Health protection strategies are those related to environmental or regulatory measures that confer protection on large population groups. In contrast to health promotion strategies (which have an individual focus), health protection strategies generally involve a community-wide focus. Preventive services include counseling, screening, and immunization interventions for individuals in clinical settings. Surveillance and data systems are incorporated to ensure useful measurement of progress toward achieving the objectives. Existing data sources (e.g., ongoing surveys) are identified that

can be used to measure progress, and the need for additional data sources is noted.

Beginning with the *Healthy People 2000* objectives, DoD identified those most relevant to the military. Of the 383 objectives, 181 were identified as being of initial primary concern to DoD. Of these 181 objectives, 45 were prioritized and designated to be of the highest importance for near-term measurement (OASD [HA], 1992). From these 45 objectives, DoD identified a subset that focused on health-related behaviors thought to be measurable with surveys and began to monitor progress toward these objectives with the 1995 and 1998 DoD surveys. The 2002 DoD survey assessed how well the *Healthy People 2000* objectives were met and also served as a baseline measure for *Healthy People 2010* objectives, which continued to be measured with the 2005 survey.

The following specific *Healthy People 2010* objectives were examined through the 2005 DoD survey:

- Reduce the prevalence of cigarette smoking among military personnel for persons aged 18 or older (2010 objective: 12% or less).
- Reduce smokeless tobacco use (2010 objective: 0.4% or less for all personnel).
- Reduce binge drinking among adults (2010 objective: 6.0% or less).
- Reduce illicit drug use, past 30 days among adults (2010 objective: 2.0%).
- Increase healthy weight, as measured by Body Mass Index (BMI) (2010 objective: 60% or more for persons aged 20 or older). Although there is no 2010 objective for overweight (it was replaced by the objective for healthy weight), estimates are also provided using the 2005 Centers for Disease Control and Prevention (CDC) guidelines, as well as the 1998 National Heart, Lung, and Blood Institute (NHLBI) guidelines.
- Increase the proportion of people aged 18 or older who engage in vigorous physical activity 3 or more days per week for 20 or more minutes per occasion (2010 objective: 30% or more).
- Increase the proportion of adults who have had their blood pressure measured within the preceding 2 years and can state whether their blood pressure was normal or high (2010 objective: 95% or more).
- Increase the proportion of people with high blood pressure who are taking action to help control their blood pressure (2010 objective: 95% or more).
- Increase the proportion of adults who had their blood cholesterol checked within the preceding 5 years (2010 objective: 80% or more).
- Reduce nonfatal unintentional injuries that require hospitalization (2000 objective: no more than 754 per 100,000 people; no objective for 2010).
- Increase the use of occupant protection systems, such as safety belts, inflatable safety restraints, and child safety seats (2010 objective: 92% or more).
- Increase the use of helmets by motorcyclists and bicyclists (2010 objective: 79% or more for motorcyclists).
- Increase the proportion of sexually active, unmarried people who used a condom at last sexual intercourse (2010 objective: 50% or more).
- Increase the proportion of women aged 18 or older with an intact uterine cervix who have ever received a Pap test (2010 objective: 97% or more) and the proportion of those who received a Pap test within the preceding 3 years (2010 objective: 90% or more).
- Increase abstinence from alcohol during pregnancy (2010 objective: 94% or more).
- Increase abstinence from tobacco use during pregnancy (2010 objective: 99% or more).

1.3 DoD Health Behavior Survey Series

A systematic effort to obtain data that can be used to guide and evaluate health and substance abuse programs and policies began in 1980 under the direction of OASD (HA). DoD initiated a series of recurrent surveys to (a) improve understanding of the nature, causes, and consequences of substance use and health in the military; (b) determine the appropriateness of the emphasis placed on program elements; and (c) examine the impact of current and future program policies. The 1980 survey was conducted by Burt Associates, Incorporated, of Bethesda, Maryland (Burt, Biegel, Carnes, & Farley, 1980). The 1982, 1985, 1988, 1992, 1995, 1998, and 2002 surveys, as well as the 2005 survey, which is the topic of this report, were conducted by RTI (Bray et al., 1983, 1986, 1988, 1992, 1995b, 1999, 2003). All nine surveys have assessed the extent and consequences of

alcohol and other drug use. Beginning in 1985, the survey's focus was broadened to include an assessment of health promotion efforts.

In particular, the 1985 Worldwide Survey of Alcohol and Nonmedical Drug Use among Military Personnel continued investigating nonmedical use of illicit drugs, alcohol use, and associated consequences (Bray et al., 1986). The survey assessed cigarette smoking behavior in more detail and, for the first time, investigated involvement in health behaviors other than alcohol and other drug use. The analyses examined the relationships of substance use and other health behaviors to health status. Thus, the continuing concerns for monitoring the prevalence of alcohol use and nonmedical drug use and associated consequences were placed within a broader health promotion framework.

The 1988 Worldwide Survey of Substance Abuse and Health Behaviors among Military Personnel maintained the prior emphases on nonmedical drug use and alcohol use and associated consequences and programmatic responses (Bray et al., 1988). The examination of health attitudes and behaviors, however, had a more central role. Hence, the name of the survey was changed accordingly. Questions on health behaviors other than substance use were augmented, and additional questions on stress were included. Overall, the questions permitted the assessment in the military of the DoD health promotion areas of alcohol and drug abuse prevention, smoking prevention and cessation, physical fitness, nutrition, stress management, and hypertension prevention behaviors. In addition, the 1988 survey examined attitudes and knowledge related to AIDS, with a view toward determining the need for additional educational efforts.

The 1992 Worldwide Survey of Substance Abuse and Health Behaviors among Military Personnel was placed within a broad health promotion framework that continued prior emphases on nonmedical drug and alcohol use and associated consequences and programmatic responses (Bray et al., 1992; Bray, Marsden, Herbold, & Peterson, 1993). The 1992 survey, however, included more extensive comparisons of DoD survey findings with civilian data on alcohol, illicit drug, and cigarette use. In addition, health attitudes and behaviors were examined in greater depth than in prior DoD surveys. Questions were included that permitted assessment of the military's progress in alcohol and other drug abuse prevention, as well as smoking prevention and cessation, and to provide data on health risks, nutrition, stress, and hypertension. The final report for the 1992 survey also discussed findings on the following health behaviors in relation to specific *Healthy People 2000* objectives: cigarette smoking, smokeless tobacco use, condom use, exercise, blood pressure screening and cholesterol screening, and actions taken to control high blood pressure.

In addition, the 1992 survey examined relationships between involvement in Operations Desert Shield and Desert Storm and rates of substance use. The 1992 survey also included questions for the first time to assess the prevalence of anabolic steroid use and to estimate the prevalence of problem gambling in the military. A special analysis conducted as part of the 1992 survey involved estimating the medical costs of tobacco and alcohol abuse.

The 1995 survey continued the broader health promotion focus begun in 1985 and included a greater emphasis on information for assessing progress toward *Healthy People 2000* objectives (Bray et al., 1995b). Within the contexts of the entire survey series and the health promotion focus of more recent surveys in the series, the 1995 DoD survey had two broad aims:

- to continue the survey of substance use among military personnel
- to establish baseline data to assess progress toward selected *Healthy People 2000* objectives

The 1998 survey also maintained a focus on health promotion and continued to place an emphasis on assessing *Healthy People 2000* objectives (Bray et al., 1999):

- to continue the analysis of trends in use of alcohol, illicit drugs, and cigarettes, and consequences associated with substance use
- to describe important correlates of substance use among military personnel in 1998

- to compare rates of alcohol, illicit drug, and cigarette use among military personnel in 1998 with rates from comparable civilian populations
- to provide estimates for health behaviors pertaining to fitness and cardiovascular disease risk reduction, injuries and injury prevention, STD risk reduction, cervical cancer screening, and maternal and infant health
- to identify important correlates of these health behaviors
- where appropriate, to compare health behavior data between 1995 and 1998

In keeping with the broad aims of the 1998 survey, major objectives of the 2002 survey were as follows:

- to assess the health behaviors of Service members with regard to smoking, fitness, diet, and other health behaviors
- to describe the prevalence of substance use (alcohol, illicit drugs, and tobacco) among military personnel
- to identify the physical and social effects and the workplace consequences of substance use and high-risk behavior
- to identify the sociodemographic and behavioral characteristics of substance users, including rank and pay grade, branch of Service, social and family climate, and reported reasons for using, not using, or discontinuing use
- to compare reported drug and alcohol use and smoking habits in 2002 with prior survey results and with analogous civilian populations
- to assess the extent of pathological gambling in the military
- to assess the degree to which active-duty members perceive organizational or cultural barriers to receiving health care treatment from traditional sources to address their behavioral health problems or concerns
- to estimate the difference between the observed demand for mental health services in military treatment facilities and the latent demand identified through self-reported levels of distress or visits made to address mental health concerns outside of the military health system (either to traditional mental health providers outside of the on-base, military treatment facility—a medical clinic or hospital—or to nontraditional care providers, such as chaplains)

Thus, the report for the 2002 survey continued to provide estimates of the use of alcohol, illicit drugs, and cigarettes among military personnel, but it gave considerable attention to health behaviors other than substance use.

As part of the objective of estimating the prevalence of condom use in 1998, the number of questions about condom use was expanded to allow measurement of use in different sexual relationships.

The 2002 survey also included more detailed questions about mental health services. Specifically, the questionnaire contained questions about receipt of mental health services within and outside the military. Also included was a measure of the unmet need for mental health services.

Finally, the 2002 survey continued to explore military women's health issues, but it also gave special consideration to emerging issues such as oral health, men's health, and problem gambling. For example, men's health issues focused on testicular self-examination and receipt of information about self-examination because testicular cancer is the most common cancer found among non-Hispanic white men aged 20 to 34 (National Cancer Institute [NCI], 1999a, 1999b; Ries, Kosary, Hankey, Miller, & Edwards, 1998). The survey also included questions concerning perceptions of barriers to receiving health care services.

1.4 Overview and Objectives of the 2005 DoD Active Duty Health Behavior Survey

The 2005 DoD health behavior survey builds on the findings of the 2002 survey by providing more detailed data on selected trends, improves on earlier surveys by including recent standardized measures that have been found to be psychometrically sound in military and civilian populations, and addresses current health-related issues of priority to DoD. Specifically, the 2005 study (a) continues to assess the nature, extent, and consequences of substance use and abuse in each Service and in the entire military; (b) provides an assessment of progress for the military in meeting selected *Healthy People 2010* objectives; (c) assesses trends in general

health status and behaviors; (d) appraises mental health; (e) evaluates the receipt of medical and mental health care; (f) continues to monitor special topics, such as sexual health, gender-specific issues, and oral health; (g) examines relationships among demographic, medical, psychosocial, occupational, and environmental factors; and (h) develops profiles of subgroups of personnel who are least and most at risk of experiencing problems due to health-related behaviors. Taken together, the results of this survey may suggest areas in which prevention and intervention efforts can be targeted to improve military health and readiness and to specify gaps in understanding that are in need of further study.

1.5 Prior Studies on Substance Use among the Military and Civilian Populations

A number of epidemiologic surveys and other studies have documented the nature and extent of substance use (i.e., alcohol, illicit drug, and tobacco use) both for civilians and for military personnel. This section briefly reviews these data. The DoD survey series has been the major source of comprehensive information on substance use among military personnel. The major sources of information documenting substance use for civilians are national alcohol surveys and the National Survey on Drug Use and Health (NSDUH) (before 2002, called the National Household Survey on Drug Abuse, NHSDA) series for alcohol use and illicit drug use; the Monitoring the Future (MTF) survey series for alcohol, tobacco, and other drug use among high school seniors and young adults; and the NSDUH and the National Health Interview Survey (NHIS) for tobacco use. Findings from these surveys provide a context for interpreting findings from the 2005 DoD survey in terms of trends both within the military and in the broader civilian population from which the military population is drawn.

1.5.1 Military Population Studies

Findings from prior DoD surveys on the prevalence of substance use among personnel in the total DoD population (Bray et al., 1992, 1995b, 1999, 2003; Bray, Kroutil, & Marsden, 1995a; Kroutil, Bray, & Marsden, 1994) indicate steady and notable reductions in overall alcohol use, illicit drug use, and cigarette smoking over the past 2 decades. DoD made less progress in reducing heavy drinking, however; about one in six active-duty personnel reported being heavy drinkers in 2002. Although the prevalence of heavy alcohol use declined from 1980 to 1998, this decline could largely be explained by changes in the sociodemographic composition of the military since 1980, and there was a significant increase in the prevalence of heavy alcohol use between 1998 and 2002. Further, significant increases were seen in smoking and alcohol-related negative consequences. Detailed findings on substance use and negative effects of substance use are described by Bray et al. (1995a, 1999, 2003). Specific highlights related to substance use among military personnel are noted below:

- Comparisons of findings across the survey series demonstrate a significant downward trend in the use of alcohol, illicit drugs, and cigarettes since 1980. For the total military population, use of any illicit drugs decreased from 27.6% in 1980 to 3.4% in 2002; cigarette smoking decreased from 51.0% in 1980 to 33.8% in 2003 for the 30-day period before the date the survey was conducted. heavy drinking did not show a significant change from 20.8% in 1980 to 18.1% in 2002.
- Declines also were seen in the overall use of alcohol, as measured by average daily consumption. However, the prevalence of heavy drinking (defined as having five or more drinks per typical occasion at least once a week) remained problematic. As noted above, about one in six military personnel in 2002 engaged in heavy drinking. Over the years, the military has become older, better educated, and more likely to be married, factors all associated with lower rates of substance use.
- Between the 1998 and 2002 surveys, significant increases were found in heavy alcohol use and in cigarette smoking among military personnel. In 2002, 18.1% were heavy drinkers and 33.8% were current cigarette smokers, whereas in 1998, 15.4%

drank heavily and 29.9% smoked in the month before the survey.[1]

- Significant declines since 1980 were found in the percentage of military personnel experiencing serious alcohol-related consequences and productivity loss. Serious consequences declined from 17.3% in 1980 to 9.6% in 2002, and productivity loss from 26.7% in 1980 to 17.3% in 2002. In 2002, 12.3% reported four or more symptoms of dependence in the past year.
- Overall in 2002, 12.2% of military personnel were current smokeless tobacco users,[2] a relatively stable prevalence since 1995. The prevalence of current smokeless tobacco use was 16.7% among military men. Use was highest among men in the Marine Corps (22.9%) and lowest among men in the Air Force (8.8%). Use among men was also inversely related to age; it was highest among men aged 18 to 24 (17.1%) and lowest among men aged 35 or older (9.5%).
- Standardized comparisons that adjusted for sociodemographic differences among military personnel in 2002 and civilians in 2001 (the most recent civilian data then available from the Office of Applied Studies [OAS, 2002]) showed notable variation in the substance use patterns between these two populations. Military personnel were significantly more likely to drink heavily than were their civilian counterparts (16.9% vs. 11.2%), significantly less likely than civilians to have used any illicit drugs in the past 30 days (3.3% vs. 12.1%), and similar to civilians in current cigarette smoking (31.6% vs. 31.1%).

As noted above, the 2002 DoD survey data provided baseline measures of selected *Healthy People 2010* objectives related to (a) cigarette smoking, (b) cigar use, (c) smokeless tobacco use, (d) binge drinking, (e) illicit drug use, (f) healthy weight, (g) strenuous exercise, (h) blood pressure awareness, (i) blood pressure control, (j) cholesterol screening, (k) seat belt use, (l) helmet use, (m) condom use, (n) Pap tests, and (o) substance use during pregnancy.

In 2002, highlights of progress toward the *Healthy People 2010* objectives included the following:

- The rate of cigarette use among military personnel (33.8%) was still considerably above the objective prevalence of no more than 20% by the year 2000 and 12% by 2010. Past-year cigar use and smokeless tobacco use prevalences were considerably higher than the objectives for military personnel. The 41.8% prevalence of binge drinking far surpasses the 6.0% objective for 2010, and the 3.4% prevalence of past-30-day illicit drug use was slightly higher than the 2.0% objective for 2010.
- Overall, the military had met or exceeded 5 of the 17 targets examined for 2010 (strenuous exercise, seat belt use, helmet use for motorcycles, Pap tests ever received, and Pap tests received in the past 3 years).

Thus, the military in 2002 had met the 2010 targets in several areas but faced considerable challenges in others. Targets were met where military regulations helped ensure compliance with the desired behaviors (e.g., exercise, seat belt use, and Pap tests). Achieving targets in areas dependent on individual initiative and behavior modification posed a greater challenge.

1.5.2 Civilian Population Studies

As with the military population, findings from surveys of the U.S. civilian population indicate declines in the prevalence of cigarette smoking and any illicit drug use but a relatively stable prevalence of heavy alcohol use. The reductions in cigarette smoking began in the mid-1960s following the publication in 1964 of the first Surgeon General's report on smoking. Declines in illicit drug use have occurred more recently, beginning in the early 1980s. Some recent survey data, however, suggest that drug use is notably higher among some population subgroups (Bray & Marsden, 1999) and may be increasing again among some subgroups in the civilian population (OAS, 2006).

Highlights on the prevalence of substance use among the civilian population based on civilian alcohol surveys (Clark & Hilton, 1986; Clark & Midanik, 1982; Polich & Kaelber, 1985), the 2005 NSDUH (OAS, 2006), the MTF study of high school seniors and young adults (Johnston, O'Malley, Bachman, & Schulenberg, 2006a,

[1] Current cigarette smoking was defined as having smoked 100 or more cigarettes in the lifetime or smoking 1 or more cigarettes in the 30 days before the survey.

[2] Current smokeless tobacco use was defined as having used smokeless tobacco at least 20 times in the lifetime or 1 or more times in the 30 days before the survey.

b) , and the NHIS (CDC, 2002, 2005) include the following:

- In 2005, about 6.6% of the civilian population was heavy drinkers (OAS, 2006). Approximately 15.3% of young adults aged 18 to 25 in 2005, however, were heavy alcohol users, based on reported consumption of five or more drinks per occasion on 5 or more days in the past month. In addition, men were more likely than women to drink and to drink heavily. Other studies have found rates of problem drinking to be higher for young men, minorities, and people with unstable work or family environments (CDC, 2002, 2005).
- Trend data on illicit drug use from the NSDUH (OAS, 2005) indicate that use of illicit drugs among the civilian population generally peaked during the late 1970s, declined through 1992, and remained relatively stable through 2004. Although trend data indicate declines since the late 1970s, the 2005 data indicate a relative stability between 2002 and 2005. About 8.1% of the 2004 U.S. civilian, noninstitutionalized population aged 12 or older, or about 19.7 million civilian Americans, used at least one illicit drug in the past year.
- According to the MTF study, the prevalence of drug use may be leveling off among youth and young adults. During the past 2 decades, past-year and past-month marijuana use among high school seniors increased from 1992 to a peak in 1997 and has since decreased, remaining stable between 2004 and 2005 (Johnston, O'Malley, Bachman, & Schulenberg, 2006a). Even though the rates of marijuana use may have stabilized, they were quite high among high school seniors. In 2005, almost one-fifth (19.8%) of 12th graders had used marijuana in the past 30 days, up from 11.9% in 1993 (Johnston et al., 2006a). Some 15.2% of young adults aged 19 to 30 surveyed in the MTF study used marijuana in the past 30 days in 2005 (Johnston et al., 2006b). Findings from the 2005 NSDUH also indicate a decrease in the prevalence of past-month marijuana use among youth aged 12 to 17, from 8.2% in 2002 to 6.8% in 2005 (OAS, 2006).
- A follow-up to the MTF study tracked high schoolers into adulthood and found that those who entered the military were less likely to use illicit drugs but more likely to smoke cigarettes or drink heavily than other young adults (Bachman, Wadsworth, O'Malley, Johnston, & Schulenberg, 1997). Furthermore, their analyses indicated that when controlling for marital status, living arrangements, pregnancy, and parenthood, military service itself seemed to contribute to the increases in smoking and drinking.
- The prevalence of cigarette smoking among civilians has decreased markedly since the first report of the Surgeon General's Advisory Committee in 1964. In 1965, some 42% of American adults smoked cigarettes regularly (Giovino et al., 1994). In 1995, the figure was about 25% (CDC, 1997a), and data for 2004 indicate a continuing decline in smoking among adults (21.6%) (CDC, 2005).
- Smoking rates for men have decreased more rapidly than for women, decreasing the gender differential apparent in the 1960s. In 1965, 52% of men and 34% of women were current smokers (Giovino et al., 1994). From 1965 to 2001, the prevalence of smoking declined such that 25.2% of men and 20% of women were current smokers in 2001 (CDC, 2002). In 2004, 23.4% of men and 18.5% of women were current smokers (CDC, 2005).
- Civilian consumption of smokeless tobacco products (snuff and chewing tobacco) increased rapidly beginning in the early 1970s (Connolly et al., 1986), particularly among young males. In 2005, about 3.2% of the household population aged 12 or older were current users of smokeless tobacco, a rate stable since 2002. Among young adult males aged 18 to 25, however, 9.7% had used smokeless tobacco in the past month (OAS, 2006).

1.5.3 Comparisons between Military and Civilian Populations

Although findings from both military and civilian surveys indicate declines in illicit drug use, smoking, any alcohol use, and heavy alcohol use, direct comparison of prevalences between these two populations can be misleading because of socio-demographic differences. For example, as shown in this 2005 report and the past three reports in the DoD series, approximately 85% of the military in the 1990s was male (Bray et al., 1992, 1995b, 1999, 2003). As noted above, men were more likely than women in both the military and civilian populations to be heavy alcohol users. Thus, higher rates of heavy alcohol use in the military compared with the heavy alcohol use rate among civilians may be due in part to a much higher proportion of males in the military, as well as other sociodemographic differences between the military and

civilian populations. Similarly, apparent differences in rates of illicit drug and cigarette use between the military and civilian populations may be due to such factors as different age and education compositions of these two populations.

Comparisons of prevalences of heavy alcohol use, illicit drug use, and cigarette use among the military and civilian populations that controlled for sociodemographic differences (Bray et al., 1992; Bray et al., 2003; Bray, Marsden, & Peterson, 1991; Marsden, Bray, Kroutil, & Wheeless, 1993) indicated the following:

- Prevalences of illicit drug use were consistently lower among military personnel than among civilians when sociodemographic differences were taken into account. The lower prevalences of illicit drug use among military personnel were found among both men and women and across age groups.
- Despite the consistently lower prevalences of illicit drug use among military personnel, the gap between military and standardized civilian prevalences of illicit drug use appeared to be narrowing overall and among males.
- Prevalences of heavy alcohol use were consistently higher among military personnel than among civilians.
- Although prevalences of heavy alcohol use were consistently higher for the military population, the gap between the military population prevalences and standardized civilian prevalences did not narrow for the total population between 1995 and 1998.
- Young military men aged 18 to 25 were consistently found to have the highest prevalence of heavy alcohol use. Furthermore, prevalences of heavy alcohol use among young military men were approximately twice the standardized prevalences for their civilian counterparts.
- Prevalences of cigarette smoking among military personnel were equal to or lower than civilian prevalences in 1998 for the first time in the DoD series of surveys.
- The declines in the prevalences of cigarette use among the overall military population paralleled the declines that would have been observed among the civilian population if the civilian population's sociodemographic characteristics had more closely resembled the military's.

1.5.4 Summary

Findings from both military and civilian studies showed declines in illicit drug use and cigarette smoking in both populations during the last 2 decades. Recent surveys, however, indicate that the prevalence of illicit drug use, particularly marijuana use, may have leveled off among some segments of the civilian population. The prevalence of cigarette smoking among the civilian population declined since the mid-1960s. Declines in the prevalence of cigarette smoking among military personnel occurred more recently (i.e., since the early 1980s). Although cigarette smoking among military personnel in 1998 (29.9%) was at its lowest level since the DoD survey series began, this prevalence increased in 2002 to 33.8% and was still well above the *Healthy People 2000* target of 20% for military personnel by the year 2000 and considerably higher than the *Healthy People 2010* target of 12%.

In both the military and civilian populations, the prevalence of heavy alcohol use was more stable over time. The prevalence of heavy alcohol use in the past 30 days stayed around 7% of the civilian population in recent years. Among military personnel, the actual prevalence of heavy alcohol use declined since the early 1980s until 2002, but this decline appears to have been due to changes in the sociodemographic composition of the military; recently, the military has shown an increased prevalence of heavy alcohol use.

Findings from civilian surveys indicate that the prevalence of smokeless tobacco use was highest among young adult males. Findings from the 2002 DoD survey also indicate that the prevalence of smokeless tobacco use in the past 12 months was higher among young males relative to the total military population.

Comparisons of rates of substance use in the military and civilian populations that took into account sociodemographic differences between the two populations indicated consistently higher rates of heavy alcohol use and lower rates of cigarette use and illicit drug use in the military. In particular, rates of heavy alcohol use in the past 30 days among military men aged 18 to 25 were nearly twice the standardized rates for civilian men in the same age group.

1.6 Prior Studies on Other Health Behaviors among Military and Civilian Populations

Poor health practices have been shown to decrease longevity and adversely affect both physical and mental health. Conversely, classic studies by Belloc and Breslow (1972) and Breslow and Enstrom (1980) demonstrated that good health practices, such as nonuse of cigarettes, moderate use of alcohol, adequate sleep, regular exercise, and proper nutrition, have an additive effect on health.

Since the Surgeon General's report on health promotion and disease prevention (PHS, 1979) and with the release of *Healthy People 2000* and *Healthy People 2010* (PHS, 1991; DHHS, 2000), the behaviors listed above and other health behaviors known to affect morbidity and mortality have been monitored in the U.S. population through the NHIS, sponsored by the National Center for Health Statistics (NCHS). In 1984, CDC established the Behavioral Risk Factor Surveillance System (BRFSS), and 15 states conducted monthly risk factor surveys throughout the year. By 1991, 47 states and the District of Columbia (DC) were participating in the BRFSS (Siegel, Frazier, Mariolis, Brackbill, & Smith, 1993).

Concern about health behaviors other than substance use in the military has been more recent, and various behaviors have been monitored through the DoD surveys. In particular, the surveys have included items on participation in health screening or education activities, nutritional practices, condom use, presence of specific health risk factors (e.g., high blood pressure), perceptions of health risks associated with various health conditions or health-related behaviors, and behavioral changes undertaken to improve health.

1.6.1 Military Population Studies

As noted above, the 2002 DoD survey included questions about a variety of health behaviors in addition to substance use. In addition, findings were discussed as they related to selected *Healthy People 2000* and *Healthy People 2010* objectives.

Surveys also have been conducted by the individual Services. Highlights from research on health behaviors other than substance use among the military population are discussed below.

In 2002, over two-thirds (70.2%) of personnel in the total DoD engaged in regular strenuous physical exercise for 20 minutes or more at least three times a week (Bray et al., 2003). This prevalence greatly exceeded the *Healthy People 2000* objective of 20% for the adult population in the United States and the objective of 30% for 2010. Given the emphasis on physical fitness as part of an overall goal of military readiness, this finding is not surprising.

Consistent with the high rates of strenuous physical exercise, the 2002 survey results indicated that the military had nearly reached its *Healthy People 2000* objective of reducing the prevalence of overweight personnel to no more than 15% under age 20 or 20% among those aged 20 or older. However, a new standard for BMI was introduced that was more stringent than the *Healthy People 2000* BMI criterion. The result was a larger percentage of personnel being classified as overweight. Regardless of the criterion, the prevalence of overweight personnel in the military based on BMI showed an increasing trend from 1995 to 2002.

In 2002, approximately 78% of personnel in the total DoD had had their blood pressure checked in the past 2 years (Bray et al., 2003) and knew results of the test. The overall prevalence for the total DoD was somewhat lower than the *Healthy People 2000* objective of at least 90% of adults having their blood pressure checked and being aware of the result and the 2010 objective of 95%.

Among persons with a history of high blood pressure, approximately 49% were taking actions to control their blood pressure, but this percentage was substantially lower than the 90% objective for 2000 or the 95% objective for 2010.

About half of the military population (56.3%) in 1998 had had their cholesterol checked in the past 2 years, far fewer than the targeted 80% in 2010. Most personnel,

however, may have needed to get their cholesterol checked only within the past 5 years.

With regard to seat belt use, over 90% reported using seat belts all or almost all of the time (Bray et al., 2003), and more than 80% of all personnel wore a helmet when driving or riding on a motorcycle. The authors noted that personnel are required to use seat belts and wear helmets on base. They also suggested that legislation requiring seat belt and helmet use in many states could be contributing to high rates of use in the military.

The 2002 DoD survey included questions to measure condom use by military personnel. In 2002, approximately 42% of the unmarried personnel in the total DoD who were sexually active used a condom the last time they had sex, a prevalence lower than the targeted 50% in 2010 (Bray et al., 2003).

Thus, the 2002 DoD survey provided some indication of progress toward a number of *Healthy People 2000* and *Healthy People 2010* objectives.

1.6.2 Civilian Population Studies

Key sources of data on progress toward *Healthy People 2000* objectives among the adult civilian population in the United States include the NHIS and the BRFSS. Other civilian studies have collected information on such behaviors as helmet use by motorcyclists and condom use by the partners of sexually active women aged 15 to 44. Highlights from research on health behaviors other than substance use among the civilian population are discussed below.

Findings from the NHIS indicate that fewer than one in five adults (19%) engage in a high level of physical activity (defined as very active during usual daily activities and engaged in regular leisure-time physical activity) (CDC, 2003). In general, men are more likely than women to engage in a high level of overall physical activity, and these rates decline with age. Results from the 1999–2000 National Health and Nutrition Examination Survey (NHANES), using measured heights and weights, indicate that an estimated 64% of U.S. adults are either overweight or obese. This represents a prevalence that is approximately 8% higher than the age-adjusted overweight estimates obtained from NHANES III (1988–1994). The percentage of adults who were overweight in 1994 (35%) increased 9% since 1980 (CDC, 1998b). These findings suggest that considerable effort may be needed to reduce the prevalence of overweight among civilian adults to no more than 15% by the year 2010.

In 2000, nearly a third of all Americans over age 20 were diagnosed with hypertension. Over 80% of people with hypertension reported taking one or more of the following actions to control their high blood pressure: taking high blood pressure medication, decreasing their salt intake, losing weight, or exercising (CDC, 2002). This prevalence of people taking action to control their high blood pressure in 1990 was somewhat lower than the 90% objective set for the year 2000. Similar to the NHIS results, the NHANES reported that as many as 89% of those with high blood pressure were aware of their condition (Mulrow, 1998). NHANES indicated that for people with high blood pressure, only 29% had their blood pressure controlled to an acceptable range (Mulrow, 1998).

BRFSS data indicate that an increasing percentage of adults in the United States are getting their blood cholesterol checked. In 1987, the median percentage of adults who had ever had their cholesterol checked was 47% (32 states and DC participating in 1987) (CDC, 1988a) and had risen to 55.1% by 1989 (38 states and DC participating). In 1991, the median percentage of adults who had their cholesterol checked in the past 5 years was approximately 64%, based on data from 47 states and DC (Siegel et al., 1993). The BRFSS findings for 1995 indicate that the median percentage of adults who had their cholesterol checked in the past 5 years rose slightly to 65% (Powell-Griner, Anderson, & Murphy, 1997). These BRFSS findings are consistent with trend data from other earlier studies showing increases in the prevalence of cholesterol screening (Schucker et al., 1987). The median rate in 1995, however, was still below the *Healthy People 2000* objective of at least 75% of adults having their cholesterol checked in the past 5 years.

Seat belt use reached 75% nationwide in 2002, the highest rate yet observed, and continues a relatively steady pattern of increase since use was first measured by a comprehensive national survey at 58% in 1994. States that allow more stringent enforcement of their seat belt use laws ("primary" states) reached a milestone of 80% belt use in 2002, and substantial gains were also seen in the Northeast and in vans and sport utility vehicles (SUVs). On the other hand, motorcycle helmet use declined sharply, from 71% 2 years ago to 58%. These rates were obtained from the National Occupant Protection Use Survey (NOPUS) conducted by NHTSA in June 2002. Although the Northeast remains the region with the lowest seatbelt use prevalence, its 7-point gain to 69% makes this region much more comparable to the rest of the country. Approximately one out of every five nonusers in the Northeast in 2001 used seatbelts in 2002, a substantial conversion rate. Vans and SUVs saw a 3-point increase to 78% seatbelt use, which is reassuring in light of recent news on SUV rollover crashes, since seatbelts are particularly effective in such crashes.

Data from NHTSA's 19 Cities Survey provided baseline data on the prevalence of helmet use by motorcyclists in 1987. At that time, an estimated 60% of motorcyclists wore helmets when they rode (NCHS, 1993). However, because many of the helmets being used did not provide sufficient protection in a crash, starting in 1996 NOPUS categorized helmets into "legal" and "illegal" helmets, as defined in the Federal Motor Vehicle Safety Standard (FMVSS-218) (NHTSA, 2002). In 1996 and later, only the use of "legal" helmets is considered to constitute use, whereas in 1994 the use of any helmet was considered to constitute use. It is now illegal to sell any motorcycle helmet that does not comply with FMVSS-218. Although a sticker reading "DOT" is affixed to every compliant helmet, it is difficult to observe a sticker from the roadside. Consequently, data collectors characterize as illegal any helmets that have features typically seen in illegal ones, such as protruding objects (e.g., spikes in costume World War II vintage helmets) or small beanie helmets.

Helmet use declined 13 percentage points over 2 years, from 71% in 2000 to 58% in 2002. This drop is statistically significant and corresponds to a striking 45% increase in nonuse. Some of this decline might be due to the time of year in which use was observed. Use in 1994 to 2000 was observed in the fall months, whereas in 2002 it was observed in June. Use might be lower in warmer months, when the higher temperatures may make helmets less comfortable. The sharp decline in helmet use, which is significant with 95% confidence, is troubling since it comes at a time when motorcyclist fatalities have been increasing (NHTSA, 2002).

The National Survey of Family Growth (NSFG), sponsored by the NCHS, has collected information about condom use by sexually active women aged 15 to 44 (Abma, Chandra, Mosher, Peterson, & Piccinino, 1997). Among women who had never married, 29.9% were using condoms as their current method of contraceptive. In addition, 34.0% of sexually active women 15 to 24 years of age who had never married had used a condom at last intercourse.

According to the BRFSS, in 2001 about 95% of all women aged 18 or older had ever had a Pap test, and 83% had had the test in the past 2 years (CDC, 1995-2001). These median percentages indicate that the *Healthy People 2000* objective of 95% for lifetime receipt of Pap tests and the objective of 85% for receipt of a Pap test in the past 2 years had nearly been achieved (PHS, 1991). As early as 1995, a number of states had already reached the year 2000 target for lifetime receipt of Pap tests, as well as the target for screening in the past 2 years (Powell-Griner et al., 1997).

1.6.3 Summary

Findings from civilian surveys suggest that progress will still be needed with respect to several of the health objectives discussed above. BRFSS data for 1994 to 1995, however, indicated that some states were already close to or had exceeded objectives related to cervical cancer screening (i.e., Pap tests) among women.

Findings from the 2002 DoD survey suggest that the military in 2002 was either very close to or had exceeded general population *Healthy People 2000* objectives in the areas of physical exercise, seat belt use, helmet use, actions taken to control high blood pressure, and Pap test

receipt. These findings, however, cannot predict how the military in 2005 compares with these objectives because of turnover in military personnel since 2002. Findings from the 2005 survey are important for identifying whether the military continues to meet or exceed these targets.

Some features of military life may facilitate the military in achieving some of these objectives by the year 2010. Given the emphasis in the military on fitness and readiness, one might expect its population to meet the objectives related to exercise and overweight status. Similarly, access to preventive medical care is likely to be less of a problem in the military population than it is for some segments of the civilian population. The military also can mandate that personnel receive age-appropriate medical screening at specific intervals. Thus, the military can mandate that personnel receive preventive medical services, such as cholesterol screening or Pap tests, in accordance with targets set in *Healthy People 2010*.

1.7 Prior Studies on Mental Health, Stress, and Coping

This section provides a brief description of selected studies examining the interrelated areas of mental health, stress, and coping that are of relevance to military personnel. Although the military recently released a directive that protects the rights of Service members who seek a mental health evaluation (DoD, 1997a), few studies have examined the relationship of stressors and mental health and functioning of the active-duty military population. Several national epidemiologic studies have examined risk factors for specific mental disorders, such as stressors, and the comorbidity of mental disorders and substance abuse in civilian and veteran populations (Kessler et al., 1994; Kulka et al., 1990; Regier et al., 1990).

The suicide of Admiral Jeremy Boorda in 1996 raised concerns about the prevalence of suicidal ideation, depressive symptoms, and the relationship of depression and other mental health problems to stress and to alcohol use. Further interest in mental health issues and the mental health effects of trauma exposures on military personnel was raised by the attack on the USS Cole, the September 11, 2001, attack on the Pentagon, and the wars in Afghanistan and Iraq. Numerous studies have reported strong relationships among stress, alcohol consumption, and mental disorders, with particularly robust connections reported between stressful life events and depression, especially for women (e.g., Pianta & Egeland, 1994). Kessler, Sonnega, Bromet, Hughes, and Nelson (1995) found in their analysis of data from the National Comorbidity Survey that stress-related psychiatric disorders were highly comorbid with depression and with substance abuse and dependence. Similar relationships among mental health and substance abuse problems have been reported in national surveys of Vietnam-era veterans (Kulka et al., 1990).

Stressors have been studied on the basis of their frequency or ordinariness ("life event" stressors vs. "daily hassles"), their intensity (e.g., mild, moderate, severe, traumatic), and their source (e.g., work, family life) (Holt, 1982). Findings from the National Vietnam Veterans Readjustment Study (Kulka et al., 1990), for example, show a strong relationship between exposure to traumatic stress while serving in a military combat zone and subsequent occupational instability. Indeed, Kulka et al.'s (1990) research indicates that male veterans with stress-related psychiatric disorders were more than five times as likely to be unemployed as their counterparts without such stress-related disorders. Findings from a study investigating the effects of combat-relevant stressors on cognitive performance showed that stressors can affect performance, different stressors induce a variety of reactions, the effects of stress vary across individuals, and stressors affect the performance of various tasks differentially (Orasanu & Backer, 1996).

In civilian populations, a number of work-related stressors have been studied, including properties of the working environment (e.g., physical hazards, noise), time factors (e.g., length of the work day, shift work), changes in job (e.g., demotion and transfer), and more subjectively defined stressors, such as role-related stress (e.g., responsibility for people), relationships with coworkers and supervisors, and underutilization of abilities. In a review of the extensive research literature on occupational stress, Holt (1982) reported that higher

levels of stress in each of these domains are related to poorer performance outcomes.

Stressors related to the family environment also have been studied. This research includes the examination of major life events, such as having a child and getting married, as well as studies of day-to-day strains, such as attempting to balance the responsibilities of family with the responsibilities of work (Holt, 1982). By creating family centers, DoD recognized the strains on personnel who try to balance the military's mission with family responsibilities (DoD, 1992). The family centers are designed to support DoD personnel and their family members in meeting the demands of the military lifestyle on their personal relationships. Although both men and women experience stressors related to their personal and family relationships, women tend to report higher levels of such stress (Barnett & Baruch, 1985). Research is needed to determine the extent to which men and women in the military may be affected differentially by responsibilities associated with familial factors, such as major changes in the family environment (e.g., birth of child) or daily strains, such as financial worries. The 2002 DoD survey identified the work-related and family stressors for men and women in the Services and examined the relationship of these stressors to a specific indicator of work performance—loss of productivity.

Research also has shown that a number of variables can mediate the effects of stressors on mental health outcomes, including the use of different types of coping strategies. Coping has been defined in terms of the strategies and processes that individuals use to modify adverse aspects of their environment and to minimize the amount of internal distress elicited by stressor events (Lazarus, 1966; Moos & Billings, 1982). Although research on the stress-moderating effects of different types of coping resources is more recent, this literature is characterized by a level of complexity that precludes succinct summarization. Nevertheless, the extant research literature suggests that coping styles aimed at managing the problem are generally more effective than coping strategies that focus on emotions or attempt to ignore or avoid the problem (Aldwin, 1993).

Social support, for example, is an extensively studied coping factor that has been shown to play a central role in adapting to stress (Etzion, 1984). Considerable research on Vietnam veterans' postwar adjustment suggests that supportive relationships both within and outside the military can reduce the deleterious effects of exposure to a variety of stressors associated with combat and military service (Egendorf, Kadushin, Laufer, Rothbart, & Sloan, 1981; King, King, Fairbank, Keane, & Adams, 1998; Norman, 1988). Though informative, this work has focused largely on the effects of social support on military stressors associated with service in a war zone. Little is known about types of coping that military personnel use to manage the diversity of stressors experienced in their military duties and personal lives.

The 2005 DoD survey included a series of questions about the mental health of active-duty personnel. As in the 1992, 1995, 1998, and 2002 surveys (Bray et al., 1992, 1995b, 1999, 2003), the 2005 survey asked respondents to appraise their levels of stress at work and in their intimate and family relationships. Respondents also provided information on their perceived need for mental health counseling and their receipt of such counseling. Respondents were also asked to specify the strategies that they use to cope with stress, and the respondents' perceived need for mental health services and their receipt of services were assessed. In addition, information on indicators of anxiety and depression and prevalence of suicidal ideation was collected, and the relationships among stress, mental health problems, and alcohol use were examined. This report presents findings on mental health, exposure to stress, coping, and functioning.

Chapter 2: Methodology of the 2005 DoD Active Duty Survey

This chapter describes the 2005 Department of Defense (DoD) survey methodology, which is patterned after the methodology used in prior surveys in the series. It includes an overview of the sampling design, instrumentation and data collection procedures, and survey performance rates. In addition, it describes the 2005 survey respondents and demographic characteristics of the eligible respondent population, and it provides an overview of measurement approaches and analysis techniques. Many of the activities, such as questionnaire development, second-stage sampling, and support for field operations, were collaborative efforts that involved the cooperation of DoD, the individual Services, and the research team. The similarity of the 2005 study design and measures of substance use and health behaviors to those of earlier DoD surveys enables comparisons of estimates across the survey years. Further, the similarity of key DoD survey measures to those used in civilian surveys enables comparisons of substance use and health behaviors in the military and civilian populations.

2.1 Sampling Design Overview

The target population for the 2005 DoD survey included all military personnel who were on active duty at the time of data collection (April through August 2005), except recruits; academy cadets; and personnel who were absent without leave (AWOL), incarcerated, or undergoing a permanent change of station (PCS). These personnel were excluded because they either were not on active duty long enough to typify the Services or were not accessible.

Although personnel with PCS status are typical of military personnel, they were excluded from the target population because of the practical difficulties of obtaining data from them quickly enough to be of use to the study. It was assumed that the substance use and health behaviors for these individuals were similar to those of other personnel represented in the survey. Further, the current survey included information from an array of respondents broad enough (i.e., all pay grades, four Services, worldwide sample) to address substance use policy and program issues.

A primary objective of the sampling design was to facilitate the planned on-site group administration of the survey questionnaire to military personnel selected to represent the military in the survey. Because of the worldwide geographic distribution of military personnel, a dual-mode sampling design was developed that called for the survey instrument to be group administered at large installations, including aboard afloat ships (where hundreds of personnel could be assembled), and mailed to persons in smaller locations where it was not practical to conduct on-site group sessions. The group-administered portion of the study was referred to as Phase 1 of the data collection effort, and the mail portion was referred to as Phase 2.

The dual-mode approach to data collection allowed cost-effective on-site data collection, while retaining complete coverage of the military population. In addition, the design included stratification to control the sample distribution with respect to organizational and demographic characteristics. Similar to the design used for the 1995, 1998, and 2002 DoD surveys, this approach allowed the sample to achieve cost efficiency while preserving inferential capability.

The sampling frame was constructed using data provided by the Defense Manpower Data Center (DMDC) and consisted of 395 military installations where 500 or more active-duty persons were stationed in September 2004. These installations were deemed large enough to support the on-site administration of the survey of at least 500 persons. Approximately 90% of all active-duty personnel selected were found to be stationed at these installations. The remaining 10% of personnel selected for the survey were mailed the questionnaire and are referred to as the Phase 2 remote sample.

As with all surveys, systematic nonresponse may introduce bias into the survey estimates. For example, the results of the 2002 DoD survey indicated that most of the nonrespondents to the group administrations did

not attend because they were away from their duty station either on routine temporary duty (TDY/TAD) or on leave. If health-related behaviors change when members are away from their duty station, the corresponding prevalence estimates of these measures may be biased because of the systematic exclusion of members who were away. To help ensure that all eligible persons had an opportunity to participate in the survey, the sampling design specified that all sample members who did not attend the group administrations be mailed a copy of the questionnaire. Eligible persons who were mailed a questionnaire are referred to as the Phase 2 nonremote sample.

A total of 40,000 active-duty members were selected for the 2005 DoD survey. Of these, 36,000 were asked to attend group administrations during Phase 1 at 60 first-stage sampling units (FSUs) around the world. The remaining 4,000 active-duty members were selected to receive a questionnaire through the mail during Phase 2. These sample sizes were determined by using optimization techniques designed to balance the project's analytical requirements with available fiscal resources. Statistical precision requirements were specified for subpopulations considered important for the analysis. These included Service (Army, Navy, Marine Corps, Air Force), gender (male, female), and pay grade groups (E1 to E3, E4 to E6, E7 to E9, W1 to W5, O1 to O3, O4 to O10).

The sample of installations was stratified by Service, location within the continental United States (CONUS) or outside the continental United States (OCONUS), and, for the Navy, afloat designation. Initially, 60 FSUs were selected with probabilities proportional to a composite size measure that is based on a function of the number of people for each gender and pay grade group within each installation, as well as the total number of sampled people desired within each gender and pay grade group across all installations. In general, selecting a sample proportionate to a composite size measure is a method of selecting a sample that will maximize the precision of subpopulation estimates for domains of interest while minimizing data collection costs by equalizing the workload among clusters (Folsom, Potter, & Williams, 1987). In this study, subpopulations that have relatively low numbers, such as officers and women, inflate the composite size measure slightly, since it is necessary to sample enough of these cases to be able to make inferences.

In addition, 20 FSUs were selected as replacements in the event that an installation was unable to participate in the survey. During planning for the survey, seven installations were replaced—three Army, one Navy, one Marine Corps, and two Air Force. Replacements were mostly due to deployment issues. Additional details of the sampling frame construction, sample allocation, and sample selection are described in Appendix A.

After the sample was selected, a sampling weight was computed for each sample member. Sampling weights may be viewed as inflation factors that account for the number of persons in the survey population that a sample member represents. The sum of the sampling weights across all active-duty sample members is approximately 1.2 million. This sum estimates the number of persons with a positive probability of being selected into the sample, including those who separated or transferred between sample selection and data collection (i.e., ineligible persons). After data collection, the sampling weights were adjusted for differential eligibility and response among the sample members. The calculation of the adjusted sampling weights is described in Appendix B.

2.2 Instrumentation and Data Collection Procedures

The survey questionnaire was designed to achieve the two broad purposes of the study: (a) to measure progress of the military in meeting selected *Healthy People 2010* objectives and (b) to continue the survey of substance abuse and health behaviors among military personnel. Military personnel completed the questionnaire either during group sessions conducted by field teams at the installations where selected personnel were stationed or by mail. Questionnaires were mailed to eligible personnel who did not participate in a group session at an installation. Approximately 88% of the completed survey questionnaires were obtained from the group sessions.

2.2.1 Survey Questionnaire

The survey instrument was a self-administered paper-and-pencil questionnaire designed for optical-mark reader scanning. In collaboration with DoD, the Headquarters Liaison Officers (HLOs), and other experts from the Services, the 2002 questionnaire was modified for 2005 to provide measures for the survey objectives discussed in Chapter 1. The instrument contained measures of selected aspects of substance use and other health behaviors. More specifically, the questionnaire included a broad array of items about

- sociodemographic characteristics and military experience;
- quantity, frequency, and correlates of alcohol use;
- problems associated with alcohol use,
- context for alcohol use;
- reasons for drinking and limiting drinking;
- use of cigarettes and other forms of tobacco;
- reasons for starting to smoke cigarettes, intentions to quit smoking, and actual attempts to quit;
- nonmedical use of drugs other than alcohol and tobacco;
- health behaviors related to exercise, eating, and supplement use;
- injuries and use of seat belts and helmets;
- oral health;
- sexual health;
- stress experienced at work or in family life, specific sources of stress, and coping behaviors
- mental health, trauma, and help-seeking;
- deployment-related health;
- women's health; and
- job satisfaction.

During fall 2005, a pilot study was conducted at one military installation for each Service to examine the adequacy of questionnaire item wording, formatting, and response alternatives. Based on analyses of item distributions and feedback from informal debriefings of selected participants, some items were refined and some item formatting or working was modified to enhance clarity. In all, 48 new questions were added to the survey in 2005. Respondents to the 2005 survey were not asked about gambling behaviors or gender-specific self-examinations such as testicular self-exams as they had been in the 2002 survey. Since rates for these health behaviors have not changed much across recent survey administrations, these questions will be included only periodically in future surveys

2.2.2 Phase 1 Data Collection

Phase 1 questionnaire administrations took place from April through August 2005 at 60 selected installations located worldwide. An HLO was appointed for each Service, and a Military Liaison Officer (MLO) at each participating installation was appointed to coordinate survey activities.

Each HLO performed a variety of tasks that were vital to a successful data collection effort. Specifically, the HLOs did the following:

- informed the Services and selected installations about the survey by sending a series of notifications to appropriate command levels
- obtained MLO names and addresses for the research team
- worked with RTI staff to coordinate survey scheduling and preparations at the installations

MLOs were also integral to the data collection effort and before the team arrived were responsible for the following:

- storing the survey instruments
- receiving lists of the sampled personnel
- arranging rooms for the survey sessions
- notifying sampled personnel of their selection
- scheduling personnel into one of the survey sessions
- distributing introductory handouts describing the study and detailing each participant's rights

During the field team visits, the MLOs were responsible for monitoring and encouraging attendance of selected personnel at the sessions and documenting the reasons for absence. The level of effort required by each MLO varied depending on the size of the sample of personnel

selected at the MLO's installation and by the turnout of participants in response to their initial notification. At those installations where turnout was high, the MLOs spent considerably less time than at those where turnout was low. In the latter case, the MLO duties were more time consuming, since a higher percentage of "no shows" had to be contacted and rescheduled into a new data collection session. Nine two-person RTI field teams collected Phase 1 data in survey sessions at the 60 installations selected for the study. In general, arrangements were coordinated with MLOs for the data collection itinerary to permit personnel to be surveyed at a nucleus installation during a 3- to 4-day visit. Additional time was allowed at locations that had large numbers of personnel selected or that had personnel dispersed over larger areas. On these data collection days, team members typically started a group session every 90 minutes, usually holding five or six sessions a day. If necessary, the two-member teams split and worked alone to conduct concurrent sessions at the installation. Five field teams were assigned to the CONUS region, three were assigned to the OCONUS region, and one team had both CONUS and OCONUS assignments. Before data collection began, two 1-day training sessions were held—one for field team leaders and the other for team leaders and team assistants—to ensure that teams were familiar with all procedures to conduct the survey.

The field teams' major responsibilities were to

- establish itineraries consistent with MLO recommendations,
- coordinate preparations with the MLO at the installation,
- conduct scheduled survey sessions,
- ship completed survey forms from installations for optical scanning, and
- report to RTI central staff on the completion of the survey at each site.

At the Phase 1 group sessions, field teams described the purpose of the study, assured participants of anonymity, informed participants of the voluntary nature of the survey, distributed introductory handouts, ensured that an ombudsperson was present for each group administration to attest that teams explained the voluntary nature of participation, and showed personnel the correct procedures for marking the questionnaire. Team members then distributed the optical-mark questionnaires to participants, who completed and returned them. On average, the questionnaire required about 55 minutes to complete.

During the visit to an installation, team members attempted to survey all eligible individuals. They used rosters on laptop computers to document attendance or reasons for absences. Eligible personnel who failed to attend their scheduled session were contacted and asked to attend a subsequent one. At the completion of the site visit, field teams inventoried completed questionnaires, reconciled the inventory with documented counts from the lists of sampled personnel completing the survey, and packaged and shipped the questionnaires for optical-scan processing.

2.2.3 Phase 2 Data Collection

Phase 2 nonremote data collection consisted of field teams mailing questionnaires to all eligible persons who did not participate in the Phase 1 group sessions at the installations. The procedure for conducting this phase of data collection was to

- document the status of each individual on the list of sampled personnel (e.g., attended, TDY, on leave, PCS),
- identify personnel eligible for Phase 2 data collection (which included those who were on TDY assignments, on leave, deployed, sick or hospitalized, in jail, or who were "no shows" for Phase 1),
- obtain a correct mailing address for Phase 2 eligible personnel, and
- prepare and mail a survey packet to Phase 2 personnel.

The Phase 2 packet included a cover letter that explained the purpose and importance of the study, an introductory handout explaining the study and each participant's rights, a blank questionnaire precoded to identify the participant's FSU and the study phase, and a business reply envelope for the respondent to use in mailing the

completed questionnaire for scanning. As with Phase 1 data collection, respondents completed the questionnaire anonymously.

2.2.4 Phase 2 Remote Personnel

As noted in Section 2.1, a subset of military personnel who were distant or remote from major installations was sent a questionnaire by mail. Approximately 10% of sampled personnel were classified as remote. The rationale was that because these personnel were far from major installations, they were unlikely to come to the bases for group sessions even if they were linked to the installations. Thus, they would eventually have become eligible for the Phase 2 data collection and received a questionnaire through the mail to complete. To circumvent this process, individuals classified as remote were identified as a separate stratum and were mailed a questionnaire at the outset.

Packets similar to those used for Phase 2 nonremote mailing were prepared and mailed to personnel in remote locations. These packets included a cover letter explaining the study, a copy of the questionnaire, and a business reply envelope for the respondents to use to return their completed questionnaires. Questionnaires were preprinted with a common FSU number to identify them as part of the remote strata. Questionnaire responses were anonymous. Two mailings were made to personnel in remote sites. Because questionnaires were anonymous, it was not possible to remail only to those who had not returned a questionnaire. Consequently, a second packet of materials was sent to all remote personnel with instructions that if they had completed the first questionnaire, they should not answer it a second time.

2.3 Survey Performance Rates

Response rate information is useful for assessing the quality of survey field operations and for assessing nonresponse bias. The term *response rate* can be used for several performance rates, each important from a survey operational perspective or from a statistical perspective. In the simplest cases, the response rate can be calculated as the number of individuals in the population of inferential interest (i.e., those to whom you wish to generalize results) for whom information was obtained, divided by the total number of individuals in the population of inferential interest who were slated for data collection (i.e., the sample).

When the population surveyed and the population of inferential interest are not the same, or when only partial information is obtained for the population units in the sample, the definition becomes more complicated. For the 2005 survey, several performance rates were computed: Phase 1 eligibility rate, Phase 1 completion rate, and response rates among eligibles. These rates are defined and described below. Data for these rates are presented in Table 2.1 along with the corresponding response data that were used to compute them.

2.3.1 Eligibility Rate

The eligibility rate is the percentage of individuals selected in the sample (for the group sessions in Phase 1) who were still eligible several weeks later during data collection. Some individuals who were selected were ineligible because they left the military or were AWOL, deceased, PCS, or had an unknown status. The eligibility rate can be an important determinant of statistical efficiency because sampling variances are high when eligibility rates are low. If the eligibility status is not known for every case, some potential for bias due to missing data is introduced. As shown in Table 2.1, the Phase 1 eligibility rate across all Services was 80.3%. The rate was highest for the Air Force and fairly similar for the Army, Navy, and Marine Corps.

2.3.2 Completion Rate

The completion rate is the percentage of identified eligible personnel who completed a questionnaire. The completion rate affected data-processing costs and schedules, and the missing data contributed to the potential for biases. The 51.0% completion rate for Phase 1 reflects the success of the field teams in obtaining questionnaires from eligible personnel who were available to be surveyed when the field teams were at the installations. In 2005, the Air Force (60.3%) and Navy (58.0%) had considerably higher completion rates than the Army (42.8%) and the Marine Corps (43.1%).

Table 2.1 **SURVEY RESPONSE DATA AND PERFORMANCE RATES**

Survey Phase/Response Data	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Phase 1					
A1. Sample	9,600	9,600	8,400	8,400	36,000
A2. Eligibles	7,723	7,500	6,707	6,983	28,913
A3. Ineligibles	1,877	2,100	1,693	1,417	7,087
A4. Unknown Eligibility	0	0	0	0	0
A5. Nonrespondents	4,417	3,148	3,816	2,772	14,153
A6. Completed Interviews	3,306	4,352	2,891	4,211	14,760
A7. Eligibility Rate 100*[A2 / (A2 + A3)]	80.4%	78.1%	79.8%	83.1%	80.3%
A8. Completion Rate 100 * [A6 / (A2 + D8*A4)]	42.8%	58.0%	43.1%	60.3%	51.0%
Phase 2 Nonremotes[1]					
B1. Sample	4,417	3,148	3,816	2,772	14,153
B2. Eligibles	4,228	3,021	3,539	2,738	13,526
B3. Ineligibles	0	0	0	0	0
B4. Unknown Eligibility	189	127	277	34	627
B5. Nonrespondents	3,890	2,801	3,103	2,456	12,250
B6. Completed Interviews	338	220	436	282	1,276
B7. Eligibility Rate 100*[B2 / (B2 + B3)]	100.0%	100.0%	100.0%	100.0%	100.0%
B8. Completion Rate 100 * [B6 / (B2 + D8*B4)]	7.7%	7.1%	11.6%	10.2%	9.1%
Phase 2 Remotes					
C1. Sample	1,000	1,000	1,000	1,000	4,000
C2. Eligibles	293	730	635	720	2,378
C3. Ineligibles	707	270	365	280	1,622
C4. Unknown Eligibility	0	0	0	0	0
C5. Nonrespondents	135	487	482	504	1,608
C6. Completed Interviews	158	243	153	216	770
C7. Eligibility Rate 100*[C2 / (C2 + C3)]	29.3%	73.0%	63.5%	72.0%	59.5%
C8. Completion Rate 100 * [C6 / (C2 + D8*C4)]	53.9%	33.3%	24.1%	30.0%	32.4%
Total Sample					
D1. Sample	10,600	10,600	9,400	9,400	40,000
D2. Eligibles	7,827	8,103	7,065	7,669	30,664
D3. Ineligibles	2,584	2,370	2,058	1,697	8,709
D4. Unknown Eligibility	189	127	277	34	627
D5. Nonrespondents	4,025	3,288	3,585	2,960	13,858
D6. Completed Interviews	3,802	4,815	3,480	4,709	16,806
D7. Usable Cases	3,639	4,627	3,356	4,524	16,146
D8. Eligibility Rate 100*[D2/(D2+D3)]	75.2%	77.4%	77.4%	81.9%	77.9%
D9. Completion Rate 100 * [D6 / (D2 + D8*D4)]	47.7%	58.7%	47.8%	61.2%	53.9%
D10. Final Response Rate 100 * [D7 / (D2 + D8*D4)]	45.7%	56.4%	46.1%	58.8%	51.8%

[1]Phase 2 nonremote sample is a subset of the Phase 1 sample.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

2.3.3 Response Rates among Eligibles

The final response rate among eligibles is the rate at which usable questionnaires were obtained from eligible personnel across the combined components of data collection. For these response rate calculations, ineligible individuals were excluded from the population (i.e., those who were separated, deceased, AWOL, PCS, or unknown). Group sessions remained the most effective method for obtaining usable questionnaires (87.8%), as opposed to Phase 2 mailing (12.2%).

The overall response rate among eligibles combines data from all three data collection activities. As shown in Table 2.1, the response rate among eligibles is 51.8%. This rate is notably higher in the Navy (56.4%) and Air Force (58.8%) than in the Army (45.7%) and Marine Corps (46.1%). Although the overall response rate is lower than in 2002, it remains in the 50s, where it has been since 1998.

2.4 Sample Participants and Military Population Characteristics

Table 2.2 displays the distribution of survey respondents for each Service by region and pay grade. Overall, 16,146 usable questionnaires were obtained from sampled personnel. The Navy had the largest number of respondents (4,627), followed by the Air Force (4,524), Army (3,639), and Marine Corps (3,356). The number of respondents is a function of the number of personnel sampled in each Service and the response rates.

The pay grade distribution for the total DoD shows that the largest number of participants were E4s to E6s (6,376), followed by E7s to E9s (3,221), E1s to E3s (2,593), O4s to O10s (2,113), O1s to O3s (1,444), and W1s to W5s (399). This pattern is fairly consistent among CONUS and OCONUS installations. It should be noted, however, that sampling was not uniform among these pay grades, so our finding that enlisted personnel had the greatest number of respondents makes sense, since they have the greatest numbers in the DoD population.

For the analyses, the data were weighted to reflect the proportional representation of respondents in the population (see Appendix B for additional details on weighting procedures).

Table 2.3 shows the distribution of survey respondents for sociodemographic subgroups. As can be seen, most subgroups had several hundred respondents, and almost half had over 1,000. The smallest group (Navy warrant officers [W1 to W5]) had 52 respondents. Many tables in subsequent chapters of the report present data in some variation of the format shown in Tables 2.2 and 2.3. Because of high variation in cell size, it was not feasible to present sample sizes in all individual tables for the report. Thus, readers will need to refer to these tables for the approximate sample sizes used.

Table 2.4 presents the sociodemographic characteristics of the eligible population for the 2005 DoD survey. These estimates are based on data from the sample respondents that were weighted and post-stratified to represent the survey-eligible population (see Appendix B). As noted in Section 2.1, the survey-eligible population included all active-duty personnel except recruits, Service academy students, personnel who were AWOL, and personnel who were PCS at the time of data collection. Table B.1 (Appendix B) shows that the survey-eligible population includes a large majority of total active-duty personnel (1,011,852 of the 1,300,039 active-duty personnel, or 77.8%). Nonetheless, because the survey-eligible population omits some groups, its characteristics may differ somewhat from those of the total active force. For the most part, however, such differences are expected to be relatively small and random. As shown in Table 2.4, the majority of personnel in the survey-eligible population were male (85.2%), white non-Hispanic (64.4%), educated beyond high school (66.1%), aged 34 or younger (77%), married (54.1%), and in pay grades E1 to E6 (73.6%). A majority of respondents (56.3%) had been deployed at least once in the past 3 years.

Table 2.4 shows some notable differences in demographic composition among the Services. The most striking contrasts are between the Marine Corps and other Services. Respondents from the Marine Corps were more likely than respondents in other Services to be male (93.9%), to have a high school education or less

Table 2.2 **DISTRIBUTION OF 2005 SURVEY RESPONDENTS, BY REGION AND PAY GRADE**

Region/Pay Grade	Service: Army	Navy	Marine Corps	Air Force	Total DoD
CONUS[a]					
E1-E3	176	315	477	405	1,373
E4-E6	710	1,091	764	1,040	3,605
E7-E9	249	457	572	819	2,097
W1-W5	113	28	109	N/A	250
O1-O3	190	273	394	208	1,065
O4-O10	159	578	386	442	1,565
Total	1,597	2,742	2,702	2,914	9,955
OCONUS[b]					
E1-E3	414	407	117	282	1,220
E4-E6	924	901	234	712	2,771
E7-E9	351	284	141	348	1,124
W1-W5	90	24	35	N/A	149
O1-O3	146	125	63	45	379
O4-O10	117	144	64	223	548
Total	2,042	1,885	654	1,610	6,191
Total					
E1-E3	590	722	594	687	2,593
E4-E6	1,634	1,992	998	1,752	6,376
E7-E9	600	741	713	1,167	3,221
W1-W5	203	52	144	N/A	399
O1-O3	336	398	457	253	1,444
O4-O10	276	722	450	665	2,113
Total	3,639	4,627	3,356	4,524	16,146

Note: Table entries are the number of respondents who completed a usable questionnaire.

[a]Refers to personnel who were stationed within the 48 contiguous states in the continental United States (excluding Alaska and Hawaii)

[b]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

(51.1%), to be aged 25 or younger (64.7%), to be unmarried (51.7%), and to be of junior pay grade E1 to E3 (43.1%). Marines were also somewhat more likely to report being deployed two or more times in the past 3 years than personnel in the other Services. These differences are of interest because they are risk factors for substance abuse and suggest that Marine Corps personnel may be at greater risk than personnel in other Services for heavy alcohol use and illicit drug use.

2.5 Key Definitions and Measures

2.5.1 Sociodemographic Characteristics

The sociodemographic characteristics examined in this report include gender, race/ethnicity, education, age, marital status, family status, pay grade, and region. Definitions for these characteristics are given below.

Gender Gender was defined as male or female.

Race/ Ethnicity Personnel were classified into four racial/ethnic groups: white non-Hispanic, African American non-Hispanic, Hispanic, and other (including all other persons not classified above).

Table 2.3 **DISTRIBUTION OF 2005 RESPONDENTS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	2,818	3,341	2,767	3,193	12,119
Female	821	1,286	589	1,331	4,027
Race/Ethnicity					
White, non-Hispanic	2,041	2,658	2,099	3,057	9,855
African American, non-Hispanic	712	787	466	668	2,633
Hispanic	462	605	528	409	2,004
Other	424	577	263	390	1,654
Education					
High school or less	1,145	1,341	1,122	701	4,309
Some college	1,523	1,940	1,196	2,364	7,023
College graduate or higher	971	1,346	1,038	1,459	4,814
Age					
20 or younger	409	307	298	284	1,298
21-25	1,092	1,167	909	1,132	4,300
26-34	992	1,262	941	1,117	4,312
35 or older	1,146	1,891	1,208	1,991	6,236
Family Status[a]					
Not married	1,603	1,799	1,169	1,567	6,138
Married, spouse not present	401	314	253	297	1,265
Married, spouse present	1,607	2,465	1,900	2,607	8,579
Pay Grade					
E1-E3	590	722	594	687	2,593
E4-E6	1,634	1,992	998	1,752	6,376
E7-E9	600	741	713	1,167	3,221
W1-W5	203	52	144	N/A	399
O1-O3	336	398	457	253	1,444
O4-O10	276	722	450	665	2,113
Total Personnel	3,639	4,627	3,356	4,524	16,146

Note: Table entries are the number of respondents who completed a usable questionnaire.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (in 1998, 2002, and 2005) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (refer to Section 2.5.1 for descriptions of sociodemographic variables).

Table 2.4 **SOCIODEMOGRAPHIC CHARACTERISTICS OF ELIGIBLE PARTICIPANT POPULATION**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	85.7 (1.6)	85.7 (1.3)	93.9 (0.7)	80.4 (1.1)	85.2 (0.7)
Female	14.3 (1.6)	14.3 (1.3)	6.1 (0.7)	19.6 (1.1)	14.8 (0.7)
Race/Ethnicity					
White, non-Hispanic	60.7 (2.4)	60.9 (1.9)	65.1 (2.6)	71.5 (2.1)	64.4 (1.2)
African American, non-Hispanic	21.8 (1.8)	18.8 (1.7)	11.1 (0.7)	14.8 (2.0)	17.6 (1.0)
Hispanic	10.5 (0.9)	8.0 (0.6)	13.7 (1.8)	5.6 (0.6)	8.8 (0.5)
Other	7.0 (0.6)	12.4 (2.0)	10.1 (1.1)	8.2 (0.6)	9.2 (0.6)
Education					
High school or less	37.0 (3.0)	38.1 (2.7)	51.1 (1.7)	19.1 (2.1)	33.9 (1.5)
Some college	40.7 (2.3)	43.0 (2.0)	36.9 (2.0)	51.9 (2.9)	44.1 (1.3)
College graduate or higher	22.3 (1.8)	18.9 (3.4)	11.9 (1.7)	28.9 (4.5)	22.0 (1.7)
Age					
20 or younger	17.6 (2.6)	12.8 (1.5)	21.8 (1.9)	7.9 (0.9)	14.1 (1.1)
21-25	33.7 (2.2)	30.7 (1.8)	42.9 (2.1)	28.6 (2.5)	32.6 (1.2)
26-34	27.5 (1.8)	31.0 (1.7)	25.0 (1.5)	34.9 (1.8)	30.3 (1.0)
35 or older	21.2 (3.1)	25.4 (2.1)	10.3 (0.9)	28.6 (2.4)	23.1 (1.4)
Family Status[a]					
Not married	50.4 (3.2)	46.4 (1.7)	51.7 (1.5)	37.7 (1.7)	45.8 (1.4)
Married, spouse not present	9.2 (2.8)	6.1 (0.9)	6.9 (0.6)	3.0 (0.7)	6.3 (1.0)
Married, spouse present	40.4 (5.9)	47.4 (1.8)	41.4 (1.1)	59.3 (2.1)	47.8 (2.3)
Pay Grade					
E1-E3	21.5 (4.6)	24.2 (2.9)	43.1 (3.4)	17.9 (1.9)	24.0 (1.7)
E4-E6	51.1 (4.6)	52.0 (2.4)	39.1 (3.4)	50.5 (2.8)	49.6 (1.8)
E7-E9	10.7 (2.0)	8.9 (1.6)	7.2 (0.9)	10.5 (0.7)	9.7 (0.8)
W1-W5	2.4 (0.3)	0.4 (0.1)	1.1 (0.1)	N/A (N/A)	1.0 (0.1)
O1-O3	8.6 (1.4)	8.5 (2.4)	8.5 (1.5)	11.5 (2.3)	9.4 (1.0)
O4-O10	5.7 (1.4)	5.9 (1.2)	1.0 (0.2)	9.6 (2.2)	6.3 (0.8)
Number of Times Deployed in Past 3 Years					
1 Time	37.2 (4.6)	31.4 (2.2)	25.3 (2.1)	23.2 (1.1)	30.1 (1.6)
2 Times	11.6 (1.3)	19.1 (1.6)	18.1 (2.4)	11.9 (1.7)	14.5 (0.9)
3 or more times	7.6 (1.5)	11.3 (1.3)	16.2 (3.7)	14.5 (2.6)	11.7 (1.1)
Not deployed in past 3 years	43.6 (6.5)	38.2 (3.2)	40.4 (6.7)	50.4 (4.1)	43.7 (2.7)
Total Personnel	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)	100.0 (0.0)

Note: Table displays the percentage of military personnel in each Service by sociodemographic characteristic (i.e., table displays column percentages). Percentages may not add to 100 because of rounding. The standard error of each estimate is presented in parentheses.

N/A: Not applicable.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (in 1998, 2002, and 2005) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (refer to Section 2.5.1 for descriptions of sociodemographic variables).

Education Education was defined as the highest level of educational attainment. Categories include high school or less, some college, and college degree or beyond. Personnel with General Educational Development (GED) certification were classified as high school graduates.

Age Age of respondents was defined as current age at the time of the survey. For several of the analyses presented in this report, estimates are presented for the age groups 20 or younger, 21 to 25, 26 to 34, and 35 or older. Other age groups are used in a few situations as dictated by the standards under consideration.

Family Status Family status was defined in terms of marital status and spouse presence at the duty location. Categories included not married (personnel living as single, widowed, divorced, or separated); married, spouse not present (those who were legally married and whose spouse was not at the duty location); and married, spouse present (those legally married and living with their spouse). The current categories represent a change from surveys prior to 2002, where *married* personnel included those who were living as married. Thus, estimates relating to family status in 2002 and 2005 are not strictly comparable to those presented in prior survey years.

Pay Grade Groups Military pay grades for enlisted personnel were grouped as E1 to E3, E4 to E6, and E7 to E9. Pay grades for officers and warrant officers were grouped as O1 to O3, O4 to O10, and W1 to W5.

Region *Region* refers to the location of the installation where personnel were stationed at the time of the survey and includes CONUS and OCONUS installations. Navy personnel assigned to afloat ships were classified as OCONUS.

2.5.2 Reference Periods

In this report, most estimates are given for the following periods:

Past 30 Days Occurrence of the behavior (e.g., heavy alcohol use, exercise) in the 30 days before the survey (also referred to as *past month* or *current* use or behavior).

Past 12 Months Occurrence of the behavior (e.g., illicit drug use, helmet use) in the 12 months before the survey (also referred to as *past year*).

Lifetime Occurrence of the behavior or condition (e.g., high blood pressure) at least once in a person's lifetime.

Some estimates related to specific *Healthy People 2010* objectives (U.S. Department of Health and Human Service [DHHS], 2000) refer to a period other than the ones listed above. In these situations, the period refers to the specified length of time before the survey. For example, *past 5 years* refers to the 5-year period preceding the survey.

2.5.3 Substance Use Measures

Measures of substance use for the 2005 DoD survey are generally consistent with those used in prior surveys in this series and with those in major national surveys, such as the National Survey on Drug Use and Health (NSDUH).

Alcohol Use. Alcohol use in this study was measured in terms of the quantity of alcohol consumed and frequency of drinking. Alcohol use in summary form is expressed as the average number of ounces of absolute alcohol (ethanol) consumed per day and as drinking levels. The ethanol index was computed following the method used in prior DoD surveys (Bray et al., 1983, 1986, 1988, 1992, 1995b, 1999, 2003) and the Rand study of alcohol use among Air Force personnel (Polich & Orvis, 1979). The ethanol index is a function of (a) the amount of ethanol contained in the ounces of beer, wine, and liquor consumed on a typical drinking day during the past 30 days; (b) the frequency of consumption of each beverage; and (c) the amount of ethanol consumed on

atypical (*heavy*) drinking days during the past 12 months. The index represents average daily ounces of ethanol consumed per day among all personnel during a 12-month period. Although the index is expressed in terms of 12-month use, most of the data come from reports of 30-day typical use. Appendix E provides additional details about the procedures for creating this index.

The drinking-level classification scheme used in the 2005 DoD survey was adapted from Mulford and Miller (1960) and followed the method used in prior DoD surveys (Bray et al., 1983, 1986, 1988, 1992, 1995b, 1999, 2003). The quantity per typical drinking occasion and the frequency of drinking for the type of beverage (beer, wine, or hard liquor) with the largest amount of absolute alcohol per day were used to fit individuals into 1 of 10 categories. The resulting quantity/frequency categories were then collapsed into five drinking-level groups: abstainers, infrequent/light drinkers, moderate drinkers, moderate/heavy drinkers, and heavy drinkers. Heavy drinkers, the category of most concern, were defined as drinking five or more drinks per typical drinking occasion at least once a week in the 30 days before the survey. The criterion of five or more drinks to define heavy drinkers is consistent with the definition used in other national surveys of civilians, such as the NSDUH (Office of Applied Studies [OAS], 2005) and the Monitoring the Future (MTF) study (Johnston, O'Malley, & Bachman, 1998a, 1998b; University of Michigan, 2005). Additional details about the procedures for creating the drinking-level classification scheme are described in Appendix E.

In addition to this drinking-level classification scheme, binge drinking among military personnel was examined. Binge drinking was defined as having five or more drinks on a single occasion at least once in the past 30 days. There was a slight change in the calculation of the ethanol index and the drinking-level measures in the 1998, 2002, and 2005 DoD surveys relative to those used in earlier DoD surveys. Specifically, the algorithm for calculating these measures was modified slightly to take into account information about consumption of beer in 32-ounce containers in the 1985 to 1995 surveys and consumption of beer in 32- and 40-ounce containers in the 1998 and subsequent surveys. No changes were made to the algorithm for the 1980 and 1982 surveys because the survey questionnaire did not ask about these larger-size beer containers. Thus, the trend data presented for ethanol and drinking levels show slightly different estimates from those presented in prior reports.

Negative Effects of Alcohol Use. The prevalence of adverse effects associated with alcohol use in the past 12 months also was estimated. Three summary measures of alcohol-related negative effects were created: serious consequences, productivity loss, and symptoms of dependence. The measure of alcohol-related *serious consequences* refers to the occurrence of the following problems in the past 12 months: (a) being passed over for promotion because of drinking, (b) receiving a lower score on a performance rating because of drinking, (c) loss of 1 week or more from duty because of a drinking-related illness, (d) Uniform Code of Military Justice (UCMJ) punishment because of drinking, (e) arrest for driving under the influence of alcohol (DUI), (f) alcohol-related arrest other than DUI, (g) alcohol-related incarceration, (h) alcohol-related injury to Service person, (i) alcohol-related accident resulting in someone else's injury or property damage, (j) physical fights while drinking, (k) spouse threatened to leave or left because of drinking, or (l) spouse asked Service person to leave or the person did leave. Two measures of serious consequences were included: one or more serious consequence in the past 12 months or two or more serious consequences in the past 12 months.

The measures of alcohol-related *productivity loss* examined (1) one or more factors of productivity loss or (2) two or more factors of productivity loss. (1) One or more factors was defined as 1 or more days in the past 12 months in which any of the following behaviors occurred, whereas (2) two or more factors was defined as either 2 or more days in the past 12 months in which any one of the following occurred or the occurrence of two or more factors on 1 or more days in the past 12 months: (a) being hurt in an on-the-job accident because of drinking; (b) being late for work or leaving early because of drinking, a hangover, or an illness caused by drinking; (c) not coming to work because of an illness or a personal accident caused by drinking; (d) performing

below a normal level of performance caused by drinking; (e) being drunk while working; or (f) being called in during off-duty hours and reporting feeling drunk.

Three measures of *symptoms of alcohol dependence* have been used throughout the survey series. The initial measure of dependence symptoms, used from 1980 to 1998, was based on the Rand Air Force study definition (Polich & Orvis, 1979). This measure of symptoms of alcohol dependence was based on the occurrence in the past 12 months of (a) withdrawal symptoms (e.g., hands shaking because of drinking, or having the "shakes"), (b) the inability to recall things that happened while drinking, (c) the inability to stop drinking before becoming drunk, and (d) morning drinking. Respondents reported the number of days that they experienced these symptoms during the past 12 months, and these frequencies were summed over the four symptoms. Individuals with scores of 48 or more were classified as dependent.

The measure of dependence symptoms for 2002 was patterned after the criteria specified in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition *(DSM-IV)* (American Psychiatric Association [APA], 1994] and based on expert input from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). This measure was based on the occurrence in the past 12 months of (a) tolerance (i.e., need for markedly increased amounts of alcohol to achieve the desired effect or markedly diminished effect with continued use of the same amount of alcohol); (b) withdrawal symptoms; (c) drinking larger amounts or over a longer period than intended; (d) the inability to cut down or control drinking; (e) a great deal of time spent drinking or trying to recover from the effects of drinking; (f) reducing or giving up important social, occupational, or recreational activities because of alcohol use; and (g) continued drinking despite physical or psychological problems caused or exacerbated by alcohol use. Respondents reported whether they experienced these symptoms during the past 12 months, and frequencies were summed over the seven symptoms (two items per symptom were included in the questionnaire). Individuals reporting four or more of these symptoms were deemed dependent.

For 2005, another measure of alcohol dependence was used: the Alcohol Use Disorders Identification Test (AUDIT), which was developed by the World Health Organization (WHO) as a simple method of screening for excessive drinking and of assisting in brief assessment. The AUDIT consists of 10 questions scored 0 to 4 that are summed to yield a total score ranging from 0 to 40. Scores between 8 and 15 are indicative of hazardous drinking, scores between 16 and 19 suggest harmful drinking, and scores of 20 or above clearly warrant further diagnostic evaluation for possible alcohol dependence.

Illicit Drug Use. Illicit drug use was measured in terms of the prevalence of nonmedical use of any of 11 categories of drugs: (1) marijuana or hashish, (2) cocaine (including "crack"), (3) hallucinogens/PCP/LSD, (4) amphetamines/stimulants, (5) tranquilizers or other depressants, (6) barbiturates/sedatives, (7) heroin or other opiates, (8) analgesics and other narcotics, (9) inhalants, (10) anabolic steroids, and (11) sexual enhancers. Nonmedical use was defined as any use of these drugs "on your own," that is, either without a doctor's prescription, or in greater amounts or more often than prescribed, or for any reasons other than as prescribed, such as for the feelings they caused. These categories are slightly different from those addressed by the 2002 survey; in 2005, the PCP and LSD/other hallucinogen categories from 2002 were included with hallucinogens. Similarly, the Gamma Hydroxyl Butyrate (GHB) and designer-drug categories from 2002 were absorbed into new 2005 categories (GHB was included with barbiturates/other sedatives, and designer drugs were included with hallucinogens). Finally, the 2005 survey added a drug category for sexual enhancers such as Viagra. No attempt was made to measure quantity (e.g., number of pills) or the size of doses for any of these drugs, because most respondents cannot furnish this information adequately and because of the considerable variation in street drug purity.

To estimate the prevalence of use, questions were included about use of each drug type within the past 30

days and within the past 12 months. Definitions followed those used in prior DoD surveys to facilitate comparisons. These definitions also have been commonly used in the NSDUH (e.g., OAS [2005]). Indices were constructed of *any illicit drug use* (see drug categories 1 to 9 above) and *any illicit drug use except marijuana* (see drug categories 2 to 9 above) by creating use/no use dichotomies for each drug category and then setting an individual's score to the maximum score value of the categories (steroids and sexual enhancers were not included in these summary measures).

As discussed more fully in Chapter 5, unexplained changes in illicit drug use, including large increases in analgesics use, occurred between 2002 and 2005. These changes may reflect actual changes in drug use or may be associated with changes in questionnaire wording in 2005, such that respondents may have answered the drug questions based on their legitimate prescription use rather than their nonmedical use of these drugs. Because the reasons for the changes cannot be determined unequivocally, trend comparisons between 2002 and 2005 data are not presented in this report.

Tobacco Use. Most analyses of tobacco use focus on cigarette smoking. *Current smokers* were defined as those who smoked at least 100 cigarettes during their lifetime and who last smoked a cigarette during the past 30 days. *Heavy smokers* were defined as current smokers who smoked one or more packs of cigarettes a day during the past 30 days. In some analyses, personnel were classified in terms of whether they were lifetime smokers (i.e., smoked at least 100 cigarettes in their lifetime but did not smoke in the past 30 days) or nonsmokers (had not smoked 100 cigarettes in their lifetime).

The 2005 survey also measured the prevalence of use of other forms of tobacco besides cigarettes (i.e., cigars, pipes, smokeless tobacco). *Current* users of smokeless tobacco were defined as personnel who used smokeless tobacco products (i.e., chewing tobacco or snuff) at least once during the past 30 days. Pipe and cigar use was defined as smoking one or more times during the past 30 days.

Nicotine Dependence. Nicotine dependence was assessed using the Fagerstrom Nicotine Dependency Assessment (Heatherton, Kozlowski, & Frecker, 1991). This brief (6-item) scale has been widely used and validated to assess severity of smoking. In this report, scale scores were dichotomized such that respondents with summed scale scores of 5 or above (medium or high dependence) were classified as nicotine dependent, whereas respondents with summed scale scores of 4 or below (low or no dependence) were classified as not nicotine dependent.

2.5.4 Other Health Behaviors

A major focus of the 2005 DoD survey was the investigation of personnel's health behaviors other than use of alcohol, illicit drugs, or tobacco. During the transition into the 21st century, progress toward *Healthy People 2010* goals for the military are being examined. In particular, the following health behaviors or factors related to *Healthy People* objectives were measured:

- substance use
- weight and exercise
- blood pressure screening and action
- cholesterol screening and action
- hospitalization for injuries
- seat belt use
- motorcycle and bicycle helmet use
- condom use by sexually active unmarried personnel
- receipt of Pap tests
- substance use during pregnancy

Overweight, obesity, and underweight were defined in terms of the Body Mass Index (BMI), where BMI is weight (in kilograms) divided by the square of height (in meters). In summer 1998, the National Heart, Lung, and Blood Institute (NHLBI) developed national BMI guidelines for screening for overweight and underweight. These guidelines defined four levels of overweight, regardless of age or gender: (a) overweight—BMI of 25.0 to 29.9; (b) obesity I—BMI of 30.0 to 34.9; (c) obesity II—BMI of 35.0 to 39.9; and (d) extreme obesity—BMI of 40.0 or greater.

Underweight was defined as BMI less than 18.5 for both men and women regardless of age (NHLBI, 1998). *Healthy People 2010* sets goals to encourage adults aged 20 years or older, regardless of gender, to maintain a healthy weight, defined as a BMI greater than 18.5 and less than 25.0, with underweight defined by BMI less than 18.5; overweight defined by BMI greater than or equal to 25.0, and obesity defined as BMI greater than or equal to 30.0. In 2005, the Departments of Health and Human Services and Agriculture released new *Dietary Guidelines for Americans* that reaffirmed the current national approach to overweight screening using BMI cutoff points. These guidelines use the same BMI criterion as the NHLBI for overweight for persons aged 20 or older (i.e., BMI 25.0 or higher). The current national standards for overweight and obesity use criteria that are consistent with international standards and make a clear distinction between the criteria for children and adolescents, who are still growing, and adults (Kuczmarski & Flegal, 2000). For persons aged 2 to 19, overweight is calculated using gender-based BMI for age tables based on CDC growth curves for each gender. Persons at or over the 95th percentile for their growth curve are classified as overweight.

Because the national standards have changed over time, this report presents some tables in which adult military personnel with a BMI of 25.0 or greater were classified as overweight, as in earlier reports, and other tables in which those with a BMI greater than 30.0 and classed as obese are shown. Since the major impact of the change in national standards on this study is the difference in the manner by which overweight is calculated for individuals under 20 years, from using a BMI 25.0 cutoff point to gender-based BMI for age, this report also provides a comparison table that illustrates the impact of these changes on percentages in the Services.

Reducing hospitalization for injuries has been of concern in the military. *Healthy People 2010* does not have an objective related to hospitalization for injuries, but *Healthy People 2000* did and referred to unintentional injuries. Before the 2002 survey, the measure of hospitalization for injuries did not distinguish between unintentional injuries and intentional injuries. Intentional injuries are those that result from deliberate intent to harm an individual or oneself (e.g., assault, suicide) and differ from injuries that result from other agents or events (e.g., running injury, motor vehicle crash). The 2005 survey asked specifically about unintentional injuries. Because there are few intentional injuries, there is little difference in the measures.

Measures for the other *Healthy People 2010* behaviors were based primarily on responses to specific questions about the behaviors and generally did not involve the construction of special indices. More detailed discussion about specific measures for these other behaviors is given in Chapters 7 and 9.

In addition to behaviors measured by *Healthy People* objectives, risk-taking/impulsivity and sensation-seeking behaviors (Cherpitel, 1999) were assessed. The impulsivity items included the following: (a) I often act on the spur of the moment without stopping to think, (b) I get a real kick out of doing things that are a little dangerous, (c) you might say I act impulsively, (d) I like to test myself every now and then by doing something a little chancy, and (e) many of my actions seem hasty. The set of sensation-seeking items included the following: (a) I'm always up for a new experience, (b) I like to try new things just for the excitement, (c) I go for the thrills in life when I get a chance, and (d) I like to experience new and different sensations. For our analyses, the items of these scales were combined, and each question was scored from 1 to 4, creating a mean score for each scale. A mean score of 1 was categorized as *low*, a mean score of between 1 and 2 (not inclusive) was categorized as *moderate*, and a mean score of 2 or greater was categorized as *high*.

The 2005 survey included a number of new items geared toward establishing measures of exercise, nutrition, use of alternative health methods, and supplement use behavior among personnel. Each of these items asked about specific types of behavior; for instance, question 84 asks participants about their past-30-day leisure-time physical activity. The item gives detailed descriptions of what constitutes moderate and vigorous physical activity. Thus, these items do not require additional constructed measures.

2.5.5 Mental Health

The 2005 DoD survey included the following sets of questions on mental health issues:

- levels of stress at work and in family life
- sources of stress
- behaviors for coping with stress
- perceived quality of mental health
- symptoms of anxiety and depression
- history of physical and sexual abuse
- symptoms of serious psychological distress and posttraumatic stress disorder (PTSD)
- suicidal ideation and attempt
- receipt of mental health services in the past 12 months, including the sources of any such services
- perceived need for mental health services in the past 12 months
- perceived damage to one's military career associated with seeking mental health services

Measures for several of these items were based on responses to specific questions. Other measures consisted of specific scales. For example, to determine whether personnel were in need of further depression screening, the three-item Version A Burnam depression screen that included three items from the Center for Epidemiologic Studies–Depression Scale (CES-D; Radloff, 1977) and one item from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) was used. From these items, an index of Need for Further Depression Evaluation was constructed based on reports of an extended period of depression, primarily in the past 12 months. Personnel were defined as needing further evaluation or assessment if they (a) felt sad, blue, or depressed for 2 weeks or more in the past 12 months or reported 2 or more years in their lifetime of feeling depressed and felt depressed "much of the time" in the past 12 months; *and* (b) felt depressed on 1 or more days in the past week. This index was based on work by Rost, Burnam, and Smith (1993). Analyses of data from a general population showed that this Burnam screener had high sensitivity and good positive predictive value for detecting depressive disorder (Burnam et al., 1988).

To screen for generalized anxiety disorder (GAD) symptoms, a set of items adapted from the Patient Health Questionnaire (Spitzer, Kroenke, & Williams, 1999) was used. If respondents told us that they had been feeling nervous, anxious, or on edge or that they had been worrying a lot about different things (the first questions in the set) for several days or more, the analysis examined whether they reported any of the other symptoms. If they reported experiencing three or more symptoms on more than half of the days in the past 30 days, they were considered to be meeting screening criteria.

In 2005, a standardized measure to screen for serious psychological distress (SPD) was included for the first time. This six-item scale of serious psychological distress, the K-6, has been found to be an efficient SPD screening scale in national samples and is used in NSDUH (Kessler, 2002; OAS, 2005). This instrument asked respondents how often they felt nervous, hopeless, restless, or fidgety; so depressed nothing could cheer them up; that everything was an effort; and worthless in the past 30 days. The five-point scale ranged from 0 to 24 with response options from "none of the time" to "all of the time." Items were summed and the standard cutoff of 13 or more indicated possible serious mental illness (Kessler et al., 2005). This scale has been shown to have a sensitivity of 0.36 and a specificity of 0.96 in the general population (Kessler et al., 2003).

Also for the first time, the 2005 DoD survey included the PTSD Checklist-civilian version (PCL-C) (Weathers, Litz, Huska, & Keane, 1994), which consists of a set of 17 items that ask about experiences related to PTSD. The civilian rather than military version (PCL-M) was used to capture PTSD symptoms that may be the result of either military or nonmilitary (i.e., traumatic exposures that occurred before being in the Service) experiences. Items included characteristics such as loss of interest in activities that used to be enjoyable, being extremely alert or watchful, having physical reactions when reminded of a stressful experience, and feeling jumpy or easily startled. Respondents were asked to indicate how much they had been bothered by each of the 17 experiences in the last 30 days; response options were not at all, a little bit, moderately, quite a bit, and

extremely. Each statement was scored from 1 to 5, and a sum for all items was computed. The standard diagnostic cutoff was used such that if the sum were greater than or equal to 50, participants were classified as needing further evaluation for current (past month) PTSD; those with a score less than 50 were considered not to need further evaluation (Forbes, Creamer & Biddle, 2001). It should be noted that the published cutpoints used to indicate need for further evaluation of PTSD were derived from samples with high prevalence rates of current PTSD and should be interpreted with caution (Orr & Kaloupek, 2004).

Also new to the 2005 survey was the addition of three items from the Brief Trauma Questionnaire to assess physical and sexual trauma or abuse. This topic was of concern because of the strong relationship between trauma and poor health behaviors. Prevention efforts in the DoD and the civilian sector could be greatly assisted by recognizing the role that trauma plays in initiating and maintaining poor health habits. Two items inquired whether the respondent was ever physically punished or beaten by a parent, caretaker, or teacher so that they were very frightened, thought they would be injured, or they were injured, and whether they had ever been attacked, beaten, or mugged. A third item inquired whether anyone had ever made or pressured the respondent into having some type of unwanted sexual contact. Response items inquired whether the trauma happened before age 18, between age 18 and the time they entered the Service, and since entering the Service.

2.5.6 Spirituality and Religious Practices

Because of findings indicating an association between spiritual practices and health behaviors/status (e.g., Niederhauser et al. [2005]; Williams et al. [2002]), three items inquiring about religious and spiritual practices were included. Respondents were asked to what extent they agreed with two questions regarding the importance of religious/spiritual beliefs and the degree to which religious/spiritual beliefs influenced their decision making. Respondents' spirituality was categorized as high if they reported *strongly agree* to both questions, medium if they reported either *strongly agree* or *agree* to at least one of the questions, and low if they reported either *disagree* or *strongly disagree* to both questions. These items were drawn from those used in the NSDUH.

2.6 Analytical Approach

The focus of our analyses of the 2005 DoD survey was to provide knowledge about current levels of substance use and health behaviors, negative effects associated with alcohol use, and trends in these behaviors throughout the survey series. In addition, analyses provide estimates of progress toward the achievement of selected *Healthy People 2010* objectives and other selected behaviors of interest. These analyses provide information to help assess and guide policy and program directions, including the most effective targeting of resources to problem areas.

To accomplish these aims, five basic types of analyses were conducted within this study:

- descriptive univariate and bivariate analyses of the prevalence of substance use, negative consequences, health behaviors, and selected *Healthy People 2010* objectives in 2005
- comparisons of trends in substance use and negative effects from 1980 to 2005 (including standardized comparisons of substance use to control for changes in demographic composition)
- standardized comparisons of the extent of substance use among personnel in the four active Services in 2005
- standardized comparisons of military and civilian rates of substance use
- multivariate logistic regression analyses

Most analyses were descriptive cross-tabulations of the responses from two or more variables. Statistical significance for these data was assessed using *t* tests.

An important part of our analyses included the comparison of trends across the series of DoD surveys. Comparing substance use over time is useful, but researchers and policy makers should recognize the limitations of such analyses in drawing policy conclusions. The data from the DoD survey series are cross-sectional, not longitudinal, and come from different populations because of the high turnover among military personnel. Many individuals serving in

the military in 1980, 1982, 1985, 1988, 1992, 1995, 1998, and 2002 (years when the surveys were administered) were no longer in the military in 2005. Thus, analysts must use caution in making inferences about reasons for the observed changes in rates of substance use, health behaviors, or problems. The changes may be partly due to effective substance use and health promotion programs and other health-related policies in the military, but they also may be due to differences in sociodemographic characteristics, attitudes, and values of the populations being surveyed.

In particular, changes in substance use patterns may have been partly due to changes in the sociodemographic composition of the military since 1980. The active force is now somewhat older, has more officers, has more married personnel, and is better educated than in 1980—factors that in previous DoD surveys have been associated with a lower likelihood of substance use. Therefore, the technique of direct standardization (Kalton, 1968), described in Appendix F, was used to create adjusted estimates of heavy alcohol, illicit drug, and cigarette use for each of the survey years since 1980. These adjustments provide an indication of the expected substance rates if the military population in each of these subsequent survey years had the same age, educational, and marital status distribution as in 1980. In Chapters 3 through 6, both adjusted and unadjusted rates (i.e., observed rates) of substance use across the survey years are presented. Adjusted estimates are constructed estimates that allow us to determine whether observed changes in substance use rates over the past 25 years can be explained by changes in the demographic composition of the Services. Unadjusted, or raw, estimates are the *observed* substance use rates and identify the challenges facing each Service in its efforts to prevent and reduce heavy drinking, illicit drug use, and smoking.

Although the observed rates mark the realities that the Services must address in combating substance abuse, some of the differences in rates among the Services are likely to be a function of the demographic composition of the Services. For example, as shown in Table 2.4, Air Force personnel tended to have a greater proportion of women and be better educated than personnel in the other Services at the time of the survey. Because these characteristics are associated with lower rates of substance use, all other things being equal, one would expect the prevalences of heavy drinking, drug use, and smoking to be lower in the Air Force than in the other Services. Comparisons of efforts by the Services to combat substance abuse must consider demographic differences in risk factors. To take into account the sociodemographic differences among Services, a second set of adjusted estimates was computed. As with the approach described above, direct standardization (Kalton, 1968) was used to adjust the 2005 prevalence rates for each Service and to construct the rates that would be expected if each Service were to have the gender, age, education, race/ethnicity, and marital status distribution of the total DoD.

In addition to standardizations that examined trends and Service differences, standardized comparisons to assess similarities in substance use rates of military and civilian populations were conducted. In these analyses, the civilian data were standardized to match the demographic distribution of the military, and new civilian rates were then computed for the standardized population. These standardized comparisons also used the technique of direct standardization (see Appendix F).

Finally, logistic regression analyses were used in Chapter 4 (alcohol use), Chapter 5 (illicit drug use), and Chapter 6 (tobacco use) to model outcome measures of heavy drinking, illicit drug use, and cigarette smoking as a function of demographic variables. In logistic regression, the natural log of the odds (i.e., $ln\ p/1\text{-}p$) is modeled as a linear function of the independent variables. The parameters of a logistic regression model are transformed to reflect relative changes in the odds due to changes in the independent variables.

2.7 Variability and Suppression of Estimates

Table 2.4 and other tables in the following chapters generally present two numbers in each cell. The first number is an estimate of the percentage of the population with the characteristics that define the cell. The second number, in parentheses, is the standard error

of the estimate. Standard errors represent the degree of variation associated with observing a sample rather than observing every member of the population.

Confidence intervals, or ranges that are very likely to include the true population value, can be constructed using standard errors. A basic 95% confidence interval can be computed by adding to and subtracting from the estimated proportion, the result of multiplying 1.96 times the standard error for a cell. The confidence interval range means that, if the study were repeated with 100 identically drawn samples (which might include different individuals), the confidence interval would include the true parameter value 95% of the time. For a given confidence level (such as 95%), then, the precision with which the cell proportions estimate the true population value varies with the size of the standard error. Because of the weighting of the estimates, constructing an accurate 95% confidence interval for the estimates presented in this report is significantly more complex.

In this report, estimates considered unreliable were omitted. More specifically, estimates of means and proportions that could not be reported with confidence because they either were based on small sample sizes ($n < 30$) or had large sampling errors were suppressed. The rules for classifying estimates as unreliable are explained in Appendix C. Unreliable estimates that were omitted are noted by "+" in the tables. Very small estimates (i.e., < 0.05%) that were not suppressed by the rules, but that rounded to zero, also were omitted from the tables and are shown as (–).

2.8 Strengths and Limitations of the Data

Self-reports in which respondents provide data about their behaviors rely on respondents' ability and veracity to provide correct information about observations and events. Surveys have been a major vehicle for obtaining self-reported data about a wide variety of behaviors, including substance use and health behaviors. A major strength of the 2005 DoD survey is that it permitted the collection of a rich array of information from active-duty personnel around the world about the nature and extent of behaviors of interest, along with information about correlates of these behaviors. Other strengths of the 2005 DoD survey include the use of sophisticated sampling techniques and widely used questionnaire items that allow for precise estimates of substance use and health behaviors for well-defined populations and permit assessment of trends over time.

Despite these strengths, survey results are subject to the potential bias of self-reports and to the ambiguities caused by questions with varying interpretations. In addition, there are other potential problems with the validity of survey data, including issues of population coverage and response rates. If the population is not properly represented in the survey or if response rates are low, biases may be introduced that can invalidate the survey results. The design and field procedures of the 2005 DoD survey are believed to have addressed these concerns to the extent possible using the most current survey methodology. A pretest was used to identify and eliminate ambiguities in question wording, the active-duty population was properly represented in the study, and the response rate was within an acceptable range (although somewhat lower than for past DoD surveys). Further, a nonresponse adjustment was made to help compensate for the potential bias of nonsurveyed persons.

Many individuals question the validity of self-reported data on sensitive topics, such as alcohol and drug use, claiming that survey respondents will give socially desirable, rather than truthful, answers. In some situations, respondents may have strong motivations not to report drug use behavior honestly, and data may yield drug use estimates that are conservative. This issue was of concern for the 2005 survey because of the belief that Service members might not reveal anything about behaviors that could jeopardize their careers in the military.

These issues have been the topic of a number of empirical investigations demonstrating that, although self-reports may sometimes underestimate the extent of substance use, they generally provide useful and meaningful data. For example, in an examination of the validity of alcohol-problem measures among Air Force

personnel, Polich and Orvis (1979) found little evidence of underreporting when comparing self-reported data on adverse effects with police records and supervisor reports. Air Force beverage sales data, however, suggested that self-reports may underestimate actual prevalence of alcohol use by as much as 20%.

The reliability and the validity of self-reported data among respondents from the U.S. civilian general population have been tested explicitly in relation to alcohol use (Lemmens, Tan, & Knibbe, 1992; Mayer & Filstead, 1979; Midanik, 1982; Smith, Remington, Williamson, & Anda, 1980) and drug use (Haberman, Josephson, Zanes, & Elinson, 1972; Harrison, 1995; Kandel & Logan, 1984; O'Malley, Bachman, & Johnston, 1983; Rouse, Kozel, & Richards, 1985). Overall, the various reviews of the literature are encouraging in suggesting that self-reports on alcohol use and drug use can be reasonably reliable and valid.

Additional information about the validity of self-reports on drug use has been addressed by Harrison (1995) and in a monograph by Rouse et al. (1985). A general conclusion emerging from these reviews is that most people appear to be truthful (within the bounds of capability) under the proper conditions. Such conditions include believing that the research has a legitimate purpose, having suitable privacy for providing answers, having assurances that answers will be kept confidential, and believing that those collecting the data can be trusted (Harrison, 1995; Johnston & O'Malley, 1985). When respondents believe that survey questions are reasonable and justified in terms of their purpose, and when they have confidence that their answers will not be used against them, self-reports can be sufficiently valid for research and policy purposes. When those conditions are not met, there may be substantial underreporting.

Support for the validity of data reported in the 2005 and earlier DoD survey derives from this extensive body of research and the methodological rigor used to conduct the studies. Throughout the DoD survey series, a strong research design has been used, and rigorous procedures have been followed that encourage honest reporting. For example, participants have been anonymous, questionnaires have been answered privately, and neutral civilian teams have collected the data and assured participants of data confidentiality.

Chapter 3: Overview of Trends in Substance Use and *Healthy People 2010* Objectives

This chapter provides a brief overview of the prevalence of alcohol use, illicit drug use, and tobacco use from the 2005 Department of Defense (DoD) survey and examines trends in substance use and negative effects due to alcohol use from 1980 to 2005. It also presents data for selected *Healthy People 2010* objectives, most of which apply to all personnel, but several of which are specific to subsets of the military and to military women. In addition, this chapter examines trends from 1995 to 2005 in achieving these objectives. Previously, these behaviors were tracked for *Healthy People 2000* objectives, but they are now considered for the *Healthy People 2010* objectives. The focus in this chapter is to provide a broad overview of data and findings for the entire DoD. These findings are discussed in more detail in later chapters, both for the total DoD and for the individual Services.

3.1 Trends in Substance Use

This section presents two types of estimates: unadjusted and adjusted substance use prevalence rates. Unadjusted data are the observed rates reported in the surveys of the DoD series from 1980 to 2005 and reflect the challenges that the Services face in reducing substance use. Adjusted data, on the other hand, are constructed rates that have been modified to take into account changes in the sociodemographic composition of the Services since the survey series began in 1980. Military personnel in 2005, on average, were more likely to be older, to be female, and to have more education than in 1980—factors that are associated with lower rates of substance use. Thus, adjusted rates help address the question of whether changes reflected in the trends in substance use are due primarily to shifts in military demographics.

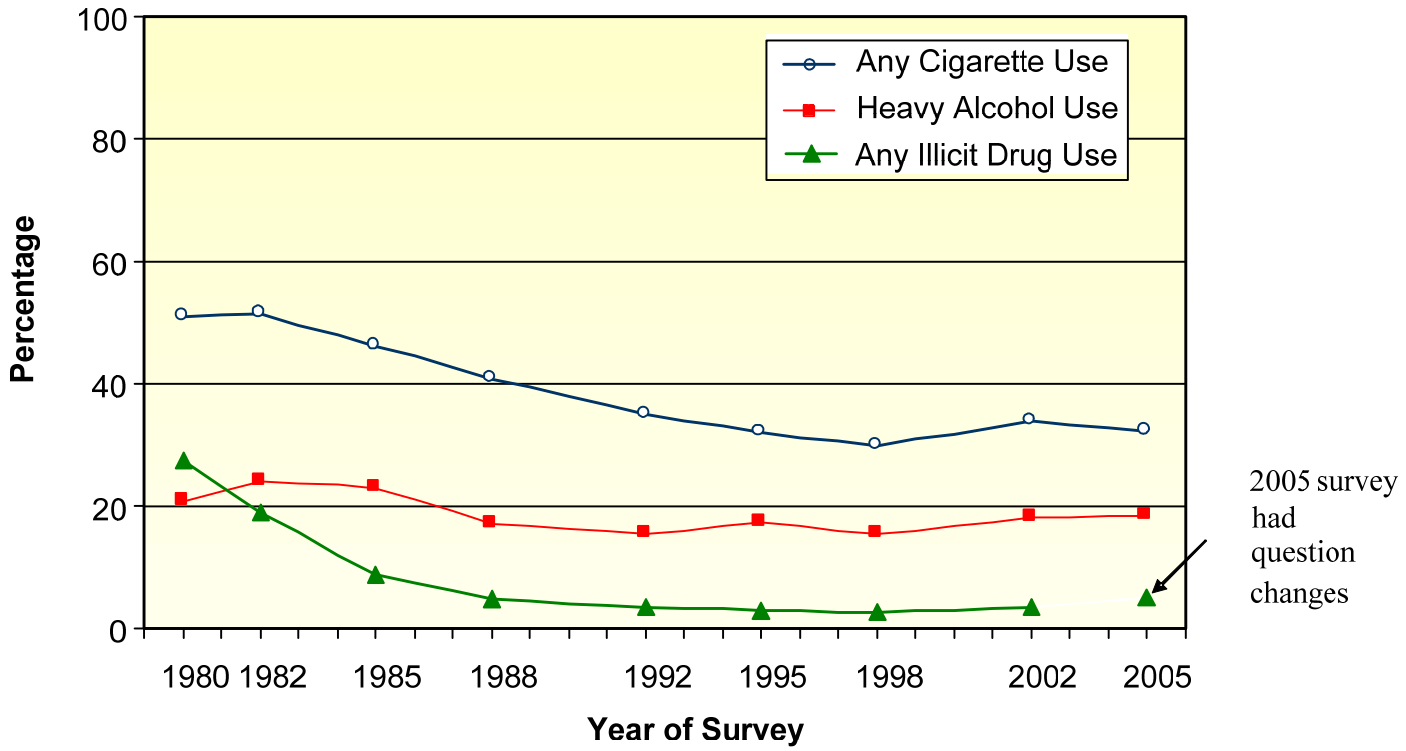
3.1.1 Unadjusted Trends in Substance Use

Figure 3.1 presents the trends over the nine DoD surveys of the percentage of the total active force during the past 30 days who engaged in heavy alcohol use, any illicit drug use, and any cigarette use. For illicit drug use the 2005 data are not included in the trend line because of some changes in question wording. Rather they are noted as a separate data point for 2005. Table 3.1 presents the observed rates of use of the three substances for the survey years and information about the statistical significance of changes in substance use between each pair of survey years and between the 1980 survey and the 2005 survey for heavy alcohol and cigarette use and from 1980 to 2002 for illicit drug use. In addition, Table 3.1 shows the distribution of alcohol use among drinking levels across the survey years and also shows negative effects of alcohol use.

As shown in Figure 3.1 and Table 3.1, any cigarette use declined significantly between 1980 and 2005. Similarly, any illicit drug use declined significantly from 1980 to 2002. The rate of decline varied for each of the substances and among the survey years. In contrast, the rates of heavy alcohol use did not show an overall significant decline between 1980 (20.8%) and 2005 (18.5%), although the 1998 survey showed a significant decline from the 1980 rate of use (from 20.8% to 15.4%).

The percentage of military personnel who smoked cigarettes in the past 30 days decreased significantly, from 51.0% in 1980 to 32.2% in 2005. Smoking rates showed no significant change between 1980 and 1982, decreased significantly between each of the survey years from 1982 to 1995, did not change significantly between 1995 and 1998, showed a significant increase from 1998 (29.9%) to 2002 (33.8%), and remained at about the same level in 2005 (32.2%). The 2005 rate is similar to the prevalence rate observed 10 years earlier in 1995 (31.9%) and suggests that additional attention may be needed to find ways to further reduce cigarette smoking in the military. The trends in heavy smoking (smoking a pack a day or more) showed a significant decline over the entire survey period from 1980 (34.2%) to 2005 (11.0%) and also showed a significant decline from 2002 (13.1%) to 2005 (11.0%).

Figure 3.1 Trends in substance use, past 30 days, total DoD, 1980-2005



This trend is in contrast to any cigarette smoking, which showed no change between 2002 and 2005.

The prevalence of any reported illicit drug use during the past 30 days declined sharply from 27.6% in 1980 to 3.4% in 2002. The decreases were statistically significant between each of the surveys from 1980 to 1992 and remained relatively stable, around 3%, from 1992 (3.4%) to 2002 (3.4%). Rates of illicit drug use during the past 12 months showed a parallel pattern to the 30-day use except at a higher level, as would be expected. Use declined from 36.7% in 1980 to 6.9% in 2002. Rates have been relatively constant from 1992 to 2002 at around 6% to 7%. In 2005, the prevalence of illicit drug use for the past 30 days was 5.0% and the prevalence for the past 12 months was 10.9%. Note that in 2005 some inadvertent changes in question wording may have changed respondents' interpretation of the items. As a result, data from 2005 are not comparable to the prior surveys' data and are not included as part of the trend line.

The trend in heavy drinking over the nine surveys shows that heavy alcohol use increased from 1980 to 1982, was relatively stable between 1982 and 1985, decreased significantly between 1985 and 1988, remained relatively stable with some up and down fluctuations between 1988 and 1998, showed a significant increase from 1998 to 2002, and remained at that level in 2005. Overall, the heavy drinking rate for 2005 (18.5%) was very similar to the rate when the survey series began in 1980 (20.8%).

Examination of drinking levels, presented in Table 3.1, shows that across the survey years, the majority of military personnel have used at least some alcohol. In 2005, more than three-fourths of the total DoD consumed some alcohol in the past 30 days. These data also show a pattern from 1980 to 1998 toward a general increase in the proportion of personnel who abstained from alcohol or who were light/infrequent users; the trend remained relatively stable from 1998 to 2005. This pattern is accompanied by corresponding decreases in the proportions of moderate and moderate/heavy drinkers from 1980 to 1998 and relative stability from 1998 to 2005, possibly suggesting a pattern toward more responsible alcohol use among the large majority of military personnel. The exception, however, is among

Table 3.1 **SUBSTANCE USE SUMMARY FOR TOTAL DOD, 1980-2005**

Measure	Year of Survey 1980	1982	1985	1988	1992	1995	1998	2002	2005
Alcohol Drinking Levels									
Abstainer	13.5 (0.5)	11.8 (0.5)[a]	13.3 (0.6)[a]	17.2 (0.4)[a]	20.0 (0.8)[a]	20.7 (0.5)	23.8 (0.6)[a]	23.0 (0.7)	22.1 (0.8)[*]
Infrequent/light	12.1 (0.4)	17.6 (0.8)[a]	16.5 (0.7)	17.5 (0.5)	18.5 (0.4)	18.5 (0.6)	19.4 (0.5)	18.3 (0.5)	18.1 (0.5)[*]
Moderate	21.2 (0.7)	17.0 (0.5)[a]	18.7 (0.6)[a]	19.4 (0.5)	19.6 (0.5)	19.0 (0.5)	18.1 (0.5)	17.9 (0.5)	17.7 (0.6)[*]
Moderate/heavy	32.4 (0.6)	29.6 (0.6)[a]	28.5 (0.8)	28.8 (0.7)	26.3 (0.6)[a]	24.5 (0.6)[a]	23.2 (0.5)	22.7 (0.4)	23.5 (0.5)[*]
Heavy	20.8 (1.1)	24.1 (1.0)[a]	23.0 (1.1)	17.2 (0.9)[a]	15.5 (0.8)	17.4 (0.9)	15.4 (0.8)	18.1 (1.1)[a]	18.5 (1.0)
Any Illicit Drug Use									
Past 30 days	27.6 (1.5)	19.0 (1.0)[a]	8.9 (0.8)[a]	4.8 (0.3)[a]	3.4 (0.4)[a]	3.0 (0.3)	2.7 (0.3)	3.4 (0.4)[*]	
Past 30 days[b]									5.0 (0.4)
Past 12 months	36.7 (1.5)	26.6 (1.0)[a]	13.4 (1.0)[a]	8.9 (0.8)[a]	6.2 (0.6)[a]	6.5 (0.5)	6.0 (0.4)	6.9 (0.7 [*]	
Past 12 months[b]									10.9 (0.7)
Cigarette Use, Past 30 Days									
Any smoking	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[a]	29.9 (0.8)	33.8 (1.3)[a]	32.2 (1.1)[*]
Heavy smoking	34.2 (0.6)	33.5 (0.7)	31.2 (0.8)[a]	22.7 (0.7)[a]	18.0 (0.5)[a]	15.0 (0.6)[a]	13.4 (0.5)	13.1 (0.6)	11.0 (0.8)[a,*]
Alcohol Use Negative Effects, Past 12 Months									
Serious consequences	17.3 (1.1)	14.6 (0.6)[a]	10.7 (0.9)[a]	9.0 (0.6)	7.6 (1.1)	7.6 (0.5)	6.7 (0.4)	9.6 (0.8)[a]	8.1 (0.5)[*]
Productivity loss	26.7 (1.2)	34.4 (0.7)[a]	27.1 (1.1)[a]	22.1 (1.2)[a]	16.4 (1.4)[a]	16.3 (0.8)	13.6 (0.6)[a]	17.3 (0.9)[a]	13.2 (0.7)[a,*]
Dependence symptoms[c]	8.0 (0.6)	9.0 (0.5)	7.7 (0.7)	6.4 (0.5)	5.2 (0.4)	5.7 (0.4)	4.8 (0.3)		
Dependence symptoms[d]								12.3 (0.9)	
Probable dependence[e]									2.9 (0.3)

Note: Table displays the percentage of military personnel by survey year who reported use of the substance noted in the rows of the table. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[*]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

[c]Having experienced alcohol dependence symptoms on at least 48 days during the year.

[d]Having experienced four or more alcohol dependence symptoms at any time during the past year.

[e]Alcohol Use Disorders Identification Test (AUDIT) score of 20 or greater, indicative of probable alcohol dependence.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Alcohol Drinking Levels, Q18-Q21 and Q23-Q26; Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68 and Q69; Cigarette Use, Past 30 Days: Any Smoking, Q49 and Q52, Heavy Smoking, Q53; Alcohol Use Negative Effects, Past 12 Months: Serious Consequences, Q37 and Q38, Productivity Loss, Q36).

the heavy alcohol users, who showed little overall change across the survey series, especially since 1988, and who showed a significant increase from 1998 to 2002, remaining at this level in 2005.

Considered together, these trend data on substance use are notable in several regards. Cigarette smoking showed large, statistically significant reductions from 1980 to 2005, and illicit drug use showed significant reductions from 1980 to 2002, indicating that the military has made important progress in reducing use of these substances over the past 2 decades. Heavy alcohol use did not show the same overall decline. There have been some reductions in heavy drinking over the years, but these have been offset by increases such that the 1980 and 2005 rates were not statistically different.

In contrast to these long-term patterns, some changes from 2002 to 2005 are noteworthy. During these 3 years, there was a significant reduction in heavy cigarette use. There was no significant change for any cigarette use or heavy drinking, however. This reduction in heavy smoking between 2002 and 2005 is encouraging and consistent with the strong emphasis from health planners and practitioners in the military on smoking reduction and the wave of national attention directed toward problems linked to smoking.

3.1.2 Trends in Substance Use, Adjusted for Changes in Sociodemographic Composition

To examine whether changes in sociodemographic composition of the military population help explain the pattern of results, direct standardization methods were used to adjust the rates of use for the 1982 through 2005 surveys to the age/education/marital status distribution for the 1980 survey respondents (see Appendix F for a discussion of standardization methods and the rationale for sociodemographic variables used for the adjustment). Adjusted rates are not actual prevalence estimates, but rather are constructed estimates that show how the rates would have looked if there had been no changes in the sociodemographic characteristics of the military from 1980 to 2005.

Table 3.2 presents the trends in unadjusted (i.e., observed) and adjusted (i.e., standardized or constructed) rates of heavy alcohol use, any illicit drug use, and cigarette smoking for the total DoD across the survey years. In general, adjustments by standardization changed the estimates somewhat but did not substantially alter the patterns of significant differences between surveys from 1980 to 2005. For heavy alcohol use, adjusted rates increased the estimates of heavy alcohol use by about 1 to 4 percentage points for the 1982 to 2005 surveys. That is, if the sociodemographic composition of the military in later years had been the same as in 1980, rates of heavy alcohol use would have been even higher than the observed rates.

A key finding for heavy alcohol use is that the adjusted rates are nearly identical across the entire survey period (with the exception of the 1982 and 1985 surveys, which were even higher). This suggests that some of the decline in heavy alcohol use observed in the unadjusted rates can be explained by the changes in the demographics of the military from 1980 to 2005. The implication is that military programs and practices have had little effect on rates of heavy alcohol use during the 25-year period. This conclusion is subject to other interpretations, however. Both the adjusted and unadjusted data showed a significant increase in heavy alcohol use between 1980 and 1982, and both adjusted and unadjusted data were significantly lower in 1988 than in 1985. This could be interpreted to mean that the military made significant progress in reducing heavy alcohol use during the 1980s that cannot be explained just by sociodemographic changes.

Another view consistent with historical events is that the 1982 increase in heavy alcohol use is an anomaly that may reflect substitution with alcohol when the initial crackdown on illicit drug use began with the reintroduction of urinalysis testing in the early 1980s. This notion suggests that rates of heavy drinking merely fluctuated around a base level observed in 1980. In either case, the adjusted data indicate that

Table 3.2 **TRENDS IN SUBSTANCE USE, PAST 30 DAYS, UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC CHARACTERISTICS FOR TOTAL DOD, 1980-2005**

	Year of Survey								
Substance/Type of Estimate	**1980**	**1982**	**1985**	**1988**	**1992**	**1995**	**1998**	**2002**	**2005**
Heavy Alcohol Use									
Unadjusted	20.8 (1.1)	24.1 (1.0)[a]	23.0 (1.1)	17.2 (0.9)[a]	15.5 (0.8)	17.4 (0.9)	15.4 (0.8)	18.1 (1.1)[a]	18.5 (1.0)
Adjusted[b]	20.8 (1.1)	23.6 (0.9)[a]	24.8 (0.9)	20.1 (1.1)[a]	19.1 (1.2)	20.5 (0.8)	19.3 (0.9)	20.7 (1.0)	21.1 (0.8)
Any Illicit Drug Use									
Unadjusted	27.6 (1.5)	19.0 (1.0)[a]	8.9 (0.8)[a]	4.8 (0.3)[a]	3.4 (0.4)[a]	3.0 (0.3)	2.7 (0.3)	3.4 (0.4)[**]	
Unadjusted									5.0 (0.4)[c]
Adjusted[b]	27.6 (1.5)	18.2 (0.7)[a]	9.7 (0.6)[a]	5.6 (0.4)[a]	4.3 (0.6)	3.6 (0.4)	4.1 (0.4)	3.9 (0.4)[**]	
Adjusted[b]									5.6 (0.4)[c]
Any Cigarette Use									
Unadjusted	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[a]	29.9 (0.8)	33.8 (1.3)[a]	32.2 (1.1)[**]
Adjusted[b]	51.0 (0.8)	52.0 (0.6)	47.5 (0.9)[a]	42.9 (0.7)[a]	37.2 (0.8)[a]	34.3 (0.6)[a]	33.8 (0.7)	37.1 (0.9)[a]	36.1 (0.9)[**]

Note: Table displays the percentage of military personnel by survey year who reported use of the substance noted in the rows of the table. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[**]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Adjusted estimates have been standardized to the 1980 distribution by age, education, and marital status.

[c]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Heavy Alcohol Use, Q18-Q21 and Q23-Q26; Any Illicit Drug Use, Q68 and Q70; Cigarette Use, Q49, Q52, Q53).

when demographics of the military were considered, rates of heavy alcohol use in 2005 were about the same as they were in 1980 and have not changed since 1988. Standardization to adjust the data had much less effect on rates of any illicit drug use and cigarette smoking or on the significance of differences between surveys. For both substances, the adjusted data showed the same significant downward trend in use as the unadjusted data over the survey years. Overall, these analyses indicated that the observed changes in illicit drug use and cigarette smoking were not accounted for by shifts in the sociodemographic composition of the military population since 1980. If the demographics of the military, however, had been the same in 2005 as in 1980, the rate of illicit drug use in 2005 would be expected to be about 0.5 percentage points higher, and the rate of cigarette smoking would be nearly 4 percentage points higher.

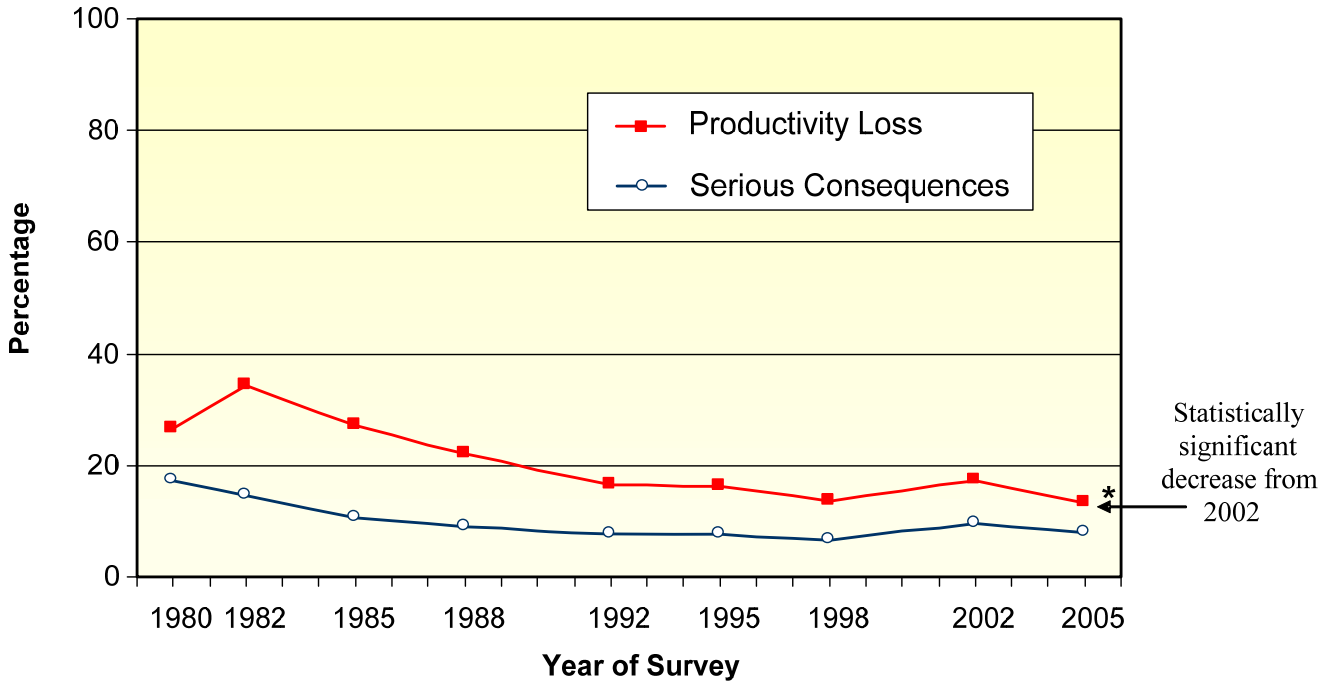
3.1.3 Trends in Alcohol-Related Negative Effects

The substantial negative consequences of alcohol use on the work performance, health, and social relationships of military personnel have been a continuing concern assessed in the DoD surveys. Figure 3.2 and Table 3.1 (shown earlier) present trends in alcohol-related negative effects for the total DoD between 1980 and 2005. In 1980, 17.3% of military personnel reported one or more serious consequences associated with alcohol use during the year. This rate declined to 6.7% in 1998, increased significantly to 9.6% in 2002, and showed a nonsignificant downward shift in 2005 (8.1%).

Productivity loss due to alcohol use (Table 3.1, Figure 3.2) decreased significantly between 1980 and 2005, from 26.7% to 13.2%. The pattern for this measure shows a statistically significant increase between 1980 and 1982 (consistent with the increase in heavy drinking between 1980 and 1982 noted above), a significant decrease for each survey from 1982 to 1992, no change from 1992 to 1995, a significant decrease from 1995 to 1998, a significant increase from 1998 to 2002, and a significant decrease from 2002 to 2005. The 2005 rate was highly similar to the 1998 rate.

For alcohol use dependence symptoms, three measures have been used over the course of the survey series (see discussion in Section 2.5.3). Table 3.1 shows trends for the initial measure, which was used in the surveys from 1980 to 1998. This measure showed a significant decline

Figure 3.2 Trends in alcohol use negative effects, past 12 months, total DoD, 1980-2005



*Significant at .05 level.

over the 18-year period in past-year symptoms, from 8.0% in 1980 to 4.8% in 1998 (significance test not shown). In 2002, a different measure of dependence symptoms was introduced. This measure, which was patterned more closely after *DSM-IV* criteria (see Section 2.5.3), indicated that in 2002, over 12% of military personnel reported symptoms of dependence due to their alcohol use. In 2005, another measure of alcohol dependence symptoms was used, the Alcohol Use Disorders Identification Test (AUDIT). The AUDIT was developed by the World Health Organization (WHO) as a simple method of screening for excessive drinking and to assist in brief assessment. Persons scoring 20 or higher were classified as having probable dependence on alcohol. As shown in Table 3.1, using this criterion, 2.9% of respondents were estimated to be highly likely to be dependent on alcohol in 2005.

These measures of negative effects are indicators of problems resulting from inappropriate drinking behavior and signal a need for greater attention to be given to addressing alcohol problems in the military.

3.2 Progress toward Healthy People 2010 *Objectives*

A major aim of the 2005 DoD survey was to assess progress toward selected *Healthy People 2010* objectives for a variety of health behaviors. The objectives that were measured were classified into three groups for presentation and discussion:

1. Substance use objectives (cigarette smoking, smokeless tobacco use, binge drinking, illicit drug use)
2. Health promotion objectives (weight, exercise, diet, blood pressure, cholesterol, injuries, seat belt use, helmet use, condom use)
3. Women's health objectives (Pap test, substance use during pregnancy)

This report provides information on 19 *Healthy People 2010* objectives and two additional health behaviors of interest (overweight and injuries):

1. Reduce the prevalence of cigarette smoking among military personnel aged 18 or older (2010 objective: 12%).
2. Reduce smokeless tobacco use (2010 objective: 0.4% for all personnel; data for males, 18 to 24, the high-risk group tracked under *Healthy People 2000* are also reported).
3. Reduce binge drinking among adults (2010 objective: 6.0%).
4. Reduce illicit drug use, past 30 days among adults (2010 objective: 2.0%).
5. Reduce overweight, as measured by the Body Mass Index (BMI). There is no 2010 objective for overweight (it was replaced by the objective for healthy weight), but because of the military's high interest in overweight, estimates using the 2005 *Dietary Guidelines* are provided, as well as the 1998 NHLBI guidelines.
6. Reduce the proportion of adults aged 20 or older who are obese (BMI greater than 30.0) (2010 objective: 15%).
7. Increase the prevalence of adults who are at a healthy weight (as measured by BMI) (2010 objective: 60% for persons aged 20 or older).
8. Increase the proportion of people aged 18 or older who engage in vigorous physical activity 3 or more days per week for 20 or more minutes per occasion (2010 objective: 30% or more).
9. Increase the proportion of persons aged 2 years or older who consume at least two daily servings of fruit (2010 objective: 75%).
10. Increase the proportion of persons aged 2 years or older who consume at least three daily servings of vegetables, with at least one-third of them being dark green or orange vegetables (2010 objective: 50%).
11. Increase the proportion of adults who have had their blood pressure measured within the preceding 2 years and can state whether their blood pressure was normal or high (2010 objective: 95% or more).
12. Increase the proportion of people with high blood pressure who are taking action to help control their blood pressure (2010 objective: 95% or more).
13. Increase the proportion of adults who had their blood cholesterol checked within the preceding 5 years (2010 objective: 80% or more).
14. Reduce nonfatal unintentional injuries that require hospitalization (2000 objective: no more than 754 per 100,000 people; no objective for 2010).

15. Increase the use of occupant protection systems, such as safety belts, inflatable safety restraints, and child safety seats (2010 objective: 92% or more).
16. Increase the use of helmets by motorcyclists (2010 objective: 79% or more). Information for bicyclists is also provided, though there is no formal objective for 2010.
17. Increase the proportion of sexually active, unmarried people who used a condom at last sexual intercourse (2010 objective: 50% or more).
18.-19. Increase the proportion of women aged 18 or older with an intact uterine cervix who have ever received a Pap test (2010 objective: 97% or more) and the proportion of those who received a Pap test within the preceding 3 years (2010 objective: 90% or more).
20. Increase abstinence from alcohol during pregnancy (2010 objective: 94%).
21. Increase abstinence from tobacco use during pregnancy (2010 objective: 99% or more).

This section describes overall findings in the total DoD from 1995, 1998, 2002, and 2005 for the *Healthy People 2010* objectives. In addition, the civilian benchmarks are provided from *Healthy People 2010* as a further comparison for military rates. Later chapters examine the objectives in more detail.

3.2.1 Cigarette Use (Objective 1)

Table 3.3 presents data from the military for *Healthy People 2010* objectives related to substance abuse. As shown, the prevalence of cigarette use in 2005 was 32.2%, which was similar to the rate in 2002. Despite clear progress in reducing the prevalence of cigarette smoking over the survey series (see Table 3.1), the 2005 rate was 20 percentage points higher than the *Healthy People 2010* objective of 12% prevalence (Department of Health and Human Services [DHHS], 2000). In addition, the military rates are all higher than the civilian benchmark. Despite this difference, as shown in Chapter 6, the overall military and civilian smoking rates at the DoD level are very similar when adjustments are made for sociodemographic differences in the two populations, although the military rate is higher among young adults aged 18 to 25.

3.2.2 Smokeless Tobacco Use (Objective 2)

As shown in Table 3.3, for smokeless tobacco use in the past 30 days, military men aged 18 to 24 showed a prevalence of 21.6% for 2005, which was a significant increase from 17.1% in 2002. Even though this age group is no longer a *Healthy People 2010* target, it is a high-risk age group in the military. This increase suggests that the military faces a considerable challenge to reduce smokeless tobacco use among young males. For all personnel, the past-year smokeless use rate was 14.5%, which is a significant increase from the 2002 rate of 12.2%. The prevalence rate in 2005 is much higher than the 2010 objective of 0.4% and the civilian benchmark of 2.6%.

3.2.3 Binge Drinking (Objective 3)

A new objective established for *Healthy People 2010* is binge drinking (now more commonly referred to in the scientific literature as *heavy episodic drinking*) (Wechsler et al., 2002). The 2005 estimate of binge drinking, defined as five or more alcoholic drinks within 2 hours at least once in the past 30 days, is 44.5% for the military. This estimate is not significantly different from the 2002 estimate (41.8%). The military rates are notably higher than the *Healthy People 2010* objective rate of 6.0% and the civilian benchmark of 16.6%. It should be noted, however, that rates of binge drinking among college populations (44.8% in 2001) are very similar to the military rate (Wechsler et al., 2002).

3.2.4 Illicit Drug Use (Objective 4)

The objective on any illicit drug use in the past 30 days is new for *Healthy People 2010*. As shown in Table 3.3, the rates for the military were relatively stable at around 3% from 1995 to 2002. The rate for 2005 was 5.0%. Because of some wording changes, the 2005 data are not strictly comparable to the data from prior years. For 2005, the military rate is similar to the civilian benchmark of 5.8% but does not meet the *Healthy People 2010* objective of 2.0%. Chapter 5 provides more systematic comparisons of the military and civilian rates

Table 3.3 **ACHIEVEMENT OF SELECTED *HEALTHY PEOPLE 2010* SUBSTANCE USE/ABUSE OBJECTIVES, TOTAL DOD, 1995-2005**

Characteristic/Group	2010 Objective[a]	Civilian Estimate[a]	Year of Survey 1995	1998	2002	2005
Cigarette Smoking, Past 30 Days[b]	12.0%	24.0%	31.9	29.9	33.8	32.2
Smokeless Tobacco Use, Past 30 Days						
Males, aged 18-24	N/A	N/A	21.9	19.0	17.1	21.6**
All personnel	0.4%	2.6%	13.2	11.7	12.2	14.5**
Binge Drinking, Past 30 Days	6.0%	16.6%	N/A	N/A	41.8	44.5
Any Illicit Drug Use, Past 30 Days	2.0%	5.8%	3.0	2.7	3.4	
Any Illicit Drug Use, Past 30 Days[c]						5.0

Note: Table displays the percentage of military personnel by survey year that reported use of the substance noted in the rows of the table. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

N/A: Not applicable.

**Comparisons between 2002 and 2005 are statistically significant at the 95% confidence level.

[a]Department of Health and Human Services. (2000, November). *Healthy People 2010: Understanding and improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.

[b]Aged 18 or over.

[c]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995 to 2005 (2005 Questions: Any Smoking, Q49, Q52; Smokeless Tobacco Use, Q62, Q64; Binge Drank, Q28; Any Illicit Drug Use, Past 30 Days, Q68, Q70).

of drug use, adjusting for demographics of the civilian population, and shows the military rates to be substantially lower than the civilian rates.

3.2.5 Overweight (Objective 5)

Table 3.4 presents estimates for objectives 5 through 17, which include estimates for overweight and corresponding DoD data for 1995, 1998, 2002, and 2005. The objectives for overweight in *Healthy People 2000* were replaced with objectives for healthy weight and obesity in *Healthy People 2010*. Because of DoD's interest in the issue of overweight, however, estimates continue to be presented here. Estimates of the prevalence of overweight were based on BMI, which is defined as the ratio of weight in kilograms to the square of height in meters. Chapter 7 includes a closer look at the *Healthy People 2010* objectives and provides information both for overweight and obesity in military personnel.

As shown in Table 3.4, using the *Dietary Guidelines for Americans, 2005* BMI cutoff points, which are the same as the *Healthy People 2010* BMI cutoff points, 6.9% of military personnel under age 20 were classified as overweight, and 61.6% of personnel aged 20 or older were defined as overweight in 2005. These data showed a notable and significant increase from 2002 for personnel under age 20 (1.9% vs. 6.9%), as well as for those aged 20 or older (58.3% vs. 61.6%). There is a different pattern in the trends for the two groups from 1995 to 2005. Personnel under age 20 had a very low prevalence of overweight from 1995 to 2002 (1% to 2%), but the prevalence increased sharply to 6.9% in 2005. Personnel aged 20 or older had much higher prevalences of overweight and a consistent pattern of increasing overweight across the 10-year period (51.2% to 61.6%). This significant increase in overweight over the survey years suggests that overweight is an area in need of additional attention.

Data on overweight are also presented using the 1998 National Heart, Lung, and Blood Institute (NHLBI) BMI guidelines for comparison. NHLBI guidelines and the *Dietary Guidelines* are the same for persons aged 20 or older in defining overweight as having a BMI of 25 or higher; those with a BMI of 30 or higher are considered

Table 3.4 **ACHIEVEMENT OF SELECTED HEALTHY PEOPLE 2010 HEALTH PROMOTION OBJECTIVES, TOTAL DOD, 1995-2005**

Characteristic/Group	2010 Objective[a]	Civilian Estimates[a]	Year of Survey 1995	1998	2002	2005
Overweight based on BMI—2005 *Dietary Guidelines*[b]						
Under age 20	N/A	N/A	1.8 (0.7)	1.2 (0.5)	1.9 (0.6)	6.9 (2.3)**
Aged 20 or older	N/A	N/A	51.2 (0.6)	55.2 (0.5)	58.3 (0.8)	61.6 (0.9)**
Total	N/A	N/A	48.6 (0.6)	52.9 (0.5)	55.3 (0.9)	57.9 (1.1)
Overweight based on BMI—1998 NHLBI Guidelines[c]						
Under age 20	N/A	N/A	28.1 (1.7)	31.6 (2.2)	36.5 (2.2)	45.1 (3.7)**
Aged 20 or older	N/A	N/A	51.2 (0.6)	55.2 (0.5)	58.3 (0.8)	61.6 (0.9)**
Total	N/A	N/A	50.0 (0.6)	54.2 (0.5)	57.2 (0.8)	60.5 (0.9)**
Obesity based on BMI—*Healthy People 2010*						
Aged 20 or older	15%	23%				12.4 (0.5)†
Healthy Weight based on BMI—*Healthy People 2010*[d]						
Aged 20 or older	60%	42%	47.9 (0.6)	44.0 (0.5)	40.7 (0.8)	37.2 (0.8)**
Vigorous Physical Activity, Past 30 Days[e]						
All personnel	≥30%	23%	65.4 (0.9)†	67.7 (0.9)†	70.2 (1.1)†	
All personnel (Refined Definition)						57.6 (1.0)†
Food Intake—Fruits and Vegetables						
Fruits ≥ 3 times/day—All personnel	75%	28%				7.7 (0.3)
Vegetables ≥ 3 times/day—All personnel	50%	49%				9.5 (0.4)
Blood Pressure, Checked Past 2 Years and Know Result						
All personnel	≥95%	90%	76.3 (0.9)	80.4 (0.5)	77.9 (0.7)	
All personnel (New Definition)						81.8 (0.9)
Taking Action to Control High Blood Pressure[f]						
Personnel with history of high blood pressure	≥95%	82%	49.3 (1.3)	46.5 (1.4)	49.0 (2.0)	
Personnel with history of high blood pressure (New Definition)						58.9 (1.3)
Cholesterol Checked, Past 5 Years						
All personnel	≥80%	67%	60.1 (1.5)	62.4 (1.1)	56.3 (1.7)	57.2 (1.6)
Hospitalization for Injuries, Past 12 Months						
All personnel	N/A	N/A	3,388 (235)	3,271 (237)	3,625 (259)	2,679 (195)**
Seat Belt Use[g]						
All personnel	≥92%	69%	90.6 (0.7)	91.4 (0.7)	92.1 (0.8)†	91.8 (0.8)†

(Table continued on next page)

Table 3.4 **ACHIEVEMENT OF SELECTED *HEALTHY PEOPLE 2010* HEALTH PROMOTION OBJECTIVES, TOTAL DOD, 1995-2005 (continued)**

Characteristic/Group	2010 Objective[a]	Civilian Estimates[a]	Year of Survey 1995	1998	2002	2005
Helmet Use, Past 12 Months[g]						
Motorcyclists	≥79%	67%	71.0 (1.3)	75.9 (0.9)	82.1 (1.8)[†]	84.4 (1.5)[†]
Bicyclists	N/A	N/A	22.8 (1.8)	44.2 (1.7)	51.9 (2.1)	56.3 (1.9)
Condom Use at Last Encounter[h]						
Sexually active unmarried personnel[i]	≥50%	23%[j]	40.4 (1.0)	41.8 (1.0)	42.1 (0.9)	45.6 (1.4)[**]

Note: Table displays the percentage of military personnel by survey year who reported the characteristic displayed in each row of the table. The exceptions to this are the estimates for hospitalization for injuries, which is expressed per 100,000 personnel. The standard error of each estimate is presented in parentheses.

[**]Comparisons between 2002 and 2005 are statistically significant at the 95% confidence level.

[†]Met or exceeded *Healthy People 2010* objective.

[a]Department of Health and Human Services. (2000, November). *Healthy People 2010: Understanding and improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.

[b]Definition of Body Mass Index (BMI) is given in Section 2.5.4. BMI ≥ 25.0 for adults ≥20 years of age; ≥95th percentile of BMI for age for males and females <20 years of age (Q101 and Q102) (PHS, 1991).

[c]Definition of BMI is given in Section 2.5.4. National Heart, Lung, and Blood Institute (NHLBI) (1998) guidelines define four levels of overweight, regardless of age or gender: (1) overweight (BMI of 25.0 to 29.9); (2) obesity I (BMI of 30.0 to 34.9); (3) obesity II (BMI of 35.0 to 39.9); and (4) extreme obesity (BMI of 40.0 or greater). For the present analyses, these four levels were aggregated such that personnel were considered overweight if their BMI was greater than or equal to 25.0 (Q119 and Q120).

[d]Defined as a BMI equal to or greater than 18.5 and less than 25 (age adjusted to the year 2000 standard population).

[e]Any of the following three or more times a week for 20 minutes or more: running, cycling, walking briskly, hiking, or other strenuous exercise (Q84 and Q85).

[f]Estimate subsetted to personnel who had ever been told they had high blood pressure (other than pregnancy-related high blood pressure). These personnel were defined as taking action to control their high blood pressure if (a) they had been advised by a health professional to take blood pressure medication, diet to reduce their weight, reduce their salt intake, or exercise; and (b) they were currently taking one or more of these advised actions (Q128, Q132, Q133.).

[g]Reported wearing seat belts or helmets "always" or "nearly always." Objectives on helmet use were subsetted to personnel who rode a motorcycle or bicycle in the past 12 months (Seat Belt Use, Q76; Motorcycle Helmet Use, Q77 and Q78; Bicycle Helmet Use, Q79 and Q80).

[h]The estimate of condom use for 2005 was computed using unedited data from question 136 to maintain consistency with condom use estimates in previous years. Since unedited data were used, this estimate will differ from estimates appearing in other sections of this report.

[i]Defined as unmarried personnel who had one or more sexual partners in the past 12 months. For consistency with previous estimates, these estimates do not include personnel who are living as married (Q136, Q139).

[j]Estimate for females aged 18 to 44.

N/A: Not applicable.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995 to 2005 (2005 Questions: Overweight, Q119-120; Strenuous Exercise, Q84, Q85; Blood Pressure, Know Result, Q129-Q130; Taking Action to Control Blood Pressure, Q128, Q132, Q133.; Cholesterol Checked, Past 5 Years, Q131; Hospitalization for Injuries, Past 12 Months, Q75; Seat Belt Use, Q76; Helmet Use, Q77-Q80; Condom Use among Sexually Active Unmarried Personnel, Q136, Q139).

obese. However, the two guidelines use very different methods for classifying persons under age 20 as overweight and therefore produce different estimates for those under age 20. The NHLBI guidelines use the BMI criterion of 25.0 or higher, whereas the *Dietary Guidelines* criterion is based on Centers for Disease Control and Prevention (CDC) gender and age-growth tables and classifies persons as overweight if they are in the 95th percentile or greater for their gender/age group. As already shown, using the *Dietary Guidelines* classification, very few military personnel under 20 were overweight. However, using the NHLBI guidelines classification, a very different picture emerges. For the 2005 survey, 45.1% of personnel under age 20 were defined as overweight, and 61.6% of personnel aged 20 or older were classified as overweight. For 2002, the corresponding percentages were 36.5% and 58.3%, respectively. Both age groups showed significant increases from 2002 to 2005.

These changes in national standards also reflect a difference in conceptual approach to the terms "overweight" and "obesity" (DHHS et al., 2000). Persons with a BMI greater than or equal to 25.0 are considered to have excess body weight and to therefore be "overweight." Individuals with BMIs in the range of 25.0 to 29.9 are therefore considered to be overweight or preobese but are not classified as obese. Anyone with a BMI greater than or equal to 30.0 is considered to be obese and overweight because of excess adiposity. While BMI is a widely used and convenient measure of body composition, the terms "overweight" and "overfat" are not fully equivalent. It is of course possible for an individual to have a BMI less than or equal to 30.0 and have excess body fat and the reverse. As discussed later, muscled individuals with an accumulation of lean body mass and a BMI at or above 25 may be classified as overweight even though their percentage body fat is in a healthy range. For this reason, although the national standards for description and screening of overweight and obesity are based on BMI alone, national recommendations for medical management and treatment of obesity recommend using additional factors to confirm diagnosis and for medical management of obesity. These factors include abdominal adiposity based on waist circumference; concomitant risk factors for obesity-related chronic disease such as diabetes; and other measures, such as skin fold measurements and bioelectrical impedance (Kuczmarski & Flegal, 2000). Indeed, although BMI has been adopted as the standard in civilian populations and is the most practical assessment for use in surveys, it is only one measure of body composition used by the military and may not be the best measure given the above limitations. The military Services (with the exception of the Air Force) use BMI as a screening measure only. Active-duty Service members whose BMI exceeds standards for their branch of Service are subsequently measured to calculate percentage body fat. Adverse career actions and enrollment into Service weight management programs are based on body fat percentage rather than on BMI. The Air Force uses waist circumference or BMI less than 25 as a body composition component of a composite physical fitness score that also includes strength and aerobic components.

A limitation of the *Dietary Guidelines* for the military is that persons shift from one criterion for assessing overweight (age growth tables) to another criterion (BMI) when they reach age 20. Many persons who would not be classified as overweight at age 19 would be classified as overweight at age 20 because of a change in the criterion, even though their weight had not changed. This is seen when comparing the *Dietary Guidelines* results with the NHLBI guidelines results for persons under age 20.

Regardless of criteria, it is somewhat surprising that military personnel show such high levels of overweight given the strong emphasis on fitness in the military. It is possible that the BMI criteria somewhat overestimate the percentages of military personnel who are overweight. Specifically, some BMI measurements among military personnel who are over the threshold for classification as overweight may be due to increased muscle mass, rather than to excess body fat. Thus, some personnel classified as overweight may still have had percentage body fat measurements within acceptable ranges for their Services. Alternatively, some junior personnel as they entered the military may have been somewhat, though not excessively, above the weight standard, and it may simply take some time in the military for them to get

into shape. Further, these measures are based on self-reports of height and weight and may not be totally accurate. Nonetheless, the 10-year trend is clearly toward increasing rates of overweight, which is cause for concern.

3.2.6 Obesity (Objective 6)

Obesity for adults age 20 or older is defined as BMI greater than or equal to 30. Although the prevalence of overweight is high, the prevalence of obesity is very low in DoD. The *Healthy People 2010* baseline for obesity from the National Health and Nutrition Examination Survey (NHANES) 1988-1994 is 23% of adults 20 years or older with a target of 15% of adults by the year 2010. With a total prevalence of obesity of personnel 20 years or older of 12.4 %, DoD is already below the *Healthy People 2010* target.

3.2.7 Healthy Weight (Objective 7)

Whereas for *Healthy People 2000* the focus was on reducing overweight in the nation, for *Healthy People 2010* the emphasis has shifted to achieving healthy weight with the target population of persons aged 20 or older. Healthy weight is defined as having a BMI equal to or greater than 18.5 and less than 25.0. As shown in Table 3.4, 37.2% of military personnel met the healthy weight criterion in 2005, which is notably below the *Healthy People 2010* objective of 60% but similar to the civilian estimate of 42%. This finding is consistent with the rates of overweight described above and indicates that the military faces a challenge to achieve this goal by 2010. Also note that overweight and healthy weight measures are not merely the converse of each other, since healthy weight considers both ends of the continuum—that is, overweight and underweight—whereas overweight considers only the upper portion of the weight distribution.

3.2.8 Vigorous Exercise (Objective 8)

Objective 8 examines personnel who engaged in vigorous exercise (running, cycling, walking, or other strenuous exercise, such as swimming laps) on 3 or more days a week for at least 20 minutes per occasion in the past 30 days. For the 2005 survey, an improved measure of strenuous exercise was introduced to assess vigorous exercise according to the new national guidelines. Because it differs somewhat from the measure for prior years, 2005 estimates cannot be compared with estimates for 1995 to 2002. As shown in Table 3.4, the refined measure indicates that 57.6% of personnel in the total DoD reported engaging in strenuous exercise in 2005. This is lower than the rate of 70.2% in 2002, but because of the change in the way the questions were asked, it is not appropriate to compare the measures. Regardless of the measure used, data for all years far exceed the *Healthy People 2010* objective of 30% or more for the general adult population. This finding is not surprising given the emphasis that the military places on physical fitness as part of an overall goal of military readiness.

3.2.9 Food Intake—Fruits and Vegetables (Objectives 9 and 10)

Objectives 9 and 10 examine daily consumption of fruits and vegetables. Because of their high antioxidant content and other important constituents linked to reduction in risk of chronic disease, high intake of fruits and vegetables is viewed as a key component of a healthy diet and weight management. The survey provides estimates of the percentages of military personnel consuming fruits and vegetables less than three times per day and three or more times per day. As shown in Table 3.4, less than 10% of military personnel eat three or more servings of fruit or vegetables per day as would be desirable for a healthy diet. The civilian baseline data indicate that civilians are more likely to consume more fruits and vegetables per day than do military personnel.

These findings combined with the overweight and exercise data suggest that poor diet rather than lack of exercise may play a key role in the weight gain observed in the military. Of interest are findings shown in Chapter 7 that many military personnel are likely to eat in a military dining facility for lunch, which may provide an opportunity to mount a healthy eating campaign.

3.2.10 Blood Pressure (Objectives 11 and 12)

Table 3.4 presents findings on percentages of personnel who had their blood pressure checked in the 2 years

before the survey and who also were aware of the result. Personnel were classified as not meeting these criteria if they (a) last had their blood pressure checked more than 2 years before the survey, (b) could not recall when they last had their blood pressure checked, or (c) were not aware of the result of their last blood pressure check (e.g., high, low, normal), even if it occurred in the past 2 years. Because some personnel may have had their blood pressure checked in the past 2 years but could not recall when they last had it checked, the estimates may be somewhat conservative. According to the self-reports from the survey, in 2005, 81.8% of all DoD personnel had their blood pressure checked in the previous 2 years and knew the result; this rate is similar to the 77.9% who reported this behavior in 2002. However, the rate is below the *Healthy People 2010* target of 95% and also below the civilian rate of 90%. These findings are somewhat surprising in view of the emphasis on fitness and health that prevails in the military and the ease of access to health care.

Data were also gathered about the group of people who had high blood pressure and were taking positive steps to control it through physical activity, diet, lifestyle changes, or medication. The measure was developed based on the structuring of blood pressure control questions in the National Health Interview Survey (NHIS). As shown, 58.9% of all military personnel who had a lifetime history of high blood pressure were taking one or more recommended actions to control it at the time of the 2005 survey. This was a significant increase from the rate in 2002. Although slightly over half of military personnel with high blood pressure were consciously taking steps to control it, this rate falls well below the *Healthy People 2010* objective of 95%. Clearly, those personnel who had a history of high blood pressure but were not taking any action to control it are a group at increased risk for a recurrence of the problem.

3.2.11 Cholesterol (Objective 13)

As shown in Table 3.4, 57.2% of all DoD personnel in 2005 had their cholesterol checked within the preceding 5 years. This was similar to the rate of 56.3% in 2002 but lower than the rate in 1995 and 1998 (around 60%). These rates were notably lower than the *Healthy People 2010* objective of 80% for adults. They are also below the civilian benchmark of 67%. Part of the reason that the military rate did not meet the objective may be related to military regulations that specify age-dependent screening criteria. Woodruff and Conway (1991), for example, noted that Navy regulations do not require personnel under age 25 to be screened for blood cholesterol level, whereas they do require that personnel between the ages of 25 and 49 have their cholesterol checked once every 5 years and that personnel between the ages of 50 and 59 have theirs checked once every 2 years.

3.2.12 Injuries and Injury Prevention (Objective 14)

Table 3.4 also presents estimates of the prevalence of hospitalization for treatment of injuries in the 12 months before the survey. Unlike the other estimates in this table, which are expressed as percentages, the estimates for hospitalization are presented as the number of personnel hospitalized for treatment of injuries per 100,000 active-duty personnel. As shown, for every 100,000 active-duty personnel, 2,679 were hospitalized for treatment of an injury in the past 12 months, which was a significant decline from the rate of 3,625 in 2002. Injury was not included as a *Healthy People 2010* objective even though it was an objective for *Healthy People 2000*, but it is included here because of the military's concern about injury rates. The high rates of injury are consistent with findings by Jones and Hansen (1996), who identified injuries in the military as a hidden epidemic. The finding suggests the need for additional research to identify risk factors for injury and to assess prevention strategies.

It should be noted that the *Healthy People 2000* objective for hospitalization for injuries refers specifically to unintentional injuries. The 1995 and 1998 DoD survey measure of hospitalization for injuries did not distinguish between unintentional and intentional injuries. Intentional injuries are those that result from deliberate intent to harm an individual or oneself (e.g., assault, suicide) and differ from injuries that result from other agents or events (e.g., running injury, motor vehicle crash). To examine the rate of hospitalization for

unintentional injuries in the 2002 and 2005 surveys, items asked whether respondents had any "overnight hospital stays for treatment of an unintentional injury in the past 12 months."

3.2.13 Seat Belt Use (Objective 15)

Table 3.4 shows that, in 2005, 91.8% of DoD personnel wore seat belts "always" or "nearly always" when they drove or rode in an automobile. This commendably high rate was similar to the rates reported for the past decade since 1995 and essentially meets the *Healthy People 2010* objective of use of occupant protection systems by at least 92% of motor vehicle occupants. These high rates of seat belt use among military personnel may be partly due to regulations requiring personnel to use seat belts when they are driving or riding in motor vehicles on military installations. As noted in Chapter 1, however, comparison of civilian survey data on seat belt use with actual observation of people in motor vehicles suggests that survey respondents may overreport their seat belt use, so these data may be overestimates.

3.2.14 Helmet Use (Objective 16)

Table 3.4 also shows the percentages of motorcyclists and bicyclists who wore helmets "always" or "nearly always" when they rode a motorcycle or bicycle in the past 12 months. The estimates of helmet use by motorcyclists were based on the subset of personnel who rode a motorcycle at least once in the past 12 months. Similarly, the estimates of helmet use by bicyclists were based on personnel who rode a bicycle at least once in the past 12 months. Personnel who reported that they never rode a motorcycle in the past 12 months or who never rode a bicycle were excluded from these estimates.

Among personnel in 2005 who rode a motorcycle at least once in the past 12 months, 84.4% wore helmets always or nearly always. This rate is similar to the 82.1% who reported this behavior in 2002. As shown, there has been an increasing trend toward higher rates of helmet use since 1995, with the 2005 overall rate exceeding the *Healthy People 2010* objective of 79% or more.

There is no objective on bicycle helmet use for *Healthy People 2010*, but it is reported here because it has been tracked since 1995. Among personnel in 2005 who rode bicycles in the past 12 months, 56.3% used helmets always or nearly always. This continues an increasing trend since 1995, when the rate was 22.8%.

Helmet use is the behavior with the greatest improvement among the *Healthy People 2010* objectives studied here. Helmet use for motorcyclists exceeded the *Healthy People 2010* objective of 79%.

3.2.15 Condom Use (Objective 17)

The proper use of condoms can reduce the risk of contracting sexually transmitted diseases (STDs), including AIDS, among individuals who are sexually active but not in a monogamous relationship. The bottom row in Table 3.4 presents findings on condom use among sexually active unmarried personnel in the military the last time they had intercourse. As shown, in 2005, 45.6% of sexually active unmarried personnel in the total DoD used a condom. This rate was significantly higher than the rate of 42.1% in 2002 but was still lower than the *Healthy People 2010* objective of 50%. This finding suggests that the military will need to focus additional attention on this area.

3.2.16 Pap Tests (Objectives 18 and 19)

The major way that women can reduce the risk of cervical cancer by getting regular Pap tests. As shown in Table 3.5, based on the 2005 survey, 97.8% of military women had ever received the test, and 97.0% had received the test within the past 3 years. These high rates are similar to those observed over the past 10 years since 1995. Military women, overall, exceeded the *Healthy People 2010* objective of 97% having ever had a Pap test and 90% having had one in the past 3 years. The near universality of receipt of Pap tests is notable. These exceptionally high rates of obtaining Pap tests probably reflect both ready access to care and mandatory care at specified intervals for military women.

Table 3.5 **ACHIEVEMENT OF SELECTED *HEALTHY PEOPLE 2010* OBJECTIVES FOR MILITARY WOMEN, TOTAL DOD, 1995-2005**

Characteristic/Group	2010 Objective[a]	Civilian Estimates[a]	Year of Survey 1995	1998	2002	2005
Pap Test[b]						
Ever received	97.0%	92.0%	97.1 (0.6)	97.8 (0.2)	98.4 (0.4)	97.8 (0.5)
Received in past 3 years	90.0%	79.0%	95.2 (0.7)	95.9 (0.4)	97.2 (0.4)	97.0 (0.6)
Substance Use During Last Pregnancy[c]						
No alcohol use[†]	94.0%	86.0%	85.2 (1.3)	85.8 (1.2)	89.9 (1.2)	94.8 (1.0)[**]
No cigarette use	99.0%	87.0%	83.9 (1.4)	85.8 (1.3)	88.5 (1.3)	89.9 (1.4)

Note: Table displays the percentage of female military personnel by survey year. The standard error of each estimate is presented in parentheses.

[**]Comparisons between 2002 and 2005 are statistically significant at the 95% confidence level.

[†]Met or exceeded *Healthy People 2010* objective.

[a]Department of Health and Human Services. (2000, November). *Healthy People 2010: Understanding and improving health* (2nd ed.). Washington, DC: U.S. Government Printing Office.

[b]Estimate made among women with an intact uterine cervix (N = 3,720 in 2005).

[c]Estimate made among women who were pregnant in the past 5 years (N = 1,328 in 2005). For women who were pregnant at the time of the survey, "last pregnancy" refers to the current pregnancy.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995 to 2005 (2005 Questions: Pap Test, Q160 and Q161; Substance Use During Last Pregnancy: No Alcohol Use, Q163 and Q166; No Cigarette Use, Q163 and Q165).

3.2.17 Substance Use Reduction During Pregnancy (Objectives 20 and 21)

Avoidance of substance use during pregnancy is important in ensuring maternal and infant health and targets two behaviors, alcohol use and cigarette use. As shown in Table 3.5, the 2005 survey estimated that 94.8% of military women who had been pregnant in the past 5 years did not consume any alcohol during their last pregnancy. This was a significant increase from the rates in the 2002 survey (89.9%) and the 1998 survey (85.8%) and reached the *Healthy People 2010* objective of 94% or higher.

Table 3.5 also shows that 89.9% of military women in 2005 who were pregnant during the past 5 years did not use cigarettes during their most recent pregnancy. This rate is about the same as that observed in 2002 (88.5%) but is below the *Healthy People 2010* objective of increasing abstinence from tobacco use during pregnancy to 99% or higher. Thus, although the large majority of women do not smoke cigarettes during pregnancy, greater preventive efforts are needed to achieve the very high objective.

3.2.18 Status in Meeting Healthy People 2010 *Objectives*

This chapter reports on findings for 19 *Healthy People 2010* objectives, along with information on overweight and injuries, to improve the health of military personnel in the areas of substance use, health promotion, and women's health. The 2005 DoD survey provides important data for assessing progress toward the *Healthy People 2010* objectives.

Overall, in 2005 the military met or exceeded 7 of the 19 *Healthy People 2010* objectives (vigorous exercise, obesity, seat belt use, helmet use for motorcycles, Pap tests ever received, Pap tests received in the past 3 years, and no alcohol use during pregnancy). Further, as discussed later in this report, other targets have been met by at least some sociodemographic subgroups in the military, even if not by the entire force.

Thus, by 2005, the military met over a third of the 19 *Healthy People 2010* objectives examined here. It is noteworthy that the areas where objectives have been met are those where military regulations help ensure compliance with the desired behaviors (vigorous exercise, obesity, seat belt use, helmet use, Pap tests). It is not clear whether the targets for these behaviors would be achieved without such requirements. It seems clear that it will be more challenging to reach the objectives in other areas, where individuals have to value the behaviors and take more initiative to achieve them.

3.3 Summary

This chapter presents the prevalence of alcohol use, illicit drug use, and tobacco use from the 2005 DoD survey and examines trends from 1980 to 2005 in substance use and negative effects due to alcohol use. For substance use trends, raw estimates and estimates that have been adjusted for changes in sociodemographic characteristics over the period the surveys were conducted are provided. This report also provides data for selected *Healthy People 2010* objectives for military personnel, many of which apply to all personnel and several of which are specific to military women. This chapter focuses on data for the entire DoD.

3.3.1 Unadjusted Trends in Substance Use

Comparisons of findings from nine DoD surveys of military personnel conducted periodically from 1980 to 2005 show a downward trend in the use of alcohol, illicit drugs, and cigarettes (Table 3.1 and Figure 3.1). Specifically, past-30-day substance use trends for the total DoD indicated that

- the prevalence of heavy drinking in the past 30 days in 2005 (18.5%) was about the same as it was in 1980 (20.8%), although there were some significant upward and downward shifts across the survey series;
- use of any illicit drugs in the past 30 days declined sharply, from 27.6% in 1980 to 3.4% in 2002; the rate for 2005 was 5.0%, but was not comparable to prior years' data because of wording changes in the questionnaire; and
- cigarette smoking in the past 30 days decreased significantly, from 51.0% in 1980 to 32.2% in 2005.

Despite a rather constant rate of heavy alcohol use over the years, there was a general shift toward lighter use of alcohol over time. The percentage of people who abstained from alcohol or who were infrequent/light drinkers increased significantly, from 25.6% in 1980 to 40.2% in 2005.

Comparisons of findings between the 2002 and 2005 surveys show a significant decrease in heavy cigarette use (13.1% to 11.0%) but no statistically significant change for heavy alcohol use (18.1% to 18.5%) or any cigarette use (33.8% to 32.2%). Heavy alcohol use and any cigarette use stayed at 2002 levels, which were a significant increase from 1998 levels. Because of item wording changes, it was not possible to compare changes in illicit drug use in the past 30 days from 2002 to 2005. The decline in heavy cigarette use is encouraging, because it suggests that smokers may be smoking fewer cigarettes, even though overall cigarette use rates have not declined.

3.3.2 Trends in Substance Use, Adjusted for Changes in Sociodemographic Composition

Members of the armed forces in 2005 were more likely to be older, to be officers, to be married, and to have more education than in 1980—factors that are associated with less substance use. To examine whether changes in sociodemographic composition explained declines in substance use across survey years, rates of use for all surveys since 1982 were standardized or adjusted to the age/education/marital status distribution for the 1980 survey. Adjusted (standardized) rates are not actual prevalence estimates, but rather are constructed estimates that show how the rates would have looked if there had been no changes in the sociodemographic characteristics of the military from 1980 to 2005 (Table 3.2):

- A key finding for heavy alcohol use is that the adjusted rates are nearly identical across the entire survey period (with the exception of the 1982 and 1985 surveys, which were even higher). This suggests that some of the decline in heavy alcohol use observed in the unadjusted rates can be explained by the changes in the demographics of the military from 1980 to 2005. The implication is that military programs and practices have had little effect on rates of heavy alcohol use during the 25-year period.
- For illicit drug use and cigarette smoking, adjusted data showed the same strong significant downward trend as the unadjusted data over the years. This finding indicates that the declines in use between surveys were not explained by shifts in the sociodemographic composition of the military population.

3.3.3 Trends in Alcohol-Related Negative Effects

There were significant declines in the percentage of military personnel experiencing alcohol-related serious consequences, productivity loss, and symptoms of dependence across the survey years (Figure 3.2 and Table 3.1):

- Serious consequences declined significantly from 17.3% in 1980 to 6.7% in 1998, increased significantly to 9.6% in 2002 and showed no statistically significant change in 2005 (8.1%).
- Productivity loss declined significantly from 26.7% in 1980 to 13.6% in 1998, increased significantly to 17.3% in 2002 and decreased significantly to 13.2% in 2005. It is notable that productivity loss declined from 2002 to 2005 even though heavy alcohol use remained at the 2002 level in 2005.
- Symptoms of dependence were assessed with three measures, the first from 1980 to 1998; a second in 2002, and the third in 2005. The first measure showed that symptoms of dependence decreased significantly from 8.0% in 1980 to 4.8% in 1998. The second measure based on *DSM-IV* criteria indicated that in 2002 over 12% of military personnel reported symptoms of dependence due to their alcohol use. The third measure based on the AUDIT estimated that 2.9% of personnel were highly likely to be dependent on alcohol.

3.3.4 Status in Meeting Healthy People 2010 *Objectives*

A variety of *Healthy People 2010* objectives were assessed in the 2005 survey. The measured objectives were classified into three groups for presentation and discussion:

1. substance use objectives (cigarette smoking, smokeless tobacco, binge drinking, illicit drug use)
2. health promotion objectives (weight, exercise, diet, blood pressure, cholesterol, seat belt use, helmet use, condom use)
3. women's health objectives (Pap tests, substance use during pregnancy)

The 2005 DoD survey examined 19 *Healthy People 2010* objectives to improve the health of military personnel:

- Overall, in 2005 the military met or exceeded 7 of the 19 *Healthy People 2010* objectives (vigorous exercise, obesity, seat belt use, helmet use for motorcycles, Pap tests ever received, Pap tests received in the past 3 years, and no alcohol use during pregnancy).
- Overweight, based on BMI, was measured because of the military's interest in it, even though it is not a *Healthy People 2010* objective. Overweight increased significantly, from 58.3% in 2002 to 61.6% in 2005 for persons aged 20 or older. This continues a trend of increasing overweight from 1995.

Overall, in 2005, the military met just over a third of the 19 *Healthy People 2010* objectives examined here. The areas where objectives have been met are those where military regulations help ensure compliance with the desired behaviors (exercise, obesity, seat belt use, helmet use, Pap tests). It is not clear whether the targets for these behaviors would be achieved without such requirements. It will likely be more challenging to reach the objectives in areas where individuals must take more initiative to achieve them.

3.3.5 Areas of Challenge

Overall, these findings indicate that DoD has made steady and notable progress during the past 25 years in combating illicit drug use and smoking and in reducing alcohol-related problems. DoD has made less progress in reducing heavy alcohol use. These findings are consistent with the military's strong emphasis on reducing drug abuse, which began in the early 1980s (DoD, 1980a, 1980b, 1985a, 1985b, 1997c), and on eliminating smoking, which began in the mid-1980s (DoD, 1986b, 1994).

Despite notable progress, there is still room for considerable improvement in some areas. Cigarette use and heavy alcohol use increased significantly from 1998 to 2002 and remained at those higher rates in 2005. About a third of military personnel smoke cigarettes, and nearly one in five active-duty personnel meets criteria for heavy alcohol use—the consumption level most likely to result in alcohol-related problems. Indeed, the rate of heavy drinking in 2005 is not significantly different from the rate in 1980, suggesting that military efforts to reduce rates of heavy drinking have not been successful overall. Clearly, new and more effective initiatives will be needed to reduce heavy alcohol use.

The military has made progress in a number of areas toward meeting selected *Healthy People 2010* objectives, but primarily in areas that are mandated by military regulations. Findings suggest that the largest gaps and greatest challenges will be to meet the objectives for smoking, smokeless tobacco use, binge drinking, healthy weight, proper food intake, control of high blood pressure, and cholesterol checks.

Chapter 4: Alcohol Use

This chapter reports results of detailed analyses of alcohol use among military personnel. It examines trends in alcohol use; comparisons of alcohol use in each Service and the Department of Defense (DoD); correlates of heavy alcohol use; binge drinking, negative effects of alcohol use, and reasons for drinking and for limiting alcohol use; engagement in risky behaviors; and the extent of heavy drinking among military personnel compared with use among civilians. As described in Chapter 2, alcohol use has been defined in terms of both average ounces of alcohol (i.e., ethanol) consumed and levels of alcohol use, with special emphasis on the heaviest level of alcohol use. Binge drinking is defined as consuming five or more drinks on at least one occasion during the past 30 days, while heavy drinking is defined as consuming five or more drinks (four for females) on the same occasion at least once a week in the past 30 days. Negative effects of alcohol use include serious consequences, productivity loss, and dependence symptoms. We have included in Appendix D additional information on sociodemographic characteristics associated with alcohol use (Tables D.5 through D.10).

4.1 Trends in Alcohol Use

This section provides two sets of estimates of alcohol use for the DoD survey years from 1980 to 2005: the average daily ounces of alcohol (ethanol) and heavy alcohol use in the past 30 days. Average daily ounces of ethanol is calculated on the entire population and, thus, represents a per capita estimate of alcohol consumption. Each measure shows both observed (unadjusted) estimates and adjusted estimates; the latter take into account differences in the sociodemographic composition of the military population over the course of the surveys.

4.1.1 Average Daily Ounces of Alcohol

As shown in the unadjusted portions of Table 4.1, the average amount of ethanol consumed per day decreased substantially from 1980 to 1998 but increased in 2002 and 2005. For the total DoD, the amount decreased from 1.48 ounces per day in 1980 to 0.79 ounces in 1998 and increased to 1.08 ounces per day in 2002 and to 1.43 ounces per day in 2005. The decreases from 1982 to 1985, from 1985 to 1988, and from 1988 to 1992 were statistically significant. The increases from 1998 to 2002 were statistically significant for DoD, and changes from 2002 to 2005 were significant for DoD and for the Army. The Army showed the most dramatic increase in the average amount of ethanol consumed between 2002 and 2005. The average amount of ethanol consumed per day in the Army increased from 1.11 ounces per day in 2002 to 1.93 ounces in 2005, a substantial increase both statistically and substantively.

Over the 18-year period until 1998, alcohol consumption among members of each of the individual Services also decreased substantially (as shown in the rows for unadjusted estimates in Table 4.1). However, for the period between 1998 and 2002, there were increases of 18% for Army personnel, 79% for Navy personnel, 38% for Marine Corps personnel, and 24% for Air Force personnel. More recently, there were increases between 2002 and 2005 of 74% for the Army, 9% for the Navy, 25% for the Marine Corps, and 12% for the Air Force. Even with the recent increases, consumption among Air Force personnel was by far the lowest of all the Services in each of the survey years. Alcohol consumption is now higher than rates observed in 1980 for the Army and equal to rates observed in 1980 for the total DoD, Navy, and Marine Corps.

The observed overall decreases through 1998 in alcohol consumption may partially reflect changes in the sociodemographic composition of the military population over time. Between 1980 and 2005, the military population became slightly older and more likely to be married, factors both related to lower levels of alcohol use (Bray et al., 2003). To examine whether the observed decreases in alcohol use were associated with changes in sociodemographic composition of the Services, estimates were adjusted from the 1982 through the 2005 surveys to take into account sociodemographic changes since 1980. The sociodemographic distributions

Table 4.1 **TRENDS IN AVERAGE DAILY OUNCES OF ETHANOL CONSUMED, PAST 30 DAYS, UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC DIFFERENCES, 1980-2005**

Substance/Type of Estimate	Year of Survey								
	1980	1982	1985	1988	1992	1995	1998	2002	2005
Army									
Unadjusted	1.61 (0.10)	1.58 (0.08)	1.42 (0.13)	1.12 (0.06)[a]	0.90 (0.06)[a]	0.98 (0.07)	0.94 (0.07)	1.11 (0.09)	1.93 (0.22)[a]
Adjusted[b]	1.61 (0.10)	1.51 (0.06)	1.49 (0.12)	1.26 (0.05)	1.09 (0.06)[a]	1.12 (0.06)	1.14 (0.08)	1.26 (0.07)	2.18 (0.18)[a,*]
Navy									
Unadjusted	1.64 (0.12)	1.64 (0.12)	1.34 (0.10)	0.88 (0.08)[a]	0.85 (0.11)	0.93 (0.08)	0.70 (0.07)[a]	1.25 (0.07)[a]	1.36 (0.15)
Adjusted[b]	1.64 (0.12)	1.58 (0.09)	1.48 (0.09)	0.97 (0.04)[a]	0.94 (0.10)	1.11 (0.08)	0.93 (0.09)	1.42 (0.06)[a]	1.56 (0.18)
Marine Corps									
Unadjusted	1.75 (0.09)	1.45 (0.09)[a]	1.49 (0.23)	1.20 (0.11)	1.04 (0.06)	1.19 (0.07)	1.08 (0.11)	1.49 (0.20)	1.86 (0.08)
Adjusted[b]	1.75 (0.09)	1.47 (0.02)[a]	1.60 (0.21)	1.46 (0.20)	1.07 (0.06)	1.37 (0.07)[a]	1.27 (0.10)	1.65 (0.17)	2.07 (0.10)[a,*]
Air Force									
Unadjusted	1.08 (0.11)	0.96 (0.05)	0.87 (0.07)	0.66 (0.03)[a]	0.52 (0.03)[a]	0.54 (0.04)	0.54 (0.04)	0.67 (0.06)	0.75 (0.08)[*]
Adjusted[b]	1.08 (0.11)	0.97 (0.04)	0.91 (0.06)	0.71 (0.03)[a]	0.61 (0.04)[a]	0.58 (0.05)	0.65 (0.04)	0.72 (0.06)	0.88 (0.09)
Total DoD									
Unadjusted	1.48 (0.07)	1.41 (0.05)	1.24 (0.06)[a]	0.92 (0.03)[a]	0.79 (0.04)[a]	0.87 (0.04)	0.79 (0.04)	1.08 (0.05)[a]	1.43 (0.10)[a]
Adjusted[b]	1.48 (0.07)	1.38 (0.03)	1.34 (0.06)	1.05 (0.03)[a]	0.91 (0.04)[a]	0.99 (0.03)	0.96 (0.04)	1.19 (0.04)[a]	1.65 (0.09)[a]

Note: Table displays the average ounces of ethanol consumed in the past 30 days by survey year and Service. The standard error of each estimate is presented in parentheses. Adjusted estimates take into account sociodemographic changes *within* Services across survey years; estimates have not been adjusted for sociodemographic differences *among* Services.

[*]Comparisons between 1980 and 2005 are statistically significant at the 95% confidence level.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Adjusted estimates have been standardized to the 1980 DoD or Service-specific distribution by age, education, and marital status.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Average Daily Ounces of Ethanol, Past 30 Days, Q18–Q31).

of the military population were standardized from the 1982 to 2005 surveys to the 1980 age, education, and marital status distribution for each Service and the total DoD. These results are presented as adjusted estimates in Table 4.1. (See Appendix F for a technical discussion of standardization procedures.) These adjusted estimates are constructed estimates and are not the actual, observed prevalence estimates for these survey years.

For the total DoD, adjustment of estimates of average daily alcohol (ethanol) consumption across the DoD survey series increased the estimate in 2005 from 1.43 to 1.65 ounces. However, differences between survey years that were statistically significant when comparing unadjusted estimates (i.e., between 1985 and 1988, 1988 and 1992, and 1998 and 2002) remained significant following adjustment. Further, adjustment of DoD estimates to reflect sociodemographic changes did not reveal any statistically significant differences between survey years that were not apparent when unadjusted estimates were compared. These findings suggest that the overall decreases in average alcohol consumption for the Services since the survey series began in 1980 until 1998 were not due primarily to sociodemographic changes.

Similarly, adjustment of estimates of average ethanol consumption to reflect sociodemographic changes in each of the Services did not affect consumption trends appreciably between 1980 and 2005, except that adjusted estimates were higher. Even after the adjustment, however, they still showed a significant decline over time until the 2 most recent survey years.

The increase in average ounces consumed per day between 1998 and 2005, which was significant for the total DoD and the Army, may reflect increased stress in the military following the World Trade Center attacks in September 2001 and the war in Iraq.

4.1.2 Heavy Alcohol Use

As shown in the unadjusted portions of Table 4.2, for the total DoD and each of the Services, heavy alcohol use was relatively stable between the 1980 and 1985 surveys and decreased from 1985 to 1988, with rates stabilizing again between 1988 and 1998. Some increases have occurred since 1998. There were statistically significant decreases over the 25-year period for the Navy (a 34% decrease) and Air Force (a 28% decrease) but not for the Army or Marine Corps. Rates of heavy drinking for the total DoD showed no significant difference between 1980 and 2005 (20.8% vs. 18.5%). (Also see Table 3.1 in Chapter 3 for DoD drinking levels and Tables D.1 through D.4 for Service drinking levels.)

From 2002 to 2005, the Army showed an increase in heavy drinking from 18.8% to 24.5% (a 30% increase). Although the Army change was large, it was not statistically significant between 2002 and 2005. However, this large difference was consistent with the significant increase observed for ounces of ethanol for the Army and may signal an increasing pattern of heavy alcohol use in the Army. Indeed, the increase in heavy alcohol use in the Army from 1998 to 2005 (from 17.2% to 24.5%) was statistically significant and is an issue of concern. The other Services showed no significant change from 2002 to 2005.

In 2005, the percentage of heavy drinkers, from lowest to highest, was 10.3% among Air Force personnel, 17.0% among Navy personnel, 24.5% among Army personnel, and 25.4% among Marine Corps personnel. The percentage of heavy drinkers was lowest among Air Force personnel in each of the survey years, reaching its lowest level in 2005 (10.3%). Between 1995 and 1998, the percentage of heavy drinkers decreased for all the Services except the Air Force, then increased in 2002 to proportions equal to or higher than those exhibited in 1995. The percentage of heavy drinkers in the Navy decreased significantly from 19.1% in 1995 to 13.5% in 1998 and increased in 2002 to 18.3%. From 2002 to 2005, the rate of heavy drinking did not change significantly among Navy personnel.

In general, adjustments for sociodemographic differences for the total DoD and each of the Services increased the estimates of heavy alcohol use by about 2 to 3 percentage points. Few differences were found in the patterns of adjusted and unadjusted rates of heavy drinking between the surveys from 1980 to 2005. For adjusted rates, there was no significant decline in the rate of heavy alcohol use between 1980 and 2005 for the

Table 4.2 **TRENDS IN HEAVY ALCOHOL USE, PAST 30 DAYS, UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC DIFFERENCES, 1980-2005**

Substance/Type of Estimate	Year of Survey								
	1980	1982	1985	1988	1992	1995	1998	2002	2005
Army									
Unadjusted	20.3 (1.6)	24.7 (1.4)[a]	25.5 (2.2)	19.7 (1.2)[a]	17.7 (1.6)	18.4 (1.8)	17.2 (1.6)	18.8 (2.1)	24.5 (2.1)
Adjusted[b]	20.3 (1.6)	23.5 (1.3)	26.7 (1.8)	23.2 (0.8)	23.0 (1.8)	21.2 (1.8)	21.7 (1.5)	22.2 (1.4)	26.8 (1.5)[a,*]
Navy									
Unadjusted	25.6 (2.3)	27.7 (2.9)	25.0 (1.4)	14.7 (2.0)[a]	14.2 (1.7)	19.1 (1.5)[a]	13.5 (1.8)[a]	18.3 (1.2)[a]	17.0 (1.4)[*]
Adjusted[b]	25.6 (2.3)	26.7 (2.4)	27.3 (1.9)	16.3 (3.6)[a]	16.6 (3.4)	23.9 (1.5)	18.2 (2.1)[a]	20.9 (1.0)	19.2 (1.9)[*]
Marine Corps									
Unadjusted	28.6 (2.5)	30.6 (0.9)	29.4 (3.7)	24.4 (4.2)	26.0 (1.3)	28.6 (2.5)	23.0 (2.1)	27.7 (4.3)	25.4 (1.3)
Adjusted[b]	28.6 (2.5)	31.6 (2.4)	32.5 (3.2)	30.7 (4.2)	30.4 (1.3)	33.5 (1.9)	26.9 (1.8)[a]	30.8 (3.4)	28.0 (0.9)
Air Force									
Unadjusted	14.3 (1.4)	17.7 (1.2)	16.5 (1.4)	14.5 (1.0)	10.6 (0.8)[a]	10.4 (1.1)	11.7 (1.0)	12.3 (1.0)	10.3 (1.3)[*]
Adjusted[b]	14.3 (1.4)	18.1 (0.8)[a]	17.5 (1.2)	16.1 (0.9)	12.9 (0.8)[a]	12.0 (0.9)	14.7 (1.0)[a]	13.5 (1.2)	11.0 (1.0)
Total DoD									
Unadjusted	20.8 (1.1)	24.1 (1.0)[a]	23.0 (1.1)	17.2 (0.9)[a]	15.5 (0.8)	17.4 (0.9)	15.4 (0.8)	18.1 (1.1)[a]	18.5 (1.0)
Adjusted[b]	20.8 (1.1)	23.6 (0.9)[a]	24.8 (0.9)	20.1 (1.1)[a]	19.1 (1.2)	20.5 (0.8)	19.3 (0.9)	20.2 (0.7)	20.5 (0.8)

Note: Table displays the percentage of military personnel by survey year and Service who were classified as heavy alcohol users in the past 30 days. The standard error of each estimate is presented in parentheses. Adjusted estimates take into account sociodemographic changes *within* Services across survey years; estimates have not been adjusted for sociodemographic differences *among* Services. Heavy alcohol use is defined as consumption of five or more drinks on the same occasion at least once a week in the past 30 days.

[*]Comparisons between 1980 and 2005 are statistically significant at the 95% confidence level.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Adjusted estimates have been standardized to the 1980 DoD or Service-specific distribution by age, education, and marital status.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Heavy Alcohol Use, Q18–Q21 and Q23–Q26).

total DoD or for the Marine Corps or Air Force. The Army showed significantly higher adjusted rates of heavy alcohol use in 2005 than in 1980, while the Navy showed a significant overall decrease between 1980 and 2005.

4.2 Service Comparisons of Alcohol Use

This section provides four sets of estimates for each of the Services: (1) per capita average daily ethanol use, (2) the prevalence of heavy alcohol use, (3) binge drinking (consuming five or more drinks per sitting one or more times in the past month), and (4) feeling drunk more than six times in the past year in 2005. It presents unadjusted estimates on these measures for each of the Services. These unadjusted estimates are descriptive only and yield no explanatory information about differences among the Services. They do, however, reflect the average amount of alcohol consumed per day by all personnel in each Service and the prevalences of heavy alcohol use, binge drinking, and feeling drunk in 2005 for each of the Services.

As discussed in Section 2.6, one possible explanation for differences across the Services stems from differences in their sociodemographic composition. To address this possibility, this report also provides adjusted estimates of ethanol use, heavy alcohol use, binge drinking, and feeling drunk, using direct standardization procedures to control for sociodemographic differences (see Appendix F). These constructed estimates resulting from standardization permit comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 2005. Unadjusted and adjusted estimates for average ounces of ethanol, heavy alcohol use, binge drinking, and feeling drunk more than six times in the past year are shown in Table 4.3.

4.2.1 Unadjusted Estimates

Over the survey series, comparisons of unadjusted estimates of average daily alcohol (ethanol) consumption (Table 4.1) and heavy alcohol use (Table 4.2) show that alcohol use has generally been lower among Air Force personnel than for personnel from the other Services.

Service comparisons of unadjusted per capita estimates of average daily ethanol consumption in 2005 shown in Table 4.3 indicate that Air Force personnel on average consumed significantly less alcohol per day than did personnel in the Army, Navy, or Marine Corps. Average daily alcohol consumption was also lower among Navy personnel when compared with rates for the Army and Marine Corps.

Unadjusted rates of heavy alcohol use (i.e., five or more drinks per typical drinking occasion at least once a week, on average) in 2005 were also significantly lower among Air Force personnel than among personnel in the Army, Navy, or Marine Corps and among Navy personnel vs. those in the Army or Marine Corps.

Similarly, the percentage of binge drinkers was significantly lower among Air Force personnel than among personnel in the Army, Navy, or Marine Corps and lower among Navy personnel than among Army or Marine Corps personnel. In 2005, 33.9% of Air Force personnel acknowledged at least one binge drinking episode in the past month, whereas rates for the Army (52.8%), Navy (41.7%), and Marines (53.2%) were significantly higher. Again, the Army and Marine Corps face the greatest challenges in addressing this issue, with more than one in two personnel in these Services reporting binge drinking.

Likewise, rates of feeling drunk more than six times in the past year were lower in the Air Force (23.0%) than in the Army (40.1%), Navy (30.1%), and Marine Corps (44.4%) and lower in the Navy than in the Army and Marine Corps.

These unadjusted estimates of the prevalence of heavy alcohol use show the relative challenges that the Services face in discouraging heavy alcohol use among their personnel. This task appears to be greatest for the Army and the Marine Corps.

4.2.2 Adjusted Estimates

Observed differences in per capita average daily alcohol (ethanol) use and heavy alcohol use among the four Services may be partially accounted for by differences in

Table 4.3 **ESTIMATES OF ALCOHOL USE, UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC DIFFERENCES, BY SERVICE**

Measure/Type of Estimate	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Average Daily Ounces of Ethanol					
Unadjusted	1.93 (0.22)[a,b]	1.36 (0.15)[b,c,d]	1.86 (0.08)[a,b]	0.75 (0.08)[a,c,d]	1.43 (0.10)
Adjusted[e]	1.84 (0.15)[a,b,d]	1.46 (0.10)[b,c]	1.47 (0.04)[b,c]	0.86 (0.07)[a,c,d]	1.41 (0.05)
Heavy Alcohol Use[f]					
Unadjusted	24.5 (2.1)[a,b]	17.0 (1.4)[b,c,d]	25.4 (1.3)[a,b]	10.3 (1.3)[a,c,d]	18.5 (1.0)
Adjusted[e]	23.2 (1.3)[a,b,d]	17.7 (1.2)[b,c]	20.0 (0.6)[b,c]	11.5 (0.9)[a,c,d]	18.1 (0.5)
Alcohol Binge Episode[g]					
Unadjusted	52.8 (3.0)[a,b]	41.7 (1.7)[b,c,d]	53.2 (2.1)[a,b]	33.9 (2.1)[a,c,d]	44.5 (1.5)
Adjusted[e]	50.8 (1.4)[a,b,d]	42.4 (1.4)[b,c,d]	46.6 (1.1)[a,b,c]	37.1 (1.2)[a,c,d]	44.3 (0.6)
Felt Drunk More Than 6 Times in Past Year					
Unadjusted	40.1 (2.1)[a,b]	30.1 (1.5)[b,c,d]	44.4 (2.1)[a,b]	23.0 (1.5)[a,c,d]	33.1 (1.1)
Adjusted[e]	37.9 (1.1)[a,b]	31.5 (1.3)[b,c,d]	36.4 (1.1)[a,b]	25.5 (1.3)[a,c,d]	32.9 (0.6)

Note: Table entries for average daily ounces of ethanol are average values among military personnel by Service. Table entries for heavy alcohol use, alcohol binge episode, and felt drunk more than six times in past year are percentages among military personnel by Service. The standard error of each estimate is presented in parentheses. Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps). Differences that were statistically significant are indicated.

[a]Estimate is significantly different from the Navy at the 95% confidence level.

[b]Estimate is significantly different from the Air Force at the 95% confidence level.

[c]Estimate is significantly different from the Army at the 95% confidence level.

[d]Estimate is significantly different from the Marine Corps at the 95% confidence level.

[e]Adjusted estimates have been standardized by gender, age, education, race/ethnicity, and marital status to the total DoD distribution.

[f]Defined as consumption of five or more drinks on the same occasion at least once a week in the past 30 days.

[g]Defined as having consumed five or more drinks (four for females) on the same occasion at least once during the past 30 days.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Average Daily Ounces of Ethanol, Q18–Q26 and Q32–Q34; Heavy Alcohol Use, Q18–Q21 and Q23–Q26; Drunk More Than 6 Times in Past Year, Q35).

the sociodemographic composition of the Services. In particular, the higher rates of alcohol consumption on average and of heavy alcohol use in the Marine Corps may have been due in part, as shown in Table 2.4, to the sociodemographic composition of the Marine Corps in comparison with the other Services. The Marine Corps has traditionally had higher percentages of personnel who were male, younger, less educated, unmarried, and enlisted—groups that have been shown in previous DoD surveys to be more likely to be heavy drinkers (Bray et al., 2003). Conversely, the lower levels of alcohol consumption and heavy alcohol use in the Air Force may have been due in part to its sociodemographic composition, with its personnel being more likely to be older, better educated, and married compared with the other Services. Thus, the Marine Corps could have had a lower level of average alcohol consumption and a lower prevalence of heavy alcohol use, as well as lower binge drinking rates, and the Air Force could have had a higher level of alcohol consumption, binge drinking, and heavy alcohol use, had the Services had the same sociodemographic composition.

To examine the potential impact of sociodemographic composition of the Services on alcohol use rates, adjusted estimates were developed for average daily alcohol use, heavy alcohol use, binge drinking rates, and frequent intoxication in 2005. The sociodemographic composition of the Services was standardized to the gender, age, education, race/ethnicity, and marital status distributions for the total DoD (see Appendix F). These adjusted estimates following standardization are

presented in Table 4.3 for average daily alcohol use, heavy alcohol use, binge drinking, and frequent intoxication.

For average daily alcohol (ethanol) consumption, adjusting the estimates for sociodemographic differences decreased the Army estimate from 1.93 ounces to 1.84 ounces. Standardization raised the Air Force estimate from an average of 0.75 ounce of ethanol per day to an average of 0.86 ounce. Standardization increased the Navy estimate slightly from 1.36 ounces per day to 1.46 ounces. Standardization also had an effect on the Marine Corps' estimate, resulting in a decrease from 1.86 ounces per day on average to 1.47 ounces. This finding suggests that the rate of absolute alcohol consumption (i.e., unadjusted) among Marine Corps personnel was partly accounted for by the Marine Corps being very different from the total DoD in sociodemographic composition; when the Marine Corps was made to match the sociodemographic composition of the total DoD, its average daily alcohol consumption also matched that of the Navy.

Following standardization, however, the Air Force continued to have a significantly lower level of per capita alcohol consumption compared with the Army, Navy, and the Marine Corps.; the Navy levels were still significantly lower than Army rates. These results suggest that the lower levels of average daily alcohol consumption in the Air Force and Navy were not only due to differences in sociodemographic composition.

With regard to heavy alcohol use, standardization to the total DoD sociodemographic composition raised the prevalence estimates slightly for the Air Force (from 10.3% to 11.5%). Adjusting the estimates for sociodemographic differences decreased the Army estimates slightly (24.5% unadjusted vs. 23.2% adjusted) and increased the Navy estimates slightly (17.0% unadjusted vs. 17.7% adjusted). Standardization reduced the estimated prevalence of heavy alcohol use for the Marine Corps, lowering it by more than 5 percentage points, from 25.4% (unadjusted) to 20.0% (adjusted). Following standardization, adjusted rates of heavy alcohol use for the Army, Navy, and Marine Corps were still significantly higher than that for the Air Force; additionally, Navy rates were lower than those for the Army.

Standardization of binge drinking rates resulted in the Air Force continuing to have a significantly lower rate of binge drinking compared with the other Services. The adjusted rate for the Air Force increased from 33.9% to 37.1%, and for the Navy from 41.7% to 42.4%. In contrast, the Army rate decreased slightly from 52.8% to 50.8%, and the Marine Corps from 53.2% to 46.6%.

Adjusted rates for feeling drunk showed a similar pattern, revealing a slight increase in the Air Force and Navy, and a small decrease in the Army. The largest decrease was demonstrated in the Marines.

These results indicate that many of the differences in the unadjusted rates of heavy alcohol use in 2005 among the Services can be accounted for by differences in their sociodemographic composition. This finding is particularly evident and important for the Marine Corps, which has consistently shown the highest unadjusted rates of heavy alcohol use across the DoD survey series and continued to do so in 2005 (though the Army was similar). However, the distinctive sociodemographic makeup of the Marine Corps, which has a higher representation of personnel at greater risk for heavy alcohol use, is an important factor in the rate of heavy alcohol use. As long as the Marine Corps has higher percentages of sociodemographic groups at increased risk for heavy alcohol use than the other Services, it will continue to face the greatest challenge in coping with heavy alcohol use among its personnel.

4.3 Correlates of Heavy Alcohol Use

Past research on military and civilian populations has firmly established that alcohol use patterns differ among certain sociodemographic groups and social conditions (Bray et al., 1992, 2003; Clark & Hilton, 1991; Midanik & Clark, 1994; Williams et al., 2002). For example, drinking tends to be more common and heavier among younger persons, males, and less well-educated people. Knowledge about these correlates of alcohol use is useful for specifying high-risk populations to be targeted for educational and treatment efforts. This section

examines the correlates of heavy alcohol use. Two types of analyses were conducted: descriptive prevalence analyses and multivariate logistic regression analyses. Results of both are presented in Table 4.4: the first column of numbers presents prevalence data for the sociodemographic groups and the next column shows the odds ratios from the logistic regression.

The prevalence rates in Table 4.4 indicate substantial differences by Service, gender, race/ethnicity, family status, pay grade, and region. As discussed previously, heavy alcohol use is more prevalent among Army, Navy, and Marine Corps personnel than among Air Force personnel. Heavy alcohol use also is more prevalent among males; non-Hispanic whites and Hispanics; those with less education; personnel not married or married but unaccompanied by their spouse; those in pay grades E1 to E9 and O1 to O3; and those stationed outside the continental United States (OCONUS).

For the logistic regression model, the probability of being a heavy drinker was used as the dependent measure. The dichotomous outcome measure was heavy alcohol use versus other drinking levels (excluding abstainers). The independent variables included seven sociodemographic variables: Service, gender, race/ethnicity, education, family status, pay grade, and region. As shown in Table 4.4, all of the sociodemographic variables were significant predictors of heavy alcohol use. The odds of being heavy drinkers were significantly higher, after adjusting for all other variables in the analysis, for the following subgroups:

- Army and Marine Corps compared with Air Force personnel
- Males compared with females
- Those with a high school education or less compared with those with a college education
- Those who were single or married with spouse absent, compared with those who were married with spouse present
- Those in pay grades E1 to E3 through O1 to O3 (excluding W1 to W5) compared with those in pay grades O4 to O10.

The odds of being a heavy drinker were significantly lower among

- African American non-Hispanics and those of “other” race/ethnic groups compared with white non-Hispanics and
- those stationed within the continental United States (CONUS) compared with those stationed outside the continental United States (OCONUS).

Pay grade and gender showed the strongest effects in the model. The odds of being heavy drinkers were three times as high for junior personnel in pay grades E1 to E3 and personnel in pay grades E4 to E9 as for senior officers in pay grades O4 to O10. The odds of junior officers in pay grades O1 to O3 being heavy drinkers were more than two times that of senior officers. The odds for male personnel being heavy drinkers were more than three times those of female personnel. The logistic model also showed that the odds of being heavy drinkers for single personnel were twice those for married personnel with spouse present. These logistic regression analyses suggest that prevention efforts for heavy alcohol use are likely to be the most productive if they focus on lower-grade enlisted male personnel in the Army, Navy, and Marine Corps, as well as on single personnel.

4.4 Binge Drinking

This section examines where and with whom binge-drinking (consuming five or more drinks on one occasion in the past month) occurred. First, the prevalence of selected sociodemographic characteristics is reported by binge-drinking companion. Next, sociodemographic characteristics are compared for binge-drinking location. Epidemiological data support the link between heavy episodic drinking and a host of social and psychological problems in college students. Heavy episodic drinkers are more likely to experience serious health consequences and injuries, have poorer academic performance, engage in unplanned or unsafe sex, and to be at higher risk for assault and aggressive behavior (Carey, 1995; Presley et al., 1995; Wechsler et al., 1994, Wechsler et al., 2002). On average, heavy episodic drinkers are more likely to report having hangovers, doing things they regretted, missing classes,

Table 4.4 **SOCIODEMOGRAPHIC CORRELATES OF HEAVY ALCOHOL USE, PAST 30 DAYS, TOTAL DOD**

Sociodemographic Characteristics	Prevalence	Odds Ratio[a] Adjusted	95% CI[b]
Service			
Army	24.5 (2.1)	2.14[c]	(1.57,2.90)
Navy	17.0 (1.4)	1.32	(1.00,1.75)
Marine Corps	25.4 (1.3)	1.92[c]	(1.50,2.45)
Air Force	10.3 (1.3)	1.00	
Gender			
Male	20.6 (1.0)	3.53[c]	(2.89,4.31)
Female	6.6 (0.8)	1.00	
Race/Ethnicity			
White, non-Hispanic	20.0 (1.1)	1.00	
African American, non-Hispanic	11.9 (1.6)	0.49[c]	(0.38,0.64)
Hispanic	22.8 (1.8)	0.96	(0.79,1.16)
Other	16.2 (1.5)	0.74[c]	(0.57,0.95)
Education			
High school or less	26.8 (1.1)	1.73[c]	(1.02,2.95)
Some college	17.2 (1.2)	1.37	(0.79,2.40)
College graduate or higher	8.8 (1.5)	1.00	
Family Status[d]			
Not married	26.1 (1.0)	2.25[c]	(1.87,2.70)
Married, spouse not present	21.8 (2.4)	1.81[c]	(1.36,2.40)
Married, spouse present	11.1 (1.0)	1.00	
Pay Grade			
E1-E3	25.5 (1.6)	4.22[c]	(2.14,8.33)
E4-E6	20.6 (1.0)	4.68[c]	(2.34, 9.36)
E7-E9	9.9 (0.8)	2.76[c]	(1.43,5.33)
W1-W5	9.4 (2.6)	2.03	(0.87,4.74)
O1-O3	11.3 (2.6)	3.46[c]	(1.99,6.02)
O4-O10	2.8 (0.5)	1.00	
Region			
CONUS[e]	15.7 (1.0)	0.75[c]	(0.61,0.92)
OCONUS[f]	24.8 (2.3)	1.00	
Total	18.5 (1.0)		

Note: Prevalence estimates are percentages among military personnel in each sociodemographic group who were classified as heavy alcohol users in the past 30 days. The standard error of each estimate is presented in parentheses. Heavy alcohol use is defined as consumption of five or more drinks on the same occasion at least once a week in the past 30 days.

[a]Odds ratios were adjusted for Service, gender, race/ethnicity, education, family status, pay grade, and region.

[b]95% CI = 95% confidence interval of the odds ratio.

[c]Odds ratio is significantly different from the reference group.

[d]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[e]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[f]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Heavy Alcohol Use, Q18-Q21 and Q23-Q26; refer to Section 2.5.1 for descriptions of sociodemographic variables).

having blackouts, damaging property, and not using protection when having sex (Dowdall et al., 1998; Hingson et al., 1997; Wechsler et al., 1995). In national surveys of college drinking, at least 40% of students acknowledged heavy episodic drinking at least once within the previous 2 weeks (Bennett et al., 1999; O'Malley & Johnston, 2002; Wechsler et al., 1994; Wechsler et al., 2002).

4.4.1 Correlates of Binge-Drinking Companion

Table 4.5 shows the prevalence of selected sociodemographic characteristics by binge-drinking companion. Males had a higher prevalence of binge drinking (48.0%) than females (24.5%) and reported that most binge-drinking occasions were with small groups (73.7%), followed by binge drinking with dates (19.2%) and alone (7.0%). For females, most occasions of binge drinking also occurred with small groups of individuals (71.0%), followed by being with a date (22.8%) or alone (6.2%). Personnel aged 18 to 25 had a higher prevalence of binge-drinking occasions (56.4%) than did personnel aged 26 to 55 (34.1%). For all age groups and all Services, binge drinking with a small group had the highest prevalence, ranging from 64.9% to 79.6%. Army and Navy personnel had the highest rates of binge drinking alone (7.9% and 8.0%), compared with rates of 4.3% for the Marine Corps and 6.1% for the Air Force. Overall, the Air Force had the lowest rates of binge drinking (33.9%), followed by the Navy (41.7%), whereas the Army (52.8%) and Marine Corps (53.2%) had the highest rates.

4.4.2 Correlates of Binge-Drinking Location

Table 4.6 shows the prevalence of binge-drinking locations by selected sociodemographic characteristics. Binge drinking in a bar was more likely reported by females (46.7%), whereas males indicated the highest rates for binge drinking at home (36.9%). The next most frequent location for binge drinking among males was in

Table 4.5 **SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS, BY BINGE-DRINKING COMPANION**

Sociodemographic Characteristics	Engaged in Binge Drinking in Last 30 Days[a]	With Whom During Last Binge Episode[b]		
		No One/ Alone	Date/Spouse or Partner	Small Group
Gender				
Male	48.0 (1.5)	7.0 (0.6)	19.2 (0.7)	73.7 (0.9)
Female	24.5 (1.5)	6.2 (1.5)	22.8 (2.3)	71.0 (2.6)
Age				
18-25	56.4 (1.5)	5.5 (0.5)	15.2 (0.8)	79.3 (0.8)
26-55	34.1 (1.3)	9.2 (1.1)	25.9 (1.3)	64.9 (1.8)
Service				
Army	52.8 (3.0)	7.9 (1.3)	18.5 (0.7)	73.6 (1.7)
Navy	41.7 (1.7)	8.0 (0.5)	21.4 (1.6)	70.5 (1.5)
Marine Corps	53.2 (2.1)	4.3 (0.6)	16.1 (2.2)	79.6 (2.1)
Air Force	33.9 (2.1)	6.1 (1.1)	21.5 (1.4)	72.5 (1.3)
Total DoD[c]	44.5 (1.5)	7.0 (0.6)	19.5 (0.7)	73.5 (0.9)

Note: Table displays the percentage of military personnel in each sociodemographic group who reported their last binge-drinking episode was with no one, date/spouse, or small group. The standard error of each estimate is presented in parentheses.

[a]Defined as having consumed five or more drinks (four for females) on the same occasion at least once during the past 30 days.

[b]These columns display estimates among those who engaged in binge drinking in last 30 days.

[c]Individuals with missing binge alcohol use in the past 30 days are not included in these estimates.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Engaged in Binge Drinking, Q28; With Whom Drank, Q29).

Table 4.6 **SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS, BY BINGE-DRINKING LOCATION**

Sociodemographic Characteristics	Engaged in Binge Drinking in Last 30 Days[b]	Location During Last Binge Episode[a]: At Home/In Quarters	In a Bar, Club, Restaurant	At Someone Else's Place (including a Party)	Other Place[c]
Gender					
Male	48.0 (1.5)	36.9 (1.3)	35.0 (2.2)	20.5 (1.3)	7.6 (0.6)
Female	24.5 (1.5)	26.6 (2.8)	46.7 (2.4)	20.9 (2.0)	5.9 (0.9)
Age					
18-25	56.4 (1.5)	32.2 (1.4)	38.1 (2.4)	22.5 (1.4)	7.2 (0.7)
26-55	34.1 (1.3)	41.9 (1.9)	32.6 (2.0)	17.6 (1.3)	7.9 (0.7)
Service					
Army	52.8 (3.0)	35.0 (2.4)	39.6 (4.5)	18.2 (2.6)	7.2 (1.1)
Navy	41.7 (1.7)	36.5 (2.4)	30.0 (2.9)	23.5 (1.4)	9.9 (0.6)
Marine Corps	53.2 (2.1)	36.3 (2.0)	37.5 (2.3)	20.0 (1.9)	6.2 (1.3)
Air Force	33.9 (2.1)	37.6 (2.0)	35.0 (2.1)	21.5 (1.7)	6.0 (1.1)
Total DoD[d]	44.5 (1.5)	36.1 (1.3)	35.9 (2.1)	20.5 (1.2)	7.5 (0.6)

Note: Table displays the percentage of military personnel in each sociodemographic group who reported their last binge-drinking episode was at home, in a bar, at someone else's place, or in some other place. The standard error of each estimate is presented in parentheses.

[a]These columns display estimates among those who engaged in binge drinking in last 30 days.

[b]Defined as having consumed five or more drinks (four for females) on the same occasion at least once during the past 30 days.

[c]Other Place includes the following response categories for Q30: at work, sporting/recreational events, ceremony/formal occasion, car, or other place.

[d]Individuals with missing binge alcohol use in the past 30 days are not included in these estimates.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Engaged in Binge Drinking, Q28; Location Drank, Q30).

a bar (35.0%), with the lowest rates being at someone else's home (20.5%). Female personnel also reported a high prevalence of binge drinking where they live (26.6%) or at someone else's home (20.9%). Personnel aged 18 to 25 most often engaged in binge drinking at a bar (38.1%), whereas personnel aged 26 to 55 reported their most frequent location for binge drinking was at home (41.9%). Considered by Service, the most common places for binging were at home or in a bar. Air Force personnel had the highest prevalence of binge drinking at home (37.6%), whereas Marine Corps and Army personnel listed a bar as the most typical location for binge drinking (37.5% and 39.6%, respectively).

4.5 Negative Effects of Alcohol Use

This section examines the negative effects of alcohol consumption on military personnel. First, trends in negative effects are examined and findings from the 1980 to the 2005 DoD surveys are compared. Next, the negative effects as a function of pay grade and the relation between drinking levels and serious consequences are examined.

4.5.1 Trends in Negative Effects

The military showed dramatic overall reductions in alcohol-related negative effects during the 25-year period from 1980 to 2005. Alcohol-related negative effects have declined significantly since the survey series began. For the total DoD in 2005, 8.1% of military personnel reported having experienced a serious consequence associated with alcohol use during the past year, and 13.2% reported some productivity loss (see Table 3.1 in Chapter 3). The increase between 1998 and 2002 in the prevalence of productivity loss (from 13.6% in 1998 to 17.3% in 2002) was statistically significant but returned to 1998 levels at 13.2% in 2005. Similarly,

the prevalence for serious consequences also increased significantly from the 1998 survey to the 2002 survey (i.e., from 6.7% to 9.6%) but decreased slightly in 2005 to 8.1%.

In 2002, the definition of dependence did not reflect the strict definition used in the *DSM-IV* (American Psychiatric Association [APA], 1994). Rather it included having experienced four or more symptoms commonly associated with dependence at any time during the past year. New criteria for alcohol dependence were included in 2005; thus, comparisons with previous survey years on this dimension of negative effects cannot be made. For 2005, the measure of symptoms of alcohol dependence was determined using the Alcohol Use Disorders Identification Test (AUDIT). The AUDIT was developed by the World Health Organization (WHO) as a simple method of screening for excessive drinking and to assist in brief assessment. The AUDIT consists of 10 questions, each scored from 0 to 4, with a total score ranging from 0 to 40. Scores between 8 and 15 are indicative of hazardous drinking, scores between 16 and 19 suggest harmful drinking, and scores of 20 or above clearly warrant further diagnostic evaluation for alcohol dependence. In 2005, 2.9% of DoD personnel indicated possible dependence on the AUDIT.

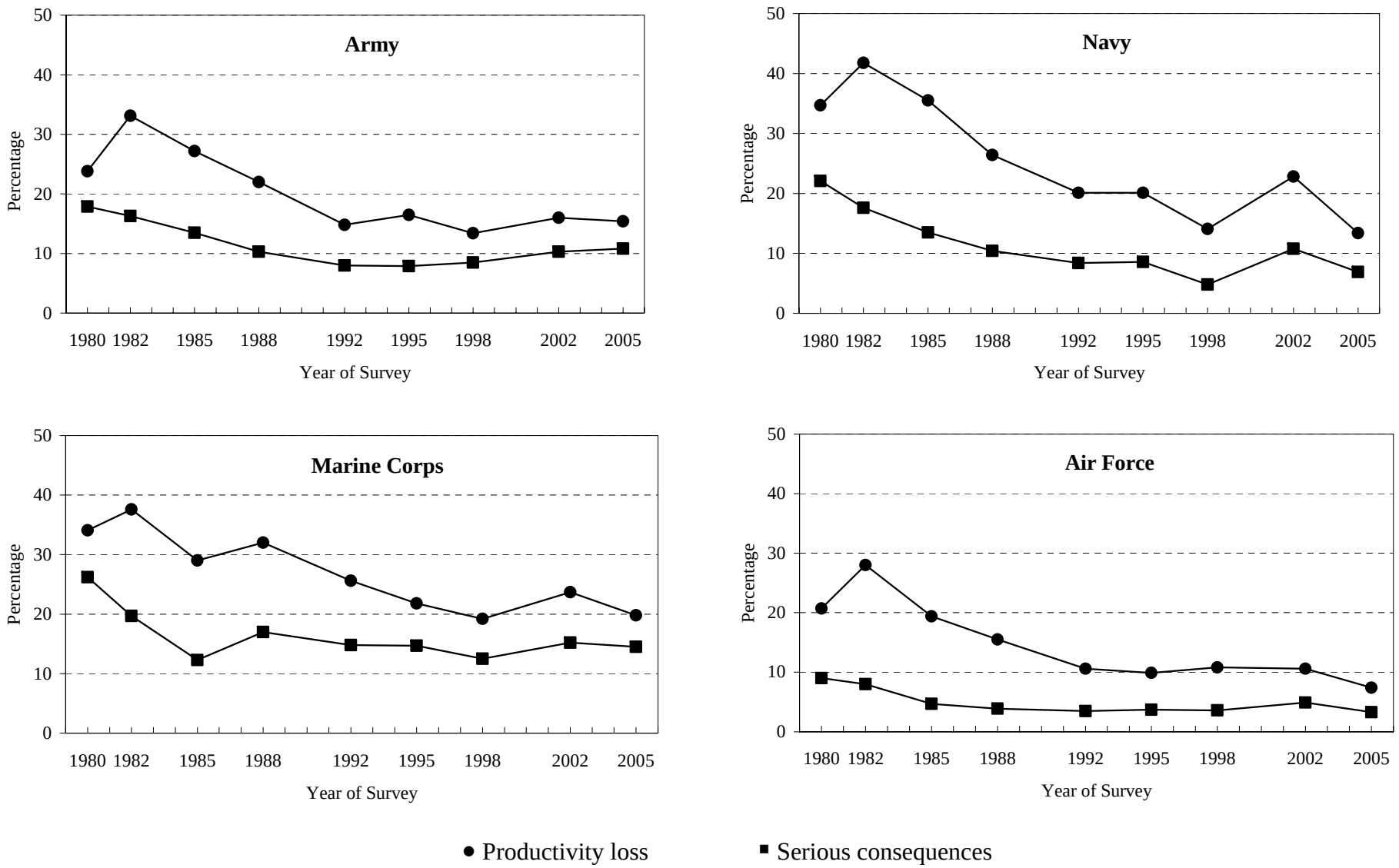
The same overall decreases in negative effects between 1980 and 2005 that were observed for the total DoD also occurred for personnel in each of the Services. Figure 4.1 and Tables D.1 to D.4 show Service trends from 1980 to 2005 for selected types of negative effects due to alcohol use. Serious consequences declined fairly steadily among Army personnel from 17.9% in 1980 to 10.8% in 2005. Following an increase in productivity loss from 1980 to 1985, productivity loss for Army personnel returned to 1980 levels in 1988, declined further to 13.4% in 1998, increased to 16.0% in 2002, and decreased slightly to 15.4% in 2005. Trends in symptoms of alcohol dependence showed a somewhat different pattern from that of serious consequences or productivity loss. For the Army, alcohol dependence symptoms increased from 8.8% in 1980 to 12.1% in 1985, declined significantly to 7.2% in 1988, dropped further to 5.4% in 1992, increased to 6.4% in 1995, and decreased slightly to 6.2% in 1998. As a result of the new dependence criteria in 2002, the rate of 13.0% is not comparable to rates from previous years. Using the AUDIT, Army personnel had a possible dependence rate of 4.1% in 2005, with 31.4% drinking at or above hazardous levels (i.e., AUDIT score greater than or equal to 8).

Navy personnel showed a steady decline in serious consequences from 22.1% in 1980 to 10.8% in 2002; the rate further decreased to 6.9% in 2005. Following an increase in productivity loss from 1980 to 1982, productivity loss for the Navy returned to 1980 levels in 1985 and declined steadily to 14.1% in 1998, but showed a substantial increase in 2002 to 22.8% and a decrease again in 2005 to 13.4%. Trends in symptoms of alcohol dependence showed a somewhat different pattern from that for serious consequences or productivity loss. For the Navy, the prevalence of alcohol dependence symptoms increased from 9.7% in 1980 to 11.6% in 1982, dropped significantly in 1985, and remained fairly constant through 1995, when it was 6.1%. In 2002, 13.0% of Navy personnel reported dependence symptoms under the new measure. Using the AUDIT, Navy personnel showed a 2.8% rate for possible alcohol dependence, and 22.2% drank at hazardous levels or higher.

Serious consequences among Marine Corps personnel declined from 26.2% in 1980 to 14.5% in 2005. Productivity loss, following an increase from 1980 to 1982 decreased to 29.0% in 1985, increased to 32.0% in 1988, and declined steadily to 19.2% by 1998, rising again in 2002 to 23.7%, and decreasing again in 2005 to 19.8%. Trends in reports of symptoms of alcohol dependence showed a decrease in dependence symptoms between 1980 and 1985; the prevalence of dependence symptoms in 1992 returned to the 1980 levels and then decreased to 8.2% by 1998. The rate in 2002 with the new measure of dependence symptoms was 20.3%. In 2005, Marine Corps personnel showed a possible dependence rate of 4.2% with 34.1% of personnel drinking at or above hazardous levels.

We found a steady decline in serious consequences among Air Force personnel from 9.0% in 1980 to 3.9% in 1988; the trend in reports of this kind of negative

Figure 4.1 Trends in alcohol-related negative effects, by Service, 1980-2005



Note: Definitions and measures of substance use are given in Section 2.5.3

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 1980-2005 (2005 Questions: Serious Consequences, Q37 and Q38; Productivity Loss, Q36).

effects remained level from 1992 (3.5%) through 1998 (3.6%), increased in 2002 (4.9%), and decreased again in 2005 (3.3%). Following an increase in productivity loss from 1980 to 1982, the Air Force returned to 1980 levels in 1985, declined to 10.6% in 1992, and subsequently remained at that level through 2002 with a prevalence of 10.6%. In 2005, the rate for productivity loss further decreased to 7.4%. The Air Force showed its lowest prevalence of dependence symptoms, from 4.3% in 1980 down to 2.8%, in 1998; in 2002, it was 6.8% with the new measure. For 2005, rates of possible dependence in the Air Force were 1.1%, and 12.8% drank at or above hazardous levels.

4.5.2 Pay Grade Differences

Because those in the lower pay grades are more likely to drink heavily, a similar distribution might be expected for negative effects of alcohol use. As Tables 4.7 and 4.8 indicate, in 2005 there was considerable variation in the problems reported by individuals in different pay grades. The highest levels of serious consequences, productivity loss, and hazardous drinking consistently occurred in the lowest pay grades (i.e., E1 to E3). Productivity loss also was high in pay grades E4 to E6. Rates of alcohol-related negative effects for serious consequences, productivity loss, and hazardous drinking were lowest in pay grades O4 to O10. For the total DoD, 15.8% of junior enlisted personnel (E1 to E3) but only 0.6% of senior officers (O4 to O10) reported the occurrence of serious consequences due to alcohol consumption. For productivity loss, 19.5% of E1s to E3s reported a problem compared with 4.1% of O4s to O10s. The prevalence of hazardous drinking or above was 35.8% for E1s to E3s and 5.3% for O4s to O10s, and the pattern for possible dependence was 5.5% for E1s to E3s and 0.3% for O4s to O10s. This pattern in the total DoD also occurred for each of the Services.

In view of the high rates of problems among E1s to E3s, Table 4.7 includes Service comparisons. Serious consequences among E1s to E3s were highest in the Marine Corps (23.1%), followed by the Army (20.2%), the Navy (11.7%), and the Air Force (7.3%). Serious consequences among E4s to E6s were found to be higher in the Army (11.3%) and Marine Corps (10.2), followed by the Navy (7.1%) and the Air Force (3.4%). Productivity loss among E1s to E3s was most prevalent in the Marine Corps (26.5%), next highest in the Army (20.8%) and Navy (19.8%), and least prevalent in the Air Force (10.0%). Productivity loss among E4s to E6s was most prevalent in the Army (17.3%) and the Marine Corps (16.8%) and least prevalent in the Navy (14.1%) and Air Force (8.5%). Finally, about 45% of E1s to E3s in the Marine Corps and 43% of E1s to E3s in the Army were drinking at hazardous levels or above, along with 31% for the Navy and 22% for the Air Force. Among E1s to E3s, possible dependence on alcohol was shown by 7.3% of Marine Corps personnel, 6.7% of Army personnel, 5.2% of Navy personnel, and by 2.3% of Air Force personnel.

The high prevalence of alcohol problems among junior enlisted personnel indicates that these pay grades are at substantially greater risk of experiencing negative effects when they drink, relative to other pay grades. In addition, because most negative effects of alcohol use occur among these junior enlisted personnel, the absolute numbers of personnel having these drinking problems are quite large, requiring substantial resources to reduce, even slightly, the impact of so many personnel experiencing these negative effects.

4.5.3 Drinking Levels and Negative Effects

To better understand the influence of drinking levels on negative effects of alcohol use, this study examined the relation between drinking levels (omitting abstainers) and the percentage of personnel with one or more alcohol-related serious consequences, any reported loss of productivity, or occurrence of possible alcohol dependence (see Tables 4.9 and 4.10). Nearly one-quarter of heavy drinkers had one or more serious consequences (24.3%), a rate that was three to six times as high as that for any other group of drinkers. The next highest prevalence was among those who were moderate/heavy drinkers, with 8.4% reporting at least one serious consequence. Having experienced a serious consequence of alcohol use was reported by similar percentages of moderate drinkers (4.1%) and infrequent/light drinkers (5.0%).

Table 4.7 **NEGATIVE EFFECTS OF ALCOHOL USE, PAST 12 MONTHS, BY PAY GRADE**

Measure/Pay Grade	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Serious Consequences (1 or More Factors)					
E1-E3	20.2 (1.5)	11.7 (2.3)	23.1 (2.1)	7.3 (1.1)	15.8 (1.2)
E4-E6	11.3 (0.9)	7.1 (0.7)	10.2 (1.2)	3.4 (0.5)	7.8 (0.6)
E7-E9	1.3 (0.5)	1.7 (0.6)	1.9 (0.5)	0.5 (0.2)	1.2 (0.2)
W1-W5	2.4 (1.4)	+ (+)	2.3 (1.4)	N/A (N/A)	2.4 (1.1)
O1-O3	4.7 (2.3)	1.9 (0.7)	4.4 (1.4)	1.0 (0.6)	2.7 (0.7)
O4-O10	0.6 (0.6)	0.7 (0.5)	0.2 (0.2)	0.6 (0.3)	0.6 (0.3)
Total	10.8 (1.0)	6.9 (0.8)	14.5 (1.3)	3.3 (0.3)	8.1 (0.5)
Alcohol-Related Productivity Loss (1 or More Factors)					
E1-E3	20.8 (2.0)	19.8 (5.8)	26.5 (2.0)	10.0 (1.3)	19.5 (1.7)
E4-E6	17.3 (1.2)	14.1 (1.2)	16.8 (1.2)	8.5 (0.6)	13.8 (0.7)
E7-E9	4.4 (0.9)	6.2 (0.7)	6.8 (0.8)	4.0 (0.7)	4.9 (0.4)
W1-W5	3.7 (1.7)	+ (+)	6.5 (2.1)	N/A (N/A)	4.6 (1.5)
O1-O3	14.1 (2.6)	5.6 (1.4)	14.9 (2.2)	5.9 (1.2)	9.3 (1.2)
O4-O10	5.6 (1.4)	3.9 (1.3)	7.1 (2.4)	3.1 (0.4)	4.1 (0.6)
Total	15.4 (1.1)	13.4 (1.7)	19.8 (1.4)	7.4 (0.6)	13.2 (0.7)
Serious Consequences (2 or More Factors)					
E1-E3	10.4 (1.1)	6.6 (1.8)	10.1 (1.7)	4.5 (1.1)	8.1 (0.8)
E4-E6	5.8 (0.6)	2.5 (0.4)	3.6 (1.1)	1.9 (0.5)	3.5 (0.4)
E7-E9	0.2 (0.1)	0.5 (0.2)	0.9 (0.4)	0.2 (0.2)	0.3 (0.1)
W1-W5	– (–)	– (–)	1.8 (1.3)	N/A (N/A)	0.2 (0.2)
O1-O3	1.3 (1.2)	1.4 (0.8)	3.1 (1.4)	0.3 (0.2)	1.2 (0.5)
O4-O10	0.6 (0.6)	0.5 (0.4)	– (–)	0.3 (0.3)	0.4 (0.2)
Total	5.4 (0.5)	3.1 (0.6)	6.1 (1.1)	1.8 (0.3)	3.8 (0.3)
Alcohol-Related Productivity Loss (2 or More Factors)					
E1-E3	14.7 (1.7)	11.8 (4.1)	16.6 (1.8)	7.1 (1.7)	12.7 (1.3)
E4-E6	10.0 (1.0)	9.3 (1.0)	10.4 (0.7)	4.1 (0.5)	8.1 (0.5)
E7-E9	1.9 (0.7)	3.3 (0.8)	4.1 (0.7)	1.8 (0.4)	2.4 (0.4)
W1-W5	2.2 (1.2)	– (–)	2.5 (1.0)	N/A (N/A)	2.0 (0.9)
O1-O3	7.0 (1.8)	1.8 (0.5)	6.0 (1.9)	1.8 (0.9)	3.8 (0.8)
O4-O10	2.5 (1.0)	1.0 (0.4)	2.8 (1.1)	1.0 (0.4)	1.5 (0.4)
Total	9.3 (0.8)	8.2 (1.3)	12.1 (1.0)	3.8 (0.5)	7.8 (0.5)

Note: Table displays the percentage of military personnel in each Service by pay grade group who reported negative effects of alcohol use in the past 12 months (serious consequences and alcohol-related productivity loss). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

+ Low precision.

– Estimate rounds to zero.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Serious Consequences, Q37 and Q38; Alcohol-Related Productivity Loss, Q36).

Table 4.8 **ALCOHOL USE DISORDERS IDENTIFICATION TEST (AUDIT) SCORE, PAST 12 MONTHS, BY PAY GRADE**

Measure/Pay Grade	Service: Army	Navy	Marine Corps	Air Force	Total DoD
AUDIT Score of 8-15 (Hazardous Drinking)					
E1-E3	30.8 (3.7)	23.5 (3.9)	30.3 (1.4)	16.5 (1.7)	25.7 (1.7)
E4-E6	24.8 (2.6)	17.8 (1.1)	25.4 (2.4)	11.5 (0.8)	19.0 (1.1)
E7-E9	11.9 (2.7)	8.8 (1.1)	8.8 (1.1)	8.0 (1.2)	9.7 (1.1)
W1-W5	7.4 (2.3)	10.4 (3.0)	15.8 (5.9)	N/A (N/A)	8.9 (1.9)
O1-O3	28.4 (5.6)	7.0 (1.8)	21.7 (3.0)	3.9 (0.8)	13.9 (2.9)
O4-O10	5.3 (1.4)	4.4 (0.9)	7.0 (1.6)	4.3 (1.8)	4.7 (0.9)
Total	23.6 (2.8)	16.6 (0.8)	25.7 (1.5)	10.4 (0.8)	18.2 (1.1)
AUDIT Score of 16-19 (Harmful Drinking)					
E1-E3	5.5 (1.2)	2.6 (0.7)	7.2 (1.2)	3.2 (0.8)	4.6 (0.5)
E4-E6	4.7 (0.8)	3.4 (0.6)	2.5 (0.3)	1.5 (0.4)	3.2 (0.4)
E7-E9	0.4 (0.2)	1.5 (0.5)	1.9 (0.5)	0.4 (0.3)	0.8 (0.2)
W1-W5	1.1 (0.7)	– (–)	– (–)	N/A (N/A)	0.8 (0.5)
O1-O3	1.6 (0.5)	2.2 (1.4)	0.6 (0.3)	– (–)	1.1 (0.5)
O4-O10	0.6 (0.6)	– (–)	0.9 (0.6)	0.1 (0.1)	0.3 (0.2)
Total	3.8 (0.5)	2.7 (0.3)	4.3 (0.6)	1.3 (0.3)	2.9 (0.2)
AUDIT Score of 20+ (Possible Dependence)					
E1-E3	6.7 (1.2)	5.2 (1.2)	7.3 (1.6)	2.3 (0.6)	5.5 (0.6)
E4-E6	4.3 (0.6)	2.9 (0.8)	2.3 (0.7)	1.1 (0.3)	2.8 (0.4)
E7-E9	1.0 (0.5)	0.7 (0.3)	0.7 (0.3)	0.5 (0.2)	0.7 (0.2)
W1-W5	0.3 (0.3)	– (–)	– (–)	N/A (N/A)	0.2 (0.2)
O1-O3	3.4 (1.6)	0.3 (0.3)	1.1 (0.9)	– (–)	1.2 (0.6)
O4-O10	0.6 (0.6)	– (–)	– (–)	0.3 (0.2)	0.3 (0.2)
Total	4.1 (0.6)	2.8 (0.6)	4.2 (0.9)	1.1 (0.2)	2.9 (0.3)
AUDIT Score of 8+					
E1-E3	43.1 (3.9)	31.4 (4.6)	44.8 (2.4)	21.9 (2.0)	35.8 (2.0)
E4-E6	33.8 (3.1)	24.1 (1.1)	30.2 (1.9)	14.1 (1.1)	25.0 (1.4)
E7-E9	13.3 (2.8)	11.0 (1.1)	11.4 (1.3)	9.0 (1.3)	11.2 (1.1)
W1-W5	8.8 (2.4)	10.4 (3.0)	15.8 (5.9)	N/A (N/A)	9.9 (2.0)
O1-O3	33.4 (7.1)	9.5 (1.7)	23.4 (3.4)	3.9 (0.8)	16.1 (3.5)
O4-O10	6.5 (1.4)	4.5 (0.9)	7.9 (1.4)	4.7 (1.9)	5.3 (0.9)
Total	31.4 (3.5)	22.2 (1.1)	34.1 (1.9)	12.8 (1.1)	24.0 (1.5)

Note: Table displays the percentage of military personnel in each Service by pay-grade group who reported alcohol dependence symptoms. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dependence Symptoms, Q42–Q45).

Productivity loss was most prevalent among the heaviest drinkers, with more than one-third of them reporting such a negative effect (Table 4.9). Productivity loss was only half as prevalent among moderate/heavy drinkers, although still high at 17.4%. In comparison, the prevalence of productivity loss was lower among moderate drinkers (5.8%) and infrequent/light drinkers (6.0%), although still high enough to warrant concern.

Finally, possible dependence was evident among 11.6% of the heavy drinkers but in only 1.3% of the moderate/heavy drinkers (Table 4.10). The prevalence of possible alcohol dependence was lowest among moderate drinkers (0.3%). The rate of drinking at or above hazardous levels was 76.7% among heavy drinkers, 26.6% among moderate/heavy drinkers, 7.3% among moderate drinkers, and 9.2% among infrequent/light drinkers.

The negative effects of alcohol use among personnel who acknowledged drinking at work in the past 30 days were compared with those who did not drink at work (see Tables 4.11 and 4.12). Serious consequences were reported among 24.8% of those who drank at work, whereas productivity loss (41.6%), possible dependence

Table 4.9 **NEGATIVE EFFECTS OF ALCOHOL USE, PAST 12 MONTHS, BY DRINKING LEVEL**

	Service				
Measure/Drinking Level	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Serious Consequences (1 or More Factors)					
Infrequent/light	6.6 (1.4)	4.9 (1.3)	9.2 (3.1)	2.2 (0.8)	5.0 (0.7)
Moderate	6.7 (1.2)	3.4 (1.2)	6.4 (2.3)	1.8 (0.6)	4.1 (0.6)
Moderate/heavy	10.1 (1.9)	7.4 (1.1)	15.4 (2.9)	4.0 (0.9)	8.4 (0.9)
Heavy	26.4 (1.2)	21.6 (2.2)	32.2 (1.7)	14.1 (2.5)	24.3 (1.0)
Total	10.8 (1.0)	6.9 (0.8)	14.5 (1.3)	3.3 (0.3)	8.1 (0.5)
Alcohol-Related Productivity Loss (1 or More Factors)					
Infrequent/light	6.2 (1.3)	7.2 (2.0)	12.5 (2.4)	2.2 (0.7)	6.0 (0.8)
Moderate	7.1 (1.4)	7.1 (1.4)	8.9 (1.7)	2.9 (0.6)	5.8 (0.7)
Moderate/heavy	18.4 (2.5)	16.8 (1.4)	20.8 (2.2)	15.3 (1.4)	17.4 (1.0)
Heavy	35.1 (1.6)	37.5 (2.3)	42.9 (3.7)	27.6 (2.6)	35.8 (1.2)
Total	15.4 (1.1)	13.4 (1.7)	19.8 (1.4)	7.4 (0.6)	13.2 (0.7)
Serious Consequences (2 or More Factors)					
Infrequent/light	4.1 (1.0)	1.7 (0.7)	6.2 (2.6)	1.8 (0.8)	3.0 (0.5)
Moderate	2.5 (1.4)	0.8 (0.5)	1.9 (1.0)	0.8 (0.4)	1.4 (0.5)
Moderate/heavy	4.7 (1.2)	3.1 (0.6)	7.0 (2.3)	1.5 (0.6)	3.7 (0.5)
Heavy	13.1 (1.3)	11.2 (1.2)	11.7 (2.1)	8.5 (1.7)	11.6 (0.8)
Total	5.4 (0.5)	3.1 (0.6)	6.1 (1.1)	1.8 (0.3)	3.8 (0.3)
Alcohol-Related Productivity Loss (2 or More Factors)					
Infrequent/light	3.8 (0.8)	3.1 (1.2)	7.5 (2.5)	1.0 (0.3)	3.2 (0.5)
Moderate	3.9 (1.0)	3.4 (1.3)	3.8 (1.7)	2.0 (0.5)	3.1 (0.5)
Moderate/heavy	8.1 (1.4)	9.3 (1.2)	10.9 (1.6)	6.6 (1.6)	8.4 (0.7)
Heavy	24.0 (1.4)	26.1 (2.3)	28.9 (2.8)	16.6 (1.9)	24.2 (1.0)
Total	9.3 (0.8)	8.2 (1.3)	12.1 (1.0)	3.8 (0.5)	7.8 (0.5)

Note: Table displays the percentage of military personnel in each Service by past-month drinking-level group who reported negative effects of alcohol use in the past 12 months (serious consequences and alcohol-related productivity loss). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Serious Consequences, Q37 and Q38; Alcohol-Related Productivity Loss, Q36).

Table 4.10 **ALCOHOL USE DISORDERS IDENTIFICATION TEST (AUDIT) SCORE, PAST 12 MONTHS, BY DRINKING LEVEL**

Measure/Drinking Level	Service: Army	Navy	Marine Corps	Air Force	Total DoD
AUDIT Score of 8-15 (Hazardous Drinking)					
Infrequent/light	10.7 (3.6)	5.5 (1.1)	11.8 (1.3)	2.9 (0.8)	6.9 (1.2)
Moderate	9.2 (1.9)	5.9 (1.8)	9.6 (1.5)	4.4 (0.9)	6.7 (0.8)
Moderate/heavy	25.6 (3.1)	25.3 (2.6)	31.0 (3.8)	16.1 (1.3)	23.6 (1.4)
Heavy	56.4 (2.9)	49.9 (3.7)	57.6 (3.8)	49.4 (2.9)	53.9 (1.9)
Total	23.6 (2.8)	16.6 (0.8)	25.7 (1.5)	10.4 (0.8)	18.2 (1.1)
AUDIT Score of 16-19 (Harmful Drinking)					
Infrequent/light	1.5 (0.9)	1.1 (0.5)	1.7 (0.8)	0.5 (0.3)	1.1 (0.3)
Moderate	0.9 (0.6)	0.3 (0.3)	– (–)	– (–)	0.4 (0.2)
Moderate/heavy	2.9 (0.9)	1.3 (0.5)	1.7 (0.5)	0.9 (0.4)	1.7 (0.4)
Heavy	10.6 (1.1)	12.0 (3.5)	13.2 (1.3)	9.1 (1.7)	11.1 (1.0)
Total	3.8 (0.5)	2.7 (0.3)	4.3 (0.6)	1.3 (0.3)	2.9 (0.2)
AUDIT Score of 20+ (Possible Dependence)					
Infrequent/light	1.1 (0.5)	1.5 (0.9)	3.1 (2.0)	0.2 (0.1)	1.2 (0.4)
Moderate	0.5 (0.3)	0.3 (0.3)	– (–)	0.1 (0.1)	0.3 (0.1)
Moderate/heavy	1.4 (0.4)	1.0 (0.4)	2.9 (1.8)	0.7 (0.4)	1.3 (0.3)
Heavy	13.7 (1.7)	11.9 (3.6)	11.6 (2.2)	6.0 (1.2)	11.6 (1.3)
Total	4.1 (0.6)	2.8 (0.6)	4.2 (0.9)	1.1 (0.2)	2.9 (0.3)
AUDIT Score of 8+					
Infrequent/light	13.3 (3.1)	8.1 (1.2)	16.6 (2.2)	3.7 (1.0)	9.2 (1.1)
Moderate	10.5 (2.2)	6.5 (1.8)	9.8 (1.5)	4.6 (1.0)	7.3 (0.9)
Moderate/heavy	29.9 (4.0)	27.5 (2.5)	35.5 (3.8)	17.7 (1.5)	26.6 (1.7)
Heavy	80.6 (2.1)	73.8 (2.6)	82.4 (2.6)	64.5 (2.5)	76.7 (1.6)
Total	31.4 (3.5)	22.2 (1.1)	34.1 (1.9)	12.8 (1.1)	24.0 (1.5)

Note: Table displays the percentage of military personnel in each Service by past-month drinking-level group who reported alcohol dependence symptoms. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dependence Symptoms, Q42–Q45).

symptoms (17.6%), and hazardous drinking or above (61.5%) were also higher among those who reported drinking at work.

4.6 Reasons for Limiting Drinking

Table 4.13 lists the importance of certain reasons for limiting drinking, by drinking level. Among light drinkers, 75.3% limited drinking because they felt it is bad for one's health, compared with 68.8% of heavy drinkers. Concern about damage to one's military career was an important reason for limiting drinking among light and moderate drinkers (71.0% and 70.9%, respectively), and 66.3% of moderate/heavy and 66.2% of heavy drinkers listed this as an important reason. Holding strong beliefs or values was also a limiting factor for drinking among light drinkers (53.2%), but was less important for moderate drinkers (46.7%), moderate/heavy (37.5%) or heavy drinkers (32.9%). Avoiding legal problems was a strong incentive for all levels of drinkers.

Endorsements for concern about being an alcoholic, the cost of alcohol, and regretting actions were found equally across all drinking levels. Fear of losing control

Table 4.11 **NEGATIVE EFFECTS OF ALCOHOL USE, PAST 12 MONTHS, BY DRINKING AT WORK**

Measure/Drank at Work	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Serious Consequences (1 or More Factors)					
Drank at work	29.4 (3.8)	22.6 (3.0)	32.5 (6.8)	13.4 (4.9)	24.8 (2.1)
Did not drink at work	9.9 (1.0)	6.2 (0.7)	13.8 (1.4)	3.0 (0.3)	7.4 (0.5)
Total	10.8 (1.0)	6.9 (0.8)	14.5 (1.3)	3.3 (0.3)	8.1 (0.5)
Alcohol-Related Productivity Loss (1 or More Factors)					
Drank at work	45.6 (4.9)	43.1 (4.1)	+ (+)	23.8 (5.2)	41.6 (2.7)
Did not drink at work	13.9 (1.1)	12.1 (1.6)	18.7 (1.1)	7.0 (0.6)	12.0 (0.7)
Total	15.4 (1.1)	13.4 (1.7)	19.8 (1.4)	7.4 (0.6)	13.2 (0.7)
Serious Consequences (2 or More Factors)					
Drank at work	19.5 (4.2)	15.0 (4.4)	16.5 (4.2)	9.5 (3.6)	16.0 (2.4)
Did not drink at work	4.7 (0.4)	2.6 (0.4)	5.7 (1.1)	1.6 (0.3)	3.4 (0.3)
Total	5.4 (0.5)	3.1 (0.6)	6.1 (1.1)	1.8 (0.3)	3.8 (0.3)
Alcohol-Related Productivity Loss (2 or More Factors)					
Drank at work	37.3 (3.6)	34.4 (4.1)	+ (+)	15.5 (4.3)	31.5 (2.2)
Did not drink at work	7.8 (0.8)	7.0 (1.2)	11.5 (0.8)	3.6 (0.5)	6.9 (0.5)
Total	9.3 (0.8)	8.2 (1.3)	12.1 (1.0)	3.8 (0.5)	7.8 (0.5)

Note: Table displays the percentage of military personnel in each Service by drank-at-work group who reported negative effects of alcohol use in the past 12 months (serious consequences and alcohol-related productivity loss). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Serious Consequences, Q37 and Q38; Alcohol-Related Productivity Loss, Q36; and Drank at Work Q31).

over one's life was a strong reason for limiting drinking among 49.3% of light drinkers and 45.8% of heavy drinkers.

4.7 Military and Civilian Comparisons

Results of standardized comparisons of heavy alcohol use among military personnel and civilians are presented in Table 4.14. Data for civilians were standardized estimates based on data from the 2004 National Survey on Drug Use and Health (NSDUH). Thus, the standardized civilian estimates presented here may differ from any published NSDUH estimates for 2004 (e.g., OAS [2005]). Data for military personnel are U.S.-based population estimates (including personnel stationed in Alaska and Hawaii) from the 2005 DoD survey. Because the military estimates for Table 4.14 have been subset to U.S.-based personnel aged 18 to 55, they may not match the estimates in earlier tables, which are based on the entire military population.

Findings for military/civilian comparisons of heavy alcohol use are presented in Table 4.14 for males and females separately and by age group (18 to 25, 26 to 55, and all ages). These findings show that the percentage of heavy drinkers generally was significantly higher among U.S.-based military personnel (total DoD) than among civilians (16.1% vs. 12.9%), even after the civilian estimates had been standardized to adjust for sociodemographic differences between the military and civilian populations. As might be expected, because males are about 86% of the military population, military males showed the same pattern of results as the total DoD: a significantly higher rate of drinking in the military (18.1%) than among civilian males (14.3%).

Table 4.12 ALCOHOL USE DISORDERS IDENTIFICATION TEST (AUDIT) SCORE, PAST 12 MONTHS, BY DRINKING AT WORK IN THE PAST 30 DAYS

Measure/Drank at Work	Service: Army	Navy	Marine Corps	Air Force	Total DoD
AUDIT Score of 8-15 (Hazardous Drinking)					
Drank at work	32.4 (3.8)	31.2 (3.8)	47.0 (5.0)	18.2 (5.6)	31.1 (2.2)
Did not drink at work	23.1 (2.9)	16.0 (0.9)	24.9 (1.4)	10.4 (0.8)	17.8 (1.2)
Total	23.6 (2.8)	16.6 (0.8)	25.7 (1.5)	10.4 (0.8)	18.2 (1.1)
AUDIT Score of 16-19 (Harmful Drinking)					
Drank at work	17.7 (2.4)	11.7 (4.1)	10.5 (4.4)	+ (+)	12.8 (2.1)
Did not drink at work	3.1 (0.5)	2.3 (0.2)	4.1 (0.6)	1.3 (0.3)	2.5 (0.2)
Total	3.8 (0.5)	2.7 (0.3)	4.3 (0.6)	1.3 (0.3)	2.9 (0.2)
AUDIT Score of 20+ (Possible Dependence)					
Drank at work	18.1 (3.2)	25.0 (3.8)	14.4 (4.7)	5.7 (2.8)	17.6 (2.1)
Did not drink at work	3.3 (0.5)	1.8 (0.5)	3.8 (0.8)	0.9 (0.2)	2.3 (0.3)
Total	4.1 (0.6)	2.8 (0.6)	4.2 (0.9)	1.1 (0.2)	2.9 (0.3)
AUDIT Score of 8+					
Drank at work	68.2 (3.4)	67.9 (2.7)	71.9 (5.2)	29.2 (3.7)	61.5 (2.2)
Did not drink at work	29.5 (3.4)	20.2 (1.0)	32.8 (1.8)	12.6 (1.1)	22.6 (1.4)
Total	31.4 (3.5)	22.2 (1.1)	34.1 (1.9)	12.8 (1.1)	24.0 (1.5)

Note: Table displays the percentage of military personnel in each Service by drank-at-work group who reported alcohol dependence symptoms. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dependence Symptoms, Q42–Q45; Drank at Work, Q31).

Table 4.13 IMPORTANCE OF CERTAIN REASONS FOR LIMITING DRINKING, BY DRINKING LEVEL

Reason for Limiting Drinking	Drinking Level: Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Drinking bad for health	75.3 (1.1)	79.0 (1.0)	74.2 (1.3)	68.8 (1.2)
Costs too much	59.4 (1.5)	58.3 (1.6)	58.9 (1.4)	65.0 (1.5)
Family/friends get upset	50.9 (1.1)	49.8 (1.2)	47.4 (1.3)	55.2 (1.5)
Might interfere with military career	71.0 (1.1)	70.9 (1.2)	66.3 (1.3)	66.2 (1.7)
Goes against basic values or beliefs	53.2 (1.5)	46.7 (1.3)	37.5 (1.1)	32.9 (1.6)
Afraid of becoming an alcoholic	40.3 (1.4)	40.4 (1.1)	37.3 (1.3)	44.4 (1.4)
Makes me do things I'm sorry for later	42.5 (1.8)	43.2 (1.4)	41.7 (1.4)	51.8 (1.8)
Can make me feel sick	59.1 (1.4)	61.8 (1.2)	57.1 (1.2)	54.1 (1.5)
Drinking can get me in trouble with police	57.3 (1.5)	58.7 (1.2)	55.3 (1.0)	55.1 (1.9)
Leads to losing control over my life	49.3 (1.5)	50.3 (1.2)	43.3 (1.1)	45.8 (1.7)

Note: Table displays the percentage of military personnel in drinking-level group who reported the above-noted reason for limiting drinking was "somewhat important" or "very important." The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Reasons for Limiting Drinking, Q41).

Table 4.14 **STANDARDIZED COMPARISONS OF THE PREVALENCE OF HEAVY ALCOHOL USE[a] AMONG MILITARY PERSONNEL AND CIVILIANS, PAST 30 DAYS, BY GENDER, AGE, AND SERVICE**

Gender/Age Group	Comparison Population					
	Civilian	Total DoD	Army	Navy	Marine Corps	Air Force
Males						
Sample size	*19,387*	*7,908*	*1,488*	*1,935*	*2,106*	*2,379*
18-25	19.7 (0.6)	28.7 (1.6)[b]	36.2 (3.0)[b]	21.1 (1.9)	35.5 (2.1)[b]	18.6 (1.8)
26-55	10.5 (0.5)	10.7 (0.8)	14.5 (1.6)[b]	10.5 (1.1)	13.4 (2.3)	7.7 (1.2)[b]
All ages	14.3 (0.4)	18.1 (1.2)[b]	24.3 (2.7)[b]	13.9 (1.3)	27.5 (1.8)[b]	11.3 (1.5)[b]
Females						
Sample size	*21,762*	*2,784*	*495*	*794*	*443*	*1,052*
18-25	7.2 (0.3)	7.6 (0.8)	8.0 (1.1)	4.7 (1.5)	12.5 (2.6)[b]	7.6 (1.6)
26-55	3.2 (0.3)	3.2 (0.9)	5.3 (2.9)	3.7 (1.8)	5.6 (2.6)	1.8 (0.4)[b]
All ages	5.2 (0.2)	5.4 (0.6)	6.8 (1.6)	4.1 (1.0)	10.6 (2.2)[b]	4.5 (0.7)
Total						
Sample size	*41,149*	*10,692*	*1,983*	*2,729*	*2,549*	*3,431*
18-25	17.4 (0.5)	24.8 (1.5)[b]	31.0 (3.2)[b]	17.7 (1.8)	33.9 (2.1)[b]	15.8 (1.4)
26-55	9.5 (0.4)	9.7 (0.7)	13.3 (1.6)[b]	9.5 (0.9)	13.1 (2.1)	6.7 (1.1)[b]
All ages	12.9 (0.3)	16.1 (1.1)[b]	21.5 (2.6)[b]	12.3 (1.2)	26.4 (1.7)[b]	9.9 (1.3)[b]

Note: Table displays the percentage of military personnel by Service, gender, and age group who were classified as heavy alcohol users in the past 30 days. The standard error of each estimate is presented in parentheses. Sample size by gender and Service are also provided. Civilian data have been standardized to the U.S.-based military data by gender, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). Estimates have not been adjusted for sociodemographic differences among Services.

[a]Defined as consumption of five or more drinks on the same occasion at least once a week in the past 30 days.

[b]Significantly different from civilian estimate at the 95% confidence.

Civilian data source: National Survey on Drug Use and Health, 2004.

Military data source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Heavy Alcohol Use, Past 30 Days, Q18–Q21 and Q23–Q26).

Military females for the total DoD (5.4%) showed rates that were equal to those among civilian females (5.2%).

Most but not all of the patterns of military/civilian differences between the total DoD and civilian populations held for the individual Services. For males of all ages, Army (24.3%) and Marine Corps (27.5%) personnel had significantly higher rates of heavy alcohol use overall than their civilian counterparts (14.3%). Rates of heavy alcohol use among Navy (13.9%) personnel were similar to the rates for civilians when controlling for differences in sociodemographic composition, and Air Force males had significantly lower rates than civilian males. A slightly different pattern emerged among females. Only Marine Corps female personnel (10.6%) had significantly higher rates of heavy alcohol use than did civilian women (5.2%), whereas the Army, Navy, and Air Force female rates were similar to the standardized civilian female population rates.

Differences in military and civilian heavy alcohol use rates were largest for men aged 18 to 25. Among young men, the military rate was nearly one-third higher than the standardized civilian rate (28.7% vs. 19.7%, respectively). For the individual Services, the largest discrepancies between military and standardized civilian estimates were for younger men aged 18 to 25 in the Army (36.2%) and the Marine Corps (35.5%). Rates were very similar for the Navy (21.1%) and Air Force (18.6%) compared with civilian men aged 18 to 25 (19.7%). Among females aged 18 to 25, the Marine Corps (12.5%) had significantly higher rates than did civilian women (7.2%). For women aged 26 to 55, the prevalence rates for the individual Services were comparable to the civilian rates, except for Air Force personnel who were lower than civilians.

4.8 Reasons for Drinking

Table 4.15 lists the importance of certain military-related beliefs about drinking, by drinking level. Among light drinkers, 19.9% reported drinking because it was part of being in the military, compared with 39.2% of heavy drinkers. Heavy drinkers also endorsed strong beliefs that drinking was the only recreation available (29.3%), they had been encouraged to drink at parties (25.1%), and that leadership was tolerant of off-duty intoxication (36.7%). Among light and moderate drinkers, 9.1% and 7.0% reported the belief that drinking was part of being in their unit compared with 18.0% of heavy drinkers. Light and moderate drinkers also had lower rates of endorsing the belief that drinking was the only recreation available (11.1% and 8.6%, respectively).

Table 4.16 provides the importance of certain reasons for drinking, by drinking level. The most important reasons for drinking among heavy drinkers were to celebrate (86.3%), to relax (77.4%), to be sociable (74.7%), to make things more fun (73.1%), and to enjoy a party (68.1%). Nearly three times as many heavy drinkers reported drinking to fit in (22.5%) compared with light drinkers (7.9%) and drinking to feel more confident (31.9% vs. 10.2%). Heavy drinkers were four times as likely as light drinkers to report drinking to forget about problems (40.6% vs. 11.2%) or to cheer up when in a bad mood (44.4% vs. 11.2%). Drinking because of pressure from friends and so that they would not be teased by others were not important reasons for any of the drinking levels.

4.9 Risky Behaviors

Table 4.17 provides estimates of engaging in risky behaviors, by drinking level. Heavy drinkers were nearly twice as likely to report driving a vehicle after having too much to drink (33.2%) compared with moderate/heavy drinkers (18.1%) and nearly five times as likely as light drinkers (7.1%). Heavy drinkers were also more likely to ride in a car driven by someone who had too much to drink (38.3%) compared with moderate/heavy (17.0%), moderate (9.3%), or light drinkers (8.3%). Finally, heavy drinkers were more likely to report operating machinery after having too much to drink (10.4%) than were moderate/heavy drinkers (2.7%), moderate (1.0%), or light (1.2%) drinkers.

4.10 Productivity Loss

Table 4.18 shows estimates of productivity loss by drinking level. Heavy drinkers were more likely to be late for work or leave early from work on 2 or more days (7.6%) compared with binge drinkers (4.3%) and all DoD personnel (2.0%). Heavy drinkers also had a larger percentage indicating that they worked below their

Table 4.15 **MILITARY-RELATED BELIEFS ABOUT DRINKING, BY DRINKING LEVEL**

	Drinking Level			
Beliefs About Drinking	**Infrequent/ Light**	**Moderate**	**Moderate/ Heavy**	**Heavy**
Hard to fit in if not drinking	6.3 (0.8)	4.9 (0.6)	7.3 (0.8)	10.2 (1.0)
Drinking is part of being in my unit	9.1 (1.1)	7.0 (0.9)	11.2 (1.1)	18.0 (1.7)
Drinking is part of being in the military	19.9 (1.2)	21.1 (1.1)	28.9 (1.2)	39.2 (1.7)
Drinking is the only recreation available	11.1 (1.5)	8.6 (1.0)	15.0 (1.3)	29.3 (2.7)
Encouraged to drink at parties/socials	14.3 (1.1)	12.9 (1.0)	15.9 (1.3)	25.1 (1.9)
Nonalcoholic beverages always available at parties	65.4 (1.5)	71.0 (1.2)	70.7 (1.3)	65.6 (1.7)
Leadership is tolerant of off-duty intoxication	18.1 (1.6)	20.0 (1.4)	24.0 (1.1)	36.7 (1.7)

Note: Table displays the percentage of military personnel in each drinking-level group who reported they agreed or strongly agreed with the specified belief about drinking. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Beliefs about Drinking, Q46).

Table 4.16 **IMPORTANCE OF CERTAIN REASONS FOR DRINKING, BY DRINKING LEVEL**

Reason for Drinking	Drinking Level: Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
To celebrate	51.1 (1.7)	63.0 (1.1)	75.9 (1.3)	86.3 (0.9)
To relax	39.1 (1.3)	53.5 (1.3)	67.4 (1.3)	77.4 (1.5)
To be sociable	44.8 (1.2)	59.1 (1.2)	66.7 (1.1)	74.7 (1.4)
To fit in	7.9 (0.9)	8.8 (0.9)	11.1 (0.8)	22.5 (1.1)
To enjoy a party	26.5 (1.4)	36.3 (1.5)	49.1 (1.2)	68.1 (1.1)
Feel more self-confident	10.2 (0.9)	11.0 (1.1)	17.2 (1.0)	31.9 (1.0)
To not feel left out	7.8 (0.8)	7.9 (0.8)	9.1 (0.7)	17.1 (1.0)
Makes things more fun	30.3 (1.8)	40.9 (1.6)	56.0 (1.4)	73.1 (1.2)
To forget about problems	11.2 (1.1)	14.0 (0.9)	20.6 (0.9)	40.6 (1.3)
To cheer up when in bad mood	11.2 (1.2)	15.2 (0.9)	24.3 (0.8)	44.4 (1.0)
Because friends pressure	3.9 (0.7)	3.5 (0.7)	4.9 (0.5)	8.6 (0.8)
So others won't tease about not drinking	2.6 (0.5)	2.3 (0.4)	3.1 (0.4)	5.2 (0.8)

Note: Table displays the percentage of military personnel in each drinking-level group who reported the specified reason for drinking was "somewhat important" or "very important." The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Reasons for Drinking, Q40).

Table 4.17 **RISKY BEHAVIORS, BY DRINKING LEVEL**

Risky Behavior	Drinking Level: Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Drive a car or other vehicle after too much to drink	7.1 (0.7)	8.5 (0.9)	18.1 (1.2)	33.2 (1.9)
Ride in a car driven by someone who had too much to drink	8.3 (0.9)	9.3 (0.7)	17.0 (0.9)	38.3 (1.9)
Drive or ride in boat after too much to drink	1.3 (0.3)	1.6 (0.4)	3.6 (0.6)	10.2 (0.7)
Operate machinery after too much to drink	1.2 (0.3)	1.0 (0.3)	2.7 (0.4)	10.4 (0.7)

Note: Table displays the percentage of military personnel in each drinking-level group who reported engaging in risky behaviors. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Risky Behaviors, Q39).

normal performance level on 2 or more days (13.3%) compared with binge drinkers (8.0%). In general, productivity loss for 2 or more days across all measures was higher among heavy drinkers compared with binge drinkers.

4.11 Deployment

Table 4.19 provides estimates of drinking level in the past 30 days, by deployment recency. There were no differences in drinking status among those who had never been deployed. Among personnel who had deployed in the past 12 months, a larger percentage were more likely to be moderate/heavy drinkers (26.6%) than heavy (22.7%), moderate (17.0%), or light (15.7%) drinkers. Among those deploying more than 36 months ago, 22.5% reported light drinking, and 21.7% reported moderate drinking; 22.2% were moderate/heavy drinkers, and 8.7% were heavy drinkers. Heavy drinking was lowest among military personnel who last deployed more than 3 years ago and highest among those who deployed in the past year.

Table 4.18 ALCOHOL USE AND ALCOHOL-RELATED PRODUCTIVITY LOSS, PAST 12 MONTHS, TOTAL DOD

Group/Problem	*N*	Number of Work Days Affected, Past 12 Months: No Days	1 Day	2 or More Days
All Personnel[a]	*16,146*			
Hurt in an on-the-job accident		99.5 (0.1)	0.3 (0.1)	0.2 (0.1)
Late for work or left work early		94.3 (0.3)	3.6 (0.2)	2.0 (0.2)
Did not come into work because of hangover, illness, or injury		98.4 (0.2)	1.2 (0.2)	0.5 (0.1)
Worked below normal performance level		90.9 (0.5)	5.4 (0.3)	3.7 (0.3)
Drunk while working		96.5 (0.3)	1.7 (0.1)	1.8 (0.2)
Called in and reported to work feeling drunk		97.1 (0.3)	2.1 (0.2)	0.8 (0.1)
Heavy Drinkers[b]	*2,307*			
Hurt in an on-the-job accident		98.6 (0.4)	0.6 (0.2)	0.8 (0.3)
Late for work or left work early		83.2 (1.1)	9.2 (0.7)	7.6 (0.8)
Did not come into work because of hangover, illness, or injury		94.9 (0.6)	3.2 (0.5)	1.9 (0.5)
Worked below normal performance level		75.8 (1.0)	10.9 (0.7)	13.3 (1.1)
Drunk while working		88.0 (1.3)	5.4 (0.7)	6.6 (1.0)
Called in and reported to work feeling drunk		89.5 (1.1)	7.1 (0.9)	3.4 (0.5)
Binge Drinkers[c]	*6,030*			
Hurt in an on-the-job accident		99.1 (0.2)	0.5 (0.1)	0.4 (0.1)
Late for work or left work early		88.7 (0.6)	7.0 (0.5)	4.3 (0.4)
Did not come into work because of hangover, illness, or injury		96.7 (0.4)	2.3 (0.3)	1.0 (0.2)
Worked below normal performance level		82.0 (0.8)	10.0 (0.5)	8.0 (0.6)
Drunk while working		92.8 (0.5)	3.5 (0.3)	3.7 (0.4)
Called in and reported to work feeling drunk		93.9 (0.5)	4.4 (0.4)	1.8 (0.3)

Note: Table displays the percentage of military personnel in the three groups of interest (all personnel, heavy drinkers, and binge drinkers) that reported the specified problem (e.g., late for work or left work early) affected no days, 1 day, or 2 or more days of work in the past 12 months. Sample sizes by group are also provided. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Individuals with productivity loss missing are not included in these estimates.

[b]Defined as consumption of five or more drinks on the same occasion at least once a week in the past 30 days.

[c]Defined as having consumed five or more drinks on the same occasion at least once during the past 30 days.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol-related Productivity Loss, Q36).

Table 4.19 DRINKING LEVEL IN PAST 30 DAYS, BY DEPLOYMENT RECENCY

Deployment Status	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Never been deployed	18.4 (0.9)	15.8 (0.9)	20.5 (1.0)	19.0 (1.9)
Last deployed in past 12 months	15.7 (1.0)	17.0 (0.8)	26.6 (1.3)	22.7 (1.3)
Last deployed 12 to 36 months ago	19.0 (0.7)	20.1 (1.1)	24.7 (1.4)	17.0 (1.2)
Last deployed more than 36 months ago	22.5 (1.4)	21.7 (1.2)	22.2 (1.3)	8.7 (1.3)

Note: Table displays the percentage of military personnel in each deployment recency group who were considered infrequent/light drinkers, moderate drinkers, moderate/heavy drinkers, and heavy drinkers in the past 30 days. The standard error of each estimate is presented in parentheses.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Drinking Level, Q18–Q21; Deployment Recency, Q146).

4.12 Summary

4.12.1 Trends in Alcohol Use

In 1998, the average amount of alcohol consumed daily and the proportion of military personnel who were heavy drinkers were close to the lowest since the survey series began. However, findings from the 2005 DoD survey indicate a continuing pattern of increases in average alcohol consumption and the prevalence of heavy alcohol use relative to 1998, although not all of these increases were statistically significant (Tables 4.1 and 4.2):

- The unadjusted average daily amount of alcohol (ethanol) consumed by total DoD personnel decreased significantly from 1.48 ounces in 1980 to 0.79 ounce in 1998, but increased in 2002 to 1.08 ounces per day, and in 2005 to 1.43 ounces per day. Each individual Service also showed an increasing pattern from 2002 to 2005, with the change being statistically significant for the Army (1.11 to 1.93 ounces per day) and for total DoD (1.08 to 1.43 ounces per day).
- Unadjusted rates of heavy alcohol use showed significant declines between 1980 and 1998, with significant increases in 2002 among total DoD personnel and Navy personnel. From 2002 to 2005, the Army showed a large but nonsignificant increase in heavy drinking from 18.8% to 24.5% (a 30% change). This large difference was consistent with the significant increase in ounces of ethanol for the Army and may signal an increasing pattern of heavy alcohol use in the Army. Indeed, the increase in heavy alcohol use in the Army from 1998 (17.2%) to 2005 (24.5%) was statistically significant and is an issue of concern. None of the Services or the DoD showed a significant change from 2002 to 2005.
- Adjusted estimates showed no significant decline in the rates of heavy alcohol use between 1980 and 2005 among total DoD personnel or for the Marine Corps or Air Force. This suggests that sociodemographic changes in the military between 1980 and 2005 have partially accounted for reductions observed in the unadjusted estimates and may indicate that the military's programmatic efforts have not had much effect on reducing heavy alcohol use among its Services. However, heavy alcohol use in the Army showed a significant increase between 1980 and 2005, whereas rates in the Navy decreased across the same period.

4.12.2 Service Comparisons of Alcohol Use

Observed differences in ethanol use and heavy alcohol use among the four Services may be partially accounted for by differences in the sociodemographic composition of the Services (Table 4.3):

- Comparisons of unadjusted estimates showed that average daily ethanol consumption in 2005 was significantly lower among Air Force personnel than among members of the Army, the Marine Corps, and the Navy.
- Unadjusted rates of heavy alcohol use were significantly lower among Air Force personnel than among personnel from the Army, the Marine Corps, or the Navy, and Navy rates were lower than those for the Army and Marine Corps. About one in four Marines (25.4%) and Army soldiers (24.5%) drank heavily in the 30 days before the 2005 survey; such a high prevalence of heavy alcohol use may be cause for concern about military readiness.
- After standardizing for sociodemographic differences among the Services, the adjusted rates of average ethanol use for all the Services except the Marine Corps showed the same pattern as was seen in comparisons of unadjusted rates. But the adjusted Marine Corps estimate of average ethanol consumption was substantially lower than the original unadjusted estimate and similar to rates for the Navy. This suggests that the difference between the Marine Corps' level of consumption and that of the other Services is partially accounted for by differences in sociodemographic composition.
- The pattern of differences between unadjusted rates of heavy alcohol use among the Services persisted when the rates were adjusted, except for the Marine Corps, whose adjusted rate was much lower than its unadjusted rate and similar to the rates for the Navy.

4.12.3 Correlates of Heavy Alcohol Use

Surveys of military and civilian populations have established certain enduring patterns in alcohol use among sociodemographic groups that are useful in targeting prevention and treatment efforts. Logistic regression analyses showed that Service, gender, race/ethnicity, education, family status, and pay grade were significantly related to heavy alcohol use. Specifically, the odds of heavy alcohol use were

significantly greater among the following groups (Table 4.4):

- Army and Marine Corps personnel compared with Air Force personnel
- Males compared with females
- Those with a high school education or less compared with those with a college education
- Those who were single or married with spouse absent compared with those who were married with spouse present
- Those in pay grades E1 to E3 through O1 to O3 compared with those in pay grades O4 to O10

The odds of heavy drinking were lower among the following groups:

- African American non-Hispanics and "other" race/ethnic groups compared with white non-Hispanics
- Those stationed within the continental United States (CONUS) compared with those stationed outside the continental United States (OCONUS)

4.12.4 Binge Drinking

Binge-drinking questions (consuming five or more drinks on the same occasion at least once during the past 30 days) were included in the 2005 survey. Responses indicated that binge-drinking rates are high among military personnel (44.5%) and that, for most military personnel, binge drinking is a social occasion (Tables 4.5 and 4.6). The following specific findings were noted:

- Binge drinking was highest in the Marine Corps (53.2%) and Army (52.8%), followed by the Navy (41.7%) and Air Force (33.9%).
- Males had a higher prevalence of binge drinking (48.0%) than did females (24.5%).
- For males, most binge-drinking occasions were with small groups (73.7%), followed by binge drinking with dates (19.2%) and alone (7.0%).
- For females, most occasions of binge drinking also occurred with small groups of individuals (71.0%), followed by being with a date (22.8%) or alone (6.2%).
- Personnel aged 18 to 25 had a higher prevalence of binge-drinking occasions than did personnel aged 26 to 55 (56.4% vs. 34.1%).
- Military women most often engaged in binge drinking at a bar (46.7%), whereas military men most often engaged in binge drinking at home (36.9%). Binge drinking at someone else's home was lowest for both males and females (20.5%; 20.9%).
- Personnel aged 18 to 25 most often engaged in binge drinking at a bar (38.1%), whereas personnel aged 26 to 55 most often engaged in binge drinking at home (41.9%).
- At home or in a bar were the most typical locations for binge drinking for all Services.

4.12.5 Negative Effects of Alcohol Use

The survey measured negative effects of alcohol use in terms of any serious consequences, productivity loss, and dependence symptoms (Table 3.1, Tables 4.7 to 4.12, Figure 4.1, and Tables D.1 to D.4):

- Alcohol-related negative effects declined significantly from 1980 to 1998, rose in 2002, and decreased again in 2005. In 2005, 8.1% of all military personnel experienced at least one alcohol-related serious consequence, 13.2% had some alcohol-related productivity loss, and 2.9% showed probable alcohol dependence (see Table 3.1).
- Alcohol-related serious consequences, productivity loss, and dependence symptoms were substantially higher among the E1 to E3 pay grades than among other pay grades (Table 4.7).
- Negative effects of alcohol use were experienced by heavy drinkers at rates three to six times (productivity loss) to two to six times (dependence symptoms) as high as military personnel who drank at only moderate or lighter levels (Table 4.9).
- Hazardous drinking was reported at rates from two to nearly eight times as high for heavy drinkers as for those who drank at lighter levels (Table 4.10).

4.12.6 Reasons for Limiting Drinking

Ratings of reasons to limit drinking revealed the following (Table 4.13):

- For all levels of drinking, the most important reasons for limiting drinking were that (1) drinking is bad for

one's health, (2) drinking can interfere with one's military career, and (3) drinking can cost too much (Table 4.13).

- A higher percentage of light drinkers listed losing control of one's life and holding strong values and beliefs as reasons for limiting drinking.

4.12.7 Military and Civilian Comparisons

Civilian data from the 2004 NSDUH were standardized to the distribution of the U.S.-based military on gender, age, education, race/ethnicity, and marital status, and adjusted rates were computed for civilians. Heavy alcohol use was then compared for the military and adjusted civilian rates of heavy use (Table 4.14):

- Military personnel overall were significantly more likely to drink heavily than were their civilian counterparts (16.1% vs.12.9%). However, these differences varied by age group. Military personnel aged 18 to 25 showed significantly higher rates of heavy drinking (24.8%) than did civilians (17.4%), whereas personnel aged 26 to 55 (9.7%) showed rates of heavy drinking similar to those of their civilian counterparts (9.5%).
- Differences in military and civilian heavy alcohol use rates were greatest for young men aged 18 to 25. Among young men, the rate of heavy alcohol use for the military was about one-third higher than the rate for civilians (28.7% vs. 19.7%).
- The individual Services showed the same pattern as total DoD, with rates of heavy alcohol use among 18 to 25 year olds being higher than those among civilians of the same age and rates of use among 26 to 55 year olds being similar. (Older Army personnel, however, also showed heavier use than did civilians, and Air Force personnel showed lower rates than civilians.)

4.12.8 Reasons for Drinking, Risky Behaviors, and Deployment

Beliefs about drinking, the importance of reasons for drinking, risk behaviors, and the relationship of deployment to drinking levels showed the following findings (Tables 4.15 to 4.17, 4.19):

- Heavy drinkers strongly endorsed the belief that drinking is part of being in the military, that drinking is the only recreation available, and that leadership is tolerant of off-duty intoxication.
- Light and moderate drinkers had the lowest rates of endorsing drinking to fit in and they believe that drinking is part of being in their unit.
- Heavy drinkers reported celebrating and relaxing as important reasons to drink. Heavy drinkers also saw being sociable and having fun as important reasons to drink and were less likely to drink to fit in or to keep from feeling left out.
- Light and moderate drinkers had low rates of drinking to fit in or to keep from feeling left out. These groups also listed celebrating and being sociable as important reasons for drinking but found them to be less important than did heavier drinking groups.
- Heavy drinkers reported high rates of driving after drinking too much and riding with a drinking driver.
- Heavy drinking was lowest among personnel who last deployed more than 3 years ago and highest among those deployed in the last year.

Chapter 5: Illicit Drug Use

In this chapter, illicit drug use among military personnel is examined, including trends in use; Service comparisons of illicit drug use; prevalence of the use of specific drugs and classes of drugs; correlates of illicit drug use; the relationship of illicit drug use to productivity loss; and the relationship of drug use to drug-testing history, predictability of last drug test, and the possible absence of testing. Findings for drug use are also compared with those for the civilian population. Supplemental tables on drug use, including trends and sociodemographic characteristics associated with illicit drug use, are included for each Service in Appendix D (Tables D.1 through D.4, D.12).

As described in Section 2.5.3 of this report, illicit drug use is defined as nonmedical use of any of nine categories of drugs: marijuana/hashish; hallucinogens (LSD, PCP, ecstasy); cocaine (including crack); amphetamines, methamphetamines, or other stimulants; tranquilizers or other depressants; barbiturates or other sedatives/hypnotics; heroin or other opiates; analgesics or other narcotics; and inhalants. Nonmedical use is any use of these drugs either without a doctor's prescription, in greater amounts or more often than prescribed, or for any reasons other than as prescribed, such as for the feelings they caused. Not included in the measure of illicit drug use are anabolic steroids and sexual enhancers.

5.1 Trends in Illicit Drug Use

Table 5.1 presents trends in any illicit drug use between 1980 and 2002 for the total Department of Defense (DoD) and each of the Services during the 30 days and 12 months prior to each survey's administration. Because the patterns for use in the past 30 days and past 12 months are similar, except that 12-month data were correspondingly higher, the discussion focuses on past 30-day drug use. Because of changes in question wording for measures of illicit drug use in 2005, the 2005 estimates are not included in the trend. As shown in Table 5.1, illicit drug use for the total DoD during the past 30 days declined steeply from a high of 27.6% in 1980 to a low of 2.7% in 1998, and increased slightly to 3.4% in 2002. The estimate of past-30-day use of illicit drug use was 5.0% in 2005. The increase between 1998 and 2002 was not statistically significant. The overall decline represents a striking decrease of 90.2% over the 18-year period between 1980 and 1998 and an 87.7% decrease between 1980 and 2002. Figure 3.1 in Chapter 3 displays this trend as a steep initial decline during the first four surveys from 1980 to 1988, then successively smaller declines until the curve flattens out. Significant decreases in drug use were found in each survey year from 1980 to 1992, and drug use continued to decline in 1995 and 1998 although the decreases were not significant. The prevalence of use in 2002 was the same as in 1992. The prevalence in 2005 was similar to that in 1988, although the data in 2005 may not be directly comparable to data from prior survey years. The long-term overall decline in drug use reflects the effectiveness of military efforts to reduce drug use among personnel, but recent increases suggest a cause for concern.

Similar to the trend for the total DoD, each Service also had a large and significant decline in 30-day drug use across the time period between 1980 and 2002, as shown in Table 5.1. However, not all changes between survey years were statistically significant. The Army and Air Force had significant declines in illicit drug use for most survey years from 1980 through 1992, then leveled off around 4.5% and 1.0%, respectively, between 1995 and 2002. Illicit drug use decreased among Navy personnel through 1998, to a low of 1.8%, but increased in 2002 to 3.7%. bringing it back to 1992 levels. The Marine Corps saw the largest decline of all the Services in 1985, although its rate declined more gradually to 3.8% in 2002. In 2005, past month illicit drug use was 5.0% among total DoD personnel and 6.9% among Army, 4.6% among Navy, 6.2% among Marine Corps, and 2.8% among Air Force personnel.

Notably, the Navy was the only Service that had a significant change in past-30-day drug use between 1998 and 2002 (an increase from 1.8% to 3.7%). Rates of use

Table 5.1 **TRENDS IN ANY ILLICIT DRUG USE, PAST 30 DAYS AND PAST 12 MONTHS, BY SERVICE, 1980-2002**

	Year of Survey								
Service/Period of Use	**1980**	**1982**	**1985**	**1988**	**1992**	**1995**	**1998**	**2002**	**2005**
Army									
Past 30 days	30.7 (2.8)	26.2 (1.8)	11.5 (1.3)[a]	6.9 (0.7)[a]	3.9 (0.8)[a]	4.0 (0.9)	4.5 (0.8)	4.8 (0.9)*	
Past 30 days									6.9 (0.5)[b]
Past 12 months	39.4 (2.9)	32.4 (1.8)[a]	16.6 (1.3)[a]	11.8 (1.1)[a]	7.7 (0.8)[a]	9.2 (1.1)	9.8 (0.9)	10.4 (1.7)*	
Past 12 months									15.1 (0.7)[b]
Navy									
Past 30 days	33.7 (2.1)	16.2 (2.2)[a]	10.3 (1.7)[a]	5.4 (0.7)[a]	4.0 (0.9)	3.6 (0.6)	1.8 (0.3)[a]	3.7 (0.3)[a,*]	
Past 30 days									4.6 (1.2)[b]
Past 12 months	43.2 (2.1)	28.1 (1.7)[a]	15.9 (2.3)[a]	11.3 (2.1)	6.6 (1.9)	7.3 (0.8)	4.2 (0.5)[a]	7.1 (0.3)[a,*]	
Past 12 months									10.1 (1.9)[b]
Marine Corps									
Past 30 days	37.7 (3.0)	20.6 (2.0)[a]	9.9 (3.2)[a]	4.0 (0.7)	5.6 (1.0)	3.6 (0.8)	3.3 (0.4)	3.8 (0.5)*	
Past 30 days									6.2 (1.1)[b]
Past 12 months	48.0 (3.1)	29.9 (3.2)[a]	14.7 (3.8)[a]	7.8 (1.0)	10.7 (1.3)	7.3 (1.2)	7.2 (0.8)	7.9 (1.3)*	
Past 12 months									12.6 (1.5)[b]
Air Force									
Past 30 days	14.5 (1.1)	11.9 (1.5)	4.5 (0.8)[a]	2.1 (0.4)[a]	1.2 (0.2)[a]	1.0 (0.2)	1.2 (0.1)	1.0 (0.2)*	
Past 30 days									2.8 (0.4)[b]
Past 12 months	23.4 (1.7)	16.4 (1.8)[a]	7.2 (0.9)[a]	3.8 (0.6)[a]	2.3 (0.3)[a]	2.5 (0.4)	2.4 (0.2)	1.8 (0.3)[a,*]	
Past 12 months									6.1 (0.7)[b]
Total DoD									
Past 30 days	27.6 (1.5)	19.0 (1.0)[a]	8.9 (0.8)[a]	4.8 (0.3)[a]	3.4 (0.4)[a]	3.0 (0.3)	2.7 (0.3)	3.4 (0.4)*	
Past 30 days									5.0 (0.4)[b]
Past 12 months	36.7 (1.5)	26.6 (1.0)[a]	13.4 (1.0)[a]	8.9 (0.8)[a]	6.2 (0.6)[a]	6.5 (0.5)	6.0 (0.4)	6.9 (0.7)*	
Past 12 months									10.9 (0.7)[b]

Note: Table displays the percentage of military personnel by survey year and Service who were classified as any illicit drug users in the past 30 days and past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of illicit drug use are given in Section 2.5.3.

*Comparisons between 1980 and 2002 are statistically significant at the 95% confidence level.

[a]Estimates between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68, Q69, and Q70).

were consistently lowest among Air Force personnel in each of the survey years.

In Chapter 2 (see Table 2.4), it was noted that the sociodemographic characteristics of Marine Corps personnel may place them at higher risk of illicit drug use (i.e., they have a higher proportion than the other Services of young personnel, single males, E1 to E3 pay grades, and those with a high school education or less). Interestingly, despite these demographics, Marine Corps drug use rates were not consistently higher than those for the other Services. They were highest only in 1980, the baseline year for the survey series, and in 1992. Even for these two surveys, however, statistical tests show that Marine Corps rates were not statistically different from the other Services except the Air Force. Thus, despite the Marine Corps' potential for higher use, it has been able to contain drug use to comparable levels with the Army and Navy generally and the Army in 1998. For most years, the highest rates of 30-day illicit drug use were found among Army personnel.

Findings were similar for illicit drug use in the past 12 months: rates of use for the total DoD decreased from 36.7% to 6.9% over the 22-year period from 1980 to 2002 and the rate was 10.9% in 2005. The total DoD and each of the Services showed a significant decrease in past 12 months illicit drug use between 1980 and 2002. In 2005, past year illicit drug use was 15.1% among Army, 10.1% among Navy, 12.6% among Marine Corps, and 6.1% among Air Force personnel.

Possible reasons for the rates of illicit drug use observed in 2005 are discussed in Section 5.3.

5.2 Service Comparisons of Illicit Drug Use

In this section, two sets of estimates of the extent of drug use for each of the Services are provided. Actual or unadjusted estimates are presented first, followed by adjusted estimates. Unadjusted estimates, which indicate observed past-year prevalence rates in 2005, provide a perspective on the comparative magnitude of the challenge facing the Services in their efforts to eradicate drug use. As discussed in Section 2.6, one possible explanation for observed differences in drug use across the Services is variations in the sociodemographic composition of the Services. Thus, adjusted estimates using direct standardization procedures to control for these differences are also provided. These adjusted or constructed estimates permit comparisons among the Services, after controlling for differences in the sociodemographic composition of the Services.

Both unadjusted and adjusted estimates of past-12-month drug use prevalence for the total DoD and individual Services in 2005 are shown in Table 5.2. Because marijuana has been the most commonly used drug, data are presented separately for marijuana use, any illicit drug use except marijuana, and any illicit drug use.

5.2.1 Unadjusted Estimates

As shown in Table 5.2, the Army had the highest unadjusted past-30-day rate of any illicit drug use (6.9%), any illicit drug use except marijuana (6.0%), and marijuana use (1.7%) among the Services in 2005; these rates were significantly higher than those of the Air Force (2.8%, 2.7%, and 0.5%, respectively). Rates were lowest among Air Force personnel for each of the three measures. The Army had similar rates of any illicit drug use and marijuana use to rates among Navy personnel.

The Air Force had significantly lower unadjusted past-30-day rates compared with those for the Army on each measure of drug use and lower than the Marine Corps on any illicit drug use and any illicit drug use except marijuana. These findings show the relative challenges that the Services face in combating illicit drug use. The Army, Navy, and Marine Corps face the greatest challenges, whereas the Air Force faces the smallest challenge.

5.2.2 Adjusted Estimates

The unadjusted results present prevalence estimates but do not examine any underlying explanations for Service differences in rates of illicit drug use. Adjusting for differences in sociodemographic compositions of the

Table 5.2 **ESTIMATES OF ILLICIT DRUG USE, PAST 30 DAYS, UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC DIFFERENCES, BY SERVICE**

	Service				
Drug/Type of Estimate	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Marijuana					
Unadjusted	1.7 (0.3)[a]	1.6 (0.6)	1.6 (0.7)	0.5 (0.1)[b]	1.3 (0.2)
Adjusted[c]	1.6 (0.3)[a]	1.7 (0.6)	1.3 (0.5)	0.6 (0.3)[b]	1.3 (0.2)
Any Illicit Drug Except Marijuana[d]					
Unadjusted	6.0 (0.5)[a,e]	4.0 (0.8)[b]	5.5 (0.8)[a]	2.7 (0.4)[b,f]	4.4 (0.3)
Adjusted[c]	6.0 (0.6)[a]	4.3 (1.0)	4.7 (0.6)[a]	2.9 (0.2)[b,f]	4.5 (0.3)
Any Illicit Drug[g]					
Unadjusted	6.9 (0.5)[a]	4.6 (1.2)	6.2 (1.1)[a]	2.8 (0.4)[b,f]	5.0 (0.4)
Adjusted[c]	6.8 (0.6)[a]	5.0 (1.4)	5.1 (0.7)[a]	3.1 (0.3)[b,f]	5.0 (0.4)

Note: Table displays the percentage of military personnel by Service who used marijuana, any illicit drug except marijuana, and any illicit drug (including marijuana) in the past 30 days. The standard error of each estimate is presented in parentheses. Pairwise significance tests were done between all possible service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps). Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimate is significantly different from the Air Force at the 95% confidence level.

[b]Estimate is significantly different from the Army at the 95% confidence level.

[c]Adjusted estimates have been standardized by gender, age, education, race/ethnicity, and marital status to the total DoD distribution.

[d]Any nonmedical use of cocaine (including crack), hallucinogens (PCP/LSD), amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants.

[e]Estimate is significantly different from the Navy at the 95% confidence level.

[f]Estimate is significantly different from the Marine Corps at the 95% confidence level.

[g]Any nonmedical use of marijuana, cocaine (including crack), hallucinogens, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Marijuana, Q68A, Q69A, and Q70A; Any Illicit Drug Use Except Marijuana, Q68B-K, Q69B-K, and Q70B-K; Any Illicit Drug Use, Q68A-K, Q69A-K, and Q70A-K).

Services may explain some of the discrepancies. As shown in Table 5.2, adjusting for sociodemographic differences among the Services resulted in small changes in drug use measures for the Army, Navy, and Air Force. The adjustments had the largest impact on the Marines, with the estimates for use of any illicit drug decreasing from 6.2% to 5.1%. Adjusted estimates show that the Marine Corps' rates were significantly higher than the adjusted rates for the Air Force on all three measures and were similar to the other two Services. Thus, the levels of unadjusted rates of illicit drug use in the Marine Corps can be explained in part by the sociodemographic composition of that Service. The Air Force still had significantly lower adjusted rates of use compared with the rates for the Army and Marine Corps for all classes of drugs shown in Table 5.2, even when controlled for sociodemographic characteristics.

Although standardization reduced the estimates of illicit drug use for the Marine Corps, that branch of the Service faces a greater challenge than the others because it has a higher proportion of personnel at high risk for using drugs. The data also suggest that the low rates in the Air Force are a function of both sociodemographic factors and other factors because the Air Force's rates of illicit drug use were lower than rates for the other Services both before and after standardization.

Overall, these findings suggest that differences among the Services in sociodemographic composition remain viable as a partial explanation for some differences observed in drug use. Clearly, this explanation does not account for all observed differences in drug use among the Services. The standardizations conducted here controlled for Service differences in gender, age,

education, race/ethnicity, and marital status, but they may not have controlled for all important differentiating factors. Alternative explanations accounting for observed differences are that the Services may vary in policies and practices associated with controlling drug use or that personnel across the Services have different attitudes and values regarding drug use.

5.3 Prevalence of Specific Drug Use

As overall drug use declined since 1980, stabilized during the 1990s but increased in recent years, so has use of most of the individual drugs or types of drugs considered in this survey. Table 5.3 presents the percentage of use of 11 specific drugs or drug classes during the 30 days before the survey for each Service and the total DoD in 2005; comparable data for the 12 months before the survey are presented in Table 5.4. Four summary measures also are included: use of any illicit drug, use of any illicit drug except marijuana, use of any illicit drug except analgesics, and use of any illicit drug except analgesics and marijuana. These measures are based on use of 9 of the 11 classes of drugs, excluding steroids and sexual enhancers. Questions on use of sexual enhancers were added for the first time in 2005. The rates presented in these two tables have not been adjusted for sociodemographic differences among the Services or between years.

As shown in Table 5.3, use of all specific drugs in the past month in 2005 was quite low. Marijuana has historically been the most commonly used drug; in 2002, 1.7% of total DoD personnel reported marijuana use in the past month, a higher percentage than for other drugs. In 2005, however, analgesics were the most commonly used drug at 3.3%, followed by marijuana at 1.3%. Past 30-day use of each of the individual drugs other than marijuana was 1.0% or less for the total DoD in 2002; in 2005, past-30-day use for each of the individual drugs other than analgesics was 1.3% or less. In 2005, the first year such questions were included in the survey, 1.4% of the total DoD reported having used sexual enhancers in the past 30 days. In 2005, use of all specific drugs was lower among Air Force personnel than personnel of other Services and similar among the three other Services.

Initial investigations of the 2005 data showed that use of any illicit drug and any illicit drug except marijuana increased between 2002 and 2005 for the total DoD and each of the Services except for the Navy, for which these rates were stable. In addition, large increases in the use of analgesics between 2002 and 2005 were observed. For these reasons, summary measures of any illicit drug use and any illicit drug use except marijuana are presented in Table 5.3, excluding the use of analgesics. As shown, rates of any illicit drug use and any use except marijuana were substantially lower when analgesics were excluded. Although analgesics increased in the total DoD between 2002 and 2005, the higher rates for analgesics in 2005 may be more consistent with findings from other surveys, such as the National Survey on Drug Use and Health (NSDUH), that find that use of this class of drugs (referred to as pain relievers in NSDUH) is generally higher than the use of other prescription-type drugs such as stimulants, tranquilizers, and sedatives (OAS, 2005).

Additional investigations of the increase in illicit drug use were performed, concentrating on the increase in analgesics (not presented here). For the total DoD, past-month analgesics use increased from 1.0% to 3.3% for the total DoD. Similar increases were found among almost all sociodemographic groups: both genders, all racial/ethnic groups, higher and lower educational groups, all age groups, all family statuses, all enlisted pay grades, personnel stationed in CONUS and OCONUS, persons who had not been deployed, and personnel with varying stress levels. No differences in past-month analgesics use between 2002 and 2005 were found among officers or among persons who had been deployed, and use was not disproportionately concentrated in any specific sociodemographic group. As with other types of drugs, use was higher among lower educational groups, younger persons, persons who were not married or married with spouse not present, and lower pay grades; however, use was similar among males and females and race/ethnic groups. Findings among sociodemographic groups were similar for past-12-month analgesics use, except that increases were also found among persons who had been deployed. Thus, there do not appear to be any simple explanations for the

Table 5.3 **ILLICIT DRUG USE IN THE PAST 30 DAYS, BY DRUG AND SERVICE, 2005**

Drug	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Marijuana	1.7	(0.3)	1.6	(0.6)	1.6	(0.7)	0.5	(0.1)	1.3	(0.2)
Cocaine (including crack)	0.8	(0.2)	0.9	(0.4)	0.7	(0.5)	0.2	(0.1)	0.6	(0.1)
Hallucinogens (PCP, LSD)	1.0	(0.3)	1.0	(0.3)	0.8	(0.3)	0.2	(0.1)	0.8	(0.1)
Amphetamines/stimulants	0.7	(0.2)	0.7	(0.3)	0.9	(0.3)	0.3	(0.1)	0.6	(0.1)
Tranquilizers/depressants	1.2	(0.2)	1.0	(0.3)	1.0	(0.3)	0.4	(0.1)	0.9	(0.1)
Barbiturates/sedatives	1.1	(0.2)	0.9	(0.3)	1.3	(0.3)	0.7	(0.2)	1.0	(0.1)
Heroin/other opiates	0.6	(0.1)	0.6	(0.2)	0.6	(0.3)	0.2	(0.1)	0.5	(0.1)
Analgesics/other narcotics	4.4	(0.5)	2.8	(0.5)	3.9	(0.7)	2.2	(0.4)	3.3	(0.3)
Inhalants	1.2	(0.3)	0.8	(0.2)	1.4	(0.4)	0.5	(0.1)	0.9	(0.1)
Any illicit drug[a]	6.9	(0.5)	4.6	(1.2)	6.2	(1.1)	2.8	(0.4)	5.0	(0.4)
Any illicit drug except marijuana[b]	6.0	(0.5)	4.0	(0.8)	5.5	(0.8)	2.7	(0.4)	4.4	(0.3)
Any illicit drug except analgesics	4.0	(0.5)	2.9	(1.0)	4.0	(0.7)	1.3	(0.2)	3.0	(0.3)
Any illicit drug except analgesics and marijuana	3.0	(0.4)	2.3	(0.7)	3.3	(0.6)	1.1	(0.2)	2.3	(0.2)
Steroids	1.0	(0.2)	0.8	(0.2)	1.1	(0.4)	0.2	(0.1)	0.7	(0.1)
Sexual enhancers	1.6	(0.3)	1.7	(0.3)	1.2	(0.2)	0.9	(0.1)	1.4	(0.1)

Note: Table displays the percentage of military personnel by Service who used the drug indicated in the past month. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

[a]Any illicit drug use is defined as one or more times of any of the above classes of drugs.

[b]Any illicit drug use except marijuana is defined as one or more times of any of the above classes of drugs, excluding marijuana.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2002 to 2005 (2005 Questions: Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68, Q69, and Q70).

increase in analgesics use, which is driving much of the increase in any illicit drug use. Further, significant increases between 2002 and 2005 were found for past-year barbiturate/sedative use for most sociodemographic groups; increases were also found for past-month barbiturate/sedative use for most groups, not all of which were significant.

One additional explanation for the increase in the use of analgesics and barbiturates/sedatives between 2002 and 2005 may be changes in question wording in 2005. In 2005, the descriptor "prescription pain relievers" was added to the analgesics item and "prescription sleeping pills" to the barbiturates/sedatives item. Respondents may have answered these questions regarding their legitimate prescription use of these drugs rather than their nonmedical use of these drugs. Thus, some changes in question wording may have changed respondents' interpretation of the items.

Because of the possibility that wording changes for illicit drug use questions in 2005 were associated with changes in responses, the data for 2005 are presented separately in this report and not included in the trend line over the survey series.

5.4 Correlates of Illicit Drug Use

In addition to examining overall prevalence rates, the analysis assessed the sociodemographic correlates of illicit drug use. Two types of analysis were conducted to examine any illicit drug use during the past 12 months and past 30 days: descriptive prevalence analysis and multivariate logistic regression analysis (described in Chapter 2 and Appendix F). Results of both are presented in Table 5.5 for illicit drug use in the past 12 months and Table 5.6 for illicit drug use in the past 30 days. Column 2 of each table presents prevalence data for the sociodemographic groups, and column 3 shows the odds ratios from the logistic regression. Because of

Table 5.4 **ILLICIT DRUG USE IN THE PAST 12 MONTHS, BY DRUG AND SERVICE, 2005**

Drug	Service: Army		Navy		Marine Corps		Air Force		Total DoD	
Marijuana	7.1	(0.7)	3.5	(1.3)	4.7	(1.0)	1.4	(0.3)	4.2	(0.5)
Cocaine (including crack)	3.2	(0.3)	1.6	(0.6)	2.6	(0.8)	0.4	(0.2)	1.9	(0.2)
Hallucinogens (PCP, LSD)	3.4	(0.4)	1.6	(0.5)	1.8	(0.5)	0.5	(0.2)	1.9	(0.2)
Amphetamines/stimulants	2.0	(0.3)	1.2	(0.4)	2.1	(0.6)	0.5	(0.2)	1.4	(0.2)
Tranquilizers/depressants	3.1	(0.3)	1.7	(0.4)	2.7	(0.5)	0.8	(0.1)	2.0	(0.2)
Barbiturates/sedatives	3.0	(0.3)	1.6	(0.4)	2.6	(0.7)	1.1	(0.2)	2.0	(0.2)
Heroin/other opiates	1.1	(0.3)	0.9	(0.3)	1.2	(0.3)	0.5	(0.1)	0.9	(0.1)
Analgesics/other narcotics	9.7	(0.5)	6.5	(0.8)	8.5	(1.1)	4.8	(0.5)	7.3	(0.4)
Inhalants	3.0	(0.5)	1.8	(0.6)	3.4	(0.9)	0.9	(0.3)	2.1	(0.3)
Any illicit drug[a]	15.1	(0.7)	10.1	(1.9)	12.6	(1.5)	6.1	(0.7)	10.9	(0.7)
Any illicit drug except marijuana[b]	12.9	(0.4)	8.5	(1.4)	11.5	(1.4)	5.7	(0.6)	9.5	(0.6)
Any illicit drug except analgesics	10.8	(0.8)	6.1	(1.8)	9.2	(1.3)	2.9	(0.3)	7.1	(0.7)
Any illicit drug except analgesics and marijuana	8.2	(0.4)	4.4	(1.2)	7.9	(1.2)	2.3	(0.3)	5.5	(0.4)
Steroids	1.5	(0.3)	1.4	(0.3)	2.3	(0.6)	0.3	(0.1)	1.2	(0.2)
Sexual enhancers	3.2	(0.4)	3.1	(0.5)	3.4	(0.6)	1.6	(0.2)	2.7	(0.2)

Note: Table displays the percentage of military personnel by Service who used the drug indicated in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of illicit drug use are given in Section 2.5.3.

[a]Any illicit drug use is defined as one or more times of any of the above classes of drugs.

[b]Any illicit drug use except marijuana is defined as one or more times of any of the above classes of drugs, excluding marijuana.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2002 to 2005 (2005 Questions: Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68, Q69, and Q70).

the collinearity between age and pay grade and other variables such as education, age was not included in these analyses.

The prevalence data in Table 5.5 indicate substantial differences in past-12-month any illicit drug use for Service, race/ethnicity, education, family status, pay grade, and region. As discussed previously, Army, Navy, and Marine Corps personnel were more likely than Air Force personnel to use drugs. Although differences in prevalence rates were not tested for statistical significance, drug use was also higher among Hispanics than other race/ethnic groups, those with some college or less compared with college graduates, those who were not married or married with spouse not present compared with those 26 or older, those at a lower pay grade, or those stationed outside the continental United States compared with those stationed inside the continental United States.

For the logistic regression model, the probability of any drug use in the past 12 months was used as the dependent variable. The past-year period was used rather than the past-month period because of the relatively low rates of illicit drug use. Independent variables in the model were sociodemographic and Service variables of Service, gender, race/ethnicity, education, family status, pay grade, and region. As shown in Table 5.5, results of the analysis showed that Service, race/ethnicity, education, family status, and pay grade were significantly related to the probability of any drug use in the past 12 months. Results show that the odds of being a 12-month drug user were significantly higher, after adjusting for all the other variables in the analysis, among the following:

- Army and Marine Corps personnel compared with Air Force personnel
- those with a high school education or less

Table 5.5 **SOCIODEMOGRAPHIC CORRELATES OF ANY ILLICIT DRUG USE, PAST 12 MONTHS, TOTAL DOD**

Sociodemographic Characteristics	Prevalence	Odds Ratio[a] Adjusted	95% CI[b]
Service			
Army	15.1 (0.7)	2.48[c]	(1.97,3.11)
Navy	10.1 (1.9)	1.48	(0.99,2.21)
Marine Corps	12.6 (1.5)	1.60[c]	(1.13,2.27)
Air Force	6.1 (0.7)	1.00	
Gender			
Male	10.9 (0.8)	0.90	(0.75,1.08)
Female	11.0 (0.7)	1.00	
Race/Ethnicity			
White, non-Hispanic	11.0 (0.8)	1.00	
African American, non-Hispanic	8.7 (0.8)	0.66[c]	(0.57,0.75)
Hispanic	13.7 (1.4)	1.05	(0.87,1.27)
Other	11.3 (1.2)	0.97	(0.75,1.25)
Education			
High school or less	15.8 (1.3)	1.49[c]	(1.07,2.06)
Some college	10.6 (0.7)	1.30	(0.98,1.72)
College graduate or higher	3.8 (0.4)	1.00	
Family Status[d]			
Not married	14.2 (1.0)	1.34[c]	(1.16,1.55)
Married, spouse not present	13.0 (1.4)	1.32[c]	(1.00,1.75)
Married, spouse present	7.4 (0.6)	1.00	
Pay Grade			
E1-E3	18.3 (1.5)	4.87[c]	(2.96,8.02)
E4-E6	11.1 (0.9)	3.16[c]	(1.87,5.34)
E7-E9	5.8 (0.6)	1.83[c]	(1.03,3.25)
W1-W5	4.5 (2.6)	1.08	(0.28,4.13)
O1-O3	2.4 (0.6)	0.83	(0.43,1.58)
O4-O10	2.6 (0.5)	1.00	
Region			
CONUS[e]	9.7 (0.6)	0.92	(0.71,1.20)
OCONUS[f]	13.4 (1.8)	1.00	
Total	10.9 (0.7)		

Note: Prevalence estimates are percentages among military personnel in each sociodemographic group who were classified as any illicit drug users in the past 12 months. Standard errors are in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Odds ratios were adjusted for Service, gender, race/ethnicity, education, family status, pay grade, and region.

[b]95% CI = 95% confidence interval of the odds ratio.

[c]Odds ratio is significantly different from the reference group.

[d]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[e]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[f]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use, Past 12 Months, Q68, Q69, and Q70; refer to Section 2.5.1 for descriptions of sociodemographic variables).

Table 5.6 **SOCIODEMOGRAPHIC CORRELATES OF ANY ILLICIT DRUG USE, PAST 30 DAYS, TOTAL DOD**

Sociodemographic Characteristics	Prevalence	Odds Ratio[a]	
		Adjusted	95% CI[b]
Service			
Army	6.9 (0.5)	2.36[c]	(1.73,3.23)
Navy	4.6 (1.2)	1.48	(0.91,2.39)
Marine Corps	6.2 (1.1)	1.78[c]	(1.15,2.77)
Air Force	2.8 (0.4)	1.00	
Gender			
Male	5.1 (0.5)	1.14	(0.81,1.62)
Female	4.4 (0.5)	1.00	
Race/Ethnicity			
White, non-Hispanic	4.9 (0.4)	1.00	
African American, non-Hispanic	4.7 (0.6)	0.85	(0.68,1.06)
Hispanic	6.0 (0.7)	1.03	(0.78,1.36)
Other	5.5 (0.7)	1.06	(0.78,1.44)
Education			
High school or less	6.7 (0.7)	0.87	(0.55,1.37)
Some college	5.2 (0.5)	0.95	(0.61,1.49)
College graduate or higher	2.1 (0.4)	1.00	
Family Status[d]			
Not married	6.6 (0.5)	1.37[c]	(1.06,1.75)
Married, spouse not present	6.3 (1.0)	1.36	(0.91,2.03)
Married, spouse present	3.4 (0.4)	1.00	
Pay Grade			
E1-E3	8.2 (0.9)	6.28[c]	(3.35,11.78)
E4-E6	5.3 (0.5)	4.36[c]	(2.26,8.40)
E7-E9	2.5 (0.3)	2.03[c]	(1.04,3.95)
W1-W5	1.6 (0.9)	1.00	(0.26,3.86)
O1-O3	1.1 (0.3)	0.83	(0.31,2.23)
O4-O10	1.1 (0.3)	1.00	
Region			
CONUS[e]	4.5 (0.4)	0.91	(0.64,1.30)
OCONUS[f]	6.2 (1.0)	1.00	
Total	5.0 (0.4)		

Note: Prevalence estimates are percentages among military personnel in each sociodemographic group who were classified as any illicit drug users in the past 30 days. Standard errors are in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Odds ratios were adjusted for Service, gender, race/ethnicity, education, family status, pay grade, and region.

[b]95% CI = 95% confidence interval of the odds ratio.

[c]Odds ratio is significantly different from the reference group.

[d]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[e]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[f]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use, Past 12 Months, Q68, Q69, and Q70; refer to Section 2.5.1 for descriptions of sociodemographic variables).

- those who were not married or who were married and had a spouse not present compared with those who were married with a spouse present
- those in pay grades E1 to E9 relative to officers in grades O4 to O10

and significantly lower among:

- African American, non-Hispanics compared with white, non-Hispanics.

Service and pay grade showed the strongest effects in the model. Among the Services, Army personnel had the highest odds of using drugs; odds among Army personnel were almost 2.5 times those of Air Force personnel. Odds among Marine Corps personnel were about 1.5 times those of Air Force personnel. Odds of illicit drug use among E1 to E3 pay grades were almost 5 times those of O4 to O10 pay grades. This logistic regression analysis suggests that drug use prevention efforts should focus on lower pay grades in the Army and Marine Corps.

Related analyses are presented in Table 5.6 for any illicit drug use in the past 30 days. As with analyses for use in the past 12 months, Service, family status, and pay grade were significant predictors, but race/ethnicity was not. Army personnel were more than twice as likely as Air Force personnel to use illicit drugs in the past 30 days, and pay grades E1 to E3 were more than 6 times as likely as pay grades O4 to O10 to use drugs in the past 30 days. For analyses of both illicit drug use in the past 12 months and in the past 30 days, gender was not a significant predictor after adjusting for other variables in the analysis.

5.5 Illicit Drug Use and Productivity Loss

The relationship between illicit drug use and productivity loss for enlisted personnel was also examined. Indicators of productivity loss that were examined were being late for work, leaving work early, being hurt in an on-the-job accident, working below one's normal level of performance, and not coming to work because of illness or injury. For the 2005 DoD survey, these items were asked without any attributions to illicit drugs.

Table 5.7 presents productivity loss indicators for all DoD enlisted personnel, for those reporting any illicit drug use during the past 12 months, and for those reporting any illicit drug use except marijuana during the past 12 months. Estimates are presented as the number of work days lost in the past 12 months as the result of a particular productivity loss indicator. Examination of the table shows that personnel who reported use of any illicit drugs or any drug except marijuana were more likely than DoD enlisted personnel to report productivity loss on 1 or more work days in the past year. For example, 27.3% of all DoD enlisted personnel reported being late for work compared with about 35% of those who reported using any illicit drug or any illicit drug except marijuana. A similar difference is apparent for each of the other measures, but differences were largest for leaving work early, being hurt in an on-the-job accident, and working below one's normal performance level.

The percentage of those who reported 4 or more work days affected by the productivity loss indicators was higher among both drug use categories than for the total DoD enlisted personnel (shown as all enlisted personnel in the table). Approximately 11% of the total DoD enlisted personnel reported leaving work early on 4 or more days in the past year, compared with about 18% of those in both drug use categories. Approximately 22% of those in both drug use categories reported working below normal performance level on 4 or more days, compared with about 13% of the total DoD enlisted personnel. For those who reported any illicit drug use, 10% reported being late for work on 4 or more days, compared with 6% of the total DoD enlisted personnel. Conversely, the total DoD enlisted personnel showed a higher percentage of those who reported productivity loss on no days in the past year, compared with those who reported illicit drug use and illicit drug use except marijuana.

These data provide some evidence that illicit drug use affects productivity and performance and thus results in lost time from work and military duties. It also suggests that these indicators may be a red flag to indicate possible substance abuse problems by military personnel. That is, if personnel have an excessive number of occurrences of being late for work, leaving

Table 5.7 **ANY ILLICIT DRUG USE AND PRODUCTIVITY LOSS, PAST 12 MONTHS, TOTAL DOD**

Group/Problem	*N*	Number of Work Days Affected, Past 12 Months: 0 Days	1 Day	2 or 3 Days	4 or More Days	1 or More Days
All Personnel	*16,146*					
Late for work by 30 minutes or more		72.7 (0.8)	11.4 (0.4)	9.9 (0.4)	6.1 (0.4)	27.3 (0.8)
Left work early		69.4 (0.8)	6.9 (0.3)	12.3 (0.4)	11.4 (0.5)	30.6 (0.8)
Hurt in an on-the-job accident		91.4 (0.6)	5.6 (0.4)	2.2 (0.2)	0.9 (0.1)	8.6 (0.6)
Worked below normal performance level		72.6 (0.7)	5.5 (0.3)	8.9 (0.4)	13.0 (0.5)	27.4 (0.7)
Did not come into work because of illness or injury		79.4 (0.8)	7.5 (0.3)	7.8 (0.5)	5.3 (0.3)	20.6 (0.8)
Any Illicit Drug Use[a]	*1,482*					
Late for work by 30 minutes or more		64.8 (1.8)	12.6 (1.1)	12.6 (1.2)	10.0 (1.0)	35.2 (1.8)
Left work early		58.7 (2.2)	9.9 (1.0)	13.7 (1.4)	17.7 (1.5)	41.3 (2.2)
Hurt in an on-the-job accident		84.3 (1.3)	8.3 (1.0)	4.1 (0.7)	3.3 (0.6)	15.7 (1.3)
Worked below normal performance level		58.6 (1.6)	6.3 (0.7)	13.2 (1.4)	21.8 (1.2)	41.4 (1.6)
Did not come into work because of illness or injury		72.8 (2.4)	9.1 (1.1)	9.5 (1.4)	8.6 (1.0)	27.2 (2.4)
Any Illicit Drug Use Except Marijuana[b]	*1,330*					
Late for work by 30 minutes or more		64.0 (1.8)	13.0 (1.2)	12.6 (1.3)	10.4 (1.1)	36.0 (1.8)
Left work early		59.1 (2.3)	9.4 (1.2)	13.3 (1.4)	18.2 (1.6)	40.9 (2.3)
Hurt in an on-the-job accident		83.5 (1.4)	9.1 (1.1)	4.1 (0.7)	3.3 (0.5)	16.5 (1.4)
Worked below normal performance level		57.3 (1.7)	6.5 (0.7)	13.0 (1.4)	23.1 (1.3)	42.7 (1.7)
Did not come into work because of illness or injury		72.0 (2.4)	9.5 (1.2)	9.7 (1.4)	8.9 (1.0)	28.0 (2.4)

Note: Table displays the percentage of military personnel in the three groups of interest (all personnel, any illicit drug users, and any illicit drug users except marijuana only) who reported the specified problem (e.g., late for work by 30 minutes or more) affected no days, 1 day, 2 or 3 days, 4 or more days, and 1 or more days. Sample sizes by group are also provided. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Unweighted number of respondents in the total DoD sample who reported any nonmedical use of marijuana, cocaine (including crack), hallucinogens (PCP/LSD), amphetamines/stimulants, tranquilizers/depressants, barbiturates/sedatives, heroin/other opiates, analgesics, other narcotics, or inhalants.

[b]Unweighted number of respondents in the total DoD sample who reported any nonmedical use of cocaine (including crack), hallucinogens (PCP/LSD), amphetamines/stimulants, tranquilizers/depressants, barbiturates/sedatives, heroin/other opiates, analgesics, other narcotics, or inhalants.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Productivity Loss, Q86; Any Illicit Drug Use, Q68A-K, Q69A-K, and Q70A-K; Any Illicit Drug Use Except Marijuana, Q68B-K, Q69B-K, and Q70B-K).

early, or working below their normal levels, drug use is one possible explanation. Caution, of course, must be used before jumping to this conclusion, because a number of other reasons could explain these behaviors.

5.6 Illicit Drug Use and Drug Testing

This section examines the association of past-12-month drug use and drug-testing experience among military personnel. Table 5.8 presents the distribution of testing periods overall and by illicit drug use status. The time frames include being tested for drugs in the past 30 days, more than 30 days ago, and never.

As shown, virtually all military personnel (97.0%) had been tested for drugs at some point since joining the Service. Overall, 26.6% of personnel reported being tested within the past 30 days and 70.4% more than 30 days ago. Among the Services, almost all personnel had been tested for drugs; higher percentages of personnel in the Army (33.1%), Navy (29.0%), and Marine Corps (34.1%) than personnel in the Air Force (13.6%) had been tested in the past 30 days.

Drug testing showed a clear association with drug use. Overall, drug users were significantly more likely to be tested in the past 30 days (33.0%) than nonusers

Table 5.8 **LAST TIME TESTED FOR ILLICIT DRUG USE, BY ANY ILLICIT DRUG USE IN PAST 12 MONTHS**

Service/Testing	Any Illicit Drug Use, Past 12 Months: Yes		No		Total[a]	
Army						
Tested in past 30 days	39.9	(7.6)[b]	31.9	(6.0)	33.1	(6.2)
Tested more than 30 days ago	58.1	(7.2)[b]	64.4	(5.2)	63.4	(5.4)
Never tested	2.1	(0.7)[b]	3.7	(1.2)	3.5	(1.1)
Navy						
Tested in past 30 days	31.3	(1.9)	28.8	(2.4)	29.0	(2.2)
Tested more than 30 days ago	65.3	(2.4)	68.4	(2.4)	68.1	(2.2)
Never tested	3.4	(1.0)	2.8	(0.5)	2.9	(0.4)
Marine Corps						
Tested in past 30 days	34.3	(3.2)	34.0	(4.0)	34.1	(3.7)
Tested more than 30 days ago	64.4	(3.4)	63.9	(4.2)	64.0	(3.9)
Never tested	1.2	(0.5)	2.1	(0.3)	2.0	(0.3)
Air Force						
Tested in past 30 days	15.3	(3.0)	13.5	(1.3)	13.6	(1.3)
Tested more than 30 days ago	81.8	(3.0)	83.6	(1.2)	83.4	(1.2)
Never tested	2.9	(1.2)	2.9	(0.4)	2.9	(0.4)
Total DoD						
Tested in past 30 days	33.0	(3.6)[b]	25.8	(2.1)	26.6	(2.2)
Tested more than 30 days ago	64.6	(3.4)[b]	71.1	(1.9)	70.4	(2.0)
Never tested	2.4	(0.5)	3.0	(0.4)	3.0	(0.4)

Note: Table displays the percentage of military personnel in each Service by any illicit drug use group (yes or no) who reported any illicit drug use testing in the past 30 days. Estimates may not sum to 100 by column group because of rounding. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of illicit drug use are given in Section 2.5.3.

[a]Individuals with missing "any illicit drug use in the past 12 months" answers are not included in these estimates.

[b]User estimate is significantly different from nonuser estimate at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use, Q68, Q69, and Q70; Last Time Tested, Q72).

(25.8%), and conversely less likely to be tested more than 30 days ago (64.6% vs. 71.1%). This pattern held for the Army, but differences between users and nonusers were not significant for the other Services.

Perceptions of the relative difficulty of predicting the last drug test by 12-month illicit drug use status was also examined. Personnel were asked to think about their last drug test and then rate how easy it was to predict that they were going to be tested. Predictability of testing was assessed on a 4-point scale from "very easy" to "very hard."

As shown in Table 5.9, a majority of military personnel (60.4%) reported that it was very hard to predict the time of their last drug test. Overall, the Air Force (73.1%) and Navy (69.4%) had the highest percentage of personnel reporting that it was very hard to predict when they were last going to be tested for drug use. Fewer personnel in the Marine Corps (51.8%) and the Army (45.2%) reported that it was very hard to predict when they were last tested.

Personnel who did not use drugs were more likely to rate that it was very hard to predict testing (62.0%) compared with past-12-month drug users (47.6%). There are many possible explanations for this difference; it would be reasonable to assume, for example, that drug users would be "on guard" and thus would be suspicious of any indication that a test was forthcoming. Further, these

Table 5.9 **PREDICTABILITY OF DRUG TESTING, BY ANY ILLICIT DRUG USE IN PAST 12 MONTHS**

Service/Predictability	Any Illicit Drug Use, Past 12 Months: Yes		No		Total [a]	
Army						
Not very hard	62.1	(4.2)[b]	49.4	(2.7)	51.3	(2.8)
Very hard	35.8	(3.7)[b]	46.9	(1.8)	45.2	(2.0)
Never tested	2.1	(0.8)[b]	3.8	(1.2)	3.5	(1.1)
Navy						
Not very hard	35.9	(3.2)[b]	26.8	(1.3)	27.7	(1.4)
Very hard	60.7	(3.1)[b]	70.3	(1.2)	69.4	(1.3)
Never tested	3.4	(1.0)	2.9	(0.5)	2.9	(0.4)
Marine Corps						
Not very hard	56.2	(7.2)	44.8	(3.0)	46.2	(2.8)
Very hard	42.6	(7.3)	53.2	(3.0)	51.8	(2.8)
Never tested	1.2	(0.5)	2.1	(0.3)	2.0	(0.3)
Air Force						
Not very hard	32.6	(4.5)[b]	23.4	(1.4)	24.0	(1.5)
Very hard	64.5	(4.4)[b]	73.7	(1.5)	73.1	(1.6)
Never tested	2.9	(1.2)	2.9	(0.4)	2.9	(0.4)
Total DoD						
Not very hard	50.0	(2.7)[b]	34.9	(1.3)	36.6	(1.4)
Very hard	47.6	(2.6)[b]	62.0	(1.3)	60.4	(1.4)
Never tested	2.4	(0.5)	3.1	(0.4)	3.0	(0.4)

Note: Table displays the percentage of military personnel in each Service by any illicit drug use group (yes or no) who reported the predictability of drug testing was not very hard, very hard, and never tested. Estimates may not sum to 100 by column group because of rounding. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of illicit drug use are given in Section 2.5.3.

[a]Individuals with missing "any illicit drug use in the past 12 months" answers are not included in these estimates.

[b]User estimate is significantly different from nonuser estimate at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use, Q68, Q69, and Q70; Predictability of Drug Testing, Q73).

individuals may be more likely to perceive that they "knew" they were going to be tested, while nonusers would not. Another explanation may be that drug users are minimizing their perception of their risk of being caught using drugs to rationalize their use. Self-assessments of the likelihood of illicit drug use if there were no drug testing in the military were also examined by level of current drug use. As shown in Table 5.10 for all DoD personnel, military personnel were many times more likely to believe that they would use illicit drugs if there were no drug testing than if there were drug testing. For example, 17.1% of military personnel who had used illicit drugs in the past 30 days stated they would be likely to use drugs if there were no drug testing, while 3.3% stated they were not likely to use illicit drugs if there were no testing. Similar findings were observed among users of marijuana only or any illicit drug other than marijuana.

5.7 Military and Civilian Comparisons

Compared with the general U.S. household population, the military contains a disproportionately large percentage of young males, a group that typically has the highest rate of drug use. For any comparisons between drug use in military and civilian populations to be valid, consideration must be given to differences in sociodemographic characteristics between military

Table 5.10 **LIKELIHOOD OF DRUG USE IF NO DRUG TESTING, BY TYPE OF DRUG USE**

Current Drug Use	Likely to Use Drugs If No Testing: Yes		No		Total [a]	
Never						
Never used illicit drug	33.3	(2.6)	69.0	(0.9)	64.4	(1.2)
Marijuana Only						
Past 30 days	7.4	(1.4)	0.4	(0.1)	1.3	(0.2)
Past 12 months	20.2	(2.1)	1.8	(0.2)	4.2	(0.5)
Any Illicit Drug Except Marijuana[b]						
Past 30 days	13.4	(1.2)	3.1	(0.2)	4.4	(0.3)
Past 12 months	26.3	(2.0)	7.0	(0.4)	9.5	(0.5)
Any Illicit Drug[c]						
Past 30 days	17.1	(1.8)	3.3	(0.2)	5.0	(0.4)
Past 12 months	33.2	(2.8)	7.6	(0.4)	10.9	(0.7)

Note: Table displays the percentage of military personnel by "likely to use drugs if there were no testing" indicator (yes or no) who reported use of the drug categories noted in the rows of the table (i.e., table displays column percentages). The standard error of each estimate is presented in parentheses. Definitions and measures of illicit drug use are given in Section 2.5.3.

[a]Individuals with missing "likely to use drugs if there were no drug testing" answers are not included in these estimates.

[b]Unweighted number of respondents in the total DoD sample who reported any nonmedical use of PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, inhalants, or sexual enhancers.

[c]Unweighted number of respondents in the total DoD sample who reported any nonmedical use of marijuana, PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, inhalants, or sexual enhancers.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Likelihood of Drug Use If No Drug Testing, Q74).

personnel and civilians. Table 5.11 contains standardized comparisons of drug use among military personnel and civilians during the 30 days prior to the survey, with the civilian data drawn from the 2004 National Survey on Drug Use and Health (NSDUH) (Office of Applied Studies [OAS], 2005). Prevalence estimates for the DoD and the individual Services are actual estimates but were subset to U.S.-based personnel to be consistent with the NSDUH data. The estimates for civilians were standardized to the distribution of U.S.-based military data by gender, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates, including Alaska and Hawaii.

As shown in Table 5.11, the prevalence of any illicit drug use among the total DoD in 2005 was less than one-half that of civilians in 2004. Among all military personnel aged 18 to 55, 4.6% used illicit drugs in the previous month, which was significantly lower than the standardized estimate of 12.8% among civilians. Similarly, drug use for all military personnel aged 18 to 25 and 26 to 55 and military personnel in each of the Services was significantly lower than use in the civilian population with similar sociodemographic characteristics.

Differences between the military and civilian populations were more pronounced for males than for females. Among U.S.-based males in the military aged 18 to 55, 4.7% used drugs in the past 30 days, compared with 13.5% of civilian males. For females, 4.0% of those aged 18 to 55 in the military used drugs in the past month, compared with 9.0% of civilian women.

These differences held for males in each of the Services, but several comparisons of military personnel and civilian women by Service were not statistically significant. Overall, these findings suggest that the

Table 5.11 **STANDARDIZED COMPARISONS OF THE PREVALENCE OF ANY ILLICIT DRUG USE AMONG MILITARY PERSONNEL AND CIVILIANS, PAST 30 DAYS, BY GENDER, AGE, AND SERVICE**

	Comparison Population											
Gender/Age Group	**Civilian**		**Total DoD**		**Army**		**Navy**		**Marine Corps**		**Air Force**	
Male												
Sample Size	*19,387*		*8,244*		*1,582*		*2,011*		*2,201*		*2,450*	
18-25	20.1	(0.7)	7.2	(0.8)[a]	10.3	(1.3)[a]	2.5	(0.5)[a]	8.9	(1.9)[a]	4.5	(0.7)[a]
26-55	8.9	(0.5)	3.0	(0.4)[a]	3.6	(0.8)[a]	4.2	(0.8)[a]	2.3	(0.5)[a]	2.1	(0.5)[a]
All ages	13.5	(0.4)	4.7	(0.5)[a]	6.7	(1.0)[a]	3.6	(0.5)[a]	6.5	(1.3)[a]	2.9	(0.4)[a]
Female												
Sample Size	*21,762*		*2,920*		*524*		*843*		*468*		*1,085*	
18-25	13.0	(0.4)	5.3	(1.0)[a]	8.1	(2.7)	4.3	(1.1)[a]	7.0	(1.4)[a]	3.4	(1.1)[a]
26-55	5.1	(0.4)	2.7	(0.4)[a]	3.9	(0.7)	3.4	(1.1)	2.9	(1.7)	1.6	(0.4)[a]
All ages	9.0	(0.3)	4.0	(0.5)[a]	6.2	(1.4)	3.8	(0.8)[a]	5.9	(1.0)[a]	2.4	(0.5)[a]
Total												
Sample Size	*41,149*		*11,164*		*2,106*		*2,854*		*2,669*		*3,535*	
18-25	18.8	(0.5)	6.8	(0.6)[a]	9.9	(0.9)[a]	2.9	(0.5)[a]	8.8	(1.7)[a]	4.2	(0.7)[a]
26-55	8.3	(0.4)	2.9	(0.3)[a]	3.6	(0.7)[a]	4.0	(0.7)[a]	2.3	(0.5)[a]	2.0	(0.5)[a]
All ages	12.8	(0.3)	4.6	(0.4)[a]	6.6	(0.7)[a]	3.6	(0.5)[a]	6.5	(1.2)[a]	2.8	(0.4)[a]

Note: Table displays the percentage of military personnel by Service, gender, and age group who were classified as any illicit drug users in the past 30 days. The standard error of each estimate is presented in parentheses. Sample size by gender and Service also provided. Civilian data have been standardized to the U.S.-based military data by gender, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). Sample size shows the number of cases on which the weighted estimates are based. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Significantly different from civilian estimate at the 95% confidence level.

Civilian data source: National Survey on Drug Use and Health, 2004.

Military data source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use, Past 30 Days, Q69 and Q70).

military environment discourages illicit drug use quite successfully.

5.8 Summary

Drug use declined steadily during the 1980s and continued to decline in the 1990s for military personnel, with a slight increase between 1998 and 2002. Past 30-day drug use among military personnel in 2005 was 5.0%. The overall decline in drug use among military personnel since the 1980s suggests that there may be a broader societal trend of reduction in drug use, as well as evidence of the effectiveness of military policies and programs directed toward reducing or eliminating drug use.

5.8.1 Trends in Illicit Drug Use

Illicit drug use among military personnel declined dramatically between 1980 and 2002, showing a significant decrease in the prevalence of drug use of more than 80% in 22 years (Table 5.1):

- Use of any illicit drugs decreased from 27.6% in the past 30 days in 1980 to 3.4% in 2002.
- All Services showed the same pattern of overall decrease from 1980 to 2002 observed for the total DoD for illicit drug use in the past 30 days.
- Findings were similar for use of illicit drugs in the past 12 months: use decreased significantly for the total DoD and each of the Services between 1980 and 2002.

- In 2005, illicit drug use in the past 30 days was 6.9% among Army, 4.6% among Navy, 6.2% among Marine Corps, and 2.8% among Air Force personnel.

5.8.2 Service Comparisons of Illicit Drug Use

Unadjusted and adjusted estimates of drug use for each of the Services were computed to assess the effects of sociodemographic composition on drug use rates (Table 5.2):

- Comparisons of unadjusted 12-month estimates showed that the rate of any illicit drug use during the past year was highest among Army personnel (15.1%), which was significantly higher than among Navy personnel (10.1%) and Air Force personnel (6.1%); rates were 12.6% among Marine Corps personnel. The difference in the unadjusted 12-month estimates in each drug use category between the Air Force and the Army and Marine Corps was statistically significant.
- After adjusting for sociodemographic differences among the Services, rates of any illicit use decreased for the Marine Corps. After the adjustments, rates of 30-day drug use for the Marine Corps (5.1%) were significantly higher than the Air Force (3.1%) and similar to the other two Services.
- Differences between adjusted and unadjusted rates suggest that differences among the Services in sociodemographic composition are a partial explanation for differences in drug use among the Services.

5.8.3 Prevalence of Specific Drug Use

Marijuana was the drug most commonly used by military personnel in 2002, but second to analgesics in 2005, and use of other drugs was much lower (Tables 5.3 and 5.4):

- In 2005, 3.3% of military personnel reported use of analgesics and 1.3% of marijuana within the past month; rates of use in the past year were 7.3% for analgesics and 4.2% for marijuana.
- Except for analgesics and marijuana, 30-day use of all other individual drugs was 1% or less, and 12-month use was less than 2% in 2005.

5.8.4 Correlates of Illicit Drug Use

Illicit drug use was related to a number of sociodemographic factors (see Tables 5.5 and 5.6). Logistic regression analysis showed that Service, race/ethnicity, education, family status, and pay grade were significantly related to the probability of any drug use in the past 12 months. Specifically, the probability of any illicit drug use was significantly higher among the following:

- Army and Marine Corps personnel compared with Air Force personnel
- those with a high school education or less
- those who were not married and those who were married but did not have a spouse present compared with those who were married and had a spouse present
- those in pay grades E1 to E9 relative to officers in grades O4 to O10,

and significantly lower among:

- African Americans compared with whites.

Service and pay grade showed the strongest effects in the model. Army personnel and personnel in pay grades E1 to E3 had higher odds of drug use than other personnel. This logistic regression analysis suggests that drug use prevention efforts should focus on personnel in pay grades E1 to E3, primarily in the Army and Marine Corps.

5.8.5 Illicit Drug Use and Productivity Loss

Illicit drug use was related to productivity loss as measured by being late for work, leaving work early, being hurt in an on-the-job accident, working below one's normal level of performance, and not coming to work because of illness or injury (Table 5.7):

- Military personnel who used any illicit drugs or any drug except marijuana were consistently more likely than all DoD enlisted personnel to report productivity loss from work on 1 or more days.
- Compared with the total DoD enlisted personnel, a higher percentage of those who used any illicit drug or any illicit drug except marijuana reported one of

the productivity loss indicators 4 or more days in the past year.

5.8.6 Illicit Drug Use and Drug Testing

Drug testing is used to deter and detect drug use among military personnel. Analyses examined the association of past-12-month drug use and drug-testing experience among military personnel (Tables 5.8, 5.9, and 5.10):

- Virtually all military personnel (97.0 %) had been tested for drugs at some point since joining the Service. Overall, 26.6% of personnel reported being tested within the past 30 days and 70.4% more than 30 days ago. Marine Corps personnel (34.1%), Army personnel (33.1%), and Navy personnel (29.0%) reported higher rates of testing in the past 30 days than personnel in the Air Force (13.6%).
- Drug testing showed a clear association with drug use. Overall, past-12-month drug users were significantly more likely to be tested in the past 30 days (33.0%) than nonusers (25.8%).
- A majority of military personnel (60.4%) reported that it was very hard to predict the time of their last drug test. This estimate varied, however, by Service. The Air Force (73.1%) and the Navy (69.4%) had the highest percentage of personnel reporting that it was very hard to predict when they were last going to be tested for drug use, followed by the Marine Corps (51.8%) and the Army (45.2%).
- Personnel who did not report drug use in the past 12 months were more likely to rate that it was very hard to predict testing (62.0%) than those who did report drug use (47.6%).
- Military personnel were more likely to believe that they would use illicit drugs if there were no drug testing than if there were drug testing.

5.8.7 Military and Civilian Comparisons

Civilian data from the 2004 NSDUH were standardized to the distribution of the military on gender, age, education, race/ethnicity, and marital status. Military and civilian rates of use were then compared (Table 5.11):

- Military personnel were notably and significantly less likely than civilians to use any illicit drug in the past 30 days (4.6% vs. 12.8%). This pattern held across all age groups and for males and females for the total DoD, although some comparisons were not significant by Service for females.
- Overall, findings suggest that the military environment discourages illicit drug use quite successfully.

Chapter 6: Tobacco Use

Historically, the military has had a reputation as an environment in which tobacco use is accepted and common. Two decades ago, just over half of military personnel on active duty were smokers. In recent years, the Department of Defense (DoD) has increased efforts to lower tobacco use by members of the armed forces, and the rate has declined sharply. Still, tobacco use in 2005 remained fairly high among military personnel (see Table 3.1).

This high rate of smoking is of concern to DoD for several reasons. First, smoking-related illnesses take a toll on the physical readiness of the armed forces. Thousands of studies have demonstrated an association between the use of tobacco and negative health outcomes, such as cardiovascular diseases, various cancers, and pulmonary disease (Haddock et al., 1998). The use of tobacco also has been associated with negative performance outcomes, such as higher absenteeism, diminished motor and perceptual skills, and poorer endurance (Chisick, Poindexter, & York, 1998). A second concern is financial. Each year, DoD spends an estimated $875 million on smoking-related health care and productivity loss (Conway, 1998). Yet another concern is that most of the individuals currently serving in the armed forces will eventually return to civilian life, and DoD has an obligation to return veterans to the civilian sector in the healthiest condition possible (Chisick et al., 1998).

This chapter focuses on tobacco use among military personnel, including use of cigarettes, smokeless tobacco, cigars, and pipes, as well as information on nicotine dependence, which is characterized by both tolerance and withdrawal symptoms regarding nicotine use (see Section 2.5.3 for more information on the measurement of nicotine dependence). Information is presented regarding prevalence and trends in tobacco use among the Services, correlates of smoking, cigarette smoking initiation and perceived availability, cigarette use and productivity loss, attempts to stop smoking, comparisons of the prevalence of smoking between the military and civilian populations, and associations between smoking and mental health problems. Additional information is included in Appendix D (Tables D.14 through D.17) about sociodemographic characteristics associated with tobacco use.

6.1 Cigarette Use

6.1.1 Trends in Cigarette Use, by Service

Table 6.1 shows trends for DoD in any cigarette use and in heavy cigarette use (one or more packs of cigarettes per day) during the past 30 days across the nine DoD surveys. In the total DoD population, the prevalence of any smoking declined significantly from 51.0% in 1980 to 32.2% in 2005. However, within this overall decline there was a recent upsurge, with the prevalence of any smoking increasing significantly between 1998 and 2002. The prevalence of any smoking in the total DoD decreased slightly from 33.8% in 2005 to 32.2% in 2005, though this difference did not reach statistical significance.

Trends for each Service are also presented in Table 6.1 (see Tables D.1 through D.4 for further detail). For each Service, there was a significant decrease in the prevalence of any smoking between 1980 and 2005. None of the Services showed a statistically significant change between 2002 and 2005 in the prevalence of any smoking. Although the difference between 2002 and 2005 was not significant, the Army continued the general upswing in the prevalence of any smoking that has been seen since 1998. The Army rate for 2005 is similar to the prevalence observed in 1992. The other three Services showed slight (nonsignificant) decreases in the prevalence of smoking between 2002 and 2005.

In the DoD population, the prevalence of heavy smoking also declined significantly from 34.2% in 1980 to 11.0% in 2005. Unlike any smoking, the decrease in the prevalence of heavy smoking, from 13.1% in 2002 to 11.0% in 2005, was statistically significant. This pattern was especially strong in the Navy (decrease in heavy smoking from 13.3% in 2002 to 9.9% in 2005) and the

Table 6.1 **TRENDS IN CIGARETTE USE, PAST 30 DAYS, BY SERVICE, 1980-2005**

Service/Smoking Level	Year of Survey								
	1980	1982	1985	1988	1992	1995	1998	2002	2005
Army									
Any smoking	54.3 (0.7)	54.7 (1.8)	52.0 (1.8)	43.1 (1.1)[a]	37.0 (2.0)[a]	34.1 (1.6)	31.1 (1.2)	35.6 (1.9)[a]	38.2 (1.5)[*]
Heavy smoking	35.2 (0.7)	34.6 (1.4)	33.6 (1.4)	22.8 (0.7)[a]	18.0 (1.1)[a]	17.0 (0.6)	14.1 (0.8)[a]	14.5 (0.7)	15.3 (1.5)[*]
Navy									
Any smoking	53.8 (1.2)	55.4 (1.0)	47.9 (1.2)[a]	43.8 (1.8)	37.1 (1.7)[a]	34.9 (1.6)	30.6 (1.5)	36.0 (2.4)	32.4 (1.9)[*]
Heavy smoking	37.3 (1.3)	35.7 (1.4)	34.8 (1.6)	24.6 (2.0)[a]	20.4 (0.5)[a]	16.3 (1.4)[a]	14.8 (1.1)	13.3 (1.1)	9.9 (0.9)[a,*]
Marine Corps									
Any smoking	53.4 (0.6)	48.7 (0.4)[a]	42.6 (3.1)	41.3 (1.8)	39.2 (2.3)	35.0 (1.8)	34.9 (2.1)	38.7 (4.1)	36.3 (2.3)[*]
Heavy smoking	34.5 (0.9)	31.6 (0.7)[a]	26.1 (0.8)[a]	18.7 (2.2)[a]	20.7 (1.8)	15.0 (1.2)[a]	13.5 (1.1)	14.6 (2.4)	11.1 (1.4)[*]
Air Force									
Any smoking	43.2 (1.8)	44.1 (1.6)	39.0 (2.3)	35.8 (1.2)	29.2 (1.4)[a]	25.1 (1.3)[a]	25.7 (1.5)	27.0 (2.7)	23.3 (1.8)[*]
Heavy smoking	29.7 (1.3)	30.6 (1.2)	26.8 (1.7)	22.0 (0.8)[a]	14.6 (1.0)[a]	11.2 (0.8)[a]	11.2 (1.0)	10.4 (1.0)	7.0 (0.6)[a,*]
Total DoD									
Any smoking	51.0 (0.8)	51.4 (0.8)	46.2 (1.0)[a]	40.9 (0.8)[a]	35.0 (1.0)[a]	31.9 (0.9)[a]	29.9 (0.8)	33.8 (1.3)[a]	32.2 (1.1)[*]
Heavy smoking	34.2 (0.6)	33.5 (0.7)	31.2 (0.8)[a]	22.7 (0.7)[a]	18.0 (0.5)[a]	15.0 (0.6)[a]	13.4 (0.5)	13.1 (0.6)	11.0 (0.8)[a,*]

Note: Table displays the percentage of military personnel by survey year and Service who smoked cigarettes in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

[*]Comparisons between 1980 and 2005 are statistically significant at the 95% confidence level.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Any Smoking, Q52 and Q53; Heavy Smoking, Q53).

Air Force (decrease in heavy smoking from 10.4% in 2002 to 7.0% in 2005). There were no significant changes between 2002 and 2005 for the Army and the Marine Corps. As with any smoking, the Army was the only Service that showed a slight increase in heavy smoking from 2002 to 2005.

6.1.2 Service Comparisons of Cigarette Use

In this section, two sets of estimates of the observed extent of cigarette use and nicotine dependence for each Service are presented. The first estimates are unadjusted estimates for each of the Services. These estimates, which indicate the observed prevalence rates of smoking and dependence in 2005, provide a perspective on the comparative magnitude of the challenge facing each Service in its efforts to reduce smoking. These unadjusted estimates are descriptive only, however, and yield no explanatory information about differences among the Services.

As discussed in Section 2.6, sociodemographic differences among the Services may contribute to the observed differences in cigarette smoking. For example, if a given behavior is more common among unmarried personnel, then Services that have a higher proportion of unmarried personnel likely would show higher rates of that behavior. Thus, observed differences in rates of tobacco use may not reflect systematic program-level differences among the Services. To address this possibility, adjusted estimates of the prevalence of smoking and dependence were computed, using direct standardization procedures to control for sociodemographic differences (see Appendix F). These constructed estimates resulting from standardization permit comparisons among the Services, as if each Service had the sociodemographic composition of the total DoD in 2005.

Unadjusted and adjusted estimates for any smoking, heavy smoking, and dependence in the past 30 days are shown in Table 6.2. When looking at the unadjusted prevalence rates of any smoking, one sees that the unadjusted rate for any smoking was significantly higher among the Army, Navy, and Marine Corps (range = 32.4% to 38.2%) than the Air Force (23.3%). The unadjusted rates of heavy smoking were also significantly higher in the Army, Navy, and Marine Corps (range = 9.9% to 15.3%) than in the Air Force (7.0%). The unadjusted rates of heavy smoking were significantly higher in the Army (15.3%) than in any other Service. In addition, the unadjusted rates of nicotine dependence were significantly higher in the Army, Navy, and Marine Corps (range = 6.4% to 10.8%) than in the Air Force (4.8%). Overall, about 8 percent of the total DoD (unadjusted) was classified as dependent on nicotine in 2005.

To examine the potential impact of sociodemographic differences among the Services, adjusted prevalence estimates were developed by standardizing the sociodemographic compositions of the Services to the gender, age, education, race/ethnicity, and marital status distributions for the total DoD. These adjusted estimates are presented in Table 6.2.

As shown, adjusting for sociodemographic differences resulted in very little change in the estimates of any smoking for the Army and Navy, but resulted in a lower estimate for the Marine Corps and a slightly higher estimate for the Air Force. When these sociodemographic factors were taken into account, the Army (38.1%) had a significantly higher rate of any smoking than any other Service, and the Air Force (25.5%) had a significantly lower rate of any smoking than other Services.

With respect to heavy smoking, adjusting for sociodemographic differences resulted in little change for the Army, Navy, and Air Force, while resulting in a slightly lower rate for the Marine Corps. As was the case with any smoking, the adjusted rate of heavy smoking in the Army (15.6%) was significantly higher than in any of the other Services. The adjusted rate of heavy smoking in the Air Force was lower than the adjusted rates for the Army and Navy, but was not significantly different from the rate for the Marine Corps.

With respect to nicotine dependence, the effect of adjusting for sociodemographic differences was similar to the effect found for heavy smoking, with little to no change for the Army, Navy, and Air Force, and a slight

Table 6.2 **ESTIMATES OF CIGARETTE USE, PAST 30 DAYS, AND NICOTINE DEPENDENCE UNADJUSTED AND ADJUSTED FOR SOCIODEMOGRAPHIC DIFFERENCES, BY SERVICE**

Smoking Measure/Type of Estimate	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Any smoking					
Unadjusted	38.2 (1.5)[a,b]	32.4 (1.9)[b,c]	36.3 (2.3)[b]	23.3 (1.8)[a,c,d]	32.2 (1.1)
Adjusted[e]	38.1 (0.7)[a,b,d]	32.3 (1.0)[b,c]	30.8 (1.5)[b,c]	25.5 (0.9)[a,c,d]	31.7 (0.5)
Heavy smoking					
Unadjusted	15.3 (1.5)[a,b,d]	9.9 (0.9)[b,c]	11.1 (1.4)[b,c]	7.0 (0.6)[a,c,d]	11.0 (0.8)
Adjusted[e]	15.6 (1.0)[a,b,d]	9.6 (0.6)[b,c]	9.5 (1.1)[c]	7.7 (0.5)[a,c]	10.6 (0.4)
Nicotine dependence					
Unadjusted	10.8 (0.8)[a,b]	6.4 (0.6)[b,c]	8.4 (1.3)[b]	4.8 (0.5)[a,c,d]	7.6 (0.5)
Adjusted[e]	10.8 (0.6)[a,b,d]	6.1 (0.3)[b,c]	6.9 (1.1)[c]	5.0 (0.4)[a,c]	7.2 (0.3)

Note: Table displays the percentage of military personnel by Service who reported any smoking, heavy smoking, or nicotine dependence in the past 30 days. The standard error of each estimate is presented in parentheses. Pairwise significance tests were done between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps). Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimate is significantly different from the Navy at the 95% confidence level.

[b]Estimate is significantly different from the Air Force at the 95% confidence level.

[c]Estimate is significantly different from the Army at the 95% confidence level.

[d]Estimate is significantly different from the Marine Corps at the 95% confidence level.

[e]Adjusted estimates have been standardized by gender, age, education, race/ethnicity, and marital status to the total DoD distribution.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Smoking, Q52 and Q53; Heavy Smoking, Q53; Nicotine Dependence, Q56-Q61).

decrease for the Marine Corps. As with the other smoking measures, the adjusted rate of nicotine dependence in the Army (10.8%) was significantly higher than in any of the other Services. The adjusted rate of nicotine dependence in the Air Force was lower than the adjusted rates in the Army and Navy, but was not significantly different from the rate in the Marine Corps.

In summary, differences in the Services' sociodemographic compositions had a minimal impact on the rates of any smoking, heavy smoking, and nicotine dependence, with the exception of the Marine Corps, which showed decreased rates after making these adjustments. Prior to adjustments, the rates of heavy smoking and nicotine dependence were higher in the Army than in the Navy and Air Force, but similar to the Marine Corps. Once sociodemographic differences were controlled by adjusting the estimates, the Army had significantly higher rates than the other Services for all three measures.

6.1.3 Correlates of Cigarette Use

Knowing the characteristics of tobacco users is essential if the military is to develop sound policies and programs that meet the needs of the military organization and personnel. In this section, the sociodemographic correlates of cigarette smoking are examined. Prevalence estimates presented in Table 6.3 are the percentages of personnel with each sociodemographic characteristic who were current smokers (smoked within the past 30 days) at the time of the survey. Significant correlates are identified by statistically significant odds ratios in a multivariate logistic regression model predicting current smoking.

Table 6.3 presents the prevalence estimates of current cigarette use by selected sociodemographic characteristics. As previously shown in Table 6.1,

Table 6.3 **SOCIODEMOGRAPHIC CORRELATES OF ANY CIGARETTE SMOKING, PAST 30 DAYS, TOTAL DOD**

Sociodemographic Characteristics	Prevalence	Odds Ratio[a] Adjusted	95% CI[b]
Service			
Army	38.2 (1.5)	1.95[c]	(1.61, 2.35)
Navy	32.4 (1.9)	1.37[c]	(1.15, 1.64)
Marine Corps	36.3 (2.3)	1.27[c]	(1.00, 1.60)
Air Force	23.3 (1.8)	1.00	
Gender			
Male	33.5 (1.2)	1.37[c]	(1.18, 1.58)
Female	24.2 (1.2)	1.00	
Race/Ethnicity			
White, non-Hispanic	36.0 (1.4)	1.00	
African American, non-Hispanic	19.7 (1.1)	0.35[c]	(0.30, 0.41)
Hispanic	27.7 (1.5)	0.51[c]	(0.43, 0.61)
Other	33.2 (2.1)	0.83	(0.69, 1.00)
Education			
High school or less	45.2 (1.3)	2.54[c]	(1.95, 3.31)
Some college	32.4 (1.1)	1.80[c]	(1.43, 2.28)
College graduate or higher	11.5 (1.0)	1.00	
Family Status[d]			
Not married	38.1 (1.1)	1.16	(1.00, 1.34)
Married, spouse not present	33.9 (2.9)	1.18	(0.96, 1.45)
Married, spouse present	26.4 (1.4)	1.00	
Pay Grade			
E1-E3	45.9 (1.5)	9.71[c]	(6.61, 14.26)
E4-E6	35.2 (1.3)	7.71[c]	(5.24, 11.35)
E7-E9	22.6 (1.2)	4.94[c]	(3.22, 7.58)
W1-W5	21.0 (2.5)	3.87[c]	(2.22, 6.74)
O1-O3	11.2 (1.3)	3.01[c]	(1.93, 4.69)
O4-O10	3.9 (0.6)	1.00	
Region			
CONUS[e]	30.1 (1.5)	0.96	(0.83, 1.11)
OCONUS[f]	36.7 (1.9)	1.00	
Total	32.2 (1.1)		

Note: Prevalence estimates are percentages among military personnel in each sociodemographic group who smoked at least once in the past 30 days. Standard errors are in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Odds ratios were adjusted for Service, gender, race/ethnicity, education, family status, pay grade, and region.

[b]95% CI = 95% confidence interval of the odds ratio.

[c]Estimate is significantly different from the reference group at the 95% confidence level.

[d]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (in 1998 and 2002) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[e]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[f]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Cigarette Smoking, Past 30 Days, Q52 and Q53; refer to Section 2.5.1 for descriptions of sociodemographic variables).

Air Force personnel were the least likely of the Services to smoke (23.3%). Females were less likely than males to smoke (24.2% vs. 33.5%). Among personnel in different racial/ethnic groups, non-Hispanic African American personnel were the least likely to smoke (19.7%). In general, smoking rates were lower among personnel with higher levels of education and higher pay grade. Married personnel living with a spouse were less likely to smoke (26.4%) than were married personnel not living with a spouse (33.9%) or unmarried personnel (38.1%). Finally, the prevalence of smoking among personnel stationed within the 48 contiguous states in the continental United States was lower than among those stationed overseas.

The picture, however, may not be as simple as it appears. For example, personnel who are in a lower pay grade are likely to have less education and to be unmarried. One needs a multiple regression framework to assess the independent effects of these factors. Therefore, logistic regression analyses were conducted to examine the independent contribution of each of the sociodemographic characteristics when they were considered simultaneously. Results are presented as adjusted odds ratios in Table 6.3.

For these multiple regression analyses, a dichotomous (0,1) smoking variable was created. Current smokers were coded as 1, and nonsmokers were coded as 0. The logistic regression analyses estimated the odds of being a smoker, based on sociodemographic variables, which were independent or predictor variables in the model. Reference groups (i.e., those to whom all other categories of each sociodemographic variable were compared) are designated by a 1.00 in the adjusted odds ratio column in Table 6.3. Odds ratios greater than 1.00 indicate a greater odds of smoking in the comparison group relative to the reference group, and those less than 1.00 indicate a lesser odds. Confidence intervals of 95% indicate whether the odds ratio is significant at the .05 level or less. Any interval that includes 1.00 within its boundaries indicates that the odds ratio is not significant at the .05 level (i.e., there is no significant difference between the reference group and the comparison group).

Results of the logistic regression analysis presented in Table 6.3 show that the following groups were significantly more likely to be current smokers when the effects of all other sociodemographic variables in the model were held constant:

- personnel in the Army, Navy, and Marine Corps compared with those in the Air Force
- males compared with females
- white non-Hispanics compared with African American non-Hispanics and Hispanics
- persons who had less than a college degree compared with those who had at least a college degree
- those in all enlisted pay grades, warrant officers, and junior commissioned officers compared with those in pay grades O4 and above

There were no significant adjusted odds ratios for family status or region.

One other noteworthy finding is that the sizes of the odds ratios associated with pay grade were quite large for the lowest grades and were lower among higher pay grade levels. Comparing the lowest to the highest grades, those in E1 to E3 had the highest odds of smoking; odds in this group were about 10 times that of personnel in pay grades O4 to O10. The odds for smoking among those in pay grades O1 to O3, however, were approximately 3 times that of personnel in pay grades O4 to O10. The sizes and pattern of these odds ratios suggest a strong negative relation between pay grade and current smoking, even when controlling for other relevant sociodemographic variables.

Appendix D Tables D.14, D.15, and D.16 present sociodemographic differences in smoking within each Service.

6.1.4 Cigarette Smoking Initiation, Perceived Cigarette Availability and Acceptability, and Reasons for Starting Smoking

Some previously published studies suggest that the military environment encourages smoking (Schei & Sogaard, 1994; Cronan & Conway, 1998). To examine this issue directly, the 2005 survey included a question

about smoking initiation in the military. Table 6.4 presents information on cigarette smoking initiation, both for the total DoD population, as well as for those who were current smokers. Findings reveal that, overall, 18.4% of respondents started smoking after joining the military. This percentage was higher for males than for females; for those aged 18 to 25 than for those aged 26 to 55; and for the Army, Navy, and Marine Corps than for the Air Force. Furthermore, 37.5% of current smokers reported that they started smoking after joining the military. This finding was fairly consistent across the Services, as well as across age groups and gender.

Table 6.5 presents information on perceived cigarette availability and acceptability. Overall, 42.0% reported that the number of places to buy cigarettes at their installation makes it easy to smoke, and a similar percentage reported that most of their friends in the military smoke. An estimated 50.1% indicated that they do not like being around people when they are smoking,

Table 6.4 **CIGARETTE SMOKING INITIATION IN THE MILITARY, BY DEMOGRAPHICS AND SERVICE**

	Service				
Gender/Age Group	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Males					
18-25	25.1 (2.2)	21.1 (0.8)	24.7 (1.5)	19.2 (2.1)	22.8 (1.0)
26-55	18.1 (1.2)	17.7 (1.3)	16.3 (1.8)	12.7 (1.7)	16.1 (0.8)
All ages	21.6 (1.3)	19.1 (0.9)	21.7 (1.3)	14.9 (1.7)	19.2 (0.7)
Females					
18-25	14.1 (2.5)	20.2 (1.9)	23.7 (2.7)	15.2 (1.3)	16.8 (1.1)
26-55	12.7 (2.5)	11.7 (1.7)	12.1 (3.5)	10.7 (1.1)	11.6 (1.0)
All ages	13.5 (1.9)	16.0 (1.2)	20.4 (2.1)	12.8 (1.0)	14.2 (0.8)
Total					
18-25	23.4 (1.9)	21.0 (0.8)	24.6 (1.4)	18.2 (1.7)	21.8 (0.8)
26-55	17.4 (1.2)	16.9 (1.1)	16.1 (1.7)	12.4 (1.4)	15.5 (0.7)
All ages	20.5 (1.3)	18.7 (0.8)	21.6 (1.3)	14.5 (1.5)	18.4 (0.7)
Estimates Among Current Smokers					
Males					
18-25	38.3 (1.8)	35.8 (2.0)	41.5 (1.6)	41.1 (3.0)	38.8 (1.1)
26-55	34.2 (2.4)	36.4 (2.7)	37.3 (5.3)	39.4 (2.6)	36.3 (1.5)
All ages	36.7 (1.4)	36.1 (2.1)	40.5 (1.7)	40.3 (1.7)	37.8 (0.9)
Females					
18-25	34.5 (4.6)	42.8 (4.8)	44.9 (4.3)	37.0 (2.6)	38.1 (2.2)
26-55	+ (+)	30.5 (4.4)	+ (+)	29.6 (2.6)	31.0 (3.2)
All ages	34.6 (4.0)	38.1 (3.6)	39.7 (4.0)	33.7 (1.8)	35.5 (1.8)
Total					
18-25	37.9 (1.7)	36.6 (1.7)	41.7 (1.5)	40.2 (2.6)	38.7 (1.0)
26-55	34.2 (2.6)	35.9 (2.3)	36.6 (5.0)	37.6 (2.0)	35.7 (1.4)
All ages	36.5 (1.3)	36.3 (1.8)	40.5 (1.6)	39.0 (1.5)	37.5 (0.8)

Note: Table displays the percentage of military personnel by Service, gender, and age group who started smoking since joining the military. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Smoking Initiation in the Military, Q51).

Table 6.5 **PERCEIVED CIGARETTE AVAILABILITY AND ACCEPTABILITY, AND REASONS FOR STARTING SMOKING REGULARLY, BY SERVICE**

Measure/Type of Estimate	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Perceived availability and acceptability[a]					
The number of places to buy cigarettes at this installation makes it easy to smoke	49.7 (2.4)	38.4 (1.8)	50.1 (3.3)	33.0 (1.3)	42.0 (1.3)
Most of my friends in the military smoke	50.8 (3.2)	41.5 (2.3)	50.6 (2.6)	30.2 (3.0)	42.5 (1.8)
Smoking is part of being in the military	18.5 (1.9)	14.5 (0.9)	14.4 (1.9)	11.2 (0.8)	14.8 (0.8)
My spouse, live-in partner, or the person I date disapproves of my smoking (or would disapprove if I did smoke)	41.3 (0.8)	42.1 (1.3)	42.6 (1.8)	45.0 (1.4)	42.7 (0.6)
I don't like being around people when they're smoking	45.3 (1.1)	49.6 (2.3)	45.1 (1.2)	58.0 (2.6)	50.1 (1.1)
Use of tobacco is against my basic values or beliefs	24.2 (1.1)	29.0 (1.4)	20.3 (1.1)	30.6 (1.4)	26.8 (0.7)
Why started smoking regularly[b]					
To fit in with my friends	5.6 (0.7)	10.3 (1.0)	7.8 (1.2)	11.0 (1.3)	8.5 (0.5)
To fit in with my military unit	1.1 (0.3)	3.9 (0.8)	1.5 (0.5)	1.7 (0.5)	2.1 (0.3)
To rebel against my parents or other in authority	4.5 (0.3)	5.6 (0.6)	4.2 (0.7)	4.8 (0.4)	4.8 (0.3)
To look "cool" or be "cool"	4.2 (0.5)	9.0 (0.8)	6.0 (0.7)	8.8 (1.0)	6.9 (0.4)
To help relieve stress	29.5 (1.4)	21.6 (1.2)	25.4 (2.4)	23.6 (1.4)	25.4 (0.9)
To help me relax or calm down	30.8 (1.5)	21.8 (1.9)	25.5 (2.2)	24.7 (1.1)	26.2 (1.1)
To relieve boredom	23.5 (1.1)	19.7 (1.0)	25.5 (2.0)	21.0 (0.5)	22.2 (0.6)
So I wouldn't want to eat as much	5.8 (0.4)	6.6 (0.6)	6.1 (0.4)	7.3 (0.4)	6.4 (0.3)
To look or feel like an adult	2.9 (0.3)	5.8 (0.7)	3.2 (0.4)	5.6 (0.7)	4.4 (0.3)
Most in my family smoked	5.2 (0.8)	6.5 (0.6)	5.3 (0.6)	5.5 (0.8)	5.6 (0.4)
To prove I could handle it	2.0 (0.2)	3.1 (0.4)	2.1 (0.4)	2.2 (0.4)	2.4 (0.2)
To be like someone I admired	1.7 (0.2)	3.8 (0.3)	1.7 (0.6)	2.1 (0.6)	2.4 (0.2)
To show I was tough	2.0 (0.3)	3.3 (0.4)	2.3 (0.4)	3.4 (0.8)	2.7 (0.3)
To avoid gaining weight	4.2 (0.7)	4.5 (0.6)	4.1 (0.6)	5.6 (0.5)	4.6 (0.3)

Note: Table displays the percentage of military personnel by Service who reported the above mentioned perceived cigarette availability and acceptability and reasons for started smoking regularly. Standard errors are in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

[a]Table entries are percentages of respondents indicating they agreed or strongly agreed with statements about cigarette availability and acceptability.

[b]Table entries are percentages of respondents indicating the reason started smoking regularly was very important.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Perceived Availability and Acceptability, Q66; Importance of Reason Started Smoking, Q67).

and 42.7% indicated that "my spouse, live-in partner, or the person I date disapproves of my smoking (or would disapprove if I did smoke)." However, only 14.8% of respondents reported that smoking is part of being in the military. Compared with personnel from the other Services, Air Force personnel were less likely to indicate that the number of places to buy cigarettes at their installation makes it easy to smoke and that most of their friends in the military smoke, and they were more likely to indicate that they do not like being around people when they are smoking.

Table 6.5 also presents information about the reasons military personnel start smoking regularly. In the total DoD, there are three frequently cited reasons: to help relax and calm down (26.2%), to help relieve stress (25.4%), and to relieve boredom (22.2%). Only 2.1% reported that they started to smoke to fit in with the

military unit. This pattern of responses persisted across the individual Services.

6.1.5 Cigarette Use and Productivity Loss

Data presented earlier in this chapter showed that in 2005 approximately one-third of all personnel were current smokers. An important related issue is the possible effect of this behavior on productivity within the military. Data addressing this question are presented in Table 6.6.

Table 6.6 presents information on productivity loss in the armed forces, by all personnel, current smokers, lifetime smokers, and nonsmokers. For purposes of comparison, the data for all personnel (regardless of cigarette use) are presented first. Overall, the prevalence of any productivity loss (1 or more work days affected) ranged from 8.7% to 30.5%. The most frequent types of productivity loss were leaving work early (30.5%), being late for work by 30 minutes or more (27.3%), and working below normal performance level (also 27.3%). Being hurt in an on-the-job accident showed a much lower prevalence (8.7%).

Next is an examination of the data for personnel who were current smokers at the time they completed the survey. Compared with nonsmokers, current smokers reported higher percentages of any productivity loss. For example, current smokers were 1.5 times more likely to be hurt in an on-the-job accident than nonsmokers. Ratios for other types of productivity loss ranged from 1.0 to 1.3. Individuals classified as "lifetime smokers" (but not current smokers) showed similar productivity losses to those of nonsmokers.

Although the findings from this survey reveal a tendency for current smokers to report greater productivity loss, it should be noted that the productivity loss ratios ranged from 1.0 to 1.5. Hence, any evidence to suggest that cigarette smoking is related to these measures of productivity loss in the military is relatively weak.

6.1.6 Attempts to Stop Smoking Cigarettes

Information regarding attempts to stop smoking provides valuable insights into the response of smokers in the military to policies and programs designed to reduce smoking. For this reason, these data are particularly relevant to development of additional military smoking policies and programs.

Table 6.7 presents the findings on respondents' smoking cessation behaviors during the past year. As shown in the top panel, a large percentage (54.4%) of military personnel never smoked. In the total DoD, a considerable proportion of personnel (13.8%) stopped smoking successfully, including 8.6% who stopped smoking over a year ago and 5.2% who stopped smoking within the past year. Among all personnel, 19.6% were current smokers who tried to quit within the past 12 months, and 12.3% were smokers who did not try to stop smoking. This pattern generally persisted across all four Services.

Perhaps of most interest to DoD are patterns of quit attempts and intentions to quit among past-year smokers. The middle panel of Table 6.7 shows smokers' attempts to stop smoking cigarettes during the past year. For the total DoD, 14.0% of smokers quit within the past year, 52.8% tried to quit but continued smoking, and 33.2% did not try to quit. Overall, 66.8% of the military personnel who were smokers in the past year made an attempt to quit during the past year. This pattern of quit attempts among past-year smokers in each Service is generally similar to that for the entire DoD.

A final consideration for those planning smoking cessation programs is the intent of current smokers to quit smoking. The bottom panel of Table 6.7 presents this information. Current smokers indicated whether they planned to quit smoking in the next 30 days or intended to quit in the next 6 months but not within the next 30 days. The time frame distinction was made because personnel who were planning to quit within 30 days may have been more committed to cessation than those who planned to quit at a later date; a more proximal cessation goal may reflect that an individual is further along in the "stages of change" process (DiClemente et al., 1991). Table 6.7 shows that approximately a fourth of current smokers (23.1%) were planning to quit soon, with an additional 40.0% reporting an intention to quit in the next 6 months. These

Table 6.6 **CIGARETTE USE AND PRODUCTIVITY LOSS, PAST 12 MONTHS, TOTAL DOD**

Group/Problem	*N*	Number of Work Days Affected, Past 12 Months				
		0 Days	1 Day	2 or 3 Days	4 or More Days	1 or More Days
All personnel	*15,933*					
Late for work by 30 minutes or more		72.7 (0.8)	11.3 (0.4)	9.9 (0.4)	6.1 (0.3)	27.3 (0.8)
Left work early		69.5 (0.8)	6.9 (0.3)	12.3 (0.4)	11.3 (0.5)	30.5 (0.8)
Hurt in an on-the-job accident		91.3 (0.6)	5.6 (0.4)	2.2 (0.3)	0.9 (0.1)	8.7 (0.6)
Worked below normal performance level		72.7 (0.7)	5.5 (0.3)	9.0 (0.4)	12.9 (0.5)	27.3 (0.7)
Did not come into work because of illness or injury		79.4 (0.8)	7.5 (0.3)	7.8 (0.5)	5.3 (0.3)	20.6 (0.8)
Current smokers[a]	*4,259*					
Late for work by 30 minutes or more		67.0 (1.3)	13.4 (0.7)	11.6 (0.8)	8.0 (0.5)	33.0 (1.3)
Left work early		67.3 (1.2)	7.4 (0.5)	13.2 (0.9)	12.1 (0.5)	32.7 (1.2)
Hurt in an on-the-job accident		88.7 (0.9)	7.0 (0.7)	3.1 (0.4)	1.2 (0.2)	11.3 (0.9)
Worked below normal performance level		70.1 (0.9)	6.2 (0.5)	8.7 (0.6)	15.0 (0.8)	29.9 (0.9)
Did not come into work because of illness or injury		79.1 (1.1)	7.7 (0.5)	7.7 (0.7)	5.6 (0.6)	20.9 (1.1)
Lifetime smokers[b]	*2,507*					
Late for work by 30 minutes or more		77.1 (1.1)	9.4 (0.9)	8.5 (0.8)	5.0 (0.4)	22.9 (1.1)
Left work early		70.5 (1.4)	4.9 (0.6)	12.6 (0.9)	12.0 (1.2)	29.5 (1.4)
Hurt in an on-the-job accident		92.8 (0.9)	4.9 (0.7)	1.5 (0.5)	0.8 (0.3)	7.2 (0.9)
Worked below normal performance level		73.0 (1.5)	4.2 (0.8)	9.1 (1.0)	13.7 (1.1)	27.0 (1.5)
Did not come into work because of illness or injury		77.8 (1.6)	8.1 (0.8)	7.9 (0.8)	6.3 (0.7)	22.2 (1.6)
Nonsmokers[c]	*9,167*					
Late for work by 30 minutes or more		75.0 (1.0)	10.6 (0.5)	9.2 (0.5)	5.2 (0.5)	25.0 (1.0)
Left work early		70.5 (0.9)	7.2 (0.5)	11.6 (0.7)	10.7 (0.5)	29.5 (0.9)
Hurt in an on-the-job accident		92.5 (0.6)	5.0 (0.4)	1.8 (0.2)	0.7 (0.2)	7.5 (0.6)
Worked below normal performance level		74.0 (0.9)	5.4 (0.4)	9.1 (0.5)	11.5 (0.6)	26.0 (0.9)
Did not come into work because of illness or injury		80.0 (1.1)	7.3 (0.5)	7.9 (0.5)	4.9 (0.4)	20.0 (1.1)

Note: Table displays the percentage of military personnel in the four groups of interest (all personnel, current smokers, lifetime smokers, and nonsmokers) who reported the specified problem (e.g., late for work by 30 minutes or more) affected no days, 1 day, 2 or 3 days, 4 or more days, and 1 or more days. Sample sizes by group are also provided. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Military personnel who smoked at least 100 cigarettes in lifetime and smoked in the past 30 days.

[b]Military personnel who smoked at least 100 cigarettes in lifetime but did not smoke in the past 30 days.

[c]Military personnel who smoked fewer than 100 cigarettes in lifetime.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Productivity Loss, Q86; Current Smoker, Lifetime Smoker, and Nonsmoker, Q49 and Q53).

Table 6.7 **SMOKING STATUS AND SMOKING CESSATION, PAST 12 MONTHS, BY SERVICE**

Measure/Type of Estimate	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Among all personnel[a]					
Never smoked[b]	49.8 (1.5)	54.1 (2.0)	50.6 (2.4)	61.3 (2.2)	54.4 (1.1)
Former smoker, quit over a year ago	7.1 (0.6)	9.2 (0.7)	6.3 (0.7)	10.8 (0.3)	8.6 (0.3)
Former smoker, quit within past year	5.2 (0.6)	4.6 (0.5)	7.1 (0.5)	4.8 (0.5)	5.2 (0.3)
Current smoker, tried to quit	22.6 (0.9)	18.9 (1.0)	23.9 (1.8)	14.9 (1.2)	19.6 (0.7)
Current smoker, didn't try to quit	15.3 (1.2)	13.3 (1.1)	12.0 (1.0)	8.2 (0.8)	12.3 (0.6)
Among smokers, past year[a]					
Quit within past year	12.2 (1.2)	12.4 (1.3)	16.6 (1.7)	17.4 (1.3)	14.0 (0.8)
Tried to quit	52.4 (1.8)	51.4 (1.0)	55.6 (2.2)	53.3 (1.8)	52.8 (0.9)
Didn't try to quit	35.4 (2.2)	36.2 (1.3)	27.8 (1.7)	29.3 (1.8)	33.2 (1.1)
Among current smokers[c]					
Planning to quit in next 30 days	22.6 (1.5)	22.8 (1.4)	23.5 (1.4)	24.0 (1.5)	23.1 (0.8)
Intending to quit in next 6 months	35.2 (0.9)	42.0 (1.4)	41.7 (1.7)	45.2 (2.0)	40.0 (0.7)

Note: Table displays the percentage of military personnel in the three groups of interest (all personnel, past year smokers, and current smokers) who reported the current smoking status and smoking cessation indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates in each column may not sum to 100 because of rounding.

[b]Smoked fewer than 100 cigarettes in their lifetime (Q49).

[c]Current smokers are defined as those who smoked at least 100 cigarettes in their lifetime and who smoked in the past 30 days.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Former Smoker, Quit Over a Year Ago or Within Past Year, Q49 and Q52; Current Smoker, Tried to Quit or Didn't Try to Quit, Q49, Q53, and Q54; Current Smoker, Planning to Quit in Next 30 Days, Q49, Q53, and Q55; Current Smoker, Planning to Quit in Next 6 Months, Q49, Q53, and Q55).

patterns of intention to quit held true in each of the four Services.

In summary, there is considerable interest in cessation of smoking. On the other hand, roughly one out of three past-year smokers did not try to quit in the past year, and the same proportion of current smokers reported no plans to quit in the near future.

6.1.7 Military and Civilian Comparisons

This section includes comparisons of the prevalence of current smoking made between civilian data taken from the 2004 NSDUH (OAS, 2005) and data from the 2005 DoD survey.

Comparisons of the prevalence of current smoking for the civilian and U.S.-based (including Alaska and Hawaii) military populations are shown in Table 6.8. It should be noted that the smoking measure used in this table includes personnel who had smoked in the past 30 days, but to be comparable to the NSDUH measure, the other criterion of current smoking used in this report (smoking at least 100 cigarettes over one's lifetime) was not included in the measure reported in the table. To further increase comparability of the two data sets, the civilian data were standardized to the sociodemographic distribution of the U.S.-based military population by gender, age, education, race/ethnicity, and marital status. Details about the standardization procedures are given in Appendix F.

Table 6.8 presents data on the prevalence of current smoking within different age groups and among males, females, and the total population for the civilian and U.S.-based military populations. Based on the definition of current smoking used in these analyses, the overall DoD rate of 30.1% was similar to the civilian rate of 28.9%. However, when the rates of cigarette smoking in the total DoD are examined by gender-age categories, one can see that among both males and females aged 18

Table 6.8 **STANDARDIZED COMPARISONS OF THE PREVALENCE OF ANY CIGARETTE SMOKING AMONG MILITARY PERSONNEL AND CIVILIANS, PAST 30 DAYS, BY GENDER, AGE, AND SERVICE**

	Comparison Population					
Gender/Age Group	**Civilian**	**Total DoD**	**Army**	**Navy**	**Marine Corps**	**Air Force**
Males						
Sample size	*19,387*	*8,256*	*1,582*	*2,021*	*2,205*	*2,448*
18-25	37.6 (0.8)	42.4 (1.7)[a]	49.0 (2.0)[a]	37.8 (3.0)	42.8 (4.2)	37.0 (2.7)
26-55	24.6 (0.8)	23.4 (1.4)	31.4 (2.1)[a]	25.9 (2.8)	24.8 (1.3)	16.2 (1.7)[a]
All ages	30.0 (0.6)	31.3 (1.5)	39.4 (1.9)[a]	29.8 (3.3)	36.3 (2.8)[a]	23.3 (2.0)[a]
Females						
Sample size	*21,762*	*2,923*	*524*	*841*	*469*	*1,089*
18-25	25.8 (0.6)	29.2 (1.6)[a]	31.7 (3.3)	27.0 (4.6)	29.1 (2.7)	28.1 (1.8)
26-55	19.7 (0.7)	18.6 (1.5)	19.2 (4.1)	18.6 (2.7)	19.7 (4.3)	18.3 (1.6)
All ages	22.7 (0.5)	23.8 (1.3)	26.0 (3.1)	22.2 (3.0)	26.6 (1.9)[a]	22.8 (1.5)
Total						
Sample size	*41,149*	*11,179*	*2,106*	*2,862*	*2,674*	*3,537*
18-25	35.4 (0.7)	40.0 (1.5)[a]	45.8 (2.3)[a]	35.5 (3.1)	41.9 (3.9)	34.8 (2.1)
26-55	23.9 (0.7)	22.7 (1.4)	29.7 (2.4)[a]	24.8 (2.6)	24.6 (1.3)	16.6 (1.6)[a]
All ages	28.9 (0.5)	30.1 (1.4)	37.3 (2.2)[a]	28.5 (3.1)	35.7 (2.6)[a]	23.2 (1.9)[a]

Note: Table displays the percentage of military personnel by Service, gender, and age group who were classified as cigarette smokers in the past 30 days. The standard error of each estimate is presented in parentheses. Sample size by gender and Service also provided. Civilian data have been standardized to the U.S.-based military data by gender, age, education, race/ethnicity, and marital status. Data for the total DoD and the individual Services are U.S.-based population estimates (including personnel in Alaska and Hawaii). Sample size shows the number of cases on which the weighted estimates are based. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Significantly different from civilian estimate at the 95% confidence level.

Civilian data source: National Survey on Drug Use and Health, 2004.

Military data source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Cigarette Smoking, Past 30 Days, Q52 and Q53).

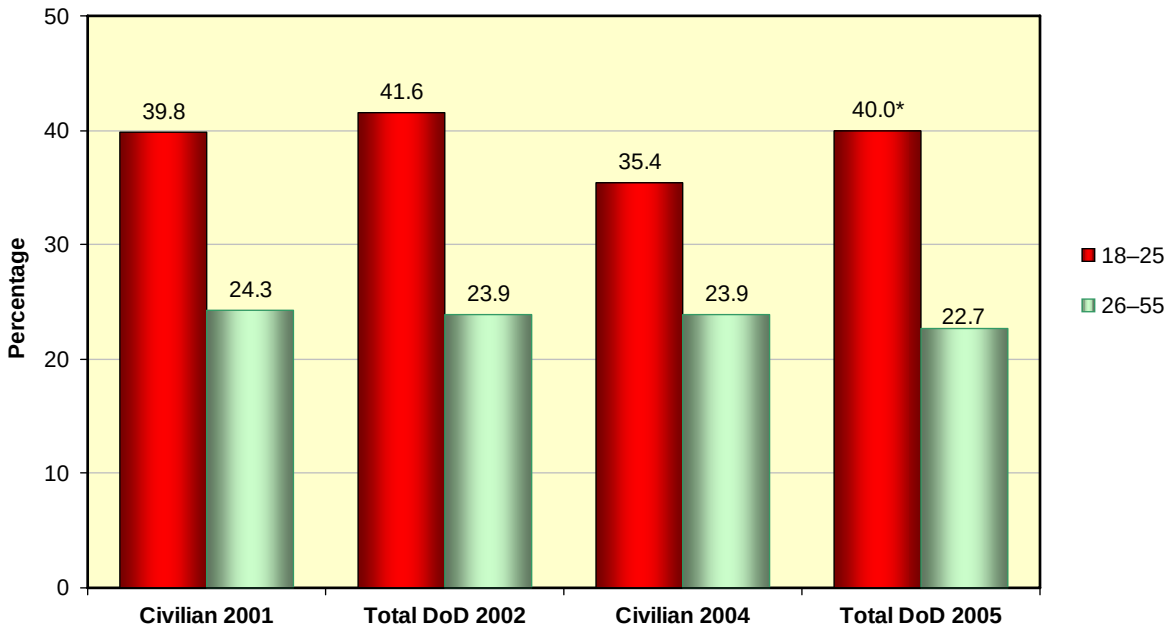
to 25, DoD had a significantly higher rate of current smoking than civilians. As seen in Figure 6.1, DoD and civilians aged 18 to 25 had a similar standardized prevalence of current smoking when comparing the rates of the 2001 NSDUH (OAS, 2002) and the 2002 DoD survey. There was not a difference between DoD and civilians for either males or females aged 26 to 55.

When looking at the total sample, the Army (37.3%) and the Marine Corps (35.7%) had a significantly higher prevalence of cigarette smoking than civilians (28.9%), whereas the Air Force (23.2%) had a significantly lower prevalence than civilians. Within the Army, males aged 18 to 25 and males aged 26 to 55 had higher smoking prevalence rates than their civilian counterparts, whereas this was not the case for females. The Marine Corps was the only Service in which females (26.6%) had a significantly higher prevalence of current smoking than their civilian counterparts. Within the Air Force, males aged 18 to 25 and males aged 26 to 55 had lower smoking prevalence rates than their civilian counterparts, whereas this was not the case for females.

6.2 Cigar, Pipe, and Smokeless Tobacco Use

Military personnel use forms of tobacco other than cigarettes. Knowing the extent of tobacco use other than cigarettes is necessary to develop comprehensive policies and programs for prevention and cessation of tobacco use. This section examines data related to the use of smokeless tobacco, as well as cigar and pipe smoking.

Figure 6.1 Standardized comparisons of any cigarette smoking, past 30 days, for persons aged 18 to 55, 2002-2005



*Statistically significant from civilian at 95% confidence level.

6.2.1 Prevalence of Smokeless Tobacco Use, Past 30 Days

Table 6.9 presents the prevalence of past-month smokeless tobacco use for each of the Services and for the total DoD. Because smokeless tobacco is used predominantly by males, prevalence estimates are presented in greater detail for males. In addition, data from the 1995, 1998, and 2002 DoD surveys are presented for comparison. It should be noted that these prevalence estimates have not been adjusted for sociodemographic differences.

As shown in the bottom panel of Table 6.9, 14.5% of all military personnel in 2005 reported using smokeless tobacco in the past 30 days. Among males across all Services, the rate of smokeless tobacco use was 16.8%, and prevalence of use was higher among younger personnel. The prevalence rate of smokeless tobacco use for men aged 18 to 24 was 21.6%, but only 10.1% of those aged 35 or older.

Comparisons across the four Services show large differences in past-month smokeless tobacco use in 2005. Personnel in the Marine Corps had the highest prevalence of use (22.3%), followed by the Army (18.8%), Navy (11.1%), and Air Force (9.2%). The prevalence of smokeless tobacco use was especially high among males aged 18 to 24 in the Army and the Marine Corps, with approximately a fourth of males reporting past-month use. Within each Service, the pattern of lower prevalence rates among older personnel applied. For a more detailed look at sociodemographic correlates of smokeless tobacco use, please see Appendix D (Table D.17).

With respect to trends, Table 6.9 indicates that, for all personnel, the prevalence of smokeless tobacco use increased significantly from 12.2% in 2002 to 14.5% in 2005. When looking only at males, this significant increase between 2002 and 2005 was found for personnel aged 18 to 24, but not for those in older age groups. Among those aged 35 or older, the prevalence of smokeless tobacco use was nearly two times higher in 2005 (10.1%) compared with 1998 (5.3%). With respect to individual Services, a significant increase in smokeless tobacco use was seen in the Army (14.0% in

Table 6.9 **TRENDS IN SMOKELESS TOBACCO USE, PAST 30 DAYS, FOR ALL PERSONNEL AND MALES, BY SERVICE AND AGE, 1995-2005**

Service/Age Group	Year of Survey 1995	1998	2002	2005
Army				
All personnel	15.3 (1.1)	14.4 (1.3)	14.0 (1.0)	18.8 (1.4)**
Males				
All ages	17.4 (1.1)	16.7 (1.3)	16.7 (1.0)	21.5 (1.6)**
Ages 18-24	21.5 (1.4)	20.1 (1.2)	18.0 (1.8)	25.6 (1.7)**
Ages 25-34	18.6 (1.5)	18.6 (1.8)	18.3 (1.8)	21.4 (2.3)
Ages 35+	7.3 (1.0)	8.3 (1.0)	11.9 (1.8)	13.4 (2.6)
Navy				
All personnel	12.0 (1.7)	9.2 (0.8)	9.0 (0.9)	11.1 (0.6)
Males				
All ages	13.4 (1.7)	10.4 (0.7)	10.4 (1.1)	12.8 (0.7)
Ages 18-24	21.2 (2.7)	18.1 (1.7)	12.6 (3.2)	16.8 (1.6)
Ages 25-34	12.2 (1.5)	11.7 (0.8)	10.1 (1.1)	12.1 (1.4)
Ages 35+	4.6 (0.9)	3.2 (0.6)	7.4 (1.3)	8.3 (1.1)
Marine Corps				
All personnel	24.0 (1.4)	19.1 (1.6)	20.4 (3.3)	22.3 (1.8)
Males				
All ages	25.1 (1.3)	20.3 (1.5)	22.9 (2.9)	23.6 (1.8)
Ages 18-24	30.6 (1.0)	22.4 (2.0)	25.4 (3.1)	27.4 (2.0)
Ages 25-34	21.2 (2.2)	21.9 (1.3)	21.8 (2.8)	18.6 (2.7)
Ages 35+	11.6 (1.4)	10.2 (1.2)	14.2 (1.8)	17.7 (2.7)
Air Force				
All personnel	7.9 (1.0)	7.3 (0.7)	8.8 (1.7)	9.2 (1.1)
Males				
All ages	9.3 (1.1)	8.9 (0.8)	11.0 (1.9)	11.4 (1.2)
Ages 18-24	15.9 (1.6)	13.7 (1.0)	13.1 (2.7)	14.3 (2.6)
Ages 25-34	9.0 (1.1)	10.5 (0.9)	12.5 (1.4)	12.2 (2.0)
Ages 35+	3.3 (0.9)	3.4 (1.0)	7.8 (1.5)	7.7 (1.5)
Total DoD				
All personnel	13.2 (0.7)	11.7 (0.7)	12.2 (0.8)	14.5 (0.7)**
Males				
All ages	15.0 (0.7)	13.4 (0.6)	14.5 (0.9)	16.8 (0.8)
Ages 18-24	21.9 (1.0)	19.0 (0.8)	17.1 (1.5)	21.6 (1.1)**
Ages 25-34	13.9 (0.7)	14.6 (0.7)	15.3 (0.9)	15.7 (1.1)
Ages 35+	5.5 (0.5)	5.3 (0.5)	9.5 (0.8)	10.1 (1.0)

Note: Table entries are percentages of military personnel by Service, gender, age group, and survey year who used smokeless tobacco at least 20 times in their lifetime and who used it in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences between Services. Definitions and measures of substance use are given in Section 2.5.3.

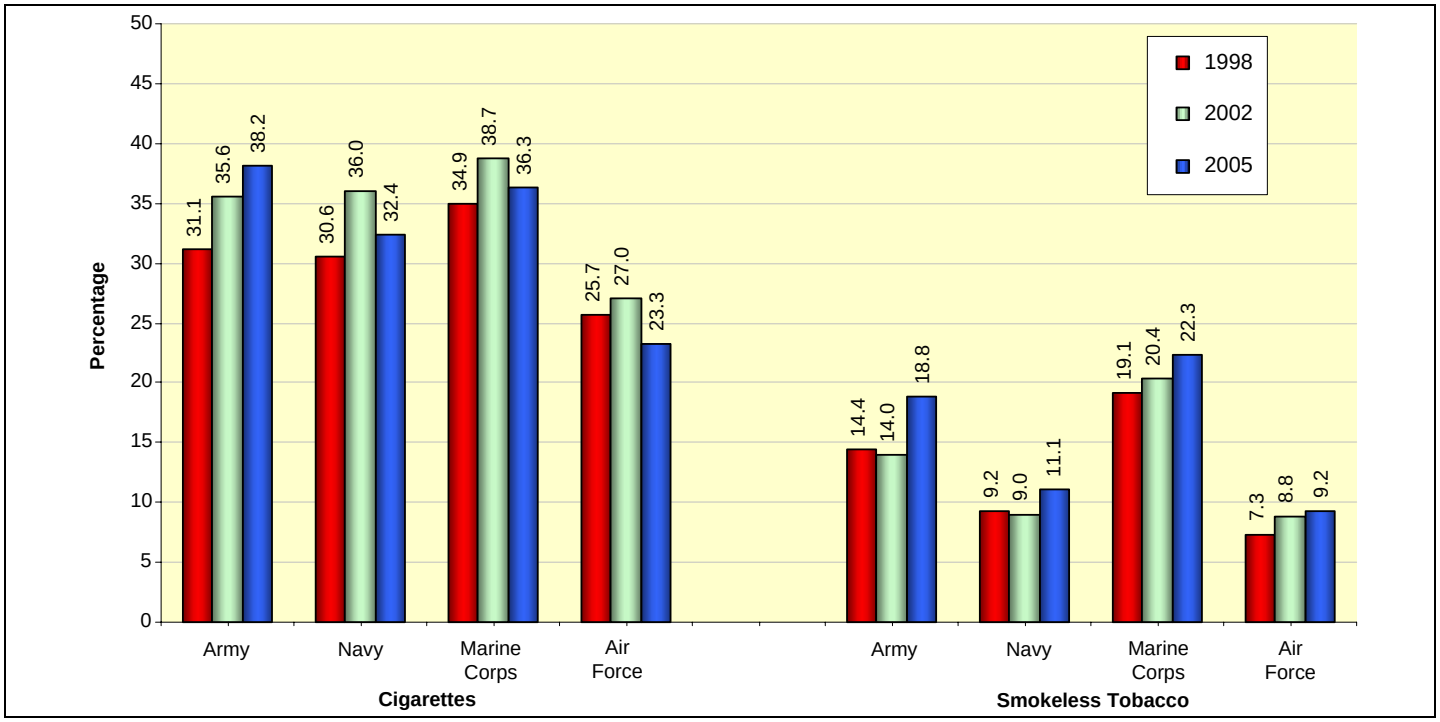
**Comparisons between 2002 and 2005 are statistically significant at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 1995 to 2005 (2005 Questions: Smokeless Tobacco Use, Q62 and Q64; refer to Section 2.5.1 for descriptions of sociodemographic variables).

2002 and 18.8% in 2005), whereas there was not a significant change in the other Services.

Figure 6.2 presents trends from 1998 to 2005 on past-month use of both smokeless tobacco and cigarettes. As shown (and noted previously in Table 6.9), the Services showed little variation in past-month smokeless tobacco use between 1998 and 2002, but saw a significant increase in use from 2002 to 2005. Past-month smoking saw a significant increase between 1998 and 2002, but leveled off from 2002 to 2005. Specifically, past-month smoking rates for the Navy, Marine Corps, and Air Force increased from 1998 to 2002 and then decreased from 2002 to 2005, similar to the 1998 levels. Note that rates of past-month cigarette use were consistently higher than rates of smokeless tobacco use.

Figure 6.2 Service comparisons in the prevalence of any cigarette use and smokeless tobacco use, past 30 days, 1998-2005



6.2.2 Smokeless Tobacco Initiation

As was the case with cigarette use (see Section 6.1.4), a substantial number of personnel began using smokeless tobacco after joining the military (see Table 6.10). In the total DoD, 13.7% of males indicated that they had initiated smokeless tobacco use in the military. In the total DoD, 17.5% of males aged 18 to 25 had initiated smokeless tobacco use since joining the military, as had 10.3% of males aged 26 to 55. Initiation of smokeless tobacco in the military was higher in the Army and the Marine Corps than in the Navy and Air Force.

6.2.3 Prevalence and Frequency of Cigar and Pipe Smoking and Smokeless Tobacco Use, Past 12 Months

In addition to past-30-day use of smokeless tobacco, the prevalence and frequency of past-year use of smokeless tobacco, as well as cigars or pipes, were examined. The bottom panel of Table 6.11 presents the unadjusted prevalence of past-year use of smokeless tobacco for the total DoD and for each of the Services. Overall, the prevalence of past-year use was 21.6%. Estimates of past-year use were highest in the Marine Corps (33.0%), followed by the Army (27.7%), the Navy (16.7%), and the Air Force (14.5%). An examination of the frequency information reveals that, regardless of Service, most personnel who used smokeless tobacco did so 1 or more days a week.

Table 6.10 **SMOKELESS TOBACCO INITIATION IN THE MILITARY AMONG MALES, BY SERVICE AND AGE**

	Service				
Age Group	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
18-25	22.9 (1.9)	12.5 (1.3)	22.0 (2.1)	11.1 (1.2)	17.5 (1.0)
26-55	14.2 (1.7)	8.4 (0.8)	16.2 (1.4)	6.9 (0.9)	10.3 (0.7)
Total (18-55)	18.7 (1.6)	10.2 (0.7)	20.0 (1.3)	8.5 (0.9)	13.7 (0.7)

Note: Table displays the percentage of military personnel by Service and age group who started using smokeless tobacco since joining the military. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

Source: Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Smokeless Tobacco Initiation in the Military, Q63).

Table 6.11 **FREQUENCY OF CIGAR, PIPE, AND SMOKELESS TOBACCO USE, PAST 12 MONTHS, BY SERVICE**

	Service				
Tobacco/Frequency	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Cigars or pipes					
Didn't smoke	70.0 (1.1)	75.5 (1.3)	63.3 (2.7)	78.5 (1.8)	73.0 (0.8)
Less than once/week	26.8 (1.2)	21.9 (1.3)	33.1 (2.3)	19.6 (1.6)	24.2 (0.8)
1 or more days/week	3.2 (0.4)	2.7 (0.2)	3.7 (0.8)	1.9 (0.3)	2.8 (0.2)
Any cigar or pipe use	30.0 (1.1)	24.5 (1.3)	36.7 (2.7)	21.5 (1.8)	27.0 (0.8)
Smokeless tobacco					
Didn't use	72.3 (1.7)	83.3 (1.0)	67.0 (2.2)	85.5 (2.1)	78.4 (1.0)
Less than once/week	12.0 (0.6)	6.8 (0.6)	12.0 (1.6)	5.8 (1.0)	8.8 (0.5)
1 or more days/week	15.7 (1.4)	9.8 (0.6)	20.9 (1.5)	8.7 (1.2)	12.8 (0.7)
Any smokeless tobacco use	27.7 (1.7)	16.7 (1.0)	33.0 (2.2)	14.5 (2.1)	21.6 (1.0)

Note: Table displays the percentage of military personnel by Service who reported cigar or pipe and smokeless tobacco frequency of use as indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Section 2.5.3.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Cigar or Pipe Use, Q65; Smokeless Tobacco Use, Q64).

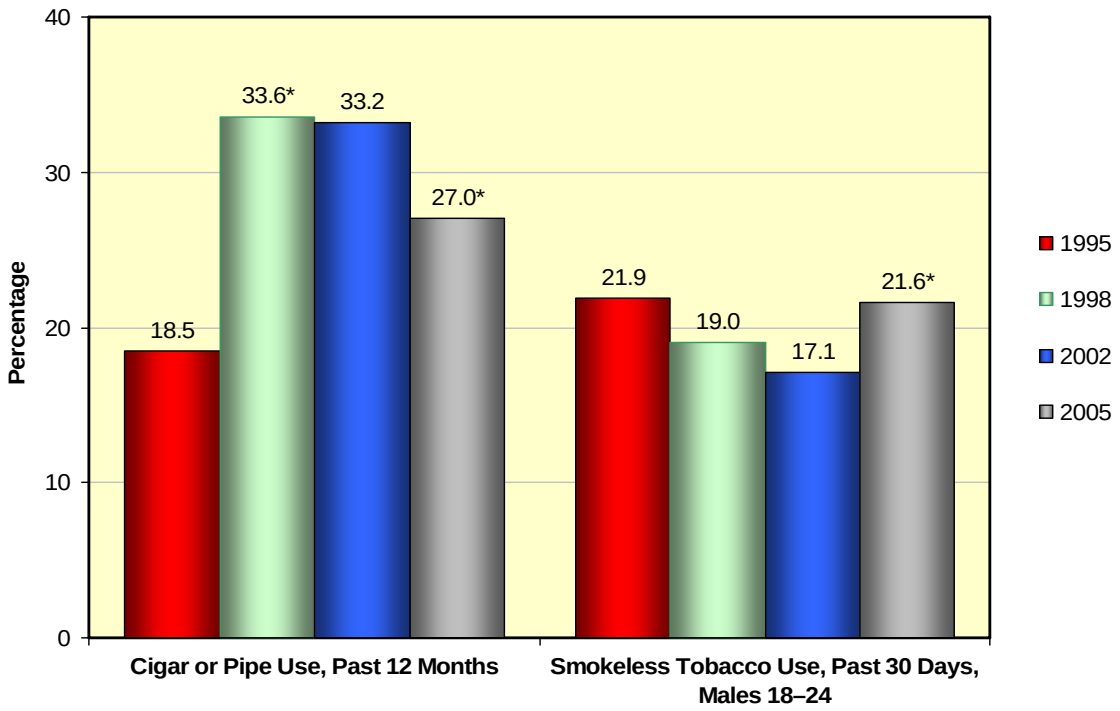
The top panel of Table 6.11 shows the frequency of cigar or pipe use. In the total DoD population, the prevalence of past-year cigar or pipe use was 27.0%. The highest prevalence was reported by the Marine Corps (36.7%), and the lowest prevalence was reported by the Air Force (21.5%). The Army and Navy had intermediate values (30.0%, and 24.5%, respectively).

Figure 6.3 presents trends from 1995 to 2005 in past-year cigar or pipe use for the total DoD and in smokeless tobacco use in the past 30 days among males aged 18 to 24. Past-year cigar or pipe use increased markedly from 1995 to 1998, was stable from 1998 to 2002, and dropped significantly from 2002 to 2005. In contrast, past-month smokeless tobacco use among males aged 18 to 24 decreased steadily from 1995 to 2002, before increasing significantly from 2002 to 2005.

6.3 Stress and Mental Health Problems by Smoking Status

Table 6.12 shows the prevalence of stress and mental health indicators for personnel who were current heavy smokers, current but not heavy smokers, former smokers, and never smokers. For each variable, personnel who were current heavy smokers were more likely to report stress or mental health indicators than

Figure 6.3 Trends in other tobacco use, total DoD, 1995-2005



*Statistically significant from prior survey.

were personnel who were former smokers or who had never smoked. For example, 29.8% of current heavy smokers reported "a lot" of stress at work in the past 12 months, compared with 17.6% of former smokers and 15.4% who had never smoked; 23.3% of current heavy smokers had limited their usual activities due to poor mental health on at least 1 day in the past month, compared with 11.6% of former smokers and 12.4% who had never smoked. Compared with former and never smokers, current heavy smokers were about 2 times as likely to meet the screening criteria for further anxiety evaluation or further depression evaluation, 2.5 times as likely to report suicide ideation in the past year, 2 times as likely to report serious psychological distress in the past 30 days, and 4 times as likely to meet the screening criteria for further PTSD evaluation. It should be noted that these associations do not necessarily imply a causal relationship between smoking and these stress and mental health variables.

6.4 Summary

This chapter has described tobacco use (cigarettes, smokeless tobacco, cigars, and pipes) among military personnel. For cigarette use, trends among personnel over the past 26 years were described, sociodemographic correlates and relationships to productivity were identified, information about smoking initiation and cessation was gathered, and comparisons between military and civilian populations were examined. The prevalence of smokeless tobacco use was estimated. Prevalence estimates for cigar or pipe smoking were also presented.

6.4.1 Trends in Cigarette Use and Service Comparisons

Findings of the 1980 to 2005 DoD surveys show that in the total DoD population the prevalence of any past-month smoking declined significantly from 51.0% in 1980 to 32.2% in 2002. Following a significant increase in the prevalence of any smoking between 1998 (29.9%) and 2002 (33.8%), the prevalence of any smoking in the

Table 6.12 **STRESS AND MENTAL HEALTH INDICATORS BY SMOKING STATUS**

Problem/Level	Smoking Status: Never Smoked	Former Smokers	Current but Not Heavy Smokers	Current Heavy Smokers
Stress at work, past 12 months				
A lot	15.4 (0.6)	17.6 (1.1)	23.4 (1.2)	29.8 (1.5)
Some/A little	59.4 (1.0)	62.1 (1.4)	55.2 (1.7)	53.4 (1.7)
None at all	25.3 (1.0)	20.3 (1.3)	21.4 (1.2)	16.8 (1.0)
Stress in family, past 12 months				
A lot	26.9 (1.0)	31.4 (1.6)	38.3 (1.3)	51.0 (2.2)
Some/A little	58.0 (1.0)	57.9 (1.6)	51.6 (1.0)	40.7 (2.1)
None at all	15.1 (1.1)	10.7 (0.9)	10.1 (0.8)	8.4 (0.9)
Days in past month limited usual activities due to poor mental health[a]				
11 or more days	2.2 (0.3)	2.0 (0.4)	3.5 (0.4)	6.4 (0.9)
4-10 days	2.3 (0.3)	2.2 (0.4)	4.6 (0.6)	5.2 (1.0)
1-3 days	7.9 (0.4)	7.4 (0.8)	11.7 (0.9)	11.7 (0.8)
None	87.6 (0.7)	88.4 (0.9)	80.3 (0.9)	76.8 (1.6)
Need for further anxiety evaluation, past 30 days				
Yes	15.6 (0.8)	16.1 (1.0)	20.7 (1.1)	32.2 (2.1)
No	84.4 (0.8)	83.9 (1.0)	79.3 (1.1)	67.8 (2.1)
Need for further depression evaluation				
Yes	18.5 (0.9)	19.6 (1.0)	26.9 (1.5)	36.3 (2.2)
No	81.5 (0.9)	80.4 (1.0)	73.1 (1.5)	63.7 (2.2)
Suicidal ideation, past year				
Yes	3.8 (0.4)	3.6 (0.7)	6.5 (0.6)	9.3 (1.5)
No	96.2 (0.4)	96.4 (0.7)	93.5 (0.6)	90.7 (1.5)
Serious psychological distress, past 30 days				
Yes	6.5 (0.5)	6.0 (0.6)	10.0 (0.8)	14.5 (1.5)
No	93.5 (0.5)	94.0 (0.6)	90.0 (0.8)	85.5 (1.5)
Need for further PTSD[b] evaluation, past 30 days				
Yes	0.9 (0.2)	0.7 (0.2)	2.0 (0.2)	4.0 (0.6)
No	99.1 (0.2)	99.3 (0.2)	98.0 (0.2)	96.0 (0.6)
Any physical/sexual abuse				
Yes	31.5 (1.1)	37.4 (1.6)	39.1 (1.2)	42.7 (2.1)
No	68.5 (1.1)	62.6 (1.6)	60.9 (1.2)	57.3 (2.1)

Note: Table displays the percentage of military personnel by smoking status who reported the stress and mental health problems noted in the rows of the table. The standard error of each estimate is presented in parentheses. Estimates may not sum within each column group to 100 because of rounding. Definitions and measures of substance use are given in Section 2.5.3.

[a]Based on respondents' perception of number of days when mental health limited usual activities.
[b]PTSD means posttraumatic stress disorder. Screening criteria suggest a need for further evaluation, not a clinical diagnosis.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Stress at Work, Q88; Stress in Family, Q89; Mental Health, Past 30 Days, Q97; Need for Further Depression Evaluation, Q94-Q96; Further Anxiety Evaluation, Q97; Suicidal Ideation, Q98A; Psychological Distress, Q100; PTSD Symptoms, Q102; Abuse Q101).

total DoD remained at about the same level in 2005 (32.2%) (see Table 6.1). Furthermore:

- There were no significant changes between 2002 and 2005 in the prevalence of any past-month smoking for any of the four Services. The Navy, Marine Corps, and Air Force showed slight reductions in any smoking, whereas the Army showed a slight increase in any smoking. The prevalence of any smoking in the Army (38.2%) was higher in 2005 than at any point since 1988 and has shown a statistically significant increase since 1998 (31.1%).
- For the total DoD population, the prevalence of heavy smoking also declined significantly, from 34.2% in 1980 to 11.0% in 2005. Unlike any smoking, the prevalence of heavy smoking in the total DoD did decrease significantly from 13.1% in 2002 to 11.0% in 2005. There were significant decreases between 2002 and 2005 in heavy smoking for the Navy and the Air Force. The Marine Corps also showed a slight decrease in the prevalence of heavy smoking, whereas the Army showed a slight increase.
- Overall, the comparisons of unadjusted and adjusted rates for any smoking and heavy smoking suggest that variations in the sociodemographic composition of the Services play a minimal role in explaining Service differences in smoking and had the greatest impact on the Marine Corps (see Table 6.2). Adjusted Marine Corps rates were notably lower than unadjusted rates. After adjusting for these factors, the Army showed higher rates of any past-month smoking, heavy smoking, and nicotine dependence compared with the other Services. The Air Force had a significantly lower adjusted rate of any smoking than any other Service and had significantly lower adjusted rates of heavy smoking and nicotine dependence compared with the Army or Navy.

6.4.2 Correlates of Cigarette Use

Results of logistic regression analysis (Table 6.3) show that the following groups were significantly more likely to be current smokers when the effects of all other sociodemographic variables in the model were held constant: personnel in the Army, Navy, and Marine Corps; males; white non-Hispanics; those who did not graduate from college; and those in pay grades lower than O4 to O10.

6.4.3 Cigarette Smoking Initiation and Perceived Cigarette Availability and Acceptability

Some previously published studies suggest that the military environment encourages smoking. This suggestion was confirmed with these data, which showed that in the total DoD 18.4% of respondents started smoking after joining the military (Table 6.4). Findings from Table 6.5 reveal that in the total DoD there are three frequently cited reasons for starting to smoke: to help relax and calm down (26.2%), to help relieve stress (25.4%), and to relieve boredom (22.2%). This pattern of responses persisted across the four Services.

6.4.4 Cigarette Use, Productivity Loss, and Attempts to Stop Smoking Cigarettes

Tobacco use has been linked with productivity loss. The most frequent types of productivity loss among military personnel were leaving work early (30.5%), being late for work by 30 minutes or more (27.3%), and working below normal performance level (27.3%) (Table 6.6). Compared with nonsmokers, current smokers were more likely to have any productivity loss, although the association is weak.

Among past-year smokers, 66.8% tried to quit or quit successfully in the past 12 months (Table 6.7). An estimated 23.1% of current smokers indicated that they planned to quit within the next 30 days, and an additional 40.0% reported an intention to quit within the next 6 months. This indicates that more than a third (36.9%) of current smokers do not have immediate plans to try and quit.

6.4.5 Military and Civilian Comparisons

Based on the definition of current smoking used in these analyses, the overall DoD rate of 30.1% in 2005 was similar to the civilian rate of 28.9% in 2004 (Table 6.8). However, both males and females aged 18 to 25 had a higher prevalence of current smoking than their civilian counterparts. In the Army, males had significantly higher rates of current smoking than civilians, but this difference was not significant for females. The Marine

Corps was the only Service in which females had a higher prevalence of current smoking than their civilian counterparts.

6.4.6 Other Tobacco Use

Overall, the prevalence of past-month smokeless tobacco use increased significantly from 12.2% in 2002 to 14.5% in 2005 (see Table 6.9). When looking only at males, this significant increase was seen for personnel aged 18 to 24, but not for personnel in older age groups. Comparisons across the four Services show large differences in past-month smokeless tobacco use. Personnel in the Marine Corps had the highest prevalence of use (22.3%), and those in the Air Force had the lowest (9.2%). For the Army (18.8%) and the Navy (11.1%), the estimates were intermediate; however, the Army was the only Service that showed a significant increase in smokeless tobacco use from 2002 to 2005. The Army and the Marine Corps had higher rates than the other Services of smokeless tobacco initiation after joining the military, with rates especially high for males aged 18 to 25 (22.9% in the Army, 22.0% in the Marine Corps) (see Table 6.10).

In the total DoD population, the prevalence of past-year cigar or pipe use was 27.0% (Table 6.11). This was a significant decrease from the prevalence of past-year cigar or pipe use in 2002 (Figure 6.3). The prevalence of cigar or pipe use in 2005 was highest in the Marine Corps (36.7%), followed by the Army (30.0%), Navy (24.5%), and Air Force (21.5%).

6.4.7 Conclusion

Taken together, findings from the 2005 DoD survey related to tobacco use are generally encouraging. First, the prevalence of any past-month smoking declined significantly from 51.0% in 1980 to 32.2% in 2005, and the increase in past-month smoking found between 1998 and 2002 did not increase further in 2005. Second, there was a significant decrease in heavy smoking between 2002 and 2005, and the prevalence of heavy smoking in 2005 (11.0%) was approximately a third of the prevalence in 1980 (34.2%). Third, two-thirds (66.8%) of the military personnel who were smokers in the past year made an attempt to quit during the past year.

Despite these encouraging findings, these data indicate a number of areas of concern regarding tobacco use in the military. First, there was a significant increase in the use of smokeless tobacco in the past 30 days in the total DoD, from 12.2% in 2002 to 14.5% in 2005. This indicates an increased need for prevention and cessation programs for smokeless tobacco, especially in the Army and the Marine Corps. Second, although a majority of the military personnel who were smokers in the past year attempted to quit during that time, roughly one-third of past-year smokers did not try to quit in the past year, and the same proportion of current smokers reported no plans to quit in the near future. These smokers may represent a more formidable target for military policies and programs designed to encourage cessation. Third, there was considerable variation in the rates of tobacco use between Services, with the Army generally showing higher rates of smoking than the other Services and the Air Force generally showing lower rates of all tobacco use than the other Services. Though some variation among Services is expected because of differences in mission, these substantial differences could indicate that the tobacco use environment and the effectiveness of existing tobacco use reduction efforts vary among the Services.

Chapter 7: Healthy Lifestyles and Disease Prevention

This chapter reports findings about healthy lifestyles and health promotion among military personnel. Fitness and cardiovascular disease risk reduction are discussed, including the prevalence of personnel who meet screening criteria for overweight and underweight, physical activity, diet and food intake, use of dietary supplements, knowledge and awareness of blood pressure and cholesterol checks, and actions taken to control high blood pressure. Where appropriate, knowledge and behavior among military personnel are compared with relevant *Healthy People 2010* objectives (U.S. Department of Health and Human Services [DHHS], 2000) and the *Dietary Guidelines for Americans* (DHHS & U.S. Department of Agriculture [USDA], 2005). In contrast to the Department of Defense (DoD)-level information presented in Chapter 3, this chapter examines estimates for the Services and includes more detailed information about attaining *Healthy People 2010* objectives.

7.1 General Overview of Physical Activity and Cardiovascular Disease Risk Reduction

Cardiovascular disease, including coronary heart disease and stroke, remains a prevalent public health problem. Heart disease and stroke are the first and third leading causes of death, respectively, in the United States, for all age groups (Anderson, 2002). In addition, research has shown high blood pressure to be a risk factor for coronary heart disease and stroke (Kannel, 1993). Studies have shown that high cholesterol also is related to coronary heart disease and that reducing cholesterol reduces the risk of that condition (Grundy, 1997; Kannel, 1993; National Cholesterol Education Program, 1994; Rossouw, 1994). Moreover, a sedentary lifestyle, characterized by a lack of physical activity, increases a person's risk for coronary heart disease (DHHS, 1996; Francis, 1998). Similarly, research has linked being overweight with a variety of chronic medical problems, including hypertension, heart disease, and diabetes (Pi-Sunyer, 1993). Fortunately, behavioral measures can have a positive impact on these types of conditions. For example, the health benefits of regular physical activity and proper weight control have been well documented. Regular physical activity can reduce the risks of coronary heart disease, can prevent or help control high blood pressure, and is important for weight control (DHHS & USDA, 2005; Paffenbarger, Hyde, Wing, & Hsieh, 1986; Piani & Schoenborn, 1993; Siscovick, LaPorte, & Newman, 1985). In addition, physical activity can have positive mental health benefits, such as reducing depression or anxiety (DHHS, 1996; Taylor, Sallis, & Needle, 1985).

In addition to problems that stem from cardiovascular disease, overall physical well-being can be compromised by being underweight. Research in this area, however, is limited. Low body weight has been demonstrated to be associated with increased mortality, especially among older adults (Sichieri, Everhart, & Hubbard, 1992; Tayback, Kumanyika, & Chee, 1990). Among young men (17 or younger), being underweight has been linked with bronchial and lung conditions, intestinal conditions, and emotional disorders (Lusky et al., 1996). Lusky et al.'s study of young men at induction into the Israeli Army underscored the impact that disorders related to low body weight can have on military readiness and overall health. In the military, early detection of cardiovascular disease risks and low body weight is likely to be facilitated by access to medical care and regulations mandating that personnel receive regular preventive medical services.

This chapter presents findings from the 2005 DoD survey related to Body Mass Index (BMI) measures of overweight and underweight, physical activity, diet, dietary supplement use, exercise, high blood pressure screening and control, and cholesterol screening among military personnel. National standards for evaluating overweight and underweight have changed significantly over time (Kuczmarski & Flegal, 2000). In 2000, new cutoff points of a single BMI for all adults for determining overweight and underweight were incorporated into the *Healthy People 2010* (DHHS, 2000). These national standards were recently reaffirmed

and presented in more detail as part of the *Dietary Guidelines for Americans, 2005* (DHHS & USDA, 2005). These most recent standards differ from those released by the National Heart, Lung, and Blood Institute (NHLBI) (NHLBI, 1998) as guidance for physicians working in the area of clinical obesity management. Since the value of applying the new standards to the military is currently under review, this report provides information on overweight and obesity using the NHLBI standards and the new national standards. This will provide information for the military to assess the impact of the new guidelines.

In this chapter, 2005 DoD survey findings are compared with selected *Healthy People 2010* objectives. Below the specific objectives addressed in the survey with the 2010 national targets. Note that the objectives in *Healthy People 2010* include different age groups as the basis for their objectives; hence, the targets are based on different ages below. The baseline sources of data differ for these objectives, and this difference in the baseline comparative data source has led to adults being classed as 20 years or older (overweight/obesity, blood pressure, cholesterol: source data: National Health and Nutrition Examination Survey [NHANES]); 18 years or older (physical activity: National Health Interview Study [NHIS]); and all individuals 2 years or older (food intake: Continuing Survey of Food Intakes by Individuals [CSFII]).

- Increase the prevalence of adults who are at a healthy weight: target of 60% of adults aged 20 years or older.
- Reduce the proportion of adults who are obese (BMI greater than 30.0): target of 15% of adults aged 20 years or older.
- Reduce the proportion of adolescents 12 to 19 years old who are overweight and obese: target of 5% for this age group.
- Reduce the proportion of adults who engage in no leisure-time physical activity: target of 20% of adults aged 18 years or older.
- Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes a day: target of 30% of adults 18 years or older.
- Increase the proportion of adults who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion: target of 30% of adults 18 years or older.
- Increase the proportion of persons aged 2 years or older who consume at least two daily servings of fruit: target 75%.
- Increase the proportion of persons aged 2 years or older who consume at least three daily servings of vegetables, with at least one-third of them being dark green or orange vegetables: target 50%.
- Increase the proportion of persons aged 2 years or older who consume at least six daily servings of grain products, with at least three being whole grains: target 50%.
- Reduce the proportion of adults with high blood pressure: target 16% of adults 20 years of age or older.
- Increase the proportion of adults who have had their blood pressure measured within the preceding 2 years and can state whether their blood pressure was normal or high: target 95% of adults aged 18 years of age or older.
- Increase the proportion of adults with high blood pressure who are taking action (e.g., losing weight, increasing physical activity, or reducing sodium intake) to help control their blood pressure: target 95% if adults aged 18 years or older.
- Increase the proportion of adults who have had their blood cholesterol checked within the preceding 5 years: target 80% of adults aged 18 years or older.

7.2 Measures of Overweight, Underweight, and Physical Activity

7.2.1 BMI Measures of Overweight

The current national standards for overweight and obesity use criteria that are consistent with international standards and make a clear distinction between the criteria for children and adolescents, who are still growing, and adults (Kuczmarski & Flegal, 2000). Using these standards, adult military personnel were defined as overweight if they were 20 or more years of age and had a BMI of 25 or greater; individuals were defined as obese if their BMI was equal to or greater than 30.0. Use

of the BMI greater than or equal to 30.0 as a cutoff standard for obesity is consistent with the international criterion that is accepted for obesity (Kuczmarski & Flegal, 2000). For children and adolescents who still experience bone growth and who are under 20 years, gender-specific BMI-for-age percentile distributions are the current national standards (Kuczmarski & Flegal, 2000; Kuczmarski et al., 2000). Individuals under 20 years, with a BMI for age that falls between the 85th to 95th percentile are classified as "at risk for overweight." BMIs greater than or equal to the 95th percentile are classified as "overweight" (Kuczmarski & Flegal, 2000). The gender-specific, BMI-for-age Centers for Disease Control and Prevention (CDC) growth charts (available at http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm) form the current standards for individuals less than 20 years old. No ranges for this age group are classified as "obese." Prior to the national standardization, a number of different expert panels and approaches defined overweight and obesity for adults and children in the United States. Now government agencies working in the health arena use and promote one standard through government policy documents, such as *Healthy People 2010* and the *Dietary Guidelines for Americans.* The current standards have redefined overweight for adults by setting the cutoff points at a lower BMI. For the 2002 DoD report, not only were the cutoff points higher, but the BMI cutoff points also were gender specific:

- Men less than 20 years old: overweight = BMI greater than or equal to 25.8
- Men 20 years or older: overweight = BMI greater than or equal to 27.8
- Women less than 20 years old: overweight = BMI greater than or equal to 25.7
- Women 20 years or older: overweight = BMI greater than or equal to 27.3

These 2002 cutoff points contrast with the current national standards:

- Young men and women less than 20 years old: overweight = gender-specific BMI for age greater than or equal to 95th percentile
- Adults: overweight = BMI greater than or equal to 25.0; obese = BMI greater than or equal to 30.0

As this comparison shows, these changes in standards would lead to a decrease in prevalence of young persons overweight and obesity and an increase in prevalence of adult overweight and obesity using data from the same population.

These changes in national standards also reflect a difference in approach to the terms "overweight" and "obesity" (DHHS et al., 2000). Persons with a BMI greater than or equal to 25.0 are considered to have excess body weight and to therefore be "overweight." Individuals with BMIs in the range of 25.0 to 29.9 are therefore considered overweight or preobese but are not classified as obese. Anyone with a BMI greater than or equal to 30.0 is considered obese and overweight due to excess adiposity. While BMI is a widely used and convenient measure of body composition, the terms "overweight" and "overfat" are not fully equivalent. It is of course possible for an individual to have a BMI less than or equal to 30.0 and have excess body fat and the reverse. As discussed later, muscled individuals with an accumulation of lean body mass and a BMI at or above 25 may be classified as overweight even though their percent body fat is in a healthy range. For this reason, although the national standards for description and screening of overweight and obesity are based on BMI alone, national recommendations for medical management and treatment of obesity recommend using additional factors to confirm diagnosis and for medical management of obesity. These factors include abdominal adiposity based on waist circumference; concomitant risk factors for obesity-related chronic disease such as diabetes; and other measures, such as skin fold measurements and bioelectrical impedance (Kuczmarski & Flegal, 2000). Indeed, although BMI has been adopted as the standard in civilian populations and is the most practical assessment for use in surveys, it is only one measure of body composition used by the military and may not be the best measure given the above limitations. The military Services (with the exception of the Air Force) use BMI as a screening measure only. Active duty service members whose BMI exceed standards for their branch of Service are subsequently measured to calculate percent body fat. Adverse career actions and enrollment into Service weight management programs are based on body fat percent rather than on BMI. The

Air Force uses waist circumference or BMI < 25 as a body composition component of a composite physical fitness score that also includes strength and aerobic components.

Table 7.1 presents findings on the prevalence of overweight and obesity as measured by BMI among active-duty military personnel, by age, gender, and Service, calculated from self-reports of weight and height. Estimates in this table use the BMI cut points from the 2005 Dietary Guidelines. Note that with this criterion individuals less than 20 years of age have estimates of overweight but no prevalence values listed in the obese category. For individuals considered young adults under 20 years, 6.9% of all personnel (8.3% of males and 1.6% of females) would be classified as overweight according to CDC's gender-based BMI-for-age weight charts for this age group (Kuczmarski et al., 2000). These overall Service prevalence values for DoD for this age group are below the *Healthy People 2010* baseline of 11% of young adults aged 12 to 19 years based on the National Health and Nutrition Examination Survey (NHANES) 1988 to 1994 data. Overall, the 6.9% prevalence is only slightly higher than the 2010 target of 5% for 12 to 19 year olds. In contrast, males in this age group in the Navy had an especially high prevalence of overweight of 20.2% in the 2005 survey. The percentage of active duty service members overweight according to CDC standards who would be determined to be overfat according to their Service body composition standards could not be determined by this survey.

Table 7.1 illustrates that rates of overweight and obesity as measured by BMI increased with age within each Service for both men and women, with the exception of women in the Marine Corps who evidenced very low prevalence of obesity ranging from essentially 0% for women 26 to 34 years to only 2.9% for women 35 or older. The prevalence of overweight and obesity among women in the Marine Corps was notably lower than that of the other Services.

The latest national civilian prevalence of overweight and obesity based on measured height and weight in the 1999-2002 NHANES were 65% and 31%, respectively, for adults of both genders aged 20 to 74 years (CDC, 2004; Hedley et al., 2004). The most recent civilian NHIS data (collected using self-reported height and weight [Schoenborn et al., 2002]) reported much lower rates—35.2% overweight and 19.5% obese. Therefore, obesity in the total DoD was less than that of any recent reports for the U.S. civilian population. However, overweight or preobesity in military personnel was higher than in the civilian population and was higher with age. Among men in the military, the rate of overweight for individuals aged 35 or older for all Services was notably high (Navy: 80.1%; Army and Air Force: 77.1%; Marine Corps: 75.6%). Overweight was lower among military women but exceeded 50% for women aged 35 or more years for the Navy (57.8%), Army (54.5%), and Air Force (52.3%). However, fewer than 35% of women in the Marine Corps were classified as overweight at age 35 or more years. Readers also should use caution, however, in interpreting these overweight estimates, particularly those for younger personnel, because the BMI may somewhat overestimate the percentages of military personnel who are overweight. BMI does not distinguish between weight due to muscle and weight due to fat (Harrison, Brennan, & Shilanskis, 1998). Thus, some of these personnel who are classified as overweight by BMI screening may still have percentage body fat measurements that are within acceptable ranges for their Services. Indeed, current military policy dictates that the decisive factor for being considered overweight is percentage body fat (maximum 26% for males and maximum 36% for females) (DoD, 2002).

Prevalence of obesity as measured by BMI is very low in the DoD. The *Healthy People 2010* baseline for obesity from the NHANES 1988-1994 is 23% of adults 20 years or older with a target or 15% of adults by the year 2010. The DoD with a total prevalence of obesity of personnel 20 years or older of 12.4% already is below the *2010 Healthy People 2010* target.

Table 7.1 **OVERWEIGHT[a] AND OBESITY[b] AS MEASURED BY BMI IN ACTIVE-DUTY PERSONNEL, BY SERVICE, GENDER, AND AGE**

	Service									
	Army		Navy		Marine Corps		Air Force		Total DoD	
Gender/Age Group	**Overweight**	**Obese**	**Overweight**	**Obese**	**Overweight**	**Obese**	**Overweight**	**Obese**	**Overweight**	**Obese**
Males										
Under 20	3.7 (1.9)	N/A (N/A)	20.2 (7.2)	N/A (N/A)	+ (+)	N/A (N/A)	+ (+)	N/A (N/A)	8.3 (2.9)	N/A (N/A)
20-25	53.4 (2.5)	8.0 (0.9)	57.2 (1.9)	13.6 (0.7)	50.6 (1.8)	6.5 (1.3)	54.2 (2.4)	9.7 (0.9)	54.0 (1.2)	9.5 (0.6)
26-34	67.7 (1.8)	12.6 (1.3)	71.2 (1.9)	21.9 (1.8)	63.8 (2.2)	9.1 (1.8)	68.1 (2.4)	15.2 (1.3)	68.3 (1.1)	15.6 (0.8)
35 or older	77.1 (1.8)	15.3 (2.1)	80.1 (1.2)	23.1 (1.5)	75.6 (1.7)	10.4 (1.5)	77.1 (1.9)	21.4 (0.6)	77.9 (1.0)	19.5 (0.8)
Total males	57.9 (2.9)	10.2 (0.9)	65.6 (1.5)	18.0 (0.7)	52.7 (0.9)	7.0 (0.8)	65.4 (1.3)	15.1 (0.5)	61.3 (1.2)	13.2 (0.5)
Females										
Under 20	– (–)	N/A (N/A)	+ (+)	N/A (N/A)	– (–)	N/A (N/A)	1.0 (1.0)	N/A (N/A)	1.6 (1.3)	N/A (N/A)
20-25	37.9 (5.7)	5.9 (1.9)	45.4 (1.5)	12.9 (1.4)	18.2 (2.5)	2.8 (1.2)	29.5 (1.5)	5.2 (1.1)	35.6 (2.1)	7.3 (0.9)
26-34	38.4 (3.7)	6.0 (2.4)	51.8 (4.4)	17.9 (4.1)	30.1 (3.7)	– (–)	44.7 (2.9)	7.2 (1.7)	44.4 (2.0)	9.4 (1.4)
35 or older	54.5 (4.1)	14.4 (3.3)	57.8 (3.7)	12.6 (2.9)	34.6 (4.3)	2.9 (1.7)	52.3 (5.1)	9.0 (2.0)	54.1 (2.6)	11.6 (1.5)
Total females	37.3 (3.3)	7.0 (1.3)	46.4 (1.6)	13.3 (0.9)	20.0 (1.1)	1.9 (0.7)	36.7 (1.7)	6.2 (1.1)	38.5 (1.3)	8.1 (0.6)
Total										
Under 20	3.1 (1.6)	N/A (N/A)	17.4 (6.6)	N/A (N/A)	3.8 (2.8)	N/A (N/A)	4.1 (2.6)	N/A (N/A)	6.9 (2.3)	N/A (N/A)
20-25	51.0 (2.7)	7.7 (0.9)	55.2 (1.6)	13.5 (0.6)	48.3 (1.8)	6.2 (1.2)	48.6 (2.0)	8.7 (0.9)	51.0 (1.1)	9.1 (0.5)
26-34	64.0 (1.1)	11.8 (1.3)	68.5 (1.9)	21.3 (1.5)	62.1 (2.0)	8.7 (1.7)	63.6 (2.3)	13.6 (1.2)	64.9 (1.0)	14.7 (0.8)
35 or older	74.0 (1.6)	15.2 (1.8)	77.7 (1.6)	22.0 (1.4)	73.6 (1.7)	10.0 (1.4)	73.9 (1.9)	19.8 (0.7)	75.1 (1.0)	18.6 (0.7)
All personnel	54.9 (2.6)	9.7 (0.9)	62.8 (1.6)	17.3 (0.7)	50.7 (0.8)	6.7 (0.8)	59.8 (1.2)	13.4 (0.5)	57.9 (1.1)	12.4 (0.5)

Note: Table entries are percentages of military personnel by Service, gender, and age group who met the criteria for being overweight or obese. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Overweight and obesity are defined in terms of Body Mass Index (BMI). Definitions of BMI are given in Section 2.5.4. Adult guidelines for what is considered overweight and obesity for males and females greater than or equal to 20 years of age, were released most recently in the 2005 *Dietary Guidelines for Americans* (DHHS & USDA, 2005). These are consistent with *Healthy People 2010* guidelines (DHHS, 2000). For males and females less than 20 years, the current recommendations use a BMI-for-age growth approach based on CDC growth charts with BMIs greater than or equal to the 95th percentile classified as overweight (Barlow & Dietz, 1998). This approach for individuals less than 20 years of age is included in the *Healthy People 2010* guidelines (DHHS, 2000). BMI does not differentiate between muscle and body fat.

[a]BMI ≥ 25.0 for adults ≥ 20 years of age; ≥ 95th percentile of BMI-for-age for males and females < 20 years of age.

[b]BMI ≥ 30.0 for adults ≥ 20 years of age; there is no obese classification for males or females < 20 years of age.

+ Low precision.

– Estimate rounds to zero.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Overweight, Q119-Q120).

guidelines, both of which are based on BMI. The 2005 Dietary Guidelines define overweight for both genders older than 20 years as BMI greater than or equal to 25.0; BMI cutoff point for each gender less than 20 years are defined as the 95% percentile of BMI for age based on CDC growth charts. NHLBI (1998) criteria define overweight as a BMI greater than or equal to 25.0 regardless of age or gender.

Table 7.2 compares the data from each survey year from 1995 to 2005 with the data for overweight calculated using both the NHLBI 1998 standards and the 2005 *Dietary Guidelines* standards. In Table 7.2 both obese and overweight are grouped together as overweight for all years. As Table 7.2 shows, the *Dietary Guidelines*/ CDC approach of using a 95% confidence level cutoff point for BMI for age results in a significant drop in those individuals less than 20 years who are categorized as overweight when compared with using the straight BMI cutoff point of 25 for all age groups (NHLBI standard). The CDC approach reflects the newer research data that indicate the continued bone growth of adolescents into their 20s. Therefore, basing overweight categories on gender- and growth-based curves for BMI better reflects the current understanding of body fat and disease risk in young adults (Kuczmarski & Flegal, 2000; Kuczmarski et al., 2000). As Table 7.2 indicates, the result is a lowered overall rate of overweight in total military personnel. However, these data continue to illustrate that data for active-duty military personnel parallel the civilian population with an increase in overweight over the last 10 years.

Figures 7.1–7.3 show the variation in BMI levels across survey years, age groups, and Services based on the NHLBI BMI definition. As shown in Figure 7.1, among personnel both under 20 years of age and those aged 20 years or older, the percentage with a BMI greater than or equal to 25 increased significantly from 1995 to 2005. Using this criterion, for the 2005 survey there are 48.2% overweight and 13.3% obese (BMI greater than or equal to 30) people among those aged 20 or older and 38.1% overweight and 7.0% obese in those younger than 20. When examined by Service (see Figure 7.2), the Navy had the highest overall percentage of people with a BMI greater than or equal to 25 at 64.8%, which was above the total DoD of 60.5% and higher than the other Services: Air Force, 60.7%; Army, 58.9%; and Marine Corps with the lowest at 54.8%.

These findings may reflect differing Service policies. The Navy has for many years adopted a policy permitting active-duty service members consistently exceeding body composition standards to remain on active duty with restricted opportunities for promotion and assignment. The other Services have policies favoring separation for individuals unable to comply with body composition standards over several measurement cycles. The Navy has changed OPNAV Instruction 6110.1H outlining the Physical Readiness Program to include administrative separation for repeated noncompliance with body composition standards.

When examining these trends by both age group and Service (Figure 7.3), with the exception of the estimates for Air Force personnel under 20 years of age, which were suppressed because of imprecise estimates, each of the Services showed significant increases in BMI-defined overweight both among personnel under 20 years of age and those 20 years or older between 1995 and 2005. In addition, in 2005, the Navy had 17.4% obese individuals under the age of 20 and 18.4% obese individuals age 20 or older Air Force, Army, and Marine Corps personnel all had lower percentages of obese individuals.

7.2.2 BMI Measures of Underweight

Table 7.3 presents data on the percentages of military personnel considered underweight, by age and gender, calculated from self-reports of weight and height, using cutoff points of BMI based on the most recent *Dietary Guidelines for Americans, 20*05 (DHHS & USDA, 2005). As was indicated for overweight, estimates for prevalence of underweight were based only on those personnel whose reported heights were within the Services' acceptable height standards. Similar to overweight and obesity classifications, national standards have changed. For individuals younger than 20 years old, classification of underweight is based on gender-specific, BMI-for-age percentile distributions

Table 7.2 **COMPARISON OF BMI MEASURES OF OVERWEIGHT IN ACTIVE-DUTY PERSONNEL, 1995-2005, BY GENDER AND AGE, USING 1998 NHLBI GUIDELINES AND 2005 *DIETARY GUIDELINES***

	1995		1998		2002		2005	
Gender/Age	**NHLBI Guidelines[a]**	**Dietary Guidelines[b]**	**NHLBI Guidelines**	**Dietary Guidelines**	**NHLBI Guidelines**	**Dietary Guidelines**	**NHLBI Guidelines**	**Dietary Guidelines**
Male								
Under 20	30.8 (1.8)[c,d]	2.2 (0.9)[d]	35.2 (2.6)[d]	1.4 (0.7)[d]	38.8 (2.4)[d,e]	2.2 (0.8)[d]	49.2 (3.9)[c,e,f]	8.3 (2.9)[c,e,f]
20 or older	55.3 (0.6)[c,d,f]	55.3 (0.6)[c,d,f]	59.6 (0.6)[c,d,e]	59.6 (0.6)[c,d,e]	63.5 (0.9)[e,f]	63.5 (0.9)[e,f]	64.9 (1.0)[e,f]	64.9 (1.0)[e,f]
Total	54.1 (0.6)[c,d,f]	52.6 (0.7)[c,d,f]	58.7 (0.5)[c,d,e]	57.3 (0.6)[c,d,e]	62.3 (0.9)[e,f]	60.4 (1.1)[e,f]	63.9 (1.0)[e,f]	61.3 (1.2)[e,f]
Female								
Under 20	14.8 (3.6)[c,d]	– (–)	14.8 (3.0)[c,d]	– (–)	28.3 (2.8)[e,f]	0.8 (0.7)	29.5 (5.4)[e,f]	1.6 (1.3)
20 or older	22.0 (0.9)[c,d,f]	22.0 (0.9)[c,d,f]	26.8 (1.1)[c,d,e]	26.8 (1.1)[c,d,e]	32.6 (1.6)[d,e,f]	32.6 (1.6)[d,e,f]	42.3 (1.2)[c,e,f]	42.3 (1.2)[c,e,f]
Total	21.5 (0.9)[c,d,f]	20.4 (0.8)[c,d,f]	26.1 (1.1)[c,d,e]	25.3 (1.1)[c,d,e]	32.3 (1.5)[d,e,f]	30.5 (1.6)[d,e,f]	41.1 (1.2)[c,e,f]	38.5 (1.3)[c,e,f]
Total								
Under 20	28.1 (1.7)[c,d]	1.8 (0.7)[d]	31.6 (2.2)[d]	1.2 (0.5)[d]	36.5 (2.2)[d,e]	1.9 (0.6)[d]	45.1 (3.7)[c,e,f]	6.9 (2.3)[c,e,f]
20 or older	51.2 (0.6)[c,d,f]	51.2 (0.6)[c,d,f]	55.2 (0.5)[c,d,e]	55.2 (0.5)[c,d,e]	58.3 (0.8)[d,e,f]	58.3 (0.8)[d,e,f]	61.6 (0.9)[c,e,f]	61.6 (0.9)[c,e,f]
Total	50.0 (0.6)[c,d,f]	48.6 (0.6)[c,d,f]	54.2 (0.5)[c,d,e]	52.9 (0.5)[c,d,e]	57.2 (0.8)[d,e,f]	55.3 (0.9)[e,f]	60.5 (0.9)[c,e,f]	57.9 (1.1)[e,f]

Note: Table entries are percentages of military personnel by year, gender and age group that meet the criteria for being overweight. NHLBI = National Heart, Lung, and Blood Institute.

[a]Definition of Body Mass Index (BMI) is given in Section 2.5.4. National Heart, Lung, and Blood Institute (NHLBI) (1998) guidelines define overweight as BMI > 25.0, regardless of age or gender. BMI does not differentiate between muscle and body fat.

[b]Definition of BMI is given in Section 2.5.4. *Dietary Guidelines* (2005) define overweight as BMI > 25.0 for adults >20 years of age; >95th percentile of BMI-for-age growth approach based on CDC growth charts for males and females <20 years of age.

[c]Comparisons between this estimate and 2002 estimate are statistically significant at the 95% confidence level.

[d]Comparisons between this estimate and 2005 estimate are statistically significant at the 95% confidence level.

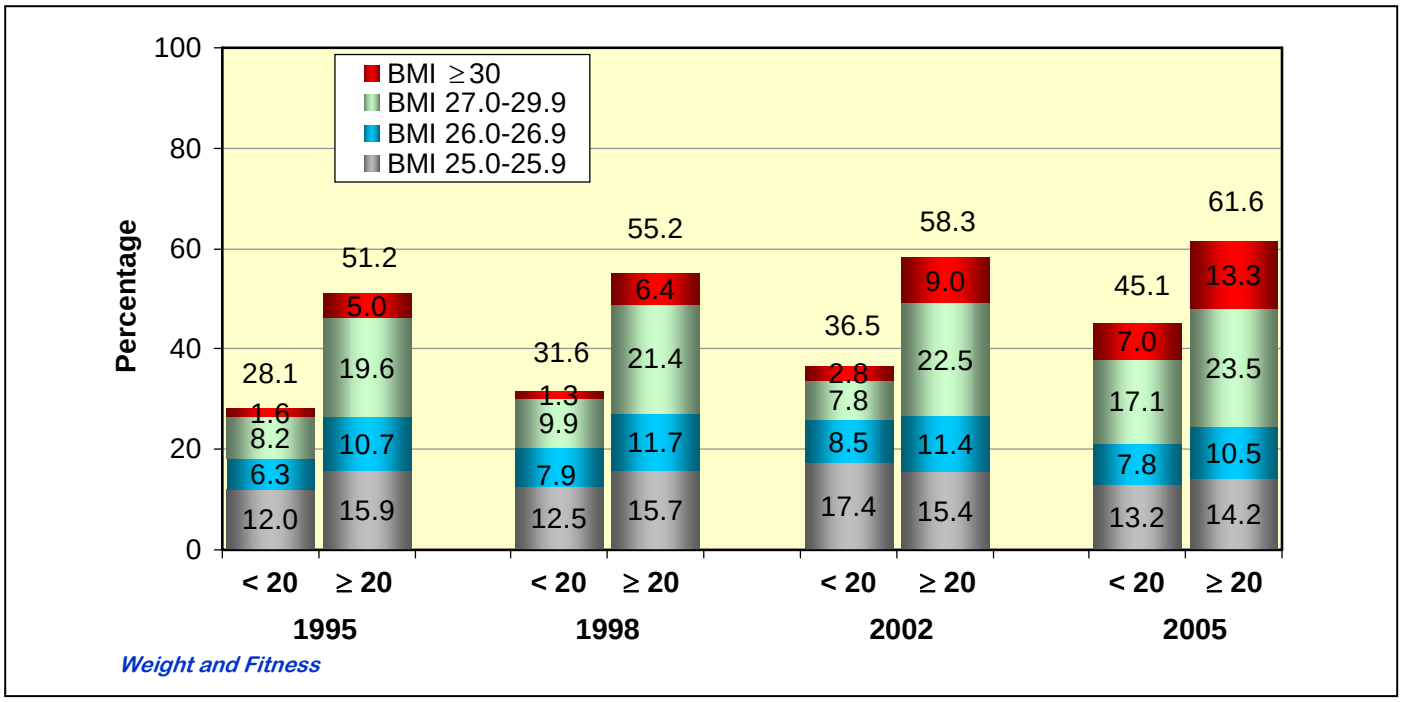
[e]Comparisons between this estimate and 1995 estimate are statistically significant at the 95% confidence level.

[f]Comparisons between this estimate and 1998 estimate are statistically significant at the 95% confidence level.

– Estimate rounds to zero.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995, 1998, 2002, and 2005 (2005 Questions: Q119-120).

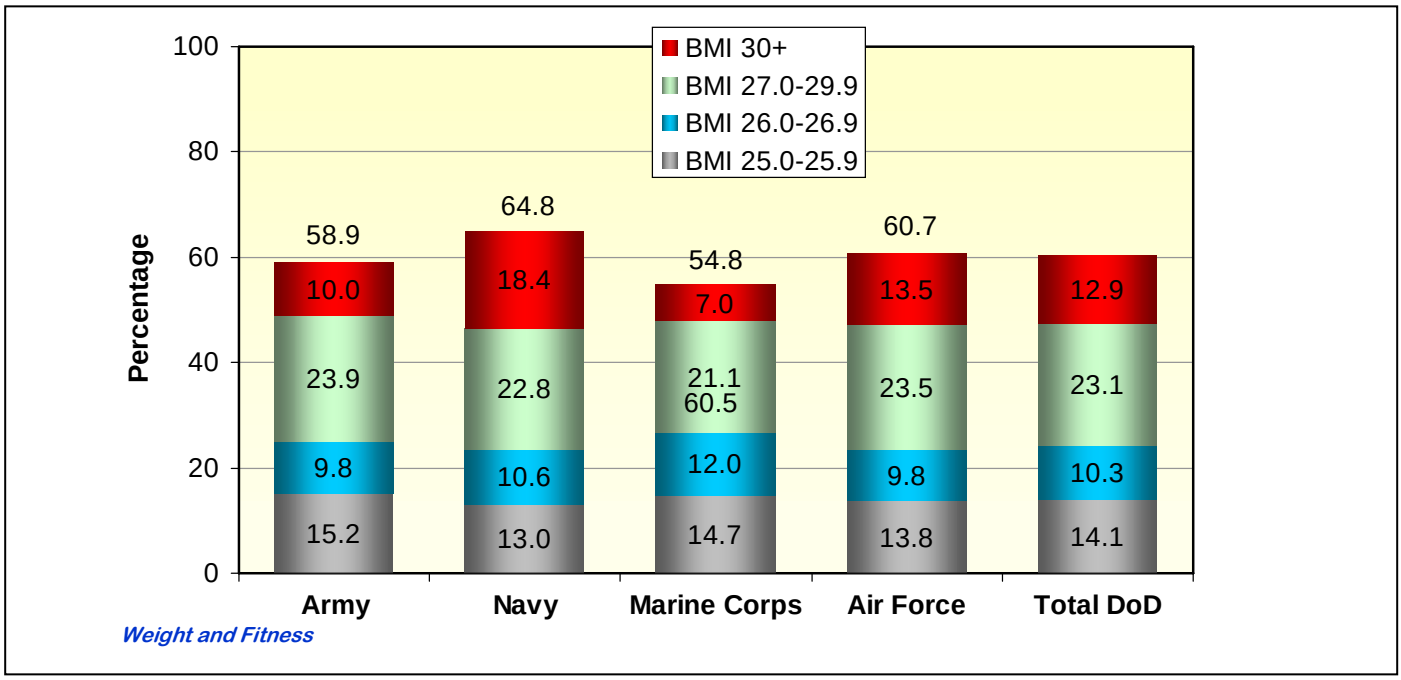
Figure 7.1 Trends in body fat by age group using BMI as a screener, 1995-2005[a]



BMI = Body Mass Index is defined as weight (kg) / [height (m)]^2. The survey uses self-reports of height and weight. In 1998, the National Heart, Lung and Blood Institute (NHLBI) defined BMI greater than 25 as a screener for overweight status. BMI does not differentiate between muscle and fat. Numbers in bars may not sum to totals greater than 25 because of rounding.

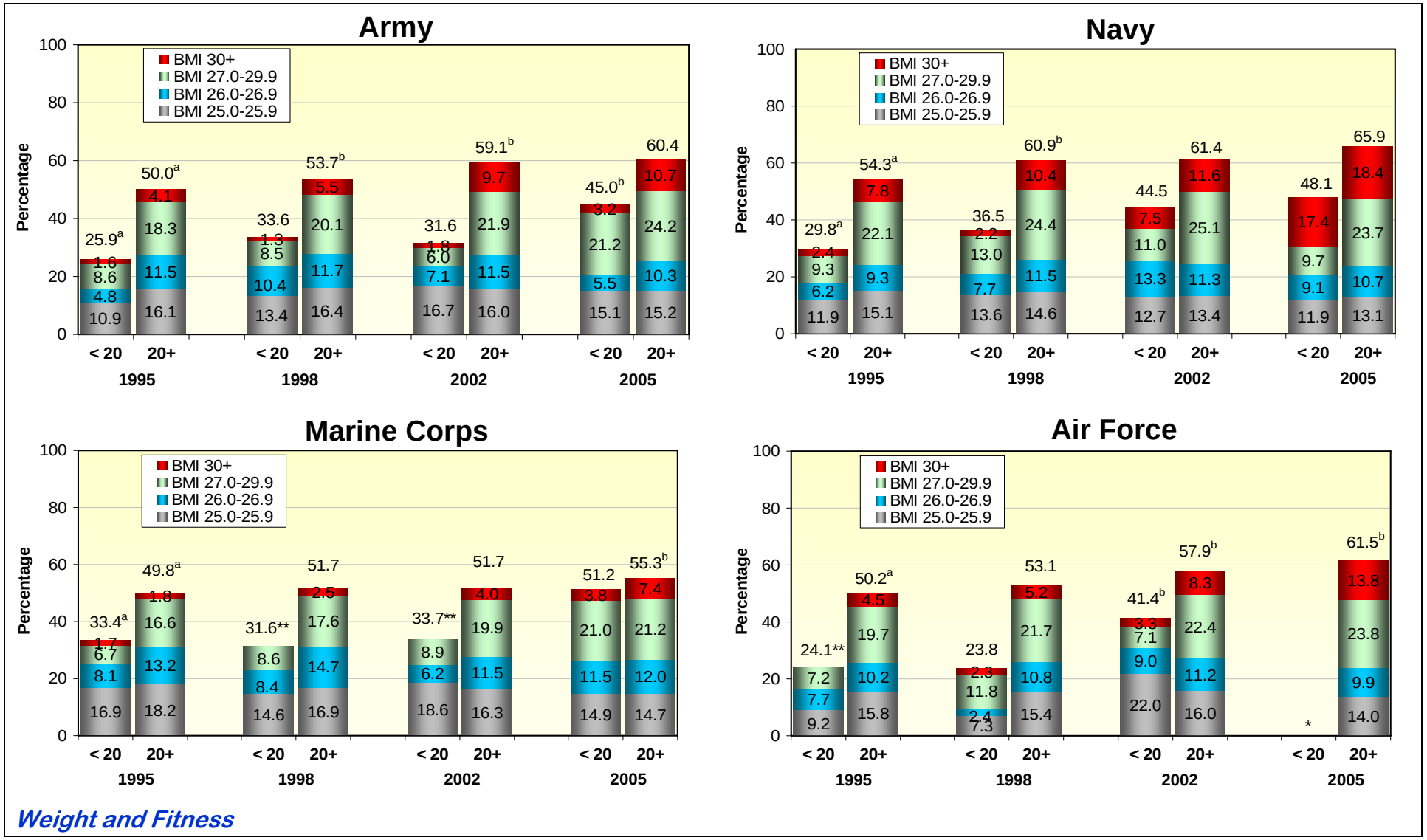
[a]For each age group (<20, 20+) BMI totals for each year are statistically higher than the prior year at the .05 level.

Figure 7.2 Elevated BMI by Service, 2005[a] (based on 1998 NHLBI BMI Guidelines)



[a]Differences in total Body Mass Index (BMI) are significant at the .05 level for Army vs. Navy, Navy vs. Marines, Navy vs. Air Force, and Marines vs. Air Force. National Heart, Lung, and Blood Institute (NHLBI) defined BMI greater than 25 as a screener for overweight status. BMI is based on self-reports of height and weight and does not differentiate between muscle and fat. Numbers in bars may not sum to totals because of rounding.

Figure 7.3 Trends in body fat by age group using BMI as a screener for the Army, Navy, Marine Corps, and Air Force, 1995-2005



BMI = Body Mass Index is defined as weight (kg)/[height (m)]^2. The survey uses self-reports of height and weight. In 1998, the National Heart, Lung, and Blood Institute (NHLBI) defined BMI greater than 25 as a screener for overweight status. BMI does not differentiate between muscle and fat. Numbers in bars may not sum to totals greater than 25 because of rounding.

[a]Estimate for 1995 is significantly different from the same age group in 2005 at the .05 level.

[b]Estimate is significantly different from the same age group in the prior survey year at the .05 level.

*Low precision. **Estimate for BMI of greater than 30 rounds to zero.

Table 7.3 **BMI MEASURES OF UNDERWEIGHT IN ACTIVE-DUTY PERSONNEL, BY SERVICE, GENDER, AND AGE**

Gender/Age Group	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Males[a]					
Under 20	3.3 (1.5)	– (–)	+ (+)	0.2 (0.1)	2.0 (0.9)
20-25	0.9 (0.4)	0.9 (0.3)	0.7 (0.3)	2.2 (0.6)	1.2 (0.2)
26-34	1.4 (0.5)	0.3 (0.2)	1.3 (0.6)	0.6 (0.4)	0.8 (0.2)
35 or older	0.6 (0.3)	0.3 (0.1)	0.3 (0.2)	0.5 (0.1)	0.5 (0.1)
Total males	1.2 (0.4)	0.5 (0.2)	1.0 (0.2)	1.0 (0.2)	0.9 (0.2)
Females[a]					
Under 20	1.1 (1.0)	+ (+)	– (–)	– (–)	1.6 (1.2)
20-25	3.5 (0.9)	2.0 (0.4)	3.5 (0.9)	3.9 (0.7)	3.3 (0.4)
26-34	5.1 (1.8)	3.4 (1.3)	1.0 (1.0)	2.2 (0.9)	3.2 (0.7)
35 or older	2.3 (1.3)	0.7 (0.4)	+ (+)	1.0 (0.4)	1.3 (0.5)
Total females	3.4 (0.5)	2.4 (0.5)	2.4 (0.8)	2.4 (0.5)	2.7 (0.3)
Total					
Under 20	2.9 (1.4)	1.0 (1.0)	+ (+)	– (–)	1.9 (0.8)
20-25	1.3 (0.5)	1.1 (0.3)	0.9 (0.3)	2.6 (0.4)	1.5 (0.2)
26-34	1.9 (0.5)	0.8 (0.2)	1.3 (0.6)	0.9 (0.3)	1.2 (0.2)
35 or older	0.8 (0.3)	0.3 (0.1)	0.4 (0.2)	0.6 (0.1)	0.6 (0.1)
Total personnel	1.5 (0.3)	0.8 (0.2)	1.1 (0.2)	1.3 (0.2)	1.2 (0.1)

Note: Table entries are percentages of military personnel by Service, gender, and age group who met the criteria for being underweight. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Underweight is defined in terms of the Body Mass Index (BMI). Definitions of BMI are given in Section 2.5.4. Adult guidelines for what is considered underweight for males and females greater than or equal to 20 years of age were released most recently in the 2005 *Dietary Guidelines for Americans* (DHHS & USDA, 2005). These are consistent with *Healthy People 2010* guidelines (DHHS, 2000) and the National Heart, Lung, and Blood Institute (NHLBI) Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (NHLBI, 1998). For males and females less than 20 years, current recommendations are to use a BMI-for-age growth approach based on CDC growth charts with a BMI less than 5th percentile classified as underweight (Barlow & Dietz, 1998). This approach for individuals less than 20 years of age is included in the *Healthy People 2010* guidelines (DHHS, 2000). BMI does not differentiate between muscle and body fat.

[a]BMI <18.5 for males and females ≥20 years of age; <5th percentile of BMI-for-age for males and females <20 years of age.

+ Low precision.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Underweight, Q119-Q120).

developed by CDC. Adolescents in this age group whose gender-based BMI fell below the 5th percentile of BMI for age were classified as underweight. Adults over 20 years of both genders were classified as underweight if their BMI was less than 18.5. This represents a change from the 2002 report where men were defined as underweight if they had a BMI of less than 20.7, regardless of age. Military women were defined as underweight if they had a BMI of less than 19.1, regardless of age. The result of this change in standards is that fewer individuals overall may be expected to be classified as underweight.

The findings in Table 7.3 indicate that being underweight was most common among younger age groups (less than 20 years: 1.9%; 20 to 25 years: 1.5%; 26 to 34 years:1.2%; 35 or older: 0.6%); however, it is important to note that less than 1.2% of the total DoD personnel were classified as underweight. There were distinct differences among male and female personnel and among the Services. Among men, the only groups for which more than 2% of the personnel were classified as underweight were among Army personnel under 20 years old (3.3%) and Air Force men aged 20 to 25 years (2.2%). Among military women, particularly in

the Army, the situation was considerably different. Although the overall percentage of Army women who were underweight remained relatively low (3.4%), among women aged 20 to 25 years the prevalence was higher (3.5% for those aged 20 to 25 and 5.1% for those aged 26 to 34). The overall rates of underweight for women in the other Services were all lower at 2.4%. This lower overall prevalence, however, included percentages above 3.0% for several age categories (Navy: 26 to 34 years: 3.4%; Marine Corps: 20 to 25 years: 3.5%; Air Force: 20 to 25 years: 3.9%).

As mentioned above, the data from the 2002 DoD survey used different standard criteria for defining underweight. In that survey, approximately 12% of men under age 20 in the total DoD met the criteria for being underweight, based on their self-reported weight and height. In contrast, only 6.6% of women aged 20 or younger in the total DoD were considered underweight. In addition, rates by Service varied according to gender in this age group. Among men under age 20, the percentage of personnel who were underweight ranged from 13.6% in the Army to 7.6% in the Air Force. Among women under age 20, the percentage of personnel who were underweight ranged from 8.3% in the Army to 3.9% in the Navy.

The striking differences between the two surveys were (a) the overall shift to a lower percentage of individuals being classified as underweight; (b) the shift in the majority of underweight individuals being female rather than male; and (c) for women, the higher percentage of underweight individuals no longer being limited to the youngest age category (under 20 years). Although the overall percentage of underweight individuals in the military Services was low, the data from this survey do show that the Army had a higher prevalence of both men and women classified as underweight. In particular, over 5% of any age group being underweight bears attention using the current more stringent BMI cutoff point standards. A systematic review of low BMI and performance (James & Ralph, 1994) included a chapter in which Durnin concluded that only BMIs of 17 or less should affect physical work capacity. Military research on physical performance, physical fitness, and injury as related to BMI and percent body fat was reviewed in an Institute of Medicine report (Marriott & Grumpstrup-Scott, 1992). Studies in this review have shown that individuals in extreme quintiles (low and high) of BMI/percent body fat distributions evidenced significantly different performance levels depending on the physical task; similarly, the individuals at the extremes were at greater risk of injuries (cf. Jones, Bovee, & Knapik, 1992; Marriott & Grumpstrup-Scott, 1992). In addition, research has identified specific health disorders associated with young men who are underweight (Lusky et al., 1996).

Table 7.4 presents the prevalence of underweight, overweight, and obesity for the total DoD by gender for 1995, 1998, 2002, and 2005 recalculated using the current BMI cutoff point standards for the United States as defined in *Healthy People 2010* and the *Dietary Guidelines, 2005* and using the CDC young adult gender-based, BMI-for-age distributions. As shown, the prevalence of underweight in the total DoD increased across the 4 years with comparison of the slight decrease between 1995 and 1998 and the increase between 1998 and 2005, being statistically significant ($p<0.05$). This increase appears to be a reflection of a statistically significant increase in underweight among male personnel (0.5% to 0.9%) between 1998 and 2005 because levels of underweight among females remained essentially constant around 2.7%.

Healthy People 2010 does not have an objective for underweight because underweight is not a major problem in American society today. However, good comparative data for this 2005 survey can be found in Schoenborn, Adams and Barnes (2002), which presents the body weight data of civilians from the 1997-1998 NHIS. The NHIS gathers basic health and demographic information on all household members in a nationally representative sample. The NHIS data are particularly comparable to this survey because both include BMI based on self-reported height and weight. The 1997-1998 NHIS data were age-adjusted to the 2000 projected U.S. population. These authors reported 2.3% of adults 18 years or older were underweight. Specifically, they found that overall 3.6% of women were underweight; about four times that of men (0.9%). The total personnel DoD figure of 1.2% is clearly less than these civilian

Table 7.4 **TRENDS IN BMI MEASURES OF UNDERWEIGHT, OVERWEIGHT, AND OBESITY IN ACTIVE-DUTY PERSONNEL, 1995-2005 BY GENDER AND AGE, TOTAL DOD**

Weight Group	Year of Survey 1995	1998	2002	2005
Underweight				
Males				
Under 20	1.2 (0.6)	1.1 (0.5)	2.1 (0.8)	2.0 (0.9)
20-25	1.0 (0.2)	0.8 (0.2)	1.0 (0.1)	1.2 (0.2)
26-34	0.4 (0.1)	0.2 (0.1)[a]	0.4 (0.2)	0.8 (0.2)[b]
35 or older	0.4 (0.1)	0.3 (0.1)	0.3 (0.1)	0.5 (0.1)
Total	0.6 (0.1)	0.5 (0.1)[a]	0.7 (0.1)	0.9 (0.2)[b]
Females				
Under 20	2.9 (1.5)	2.2 (1.0)	1.5 (0.9)	1.6 (1.2)
20-25	3.6 (0.5)	3.8 (0.5)	3.5 (0.4)	3.3 (0.4)
26-34	2.0 (0.5)	2.4 (0.4)	3.1 (0.7)	3.2 (0.7)
35 or older	1.1 (0.5)	1.5 (0.5)	0.9 (0.7)	1.3 (0.5)
Total	2.5 (0.3)	2.7 (0.3)	2.8 (0.4)	2.7 (0.3)
Total				
Under 20	1.5 (0.7)	1.3 (0.5)	2.0 (0.7)	1.9 (0.8)
20-25	1.3 (0.2)	1.2 (0.2)	1.5 (0.2)	1.5 (0.2)
26-34	0.6 (0.1)[a]	0.5 (0.1)[a]	0.9 (0.2)	1.2 (0.2)[b,c]
35 or older	0.4 (0.1)	0.4 (0.1)	0.4 (0.1)	0.6 (0.1)
Total	0.9 (0.1)[a]	0.8 (0.1)[a]	1.1 (0.1)	1.2 (0.1)[b,c]
Overweight				
Males				
Under 20	2.2 (0.9)[a]	1.4 (0.7)[a]	2.2 (0.8)[a]	8.3 (2.9)[b,c,d]
20-25	44.4 (0.9)[a,b,d]	47.6 (0.8)[a,c,d]	51.8 (1.0)[b,c]	54.0 (1.2)[b,c]
26-34	59.2 (1.1)[a,b,d]	62.6 (1.0)[a,c,d]	66.8 (1.2)[b,c]	68.3 (1.1)[b,c]
35 or older	67.4 (0.7)[a,b,d]	70.4 (0.8)[a,c,d]	77.4 (1.2)[b,c]	77.9 (1.0)[b,c]
Total	52.6 (0.7)[a,b,d]	57.3 (0.6)[a,c,d]	60.4 (1.1)[b,c]	61.3 (1.2)[b,c]
Females				
Under 20	– (–)	– (–)	0.8 (0.7)	1.6 (1.3)
20-25	17.2 (1.2)[a,b,d]	22.3 (1.3)[a,c,d]	28.3 (1.6)[a,b,c]	35.6 (2.1)[b,c,d]
26-34	22.7 (1.9)[a,d]	26.2 (1.6)[a,d]	32.8 (2.5)[a,b,c]	44.4 (2.0)[b,c,d]
35 or older	30.4 (2.5)[a,d]	35.7 (2.1)[a]	42.7 (3.3)[a,c]	54.1 (2.6)[b,c,d]
Total	20.4 (0.8)[a,b,d]	25.3 (1.1)[a,c,d]	30.5 (1.6)[a,b,c]	38.5 (1.3)[b,c,d]
Total				
Under 20	1.8 (0.7)[a]	1.2 (0.5)[a]	1.9 (0.6)[a]	6.9 (2.3)[b,c,d]
20-25	40.8 (0.9)[a,b,d]	43.6 (0.8)[a,c,d]	47.2 (0.8)[a,b,c]	51.0 (1.1)[b,c,d]
26-34	54.8 (1.0)[a,b,d]	57.8 (1.0)[a,c,d]	61.4 (1.3)[a,b,c]	64.9 (1.0)[b,c,d]
35 or older	63.5 (0.8)[a,b,d]	66.6 (0.9)[a,c,d]	72.8 (1.4)[b,c]	75.1 (1.0)[b,c]
Total	48.6 (0.6)[a,b,d]	52.9 (0.5)[a,c,d]	55.3 (0.9)[b,c]	57.9 (1.1)[b,c]

(Table continued on next page)

Table 7.4 **TRENDS IN BMI MEASURES OF UNDERWEIGHT, OVERWEIGHT, AND OBESE ACTIVE-DUTY PERSONNEL, 1995-2005 BY GENDER AND AGE, TOTAL DOD (continued)**

Weight Group	Year of Survey 1995	1998	2002	2005
Obese				
Males				
Under 20	– (–)	– (–)	– (–)	– (–)
20-25	3.6 (0.3)[a,b,d]	5.1 (0.5)[a,c]	6.3 (0.6)[a,c]	9.5 (0.6)[b,c,d]
26-34	5.9 (0.6)[a,b,d]	7.7 (0.5)[a,c,d]	11.3 (0.8)[a,b,c]	15.6 (0.8)[b,c,d]
35 or older	8.1 (0.6)[a,d]	9.0 (0.5)[a,d]	14.3 (0.8)[a,b,c]	19.5 (0.8)[b,c,d]
Total	5.2 (0.3)[a,b,d]	6.9 (0.3)[a,c,d]	9.6 (0.4)[a,b,c]	13.2 (0.5)[b,c,d]
Females				
Under 20	– (–)	– (–)	– (–)	– (–)
20-25	1.0 (0.3)[a,d]	0.6 (0.3)[a,d]	3.1 (0.6)[a,b,c]	7.3 (0.9)[b,c,d]
26-34	1.3 (0.4)[a,d]	1.5 (0.5)[a,d]	4.7 (1.1)[a,b,c]	9.4 (1.4)[b,c,d]
35 or older	2.3 (0.6)[a,d]	2.7 (0.6)[a]	4.7 (0.9)[a,c]	11.6 (1.5)[b,c,d]
Total	1.3 (0.2)[a,d]	1.3 (0.2)[a,d]	3.6 (0.5)[a,b,c]	8.1 (0.6)[b,c,d]
Total				
Under 20	– (–)	– (–)	– (–)	– (–)
20-25	3.2 (0.3)[a,b,d]	4.4 (0.4)[a,c]	5.7 (0.6)[a,c]	9.1 (0.5)[b,c,d]
26-34	5.3 (0.6)[a,b,d]	6.9 (0.5)[a,c,d]	10.3 (0.8)[a,b,c]	14.7 (0.8)[b,c,d]
35 or older	7.5 (0.6)[a,d]	8.3 (0.5)[a,d]	13.0 (0.7)[a,b,c]	18.6 (0.7)[b,c,d]
Total	4.8 (0.3)[a,b,d]	6.1 (0.3)[a,c,d]	8.6 (0.4)[a,b,c]	12.4 (0.5)[b,c,d]

Note: Table entries are percentages of military personnel by year and gender who met the criteria for being underweight, overweight, or obese. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Overweight and obesity are defined in terms of Body Mass Index (BMI). Definitions of BMI are given in Section 2.5.4. Adult guidelines for what is considered overweight and obesity for males and females greater than or equal to 20 years of age were released most recently in the 2005 *Dietary Guidelines for Americans* (DHHS & USDA, 2005). These are consistent with *Healthy People 2010* guidelines (DHHS, 2000) and guidelines from the National Heart, Lung, and Blood Institute (NHLBI) Obesity Education Initiative Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (NHLBI, 1998). For males and females less than 20 years, the current recommendations use a BMI-for-age growth approach based on CDC's growth charts with BMIs greater than or equal to the 95th percentile classified as overweight (Barlow & Dietz, 1998). This approach for individuals less than 20 years of age is included in the *Healthy People 2010* guidelines (DHHS, 2000). BMI does not differentiate between muscle and body fat.

[a]Comparisons between this estimate and 2005 estimate are statistically significant at the 95% confidence level.

[b]Comparisons between this estimate and 1998 estimate are statistically significant at the 95% confidence level.

[c]Comparisons between this estimate and 1995 estimate are statistically significant at the 95% confidence level.

[d]Comparisons between this estimate and 2002 estimate are statistically significant at the 95% confidence level.

– Estimate rounds to zero.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995, 1998, 2002, and 2005 (2005 Questions: Q119-120).

figures, but prevalence of underweight in military men equals the civilian population as reported by Schoenborn et al. (2002). In contrast to civilian women, underweight is three times as prevalent (2.7%) in military women as military men. The age categories between the two studies were not directly comparable; however, prevalence of underweight of civilian women 25 to 44 years old was 3.5%, comparable to military women 20 to 34 years (approximately 3.3%). The youngest and oldest civilian age groups were almost twice as likely to be underweight as adults in other age groups. Thus, for civilian women, only those in age groups 18 to 24 and over 75 years evidenced a prevalence of underweight over 5% (7.2%, 6.7%, respectively). The 5.1% prevalence of underweight in Army women 25 to 34 years old, therefore, appears to be outside national civilian trends. The Army has historically used a lower screening BMI for women than the other Services. The Army has revised the weight table for women in AR 600-9 *The Army Weight Control Program* effective September 1, 2006. The lowest BMI triggering measurement of body fat percentage for women has now been increased to 25. Military women with low BMI should be encouraged to attain a healthy weight.

Consistent with data presented earlier using the NHLBI BMI standard, Table 7.4 also shows increases in overweight over the past 10 years using the Dietary Guidelines standards for overweight. With this standard roughly half of military personnel in the four surveys were classified as overweight, and this percentage increased steadily and statistically significantly over the past 10 years (1995: 48.6%; 1998: 52.9%; 2002: 55.3%; 2005: 57.9%). Similar increasing trends across the years were seen in both male and female personnel; however, roughly half as many military women as men were classified as overweight in each survey.

The percentage of military personnel classified as obese (BMI greater than 30.0) was low compared with the U.S. civilian population (current military: 12.4% vs. current civilian: 31%); however, similar to the civilian population, the total DoD has evidenced a steady and statistically significant increase in obesity over the past 10 years (1995: 4.8%; 1998: 6.1%; 2002: 8.6%; 2005: 12.4%). Noteworthy is the increase of roughly 4% since the last survey in 2002.

7.2.3 Healthy Weight

Table 7.5 provides an overview of trends in healthy weight (BMI greater than 18.5 and less than 25.0) by Service, gender, and age. The total DoD has little concern about overweight and obesity among its youngest age group (younger than 20 years). Some attention may need to be paid to underweight among individuals in this age group; however, at an individual level, increasing age itself may address that issue. To increase the proportion of adults who are at a healthy weight, the Services must not only address overweight and obesity, but also consider how best to provide support to female personnel who are underweight. The *Healthy People 2010* baseline is 42% of adults 20 years or older with a healthy weight and a target of 60% of adults by the year 2010. This table indicates that 37.2% of total DoD personnel 20 years or older currently exhibit a healthy weight. Some 54.9% of military women 20 years or older have a healthy weight, and military women are much closer to attaining the target of 60% than military men (currently 34.3%). Marine women 20 years or older currently exceed the *Healthy People 2010* target with 74.8% having a healthy weight. Army (54.5%) and Air Force (57.3%) women are close to achieving the healthy weight 2010 target of 60% of individuals 20 years or older. With the current clearly defined national standards, DoD has the opportunity in the next 4 years to make significant strides toward attaining the healthy weight targets set in *Healthy People 2010.*

7.2.4 Weight Loss History and Reasons for Weight Gain and Weight Loss

Table 7.6 presents information on weight loss history of DoD personnel. The questions summarized in Table 7.6 asked personnel about their weight currently, prior to joining the military, and since joining the military. Currently, more women (42.4 %) than men (28.2%) in the total DoD considered themselves overweight. Similarly, a higher percentage of women (63.3%) than men (45.0%), regardless of Service, were currently

Table 7.5 **TRENDS IN BMI MEASURES OF HEALTHY WEIGHT AMONG ACTIVE-DUTY PERSONNEL, 1995-2005 BY SERVICE, GENDER, AND AGE**

Service, Gender, and Age Group	Year of Survey 1995	1998	2002	2005
Army				
Male				
Under 20	83.8 (2.4)[a]	83.3 (4.7)[a]	89.7 (3.3)[a]	66.9 (4.3)[b,c,d]
20 or older	45.9 (1.6)[a,c,d]	42.1 (1.0)[a,b,d]	36.1 (1.6)[b,c]	35.5 (2.2)[b,c]
Total	48.1 (1.6)[a,c,d]	43.9 (1.0)[a,b,d]	39.2 (2.0)[b,c]	38.5 (2.2)[b,c]
Female				
Under 20	+ (+)	90.9 (4.2)	90.5 (2.9)	87.8 (4.5)
20 or older	74.0 (1.8)[a,c]	68.9 (2.0)[a]	62.4 (3.0)[b]	54.5 (2.7)[b,c]
Total	75.4 (1.7)[a,c]	70.5 (2.0)[a]	64.8 (2.7)[b]	58.1 (3.1)[b,c]
Total				
Under 20	85.3 (2.3)[a]	84.9 (3.6)[a]	89.9 (2.6)[a]	70.3 (4.7)[b,c,d]
20 or older	49.5 (1.3)[a,c,d]	45.8 (0.9)[a,b,d]	40.5 (1.6)[b,c]	38.2 (1.9)[b,c]
Total	51.7 (1.2)[a,c,d]	47.7 (0.8)[a,b,d]	43.6 (1.8)[b,c]	41.3 (1.9)[b,c]
Navy				
Male				
Under 20	82.7 (3.8)	83.8 (4.7)	69.2 (7.4)	72.0 (7.4)
20 or older	41.6 (0.5)[a,c,d]	35.2 (1.5)[a,b]	34.4 (2.0)[b]	31.0 (1.4)[b,c]
Total	43.4 (0.6)[a,c,d]	36.4 (1.6)[b]	35.7 (2.0)[b]	33.4 (1.5)[b]
Female				
Under 20	90.5 (3.3)[a,d]	+ (+)	71.5 (3.4)[b,c]	+ (+)
20 or older	71.0 (1.5)[a,c,d]	61.0 (1.7)[a,b,d]	54.5 (2.6)[a,b,c]	47.8 (1.6)[b,c,d]
Total	73.2 (1.3)[a,c,d]	61.9 (1.7)[a,b,d]	55.8 (2.3)[a,b,c]	49.1 (1.6)[b,c,d]
Total				
Under 20	84.5 (3.5)[a,d]	84.8 (4.5)[d]	69.8 (5.3)[b,c]	70.5 (6.0)[b]
20 or older	44.7 (0.7)[a,c,d]	38.3 (1.4)[a,b]	37.5 (2.1)[b]	33.4 (1.5)[b,c]
Total	46.8 (0.9)[a,c,d]	39.5 (1.4)[b]	38.9 (2.2)[b]	35.7 (1.5)[b]
Marine Corps				
Male				
Under 20	88.3 (1.6)[a]	85.4 (2.6)[a]	86.1 (3.0)[a]	63.9 (3.1)[b,c,d]
20 or older	47.8 (0.7)[a]	45.5 (0.9)[a]	43.2 (2.3)	41.8 (1.2)[b,c]
Total	51.4 (0.6)[a]	49.1 (1.2)[a]	47.0 (3.2)	43.7 (1.1)[b,c]
Female				
Under 20	100.0 (0.0)[c]	95.6 (0.9)[b]	+ (+)	+ (+)
20 or older	87.0 (1.2)[a]	86.0 (1.7)[a]	80.7 (3.9)	74.8 (1.9)[b,c]
Total	88.1 (1.1)[a]	87.1 (1.6)[a]	81.7 (3.9)	76.0 (2.3)[b,c]
Total				
Under 20	88.8 (1.5)[a]	86.1 (2.4)[a]	87.0 (3.2)[a]	65.6 (3.1)[b,c,d]
20 or older	49.7 (0.7)[a]	47.8 (0.9)[a]	47.6 (1.1)[a]	43.8 (1.1)[b,c,d]
Total	53.2 (0.5)[a]	51.3 (1.1)[a]	51.0 (2.0)[a]	45.7 (1.0)[b,c,d]

(Table continued on next page)

Table 7.5 **TRENDS IN BMI MEASURES OF HEALTHY WEIGHT AMONG ACTIVE-DUTY PERSONNEL, 1995-2005 BY SERVICE, GENDER, AND AGE (continued)**

Service, Gender, and Age Group	Year of Survey 1995	1998	2002	2005
Air Force				
Male				
Under 20	89.2 (2.0)[d]	79.8 (6.0)	73.9 (4.6)[b]	+ (+)
20 or older	43.2 (1.0)[a,c,d]	39.4 (0.7)[a,b,d]	32.9 (0.9)[b,c]	32.4 (1.2)[b,c]
Total	44.5 (1.0)[a,c,d]	40.4 (0.7)[a,b,d]	34.4 (0.9)[b,c]	33.3 (1.2)[b,c]
Female				
Under 20	+ (+)	89.9 (3.1)	84.6 (5.4)	+ (+)
20 or older	78.5 (1.1)[a,d]	76.3 (1.7)[a,d]	68.6 (2.1)[a,b,c]	57.3 (1.5)[b,c,d]
Total	79.1 (1.2)[a,d]	76.9 (1.6)[a,d]	69.4 (2.3)[a,b,c]	59.4 (1.6)[b,c,d]
Total				
Under 20	89.7 (2.3)[a]	82.5 (4.8)	76.6 (4.6)[b]	80.8 (6.5)
20 or older	48.7 (1.1)[a,c,d]	45.7 (0.9)[a,b,d]	40.4 (0.6)[a,b,c]	37.0 (1.2)[b,c,d]
Total	49.9 (1.1)[a,c,d]	46.8 (0.8)[a,b,d]	41.8 (0.6)[a,b,c]	38.4 (1.0)[b,c,d]
Total DoD				
Male				
Under 20	85.3 (1.5)[a]	83.4 (2.3)[a]	82.1 (2.6)[a]	68.7 (3.0)[b,c,d]
20 or older	44.1 (0.6)[a,c,d]	39.9 (0.6)[a,b,d]	35.8 (0.9)[b,c]	34.3 (0.9)[b,c]
Total	46.1 (0.6)[a,c,d]	41.7 (0.6)[a,b,d]	38.2 (1.1)[b,c]	36.4 (1.0)[b,c]
Female				
Under 20	92.2 (2.3)[a,d]	91.1 (2.3)[a]	85.1 (2.4)[b]	80.1 (4.4)[b,c]
20 or older	75.5 (0.9)[a,c,d]	70.5 (1.1)[a,b,d]	64.5 (1.5)[a,b,c]	54.9 (1.2)[b,c,d]
Total	76.7 (0.8)[a,c,d]	71.6 (1.1)[a,b,d]	65.9 (1.5)[a,b,c]	57.2 (1.2)[b,c,d]
Total				
Under 20	86.5 (1.4)[a]	84.7 (1.9)[a]	82.7 (2.0)[a]	71.0 (2.8)[b,c,d]
20 or older	47.9 (0.6)[a,c,d]	44.0 (0.5)[a,b,d]	40.7 (0.8)[a,b,c]	37.2 (0.8)[b,c,d]
Total	49.9 (0.6)[a,c,d]	45.8 (0.5)[a,b,d]	42.9 (0.9)[a,b,c]	39.5 (0.8)[b,c,d]

Note: Table entries are percentages of military personnel by Service, gender, age group, and year who met the criteria for healthy weight based on the definition presented in the *Healthy People 2010* guidelines (DHHS, 2000). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Comparisons between this estimate and 2005 estimate are statistically significant at the 95% confidence level.

[b]Comparisons between this estimate and 1995 estimate are statistically significant at the 95% confidence level.

[c]Comparisons between this estimate and 1998 estimate are statistically significant at the 95% confidence level.

[d]Comparisons between this estimate and 2002 estimate are statistically significant at the 95% confidence level.

+ Low precision.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1995, 1998, 2002, and 2005 (2005 Questions: Q119-120).

Table 7.6 **WEIGHT LOSS HISTORY, BY SERVICE AND GENDER**

Weight Loss History	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Consider Yourself Overweight					
Males	25.3 (1.5)	32.2 (1.6)	20.2 (1.5)	31.9 (1.0)	28.2 (0.8)
Females	40.2 (1.9)	47.6 (3.1)	30.1 (2.5)	42.4 (1.8)	42.4 (1.3)
Total	27.5 (1.5)	34.4 (1.2)	20.8 (1.5)	34.0 (1.0)	30.4 (0.8)
Currently Trying to Lose Weight					
Males	42.7 (2.2)	46.5 (1.9)	41.5 (0.9)	48.0 (1.3)	45.0 (1.0)
Females	61.9 (2.1)	67.1 (2.7)	62.4 (2.4)	62.0 (1.9)	63.3 (1.2)
Total	45.4 (2.2)	49.5 (1.5)	42.8 (0.9)	50.8 (1.4)	47.7 (1.0)
History of Trying to Lose Weight Prior to Joining Military					
Males	25.9 (0.7)	22.6 (1.4)	27.5 (1.4)	22.1 (1.3)	24.2 (0.6)
Females	46.2 (3.5)	39.7 (2.4)	47.2 (3.9)	43.1 (1.8)	43.4 (1.4)
Total	28.8 (0.9)	25.0 (1.3)	28.7 (1.5)	26.1 (1.2)	27.0 (0.6)
Tried to Lose Weight Since Joining the Military					
Males	49.5 (2.6)	53.7 (2.4)	48.2 (1.1)	57.6 (1.0)	52.6 (1.2)
Females	72.2 (2.5)	74.8 (1.9)	76.1 (1.8)	78.3 (1.8)	75.4 (1.2)
Total	52.8 (2.5)	56.7 (2.1)	49.9 (1.1)	61.7 (1.1)	56.0 (1.1)
Had to Lose Weight to Join Military					
Males	11.6 (1.3)	8.7 (0.8)	11.5 (1.1)	9.8 (1.5)	10.3 (0.7)
Females	18.9 (1.6)	13.6 (1.1)	18.7 (3.0)	12.6 (1.2)	15.1 (0.9)
Total	12.6 (1.0)	9.4 (0.7)	12.0 (1.2)	10.3 (1.2)	11.0 (0.6)
Difficulty Meeting Service Weight and/or Body Fat Standards					
Males	18.2 (1.7)	21.1 (1.3)	17.6 (0.7)	17.4 (0.7)	18.7 (0.7)
Females	28.8 (2.0)	32.0 (2.0)	26.8 (2.0)	24.9 (1.4)	28.1 (1.0)
Total	19.7 (1.4)	22.7 (1.2)	18.2 (0.7)	18.9 (0.8)	20.1 (0.6)
Passed Most Recent Physical Fitness Test					
Males	90.8 (0.6)	87.4 (1.6)	92.8 (0.7)	89.3 (0.9)	89.7 (0.6)
Females	83.8 (2.6)	68.5 (2.4)	77.3 (2.3)	82.7 (1.7)	79.1 (1.3)
Total	89.8 (0.8)	84.6 (1.5)	91.9 (0.7)	88.0 (1.0)	88.1 (0.6)
Currently Enrolled in Mandatory Weight Control Program					
Males	4.0 (1.0)	8.1 (1.0)	5.0 (0.4)	4.2 (0.7)	5.3 (0.5)
Females	4.7 (1.2)	15.3 (2.1)	6.7 (1.1)	4.6 (1.0)	7.5 (0.9)
Total	4.1 (0.8)	9.2 (1.0)	5.1 (0.4)	4.3 (0.7)	5.6 (0.5)

Note: Table entries are percentages of military personnel by Service who reported the weight loss history indicated. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Weight loss history: Q118, Q121, Q122, Q123-125, Q127).

trying to lose weight. Although nearly 90% of personnel in the total DoD passed their most recent physical fitness test and in general very few were enrolled in mandatory weight loss programs (men: 5.3%; women 7.5%), one-fifth of all personnel had difficulty meeting Service weight and/or body weight standards. The Navy evidenced overall the fewest individuals passing the physical fitness test (84.6%) and the highest percentages of men and women who were currently enrolled in weight control programs (males: 8.1%; females 15.3%) and who had difficulty meeting weight standards (males 21.1%; females: 32.0%). What is particularly striking is that roughly three-quarters of women and 50% of men said that they had tried to lose weight since joining the military, with Air Force personnel evidencing the highest percentages (males 57.6%; females: 78.3%). Is this high percentage of attempting to lose weight while in the military the result of people losing weight to meet entrance standards and thereby setting up a situation where the need for weight loss becomes a way of life for Service personnel? Although more women (15.1%) than men (10.3%) said they had to lose weight to enter the Service, the percentages were still relatively low and cannot account for the high percentage of military personnel who said that they had tried to lose weight since joining a Service. This difference may merely reflect an age effect in that most personnel are younger when they join a Service, and, as seen earlier in Table 7.1, increasing weight is associated with increasing age in all Service branches.

Of people who said they gained weight in the past year, Table 7.7 summarizes the reasons for the weight gain. More than other Service branches, Army personnel (total) reported a medical profile (31.8%) and returning from deployment (32.4%) as the main reasons for weight gain for both men and women. Of the Services, Marine Corps men and women found that they most often gained weight when they became married (males: 17.7%; females 12.8%). Few personnel attributed weight gain to divorce (3.5%), quitting smoking (8.1%), or death of a relative or friend (4.9%). More persons attributed weight gain to stress than any other factor (34.5%), with many more women (51.8%) than men (30.8%) in all Services reporting that stress caused them to gain weight. Women reported stress was more than twice as important as even pregnancy (23.3%) in being a causative factor in weight gain.

7.2.5 Leisure-Time Physical Activity

Healthy People 2010 provided not only examples of activities that are recognized as "moderate" and "vigorous," but also defined "vigorous" as using large muscle groups at 70% or more of maximum heart rate for age. Concern about lack of precision with these definitions led to the *Dietary Guidelines for Americans, 2005*, inclusion of definitions for these two levels of physical activity based on metabolic equivalents:

Moderate physical activity was defined in the survey as any activity that burns 3.5 to 7 kcal/min or the equivalent of 3 to 6 metabolic equivalents (METs) and results in achieving 60% to 73% of peak heart rate. Examples of moderate physical activity include walking briskly, mowing the lawn, dancing, swimming, or bicycling on level terrain. A person should feel some exertion but should be able to carry on a conversation comfortably during the activity.

Vigorous physical activity was defined as any activity that burns more than 7 kcal/min or the equivalent of 6 or more METs and results in achieving 74% to 88% of peak heart rate. Examples of vigorous physical activity include jogging, mowing the lawn with a nonmotorized push mower, chopping wood, participating in high impact aerobic dancing, swimming continuous laps, or bicycling uphill. These definitions follow the *Dietary Guidelines for Americans, 2005* (DHHS & USDA, 2005).

Although the definitions for activity levels have become more precise with the release of new federal guidelines and objectives, the activities that cluster within them have not changed. A difference in understanding of the importance of physical activity to health has led to the recommendations that physical activity be sustained for longer durations and/or longer accumulated time each day to have an impact on health.

Recommendations on duration and frequency of physical activity are associated with population groups and health goals in the *Dietary Guidelines for Americans, 2005.*

Table 7.7 **REASONS FOR WEIGHT GAIN IN THE PAST YEAR,[a] BY SERVICE AND GENDER**

Reason for Weight Gain	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Medical Profile					
Males	30.1 (2.5)	16.9 (1.4)	19.6 (1.7)	23.7 (1.1)	23.4 (1.2)
Females	40.1 (4.0)	20.2 (2.3)	28.8 (3.4)	23.0 (2.0)	28.0 (2.0)
Total	31.8 (2.3)	17.4 (1.3)	20.3 (1.6)	23.5 (1.0)	24.2 (1.1)
Return Home from Deployment					
Males	34.9 (4.9)	23.2 (1.7)	29.1 (4.1)	20.1 (2.1)	27.1 (1.8)
Females	20.6 (4.1)	17.0 (4.0)	13.5 (2.8)	10.6 (1.5)	15.6 (1.8)
Total	32.4 (4.5)	22.2 (1.8)	28.0 (4.0)	17.9 (1.9)	25.1 (1.7)
Reassignment (PCS[b])					
Males	12.8 (1.8)	13.0 (0.8)	7.2 (1.3)	10.6 (0.5)	11.5 (0.7)
Females	12.6 (2.4)	13.6 (1.1)	9.3 (2.1)	15.5 (2.4)	13.8 (1.2)
Total	12.7 (1.8)	13.1 (0.7)	7.4 (1.2)	11.7 (0.7)	11.9 (0.7)
Marriage					
Males	14.1 (1.5)	14.1 (0.9)	17.7 (2.3)	14.1 (1.6)	14.6 (0.8)
Females	8.5 (1.4)	6.8 (1.0)	12.8 (3.5)	10.8 (1.3)	9.2 (0.8)
Total	13.1 (1.3)	12.8 (0.9)	17.3 (2.3)	13.3 (1.3)	13.6 (0.7)
Divorce					
Males	3.4 (0.7)	4.3 (0.8)	2.1 (0.6)	2.7 (0.7)	3.3 (0.4)
Females	4.0 (1.0)	3.5 (0.6)	4.5 (1.5)	4.9 (1.0)	4.2 (0.5)
Total	3.5 (0.6)	4.2 (0.6)	2.2 (0.5)	3.2 (0.7)	3.5 (0.3)
Quit Smoking					
Males	7.9 (1.5)	8.9 (0.6)	8.5 (1.0)	7.4 (1.0)	8.1 (0.6)
Females	7.8 (2.5)	7.8 (1.5)	10.0 (1.7)	8.3 (1.1)	8.1 (1.0)
Total	7.9 (1.1)	8.7 (0.6)	8.6 (1.0)	7.6 (0.9)	8.1 (0.5)
Child Birth/Pregnancy					
Males	3.7 (0.6)	6.5 (0.7)	6.2 (0.8)	5.3 (0.5)	5.2 (0.4)
Females	21.0 (2.5)	23.2 (2.9)	28.3 (2.7)	24.6 (2.9)	23.3 (1.6)
Total	6.7 (0.8)	9.3 (0.8)	7.9 (0.9)	9.9 (0.9)	8.5 (0.5)
Stress					
Males	31.7 (2.4)	31.3 (1.7)	26.7 (1.5)	31.4 (1.5)	30.8 (1.0)
Females	49.9 (5.4)	52.3 (2.5)	53.9 (3.7)	52.8 (2.6)	51.8 (2.1)
Total	34.8 (2.1)	34.9 (1.4)	28.7 (1.4)	36.5 (1.4)	34.5 (0.9)
Death of Family Member or Friend					
Males	6.0 (1.2)	4.8 (0.6)	4.2 (0.9)	2.9 (0.8)	4.6 (0.5)
Females	6.3 (1.4)	8.1 (1.7)	3.8 (0.7)	5.0 (1.1)	6.2 (0.8)
Total	6.0 (0.9)	5.4 (0.7)	4.2 (0.8)	3.4 (0.8)	4.9 (0.4)

Note: Table entries are percentages of military personnel by Service who reported the weight gain history indicated. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]People who did not gain weight in the past year were excluded.

[b]Permanent change of station.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Reasons for Weight Gain, Q126).

Recommendations for nonbreast feeding, nonpregnant adults are as follows:

- Adults: to reduce the risk of chronic disease—engage in at least 30 minutes of moderate-intensity physical activity on most days.
- Adults: to obtain greater health benefits—engage in physical activity or more vigorous intensity of longer duration.
- Adults: to help manage body weight gain—engage in approximately 60 minutes of moderate-to-vigorous intensity activity on most days.
- Adults: to sustain weight loss—engage in at least 60 to 90 minutes of daily moderate-intensity physical activity.

Table 7.8 presents the prevalence and duration of DoD personnel who engaged in moderate and vigorous leisure-time physical activity each by Service for 20, 30, or 60 minutes sustained duration or more for 3 or more days per week in the past 30 days. For the total DoD, nearly two-thirds of personnel (61.1%) met the *Healthy People 2010* objective of engaging in sustained moderate physical activity for 30 minutes, which significantly exceeds the 2010 target of 30 % of the population. *Healthy People 2010* seeks to encourage people to exercise *daily* at this level and duration. For this survey, the percentage of military personnel who met this objective for at least 3 days per week was the focus of the tabulations, which was the objective of *Healthy People 2000*. A higher percentage of Army and Marine Corps personnel engaged in moderate sustained physical activity for each of 20, 30, and 60 minutes for 3 or more days each week than did personnel in the other Services.

Fewer military personnel reported engaging in regular vigorous intensity physical activity than moderate intensity activity. Nearly 50% of military personnel engaged in 30 or more sustained minutes of vigorous intensity physical activity for 3 or more days each week, which again exceeds the *Healthy People 2010* target of 30% of the population. Again, the Marine Corps and Army evidenced the highest percentage of personnel engaged in vigorous activity for the three sustained durations.

Overall, 76.5% of the total DoD engaged in moderate *or* vigorous physical activity at least 20 minutes/day on three or more days/week. The differences between Services are not as large as the differences seen in other measures (e.g., BMI); however, in parallel with the BMI differences, the Marines had the highest percentage engaging in this type of activity at 80.4%, followed by the Army at 80.2%, the Air Force at 77.0%, and the Navy at 69.5%. This is consistent with the Navy having the highest percentage of personnel at higher BMIs.

7.3 Food Intake and Use of Dietary Supplements and Complementary and Alternative Medicine

The 2005 DoD survey includes more questions on food intake, diet, and the use of dietary supplements than in previous surveys. Specifically, the data in this survey allow a comparison of the intake of food (by categories) by military personnel with the recommendations in *Healthy People 2010* and the *Dietary Guidelines for Americans, 2005*. These two documents provide science-based national goals and recommendations to promote health and reduce the risk of chronic disease through a healthier diet.

7.3.1 Food Intake

Healthy People 2010 cites the *Dietary Guidelines for Americans, 2005*, as recommending a healthful assortment of food types that include the eight categories in our survey. Prior to the latest version of the guidelines that were published in 2005, while our survey was in the field, Americans were advised to consume three or more servings of fruits and vegetables each day. The 2005 version of the *Dietary Guidelines* continues to recommend consumption of a variety of nutrient-dense foods but has increased the recommended intake of fruits and vegetables together to nine servings each day (4.5 cups). The *Healthy People 2010* objectives for the nation are more conservative and serve as our comparisons below.

Table 7.8 **PREVALENCE AND DURATION OF INVOLVEMENT IN MODERATE[a] AND VIGOROUS[b] LEISURE-TIME PHYSICAL ACTIVITY, BY SERVICE**

Leisure-Time Physical Activity	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Moderate Physical Activity, Past 30 Days					
20 minutes or more for 3 or more days per week	74.3 (1.6)	64.3 (1.8)	72.8 (1.3)	69.9 (0.8)	70.2 (0.8)
30 minutes or more for 3 or more days per week	66.6 (1.0)	54.2 (1.8)	65.1 (1.3)	59.4 (1.0)	61.1 (0.8)
60 minutes or more for 3 or more days per week	34.8 (1.2)	24.4 (0.7)	34.0 (1.2)	23.2 (0.9)	28.6 (0.7)
Vigorous Physical Activity, Past 30 Days					
20 minutes or more for 3 or more days per week	63.3 (1.5)	48.5 (2.0)	64.6 (1.7)	56.4 (0.7)	57.6 (1.0)
30 minutes or more for 3 or more days per week	55.3 (1.5)	40.8 (1.9)	57.3 (1.3)	45.9 (0.9)	49.0 (1.1)
60 minutes or more for 3 or more days per week	26.2 (1.2)	17.6 (0.9)	27.8 (1.1)	15.8 (0.9)	21.1 (0.7)
Moderate OR Vigorous Physical Activity, Past 30 Days[c]					
20 minutes or more for 3 or more days per week	80.2 (1.4)	69.5 (1.8)	80.4 (0.9)	77.0 (0.9)	76.5 (0.8)
30 minutes or more for 3 or more days per week	73.6 (1.1)	60.4 (1.9)	74.3 (0.8)	66.9 (0.9)	68.3 (0.9)
60 minutes or more for 3 or more days per week	40.4 (1.2)	28.7 (1.1)	41.5 (1.1)	27.3 (0.6)	33.7 (0.8)

Note: Table displays percentage of military personnel by Service who were involved in moderate or vigorous physical activity. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Moderate physical activity is defined in the survey as any activity that burns 3.5 to 7 kcal/min or the equivalent of 3 to 6 METs and results in achieving 60% to 73% of peak heart rate. Examples of moderate physical activity include walking briskly, mowing the lawn, dancing, swimming, and bicycling on level terrain. A person should feel some exertion but should be able to carry on a conversation comfortably during the activity.

[b]Vigorous physical activity is defined as any activity that burns more than 7 kcal/min or the equivalent of 6 or more METs and results in achieving 74% to 88% of peak heart rate. Examples of vigorous physical activity include jogging, mowing the lawn with a nonmotorized push mower, chopping wood, participating in high-impact aerobic dancing, swimming continuous laps, or bicycling uphill. Definitions follow those in the *2005 Dietary Guidelines for Americans* (DHHS & USDA, 2005).

[c]At least 20 minutes/day on 3 or more days/week. Service differences are significant at the .05 level between Navy and other Services and between Marine Corps and Air Force.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Leisure-Time Physical Activity, Q84 and Q85).

Table 7.9 presents reported intake of eight categories of food plus snack and fast foods by Service and gender. Military personnel are well below the *Healthy People 2010* baselines for fruit and vegetable intake and have a long way to go to reach the 2010 targets (2 or more servings of fruit per day: baseline: 28%; target 75%; 3 or more servings of vegetables per day: baseline: 49%; target 50%). Table 7.9 illustrates that less than 10% of military personnel eat three or more servings of fruits and vegetables per day. Women in the Navy had the highest reported intake of fruits and vegetables, with 10.7% and 12.9% intake, respectively, of three or more servings per day. Both men and women in the Marine Corps reported the lowest intake of fruits and vegetables of the Service branches, with 43.2% of men and 36.5% of women eating fewer than three servings of fruit *per week* and 27.5% of men and 25.2 % of women reporting an intake of fewer than three servings per week of

Table 7.9 **FREQUENCY OF INTAKE OF FOOD CATEGORIES, BY SERVICE AND GENDER**

	Service									
	Army		Navy		Marine Corps		Air Force		Total DoD[a]	
Food Categories	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times Per week	≥ 3 times per day
Fruit[b]										
Males	40.7 (2.2)	6.8 (0.6)	37.5 (1.8)	8.7 (0.4)	43.2 (1.2)	5.9 (0.6)	36.0 (1.3)	7.4 (0.9)	38.9 (1.0)	7.3 (0.4)
Females	31.8 (1.7)	9.7 (1.1)	34.2 (2.3)	10.7 (0.7)	36.5 (3.3)	9.7 (1.4)	31.3 (1.9)	9.7 (1.2)	32.5 (1.1)	9.9 (0.6)
Total	39.4 (2.1)	7.2 (0.6)	37.1 (1.7)	9.0 (0.4)	42.8 (1.2)	6.1 (0.6)	35.1 (1.2)	7.9 (0.9)	38.0 (0.9)	7.7 (0.3)
Vegetables[c]										
Males	26.6 (2.4)	8.9 (0.9)	23.4 (1.3)	10.5 (0.6)	27.5 (1.5)	7.8 (0.6)	21.0 (1.3)	9.1 (0.9)	24.4 (1.0)	9.2 (0.4)
Females	23.2 (2.4)	9.2 (2.1)	21.3 (2.2)	12.9 (1.0)	25.2 (2.0)	9.8 (1.3)	18.1 (1.6)	11.2 (1.8)	20.9 (1.1)	10.9 (1.0)
Total	26.1 (2.3)	8.9 (0.9)	23.1 (1.2)	10.8 (0.5)	27.4 (1.5)	7.9 (0.6)	20.4 (1.3)	9.5 (0.9)	23.8 (1.0)	9.5 (0.4)
Whole Grains[d]										
Males	25.4 (1.5)	11.4 (1.0)	24.5 (1.6)	12.4 (0.7)	23.3 (1.1)	9.8 (1.0)	23.1 (0.9)	11.8 (0.7)	24.3 (0.7)	11.6 (0.5)
Females	32.2 (3.0)	8.8 (1.9)	29.6 (1.5)	10.8 (1.7)	28.4 (1.8)	9.6 (0.8)	30.3 (1.6)	10.1 (1.2)	30.6 (1.2)	9.8 (0.9)
Total	26.4 (1.6)	11.0 (1.0)	25.3 (1.5)	12.2 (0.8)	23.6 (1.1)	9.8 (0.9)	24.5 (0.9)	11.5 (0.6)	25.2 (0.7)	11.3 (0.4)
Other Grains[e]										
Males	25.8 (1.7)	10.1 (1.0)	23.2 (1.5)	11.3 (0.9)	22.0 (1.1)	9.0 (1.1)	22.3 (1.5)	8.4 (1.0)	23.7 (0.8)	9.8 (0.5)
Females	30.7 (2.3)	7.3 (0.9)	29.2 (2.4)	9.1 (1.4)	30.7 (2.0)	5.8 (1.0)	27.8 (2.5)	8.1 (1.3)	29.2 (1.3)	8.0 (0.7)
Total	26.5 (1.6)	9.7 (0.9)	24.1 (1.5)	11.0 (0.7)	22.5 (1.1)	8.8 (1.0)	23.4 (1.4)	8.3 (0.9)	24.5 (0.8)	9.5 (0.5)
Dairy (1)[f]										
Males	32.7 (1.8)	11.9 (0.6)	31.1 (1.6)	11.3 (0.7)	33.5 (1.1)	10.1 (0.6)	25.0 (1.0)	11.1 (1.1)	30.3 (0.8)	11.3 (0.4)
Females	32.1 (3.2)	12.8 (1.9)	29.9 (1.1)	13.1 (1.0)	35.7 (3.3)	12.0 (1.3)	25.2 (1.7)	12.7 (1.2)	29.1 (1.2)	12.8 (0.8)
Total	32.6 (1.8)	12.0 (0.8)	30.9 (1.5)	11.6 (0.7)	33.6 (1.1)	10.2 (0.6)	25.0 (0.9)	11.4 (1.0)	30.1 (0.8)	11.5 (0.4)
Dairy (2)[g]										
Males	38.4 (1.3)	9.1 (0.7)	39.2 (1.3)	8.5 (0.8)	38.2 (1.2)	8.0 (1.2)	39.1 (1.7)	6.4 (0.8)	38.8 (0.7)	8.1 (0.4)
Females	44.2 (1.9)	7.9 (2.1)	46.3 (2.0)	6.5 (1.0)	51.1 (2.0)	5.7 (1.6)	47.0 (1.9)	5.3 (0.6)	46.2 (1.1)	6.4 (0.7)
Total	39.2 (1.3)	8.9 (0.7)	40.2 (1.1)	8.2 (0.7)	39.0 (1.1)	7.9 (1.2)	40.6 (1.6)	6.2 (0.6)	39.9 (0.7)	7.8 (0.4)
Lean Protein[h]										
Males	22.8 (1.5)	10.1 (0.9)	21.0 (1.5)	9.6 (0.6)	20.8 (1.0)	12.3 (1.5)	16.9 (1.0)	8.6 (1.2)	20.5 (0.8)	9.9 (0.5)
Females	26.0 (2.3)	5.9 (1.1)	24.1 (1.9)	7.6 (0.8)	27.7 (2.3)	7.3 (1.3)	18.7 (1.2)	6.5 (1.1)	22.8 (1.0)	6.6 (0.6)
Total	23.3 (1.6)	9.5 (0.7)	21.5 (1.4)	9.3 (0.5)	21.3 (1.0)	12.0 (1.4)	17.3 (0.8)	8.2 (1.0)	20.8 (0.7)	9.4 (0.4)

(Table continued on next page)

Table 7.9 **FREQUENCY OF INTAKE OF FOOD CATEGORIES, BY SERVICE AND GENDER (continued)**

Food Categories	Army		Navy		Marine Corps		Air Force		Total DoD[a]	
	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day	< 3 times per week	≥ 3 times per day
Other Protein[i]										
Males	27.3 (1.4)	7.8 (0.7)	28.7 (1.3)	8.9 (0.8)	25.4 (1.1)	8.8 (1.4)	27.4 (1.6)	6.3 (0.5)	27.4 (0.7)	7.8 (0.4)
Females	41.7 (2.3)	3.9 (1.1)	41.7 (2.3)	6.4 (1.1)	48.6 (2.3)	5.5 (0.8)	47.1 (1.7)	4.5 (0.9)	44.1 (1.2)	4.8 (0.6)
Total	29.4 (1.1)	7.2 (0.7)	30.5 (1.1)	8.6 (0.7)	26.8 (1.1)	8.6 (1.3)	31.3 (1.7)	5.9 (0.6)	29.9 (0.7)	7.4 (0.4)
Snack Foods/Sweets[j]										
Males	34.1 (1.4)	10.2 (0.9)	34.0 (0.9)	9.9 (0.8)	33.9 (1.5)	11.0 (1.1)	29.4 (1.2)	8.7 (0.7)	32.8 (0.7)	9.8 (0.4)
Females	42.7 (3.3)	7.2 (1.0)	36.1 (1.4)	10.8 (1.6)	39.4 (2.8)	8.4 (2.4)	36.5 (2.2)	9.5 (1.3)	38.5 (1.4)	9.1 (0.7)
Total	35.4 (1.2)	9.8 (0.9)	34.3 (1.0)	10.0 (0.9)	34.2 (1.4)	10.8 (1.0)	30.8 (1.3)	8.9 (0.6)	33.6 (0.7)	9.7 (0.4)
Fast Food[k]										
Males	44.6 (1.7)	6.1 (0.6)	48.9 (1.3)	6.0 (0.5)	46.2 (1.9)	6.3 (0.9)	48.4 (1.5)	3.7 (0.5)	47.0 (0.9)	5.5 (0.3)
Females	59.2 (1.8)	4.7 (0.9)	54.5 (3.3)	5.5 (0.9)	62.8 (3.9)	4.4 (2.0)	61.2 (1.7)	3.3 (0.4)	59.0 (1.2)	4.4 (0.4)
Total	46.7 (1.7)	5.9 (0.6)	49.7 (1.1)	5.9 (0.4)	47.2 (2.0)	6.1 (0.9)	50.9 (1.5)	3.6 (0.4)	48.8 (0.8)	5.3 (0.3)

Note: Table displays the percentage of military personnel by Service and gender who reported intake of the food categories (fruit, whole grains, other grains, etc.) less than 3 times per week or 3 or more times per day. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Individuals with missing intake of food categories (fruit, whole grains, other grains, etc.) less than 3 times per week or 3 or more times per day are not included in these estimates.

[b]All types: fresh, frozen, canned, or dried, or 100% fruit juices.

[c]All types: fresh, frozen, canned, cooked, or raw.

[d]Examples given in the survey include rye, whole wheat, or heavily seeded bread; popcorn; brown or wild rice; whole wheat pasta or crackers; oatmeal; corn tacos; etc.

[e]Examples given in the survey include white bread or rolls, plain pasta, white rice, plain tortillas.

[f]Low-fat dairy products; examples given in the survey include low- or reduced-fat milk (2%, 1%, 1/2%, or skim), yogurt, cottage cheese, low-fat cheese, frozen low-fat yogurt, soy milk.

[g]Full-fat dairy products; examples given in the survey include regular or whole milk, cheese, ice cream.

[h]Examples given in the survey include baked or broiled chicken breasts (no skin) or fish; baked or broiled lean pork, beef, and other seafood; eggs; natural peanut butter; nuts; cooked or dried beans; other legumes; tofu; turkey- or chicken-based hot dogs; sausage; ground meat; or lunch meat products.

[i]Examples given in the survey include fried chicken, fried fish, regular ground beef, sausage, regular hot dogs, heavily marbled beef, lamb, ham, salami or lunch meats, peanut butter with oil and sugar added.

[j]Examples given in the survey include chips, pretzels, power bars, candy bars, other candy, cake, pie, regular or diet soda.

[k]Examples given in the survey include pizza; hot dogs; hamburgers; cheeseburgers; tacos; breakfast biscuits/croissants with sausage or bacon, cheese, etc.; fried chicken/fish; French fries; donuts; hash brown potatoes.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Frequency of Food Intake, Q112).

vegetables. More civilians appear to consume more fruits and vegetables per day than do military personnel. The Behavioral Risk Factor Surveillance System (BRFSS), 1990-1996 (Li et al., 2000), indicated that by 1996 an estimated 23% of adults in the 16 states studied consumed fruits and vegetables at least five times a day. This intake represented 4.6 servings per day (Krebs-Smith, 1998).

Because of their high antioxidant content and specific other important constituents linked to reduction in risk of chronic disease, higher intakes of fruits and vegetables are viewed as a key component of a healthy diet and weight management. Increased intake of whole grains and low-fat dairy products (referred to as Dairy (1) in Table 7.9) are also identified in the *Dietary Guidelines* as the most likely dietary changes to have an impact on the overall health of Americans. National recommendations are three 1-ounce servings of whole grain products and 3 cups per day of fat-free or low-fat milk or equivalent products. As shown in Table 7.9, fewer than 12% of military personnel met these recommendations for intake of whole grains and low-fat milk products, with roughly 25% and 30% reporting that they consumed whole grains and low-fat milk (respectively) fewer than three times per week. Refined grains and regular fat content dairy products do not appear to be making up the difference: less than 10% of military personnel reported consuming three or more servings per day of refined grain products or milk. More Navy men (12.4%) and women (10.8%) reported eating three servings per day of whole grains than did the other Service branches, whereas no one Service branch personnel reported a higher intake of low-fat dairy products.

Healthy People 2010 does not include an intake goal for dairy products but has as an objective to "increase the proportion of persons aged 2 years and older who consume at least 6 daily servings of grain products, with at least 3 being whole grains." The baseline percentages from the CSFII are 51% of Americans consuming 6 or more daily servings of grains with 7% having 3 or more servings from whole grains. The overall target for the combined objective is 50% of Americans by 2010.

While the total DoD reports an intake of whole grains higher than the current civilian national baseline, DoD personnel, like all Americans, are facing a challenge to improve their intake of healthy grains by 2010.

Approximately 10% of military personnel reported eating lean protein sources three or more times per day, with 30% stating that higher fat protein was consumed fewer than three times per week. One-third of personnel stated that they ate sweets and snacks fewer than three times per week, and about 50% stated that they consumed fast food fewer than three times per week.

Self-reports of dietary intake are noted for their underreporting of problem foods and overreporting of healthful foods. In particular, research has shown that overestimation of the number of servings may be a result of specific psychosocial traits in individuals, such as positive attitudes and self-efficacy as well as social desirability (Lechner, Brug, & De Vries, 1997). Even with this consideration, our survey results on the intake of fruits, vegetables, whole grains, and low-fat dairy products (which form the cornerstone of current national recommendations) present a picture of military personnel who need to significantly increase their intake of food categories with known health benefits. With the advent of shelf-stable packaged fresh fruit slices military personnel can have access to ready sources of fruit, even in vending machines. Health promotion campaigns in the military can capitalize on these newer products to encourage personnel to have a healthier diet.

The potential impact of military health promotion campaigns is underscored in the data shown in Table 7.10, which illustrate where military personnel obtain their food. Specifically, this table shows the percentage of military personnel by Service and gender who reported eating or omitting breakfast, lunch, or dinner at least twice a week over the past year in the locations indicated. Military dining facilities were reported as the source of meals for between 15% and almost 30% overall across the three meals. The choice of military dining facilities varied greatly among the Service branches and across the three daily meals, with Air Force personnel indicating the least use of dining

Table 7.10 **LOCATION AND FREQUENCY OF MEALS CONSUMED, BY SERVICE AND GENDER**

	Service								
	Army			Navy			Marine Corps		
Location and Frequency of Meals	**Breakfast**	**Lunch**	**Dinner**	**Breakfast**	**Lunch**	**Dinner**	**Breakfast**	**Lunch**	**Dinner**
At Home or Food Brought from Home									
Males	40.4 (2.0)	37.7 (1.5)	56.4 (3.6)	41.1 (1.9)	43.0 (2.0)	65.0 (3.3)	34.1 (1.1)	37.6 (0.7)	50.5 (1.4)
Females	45.5 (2.2)	39.0 (1.5)	63.3 (2.6)	47.3 (2.1)	48.9 (3.0)	69.1 (4.0)	47.0 (1.2)	46.9 (2.0)	60.2 (2.1)
Total	41.2 (2.0)	37.9 (1.3)	57.4 (3.3)	42.0 (1.8)	43.8 (2.0)	65.6 (3.3)	34.9 (1.1)	38.2 (0.7)	51.1 (1.3)
In Military Dining Facility or Take Out from Military Dining Facility									
Males	28.5 (1.8)	30.3 (2.8)	22.9 (2.8)	15.5 (3.4)	30.2 (2.8)	14.1 (2.4)	19.7 (1.7)	31.7 (2.1)	22.0 (1.9)
Females	19.3 (4.3)	24.9 (3.8)	14.6 (3.7)	12.0 (2.7)	23.9 (3.3)	5.7 (2.5)	13.7 (2.2)	22.5 (2.5)	15.1 (2.6)
Total	27.2 (2.0)	29.5 (2.8)	21.7 (2.8)	15.0 (3.2)	29.3 (2.7)	12.9 (2.4)	19.3 (1.6)	31.1 (2.0)	21.6 (1.7)
In Restaurant or Restaurant Take Out									
Males	8.9 (1.1)	28.0 (1.7)	29.7 (1.7)	6.5 (0.7)	24.8 (1.3)	28.6 (0.7)	8.2 (0.6)	25.4 (1.0)	30.9 (1.2)
Females	8.2 (0.8)	31.7 (2.8)	27.1 (2.2)	6.3 (0.7)	27.0 (3.1)	32.9 (1.6)	5.3 (1.1)	24.3 (2.8)	25.0 (3.6)
Total	8.8 (1.0)	28.5 (1.6)	29.3 (1.6)	6.5 (0.6)	25.1 (1.5)	29.2 (0.5)	8.0 (0.5)	25.3 (1.1)	30.5 (1.3)
Omit this Meal at Least Two Times Per Week									
Males	38.0 (1.6)	23.2 (1.2)	9.5 (1.1)	45.2 (1.8)	14.7 (1.0)	6.9 (1.1)	45.2 (1.5)	15.8 (1.0)	8.6 (1.0)
Females	39.8 (3.1)	20.1 (1.8)	11.3 (1.7)	43.3 (1.8)	15.4 (1.6)	7.3 (0.9)	42.6 (3.2)	14.9 (1.6)	14.2 (2.0)
Total	38.2 (1.4)	22.7 (1.0)	9.7 (1.0)	44.9 (1.6)	14.8 (1.0)	7.0 (0.9)	45.0 (1.5)	15.8 (1.0)	9.0 (1.0)

(*Table continued on next page*)

Table 7.10 **LOCATION AND FREQUENCY OF MEALS CONSUMED, BY SERVICE AND GENDER (continued)**

	Service					
	Air Force			Total DoD[a]		
Location and Frequency of Meals	**Breakfast**	**Lunch**	**Dinner**	**Breakfast**	**Lunch**	**Dinner**
At Home or Food Brought from Home						
Males	49.8 (1.6)	50.0 (1.7)	71.9 (2.3)	42.3 (1.0)	42.5 (1.0)	62.1 (1.8)
Females	52.1 (2.9)	47.0 (2.1)	70.1 (2.7)	48.6 (1.4)	45.0 (1.2)	67.3 (1.7)
Total	50.2 (1.6)	49.4 (1.6)	71.6 (2.3)	43.2 (1.0)	42.9 (0.9)	62.9 (1.7)
In Military Dining Facility or Take Out from Military Dining Facility						
Males	7.8 (0.7)	21.3 (1.3)	9.2 (1.0)	18.1 (1.5)	28.0 (1.3)	16.7 (1.4)
Females	7.8 (0.9)	20.2 (1.8)	5.7 (1.3)	12.7 (1.6)	22.7 (1.6)	8.9 (1.5)
Total	7.8 (0.7)	21.1 (1.3)	8.5 (1.0)	17.3 (1.4)	27.2 (1.2)	15.5 (1.3)
In Restaurant or Restaurant Take Out						
Males	5.2 (0.7)	32.4 (1.5)	29.1 (1.6)	7.1 (0.5)	28.0 (0.8)	29.4 (0.7)
Females	6.4 (1.0)	37.4 (2.1)	32.4 (2.3)	6.9 (0.5)	32.3 (1.5)	30.5 (1.2)
Total	5.4 (0.7)	33.4 (1.3)	29.7 (1.2)	7.1 (0.5)	28.6 (0.8)	29.6 (0.6)
Omit this Meal at Least Two Times Per Week						
Males	43.2 (1.2)	11.5 (0.5)	4.5 (0.4)	42.3 (0.9)	16.7 (0.7)	7.3 (0.5)
Females	40.6 (1.2)	8.9 (0.9)	5.9 (1.0)	41.2 (1.2)	14.3 (0.8)	8.4 (0.7)
Total	42.7 (0.9)	11.0 (0.4)	4.8 (0.4)	42.2 (0.7)	16.4 (0.6)	7.5 (0.5)

Note: Table displays the percentage of military personnel by Service and gender who reported eating or omitting breakfast, lunch, or dinner at least twice a week over the past 12 months in the locations indicated. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Individuals with missing data on eating or omitting breakfast, lunch, or dinner at least twice a week over the past 12 months are not included in these estimates.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Frequency of Food Intake, Q111).

facilities (breakfast: 7.8%; lunch: 21.1%; dinner: 8.5%). Lunch, however, is a meal that was clearly eaten more in the dining facilities than any other meal. The luncheon setting therefore could provide a good opportunity for promoting healthful eating. Overall, more military personnel reported eating at home or bringing food from home for all three meals at least twice each week (breakfast: 43.2%; lunch: 42.9%; and dinner: 62.9%). Quite consistently, approximately 30% of military personnel stated that they ate dinner twice a week in restaurants or ate restaurant carry-out food. Across the Services, from 38.2% (Army) to 45.0% (Marine Corps) of personnel reported skipping breakfast at least twice a week. There was no gender difference in this behavior pattern: overall 42.3% of men and 41.2% of women reported missing breakfast. For the total DoD, lunch (16.4%) and dinner (7.5%) were skipped more rarely, with the exception that Army men (23.2%) and women (20.1%) reported skipping lunch at least twice a week, which was more often than other Service personnel.

7.3.2 Dietary Supplements

Table 7.11 presents the percentage of male and female military personnel by Service and gender who reported taking specific dietary supplement categories at least once a week or more, over the past 12 months. In the total DoD, 60.3% of military personnel reported having taken dietary supplements at least this regularly. In addition, military women (71.4%) were more likely than military men (58.3%) to have taken any supplement in the past 12 months. Although trends data illustrate that dietary supplement use among U.S. civilians has been steadily increasing (Radimer et al., 2004), these data on supplement use among military personnel were higher than use based on the most recent nationally representative sample of U.S. civilians (i.e., NHANES). Radimer et al. (2004) reported that 52.0% of civilian adults reported having taken a dietary supplement in the past month in the 1999-2000 NHANES, with a higher rate in women (56.7%) than in men (46.9%). This represented an increase from data collected in earlier NHANES where prevalence rates of dietary supplement use for adults were 35% in the NHANES II (Koplan, Annest, Layde, & Rubin, 1986) and 23% in NHANES I (Block et al., 1988).

Looking at specific supplement types, military women were more regular users than men of multiple vitamin/minerals (56.2% vs. 43.0%) and single vitamins and minerals (36.6% vs. 25.2%). This pattern was consistent for each of the four Services. Men in the Navy (22.8%) and women in the Air Force (25.1%) reported the highest intake of antioxidants when compared with personnel in the other Services. Similarly, civilian women (38.0%) had a higher rate of multivitamin/ multimineral use than civilian men (31.7%) (Radimer et al., 2004).

Nearly one in four males in the total DoD (23.0%) reported taking a body-building supplement at least once a week in the past year. Use of body-building supplements by male military personnel in this survey is consistent with the same amount reported in the 2002 survey. Use of body-building supplements has declined 1.6% since 2002 among military women from an overall reported level of 7.8% to 6.2% in the present survey. This represents a reduction in use by women in all branches of the Services, with the exception of women in the Marine Corps who evidenced a slight increase in use (2002: 9.2%; 2005: 9.6%). As in the 2002 survey, men in the Marine Corps were more likely to have taken body-building supplements over the past year (29.6%) than men in the other Services. Female personnel were more likely than male personnel in the total DoD to have taken a weight loss supplement over the past year (25.0% vs. 16.8%). The use of weight loss supplements as a whole sharply decreased in the total DoD from 20.5% to 16.8% for men and from 29.9% to 25.0% for women. This decline in weight loss supplement use was consistent across both genders and all branches of the Service. Women in the Marine Corps (30.6%) continued to report the highest rate of weight loss supplement use. Use of herbal supplements also declined sharply in the total DoD between the two surveys (men: 18.1% to 11.8%; women: 17.2% to 11.0%). Again, this was a consistent decline across all Services.

Table 7.11 **TAKING DIETARY SUPPLEMENTS, BY SERVICE AND GENDER**

Type of Supplements Taken	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Multiple Vitamins and Minerals					
Males	38.2 (1.4)	46.2 (1.2)	41.1 (1.3)	46.7 (1.5)	43.0 (0.9)
Females	49.6 (2.7)	54.9 (1.7)	52.8 (1.6)	63.0 (2.6)	56.2 (1.5)
Total	39.8 (1.6)	47.5 (1.1)	41.8 (1.2)	49.9 (1.5)	45.0 (1.0)
Individual Vitamins and Minerals					
Males	24.3 (0.7)	27.0 (2.0)	24.1 (1.2)	25.1 (0.8)	25.2 (0.7)
Females	34.4 (2.9)	35.8 (1.5)	32.5 (2.1)	39.5 (1.2)	36.6 (1.1)
Total	25.8 (1.0)	28.3 (1.7)	24.6 (1.2)	28.0 (0.8)	26.9 (0.6)
Antioxidants					
Males	19.1 (0.7)	22.8 (1.5)	20.5 (0.8)	19.8 (0.6)	20.5 (0.5)
Females	19.2 (2.0)	23.1 (1.7)	18.5 (2.9)	25.1 (0.8)	22.4 (0.9)
Total	19.1 (0.6)	22.8 (1.3)	20.3 (0.9)	20.9 (0.6)	20.8 (0.5)
Body Building					
Males	23.0 (1.5)	21.6 (1.7)	29.6 (1.4)	21.0 (1.3)	23.0 (0.8)
Females	8.4 (1.5)	4.7 (0.7)	9.6 (1.5)	4.9 (0.5)	6.2 (0.6)
Total	20.9 (1.5)	19.1 (1.4)	28.4 (1.3)	17.8 (1.0)	20.5 (0.7)
Herbal					
Males	10.8 (0.7)	13.4 (0.9)	12.2 (0.7)	11.3 (1.0)	11.8 (0.4)
Females	10.7 (1.3)	10.4 (1.1)	12.4 (1.3)	11.4 (1.5)	11.0 (0.8)
Total	10.8 (0.6)	13.0 (0.9)	12.2 (0.7)	11.3 (0.7)	11.7 (0.4)
Weight Loss					
Males	17.0 (0.8)	17.2 (1.1)	20.4 (1.1)	14.2 (1.0)	16.8 (0.5)
Females	23.8 (2.0)	28.0 (2.6)	30.6 (2.4)	23.1 (1.6)	25.0 (1.1)
Total	18.0 (0.8)	18.8 (1.0)	21.1 (1.1)	15.9 (1.0)	18.0 (0.5)
Joint Health/Arthritis					
Males	8.4 (0.7)	10.3 (0.6)	8.2 (0.6)	8.1 (0.6)	8.8 (0.3)
Females	8.8 (0.9)	7.1 (1.3)	7.8 (1.8)	5.5 (1.0)	7.1 (0.6)
Total	8.4 (0.7)	9.9 (0.5)	8.2 (0.6)	7.6 (0.6)	8.5 (0.3)
Performance Enhancing					
Males	10.9 (1.2)	9.9 (1.3)	11.2 (0.9)	6.4 (0.8)	9.4 (0.6)
Females	2.6 (0.8)	1.7 (0.3)	5.7 (1.5)	2.1 (0.6)	2.4 (0.4)
Total	9.7 (1.2)	8.7 (1.1)	10.9 (0.9)	5.6 (0.7)	8.4 (0.6)
Other					
Males	8.9 (0.5)	10.5 (1.3)	11.6 (0.6)	7.4 (0.5)	9.3 (0.4)
Females	8.3 (0.7)	9.8 (1.0)	11.7 (2.2)	6.6 (1.3)	8.2 (0.6)
Total	8.8 (0.4)	10.4 (1.2)	11.6 (0.7)	7.2 (0.5)	9.1 (0.4)
Any Supplement Use					
Males	54.6 (1.4)	59.6 (1.2)	60.7 (1.3)	60.2 (1.2)	58.3 (0.8)
Females	66.1 (3.1)	71.1 (1.2)	70.9 (1.6)	76.1 (1.6)	71.4 (1.3)
Total	56.3 (1.6)	61.3 (1.1)	61.3 (1.2)	63.3 (1.2)	60.3 (0.8)

Note: Table displays the percentage of military personnel by Service and gender who reported taking the indicated dietary supplement type on a regular basis at least once a week in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dietary Supplements, Q114).

The 2005 DoD survey includes information about two new categories of dietary supplements: joint health/arthritis and performance-enhancing. Approximately, 8.5% of the total force used each of these supplements regularly over the past 12 months. Navy men reported the highest rate of use of joint health supplements (10.3%), and the lowest rate of use was reported by Air Force women (5.5%). In a separate analysis (see Table 7.12), as expected, there was an increase in the use of joint health products by men with increasing age regardless of Service, such that men 35 years or older used these supplements at a higher rate

Table 7.12 **TAKING DIETARY SUPPLEMENTS, BY AGE AND GENDER**

Type of Supplements Taken	Age Category: Under 20	20-25	26-34	35 or Older	Total DoD
Multiple Vitamins and Minerals					
Males	30.7 (2.8)	37.6 (1.2)	46.5 (1.3)	50.7 (0.9)	43.0 (0.9)
Females	45.2 (4.7)	51.1 (2.2)	61.9 (2.4)	63.9 (1.9)	56.2 (1.5)
Total	33.6 (2.5)	39.7 (1.2)	48.7 (1.3)	52.3 (0.9)	45.0 (1.0)
Individual Vitamins and Minerals					
Males	24.2 (2.6)	25.4 (1.1)	23.1 (1.0)	28.0 (1.0)	25.2 (0.7)
Females	30.2 (2.7)	35.2 (2.0)	34.1 (2.0)	46.6 (2.4)	36.6 (1.1)
Total	25.4 (2.1)	27.0 (1.0)	24.6 (0.9)	30.3 (1.0)	26.9 (0.6)
Antioxidants					
Males	22.0 (3.1)	19.2 (0.8)	19.5 (1.0)	23.3 (0.8)	20.5 (0.5)
Females	14.9 (3.6)	20.3 (1.3)	22.4 (1.8)	30.7 (1.8)	22.4 (0.9)
Total	20.6 (2.6)	19.4 (0.8)	19.9 (0.9)	24.2 (0.8)	20.8 (0.5)
Body Building					
Males	30.8 (2.4)	29.4 (1.1)	22.1 (1.1)	11.8 (0.7)	23.0 (0.8)
Females	2.2 (1.6)	6.8 (1.1)	6.7 (0.7)	6.0 (1.1)	6.2 (0.6)
Total	25.0 (2.1)	25.7 (1.0)	19.9 (1.0)	11.1 (0.6)	20.5 (0.7)
Herbal					
Males	9.7 (1.9)	13.4 (0.9)	10.5 (0.9)	11.5 (0.6)	11.8 (0.4)
Females	9.6 (4.0)	11.1 (1.1)	8.6 (1.2)	15.0 (2.1)	11.0 (0.8)
Total	9.6 (1.6)	13.1 (0.8)	10.2 (0.8)	11.9 (0.5)	11.7 (0.4)
Weight Loss					
Males	15.2 (2.9)	19.1 (0.7)	17.6 (0.9)	12.4 (0.7)	16.8 (0.5)
Females	16.2 (4.0)	24.6 (1.4)	27.6 (1.8)	26.1 (2.5)	25.0 (1.1)
Total	15.4 (2.4)	20.0 (0.6)	19.0 (0.8)	14.1 (0.7)	18.0 (0.5)
Joint Health/Arthritis					
Males	4.7 (2.0)	7.3 (0.5)	8.3 (0.6)	12.9 (0.5)	8.8 (0.3)
Females	3.0 (1.7)	6.0 (1.0)	5.9 (1.0)	13.4 (1.2)	7.1 (0.6)
Total	4.3 (1.6)	7.0 (0.5)	8.0 (0.5)	13.0 (0.5)	8.5 (0.3)
Performance Enhancing					
Males	12.7 (2.4)	13.4 (0.9)	8.0 (0.9)	4.1 (0.4)	9.4 (0.6)
Females	– (–)	2.7 (0.6)	2.1 (0.6)	3.1 (0.9)	2.4 (0.4)
Total	10.1 (2.0)	11.7 (0.8)	7.1 (0.8)	4.0 (0.4)	8.4 (0.6)
Other					
Males	9.7 (2.1)	11.0 (0.6)	9.0 (0.7)	6.8 (0.5)	9.3 (0.4)
Females	5.5 (2.3)	8.8 (0.9)	6.7 (1.0)	10.4 (1.5)	8.2 (0.6)
Total	8.8 (1.9)	10.7 (0.5)	8.7 (0.6)	7.2 (0.5)	9.1 (0.4)
Any Supplement Use					
Males	50.9 (2.8)	55.6 (1.3)	59.6 (1.3)	62.8 (0.8)	58.3 (0.8)
Females	61.2 (4.3)	67.7 (2.2)	75.9 (2.2)	77.7 (1.7)	71.4 (1.3)
Total	53.1 (2.6)	57.6 (1.4)	62.0 (1.2)	64.6 (0.8)	60.3 (0.8)

Note: Table displays the percentage of military personnel by age category and gender who reported taking the indicated dietary supplement type on a regular basis at least once a week in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dietary Supplements, Q114).

than younger men (less than 20 years: 4.7%; 20 to 25 years: 7.3%; 26 to 34 years: 8.3%; 35 years or older: 12.9%).

Male personnel were the predominant users of performance-enhancing supplements in the total DoD, with 9.4% of men and only 2.4% of women reporting regular use. Marine personnel of both genders used performance-enhancing supplements at a higher rate than personnel in the other Services (men: 11.2%; women: 5.7%). The lowest reported use was by Air Force men (6.4%) and Navy women (1.7%). As might be expected, younger men regardless of Service used performance-enhancing supplements more than older men (less than 20 years: 12.7%; 20 to 25 years: 13.4%; 26 to 34 years: 8.0%; 35 years or older: 4.1%). There were no age trends in female use for this supplement category.

Other age trends in dietary supplement use as shown in Table 7.12 include an increasing rate of use of multivitamins and minerals by both men and women combined with increasing age regardless of Service (total less than 20 years: 33.6%; 20 to 25 years: 39.7; 26 to 34 years: 48.7% ; 35 years or older: 52.3%). This trend also was consistent within each gender. Not unexpectedly, Table 7.12 illustrates a decrease in rate of use of body-building supplements with age in men across Services (less than 20 years: 30.8%; 20 to 25 years: 29.4%; 26 to 34 years: 22.1%; 35 years or older: 11.8%). In addition, any supplement use, regardless of Service and category, increased with increasing age from roughly 53.1% to 64.6%. When asked why they used any dietary supplements, multiple vitamins and minerals, individual vitamins and minerals, and antioxidants (table not shown), military personnel cited to supplement the diet or improve health as the primary reasons (69.4%, 76.1 %, 65.1%, and 63.4%, respectively). As expected, body-building supplements and performance-enhancing supplements were used by both men and women to improve physical performance.

Table 7.13 presents the percentage of use of 19 complementary and alternative medicine (CAM) practices by military personnel by age and gender over the 12 months prior to the survey. In general, use of CAM is infrequent among military personnel, with 11 of the 19 practices reported as used by less than 5% of personnel in the past year. Self-prayer was the practice cited at the highest rate in the total DoD, with almost one in four military personnel stating that they had prayed for their own health at least once in the past 12 months (total DoD: 24.4%; men: 22.6%; women: 35.0%). Massage therapy (14.1%) and relaxation techniques (10.8%) were the next most frequently cited alternative practices. Women and men in the total DoD differed in their use of CAM, with women exhibiting more use and use of more diverse practices than men. Specifically, women also reported more than 10% use of exercise/movement therapy (15.6%), herbal medicine (13.3%), and art and music therapy (10.2%).

There were few other published data on the use of CAM therapies by military personnel. Self-prayer for health was not among the 17 categories of CAM included in the one small recent survey of 291 active-duty (46%) and retired (18%) military personnel and their family members (36%) (ages 18 to 83) in outpatient clinic settings in the northwestern United States (McPherson & Schwenka, 2004). Ten of the 17 categories were included in our survey. CAM use in this clinic-based sample was 81% overall; of these 10 categories, massage therapy and exercise therapy were two of the most often used practices (41% and 36%, respectively). This study of military personnel and their families was limited because it was not nationally representative. Eisenberg et al. (1998) found in a nationally representative random household telephone survey that CAM use among civilians increased from 33.8% to 42.1%. Our 2005 survey of active-duty military personnel assessed 15 of the same CAM therapies identified by Eisenberg and his colleagues. Eisenberg et al. (1998) found that self-prayer had the highest rate of use among the civilians sampled in their surveys (1990: 25.2%; 1997: 35.1%). Relaxation techniques (16.3%), herbal medicine use (12.1%), massage therapy (11.1%), and chiropractic (11.0%) were the most cited CAM practices by civilians in the 1997 survey. Clearly, military personnel surveyed in 2005 reported lower use of CAM therapies than the civilian population in the United States overall; however, both civilian and military survey participants in these

Table 7.13 USING COMPLEMENTARY AND ALTERNATIVE MEDICINE, BY AGE AND GENDER

Health Care Type	Age Category: Under 20	20-25	26-34	35 or Older	Total DoD
Acupuncture					
Males	2.3 (1.3)	1.0 (0.1)	0.8 (0.2)	0.7 (0.2)	1.0 (0.1)
Females	** (**)	1.6 (0.6)	1.3 (0.5)	2.4 (0.5)	1.5 (0.3)
Total	1.9 (1.0)	1.1 (0.1)	0.9 (0.2)	0.9 (0.2)	1.1 (0.1)
Homeopathy					
Males	1.5 (0.8)	0.6 (0.1)	0.8 (0.2)	0.9 (0.2)	0.8 (0.1)
Females	0.6 (0.6)	1.1 (0.3)	2.0 (0.6)	3.4 (0.9)	1.8 (0.3)
Total	1.3 (0.6)	0.6 (0.1)	1.0 (0.2)	1.2 (0.2)	0.9 (0.1)
Herbal Medicine					
Males	6.8 (2.0)	7.8 (0.8)	8.1 (0.7)	9.2 (0.5)	8.2 (0.5)
Females	9.9 (3.9)	13.4 (1.3)	10.5 (1.7)	18.8 (2.4)	13.3 (1.0)
Total	7.5 (1.7)	8.7 (0.8)	8.5 (0.6)	10.4 (0.5)	8.9 (0.5)
Chiropractic					
Males	2.8 (0.9)	4.1 (0.5)	5.1 (0.6)	6.3 (0.9)	4.9 (0.4)
Females	4.4 (1.9)	5.9 (1.1)	8.8 (1.9)	6.6 (1.0)	6.7 (1.0)
Total	3.2 (0.8)	4.4 (0.4)	5.7 (0.7)	6.4 (0.8)	5.2 (0.5)
Massage Therapy					
Males	12.1 (2.8)	11.5 (0.7)	13.9 (0.8)	11.3 (0.8)	12.2 (0.6)
Females	13.0 (3.0)	20.2 (1.5)	32.9 (2.7)	27.5 (2.3)	24.6 (1.2)
Total	12.3 (2.3)	12.9 (0.7)	16.6 (0.9)	13.3 (0.8)	14.1 (0.6)
Exercise/Movement Therapy					
Males	8.7 (1.8)	4.6 (0.3)	5.9 (0.6)	4.5 (0.3)	5.2 (0.3)
Females	19.2 (4.0)	15.7 (1.3)	15.6 (1.6)	13.4 (1.1)	15.6 (0.9)
Total	10.8 (1.7)	6.4 (0.4)	7.3 (0.6)	5.6 (0.3)	6.8 (0.3)
High-Dose Megavitamins					
Males	3.8 (1.5)	7.6 (0.6)	9.1 (0.7)	9.4 (0.6)	8.2 (0.4)
Females	8.8 (4.1)	8.3 (1.1)	9.2 (1.3)	12.0 (1.5)	9.3 (1.0)
Total	4.8 (1.5)	7.7 (0.5)	9.1 (0.6)	9.7 (0.6)	8.4 (0.4)
Spiritual Healing by Others					
Males	3.0 (1.0)	2.8 (0.3)	1.9 (0.3)	1.3 (0.2)	2.2 (0.2)
Females	2.6 (1.4)	3.9 (1.0)	2.5 (0.7)	2.7 (0.7)	3.1 (0.4)
Total	2.9 (1.0)	3.0 (0.3)	2.0 (0.3)	1.5 (0.2)	2.3 (0.2)
Lifestyle Diet					
Males	0.8 (0.5)	3.6 (0.4)	3.9 (0.5)	5.2 (0.5)	3.9 (0.3)
Females	6.5 (2.6)	7.9 (0.8)	6.7 (0.8)	13.0 (1.1)	8.4 (0.4)
Total	1.9 (0.7)	4.3 (0.4)	4.3 (0.5)	6.1 (0.5)	4.6 (0.2)
Relaxation Techniques					
Males	7.6 (1.8)	8.6 (0.6)	10.9 (1.0)	10.1 (0.7)	9.6 (0.5)
Females	19.9 (6.6)	16.9 (1.4)	16.8 (1.5)	21.2 (1.6)	18.0 (1.2)
Total	10.0 (2.3)	9.9 (0.7)	11.7 (0.9)	11.4 (0.7)	10.8 (0.6)

(Table continued on next page)

Table 7.13 **USING COMPLEMENTARY AND ALTERNATIVE MEDICINE, BY AGE AND GENDER (continued)**

Health Care Type	Age Category: Under 20	20-25	26-34	35 or Older	Total DoD
Guided Imagery Therapy					
Males	2.9 (1.1)	2.8 (0.3)	2.8 (0.5)	2.1 (0.3)	2.6 (0.2)
Females	8.2 (3.2)	6.4 (0.8)	6.0 (1.0)	7.0 (1.1)	6.5 (0.6)
Total	3.9 (1.2)	3.3 (0.3)	3.2 (0.4)	2.7 (0.3)	3.2 (0.2)
Energy Healing					
Males	2.0 (0.8)	1.2 (0.2)	0.5 (0.2)	0.5 (0.1)	0.8 (0.1)
Females	1.1 (0.8)	1.4 (0.4)	0.9 (0.4)	0.7 (0.2)	1.1 (0.2)
Total	1.8 (0.7)	1.2 (0.1)	0.6 (0.2)	0.5 (0.1)	0.9 (0.1)
Folk Remedies					
Males	2.2 (1.0)	1.3 (0.2)	0.4 (0.1)	0.3 (0.1)	0.8 (0.1)
Females	1.2 (1.2)	1.2 (0.2)	0.6 (0.3)	0.9 (0.4)	1.0 (0.2)
Total	2.0 (0.8)	1.3 (0.2)	0.4 (0.1)	0.4 (0.1)	0.9 (0.1)
Biofeedback					
Males	1.7 (1.0)	0.8 (0.2)	0.5 (0.2)	0.4 (0.1)	0.6 (0.1)
Females	0.5 (0.5)	0.6 (0.3)	0.3 (0.2)	0.9 (0.3)	0.6 (0.2)
Total	1.4 (0.8)	0.7 (0.1)	0.4 (0.2)	0.4 (0.1)	0.6 (0.1)
Hypnosis					
Males	2.2 (1.0)	1.2 (0.2)	0.8 (0.2)	0.4 (0.1)	0.9 (0.1)
Females	0.9 (0.7)	0.8 (0.2)	1.0 (0.4)	0.9 (0.2)	0.9 (0.2)
Total	2.0 (0.8)	1.1 (0.2)	0.8 (0.2)	0.4 (0.1)	0.9 (0.1)
Art/Music					
Males	13.4 (2.0)	8.7 (0.8)	6.3 (0.7)	4.6 (0.4)	7.3 (0.5)
Females	14.7 (3.2)	12.0 (1.0)	6.8 (1.1)	9.2 (1.1)	10.2 (0.7)
Total	13.6 (1.8)	9.2 (0.7)	6.4 (0.6)	5.2 (0.4)	7.7 (0.4)
Self-Help Group					
Males	3.1 (1.4)	1.9 (0.3)	1.5 (0.4)	1.0 (0.2)	1.6 (0.3)
Females	0.6 (0.6)	1.1 (0.2)	2.2 (0.8)	1.6 (0.5)	1.5 (0.3)
Total	2.6 (1.1)	1.8 (0.2)	1.6 (0.4)	1.1 (0.2)	1.6 (0.2)
Hyperbaric Oxygen Therapy					
Males	1.6 (1.0)	0.5 (0.1)	0.3 (0.1)	0.1 (0.1)	0.4 (0.1)
Females	0.6 (0.6)	0.1 (0.1)	0.1 (0.1)	– (–)	0.2 (0.1)
Total	1.4 (0.8)	0.5 (0.1)	0.3 (0.1)	0.1 (0.1)	0.4 (0.1)
Prayer for Your Own Health					
Males	19.6 (2.8)	18.7 (0.7)	23.2 (1.1)	28.9 (0.8)	22.6 (0.7)
Females	26.4 (4.5)	31.5 (1.1)	38.4 (2.0)	41.5 (1.9)	35.0 (0.9)
Total	21.0 (2.3)	20.7 (0.6)	25.3 (1.1)	30.4 (0.7)	24.4 (0.6)
Others					
Males	7.2 (1.8)	7.9 (0.8)	6.1 (0.5)	5.2 (0.5)	6.7 (0.4)
Females	15.5 (4.5)	10.8 (1.0)	7.7 (1.3)	6.6 (1.2)	9.6 (0.8)
Total	8.8 (1.9)	8.4 (0.7)	6.3 (0.5)	5.4 (0.5)	7.1 (0.4)

Note: Table displays the percentage of military personnel by age category, gender, and type of complementary or alternative medicine used in the last 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Complementary/Alternative Medicine Use, Q113).

representative samples identified the same types of therapies as the most frequently used.

7.4 Blood Pressure and Cholesterol

7.4.1 Blood Pressure Screening and Awareness

Table 7.14 presents findings on blood pressure checks and awareness among military personnel. This table reports percentages of personnel who had their blood pressure checked in the 2 years preceding the survey and also knew the result. Personnel did not meet these criteria if they (a) most recently had their blood pressure checked more than 2 years before the survey, (b) could not recall when they last had their blood pressure checked, or (c) had their blood pressure checked within the past 2 years but could not recall the result (e.g., high, low, normal). Because some personnel may have had their blood pressure checked in the past 2 years but reported that they could not recall when they last had it checked, the estimates in Table 7.14 may be somewhat conservative.

Healthy People 2010 included an objective to increase the proportion of adults who have had their blood pressure checked in the past 2 years and who are able to state whether their blood pressure was normal or high with a target of 95%. In the 2002 survey, overall approximately 78% of personnel met those two objective criteria, which was 17 percentage points below the *Healthy People 2010* target. In only 3 years between the

Table 7.14 **BLOOD PRESSURE SCREENING AND AWARENESS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS AND SERVICE**

	Service				
Sociodemographic Characteristic	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Gender					
Male	90.1 (1.8)	91.0 (0.7)	92.0 (0.7)	97.0 (0.5)	92.5 (0.7)
Female	92.1 (1.4)	93.3 (1.0)	89.9 (2.5)	96.9 (0.7)	94.2 (0.6)
Race/Ethnicity					
White, non-Hispanic	93.1 (0.7)	92.9 (0.6)	92.8 (0.9)	97.2 (0.5)	94.4 (0.4)
African American, non-Hispanic	86.9 (3.5)	87.5 (2.5)	87.6 (2.9)	97.6 (0.6)	89.7 (1.7)
Hispanic	81.5 (3.6)	89.5 (2.9)	92.0 (2.2)	96.5 (1.3)	88.4 (1.9)
Other	89.0 (1.8)	90.1 (2.2)	89.7 (2.9)	94.0 (2.3)	90.8 (1.2)
Education					
High school or less	82.7 (2.7)	84.9 (1.9)	90.3 (0.8)	91.2 (1.5)	86.2 (1.3)
Some college	93.0 (1.1)	93.4 (0.7)	92.7 (1.2)	97.4 (0.5)	94.6 (0.5)
College graduate or higher	95.6 (1.5)	97.2 (1.0)	94.7 (2.4)	99.2 (0.4)	97.3 (0.6)
Age					
Under 20	79.1 (4.3)	69.4 (5.8)	90.2 (4.6)	93.6 (2.5)	80.3 (2.7)
20-25	87.5 (1.7)	86.8 (1.2)	90.1 (1.6)	92.7 (1.2)	89.0 (0.8)
26-34	93.3 (1.6)	94.5 (0.7)	93.2 (1.4)	98.6 (0.4)	95.4 (0.6)
35 or older	95.1 (0.9)	97.3 (0.4)	97.1 (0.7)	99.4 (0.2)	97.4 (0.3)
Total	90.4 (1.5)	91.3 (0.6)	91.9 (0.6)	97.0 (0.4)	92.8 (0.6)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who had their blood pressure checked in the 2 years prior to the survey and who knew the result (result was "high," "low," "normal," or "something else"). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2002 (Blood Pressure Screening and Awareness, Q129-Q130; refer to Section 2.5.1 for descriptions of sociodemographic variables).

two surveys, there had been significant improvement, in that in the 2005 survey approximately 93% of personnel in the total DoD met these two criteria. This rate is 2 percentage points below the *Healthy People 2010* objective and represents almost a 20% increase over the 2002 total DoD survey results. The Air Force had the highest percentage of personnel having had a recent blood pressure check and remembering the result (97.0%), followed by the Marine Corps (91.9%), Navy (91.3%), and Army (90.4%). A 2004 National Quality Monitoring Program study of blood pressure measurement in the direct care system demonstrated that 96% of active duty beneficiaries had their blood pressure checked during their most recent visit. This study involved the physical abstraction of blood pressure readings from randomly selected clinical records.

Several sociodemographic characteristics were associated with an increased likelihood of having had one's blood pressure checked within the past 2 years and being able to recall the result (Table 7.14). Females were slightly more likely than males to meet these criteria in the total DoD (94.2% vs. 92.5%). In the total DoD, non-Hispanic whites (94.4%) had the highest percentage of screening and knowledge of the results, but personnel in all of the race/ethnicity categories were within less than 7 percentage points of meeting the 2010 95% target. Higher education was associated with a greater likelihood of having had one's blood pressure checked in the past 2 years and remembering the result. In the total DoD, 97.3% of college graduates met these criteria, compared with 94.6% of those with some college education and 86.2% of those with an education level of high school or less. This pattern of higher educational attainment being associated with an increased likelihood of having had one's blood pressure checked and remembering the result was consistent within each Service. Increased age also was associated with a greater likelihood of blood pressure screening in the total DoD and within each Service. In the total DoD, 97.4% of those aged 35 or older had their blood pressure checked in the past 2 years and remembered the result compared with 95.4% of those aged 26 to 34, 89.0% of those aged 20 to 25, and 80.3% of those younger than 20. Personnel younger than 20 and those with a high school education or less were the only sociodemographic subgroups of the DoD to be 10 or more percentage points below the *Healthy People 2010* 95% target for blood pressure checks.

These findings do not necessarily mean that younger or less educated military personnel are less likely to have had their blood pressure checked. They may indicate that these personnel are less likely to be aware of when they last had their blood pressure checked or to be aware of the result of their most recent check. Thus, efforts geared toward increasing the percentages of personnel who had their blood pressure checked in the past 2 years and can state the result could focus on increasing the number of personnel who have had their blood pressure checked in the past 2 years or implementing strategies to communicate blood pressure results more effectively.

7.4.2 High Blood Pressure Advice or Interventions

Table 7.15 reports percentages of personnel who had ever been told by a health care provider in the past 2 years that they had high blood pressure (hypertension). These estimates do not include women who had high blood pressure during pregnancy only. In total, an estimated 12.1% of all active-duty military personnel in 2005 had been told they had high blood pressure. The overall rates for being told of high blood pressure in the past 2 years were Air Force (12.6%), Army (12.4%), Marine Corps (12.0%), and Navy (11.1%). *Healthy People 2010* has as a target reducing the proportion of adults with high blood pressure from a baseline of 28% to a target of 16%. All Services and the total DoD have already met this target.

Table 7.15 also presents information on the different types of medical advice or intervention related to lowering blood pressure received by military personnel who had been told that they had hypertension in the past 2 years. Types of advice or intervention asked about in the questionnaire include the following:

- prescribing blood pressure medication

Table 7.15 **ADVICE GIVEN AND ACTIONS TAKEN TO CONTROL HIGH BLOOD PRESSURE, BY SERVICE**

Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Told within Last 2 Years of High Blood Pressure[a]	12.4 (1.3)	11.1 (0.7)	12.0 (1.0)	12.6 (1.2)	12.1 (0.6)
Advice Given to Probable Hypertensives[b]					
Diet to reduce weight	26.1 (3.0)	38.9 (3.9)	21.0 (3.4)	31.6 (2.8)	30.4 (1.6)
Decrease salt intake	45.4 (3.3)	51.5 (3.3)	39.1 (2.5)	39.1 (2.7)	44.2 (1.7)
Exercise	37.2 (3.2)	62.9 (2.6)	41.0 (5.2)	55.1 (2.2)	49.6 (1.9)
Stop smoking	31.7 (2.9)	29.6 (2.8)	27.1 (5.3)	24.7 (3.1)	28.4 (1.7)
Cut down on use of alcohol	17.3 (2.7)	21.6 (2.9)	16.2 (3.1)	8.5 (2.3)	15.5 (1.5)
Medication prescribed	25.5 (5.8)	34.3 (3.2)	18.4 (4.0)	24.5 (3.3)	26.5 (2.3)
Any of the above	75.9 (1.4)	81.7 (2.2)	69.6 (5.8)	70.7 (2.7)	75.0 (1.3)
Action Being Taken by Probable Hypertensives[c]					
Diet to reduce weight	29.0 (2.2)	43.0 (3.5)	35.1 (4.8)	38.5 (2.9)	36.2 (1.7)
Decrease salt intake	43.4 (3.2)	47.6 (2.4)	34.0 (4.5)	39.9 (2.9)	42.3 (1.6)
Exercise	64.8 (5.2)	71.1 (3.3)	59.8 (4.9)	66.5 (2.9)	66.3 (2.2)
Not smoking	24.6 (3.1)	41.6 (4.5)	22.6 (2.6)	27.2 (2.6)	29.4 (1.9)
Cut down on use of alcohol	25.2 (4.7)	35.1 (3.4)	18.1 (3.7)	18.8 (3.3)	24.8 (2.1)
Taking prescribed medication	19.3 (5.0)	28.4 (2.6)	10.7 (3.7)	19.7 (2.5)	20.6 (2.0)
Any of the above	73.4 (5.0)	83.2 (2.0)	69.9 (5.0)	74.0 (3.2)	75.6 (2.1)

Note: Table displays the percentage of military personnel by Service who reported the advice given and action taken to control high blood pressure as indicated by the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Respondents in the total DoD sample who had been told they had high blood pressure the last time they had their blood pressure checked.

[b]Advice given by a health care provider, such as a doctor or other health professional.

[c]Estimates based on personnel who had their blood pressure taken in the last 2 years. Personnel "taking action" are those who were advised by a health care provider to take a particular action to control high blood pressure and were following this advice at the time of the survey.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Blood Pressure In Last Two Years, Q129; High Blood Pressure, Q130; Advice, Q132; Action Taken, Q133).

- advising dietary changes to reduce a person's weight
- advising reductions in sodium intake
- recommending exercise
- stopping smoking
- cutting down on the use of alcohol

Three-quarters of military personnel who had been recently told they had high blood pressure had been advised to take one or more of the actions asked about in the questionnaire. Navy personnel (81.7%) were the most likely among the Services to have been advised to take one or more of these actions; Marine Corps personnel were the least likely (69.6%) to have been so advised.

Recommendations to exercise and reduce salt intake were the most common forms of medical advice given to hypertensives in the total DoD (49.6% and 44.2%, respectively). About 30% of personnel with a history of high blood pressure in the total DoD were advised to diet to reduce their weight, and about 27% of such personnel were prescribed blood pressure medication.

The lower rates of personnel receiving prescriptions for blood pressure medication may mean that military health care providers were attempting to control personnel's

high blood pressure by recommending behavioral changes before prescribing medication. Another possibility is that some of these personnel may have had borderline hypertension, which is potentially controllable without medication. The low rate of medication being prescribed for military personnel with a history of high blood pressure may reflect the younger age composition of the military, health and fitness standards for enlistment that can screen out less healthy applicants, the military's emphasis on fitness and readiness, and the almost universal access to preventive medical services in the military. This access to medical services in the military means that hypertension may be detected relatively early and at less seriously elevated levels.

These estimates of medical advice given to military personnel may be somewhat conservative because they are based on survey respondents' ability to recall whether they had been given a particular form of advice to control their high blood pressure. Thus, some respondents with a history of high blood pressure may have been advised to take one or more of these actions but did not report this on the survey. In addition, some personnel may have been advised to take actions to control their high blood pressure that the survey did not ask about. Some evidence of that comes from a 2005 National Quality Monitoring Program study of the "Process of Care for High Blood Pressure in the Military Health System." This study that involved review of medical records in fixed military treatment facilities by professional abstractors indicated that documentation of patient counseling and education on diet could be found in 57% of active duty patients with hypertension. About 53% of active duty patients had documentation of counseling on exercise and 68% had a filled prescription for hypertensive medication. A sample of records of active duty service members seen afloat or in a battalion aid station showed lower rates of counseling (both were at 23%).

7.4.3 Actions to Control High Blood Pressure

Table 7.15 also presents the percentages of military personnel who are probable current hypertensives, that is, who (a) had been told within the past 2 years that they had high blood pressure, (b) had been advised by a health care provider to take a particular action to control their high blood pressure, and (c) were currently taking action to control their high blood pressure.

Overall, about 76% of persons who had been recently told that they had high blood pressure were currently taking one or more of these six recommended actions to control their high blood pressure. The rate for the Marine Corps (69.9%) was lower than the corresponding rates for the total DoD and the other Services. Specifically, among personnel who had been recently told they had high blood pressure, 83.2% of those in the Navy, 74.0% of those in the Air Force, and 73.4% of those in the Army were currently following one or more of these four recommendations. About 42% of DoD personnel were reducing their salt intake to control their high blood pressure. Among those in the total DoD advised to exercise or diet, about 66% and 36%, respectively, were acting on that advice. Additional analysis not shown here in a table indicated that taking action to reduce high blood pressure was related to personnel age, in that with increasing age personnel were more likely to be engaging in any one recommended action such that, regardless of Service, there was an increase from 61.2% of individuals aged 20 to 25 to 80.6% of individuals aged 26 to 34, to 85.7% of individuals aged 35 or older. This increasing action with increasing age trend was consistent for all possible actions recorded in the survey with the exception of cutting down on alcohol intake.

Relatively few DoD personnel who had been told they had high blood pressure were currently taking prescribed blood pressure medication (20.6%). The lower rates of personnel currently taking blood pressure medication, however, may reflect current approaches to the form of intervention to reduce or control blood pressure. Specifically, the initial approach to blood pressure regulation with mild hypertension in many situations is to first attempt to control blood pressure through behavioral change. In other situations, with persons with a longer-term history of high blood pressure, some personnel's blood pressure may have been lowered sufficiently through medication, so that they may have been taken off the medication completely in the hope

that their blood pressure could be controlled through behavioral changes.

Healthy People 2010 includes an objective of increasing the proportion of adults with high blood pressure who are taking action to control their blood pressure from a baseline of 82% to a target of 95%. Considering personnel who have been told within the past 2 years that they have high blood pressure (many of whom might have had a lifetime history of hypertension) in the total DoD, our findings indicate that only about two-thirds were currently taking action (58.3%) in the 2002 survey, but this percentage significantly improved in the 2005 survey to 75.6%. Clearly, the DoD has met the *Healthy People 2010* objective of increasing the proportion of adults who take action regarding their high blood pressure, but significant progress needs to be made to reach the 2010 goal of 95% of personnel with high blood pressure taking action. Some of these personnel, however, may not have been taking current action because their blood pressure had returned to normal. In addition, they may have been taking other actions that the questionnaire did not ask about. Nevertheless, those personnel who have been advised that they had high blood pressure but were not taking any actions to control their condition are a group at increased health risk of more serious complications, such as stroke, and they represent a concern for treatment of more minor injuries, such as highly elevated blood pressure delaying routine treatment for broken bones.

7.4.4 Cholesterol

Table 7.16 presents findings on how recently personnel had their cholesterol level screened. Findings are displayed for specific age groups and for the overall total DoD and Service populations because requirements for cholesterol screening tend to be age dependent. Approximately 57% of personnel in the total DoD had their cholesterol checked within the preceding 5 years. Approximately 67% of Air Force personnel, 63% of Navy, and only 48.3% and 44.6% of Army and of Marine Corps personnel had their cholesterol checked within the past 5 years. These overall rates for the total DoD, and for each Service, with the exception of the Air Force, are lower than the baseline prevalence cited in *Healthy People 2010* and well below the target of 80% of adults having their cholesterol checked within the preceding 5 years. The lower rate of cholesterol screening among Marine Corps personnel, however, may in part reflect the younger age composition of this Service; these younger personnel may not be required to have their cholesterol checked. Similarly, the fact that the overall rates for the military were below the target of 90% may be due in part to the younger age composition of the military relative to the age composition of the civilian population. In fact, the *Healthy People 2000* target of 75% was reached in 2002 among personnel aged 35 or older and well exceeded in 2005, both in the total DoD and in each Service. Specifically, 90% of Air Force personnel aged 35 or older and 87.4% of personnel aged 35 or older in the total DoD had their cholesterol checked within the past 5 years. As noted in the previous paragraph, these high rates of cholesterol screening in the past 5 years for personnel aged 35 or older are probably related to requirements for more frequent screening among this age group.

About one in four personnel (24.7%) were unable to recall when they last had their cholesterol checked. The inability to recall how recently cholesterol screening was conducted is considerably higher among younger personnel (37.0% of personnel aged 20 to 25 vs. 18.7% of personnel aged 26 to 34 and 5.9% of personnel aged 35 or older). At least some of these personnel, however, might have had their cholesterol checked in the past 5 years and forgotten about it, or perhaps might have been unaware of it, if the test were performed as one of many in a standard battery of blood tests. Hence, the estimates of cholesterol screening in the past 5 years in Table 7.16 may be somewhat conservative.

Table 7.16 **RECEIPT OF CHOLESTEROL SCREENING, BY SERVICE**

Age Group/Recency	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Under 20					
Within past 5 years	25.5 (4.6)	33.4 (3.7)	20.9 (3.2)	27.9 (5.2)	27.0 (2.5)
More than 5 years ago	3.1 (1.5)	6.6 (3.1)	– (–)	– (–)	3.0 (1.1)
Never	31.9 (4.4)	23.5 (6.3)	12.5 (3.4)	14.1 (4.2)	24.1 (3.2)
Don't know	39.5 (3.0)	36.5 (6.5)	66.6 (3.7)	58.0 (4.8)	45.9 (2.8)
Aged 20 to 25					
Within past 5 years	31.4 (2.2)	44.3 (2.6)	33.1 (2.3)	42.0 (2.5)	37.4 (1.4)
More than 5 years ago	3.8 (0.9)	2.4 (0.8)	1.6 (0.3)	0.5 (0.3)	2.3 (0.5)
Never	27.5 (1.6)	20.4 (1.5)	24.1 (1.9)	19.8 (1.6)	23.3 (1.0)
Don't know	37.3 (1.8)	32.8 (1.8)	41.2 (2.0)	37.8 (2.3)	37.0 (1.0)
Aged 26 to 34					
Within past 5 years	53.6 (2.8)	70.0 (1.7)	62.9 (1.1)	75.0 (2.9)	66.1 (1.7)
More than 5 years ago	4.2 (0.9)	2.4 (0.7)	1.3 (0.6)	3.5 (0.7)	3.2 (0.4)
Never	19.7 (1.2)	8.6 (0.9)	12.1 (1.7)	8.0 (1.2)	12.0 (0.9)
Don't know	22.5 (1.4)	19.0 (1.9)	23.7 (2.7)	13.5 (2.2)	18.7 (1.1)
Aged 35 or Older					
Within past 5 years	84.4 (1.3)	88.6 (1.4)	80.0 (2.8)	90.1 (1.8)	87.4 (0.9)
More than 5 years ago	5.6 (1.1)	3.9 (0.8)	4.9 (1.2)	4.7 (1.0)	4.7 (0.5)
Never	3.1 (1.0)	1.7 (0.4)	4.8 (0.3)	0.7 (0.3)	1.9 (0.3)
Don't know	6.9 (0.8)	5.8 (0.9)	10.2 (1.9)	4.5 (0.9)	5.9 (0.5)
Total[a]					
Within past 5 years	48.3 (2.7)	63.0 (2.3)	44.6 (1.9)	67.2 (2.5)	57.2 (1.6)
More than 5 years ago	4.2 (0.5)	3.1 (0.3)	1.8 (0.2)	2.7 (0.3)	3.2 (0.2)
Never	20.5 (2.0)	12.1 (1.3)	17.9 (0.7)	9.9 (0.8)	14.9 (1.0)
Don't know	26.9 (0.7)	21.8 (1.1)	35.7 (1.7)	20.2 (1.9)	24.7 (0.8)

Note: Table displays the percentage of military personnel by service and age group who received cholesterol screening within the recency categories noted in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a] Individuals with missing cholesterol screening data are not included in these estimates.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Cholesterol Screening, Q131).

7.5 Summary

7.5.1 BMI Measures of Overweight and Obesity

This chapter presented data on the percentage of active-duty personnel classified as overweight by BMI:

- In 2005, 50.7% to 62.8% of military personnel in the services, with 57.9% overall were overweight using Dietary Guidelines BMI criteria. An estimated 6.7% to 17.3% were classified as obese (12.4% overall) (Table 7.1). Estimates of overweight are somewhat higher using the NHLBI BMI criterion (60.5% overall) due to differences in estimates for persons under age 20 (45.1% NHLBI vs. 6.9% Dietary Guidelines) (Table 7.2).
- Among men in the military, the rate of overweight for individuals aged 35 or older was notably high (Navy: 80.1%; Army and Air Force: 77.1%; Marine Corps: 75.6%).
- Overweight was lower among military women than military men but exceeded 50% for women aged 35 or older for the Navy (57.8%), Army (54.5%), and Air Force (52.3%). Women in the Marine Corps were notably lower (34.6%).
- Prevalence of obesity is very low in the DoD (12.4%) and is already below the *Healthy People 2010* target of 15% of adults aged 20 or older.

7.5.2 Underweight

The prevalence of underweight among active-duty personnel was examined using BMI cutoff points from

the *Dietary Guidelines for Americans, 2005*. The prevalence of underweight was highest among younger DoD personnel (Table 7.3). In the total DoD, 1.9% of personnel under age 20 were underweight, including about 2.0% of males and about 1.6% of females.

- The total personnel DoD figure of 1.2% is less than recent civilian figures (2.3%), but prevalence of underweight in military men equals that among the civilian population (0.9%). Underweight is three times as prevalent (2.7%) in military women as military men (Table 7.3).
- The 5.1% prevalence of underweight in Army women 26 to 34 years old appears to be higher than national civilian figures. Military women with low BMI should receive encouragement to attain a healthy weight.

7.5.3 Weight Loss History, Reasons for Weight Gain, and Weight Loss

Military personnel reported on their weight loss history, self-perception of weight, as well as their reasons for weight gain or weight loss:

- Currently, more women (42.4 %) than men (28.2%) in all Service branches considered themselves overweight. Similarly, a higher percentage of women (63.3%) than men (45.0%), regardless of Service, were currently trying to lose weight (Table 7.6).
- Very few military personnel were enrolled in mandatory weight loss programs (men: 5.3%; women: 7.5%).
- More than those in other Service branches, Army personnel reported medical profile (31.8%) and returning from deployment (32.4%) as the main reasons for weight gain for both men and women (Table 7.7).
- More persons attributed weight gain to stress than any other factor (34.5%), with many more women (51.8%) than men (30.8%) in all Services reporting that stress caused them to gain weight. Women reported stress (51.8%) was more than twice as important as even pregnancy (23.3%) in being a causative factor in weight gain.

7.5.4 Leisure-Time Physical Activity

Military personnel's leisure-time physical activity was compared with the standards set forth by *Healthy People 2010*:

- For the total DoD, over two-thirds of personnel (61.1%) met the *Healthy People 2010* objective of engaging in sustained moderate physical activity for 30 minutes (Table 7.8). A higher percentage of Army and Marine Corps personnel engaged in moderate sustained physical activity for each of 20, 30, and 60 minutes for 3 or more days each week than did personnel in the other Services.
- Nearly 50% of military personnel engaged in 30 or more sustained minutes of vigorous intensity physical activity for 3 or more days each week. Again, the Marine Corps and the Army evidenced the highest percentage of percentage of personnel engaged in vigorous activity for the three sustained durations.

7.5.5 Food Intake

Healthy People 2010 recommends a healthful assortment of food types that include the eight categories in our survey. Military personnel were asked to report their intake of food in these categories plus snacks and fast foods (Table 7.9):

- Only 8% to 10% of military personnel met the *Healthy People 2010* goals of eating three or more servings of fruit and vegetables per day. Women in the Navy had the highest reported intake of fruits and vegetables, with 10.7% and 12.9% intake, respectively, of three or more servings a day.
- In 2005, fewer than 13% of military personnel met the recommendations for intake of whole grains and low-fat milk products, with roughly 25% and 30% reporting that they consumed whole grains and low-fat milk, respectively, fewer than three times a week.
- Approximately 10% of military personnel reported eating lean protein sources three or more times per day, with 30% stating that higher fat protein was consumed fewer than three times a week.
- One-third of personnel stated that they ate sweets and snacks fewer than three times per week, and about 50% stated that they consumed fast foods fewer than three times a week.

- Military dining facilities were reported as the source of meals for between 15% and almost 30% overall across the three meals. The choice of military dining facilities varied greatly among the Service branches and across the three daily meals, with Air Force personnel indicating the least use of dining facilities (breakfast: 7.8%; lunch: 21.1%; dinner: 8.5%). (Table 7.10).
- Lunch is a meal that was clearly eaten more in the dining facilities than any other meal. The luncheon setting could provide a good opportunity for promoting healthful eating.

7.5.6 Dietary Supplements and Alternative Medicine

DoD personnel were asked how often they took various types of dietary supplements and about their use of alternative medicines:

- In the total DoD, 60.3% of military personnel reported having taken dietary supplements at least once per week in the past 12 months (Table 7.11).
- In addition, military women (71.4%) were more likely than military men (58.3%) to have taken any supplement in the past 12 months. In the total DoD, 25.0% of women and16.8% of men reported using weight loss supplements at least once a week.
- Nearly one in four males in the total DoD (23.0%) reported taking a body-building supplement at least once a week in the past year.
- In 2005, any supplement use, regardless of Service and category, increased with increasing age from roughly 53.1% to 64.6% (Table 7.12).
- Male personnel were the predominant users of performance-enhancing supplements in the total DoD, with 9.4% of men and only 2.4% of women reporting regular use.
- Younger men regardless of Service used performance-enhancing supplements more than older men (less than 20 years: 12.7%; 20 to 25 years: 13.4%; 26 to 34 years: 8.0%; 35 years or older: 4.1%).
- Use of CAM therapies is infrequent among military personnel, with 11 of the 19 practices reported as used by less than 5% of personnel in the past year. (Table 7.13).
- Women and men in the total DoD differed in their use of CAM, with women exhibiting more use and use of more diverse practices than men.
- Self-prayer was the CAM practice cited at the highest rate in the total DoD with almost one in four military personnel stating that they had prayed for their own health at least once in the past 12 months (total DoD: 24.4%; men: 22.6%; women: 35.0%).

7.5.7 Blood Pressure Screening and Awareness

The total DoD was about 2 percentage points below the *Healthy People 2010* objective target for blood pressure screening and awareness:

- Almost 93% of personnel in the total DoD reported that they had their blood pressure checked within the 2 years prior to the survey and knew the result (Table 7.14).
- Sociodemographic groups associated with an increased likelihood of meeting these blood pressure criteria were females, non-Hispanic whites, college graduates, those aged 35 or older, and those in the Air Force.

7.5.8 High Blood Pressure Advice or Interventions

Awareness of blood pressure status is important because high blood pressure does not usually have symptoms and can have long-term negative effects on health and well-being. Results of the 2005 DoD survey showed the following (Table 7.15):

- Less than one in eight DoD personnel (12.1%) reported being diagnosed as having high blood pressure in the past 2 years.
- About 75% of DoD personnel who had ever had high blood pressure had been advised to take one or more of the following actions to help lower their blood pressure: take blood pressure medication, diet to reduce weight, reduce sodium intake, or exercise. Recommendations to reduce salt in one's diet (44.2%) and to exercise (49.6%) were most common.

7.5.9 Actions to Control High Blood Pressure

Being aware of one's blood pressure status is important, but more important are the actions taken to control high blood pressure:

- Among probable current hypertensives, 75.6% of personnel were taking one or more of these actions (Table 7.15). This is well below the *Healthy People 2010* target of 95% or more people with hypertension taking action to control their blood pressure. Exercising (66.3%) and reducing salt (42.3%) were the most common actions taken within this group.

7.5.10 Cholesterol

Some subgroups of the DoD met the *Healthy People 2010* objective for receipt of cholesterol measurement, but the total DoD did not (Table 7.16). Military regulations may have a bearing on which groups meet this objective because older personnel are required to have cholesterol checks more frequently:

- Approximately 57% of personnel in the total DoD had their cholesterol checked within the preceding 5 years.
- Approximately 67% of Air Force personnel, 63% of Navy, and only 48.3% and 44.6% of Army and of Marine Corps personnel had their cholesterol checked within the past 5 years. These overall rates for the total DoD, and for each Service, with the exception of the Air Force, are lower than the baseline prevalence cited in *Healthy People 2010* and well below the target of 80% of adults having their cholesterol checked within the preceding 5 years.
- The *Healthy People 2010* target of 80% having cholesterol checked was well exceeded in 2005, both in the total DoD as well as in each Service. Specifically, 90% of Air Force personnel aged 35 or older and 87.4% of personnel aged 35 or older in the total DoD had their cholesterol checked within the past 5 years.
- These high rates of cholesterol screening in the past 5 years for personnel aged 35 or older are probably related to requirements for more frequent screening among this age group.

Chapter 8: Health Behavior and Health Promotion

This chapter reports findings on health behavior and health promotion among military personnel. Injuries and injury prevention are examined, including factors such as the prevalence of seat belt use in motor vehicles and helmet use among motorcyclists and bicyclists. Sexually transmitted diseases (STDs) and STD risk reduction also are examined. In addition, this chapter presents estimates for unintended pregnancies (both causing an unintended pregnancy and experiencing an unintended pregnancy). Finally, this chapter discusses sleeping habits, limitations on activities because of poor physical health, and risk-taking and sensation-seeking behavior. Where appropriate, knowledge and behavior among military personnel are compared with relevant *Healthy People 2010* objectives (U.S. Department of Health and Human Services [DHHS], 2000). In contrast to the Department of Defense (DoD)-level information presented in Chapter 3, this chapter examines estimates for the Services and includes more detailed information about attaining selected *Healthy People 2010* objectives.

8.1 Injuries and Injury Prevention

A major effort in injury prevention is to reduce injuries and fatalities resulting from motor vehicle accidents. In 2004, nearly 43,000 people were killed and 2.8 million people were injured in motor vehicle crashes (National Highway Traffic Safety Administration [NHTSA], 2005). Research demonstrates, however, that seat belts are very effective in preventing injury and reducing the likelihood of death in motor vehicle accidents (NHTSA, 2000). Most states now have laws requiring vehicle occupants to use seat belts. As of February 2006, 49 states and the District of Columbia (DC) had mandatory seat belt use laws (Insurance Institute for Highway Safety [IIHS], 2006).

Injuries to motorcyclists and bicyclists are also of concern. For example, in 2004, motorcycle and bicycle fatalities accounted for 9% and 2%, respectively, of all traffic fatalities (NHTSA, 2005). Motorcycle and bicycle helmet use, however, can decrease the risk of head injuries in a crash or fall (Sosin & Sacks, 1992; Sacks, Holmgreen, Smith, & Sosin, 1991; Sosin, Sacks, & Holmgreen, 1990): motorcycle helmets have been shown to be 67% effective in preventing brain injuries (NHTSA, 1996). As of January 2006, 47 states and DC had laws requiring some motorcyclists (usually riders younger than age 20) or all motorcyclists to wear helmets (NHTSA, 2005). Fewer states (only 20) had laws on bicycle helmet use, and these applied only to young riders (aged 16 or younger) (NTHSA, 2005).

This section presents findings from the 2005 DoD survey related to the prevalence of unintentional serious injuries and behaviors that reduce the risk of injury, such as seat belt and helmet use. As part of this discussion, the 2005 survey findings are compared with the following *Healthy People 2010* objectives:

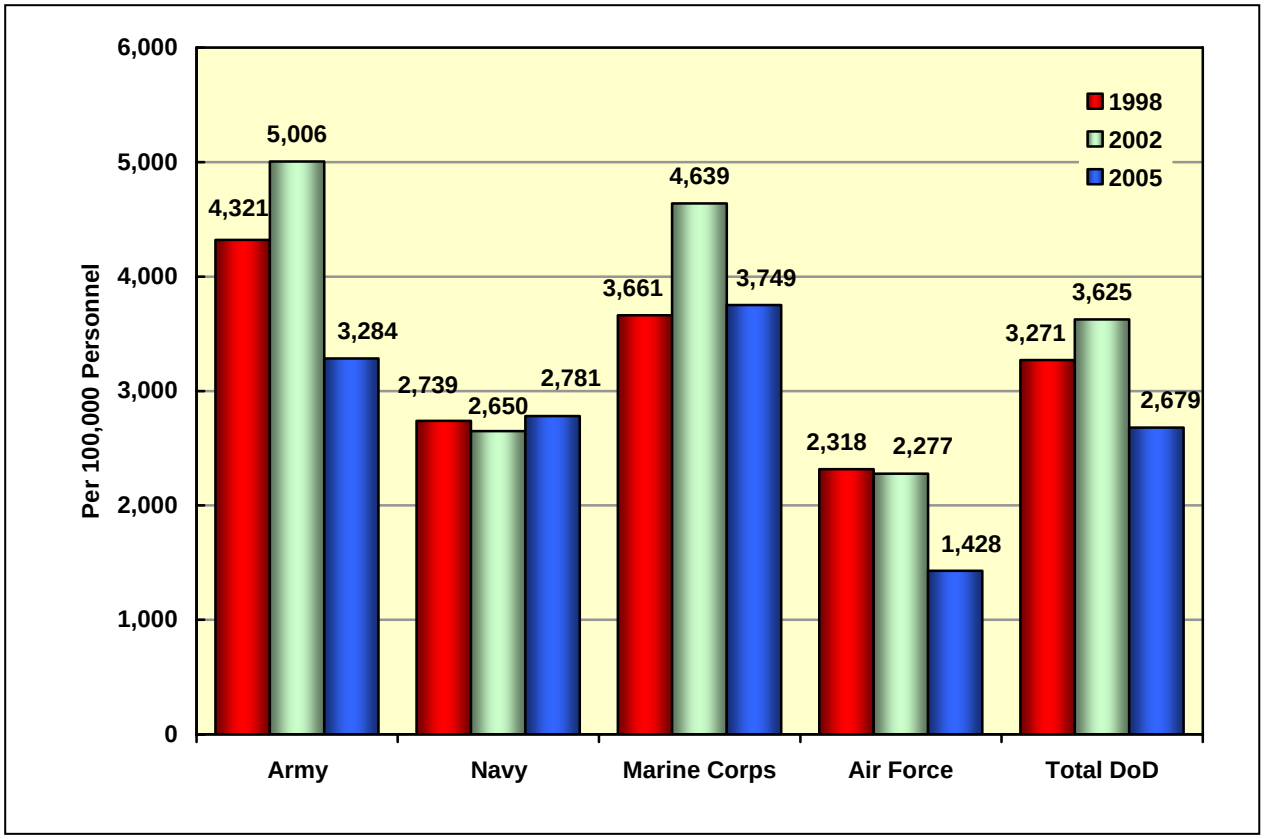
- increase the proportion of motorcyclists using helmets to at least 79%
- increase the use of safety belts to 92%

8.1.1 Injuries

Injuries have been identified as the single largest direct medical cost to the military and may represent the most significant challenge to military readiness (Stea, 2002). Figure 8.1 compares prevalence estimates from the 1998, 2002, and 2005 DoD surveys of hospitalization for treatment of injuries in the 12 months before each survey. To obtain these estimates, respondents were asked whether they had any overnight hospital stays in the previous 12 months for treatment of an injury. Unlike most other estimates in this report, which are expressed as percentages, the estimates shown in Figure 8.1 are presented as the number of personnel hospitalized for treatment of injuries per 100,000 active-duty personnel.

In the total DoD in 2005, 2,679 per 100,000 personnel were hospitalized for injuries. Among the Services, personnel in the Marine Corps (3,749 per 100,000) and Army (3,284 per 100,000) were most likely to have been hospitalized, followed by Navy personnel (2,781 per 100,000) and Air Force personnel (1,428 per 100,000).

Figure 8.1 Comparison of prevalence of hospitalization for unintentional injuries in the past 12 months, by Service: 1998, 2002, and 2005



Comparing 2005 rates with those of 1998 and 2002, Figure 8.1 indicates that rates in hospitalizations for injuries across the total DoD decreased over the 7-year period: in 1998, 3,271 per 100,000 active-duty personnel were hospitalized and in 2005, 2,679 per 100,000 were hospitalized.

Since the 2002 survey, all Services reduced hospitalizations for unintentional injuries, with the exception of the Navy, whose rate remained essentially the same. The biggest decrease was among Army personnel, who went from 5,006 per 100,000 in 2002 to 3,284 per 100,000 active-duty personnel in 2005. The military continues to have extremely high rates of hospitalization for injuries, relative to the *Healthy People 2000* objective of 754 per 100,000. (*Healthy People 2010* includes a developmental objective but does not specify an objective rate per 100,000 population.) These high unintentional injury rates likely reflect combat injuries, as well as the intense physical nature of the military. They may also reflect potential differences in military and civilian hospital admission practices.

It should be noted that the *Healthy People 2000* objective of 754 per 100,000 population for hospitalization for injuries refers specifically to unintentional injuries. The 1998 DoD survey measure of hospitalization for injuries does not distinguish between unintentional injuries and intentional injuries, but the 2002 and 2005 surveys asked specifically about unintentional injuries. Intentional injuries are those that result from deliberate intent to harm an individual or oneself (e.g., assault, suicide) and differ from injuries that result from other agents or events (e.g., running injury, motor vehicle crash). To have examined the distinction between unintentional and intentional injuries in the survey would have required the addition of a series of questions and skip patterns. Because the number of hospitalizations due to intentional injuries is

likely to be small, the high rate of hospitalizations for injuries in 1998 cannot be explained by intentional injuries. Further, because of the nature of military training and physical activities, it is probably not realistic to expect the military to meet the *Healthy People 2000* objective.

Notably, efforts to address high rates of injury in the military are under way. The Injury Prevention and Control Work Group of the Armed Forces Epidemiological Board was formed in 1996 to investigate the impact that injuries have on the health and readiness of the U.S. armed forces (Jones & Hansen, 1996). A report compiled by this work group examined various facets of the injury problem (including hospitalizations, disabilities, and deaths due to injury) and made recommendations for future research, surveillance, and prevention. Using hospital discharge data from 1992, the report identified sports injuries, motor vehicle crashes, and falls or jumps as major causes of hospitalization for injury among military personnel. Furthermore, military discharge databases were identified as very useful sources of surveillance information and were recommended to be used routinely (Smith, Dannenberg, & Runyan, 1996). In addition to surveillance, it has been recently suggested that the success of injury prevention will depend on partnerships among the medical, surveillance, and safety agencies of the military, as well as the military commanders, other decision makers, and Service members whose direct actions can prevent injuries and disease (Jones, Perrotta, Canham-Chervak, Nee, & Brundate, 2000). Data presented in this report can aid the military in evaluating the underlying causes of hospitalization due to injury and working toward the *Healthy People 2000* objective or an alternative objective that may be adopted.

8.1.2 Seat Belt Use

Table 8.1 shows percentages of personnel who reported wearing seat belts always or nearly always when they drove or rode in an automobile. Altogether, a high percentage of personnel in the total DoD (and in all Services) used seat belts, although the rates varied somewhat by Service and demographic characteristics. Air Force personnel reported higher rates of seat belt use (95.6%), compared with the Marine Corps, the Navy, and the Army (94.1%, 90.2%, and 88.7%, respectively). In the total DoD, 91.8% reported regular seat belt use. Seat belt use in the total DoD differed by gender, with women reporting regular seat belt use at a higher rate than men reported (96.3% vs. 91.0%). These overall DoD population rates met the *Healthy People 2010* target of 92% overall seat belt use.

Civilian survey data that show the highest rates of seat belt use occur in states with the most stringent seat belt laws (Siegel, Frazier, Mariolis, Brackbill, & Smith, 1993). The high rates of seat belt use among military personnel probably similarly reflect military regulations requiring personnel to use seat belts when they are driving or riding in motor vehicles on military installations. Comparison of civilian survey data on seat belt use with actual observation of people in motor vehicles, however, suggests that survey respondents may overreport their seat belt use (Siegel et al., 1991). Indeed, a recent study of the civilian population in which seat belt use was observed found that 75% of passengers (in all vehicles) wore seat belts (NHTSA, 2003b), a rate much lower than reported that for the total DoD (91.8%). To the extent that military personnel also may tend to overreport their seat belt use, readers are cautioned that these estimates of regular seat belt use among military personnel may overestimate somewhat the percentages of personnel who actually use seat belts regularly.

Findings presented in Table 8.1 also indicate that age had an impact on regular seat belt use, with younger groups less likely than older groups to report wearing a seat belt always or nearly always. Overall, in the total DoD, about 81.8% of men aged 20 or younger reported regular seat belt use. The rates of seat belt use for men aged 20 or younger in the Army and the Navy (76.2% and 78.6%) were well below the *Healthy People 2010* objective of 92%. However, the rate of regular seat belt use among men aged 20 or younger in the Air Force (92.6%) met the *Healthy People 2010* objective.

In contrast to the self-reported seat belt use behavior of these groups of young men, rates among men in older age groups met or exceeded the 92% objective in the

Table 8.1 **SEAT BELT USE, BY GENDER, SERVICE, AND AGE**

Gender/Age Category	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Male					
20 or younger	76.2 (2.4)	78.6 (3.0)	+ (+)	92.6 (1.8)	81.8 (2.2)
21-25	84.0 (1.1)	84.4 (2.0)	94.0 (1.3)	90.6 (1.4)	87.5 (1.0)
26-34	91.9 (1.6)	91.9 (1.5)	97.8 (0.8)	95.2 (0.9)	93.6 (0.7)
35 or older	96.5 (1.2)	96.9 (0.8)	96.2 (1.3)	98.7 (0.3)	97.4 (0.5)
Total	87.7 (1.7)	89.4 (1.4)	94.0 (1.4)	94.9 (0.4)	91.0 (0.8)
Female					
20 or younger	92.9 (2.8)	94.0 (2.1)	89.6 (3.3)	99.7 (0.3)	95.0 (1.3)
21-25	93.6 (2.1)	92.3 (1.9)	98.5 (0.6)	96.8 (1.0)	94.7 (0.9)
26-34	96.6 (1.4)	96.5 (1.3)	99.5 (0.6)	98.7 (0.8)	97.6 (0.7)
35 or older	97.0 (1.4)	97.3 (1.1)	+ (+)	99.6 (0.3)	98.1 (0.5)
Total	94.8 (1.1)	94.8 (1.0)	96.3 (1.0)	98.4 (0.6)	96.3 (0.5)
Total					
20 or younger	78.9 (2.6)	81.2 (2.7)	88.4 (5.5)	94.9 (1.2)	84.0 (2.0)
21-25	85.5 (1.2)	85.8 (2.0)	94.3 (1.2)	92.0 (1.2)	88.7 (0.9)
26-34	92.5 (1.5)	92.6 (1.3)	97.9 (0.8)	95.9 (0.7)	94.2 (0.6)
35 or older	96.5 (0.9)	96.9 (0.7)	96.2 (1.3)	98.8 (0.3)	97.5 (0.4)
Total	88.7 (1.6)	90.2 (1.3)	94.1 (1.3)	95.6 (0.4)	91.8 (0.8)

Note: Table displays the percentage of military personnel by Service, gender, and age category who reported that they used seat belts "always" or "nearly always" when driving or riding in a car. Personnel who reported that they did not drive or ride in a car were excluded from these analyses. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Seat Belt Use, Q76).

total DoD. Across all Services, men aged 26 to 34 and men aged 35 or older met or exceeded the *Healthy People 2010* seat belt use objective rate of 92%.

In addition, the *Healthy People 2010* objective was exceeded for women in all age and Service subgroups, with the exception of female Marines aged 20 or younger.

Findings for males aged 21 or older suggest that younger males who do not use seat belts regularly may eventually mature into the behavior of regular seat belt use. In the meantime, however, the males aged 20 or younger who reported not using seat belts regularly place themselves at increased risk of serious injury or death should they be involved in a serious motor vehicle crash. Given that males, and particularly young males, were more likely to be heavy alcohol users (as shown in Table 4.4), and that alcohol is commonly involved in motor vehicle fatalities (NHTSA, 2003c), young military men who do not wear seat belts and who also drink and drive would be further adding to their risk of serious injury or death in a motor vehicle crash. These findings suggest that the DoD and the Services may want to consider additional efforts to encourage seat belt use among young males to bring the rates of seat belt use among this group more closely into line with the rates of seat belt use among other groups in the military and with the *Healthy People 2010* objective.

8.1.3 Helmet Use

Table 8.2 shows the percentages of motorcyclists and bicyclists who wore helmets always or nearly always when they rode a motorcycle or bicycle in the previous 12 months. The estimates of helmet use by motorcyclists were based on personnel who rode a motorcycle at least

Table 8.2 **HELMET USE AMONG MOTORCYCLISTS AND BICYCLISTS, PAST 12 MONTHS, BY SERVICE AND GENDER**

		Service				
Gender	***N***	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Male						
Motorcyclists	2,286	76.4 (3.4)	86.8 (0.8)	84.6 (1.7)	89.0 (3.1)	83.8 (1.7)
Bicyclists	5,716	56.2 (3.4)	51.7 (5.2)	53.5 (3.6)	61.6 (1.7)	56.2 (1.9)
Female						
Motorcyclists	688	85.1 (5.7)	88.7 (2.3)	84.7 (4.9)	89.9 (3.1)	87.8 (2.2)
Bicyclists	1,261	63.1 (8.2)	57.7 (6.1)	60.3 (7.9)	53.3 (4.3)	57.5 (3.3)
Total						
Motorcyclists	2,974	77.7 (3.5)	87.1 (0.7)	84.6 (1.7)	89.2 (2.4)	84.4 (1.5)
Bicyclists	6,977	56.9 (3.3)	52.3 (5.2)	53.8 (3.3)	60.4 (1.5)	56.3 (1.9)

Note: Table displays the percentage of military personnel who rode a motorcycle/bicycle, by Service and gender who reported wearing helmets "always" or "nearly always" when they rode the motorcycle/bicycle in the past 12 months. Ns are unweighted counts of respondents in the total DoD sample who rode a motorcycle or bicycle in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Helmet Use for Motorcyclists, Q78; for Bicyclists, Q80).

once in the previous 12 months (unweighted N = 2,974). Similarly, the estimates of helmet use by bicyclists were based on personnel who rode a bicycle at least once in the previous 12 months (unweighted N = 6,977). Personnel who reported that they never rode a motorcycle or bicycle in the previous 12 months were excluded from these estimates.

Among personnel in the total DoD who rode a motorcycle at least once in the previous 12 months, 84.4% wore helmets always or nearly always; more females (87.8%) were more likely than males (83.8%) to wear helmets. These overall rates for the military exceeded the *Healthy People 2010* objective of increasing helmet use to at least 79% of motorcyclists. Each of the Services exceeded this objective, with the exception of the Army (77.7%). Among men, the Air Force, Navy, and Marine Corps met the objective of 79% (approximately 89.0%, 86.8%, and 84.6% respectively); rates were below the objective for men in the Army (76.4%). Women in all Services met the *Healthy People 2010* objective of 79%, with rates ranging from 84.7% in the Marine Corps to 89.9% in the Air Force.

Progress in motorcycle helmet use also can be measured by comparing results to those of the military in 1995 (Bray et al., 1995b), 1998 (Bray et al., 1999), and 2002 (Bray et al., 2003). As shown in Table 3.4, the prevalence of helmet use by motorcyclists in the total DoD in 2005 discussed above represents a significant increase from previous years (71.0% in 1995, 75.9% in 1998, 82.1% in 2002, and 84.4% in 2005). Furthermore, self-reported rates of motorcycle helmet use for each gender group in each Service were higher than those reported in 2002. These results suggest that helmet-related injury prevention efforts in the military are yielding results. Given that some groups were still below the objective of 79% helmet use (e.g., males in the Army), however, some additional efforts may still be needed to encourage regular helmet use by motorcyclists in the military.

Rates of bicycle helmet use reported in 2005 are encouraging. Of DoD personnel who reported riding a bicycle at least once in the previous 12 months, about 56.3% indicated that they always or nearly always wore a helmet. Rates for men and women were similar (56.2% and 57.5%, respectively). These rates represent an increase in regular bicycle helmet use since 2002 (51.9% for the total DoD) and a marked increase since 1995

(22.8% for the total DoD) (Table 3.4). The pattern of bicycle helmet use among the Services was consistent by gender. Rates were highest in the Air Force and lowest in the Navy (60.4% and 52.3%, respectively). With the exception of the Air Force, females in all Services had higher rates of regular bicycle helmet use than their male counterparts.

8.2 Sexually Transmitted Disease Risk Reduction and Unintended Pregnancy

Although abstinence from sexual intercourse is the most effective means of preventing STDs, including AIDS, proper use of latex condoms can reduce the risk of contracting STDs among individuals who are sexually active. In the United States, failure of condoms to prevent transmission of disease is more often due to improper use than to product defects (Cates, 2001). The proper use of latex condoms can also reduce the rate of unintended pregnancies (Mosher et al., 2004).

This section presents findings on military personnel's STD histories, condom use among sexually active unmarried personnel, sexual partner history, and history of unintended pregnancy. As part of this discussion, findings on condom use among sexually active unmarried personnel and unintended pregnancy among female personnel are compared with the following *Healthy People 2010* objectives:

- increase condom use to more than 50% the proportion of sexually active unmarried people who used a condom at last sexual intercourse
- increase intended pregnancies to 70% of female military personnel who become pregnant.

8.2.1 Sexually Transmitted Diseases

Table 8.3 presents the prevalence of STDs among military personnel over their lifetime and over the past 12 months. To estimate the lifetime prevalence of STDs, personnel were asked a "yes/no" question regarding whether they had ever had an STD in the past 12 months and in their lifetime. To help make it clear for personnel what was meant by "sexually transmitted disease," the following examples of STDs were also provided: gonorrhea, syphilis, chlamydia, or genital herpes. In the examples of STDs, such diseases as hepatitis B or HIV/AIDS, for which sexual transmission is a major route of infection were not specifically mentioned, because important routes of nonsexual transmission also exist for these diseases.

As shown in Table 8.3, approximately 13% of personnel in the total DoD had an STD at least once in their

Table 8.3 **SEXUALLY TRANSMITTED DISEASES, BY SERVICE AND GENDER**

Gender/ Time Period	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Male					
Lifetime	10.5 (0.8)	12.6 (1.2)	9.9 (0.8)	10.9 (0.8)	11.1 (0.5)
Past 12 months	3.3 (0.4)	3.4 (0.7)	2.1 (0.6)	2.2 (0.2)	2.9 (0.2)
Female					
Lifetime	21.5 (3.2)	23.7 (1.5)	20.5 (2.8)	22.4 (1.8)	22.3 (1.2)
Past 12 months	8.1 (1.2)	6.8 (1.0)	5.6 (1.1)	6.0 (1.3)	6.8 (0.7)
Total					
Lifetime	12.1 (1.1)	14.2 (1.1)	10.6 (0.9)	13.2 (0.9)	12.8 (0.5)
Past 12 months	4.0 (0.4)	3.9 (0.6)	2.3 (0.5)	2.9 (0.3)	3.5 (0.2)

Note: Table displays the percentage of military personnel by Service and gender who had a sexually transmitted disease (STD) in their lifetime or in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Sexually Transmitted Disease: Q135).

lifetime. Among military men, the lifetime prevalence of STDs was approximately 11% in the total DoD; rates in the different Services ranged from 9.9% in the Marine Corps to 12.6% in the Navy. Lifetime prevalence of STDs was doubled among military women compared with military men. Lifetime STD prevalence for females was approximately 22% for the total DoD; rates in the different Services ranged from 20.5% in the Marine Corps to 23.7% in the Navy. A similar difference in lifetime prevalence rates between men and women is seen in the civilian population and may reflect the greater efficiency of STD transmission from male to female rather than from female to male in heterosexual intercourse (Fleming et al., 1997).

Nearly 4% of all personnel in the total DoD reported having an STD in the past 12 months. As was the case with lifetime prevalence of STDs, female personnel were twice as likely to have reported an STD in the past year than male personnel (6.8% vs. 2.9%). Levels of past-year STDs were generally similar across the Services.

When compared with the 2002 findings (Bray, Hourani, Rae, Dever, Brown, et al., 2003—data not shown), the lifetime prevalence of STDs in the total DoD decreased from 17.7% in 2002 to 12.8% in 2005), whereas past-year prevalence was similar (3.8% in 2002, 3.5% in 2005).

8.2.2 Condom Use

Table 8.4 presents findings regarding condom use at last encounter among sexually active unmarried personnel in the military. For these estimates, "sexually active" personnel were defined as those who had vaginal, oral, or anal intercourse in the 12 months prior to the survey. For consistency with previous estimates, the 2005 estimates do not include personnel who were living as married.

Approximately 49% of unmarried personnel in the total DoD who were sexually active in the 12 months before the 2005 survey reported using a condom the last time they had intercourse. This rate, as well as the rates for all the Services, was only slightly lower than the *Healthy People 2010* objective of 50% condom use at last sexual encounter among unmarried individuals.

Additional key findings about condom use among sexually active unmarried personnel in 2005 include the following:

- Unmarried male personnel were generally more likely to indicate that they or their partner used a condom the last time they had sex than unmarried female personnel (51.7% vs. 36.2%, respectively).
- Younger unmarried personnel were more likely than older unmarried personnel to have used a condom the last time they had sex. Air Force personnel were less likely than personnel in the other Services to have used condoms.
- Differences in condom use by education and pay grade status were also noted. Consistent with the 2002 findings (Bray, Hourani, Rae, Dever, Brown, et al., 2003), sexually active unmarried enlisted personnel reported higher rates of condom use the last time they had sex than did officers. This trend was consistent among all Services except the Air Force.
- Personnel who had more than one sexual partner in the past 12 months were more likely to have used a condom than were personnel who reported having only one partner. For personnel who had five or more partners in the past 12 months, rates of condom use at last encounter were similar in 2005 when compared with 2002 rates. In 2005, over 53% of total DoD personnel who had five or more partners in the past 12 months reported using a condom at last encounter, as compared with 46% in 2002 (Bray, Hourani, Rae, Dever, Brown, et al. 2003). However, some rather large standard errors among the individual Services' estimates suggest some caution in interpreting the strength of these relationships.

The generally higher rates of condom use among enlisted unmarried personnel compared with unmarried officers are encouraging because they suggest that enlisted personnel have been heeding the messages about the importance of using condoms if they are sexually active. Conversely, the finding that sexually active unmarried officers were generally less likely to have used a condom the last time they had sex may be a cause for concern, because many of these personnel could still be engaging in behaviors that place them at increased risk for STD infection, including HIV infection. The finding that the prevalence of condom use

Table 8.4 **CONDOM USE AT LAST ENCOUNTER AMONG SEXUALLY ACTIVE UNMARRIED PERSONNEL, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS**

	Service				
Characteristic/Group	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
All Sexually Active Unmarried Personnel	50.8 (2.2)	49.0 (2.8)	51.3 (1.6)	43.5 (1.7)	48.8 (1.2)
Gender					
Male	52.9 (2.4)	52.7 (2.9)	52.6 (1.7)	47.2 (1.9)	51.7 (1.3)
Female	41.3 (4.4)	33.5 (3.2)	32.6 (2.4)	33.5 (2.1)	36.2 (2.0)
Age					
20 or younger	55.5 (2.6)	61.8 (4.7)	54.3 (3.9)	45.3 (5.6)	55.4 (1.9)
21-25	48.4 (3.2)	47.6 (4.1)	50.0 (1.9)	44.1 (2.3)	47.5 (1.7)
26-34	50.0 (3.1)	45.2 (3.9)	50.9 (4.6)	41.6 (4.8)	46.6 (2.2)
35 or older	49.5 (4.6)	37.4 (3.8)	43.2 (2.7)	42.9 (4.4)	43.1 (2.4)
Education					
High school or less	50.8 (2.1)	55.7 (4.1)	50.7 (1.8)	38.7 (4.6)	50.6 (1.6)
Some college	55.0 (3.3)	44.3 (3.3)	52.6 (2.4)	45.4 (2.3)	48.9 (1.8)
College graduate or higher	41.8 (3.6)	37.7 (4.1)	+ (+)	44.7 (6.3)	42.5 (2.5)
Pay Grade					
Enlisted	52.6 (2.3)	50.4 (2.9)	51.6 (1.7)	43.2 (1.9)	49.7 (1.3)
Officer	38.4 (2.8)	30.3 (5.8)	47.3 (7.5)	46.7 (7.9)	39.7 (2.7)
Number of Partners, Past 12 Months					
5 or more partners	54.2 (5.4)	57.8 (4.7)	51.7 (4.1)	44.1 (4.4)	53.1 (2.7)
2-4 partners	51.0 (2.3)	49.7 (2.6)	52.1 (2.9)	48.0 (2.1)	50.2 (1.3)
1 partner	47.4 (2.9)	41.9 (3.0)	50.1 (2.3)	39.2 (3.9)	44.2 (1.7)

Note: Table displays the percentage of unmarried military personnel by Service and characteristic/group who had one or more sexual partners in the past 12 months (*N* =5,103) and who reported using a condom during their last sexual encounter. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. For consistency with previous estimates, these estimates do not include personnel who are living as married.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Condom Use, Q136 and Q139; refer to Section 2.5.1 for descriptions of sociodemographic variables).

among unmarried personnel remained largely unchanged from 1998 through 2005 is cause for concern.

For those at highest risk (i.e., personnel who had multiple partners in the past 12 months), continued emphasis needs to be placed on adopting the behavior of correct and consistent condom use. Although the rates of HIV infection in 2002 among military personnel were estimated to be relatively low—approximately 1 to 2 per 10,000 (The Body: The Complete HIV/AIDS Resource, 2002)—personnel who have multiple partners but who use condoms inconsistently (or not at all) are at risk for infection with other STDs, such as gonorrhea, syphilis, chlamydia, and genital herpes.

8.2.3 Sexually Transmitted Diseases by Sexual Behavior

The 2005 DoD survey questionnaire also included a question about the number of new sex partners personnel had in the past 12 months. A new sex partner was defined as "someone you had sex with for the first time in the past 12 months." Table 8.5 presents percentages of STDs in sexually active men and women by sexual

Table 8.5 **SEXUALLY TRANSMITTED DISEASES IN MEN AND WOMEN BY SEXUAL BEHAVIOR, LAST 12 MONTHS**

Sexual Behavior	Men	Women	Total
Number of Sexual Partners, Past 12 Months			
5 or more total partners	9.9 (1.2)	17.1 (4.6)	10.5 (1.2)
2-4 total partners	4.1 (0.8)	10.8 (1.6)	5.3 (0.7)
1 partner	1.2 (0.2)	4.9 (0.7)	1.7 (0.2)
Number of New Sexual Partners, Past 12 Months[a]			
2 or more new partners	6.8 (0.6)	13.9 (2.1)	7.7 (0.7)
1 partner	2.2 (0.5)	5.3 (1.6)	2.8 (0.6)
No new partner	1.2 (0.2)	5.2 (0.8)	1.7 (0.2)
Use of Condom Last Sexual Encounter			
Yes	3.8 (0.5)	10.6 (1.6)	4.7 (0.5)
No	2.6 (0.3)	6.0 (0.8)	3.1 (670

Note: Table displays the percentage of all sexually active (in the past 12 months) military personnel (married and unmarried) with a sexually transmitted disease (STD) in the past 12 months, by gender, who reported the sexual behavior indicated in the rows of this table. The standard error of each estimate is presented in parentheses.

[a]Defined as "someone you had sex with for the first time in the past 12 months."

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Total Number of Partners, Q139; Number of New Partners, Q140; Condom Use, Q136).

behavior. Note that in contrast to the data in Table 8.4, which reports on condom use just for sexually active unmarried personnel, this table reports on condom use for all sexually active personnel, regardless of marital status.

Overall, as the number of reported sexual partners in the past 12 months increased, the prevalence of having an STD in the past 12 months was higher. Among the total DoD, 10.5% of personnel reporting having five or more sexual partners in the past 12 months had an STD. As expected, this percentage was lower (1.7%) for those reporting only one sexual partner in the past 12 months. Gender differences in estimates were noted: female personnel with higher numbers of sex partners were more likely to report an STD than males, although because of large standard errors, these estimates must be interpreted conservatively.

This trend was also seen among personnel reporting the number of new sexual partners in the past 12 months. In the total DoD, 7.7% of personnel with two or more new sexual partners in the past 12 months reported having an STD compared with 2.8% who reported having one new sexual partner in the past 12 months. Overall, females were more likely than males to report having an STD regardless of the number of new sexual partners they had in the past 12 months.

Table 8.5 also presents the prevalence of STDs and condom use during the last sexual encounter. For the total DoD, 4.7% of personnel who used a condom during their last sexual encounter reported having an STD in the past 12 months compared with 3.1% who did not use a condom during their last sexual encounter. This finding suggests that military personnel are heeding messages about condom use and protection from STDs.

8.2.4 Unintended Pregnancies

Survey participants were asked about having or causing an unintended pregnancy during the past 12 months. Table 8.6 presents unintended pregnancy rates among all sexually active personnel during the past 12 months across Services. In the total DoD, about 1 in 14 (7.1%) sexually active personnel reported either having or causing an unintended pregnancy during the past year. Overall, Air Force personnel reported fewer unintended pregnancies than the other Services; 4.8% of Air Force personnel, 7.5% of Navy personnel, 7.8% of Marine

Table 8.6 **CAUSED OR HAD UNINTENDED PREGNANCY IN PAST 12 MONTHS BY GENDER AND AGE**

Characteristic/Group	Service: Army	Navy	Marine Corps	Air Force	Total DoD
All Sexually Active Personnel	8.5 (0.8)	7.5 (0.6)	7.8 (0.6)	4.8 (0.4)	7.1 (0.4)
Men					
20 or younger	13.8 (2.3)	9.8 (3.1)	8.6 (1.9)	6.1 (2.8)	10.7 (1.5)
21-25	11.4 (0.9)	11.5 (2.7)	9.8 (1.4)	9.0 (0.9)	10.6 (0.8)
26-34	5.3 (0.9)	6.4 (0.8)	4.3 (1.3)	3.1 (0.8)	4.8 (0.5)
35 or older	1.8 (0.6)	2.2 (0.4)	3.0 (0.6)	1.0 (0.4)	1.7 (0.3)
Women					
20 or younger	24.0 (6.3)	8.7 (3.5)	15.4 (3.3)	13.0 (5.4)	16.2 (3.0)
21-25	16.4 (4.3)	15.6 (2.1)	19.2 (1.8)	11.8 (2.4)	14.8 (1.8)
26-34	4.3 (2.1)	7.5 (2.7)	13.1 (3.0)	5.1 (1.2)	5.8 (1.1)
35 or older	2.4 (0.9)	1.2 (0.7)	2.2 (1.6)	1.1 (0.7)	1.6 (0.5)
Education					
High school or less	13.0 (1.1)	10.6 (1.2)	9.0 (1.3)	7.8 (1.6)	10.7 (0.7)
Some college	7.8 (1.2)	6.8 (0.6)	8.0 (1.7)	5.6 (0.7)	6.8 (0.5)
College graduate or higher	3.1 (0.7)	3.3 (0.8)	2.8 (0.8)	1.7 (0.3)	2.6 (0.3)
Pay Grade					
Enlisted	9.7 (1.0)	8.4 (0.7)	8.3 (0.6)	5.9 (0.4)	8.1 (0.4)
Officer	3.2 (0.9)	2.7 (0.9)	3.6 (1.3)	1.0 (0.3)	2.3 (0.4)
Number of Partners, Past 12 Months					
1 partner	5.2 (0.5)	5.8 (0.5)	7.4 (1.0)	4.1 (0.5)	5.3 (0.3)
2-4 partners	11.1 (1.7)	8.6 (1.1)	5.9 (1.6)	6.0 (0.5)	8.6 (0.8)
5 or more partners	16.6 (1.9)	14.0 (2.3)	11.7 (1.6)	10.1 (3.0)	14.0 (1.2)

Note: Table displays the percentage of military personnel by Service and characteristic/group who caused or had an unintended pregnancy in the past 12 months. Only personnel who had one or more sexual partners in the past 12 months were considered in these estimates (Total DoD *N* =14,670). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Unintended Pregnancy, Q141; Sexually Active, 139; Number of Partners, Q139; refer to Section 2.5.1 for descriptions of sociodemographic variables).

Corps personnel, and 8.5% of Army personnel reported having or causing an unintended pregnancy during the past year. Although the rates for unintended pregnancies among certain groups is high (e.g., among Army women 20 years or younger), the military is well above the *Healthy People 2010* objective of having 70% or more of its pregnancies intended.

For both men and women, younger personnel were more likely to experience an unintended pregnancy than older personnel. Among males aged 20 or younger, 10.7% reported an unintended pregnancy, while 4.8% of those aged 26 to 34 and 1.7% of those aged 35 or older reported an unintended pregnancy during the past year. For women, 16.2% (about 1 in 6) of personnel aged 20 or under reported an unintended pregnancy compared with 5.8% of those aged 26 to 34 and 1.6% of those aged 35 or older.

Percentages of personnel reporting unintended pregnancies were higher with greater numbers of sexual partners during the past year. Among the total DoD,

5.3% of personnel who reported having one sex partner had or had caused an unintended pregnancy, 8.6% of those with two to four sex partners reported an unintended pregnancy, and 14.0% of those with 5 or more partners reported an unintended pregnancy in the past 12 months.

8.3 Sleep Habits

Humans spend an estimated one-third of their lives sleeping (libraryjournal.com, 2005). Lack of sleep has been associated with a number of poor health outcomes, including interference with general activities of daily living, decreased immune function (Ozturk, Pelin, Karadeniz, Kaynak, Caka, & Gozukirmizi, 1999), mood disturbance (Dinges et al., 1997), decreased alertness, and an estimated 100,000 fatigue-related highway accidents per year (National Sleep Foundation, 2006). An estimated 40 million Americans have sleep disorders; as of July 1998, 95% of victims were thought to be undiagnosed (The Sleep Well, 1998).

The 2005 survey asked participants how many hours of sleep they got each night, on average, during the past 12 months. Table 8.7 presents the percentages of personnel who reported an average of 2 hours of sleep or less, 3 to 4 hours, 5 to 6 hours, and 7 hours or more of sleep per night.

In the total DoD, nearly a quarter (23.8%) of personnel reported getting 7 or more hours of sleep on average per night, 62.3% reported getting 5 or 6 hours per night,

Table 8.7 **AVERAGE NUMBER OF HOURS OF SLEEP PER NIGHT IN PAST 12 MONTHS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS**

	Average Hours of Sleep in Past 12 Months			
Characteristic/Group	**2 Hours or Less**	**3 or 4 Hours**	**5 or 6 Hours**	**7 Hours or More**
Service				
Army	1.2 (0.3)	18.3 (1.3)	64.0 (1.1)	16.4 (1.2)
Navy	1.1 (0.2)	13.2 (1.6)	62.7 (0.9)	23.1 (1.7)
Marine Corps	1.2 (0.2)	11.2 (1.0)	64.7 (1.4)	23.0 (1.1)
Air Force	0.4 (0.1)	7.6 (0.8)	58.9 (1.1)	33.1 (1.3)
Gender				
Male	1.0 (0.1)	13.1 (0.9)	62.9 (0.7)	23.0 (1.1)
Female	0.5 (0.1)	12.2 (1.0)	58.9 (1.2)	28.4 (1.1)
Age				
20 or younger	1.8 (0.5)	16.4 (1.9)	61.5 (1.6)	20.2 (1.8)
21-25	1.4 (0.2)	15.5 (1.0)	61.0 (1.3)	22.1 (1.4)
26-34	0.6 (0.2)	12.1 (1.1)	62.1 (1.2)	25.3 (1.3)
35 or older	0.4 (0.2)	8.8 (0.8)	64.7 (0.8)	26.2 (1.1)
Education				
High school or less	1.8 (0.3)	17.2 (1.3)	61.8 (1.1)	19.2 (1.3)
Some college	0.7 (0.1)	13.8 (0.9)	62.7 (0.9)	22.9 (1.2)
College grade or higher	0.3 (0.1)	5.1 (0.7)	62.2 (1.7)	32.4 (1.7)
Pay Grade				
Enlisted	1.1 (0.1)	14.9 (0.9)	62.4 (0.7)	21.5 (1.0)
Officer	0.2 (0.1)	3.6 (0.6)	61.5 (2.0)	34.7 (2.0)
Total DoD	1.0 (0.1)	13.0 (0.8)	62.3 (0.6)	23.8 (1.0)

Note: Table displays the percentage of military personnel by characteristic/group who reported their average hours of sleep per night in the past 12 months. The standard error of each estimate is presented in parentheses. Within each row, the percentages may not sum to 100 because of rounding.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Hours of Sleep, Q134; refer to Section 2.5.1 for descriptions of sociodemographic variables).

13.0% reported getting 3 to 4 hours, and 1.0% reported an average of 2 hours or less of sleep per night. Air Force personnel reported getting more sleep per night than personnel from other Services. One-third (33.1%) of Air Force personnel reported an average of 7 or more hours of sleep per night, compared with 23.0% of Marine Corps personnel, 23.1% of Navy personnel, and 16.4% of Army personnel. Females generally reported getting more sleep per night than males.

Table 8.7 shows a relationship between age group and reported average number of hours of sleep per night. Fewer personnel aged 20 or younger reported getting 7 or more hours of sleep per night (20.2%) than those aged 35 or older (26.2%). Similarly, 1.8% of personnel aged 20 or younger reported getting 2 hours or less of sleep on average, while 0.4% of those aged 35 or older reported getting 2 hours or less of sleep per night on average. Officers reported getting significantly more sleep per night than enlisted personnel.

8.4 Poor Physical Health

In the 2005 survey, DoD personnel were asked how often poor physical health kept them from doing their usual activities, such as work or recreation, in the past 30 days. Table 8.8 displays the percentages of personnel who reported no limitations during the past month, those

Table 8.8 **LIMITED USUAL ACTIVITIES BECAUSE OF POOR PHYSICAL HEALTH, PAST MONTH, BY SERVICE, GENDER, AND AGE**

	Poor Physical Health Limited Usual Activities					
Service and Gender/Age Group	**Never**		**Less Than Once a Week (1-3 Days)**		**Once a Week or More (4 or More Days)**	
Service						
Army	76.3	(0.9)	13.0	(0.6)	10.7	(0.6)
Navy	82.9	(0.8)	11.2	(0.6)	5.9	(0.5)
Marine Corps	83.2	(0.8)	9.3	(0.5)	7.5	(0.7)
Air Force	83.8	(0.9)	11.2	(0.9)	4.9	(0.3)
Total	81.1	(0.6)	11.5	(0.4)	7.4	(0.4)
Male						
20 or younger	82.6	(1.4)	10.5	(1.3)	6.9	(1.0)
21-25	83.0	(0.8)	9.5	(0.7)	7.5	(0.8)
26-34	83.6	(0.8)	10.9	(0.6)	5.6	(0.5)
35 or older	79.6	(1.0)	12.5	(0.9)	7.9	(0.6)
Total	82.3	(0.6)	10.8	(0.4)	6.9	(0.4)
Female						
20 or younger	64.9	(5.2)	21.5	(4.0)	13.5	(2.9)
21-25	76.1	(1.9)	13.7	(1.1)	10.2	(1.4)
26-34	77.8	(1.4)	15.4	(1.2)	6.8	(1.2)
35 or older	72.3	(2.4)	16.2	(1.7)	11.4	(1.6)
Total	74.1	(1.4)	15.9	(0.9)	10.0	(1.0)
Total						
20 or younger	79.6	(1.4)	12.4	(1.3)	8.0	(0.8)
21-25	81.9	(0.8)	10.2	(0.7)	7.9	(0.7)
26-34	82.8	(0.8)	11.5	(0.6)	5.7	(0.5)
35 or older	78.7	(1.0)	12.9	(0.9)	8.3	(0.6)

Note: Table displays the percentage of military personnel by Service, gender, and age group who reported they limited their usual activities because of poor physical health in the past month. The standard error of each estimate is presented in parentheses. Within each row, the percentages may not sum to 100 because of rounding. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Poor Physical Health Past Month, Q83).

who had limited their usual activities less than once a week (1 to 3 days in the past month), and those who had limited their usual activities once a week or more (4 or more days in the past month).

In the total DoD, 79.6% of personnel aged 20 or younger had not limited their usual activities in the past month because of poor physical health; similar rates were seen across age groups. Among the individual Services, Air Force, Navy, and Marine Corps personnel were less likely than Army personnel to have been kept from their regular activities by poor physical health, followed by the Navy, Marine Corps, and Army; for example, 4.9% of Air Force personnel had been kept from their usual activities once a week or more in the past month, compared with 5.9% of the Navy, 7.5% of the Marine Corps, and 10.7% of the Army. Female personnel were more likely to have limited their usual activities because of poor physical health (25.9%) than male personnel (17.7%).

Table 8.9 displays the percentages of total DoD personnel who limited their usual activity because of poor physical health in the past month by selected health behaviors. A clear relationship with exercise was noted: approximately 6% of personnel who regularly engaged in strenuous exercise had limited their usual activities once a week or more in the past month because of poor physical health, compared with 13% of personnel who had not regularly engaged in strenuous exercise. This finding illustrates the importance of exercise in health outcomes that may not be particularly apparent, such as limitation of activities due to poor physical health.

The associations between substance use and limiting usual activities because of poor physical health varied by substance. This association was not strong for alcohol

Table 8.9 **LIMITED USUAL ACTIVITIES BECAUSE OF POOR PHYSICAL HEALTH, PAST MONTH, BY HEALTH BEHAVIORS**

	Poor Physical Health Limited Usual Activities					
Health Behaviors	**Never**		**Less Than Once a Week (1-3 Days)**		**Once a Week or More (4 or More Days)**	
Engaged in Strenuous Exercise 20 Minutes or More at Least 3 Days a Week						
Yes	83.3	(0.6)	11.1	(0.5)	5.6	(0.3)
No	74.4	(1.3)	12.5	(0.6)	13.1	(1.1)
Alcohol Drinking Level						
Abstainer	81.8	(1.0)	10.8	(0.9)	7.4	(0.7)
Infrequent/light	81.3	(1.1)	11.4	(0.8)	7.4	(0.8)
Moderate	82.8	(1.1)	10.5	(0.8)	6.7	(0.7)
Moderate/heavy	81.4	(1.1)	11.6	(0.7)	7.0	(0.9)
Heavy	79.5	(1.6)	13.2	(0.9)	7.3	(1.0)
Past-Year Illicit Drug Use						
No drug use	82.8	(0.5)	10.7	(0.4)	6.5	(0.3)
Marijuana	65.1	(2.5)	16.1	(2.7)	18.8	(3.0)
Any illicit drug use except marijuana	66.7	(2.3)	19.5	(2.0)	13.9	(1.9)
Smoking Status						
Never smoked	83.0	(0.6)	10.7	(0.5)	6.3	(0.4)
Former smoker	80.2	(1.5)	11.6	(0.7)	8.2	(1.2)
Current smoker, not heavy	80.4	(0.9)	12.2	(0.8)	7.4	(0.6)
Heavy smoker	74.2	(1.7)	14.5	(1.3)	11.3	(1.2)

Note: Table displays the percentage of military personnel by health behavior who reported they limited their usual activities because of poor physical health in the past month. The standard error of each estimate is presented in parentheses. Within each row, the percentages may not sum to 100 because of rounding.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Poor Physical Health Past Month, Q83).

use; personnel who were heavy alcohol users limited their usual activities because of poor physical health at similar levels as infrequent/light alcohol users. Illicit drug use and cigarette use, however, were more closely associated with physical health. For example, personnel who had used marijuana in the past year were more likely to have limited their usual activities because of poor physical health at least once in the past month compared with personnel who had not used an illicit drug (34.9% vs. 17.2%). Similarly, personnel who had used any illicit drug except marijuana were more likely than nondrug users to have limited their usual activities due to poor physical health. Heavy smokers were somewhat more likely to have limited their usual activities because of poor health once a week or more in the past month (about 11%) compared with those who had never smoked (about 6%), former smokers (about 8%), or current nonheavy smokers (about 7%).

Table 8.10 displays the percentages of total DoD personnel who limited their usual activity because of poor physical health by perceived levels of stress and poor mental health. Personnel who perceived high levels of stress at work or in their family life were more likely to have limited activities due to poor physical health. Compared with personnel who perceived no stress at work, personnel who perceived "a lot" of stress at work were markedly more likely to have limited their usual activities at least once in the past month because of poor physical health (26.5% vs. 9.5%). Similarly, personnel who perceived "a lot" of stress in their family life were more likely to have limited their usual activity because of poor physical health at least once during the past month (28.0%) than were personnel who reported no stress in their family life (10.9%).

Poor physical health was also associated with poor mental health. Among personnel who reported that poor *mental* health limited their usual activities once a week or more during the past month, more than 1 in 4 (28.8%) also reported limiting their usual activities once a week or more due to poor *physical* health. More than half (50.8%) of personnel who had limited their usual

Table 8.10 **LIMITED USUAL ACTIVITIES BECAUSE OF POOR PHYSICAL HEALTH, BY PERCEIVED LEVEL OF STRESS AND POOR MENTAL HEALTH**

	Poor Physical Health Limited Usual Activities					
Perceived Level of Stress	**Never**		**Less Than Once a Week (1-3 Days)**		**Once a Week or More (4 or More Days)**	
Perceived Stress at Work						
A lot	73.5	(1.1)	14.9	(0.7)	11.6	(0.9)
Some	80.9	(0.6)	12.6	(0.5)	6.5	(0.5)
A little	86.7	(0.9)	8.9	(0.7)	4.4	(0.5)
None at all	90.4	(1.0)	5.4	(0.8)	4.1	(0.6)
Perceived Stress in Family Life						
A lot	72.0	(1.4)	15.8	(0.9)	12.2	(0.8)
Some	79.1	(0.8)	13.5	(0.8)	7.4	(0.8)
A little	82.7	(0.6)	11.4	(0.5)	5.9	(0.4)
None at all	89.1	(0.8)	6.1	(0.7)	4.8	(0.6)
Poor Mental Health Limited Usual Activities						
Never	85.2	(0.5)	9.6	(0.4)	5.3	(0.3)
Less than once a week	64.5	(1.8)	22.8	(1.6)	12.7	(1.4)
Once a week or more	49.1	(2.8)	22.0	(2.1)	28.8	(2.5)

Note: Table displays the percentage of military personnel by perceived level of stress who reported they limited their usual activities because of poor physical health in the past month. The standard error of each estimate is presented in parentheses. Within each row, the percentages may not sum to 100 because of rounding.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Perceived Stress at Work, Q88; Perceived Stress in Family Life, Q89; Poor Mental Health Limited Usual Activities, Q87; Poor Physical Health Limited Usual Activities, Q83).

activities because of poor mental health once a week or more in the past month had also limited their activities at least once because of poor physical health.

8.5 Risk Taking and Sensation Seeking

Risk-taking dispositions include a series of associated characteristics, such as impulsiveness, venturesomeness, and sensation seeking. *Impulsiveness* refers to acting impulsively without considering the possible risk of the action, and *venturesomeness* refers to engaging in risky behaviors though the potential dangers of the action are known (Eysenck & Eysenck, 1978). *Sensation seeking* refers to the seeking of varied, novel, complex, and intense sensations and experiences (Zuckerman, 1994). Though these factors are correlated, they have been shown to be both conceptually and empirically distinct (Cherpitel, 1999). In addition to substance use, these risk-taking dispositions have been linked with accidental injury (Cherpitel, 1993; Cherpitel, 1999), pathological gambling (Wolkowitz, Roy, & Doran, 1985), and risky sexual activity (Kahn, Kaplowitz, Goodman, & Emans, 2002).

8.5.1 Risk Taking

In the 2005 survey, DoD personnel were asked a series of five questions about their tendency to take risks (e.g., "I often act on the spur of the moment without stopping to think," "I like to test myself every now and then by doing something a little chancy," and "You might say I act impulsively"). Based on their responses to these questions, personnel were classified as either low risk takers (17.2% of personnel), moderate risk takers (54.8% of personnel), or high risk takers (28.0% of personnel). The percentages of personnel characterized by different risk-taking levels who displayed selected health behaviors are shown in Table 8.11 (also see Figure 8.2).

DoD personnel who were high risk takers were significantly more likely to engage in some forms of substance use than those who were low or moderate risk takers. Regarding alcohol use, 13.7% of high risk takers were abstainers, compared with 32.8% of low risk takers. In addition, one-third of high risk takers reported heavy drinking, compared with 7.5% of low risk takers. High risk takers were also more likely to report drinking and driving (23.5%) when compared with low risk takers (4.6%).

Personnel who were classified as high risk takers were more likely to engage in illicit drug use and cigarette smoking during the past year. An estimated 9.1% reported marijuana use in the past month, compared with 2.7% of moderate risk takers and 1.3% of low risk takers. Similarly, high risk takers were more likely to have used other drugs during the past year: 16.6% of high risk takers, 7.3% of moderate risk takers, and 5.0% of low risk takers reported using an illicit drug other than marijuana in the past 12 months. Nearly half (47.3%) of high risk takers reported that they were current smokers, compared with 17.8% of low risk takers.

Table 8.11 also presents personnel at different risk-taking levels and selected risk behaviors such as suicidal ideation, hospitalizations for unintended injuries, and not using seat belts. Among high risk takers, almost 1 in 10 (9.7%) had seriously considered suicide in the past year, and 7.5% reported seldom or never using seat belts, while 2.2% of low risk takers had considered suicide and 2.3% seldom or never used seat belts. Although risk-taking behavior may be an advantage in some military occupations, this advantage may be offset by risks that can negatively affect readiness in terms of potential injuries or loss of life.

8.5.2 Sensation Seeking

In addition to items regarding risk taking, the 2005 survey included questions regarding respondents' sensation-seeking behavior (e.g., "I'm always up for a new experience," "I like to try new things just for the excitement," and "I like to experience new and different sensations"). Overall, an estimated 8.1% of personnel were classified as low sensation seekers, 32.2% were classified as moderate sensation seekers, and 59.7% were classified as high sensation seekers. This distribution differs from that regarding risk taking in that more than half of military personnel were classified as high sensation seekers, whereas more than half of personnel were classified as moderate risk takers.

Table 8.11 **SELECTED HEALTH BEHAVIORS, PAST 12 MONTHS, BY RISK-TAKING DISPOSITION[a]**

	Risk-Taking/Impulsivity			Sensation Seeking		
Behavior	**Low**	**Moderate**	**High**	**Low**	**Moderate**	**High**
Alcohol Drinking Level						
Abstainer	32.8 (1.4)	22.4 (1.1)	13.7 (0.9)	35.4 (2.1)	26.6 (1.2)	17.3 (0.7)
Infrequent/light	21.8 (1.3)	19.2 (0.6)	13.9 (1.1)	22.0 (1.2)	19.9 (0.7)	16.7 (0.7)
Moderate	18.6 (1.2)	19.8 (0.6)	13.3 (0.8)	18.1 (1.7)	18.9 (1.0)	17.1 (0.7)
Moderate/heavy	19.2 (1.3)	24.0 (0.7)	25.9 (1.3)	15.2 (1.7)	21.9 (0.9)	25.8 (0.8)
Heavy	7.5 (0.8)	14.7 (0.9)	33.2 (1.5)	9.2 (1.0)	12.8 (0.9)	23.1 (1.2)
Past-Year Illicit Drug Use						
No drug use	94.6 (0.7)	91.5 (0.6)	81.0 (1.4)	95.3 (0.9)	92.5 (0.7)	86.4 (0.9)
Marijuana	1.3 (0.4)	2.7 (0.4)	9.1 (1.0)	1.3 (0.5)	2.0 (0.5)	5.8 (0.6)
Any illicit drug use except marijuana	5.0 (0.6)	7.3 (0.5)	16.6 (1.0)	4.3 (0.8)	7.0 (0.7)	11.6 (0.7)
Smoking Status						
Nonsmoker	67.6 (2.0)	56.7 (1.2)	40.7 (1.2)	64.9 (3.0)	59.2 (1.4)	49.8 (1.0)
Former smoker	14.6 (0.9)	14.3 (0.6)	12.0 (0.9)	14.3 (1.3)	15.7 (0.6)	12.5 (0.6)
Current smoker	17.8 (1.6)	29.0 (1.2)	47.3 (1.1)	20.8 (2.6)	25.1 (1.1)	37.7 (1.1)
Risk Behaviors						
Drinking and driving	4.6 (0.6)	10.9 (0.6)	23.5 (1.4)	6.2 (0.9)	8.5 (0.8)	16.9 (0.8)
Seriously considered suicide in past year	2.2 (0.5)	3.4 (0.3)	9.7 (0.9)	3.1 (0.7)	3.1 (0.3)	6.2 (0.4)
Hurt in on-the-job accident 1+ days	4.8 (0.6)	7.2 (0.6)	13.9 (1.0)	4.6 (0.7)	7.0 (0.8)	10.1 (0.8)
Hospitalized for unintentional injury	1.7 (0.3)	2.2 (0.2)	4.2 (0.5)	2.3 (0.6)	2.3 (0.3)	2.9 (0.3)
Seldom or never used seat belts	2.3 (0.5)	2.5 (0.3)	7.5 (0.9)	2.4 (0.4)	2.3 (0.3)	4.9 (0.5)
Seldom or never used motorcycle helmet	1.4 (0.4)	1.5 (0.2)	4.5 (0.5)	1.9 (0.4)	1.4 (0.3)	2.9 (0.3)
Total[b]	17.2 (0.6)	54.8 (0.7)	28.0 (0.9)	8.1 (0.4)	32.2 (0.7)	59.7 (0.9)

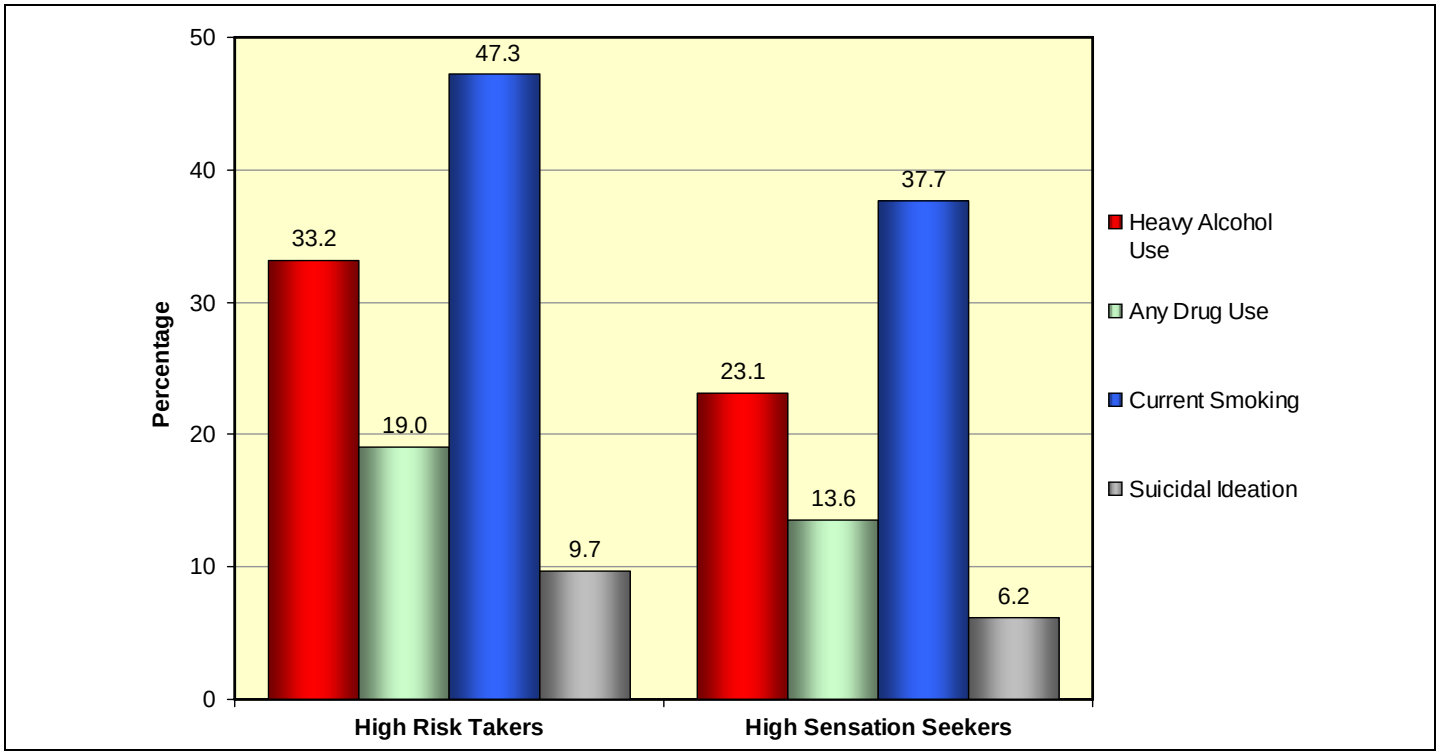
Note: Table displays the percentage of military personnel by risk-taking disposition (risk-taking/impulsivity and sensation seeking) who reported the behavior indicated in the rows of this table. The standard error of each estimate is presented in parentheses.

[a]Risk-taking disposition is based on an item and scoring algorithm from the National Alcohol Research Center's 1995 National Alcohol Survey. Respondents were categorized as low (not at all), moderate (a little), or high (some, quite a lot) based on four summed scores on two scales scored 1 to 4 (Cherpitel, 1999).

[b]The total row presents the percentage of military personnel who fit into each level of risk-taking/impulsivity and sensation seeking.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Risk Taking Disposition, Q15).

Figure 8.2 Health behaviors among high risk takers and high sensation seekers



Sensation seeking appeared to be positively associated with substance use. Nearly half of all high sensation seekers in the military (48.9%) reported either moderate/heavy or heavy drinking levels, compared with 24.4% of low sensation seekers. A similar pattern was seen regarding past-year illicit drug use: 17.4% of high sensation seekers and 5.6% of low sensation seekers reported using marijuana or other illicit drugs in the past year. Personnel high on sensation-seeking characteristics were also more likely to be current cigarette smokers.

Some risk behaviors reported in Table 8.11 differed by sensation-seeking level, while others did not. High sensation seekers were significantly more likely to have engaged in drinking and driving during the past year (16.9%) than either moderate (8.5%) or low (6.2%) sensation seekers. High sensation seekers were also more likely to report suicidal ideation in the past year (6.2%) than low sensation seekers (3.1%). Percentages of personnel reporting hospitalizations for unintended injuries were similar across sensation-seeking levels.

8.6 Summary

8.6.1 Injuries and Injury Prevention

Injuries. Hospitalization for injuries affects the overall health and readiness of the military population. Although significant progress has been made since 2002, additional efforts will be needed to reduce high rates of injury in the military.

In the total DoD in 2005, 2,679 per 100,000 personnel reported injuries that required overnight hospitalization (Figure 8.1). This was a significant decrease from the 2002 survey, which reported injury rates at 3,625 per 100,000 personnel. Currently there is no comparable *Healthy People 2010* objective to reduce injuries that require overnight hospitalization; however, the *Healthy People 2000* objective to reduce these injuries was targeted at 754 per 100,000.

Among the Services, personnel in the Marine Corps (3,749 per 100,000) and Army (3,284 per 100,000) were most likely to have been hospitalized for an unintentional injury, followed by Navy personnel (2,781

per 100,000) and Air Force personnel (1,428 per 100,000).

Seat Belt Use. Use of seat belts is an important injury prevention measure. The total DoD met the *Healthy People 2010* objective for seat belt use, although some subgroups did not (Table 8.1):

Some 91.8% of military personnel reported that they wore seat belts always or nearly always when driving a motor vehicle. This met the *Healthy People 2010* objective of 92%.

Males aged 20 or younger and males aged 21 to 25 in the total DoD (and in the Army and Navy separately) did not meet the *Healthy People 2010* objective of seat belt use.

In the total DoD, females (96.3%) were more likely than males (91.0) to report seat belt use always or nearly always. This pattern held in each age group and in each Service.

Helmet Use. Helmet use is another important injury prevention measure (Table 8.2). The total DoD met the *Healthy People 2010* objective for motorcycle helmet use, although certain subgroups did not. Although there is currently no *Healthy People 2010* objective for bicycle helmet use, the proportion of military personnel wearing bicycle helmets increased by nearly 4.4% since 2002.

Among DoD personnel who rode a motorcycle in the past 12 months, 84.4% wore helmets always or nearly always. This rate was above the *Healthy People 2010* objective of 79% or greater use of helmets among motorcyclists. All groups of personnel with the exception of men in the Army (76.4%) met this objective.

About 56.3% of DoD personnel who rode a bicycle in the past 12 months always or nearly always wore a helmet. This finding in 2005 represents an increase in bicycle helmet use from 52% in 2002, 44% in 1998, and 23% use in 1995.

8.6.2 Sexually Transmitted Disease Risk Reduction and Unintended Pregnancy

Prevalence of Sexually Transmitted Disease. Military women reported a higher lifetime and past-year prevalence of STDs than did men. Lifetime prevalence of STDs was more than 1 in 8 personnel, whereas past-year prevalence was much lower, at 1 in 30 personnel (Table 8.3):

- About 13% of DoD personnel had ever had an STD. Lifetime prevalence rates for men in the total DoD and in individual Services were comparable to the overall rate.
- Women had higher lifetime prevalence of STDs, with approximately 22% of military women reporting ever having an STD. Among women, lifetime prevalence rates were approximately 24% in the Navy, 22% in the Army and Air Force, and 21% in the Marine Corps.
- About 4% of personnel in the total DoD (3% of males and 7% of females) reported having an STD in the preceding year. Rates of past-year STDs were consistent across Services.

Condom Use. In the 2005 survey, condom use was assessed among sexually active unmarried personnel (Table 8.4):

- About 49% of sexually active unmarried personnel in the total DoD used a condom the last time they had intercourse. The rate of reported condom use was higher among males, younger personnel, those with a high school education or less, enlisted personnel, and those who had more than 5 sexual partners in the past 12 months.

Prevalence of Sexually Transmitted Diseases by Sexual Behavior. The prevalence of STDs in the past was also assessed among *all* sexually active personnel by sexual partners and condom use (Table 8.5):

- Almost 11% of military personnel who had sex with five or more people in the past year reported having an STD . Of personnel having sex with two or more new sexual partners, almost 8% reported having an STD. Females reported higher rates of STDs than men across type of sexual partner and condom use at last encounter.

- Approximately 5% of military personnel who used a condom during their last sexual encounter reported having an STD.

Unintended Pregnancies. The 2005 survey asked participants whether they had caused or had an unintended pregnancy in the past 12 months (Table 8.6).

- In the total DoD, about 1 in 14 (7.1%) sexually active personnel reported either having or causing an unintended pregnancy during the past year. Although the rates for unintended pregnancies among certain groups were high (e.g., among Army women 20 years or younger), the military is well above the *Healthy People 2010* objective of having 70% or more of its pregnancies intended.
- The rate of causing or having an unintended pregnancy was highest among younger males and females, those with a high school education or less, enlisted personnel, and those who had more than five sexual partners in the past 12 months.

8.6.3 Sleep Habits

The 2005 survey asked personnel how many hours of sleep they got per night, on average, during the past 12 months (Table 8.7):

- In the total DoD, nearly a quarter (23.8%) of personnel reported getting 7 or more hours of sleep on average per night, 62.3% reported getting 5 or 6 hours per night, 13.0% reported getting 3 to 4 hours, and 1.0% reported an average of 2 hours or less of sleep per night. Air Force personnel get significantly more sleep per night than those from other Services.
- Fewer personnel aged 20 or younger reported getting 7 or more hours of sleep per night (20.2%) than those aged 35 or older (26.2%). Similarly, 1.8% of personnel aged 20 or younger reported getting 2 hours or less of sleep on average, while 0.4% of those aged 35 or older reported getting 2 hours or less of sleep per night on average.

8.6.4 Poor Physical Health

DoD personnel were asked how often poor physical health kept them from doing their usual activities, such as work or recreation, in the past 30 days (Tables 8.8 and 8.9):

- In the total DoD, 79.6% of personnel aged 20 or younger had not limited their usual activities in the past month because of poor physical health, and 78.7% of personnel aged 35 or older had not limited their usual activities in the past month because of poor physical health.
- Among the individual Services, Air Force personnel were the least likely to have been kept from their regular activities by poor physical health at least once a week or more (4.9%), followed by the Navy (5.9%), Marine Corps (7.5%), and Army (10.7%).
- Female personnel were more likely to have limited their usual activities because of poor physical health at least once in the past month (25.9%) than male personnel (17.7%).
- Approximately 6% of personnel who regularly engaged in strenuous exercise had limited their usual activities once a week or more in the past month because of poor physical health, compared with 13% of personnel who had not regularly engaged in strenuous exercise.
- Personnel who had used marijuana (and no other illicit drugs) in the past year were more likely to have limited their usual activities because of poor physical health at least once in the past month compared with personnel who had not used an illicit drug (34.9% vs. 17.2%). Heavy smokers were somewhat more likely to have limited their usual activities because of poor health once a week or more in the past month (about 11%), compared with those who had never smoked (about 6%).

8.6.5 Risk Taking and Sensation Seeking

The 2005 survey included five items geared toward classifying personnel in terms of risk taking and four items geared toward categorizing them in terms of sensation-seeking characteristics (Table 8.11):

- In the total DoD, personnel were classified as either low risk takers (17.2% of personnel), moderate risk takers (54.8% of personnel), or high risk takers (28.0% of personnel).
- DoD personnel who were high risk takers were significantly more likely to engage in some forms of substance use than those who were low or moderate risk takers. An estimated 13.7% of high risk takers reported being alcohol abstainers, compared with 32.8% of low risk takers. One-third of high risk takers reported heavy drinking, compared with 7.5% of low risk takers.

- Overall, an estimated 8.1% of personnel were classified as low sensation seekers, 32.2% were classified as moderate sensation seekers, and 59.7% were classified as high sensation seekers. This distribution differs from that regarding risk taking in that more than half of military personnel are high sensation seekers, whereas more than half of personnel are moderate risk takers.
- Nearly half of all high sensation seekers in the military (48.9%) reported either moderate/heavy or heavy drinking levels, compared with 24.4% of low sensation seekers. High sensation seekers were significantly more likely to have engaged in drinking and driving during the past year (16.9%) than either moderate (8.5%) or low (6.2%) sensation seekers.

Chapter 9: Stress and Mental Health

Challenges in demanding military environments may elicit experiences of stress (Orasanu & Backer, 1996). To assess the impact of these experiences, the Department of Defense (DoD) survey series has contained a set of questions since 1988 about the mental health of active-duty personnel. As in previous surveys (Bray et al., 1988, 1992, 1995b, 1999, 2003), the 2005 survey asked respondents to appraise their levels of stress experience attributed to work and to their intimate and family relationships. As they had since 1995, respondents also provided information on the perceived impact of work-related and personal or family-related stress experiences on their military performance. Respondents were also asked to specify the methods they used to cope with feeling stressed. In addition, information was collected on indicators of depressive symptoms for different time frames and relationships among feeling stressed, depression, and alcohol use. In the 2002 survey, new measures were included to support the 1999 DoD initiatives to control combat stress among Service members and to expand DoD's suicide prevention program (OASD, 1999). To obtain baseline prevalence information, items were added on anxiety symptoms and suicidal ideation. New to the 2005 survey were standardized instruments to screen for symptoms potentially due to serious psychological distress and posttraumatic stress disorder (PTSD) (see Chapter 2). Screeners, of course, are not clinical assessments of these conditions but may suggest the need for further evaluation. Finally, the use of, perceived need for, and perceived career damage associated with mental health counseling by Service was assessed, as well as the relationship between perceived career damage and selected mental health measures. This chapter presents findings related to the issues of mental health, exposure to challenges eliciting stress, coping strategies, and life functioning.

9.1 Appraisal of Stress and Impact on Military Job

Psychosocial theories of stress generally recognize the importance of cognitive factors in developing and maintaining stress-related symptoms and problems in life functioning. Folkman and Lazarus (1980, 1985), for example, proposed a psychosocial model that emphasizes the important role that appraisal plays in developing and maintaining stress-related adjustment problems. Indeed, a number of experimental and applied studies have shown robust relationships between individuals' appraisal of the level of stress associated with specific life events and their capacity to function effectively (see Foa, Steketee, & Olasov Rothbaum [1989]). Most studies examining deployment stressors have been limited to selected combat troops and/or veteran groups (e.g., Vogt et al. [2005]; Hoge et al. [2004]). The 2005 survey offered the opportunity to assess the degree to which deployment, work, and interpersonal challenges were cited as main sources of experiencing stress in the general military population.

Personnel were asked to separately appraise their stress levels attributed to work and family challenges, as well as the degree to which the experience of stress interfered with the performance of their military jobs. Table 9.1 shows that personnel attributed higher levels of stress to work than to their personal lives. Almost one-third of the total DoD attributed "a lot" of stress to work, compared with the less than 20% who attributed "a lot" of stress to their personal lives. Rates did not differ significantly from those in 2002. Army and Marine Corps personnel attributed the most stress to work and to their personal or family lives. Air Force personnel attributed less stress to their family lives than members of the Army and Marine Corps. Of the total DoD, 27.6 % reported the experience of stress attributed to work interfered "some" or "a lot" with the performance of their military job, and 14.1% reported that the experience of stress attributed to family issues interfered with their job performance more than "a little."

9.2 Specific Life Events to Which Stress is Attributed

To enhance the understanding of the nature of perceived sources of stress, the survey included the following

Table 9.1 **LEVELS OF PERCEIVED STRESS AT WORK AND IN FAMILY LIFE, PAST 12 MONTHS, BY SERVICE**

Type and Level of Stress	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Stress at Work					
A lot	38.6 (1.4)	28.2 (1.4)	36.9 (1.7)	27.6 (1.1)	32.5 (0.9)
Some	29.8 (0.9)	30.1 (0.9)	30.3 (1.2)	33.9 (1.5)	31.1 (0.6)
A little	20.0 (1.3)	25.2 (0.8)	21.6 (1.5)	27.1 (0.8)	23.6 (0.7)
None at all	11.7 (1.1)	16.4 (1.4)	11.2 (0.8)	11.4 (1.1)	12.8 (0.7)
Stress in Family					
A lot	20.8 (0.9)	18.5 (1.1)	21.5 (1.2)	16.0 (0.6)	18.9 (0.5)
Some	25.2 (1.4)	25.5 (1.2)	25.4 (1.4)	26.7 (1.0)	25.7 (0.6)
A little	30.5 (2.0)	32.4 (0.7)	30.4 (1.6)	35.4 (1.3)	32.4 (0.8)
None at all	23.5 (1.4)	23.5 (1.1)	22.7 (1.0)	21.9 (1.5)	22.9 (0.7)
Work Stress Interfered with Job Performance					
A lot	12.1 (1.1)	10.2 (1.3)	10.7 (0.5)	7.1 (0.9)	10.0 (0.6)
Some	20.5 (0.8)	16.6 (0.5)	17.5 (0.7)	15.2 (0.9)	17.6 (0.5)
A little	27.4 (0.7)	26.9 (1.2)	26.5 (1.8)	29.1 (0.7)	27.6 (0.5)
None at all	39.9 (1.2)	46.3 (1.8)	45.3 (1.4)	48.7 (1.5)	44.8 (0.9)
Family Stress Interfered with Job Performance					
A lot	4.7 (0.4)	5.8 (0.7)	4.9 (0.7)	3.7 (0.5)	4.7 (0.3)
Some	10.6 (0.4)	9.1 (0.7)	10.1 (1.1)	8.0 (1.0)	9.4 (0.4)
A little	24.4 (1.1)	24.2 (0.6)	22.4 (0.8)	23.4 (1.1)	23.8 (0.5)
None at all	60.3 (1.2)	60.8 (1.3)	62.7 (0.8)	65.0 (1.5)	62.1 (0.7)

Note: Table displays the percentage of military personnel by Service who reported the indicated type and level of stress in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Stress at Work, Q88; Stress in Family, Q89; Work Stress Interference Q90; Family Stress Interference Q91).

specific questions on the domains of work and family life: During the past 12 months, how much stress did you experience from each of the following?

- being deployed at sea or in the field
- having a permanent change of station (PCS)
- problems in your relationships with the people you work with
- problems in your relationship with your immediate supervisor(s)
- concern about performance rating
- increases in your work load
- decreases in your work load
- insufficient training
- being away from your family
- having a baby
- finding childcare/daycare
- divorce or breakup
- death in the family
- conflicts between your military and family responsibilities
- problems with money
- problems with housing
- health problems that you had
- health problems in your family
- behavior problems in some of your children

- unexpected events/problems (i.e., hurricane, flood, home robbery)

As shown in Table 9.2, the most frequently reported sources of stress were being away from home (16.6%), deployment (13.4%), and increases in work load (12.9%). Problems with supervisor was the next most frequently acknowledged source of stress (9.6%), followed by conflicts between military and family responsibilities (9.2%) and problems with coworkers (8.6%). These top sources of stress were reported by both genders, although several significant differences were observed. Women experienced significantly more stress than men because of problems with supervisors (12.5% vs. 9.0%), problems with coworkers (11.8% vs. 8.1%), and concern about their performance rating (6.6% vs. 5.0%). Women also reported more stress than men because of family concerns such as conflicts between military and family responsibilities (9.0% vs. 5.2%), finding childcare/daycare (7.3% vs. 2.9%), having a baby (6.8% vs. 2.9%), death in the family (6.7% vs. 5.2%), divorce or breakup (9.0% vs. 5.2%), personal health problems (6.8% vs. 4.0%), and behavior problems in their children (2.9% vs. 2.1%). On the other hand, a greater percentage of men than women (13.9% vs. 10.1%) reported high levels of stress because of deployment.

Also shown in Table 9.2, fewer personnel attributed their source of high stress to conflicts between military and family responsibilities, problems with money, and problems with housing in 2005 than in 2002. Both men and women reported less conflict between military and family responsibilities, fewer men attributed stress to housing, and fewer women attributed stress to problems with money. Stress attributed to deployment showed a significant increase between 2002 and 2005 only among men.

9.3 Stress and Productivity Loss

Respondents were also asked about loss of productivity at work associated with stress. Military personnel were asked to indicate on how many work days in the past 12 months any of the following things occurred:

- They were late for work by 30 minutes or more.
- They left work early for a reason other than an errand or early holiday leave.
- They were hurt in an on-the-job accident.
- They worked below their normal level of performance.
- They did not come to work at all because of an illness or a personal accident.

Table 9.3 shows the percentages of military personnel who experienced these performance issues during the past year across five categories of occurrence: no days, 1 day, 2 or 3 days, 4 or more days, and any number of days (this last category was not a separate response option but represents the sum percentage of personnel who endorsed 1 or more days). Findings are displayed for all military personnel, for personnel in a high-stress group (i.e., those who experienced a “great deal” or a “fairly large amount” of stress at work or in personal relationships within the past 12 months), and for a moderate/low-stress group (i.e., personnel who reported “some,” “a little,” or no stress both at work and in the family in the past 12 months). Note that personnel who experienced a high level of stress in either the family or work environment were categorized into the high-stress group.

The productivity loss most frequently reported by all personnel, for any number of days, was leaving work early (30.7%), followed by working below normal performance level (27.6%) and being late for work by at least 30 minutes (27.1%). Not coming to work because of injury or illness was reported by 20.7% of respondents, and being hurt in an on-the-job accident was reported by 8.5% of respondents.

When the relationship between stress and productivity loss was examined, a consistent pattern emerged. As shown in the middle and lowest panels of Table 9.3, compared with military personnel who perceived low to moderate levels of stress, those who experienced high levels of job-related or personal stress were more likely to experience a corresponding productivity loss. Overall productivity loss was greater for the group that experienced more stress. For example, working below normal performance level was reported by 38.2% of the high-stress group, compared with 20.4% of the

Table 9.2 **LIFE EVENTS TO WHICH STRESS ATTRIBUTED, PAST 12 MONTHS, BY GENDER AND YEAR, TOTAL DOD**

	Men				Women				Total			
Stressor	**2002**		**2005**		**2002**		**2005**		**2002**		**2005**	
Deployment	12.3[a]	(1.4)	13.9[a]	(1.2)	8.8	(1.8)	10.1	(1.3)	11.7	(1.4)	13.4	(1.2)
Having a PCS[b]	5.3	(0.3)	6.3	(0.8)	6.1	(0.5)	6.4	(0.5)	5.5	(0.3)	6.3	(0.7)
Problems with coworkers	9.4[a]	(0.6)	8.1[a]	(0.7)	13.5	(1.1)	11.8	(0.7)	10.1	(0.6)	8.6	(0.6)
Problems with supervisor	10.0[a]	(0.7)	9.0[a]	(0.7)	12.5	(0.7)	12.5	(0.8)	10.4	(0.6)	9.6	(0.7)
Concern about performance rating	5.6	(0.4)	5.0[a]	(0.3)	5.6	(0.4)	6.6	(0.6)	5.6	(0.4)	5.2	(0.3)
Increases in work load	13.9[a]	(0.8)	12.8	(0.5)	15.8	(0.8)	13.5	(0.8)	14.2	(0.7)	12.9	(0.5)
Decreases in work load	1.9[a]	(0.2)	1.7	(0.2)	2.9[c]	(0.4)	1.4	(0.2)	2.1	(0.2)	1.6	(0.2)
Insufficient training	N/A	N/A	6.7	(0.4)	N/A	N/A	8.1	(0.8)	N/A	N/A	6.9	(0.4)
Being away from family	16.9	(1.0)	16.6	(1.1)	18.6	(1.4)	16.9	(1.0)	17.2	(1.0)	16.6	(1.1)
Having a baby	N/A	N/A	5.0[a]	(0.4)	N/A	N/A	6.8	(0.7)	N/A	N/A	5.2	(0.3)
Finding childcare/daycare	N/A	N/A	2.9[a]	(0.2)	N/A	N/A	7.3	(0.7)	N/A	N/A	3.5	(0.2)
Death in family	N/A	N/A	5.2[a]	(0.3)	N/A	N/A	6.7	(0.6)	N/A	N/A	5.4	(0.3)
Divorce or breakup	N/A	N/A	5.2[a]	(0.4)	N/A	N/A	9.0	(0.8)	N/A	N/A	5.8	(0.4)
Conflicts between military and family responsibilities	10.5[a]	(0.6)	9.0	(0.6)	13.0[c]	(0.9)	10.0	(0.8)	10.9[c]	(0.6)	9.2	(0.5)
Problems with money	9.6	(0.7)	8.0	(0.6)	10.7[c]	(0.8)	7.5	(0.7)	9.8[c]	(0.6)	7.9	(0.6)
Problems with housing	5.4[c]	(0.3)	4.2	(0.4)	5.8	(0.6)	5.2	(0.5)	5.4[c]	(0.3)	4.4	(0.3)
Personal health problems	3.6[a]	(0.3)	4.0[a]	(0.4)	7.8	(0.5)	6.8	(0.9)	4.3	(0.3)	4.4	(0.4)
Family health problems	5.6[a]	(0.2)	5.9	(0.4)	7.0	(0.7)	6.9	(0.6)	5.8	(0.2)	6.0	(0.3)
Behavior problems in children	2.1[a]	(0.2)	2.1[a]	(0.1)	3.3	(0.3)	2.9	(0.4)	2.3	(0.2)	2.2	(0.1)
Unexpected event/problem	N/A	N/A	3.1	(0.4)	N/A	N/A	3.5	(0.6)	N/A	N/A	3.1	(0.4)

Note: Table displays the percent of military personnel by gender that reported the indicated source of stress was “a lot” in the past 12 months. The standard error of each estimate is presented in parentheses.

The 2002 estimates displayed in this table may differ from estimates presented in other reports. Those respondents who indicated the stressor “Doesn’t Apply” are considered negative responses to the stressor in the table above. In other tables, these respondents were omitted from the estimate. This difference has been introduced in order to maintain comparability between the 2002 and 2005 estimates in this table.

[a]Difference between men and women within each survey year is significant at 95% confidence level.

[b]PCS = Permanent change of station.

[c]Difference between 2002 and 2005 (within same gender group) is significant at 95% confidence level.

N/A = Estimate is not available.

Source: DoD Survey of Health Related Behaviors Among Military Personnel, 2002 (Specific Sources of Stress, Q84) and 2005 (Specific Sources of Stress, Q92).

Table 9.3 **PERCEIVED STRESS AND PRODUCTIVITY LOSS, PAST 12 MONTHS, TOTAL DOD**

		Number of Work Days Affected, Past 12 Months				
Group/Problem	***N***	**No Days**	**1 Day**	**2 or 3 Days**	**4 or More Days**	**1 or More Days**
All Personnel[a]	*15,319*					
Late for work by 30 minutes or more		72.9 (0.8)	11.3 (0.4)	9.7 (0.4)	6.1 (0.4)	27.1 (0.8)
Left work early		69.3 (0.8)	6.9 (0.3)	12.2 (0.4)	11.5 (0.5)	30.7 (0.8)
Hurt in an on-the-job accident		91.5 (0.6)	5.4 (0.4)	2.2 (0.3)	0.9 (0.1)	8.5 (0.6)
Worked below normal performance level		72.4 (0.7)	5.4 (0.3)	9.0 (0.4)	13.2 (0.5)	27.6 (0.7)
Did not come into work because of illness or injury		79.3 (0.8)	7.5 (0.3)	7.8 (0.5)	5.4 (0.3)	20.7 (0.8)
Moderate or Low Level of Stress, Past 12 Months[b]	*9,279*					
Late for work by 30 minutes or more		76.6 (0.9)	10.5 (0.6)	8.3 (0.4)	4.6 (0.4)	23.4 (0.9)
Left work early		72.7 (0.8)	6.5 (0.4)	11.3 (0.5)	9.5 (0.5)	27.3 (0.8)
Hurt in an on-the-job accident		94.6 (0.4)	3.9 (0.3)	1.1 (0.2)	0.5 (0.2)	5.4 (0.4)
Worked below normal performance level		79.6 (0.7)	4.6 (0.4)	8.0 (0.4)	7.8 (0.4)	20.4 (0.7)
Did not come into work because of illness or injury		83.0 (0.9)	6.5 (0.4)	6.8 (0.6)	3.7 (0.3)	17.0 (0.9)
High Level of Stress, Past 12 Months[c]	*6,040*					
Late for work by 30 minutes or more		67.5 (1.0)	12.5 (0.6)	11.8 (0.8)	8.2 (0.6)	32.5 (1.0)
Left work early		64.4 (1.0)	7.6 (0.4)	13.5 (0.6)	14.5 (0.8)	35.6 (1.0)
Hurt in an on-the-job accident		87.0 (0.9)	7.6 (0.6)	3.9 (0.5)	1.4 (0.2)	13.0 (0.9)
Worked below normal performance level		61.8 (1.0)	6.6 (0.5)	10.5 (0.6)	21.0 (0.8)	38.2 (1.0)
Did not come into work because of illness or injury		74.0 (1.0)	8.9 (0.5)	9.3 (0.6)	7.8 (0.5)	26.0 (1.0)

Note: Table displays the percentage of military personnel in the three groups of interest (all personnel, personnel exhibiting moderate or low levels of stress, and personnel exhibiting high levels of stress) who reported that the specified problem (e.g., late for work by 30 minutes or more) affected no days, 1 day, 2 to 3 days, 4 or more days, and 1 or more days. Sample sizes by group are also provided. The standard error of each estimate is presented in parentheses.

[a]Individuals with missing level of stress are not included in these estimates.

[b]Personnel who experienced "some," "a little," or no stress both at work and in the family in the past 12 months.

[c]Personnel who experienced "a lot" of stress either at work or in the family in the past 12 months.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Stress at Work, Q88; Stress in Family, Q89; Productivity Loss, Q86).

moderate/low-stress group. The high-stress group was also much more likely to report more days affected in the past 12 months in all domains of productivity loss. Personnel in the high-stress group were nearly 3 times as likely as those in the moderate/low-stress group to report 4 or more days working below their normal performance level (21.0% vs. 7.8%), not coming into work because of illness or injury (7.8% vs. 3.7%), and being hurt in an on-the job-accident (1.4% vs. 0.5%).

These findings are consistent with an extensive body of research (e.g., Kanki [1996]; Orasanu & Backer [1996]) that shows a strong relationship between high levels of stress and impaired occupational functioning, including increased absenteeism, lower levels of productivity, and more interpersonal problems. The 28% of Air Force personnel reporting a high level of work stress (Table 9.1) is also very close to the 26% of personnel who reported suffering significant work stress on an Air Force base (Pflanz & Sonnek, 2002). A caveat to this finding is that it cannot be stated definitively that higher levels of stress cause reduced performance. It could be that lower productivity (e.g., frequently working below normal performance level or being hurt on the job more often than others) causes individuals to feel higher levels of stress. Regardless of the direction of the relationship, however, it is clear that stress and job performance are related. It is likely that Service personnel who are

experiencing high levels of stress at work, in their personal lives, or in both of these domains are at increased risk for a host of adverse psychological and health conditions. These conditions, in turn, could potentially compromise military readiness.

9.4 Coping with Stress

Coping has been defined in terms of the strategies and processes that individuals use to modify adverse aspects of their environment, as well as to minimize internal distress induced by environmental demands (Lazarus, 1966; Moos & Billings, 1982). An important dimension of coping is the distinction between problem-focused coping strategies (efforts to recognize, modify, or eliminate the impact of a stressor), emotion-focused coping strategies (efforts to regulate negative emotions that occur in reaction to a stressor event), and avoidance strategies (efforts to avoid dealing with the stressor). Although the utility of any approach depends on the demands of the situation and the skill and flexibility of individuals in using various coping strategies, preference for an avoidance strategy has been linked with a greater risk of mental health problems in military personnel, especially when they are faced with a radically changing environment (Johnsen, Laberg, & Eid, 1998).

Respondents were asked to identify the types of strategies they used to cope when they "feel pressured, stressed, depressed, or anxious." The list of response categories included items that tap approach- and problem-oriented strategies (e.g., "think of plan to solve problem"); emotion-focused strategies, such as seeking social support ("talk to friend or family member"); and avoidance strategies (e.g., "have a drink," "smoke marijuana or use other illegal drugs," "think about hurting yourself or killing yourself"). Table 9.4 shows the percentage of personnel, by Service, who commonly used specific coping strategies under conditions of stress. Table 9.5 shows the distribution of these percentages by gender and for the total DoD.

As shown in Table 9.4, military personnel seemed to be more likely to use problem- or emotion-oriented coping strategies than avoidance-oriented alternatives. When the responses of the total DoD were rank ordered, each of the five problem- or emotion-oriented options were reported by more personnel than any of the five avoidance-oriented options. "Think of plan to solve problem" was overwhelmingly indicated by military personnel as a "frequently" or "sometimes" implemented coping strategy (81.0%), followed by "talk to friend or family member" (74.1%), "exercise or play sports" (61.5%), and "engage in a hobby" (61.2%). A solid majority of personnel often used these potentially effective problem-focused and approach-oriented coping strategies to deal with stress, daily pressures, and feelings of depression. Slightly over half (52.4%) of personnel reported saying a prayer to cope with stress. With respect to generally less-effective avoidant coping strategies, 43.7% indicated that they "get something to eat" when confronted with stress, 28.7% "have a drink," 27.0% "light up a cigarette," 4.3% considered hurting or killing themselves, and 1.5% used illegal substances as a coping option for stress and/or depressive symptoms.

Table 9.5 shows significant gender differences in coping strategies. More women than men reported using social support (87.0% vs. 71.8 %, respectively), thinking of a plan to solve the problem (84.2 vs. 80.4%), prayer (69.9% vs. 49.4%), food (50.8% vs. 42.5%), and hurting or killing themselves (5.5% vs. 4.1%). In contrast, men were more likely than women to engage in hobbies (62.1% vs. 56.4%) and use alcohol (29.9% vs. 21.8%) and cigarettes (27.7% vs. 22.6%) as methods of coping.

9.5 Screening for Anxiety

Seven items from the Patient Health Questionnaire (PHQ), which has been widely used to screen for generalized anxiety disorder (GAD) symptoms (Spitzer, Kroenke, & Williams, 1999), were included in the survey. Screening criteria was met if respondents had been bothered by feeling nervous, anxious, on edge, or worrying a lot about different things for several days in the past month and had at least three other symptoms for more than half the days. Table 9.6 shows, by selected sociodemographic characteristics, the percentages of military personnel who met this screening criterion. The sociodemographic characteristics were gender, race/ethnicity, education, age, family status, pay grade, and geographic region where the respondent was

Table 9.4 BEHAVIORS FOR COPING WITH STRESS, BY SERVICE

Coping Behavior	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Talk to friend/family member	73.3 (1.1)[a]	71.9 (1.6)[a]	70.8 (1.3)[a]	78.4 (0.8)[b,c,d]	74.1 (0.6)
Light up a cigarette	32.9 (1.7)[a,c]	27.1 (1.6)[a,b]	30.0 (2.2)[a]	18.9 (1.5)[b,c,d]	27.0 (1.1)
Have a drink	33.9 (2.1)[a,c]	28.4 (1.5)[a,b,d]	34.1 (1.4)[a,c]	20.6 (0.9)[b,c,d]	28.7 (1.0)
Say a prayer	51.9 (1.7)	52.3 (1.8)[d]	46.8 (1.9)[a,e]	55.6 (2.0)[d]	52.4 (1.0)
Exercise or play sports	59.3 (1.4)[a]	60.2 (2.3)	62.3 (0.9)	65.0 (1.9)[b]	61.5 (1.0)
Engage in a hobby	61.8 (1.0)[c]	58.7 (1.2)[a,b]	60.8 (1.3)	63.2 (1.5)[c]	61.2 (0.7)
Get something to eat	45.9 (1.0)[a,d]	44.6 (1.2)	41.6 (1.2)[b]	41.5 (1.5)[b]	43.7 (0.7)
Smoke marijuana/use other illegal drugs	2.1 (0.3)[a]	1.7 (0.6)	1.7 (0.6)	0.6 (0.1)[b]	1.5 (0.2)
Think of plan to solve problem	81.0 (1.8)	80.1 (1.4)	78.4 (1.1)	83.0 (2.1)	81.0 (0.9)
Consider hurting or killing myself	5.4 (0.3)[a]	5.0 (0.8)[a]	4.7 (0.6)[a]	2.4 (0.3)[b,c,d]	4.3 (0.3)

Note: Table displays the percentage of military personnel by Service who "frequently" or "sometimes" engage in the indicated coping behavior when they feel pressured, stressed, depressed, or anxious. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimate is significantly different from the Air Force at the 95% confidence level.

[b]Estimate is significantly different from the Army at the 95% confidence level.

[c]Estimate is significantly different from the Navy at the 95% confidence level.

[d]Estimate is significantly different from the Marine Corps at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Coping Behavior, Q93).

Table 9.5 BEHAVIORS FOR COPING WITH STRESS, BY GENDER

Coping Behavior	Gender: Men	Women	Total DoD
Talk to friend/family member	71.8 (0.7)[a]	87.0 (1.0)	74.1 (0.6)
Light up a cigarette	27.7 (1.1)[a]	22.6 (1.2)	27.0 (1.1)
Have a drink	29.9 (1.1)[a]	21.8 (1.1)	28.7 (1.0)
Say a prayer	49.4 (0.9)[a]	69.9 (1.3)	52.4 (1.0)
Exercise or play sports	61.5 (1.0)	61.6 (1.5)	61.5 (1.0)
Engage in a hobby	62.1 (0.7)[a]	56.4 (1.6)	61.2 (0.7)
Get something to eat	42.5 (0.8)[a]	50.8 (1.4)	43.7 (0.7)
Smoke marijuana/use other illegal drugs	1.6 (0.2)[a]	0.9 (0.3)	1.5 (0.2)
Think of plan to solve problem	80.4 (1.0)[a]	84.2 (0.9)	81.0 (0.9)
Consider hurting or killing myself	4.1 (0.3)[a]	5.5 (0.6)	4.3 (0.3)

Note: Table displays the percentage of military personnel by gender who "frequently" or "sometimes" engage in the indicated coping behavior when they feel pressured, stressed, depressed, or anxious. The standard error of each estimate is presented in parentheses.

[a]Difference between men and women is significant at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Coping Behavior, Q93).

Table 9.6 **PERCENTAGE MEETING SCREENING CRITERIA FOR GENERALIZED ANXIETY DISORDER (GAD) SYMPTOMS, PAST 30 DAYS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS AND SERVICE**

	Service				
Sociodemographic Characteristic	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Gender					
Male	15.0 (1.1)	12.1 (0.8)	12.6 (0.6)	7.6 (1.1)	11.9 (0.6)
Female	18.8 (1.4)	17.0 (1.5)	23.1 (2.4)	15.6 (1.9)	17.4 (0.9)
Race/Ethnicity					
White, non-Hispanic	15.1 (0.8)	13.8 (0.7)	13.8 (0.8)	8.2 (1.2)	12.4 (0.6)
African American, non-Hispanic	16.1 (2.0)	9.4 (1.1)	10.8 (2.3)	10.2 (0.7)	12.4 (1.0)
Hispanic	15.9 (2.1)	12.3 (2.5)	12.0 (1.5)	9.9 (1.6)	13.2 (1.2)
Other	16.6 (2.0)	13.4 (2.7)	14.6 (2.0)	15.0 (2.8)	14.8 (1.3)
Education					
High school or less	21.6 (1.2)	14.3 (1.4)	15.6 (1.3)	9.9 (2.3)	16.4 (1.0)
Some college	14.1 (1.6)	13.9 (1.0)	12.4 (1.1)	10.9 (1.0)	12.8 (0.6)
College graduate or higher	8.1 (0.9)	7.2 (1.0)	6.3 (1.5)	5.6 (0.8)	6.8 (0.5)
Age					
20 or younger	23.4 (1.4)	15.9 (2.2)	19.1 (2.3)	15.3 (3.6)	19.4 (1.3)
21-25	17.8 (1.3)	16.6 (1.2)	13.7 (1.2)	9.5 (1.6)	14.7 (0.7)
26-34	13.2 (1.9)	12.2 (1.0)	9.5 (1.2)	8.7 (1.5)	11.1 (0.8)
35 or older	8.4 (1.1)	7.5 (0.7)	8.2 (1.1)	7.6 (1.1)	7.8 (0.6)
Family Status[a]					
Not married	17.9 (0.6)	13.5 (0.8)	14.0 (1.3)	10.6 (1.3)	14.5 (0.5)
Married, spouse not present	13.0 (1.9)	20.3 (4.2)	14.7 (2.4)	11.5 (3.4)	14.9 (1.8)
Married, spouse present	13.0 (2.0)	11.3 (0.8)	12.3 (1.1)	8.1 (0.8)	10.7 (0.7)
Pay Grade					
E1-E3	20.7 (1.6)	18.0 (2.3)	18.6 (1.2)	11.7 (2.1)	17.6 (1.0)
E4-E6	17.7 (1.2)	13.1 (0.7)	10.9 (1.0)	10.4 (1.0)	13.6 (0.7)
E7-E9	6.4 (1.2)	9.6 (1.0)	8.1 (0.8)	6.6 (0.9)	7.4 (0.6)
W1-W5	7.8 (1.2)	1.5 (1.1)	4.9 (3.3)	N/A (N/A)	6.7 (1.1)
O1-O3	8.8 (2.1)	5.5 (1.6)	3.7 (1.3)	7.2 (2.1)	6.9 (1.0)
O4-O10	6.3 (1.8)	5.5 (0.6)	8.3 (1.1)	3.2 (1.0)	4.8 (0.8)
Region					
CONUS[b]	14.8 (1.5)	10.7 (0.9)	13.7 (0.6)	9.2 (1.1)	11.8 (0.7)
OCONUS[c]	16.7 (1.3)	15.0 (1.4)	11.4 (1.5)	8.8 (0.1)	14.7 (1.0)
Total	15.5 (1.0)	12.8 (0.7)	13.3 (0.7)	9.2 (1.0)	12.7 (0.5)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who met screening criteria for anxiety symptoms on the Patient Health Questionnaire (PHQ). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Screening criteria for anxiety symptoms is given in Section 2.5.5.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (PHQ, Q97; refer to Section 2.5.1 for descriptions of sociodemographic variables).

stationed. Overall, 12.7% of the survey respondents met screening criteria for GAD symptoms. This is consistent with other screening studies using the PHQ, where a range of rates were found in older samples (e.g., 4% to 16% [Spitzer et al., 1999]) and is lower than the 19.1% prevalence rate for reporting mental health problems among Service members returning from Iraq (Hoge et al., 2006). GAD symptom screening rates decreased with age across all Services. Indeed, respondents aged 25 or younger had almost twice the rates as those 35 years of age or older. Also consistent with the literature, women, respondents with a high school education or less, and those in the lowest ranks had the highest rates. Overall, Army personnel were at highest risk for anxiety symptoms and Air Force personnel at lowest risk. Among Navy personnel, rates for those stationed outside the continental United States (OCONUS) (15.0%) significantly exceeded those for personnel stationed within the continental United States (CONUS) (10.7%).

The finding that a considerable proportion of military personnel met screening criteria for anxiety symptoms is not surprising. Anxiety is among the most common mental health problems in the general population and among returning Operation Iraqi Freedom combat troops (Hoge et al., 2004). It also is one of the most serious and may have serious consequences for mission readiness and recent attrition (Hoge et al., 2006). To better understand the consequences of personnel experiencing anxiety symptoms, the perceived levels of stress associated with work and family were examined among those meeting screening criteria by Service (see Table 9.7).

Overall, work was perceived as significantly more stressful than family life among those meeting GAD screening criteria on the PHQ. The most notable difference between work- and family-related stress was among persons reporting "a lot" of stress. Among personnel who met screening criteria, these high levels of stress were associated with work for 63.5% and with family for 41.5%. Army and Marine Corps personnel reported more stress at work than Navy and Air Force personnel reported. Air Force personnel reported less family stress than personnel in other Services. When these percentages are compared with those in Table 9.1, clear distinctions are evident. Individuals who met screening criteria reported much higher levels of stress

Table 9.7 **LEVELS OF PERCEIVED STRESS AT WORK AND IN FAMILY LIFE FOR PAST 12 MONTHS AMONG PERSONNEL MEETING SCREENING CRITERIA FOR GENERALIZED ANXIETY DISORDER (GAD) SYMPTOMS, BY SERVICE**

	Service				
Type and Level of Stress among Personnel Meeting Screening Criteria for GAD Symptoms	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Stress at Work					
A lot	69.2 (1.7)	55.6 (2.8)	67.6 (5.8)	60.0 (3.0)	63.5 (1.5)
Some	15.7 (1.9)	20.1 (2.3)	18.1 (3.6)	23.1 (2.0)	18.7 (1.1)
A little/none at all	15.1 (2.5)	24.3 (3.1)	14.3 (2.8)	16.9 (2.5)	17.8 (1.5)
Stress in Family					
A lot	41.9 (2.3)	46.7 (2.1)	40.4 (4.5)	34.9 (2.0)	41.5 (1.3)
Some	22.2 (1.6)	21.4 (2.0)	16.3 (2.3)	27.0 (3.3)	22.2 (1.1)
A little/none at all	35.9 (2.6)	31.9 (1.8)	43.3 (4.7)	38.1 (4.6)	36.3 (1.7)

Note: Table displays the percentage of military personnel by service who reported the indicated type and level of stress. Only those personnel who met screening criteria for anxiety symptoms on the Patient Health Questionnaire (PHQ) were included in these estimates (Total DoD N=1,824). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among services. Estimates within each column group may not sum to 100 due to rounding. Screening criteria for anxiety symptoms is given in Section 2.5.5.

Source: Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (PHQ, Q97; Stress at Work, Q88; Stress in Family, Q89).

associated with both work and family than those in the population as a whole.

9.6 Screening for Depression

In addition, four items similar to those frequently used in psychiatric epidemiologic surveys to screen for the presence of depressive symptoms and syndromes were included (see Chapter 2). One item asked, “In the past 12 months, have you had 2 weeks or more during which you felt sad, blue, or depressed, or when you lost all interest in things that you usually cared about or enjoyed?” Two items screened for possible dysthymia by asking (a) “In the past 12 months, have you felt depressed or sad much of the time?" and (b) "In your entire life, have you ever had 2 years or more when you felt sad or depressed on most days, even if you felt okay sometimes?” A fourth item asked for the number of days of depressed mood during the past week.

Screening items were combined to develop a composite indicator of respondents’ probable need for further assessment for depression using clinical evaluation methods based on the brief scale developed by Rost, Burnam, and Smith (1993). Specifically, an individual had to meet two separate criteria to be categorized as needing further evaluation. The first was feeling depressed for at least a full day in the past week. The second criterion was *either* experiencing depressive symptoms for 2 or more weeks in the past 12 months *or* feeling depressed at any time during the past 12 months, and on most days over 2 or more years over the lifetime. Table 9.8 shows, by selected sociodemographic characteristics, the percentages of military personnel who met this composite screening criterion.

Overall, 22.3% of the total DoD scored as needing further evaluation for a depressive disorder. This was a significant increase from the 18.8% found in the 2002 survey. As shown in Figure 9.1, this overall increase in personnel meeting screening criteria is the result of the significant increase among men in the Army. Consistent with findings on depression from major epidemiologic surveys of psychiatric disorders in the general civilian population of the United States, such as the Epidemiologic Catchment Area (ECA) Study (Regier et al., 1990) and the National Comorbidity Survey (Kessler et al., 1994), this study found other evidence for gender differences in the need for further assessment for depression. For the total DoD, a slightly higher percentage of women than men responded to the depression screening questions in a direction suggestive of need for more comprehensive evaluation for depression. The percentage of women who had a score suggestive of a need for further depression evaluation was 27.9% for the DoD and ranged from 23.4% of Air Force women to 34.4% of Marine Corps women. For men in the total DoD, 21.3% needed further assessment for depression, with percentages in specific Services ranging from 13.7% (Air Force) to 27.1% (Army).

Analysis of the scored need for further depression evaluation by race/ethnicity shows a larger percentage of Army personnel of Hispanic and “other” ethnicity (65.9%) relative to Hispanic and “other” ethnic groups in the Navy, Marine Corps, and Air Force. Educational attainment and age were inversely related to the need for further assessment for depression. For the total DoD, as well as for each Service, those who were less educated and younger were more likely to screen high for depression. This pattern was similar for personnel in the Army, Navy, and Marine Corps, all of which were higher than for personnel in the Air Force.

Family status also was related to the need for further depression evaluation. The presence of a spouse appeared to be a strong buffer; unmarried personnel (28.0%) and married personnel not living with their spouse (28.1%) scored considerably higher on need for further depression evaluation than did married personnel living with their spouse (16.3%). This pattern was consistent across all Services. As with those meeting screening criteria for anxiety symptoms, Army personnel in the lowest rank and youngest age groups had particularly high percentages of depressive symptoms relative to other Services. For example, 70% of E1 to E6 Army personnel were considered in need of further depression evaluation compared with 56% of Marines, 51% of Navy personnel, and 39% of Air Force personnel in the same ranks. In contrast, rates for officers ranged from 28.5% (Army) to 19% (Air Force). Finally, personnel at OCONUS duty stations were more likely to

Table 9.8 **NEED FOR FURTHER DEPRESSION EVALUATION, PAST 7 DAYS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS AND SERVICE**

	Service				
Sociodemographic Characteristic	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Gender					
Male	27.1 (1.8)	20.2 (1.2)	24.8 (1.4)	13.7 (0.6)	21.3 (1.0)
Female	30.6 (2.5)	30.0 (2.5)	34.4 (2.9)	23.4 (2.1)	27.9 (1.3)
Race/Ethnicity					
White, non-Hispanic	27.4 (1.7)	23.1 (1.3)	27.4 (1.1)	15.3 (0.8)	22.5 (0.8)
African American, non-Hispanic	23.8 (1.9)	17.0 (1.1)	16.8 (4.6)	11.6 (1.2)	18.4 (1.1)
Hispanic	34.7 (3.3)	17.4 (3.2)	22.8 (2.2)	17.9 (2.4)	25.1 (2.3)
Other	31.2 (4.6)	24.0 (3.2)	25.3 (3.9)	23.5 (3.9)	25.9 (2.0)
Education					
High school or less	36.8 (1.4)	23.1 (1.9)	29.3 (1.7)	17.6 (1.7)	28.2 (1.4)
Some college	24.8 (2.1)	22.6 (0.9)	24.4 (1.5)	17.7 (0.9)	21.8 (0.8)
College graduate or higher	17.8 (2.0)	16.6 (1.7)	12.4 (1.3)	10.6 (1.1)	14.4 (1.0)
Age					
20 or younger	42.8 (2.8)	22.6 (3.6)	35.6 (2.9)	23.2 (3.4)	33.4 (2.4)
21-25	30.5 (1.9)	30.2 (1.7)	28.4 (1.7)	21.0 (1.4)	27.7 (0.9)
26-34	22.8 (2.3)	19.4 (1.6)	17.2 (3.1)	12.8 (1.2)	18.0 (1.0)
35 or older	16.6 (2.3)	13.9 (0.8)	12.0 (1.8)	11.6 (1.1)	13.8 (0.9)
Family Status[a]					
Not married	33.9 (1.0)	25.9 (1.4)	29.4 (1.7)	20.5 (1.1)	28.0 (0.9)
Married, spouse not present	31.3 (1.7)	27.1 (5.8)	24.8 (3.2)	22.3 (2.8)	28.1 (2.0)
Married, spouse present	19.1 (1.9)	16.9 (1.1)	20.4 (1.7)	12.3 (1.0)	16.3 (0.8)
Pay Grade					
E1-E3	41.7 (2.6)	28.6 (3.3)	36.2 (2.2)	22.6 (2.9)	32.9 (1.8)
E4-E6	28.8 (1.0)	22.2 (0.9)	19.9 (1.7)	16.5 (1.3)	22.5 (0.8)
E7-E9	14.1 (2.1)	14.7 (1.2)	11.6 (1.3)	11.6 (0.8)	13.2 (0.8)
W1-W5	11.6 (2.5)	9.1 (3.3)	13.0 (5.2)	N/A (N/A)	11.5 (2.1)
O1-O3	17.9 (3.4)	14.1 (2.0)	12.5 (2.0)	10.9 (2.0)	13.9 (1.5)
O4-O10	10.6 (2.9)	11.6 (1.7)	10.2 (1.1)	8.1 (1.1)	9.7 (1.1)
Region					
CONUS[b]	25.0 (1.2)	19.1 (0.8)	27.0 (1.7)	15.0 (0.7)	20.4 (0.8)
OCONUS[c]	31.6 (2.3)	24.4 (1.9)	18.7 (0.6)	19.8 (1.3)	26.4 (1.9)
Total	27.6 (1.5)	21.6 (0.9)	25.4 (1.4)	15.6 (0.7)	22.3 (0.8)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who are considered in need for further depression evaluation. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. The definition of need of further depression evaluation is given in Section 2.5.5.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

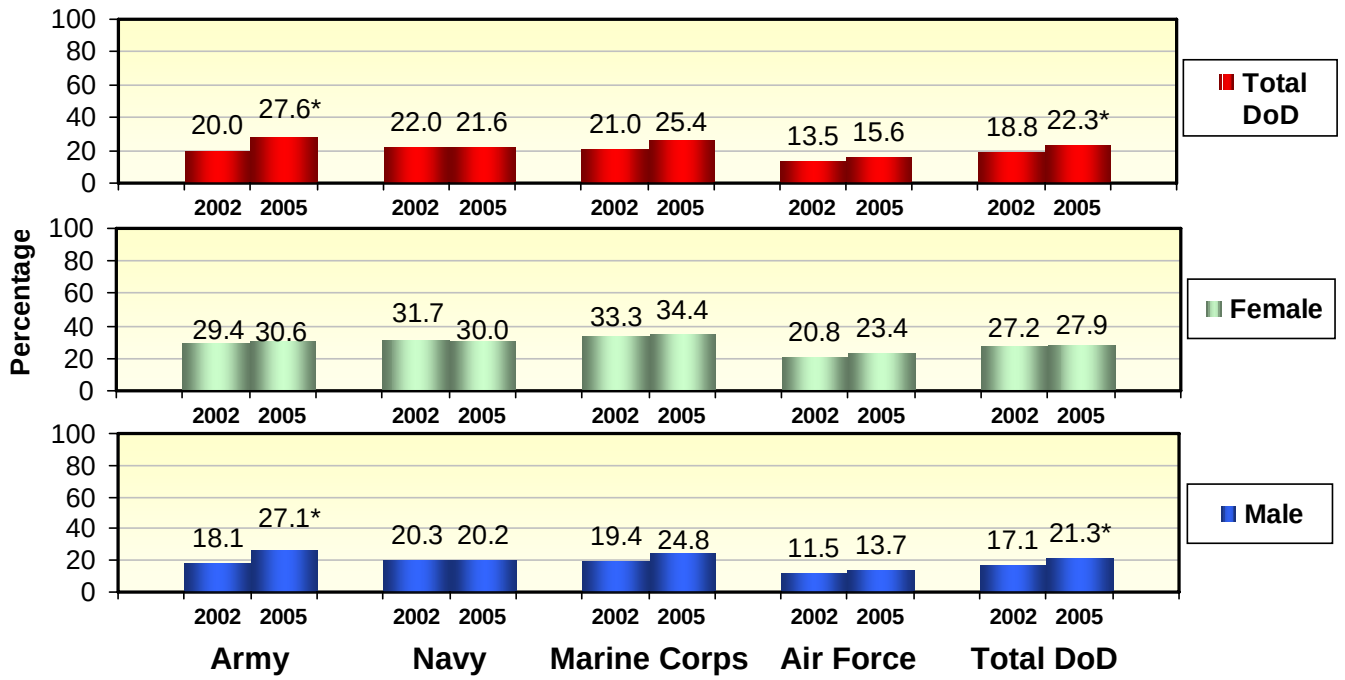
[b]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Need for Further Depression Evaluation, Q94-Q96; refer to Section 2.5.1 for descriptions of these sociodemographic variables).

Figure 9.1 Percentage of personnel meeting screening criteria for recent depressive disorder, by gender, Service, and survey year



*Significant difference between 2002 and 2005 at .05 level. Recent depressive disorder symptoms measured with 3-item Burnam Scale screening criteria (Rost et al., 1993) and do not indicate a clinical diagnosis.

need further depression evaluation than those at CONUS stations. This pattern held across all Services with one notable exception. Marine Corps personnel stationed in CONUS were much more likely than those in the other Services to need evaluation than OCONUS personnel (27.0% vs. 18.7%, respectively).

Depression is the most common mental health problem in the general population and, like anxiety, is associated with many symptoms that could reduce the military readiness of those it affects. These symptoms include disturbed sleep; fatigue; persistent physical problems (e.g., headaches); and difficulty concentrating, remembering, and making decisions. To better understand the consequences of personnel experiencing depressive symptoms, perceived levels of stress associated with work and family were examined among those in need of depression evaluation by Service (see Table 9.9). Among personnel in need of further depression evaluation, high levels of stress were associated with work by 63.0% and with family by 42.2%. As with anxiety, Army and Marine Corps personnel in need of depression evaluation reported more stress at work than Navy or Air Force personnel. There were no Service differences, however, with respect to reported stress in family among depressed personnel.

When these percentages are compared with those in Table 9.1, individuals in need of further depression evaluation reported much higher levels of stress associated with both work and family than those in the population as a whole.

9.7 Screening for Serious Psychological Distress

To estimate the prevalence of serious psychological distress among active-duty personnel, two new measures were added to the survey in 2005: the K-6 measure of serious psychological distress and the PTSD Checklist-Civilian (PCL-C) screen for PTSD. As noted in Chapter 2, the cutpoint used here to indicate need for further

Table 9.9 **LEVELS OF PERCEIVED STRESS AT WORK AND IN FAMILY LIFE FOR PAST 12 MONTHS AMONG PERSONNEL IN NEED FOR FURTHER DEPRESSION EVALUATION, BY SERVICE**

Type and Level of Stress among Personnel in Need of Further Depression Evaluation	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Stress at Work					
A lot	68.8 (1.5)	55.6 (1.6)	65.2 (2.1)	59.4 (1.9)	63.0 (1.2)
Some	21.7 (1.6)	27.9 (1.7)	24.6 (2.2)	27.2 (1.6)	24.8 (1.0)
A little/none at all	9.5 (1.1)	16.5 (1.5)	10.2 (1.7)	13.4 (1.5)	12.2 (0.8)
Stress in Family					
A lot	41.4 (2.3)	43.5 (2.3)	43.5 (2.5)	41.1 (2.3)	42.2 (1.2)
Some	25.7 (1.8)	27.4 (2.1)	24.9 (2.4)	29.1 (1.8)	26.7 (1.0)
A little/none at all	32.8 (2.7)	29.0 (1.9)	31.6 (2.4)	29.9 (2.2)	31.1 (1.3)

Note: Table displays the percentage of military personnel by Service who reported the indicated type and level of stress. Only those personnel who are considered in need for further depression evaluation were included in these estimates (total DoD N = 3,217). The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Estimates within each column group may not sum to 100 because of rounding. The definition of need of further depression evaluation is given in Section 2.5.5.

Source: Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Need for Further Depression Evaluation, Q94-Q96; Stress at Work, Q88; Stress in Family, Q89).

PTSD evaluation was derived from samples with high prevalence rates of current PTSD and should be interpreted with caution. Two additional measures included self reports of past-year suicidal ideation and suicide attempt. As shown in Table 9.10, 8.1% met criteria for serious psychological distress in the past 30 days, 6.7% met screening criteria for need for further PTSD evaluation in the past 30 days, 4.9% reported seriously considering suicide in the past year, and 0.8% reported a suicide attempt. Air Force personnel reported the lowest rates on these measures among all the Services. Twice as many Army personnel screened positive for serious psychological distress in the past 30 days than Air Force personnel (10.4% vs. 5.0%, respectively). Army personnel were almost three times as likely to meet screening criteria for need for further PTSD evaluation as Air Force personnel (9.3% vs. 3.7%). There is some evidence that these Service differences may be associated with the past psychological history of their personnel (i.e., significantly fewer Air Force personnel reported a pre-Service history of suicidal ideation or attempt than those in the other Services).

In comparing the current (1-month) rate for needing further PTSD evaluation above with those in other military populations, the observed rate of PTSD of 9.3% among all Army personnel was consistent (using a cutoff of 50 on the PCL) with findings from Hoge et al. (2004). The Hoge study found rates of 5% before deployment and 6.2% to 12.9% after deployment. It should be noted however, that the present rate is a population-based estimate for the Army as a whole and is based on a different sociodemographic distribution than that of combat infantry personnel. This estimated rate is also consistent with the 1.5% 1-month prevalence rate found in a community sample of men (Stein et al., 1997).

9.8 Mental Health and Productivity Loss

The relationship between mental health indices and productivity loss was also examined. Table 9.11 presents the types of productivity loss reported by all personnel, by those who reported suicidal ideation in the past year, by those needing further depression evaluation, and by those meeting screening criteria for GAD symptoms. The last column shows the percentage who reported a given type of productivity loss on at least 1 day in the past 12 months. As shown, personnel experiencing suicidal ideation and need for further depression or meeting screening criteria for GAD, were much more likely to experience productivity loss than all military personnel. For example, those who had suicidal ideation

Table 9.10 **SELF-REPORTED SERIOUS PSYCHOLOGICAL DISTRESS, NEED FOR FURTHER POSTTRAUMATIC STRESS DISORDER (PTSD) EVALUATION, SUICIDAL IDEATION, AND SUICIDE ATTEMPTS, BY SERVICE**

	Service				
Measure	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Serious Psychological Distress, Past 30 Days	10.4 (0.9)	8.2 (0.7)	9.0 (1.1)	5.0 (0.8)	8.1 (0.5)
Need for Further PTSD Evaluation, Past 30 Days	9.3 (1.2)	6.2 (0.9)	7.6 (0.5)	3.7 (0.4)	6.7 (0.5)
Seriously Considered Suicide					
Past year	5.6 (0.5)	5.3 (0.6)	5.9 (0.8)	3.5 (0.3)	4.9 (0.3)
Not within past year but since joining Service	7.0 (0.4)	8.1 (0.5)	7.4 (1.2)	6.0 (0.5)	7.0 (0.3)
Not within past year but before joining Service	9.0 (0.5)	8.0 (0.6)	8.1 (1.0)	5.7 (0.5)	7.7 (0.3)
Attempted Suicide					
Past year	1.0 (0.2)	0.9 (0.2)	0.9 (0.3)	0.3 (0.1)	0.8 (0.1)
Not within past year but since joining Service	1.7 (0.3)	1.7 (0.3)	0.9 (0.2)	0.7 (0.2)	1.3 (0.1)
Not within past year but before joining Service	3.8 (0.5)	3.4 (0.3)	2.2 (0.2)	1.9 (0.2)	2.9 (0.2)

Note: Table displays the percentage of military personnel by Service who reported the psychological distress/suicide response as indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Serious Psychological Distress, Q100; Need for Further PTSD Evaluation, Q102; Suicidal Ideation, Q98; Suicide Attempt, Q99).

were more than twice as likely (25.9%) to be hurt on the job than those in the total population (8.6%). Similarly, significantly more of those with suicidal ideation (49.8%), depressive symptoms (45.0%), and/or anxiety symptoms (42.5) worked below their normal performance level, compared with the total population (27.4%). In addition, personnel reporting suicidal ideation reported more productivity loss than those needing further depression or anxiety evaluation, which varied very little. For example, 14.0% of those experiencing suicidal ideation reported being late for work by 30 minutes or more on 4 or more days in the past year, compared with 9.8% of those needing further depression evaluation and 11.4 of those meeting screening criteria for GAD symptoms.

It is clear from these findings that psychological symptoms are fairly common among military personnel and that these symptoms are associated with high levels of perceived stress and decreased productivity. The analyses previously conducted on the 1998 and 2002 data represented the first attempt in the series of DoD surveys to understand the outcomes associated with the need for further depression evaluation. The present analyses expand those observations to include anxiety symptoms and suicidal ideation. Additional research is needed to fully understand the causes, outcomes, and treatment success of psychological disorders among military personnel. Depressive and anxiety disorders are complex illnesses and include different subtypes that respond best to different treatments (Clayton, 1998). Fortunately, many cases can be treated successfully. Even major, chronic depression can be treated effectively with a combination of antidepressants (see Miller et al. [1998]) and cognitive behavioral therapy (see Fava, Rafanelli, Grandi, Canestrari, & Morphy [1998]). Such treatments have the potential to significantly improve the functioning of those suffering from psychological disorder and potentially decrease the risk of suicide among military personnel.

Table 9.11 **SELF-REPORTED MENTAL HEALTH INDICATORS AND PRODUCTIVITY LOSS IN PAST 12 MONTHS, TOTAL DOD**

Group/Type of Loss	*N*	Number of Work Days Affected, Past 12 Months: 0 Days	1 Day	2 or 3 Days	4 or More Days	1 or More Days
All Personnel	*16,146*					
Late for work by 30 minutes or more		72.7 (0.8)	11.4 (0.4)	9.9 (0.4)	6.1 (0.4)	27.3 (0.8)
Left work early		69.4 (0.8)	6.9 (0.3)	12.3 (0.4)	11.4 (0.5)	30.6 (0.8)
Hurt in an on-the-job accident		91.4 (0.6)	5.6 (0.4)	2.2 (0.2)	0.9 (0.1)	8.6 (0.6)
Worked below normal performance level		72.6 (0.7)	5.5 (0.3)	8.9 (0.4)	13.0 (0.5)	27.4 (0.7)
Did not come into work because of illness or injury		79.4 (0.8)	7.5 (0.3)	7.8 (0.5)	5.3 (0.3)	20.6 (0.8)
Suicidal Ideation in Past Year	*680*					
Late for work by 30 minutes or more		57.7 (3.0)	14.4 (1.8)	13.9 (1.9)	14.0 (2.2)	42.3 (3.0)
Left work early		59.8 (3.3)	8.0 (1.0)	14.0 (2.2)	18.2 (2.4)	40.2 (3.3)
Hurt in an on-the-job accident		74.1 (2.8)	15.4 (2.2)	5.0 (1.1)	5.5 (1.1)	25.9 (2.8)
Worked below normal performance level		50.2 (2.8)	7.9 (1.6)	10.5 (1.7)	31.4 (2.1)	49.8 (2.8)
Did not come into work because of illness or injury		65.5 (2.8)	10.0 (1.6)	10.5 (2.0)	14.0 (2.1)	34.5 (2.8)
Need for Further Depression Evaluation, Past 7 Days	*3,217*					
Late for work by 30 minutes or more		64.5 (1.4)	13.2 (0.8)	12.5 (0.9)	9.8 (0.6)	35.5 (1.4)
Left work early		61.8 (1.7)	7.8 (0.8)	14.2 (0.9)	16.2 (1.0)	38.2 (1.7)
Hurt in an on-the-job accident		83.7 (1.4)	9.9 (1.1)	4.5 (0.5)	1.9 (0.4)	16.3 (1.4)
Worked below normal performance level		55.0 (1.2)	7.7 (0.7)	11.8 (0.9)	25.5 (1.2)	45.0 (1.2)
Did not come into work because of illness or injury		72.6 (1.2)	9.6 (0.7)	9.2 (0.7)	8.5 (0.6)	27.4 (1.2)
Met Screening Criteria for GAD Symptoms, Past 30 Days	*1,824*					
Late for work by 30 minutes or more		64.4 (1.4)	12.6 (1.0)	11.7 (1.2)	11.4 (0.8)	35.6 (1.4)
Left work early		60.6 (1.9)	6.8 (0.8)	14.6 (1.0)	18.0 (1.2)	39.4 (1.9)
Hurt in an on-the-job accident		83.3 (1.5)	9.2 (0.9)	5.9 (1.0)	1.6 (0.3)	16.7 (1.5)
Worked below normal performance level		57.5 (1.6)	6.5 (0.9)	10.0 (1.0)	26.0 (1.6)	42.5 (1.6)
Did not come into work because of illness or injury		72.9 (1.5)	9.2 (0.9)	9.0 (0.8)	9.0 (0.8)	27.1 (1.5)

Note: Table displays the percentage of military personnel in the four groups of interest (all personnel, suicidal ideation, need for further depression evaluation and met screening criteria for generalized anxiety disorder (GAD) symptoms who reported the specified problem (e.g., late for work by 30 minutes or more) affected no days, 1 day, 2-3 days, 4 or more days, and 1 or more days. Sample sizes by group are also provided. The standard error of each estimate is presented in parentheses. The definitions of need for further depression and met screening criteria for GAD are given in Section 2.5.5.

Source: Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Need for Further Depression Evaluation, Q94-Q96; Productivity Loss, Q86A-E; Suicidal Ideation, Q98A; PHQ, Q97).

9.9 Physical and Sexual Abuse

Another important health concern that the 2005 survey examined for the first time was the prevalence of self-reported physical and sexual abuse. Table 9.12 shows the prevalence of physical and sexual abuse by time period and Service. Almost half of the total population reported some type of past physical or sexual abuse (45.5%). The large majority of this abuse occurred before the age of 18 (39%). About 3.2% of the military reported unwanted sexual contact since entering the Service, and 8.2% reported any abuse since entering the Service. The time period in which the abuse occurred was similar across Services, although Air Force personnel were less likely to report abuse than personnel in the other Services.

Tables 9.12a and b present gender differences related to physical and sexual abuse. Women were significantly more likely than men to report unwanted sexual contact (37.9% vs. 9.6%, respectively) and being attacked, beaten, or mugged since entering the Service (7.1% vs. 5.3%). Enlisted personnel were more likely than officers to report a history of physical attack (27.1% vs. 16.9%, respectively); however, there were no differences by rank among those reporting unwanted sexual contact (14.1% vs. 12.3%) (data not tabled).

Table 9.12 **SELF-REPORTED PHYSICAL AND SEXUAL ABUSE, BY SERVICE**

	Service				
Type and Time of Abuse	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Physically Punished/Beaten by Parent, Caretaker, Teacher					
Before age 18	29.9 (0.8)	28.6 (2.2)	30.3 (1.2)	23.2 (0.6)	27.7 (0.7)
Between age 18 and entering Service	0.8 (0.2)	1.0 (0.2)	0.4 (0.2)	0.6 (0.2)	0.8 (0.1)
Since entering Service	0.4 (0.1)	0.3 (0.2)	0.7 (0.3)	0.1 (0.1)	0.3 (0.1)
Total ever punished/beaten	30.8 (1.0)	29.6 (2.2)	31.0 (1.2)	23.5 (0.6)	28.5 (0.8)
Other Attacked/Beaten/Mugged					
Before age 18	19.2 (1.2)	15.4 (1.0)	20.9 (1.4)	12.8 (0.8)	16.6 (0.7)
Between age 18 and entering Service	6.4 (0.7)	4.7 (0.4)	6.6 (0.7)	3.6 (0.3)	5.2 (0.3)
Since entering Service	5.7 (0.8)	6.3 (0.4)	6.1 (0.7)	4.5 (0.4)	5.6 (0.3)
Total ever attacked/mugged	29.2 (1.8)	24.5 (1.2)	30.5 (1.3)	19.4 (0.9)	25.3 (0.9)
Unwanted Sexual Contact					
Before age 18	11.0 (0.7)	10.3 (0.5)	8.2 (0.9)	8.4 (0.6)	9.7 (0.4)
Between age 18 and entering Service	2.3 (0.6)	2.3 (0.3)	1.4 (0.2)	1.9 (0.3)	2.0 (0.2)
Since entering Service	3.0 (0.4)	3.5 (0.3)	2.8 (0.3)	3.3 (0.5)	3.2 (0.2)
Total unwanted sexual contact	14.9 (1.0)	15.0 (0.5)	11.6 (0.8)	12.4 (0.9)	13.8 (0.4)
Any Abuse Experience					
Before age 18	41.8 (1.2)	39.5 (1.9)	41.7 (1.5)	34.1 (0.6)	39.0 (0.8)
Between age 18 and entering Service	8.7 (0.9)	7.0 (0.4)	7.8 (0.8)	5.1 (0.5)	7.1 (0.4)
Since entering Service	8.0 (0.9)	8.9 (0.5)	8.9 (0.8)	7.3 (0.7)	8.2 (0.4)
Total any abuse	49.3 (1.7)	45.6 (1.7)	48.1 (1.4)	39.9 (0.8)	45.5 (0.9)

Note: Table displays the percentage of military personnel by service who reported the type and time of physical and sexual abuse as indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Abuse, Q101A-C).

Table 9.12a **SELF-REPORTED PHYSICAL AND SEXUAL ABUSE AMONG MALES, BY SERVICE**

Type and Time of Abuse	Service: Army	Navy	Marine Corps	Air Force	Total Males
Physically Punished/Beaten by Parent, Caretaker, Teacher					
Before age 18	29.9 (0.9)	28.1 (2.6)	30.0 (1.2)	23.6 (0.9)	27.8 (0.8)
Between age 18 and entering Service	0.8 (0.2)	1.0 (0.2)	0.4 (0.2)	0.6 (0.2)	0.7 (0.1)
Since entering Service	0.3 (0.1)	0.3 (0.2)	0.7 (0.3)	– (–)	0.3 (0.1)
Total ever punished/beaten	30.8 (1.0)	29.2 (2.6)	30.7 (1.2)	23.7 (0.9)	28.5 (0.9)
Other Attacked/Beaten/Mugged					
Before age 18	20.5 (1.2)	16.5 (1.2)	21.3 (1.6)	14.3 (0.8)	17.9 (0.7)
Between age 18 and entering Service	6.7 (1.0)	4.7 (0.4)	6.7 (0.8)	3.4 (0.4)	5.3 (0.4)
Since entering Service	5.3 (0.7)	6.3 (0.4)	6.2 (0.7)	3.9 (0.4)	5.3 (0.3)
Total ever attacked/mugged	30.2 (1.7)	25.3 (1.4)	31.0 (1.4)	20.1 (1.2)	26.3 (0.9)
Unwanted Sexual Contact					
Before age 18	8.5 (0.7)	7.8 (0.6)	7.1 (0.8)	5.6 (0.7)	7.3 (0.4)
Between age 18 and entering Service	1.3 (0.4)	1.3 (0.2)	1.1 (0.2)	0.7 (0.2)	1.1 (0.2)
Since entering Service	1.5 (0.2)	1.9 (0.2)	1.7 (0.3)	1.4 (0.3)	1.6 (0.1)
Total unwanted sexual contact	10.7 (0.8)	10.9 (0.5)	9.5 (0.7)	7.2 (0.8)	9.6 (0.4)
Any Abuse Experience					
Before age 18	41.4 (1.0)	38.3 (2.1)	41.4 (1.5)	33.7 (0.9)	38.5 (0.8)
Between age 18 and entering Service	8.4 (0.9)	6.2 (0.5)	7.6 (0.8)	4.1 (0.6)	6.5 (0.4)
Since entering Service	6.5 (0.7)	7.7 (0.6)	8.2 (0.8)	5.2 (0.5)	6.7 (0.3)
Total any abuse	48.0 (1.7)	43.6 (1.8)	47.5 (1.4)	37.4 (1.0)	43.9 (1.0)

Note: Table displays the percentage of military personnel by Service who reported the type and time of physical and sexual abuse as indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Abuse, Q101A-C).

9.10 Alcohol Use, Stress, and Mental Health

The relationship of alcohol use during the past 30 days to perceived stress at work, mental health, and abuse history was examined in Table 9.13. A strong relationship exists between heavy alcohol use, stress, and mental health measures. In particular, relative to nondrinkers, heavy alcohol users were more likely to

- perceive "a lot" of stress at work (41.1% vs. 28.4%) or in their family life (24.7% vs. 15.3%),
- experience 11 or more days during the month when their mental health interfered with their usual activities (4.8% vs. 2.0%),
- meet the screening criteria for GAD symptoms (17.5% vs. 10.1%) and depression evaluation (31.2% vs. 19.1%),
- report suicidal ideation in the past year (6.7% vs. 3.8%),
- report serious psychological distress (12.8% vs. 7.1%),
- meet screening criteria for further PTSD evaluation (10.5% vs. 5.5%), and
- report any physical or sexual abuse (37.3% vs. 33.3%).

These findings are consistent with other national studies showing high rates of comorbidity between substance use and mental health problems, both in the general

Table 9.12b **SELF-REPORTED PHYSICAL AND SEXUAL ABUSE AMONG FEMALES, BY SERVICE**

Type and Time of Abuse	Service: Army	Navy	Marine Corps	Air Force	Total Females
Physically Punished/Beaten by Parent, Caretaker, Teacher					
Before age 18	30.0 (2.7)	31.2 (1.3)	34.2 (2.3)	21.9 (1.1)	27.4 (1.2)
Between age 18 and entering Service	1.0 (0.4)	1.3 (0.4)	0.8 (0.6)	0.9 (0.2)	1.0 (0.2)
Since entering Service	0.5 (0.2)	0.5 (0.2)	0.9 (0.7)	0.3 (0.2)	0.4 (0.1)
Total ever punished/beaten	31.1 (2.4)	32.3 (1.2)	35.8 (2.2)	22.7 (0.8)	28.5 (1.0)
Other Attacked/Beaten/Mugged					
Before age 18	11.5 (1.4)	9.1 (1.3)	14.7 (1.9)	6.5 (1.1)	9.2 (0.7)
Between age 18 and entering Service	4.7 (0.9)	5.1 (0.9)	4.9 (1.4)	4.4 (0.6)	4.7 (0.4)
Since entering Service	8.0 (2.0)	6.3 (0.7)	4.7 (0.7)	7.2 (0.9)	7.1 (0.7)
Total ever attacked/mugged	23.7 (3.1)	19.7 (1.5)	23.8 (1.8)	16.8 (1.0)	20.1 (1.2)
Unwanted Sexual Contact					
Before age 18	26.1 (1.6)	24.9 (1.4)	25.0 (1.7)	19.7 (1.4)	23.3 (0.9)
Between age 18 and entering Service	7.8 (1.5)	8.0 (1.0)	6.7 (1.1)	6.8 (0.9)	7.4 (0.6)
Since entering Service	11.7 (1.5)	12.8 (1.1)	18.9 (2.0)	11.3 (1.8)	12.2 (0.9)
Total unwanted sexual contact	40.7 (2.5)	39.5 (1.2)	43.9 (3.0)	33.5 (2.1)	37.9 (1.2)
Any Abuse Experience					
Before age 18	44.0 (2.7)	46.4 (1.2)	46.6 (1.7)	35.5 (1.3)	41.6 (1.1)
Between age 18 and entering Service	10.7 (1.4)	11.6 (1.3)	10.9 (1.5)	9.4 (1.1)	10.5 (0.7)
Since entering Service	17.0 (2.2)	16.1 (1.4)	20.3 (2.0)	15.9 (1.9)	16.5 (1.1)
Total any abuse	56.8 (2.6)	57.9 (1.7)	58.9 (2.2)	50.0 (1.5)	54.6 (1.1)

Note: Table displays the percentage of military personnel by Service who reported the type and time of physical and sexual abuse as indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Abuse, Q101A-C).

population of the United States (Regier et al., 1990) and among military veterans (Kulka et al., 1990). Although it is clear that there is also a relationship between heavy drinking and stress at work, the data do not allow us to infer the direction of the relationship. It seems more likely, however, that alcohol would be used as a relatively ineffective avoidance strategy for coping with stress rather than as a precursor of stress.

9.11 Selected Mental Health Issues

Respondents were also asked several questions about mental health care. These included whether they had felt a need for counseling within the past 12 months and whether they had received such care. Personnel also were questioned about their perception of whether mental health counseling would have a detrimental impact on their career. Table 9.14 presents distributions across response categories, displayed separately for each Service. Overall, 17.8% of personnel perceived a need for mental health counseling in the past year. As shown, the perceived need for mental health counseling was higher among Army personnel than those in other Services. Compared with the 21% of Army personnel, roughly 15% to 17% of personnel in the other Services indicated that they had perceived a personal need for counseling in the past 12 months. A reported 14.6% of personnel received any care. Marines were less likely to

Table 9.13 **STRESS AND MENTAL HEALTH INDICATORS, BY DRINKING LEVEL**

Problem/Level	Drinking Level: Nondrinker	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Stress at Work, Past 12 Months					
A lot	28.4 (1.6)	29.1 (1.4)	30.0 (1.3)	33.1 (1.1)	41.1 (1.6)
Some/a little	55.6 (1.4)	58.0 (1.5)	59.9 (1.3)	55.8 (1.3)	48.1 (1.6)
None at all	16.0 (1.4)	12.9 (1.1)	10.1 (1.0)	11.1 (0.7)	10.8 (1.1)
Stress in Family, Past 12 Months					
A lot	15.3 (0.9)	18.3 (1.0)	18.1 (0.9)	18.3 (1.3)	24.7 (1.4)
Some/a little	57.3 (1.2)	59.7 (1.6)	61.9 (1.3)	62.5 (1.0)	51.6 (1.4)
None at all	27.4 (1.1)	22.0 (1.5)	20.0 (1.1)	19.2 (1.0)	23.7 (1.8)
Days in Past Month Limited Usual Activities Due to Poor Mental Healtha					
11 or more days	2.0 (0.3)	2.2 (0.3)	2.4 (0.4)	2.7 (0.4)	4.8 (0.7)
4-10 days	2.1 (0.5)	3.0 (0.5)	2.5 (0.4)	2.1 (0.4)	5.6 (0.8)
1-3 days	7.3 (0.6)	8.9 (0.8)	8.8 (0.8)	8.2 (0.6)	11.8 (0.9)
None	88.6 (0.9)	85.9 (1.0)	86.3 (0.9)	87.0 (0.7)	77.8 (1.4)
Met Screening Criteria for Generalized Anxiety Disorder (GAD) Symptoms, Past 30 Days					
Yes	10.1 (0.8)	12.0 (0.9)	10.6 (1.0)	11.7 (1.0)	17.5 (1.3)
No	89.9 (0.8)	88.0 (0.9)	89.4 (1.0)	88.3 (1.0)	82.5 (1.3)
Need for Further Depression Evaluation					
Yes	19.1 (1.0)	21.3 (1.2)	19.5 (1.5)	20.6 (1.0)	31.2 (1.2)
No	80.9 (1.0)	78.7 (1.2)	80.5 (1.5)	79.4 (1.0)	68.8 (1.2)
Suicidal Ideation, Past Year					
Yes	3.8 (0.4)	5.0 (0.5)	3.7 (0.7)	4.0 (0.5)	6.7 (0.8)
No	96.2 (0.4)	95.0 (0.5)	96.3 (0.7)	96.0 (0.5)	93.3 (0.8)
Serious Psychological Distress, Past 30 Days					
Yes	7.1 (0.7)	7.5 (0.7)	6.1 (0.5)	6.1 (0.8)	12.8 (1.2)
No	92.9 (0.7)	92.5 (0.7)	93.9 (0.5)	93.9 (0.8)	87.2 (1.2)
Need for Further PTSDb Evaluation, Past 30 Days					
Yes	5.5 (0.7)	5.1 (0.6)	5.6 (0.7)	5.6 (0.7)	10.5 (0.9)
No	94.5 (0.7)	94.9 (0.6)	94.4 (0.7)	94.4 (0.7)	89.5 (0.9)
Any Physical/Sexual Abuse					
Yes	33.3 (1.6)	35.6 (1.4)	34.8 (1.4)	34.3 (1.5)	37.3 (1.2)
No	66.7 (1.6)	64.4 (1.4)	65.2 (1.4)	65.7 (1.5)	62.7 (1.2)

Note: Table displays the percentage of military personnel by drinking level that reported the stress and mental health problems indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Column group estimates may not sum to 100 due to rounding. Definitions and measures of substance use are given in Section 2.5.3.

[a]Based on respondents' perception of number of days when mental health limited usual activities.

[b]PTSD means posttraumatic stress disorder. Meeting screening criteria suggests a need for further evaluation; not a clinical diagnosis.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Stress at Work, Q88; Stress in Family, Q89; Mental Health, Past 30 Days, Q97; Need for Further Depression Evaluation, Q94-Q96; PHQ, Q97; Suicidal Ideation, Q98A; Psychological Distress, Q100; Need for Further PTSD Evaluation, Q102; Abuse, Q101).

Table 9.14 **SELECTED MENTAL HEALTH ISSUES, PAST 12 MONTHS, BY SERVICE**

	Service				
Mental Health Measure	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Perceived Need for Mental Health Counseling	21.1 (0.8)	17.4 (0.8)	15.5 (1.1)	15.4 (1.1)	17.8 (0.6)
Receipt of Prescribed Medication for Depression, Anxiety, or Sleeping Problems, Past 6 Months	4.8 (0.7)	5.1 (0.5)	3.8 (0.6)	4.9 (0.3)	4.8 (0.3)
Receipt of Mental Health Counseling					
Any counseling professional	16.4 (1.2)	14.8 (0.9)	12.7 (1.2)	13.3 (1.0)	14.6 (0.6)
From a military mental health professional	8.6 (0.8)	8.2 (0.8)	5.6 (0.6)	7.7 (0.7)	7.8 (0.4)
From a general physician at a military facility	4.2 (0.3)	4.4 (0.4)	5.4 (0.7)	3.8 (0.4)	4.3 (0.2)
From a military chaplain	8.1 (0.5)	4.8 (0.5)	5.3 (0.8)	3.2 (0.4)	5.5 (0.3)
From a civilian mental health professional	3.4 (0.4)	3.2 (0.4)	2.2 (0.5)	2.8 (0.4)	3.0 (0.2)
From a general physician at a civilian facility	1.0 (0.2)	1.4 (0.2)	1.0 (0.4)	0.5 (0.1)	1.0 (0.1)
From a civilian pastoral counselor	2.6 (0.4)	2.1 (0.3)	1.9 (0.4)	2.3 (0.4)	2.3 (0.2)
From a self-help group (AA, NA)	2.6 (0.5)	2.4 (0.3)	2.8 (0.4)	1.1 (0.2)	2.1 (0.2)
Concerns Sought Help For					
Depression	8.4 (0.7)	8.3 (0.5)	5.9 (0.8)	6.2 (0.5)	7.4 (0.3)
Anxiety	4.5 (0.4)	5.3 (0.6)	3.9 (0.6)	4.2 (0.5)	4.6 (0.3)
Family problems	7.1 (0.7)	8.5 (0.9)	5.9 (0.8)	7.0 (0.7)	7.3 (0.4)
Substance use problems	2.6 (0.6)	1.6 (0.4)	2.2 (0.6)	0.8 (0.2)	1.8 (0.2)
Anger or stress management	7.5 (0.7)	5.8 (0.4)	5.9 (0.6)	4.3 (0.4)	5.9 (0.3)
Other	4.9 (0.6)	5.2 (0.5)	4.7 (0.6)	4.3 (0.6)	4.8 (0.3)
Perceived Damage to Career					
Definitely would	18.0 (0.7)	15.8 (1.0)	16.4 (0.6)	14.1 (0.7)	16.1 (0.5)
Probably would	27.4 (1.1)	28.3 (1.1)	29.1 (1.3)	28.1 (1.0)	28.0 (0.6)
Probably would not	31.7 (0.7)	31.7 (0.9)	31.6 (1.4)	40.4 (1.7)	34.1 (0.7)
Definitely would not	23.0 (0.9)	24.2 (1.7)	22.9 (1.5)	17.5 (1.2)	21.7 (0.7)

Note: Table displays the percentage of military personnel by Service who reported the mental health issues indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Perceived Need for Counseling Services, Q103; Receipt of prescribed medication, Q106; Receipt of Counseling, Q104A-F; Concerns Sought Help, Q105; Perceived Damage to Career, Q107).

receive prescribed medication for depression, anxiety, or sleeping problems or counseling from a mental health professional than other Service personnel. More individuals received counseling from a military mental health professional (7.8%), a military chaplain (5.5%), or a physician at a military facility (4.3%) than from other sources.

The perceived impact of mental health counseling on a military career is also shown in Table 9.14. Somewhat fewer personnel perceived it "definitely or probably would" damage a military career (44.1%) than those who perceived it "definitely or probably would not" (55.8%). This pattern was fairly similar across the four Services. To determine whether the perception of negative repercussions is deterring some personnel from receiving mental health counseling, the opinions of those who perceived or indicated a need for this type of treatment were examined. If personnel who needed treatment and received it perceived more positive career outcomes, this would indicate that these fears are largely unwarranted. If, however, those who had received treatment perceived a greater threat to their career than those who had not, this would indicate that they may have experienced negative career consequences as a result of their counseling.

Table 9.15 includes data only for those who perceived a need for mental health services, revealed a need for further anxiety or depression evaluation, reported suicidal ideation in the past 12 months, or reported limited activities because of poor mental health. Thus, this is a small subset of active-duty personnel. Within each group, respondents were divided into those who had received mental health care in the past 12 months and those who had not. As shown, among those who felt they needed counseling, those who had not received mental health services (63.2%) were more likely than those who had received them (47.9%) to respond that such services "definitely or probably would" damage a person's military career. In contrast, personnel who had received mental health care (52.2%) were more likely to respond that such services "probably or definitely would not" be detrimental to their career than those who had not received such services (36.8%). This pattern held among personnel needing further depression evaluation and among personnel reporting suicidal ideation or limited activities because of poor mental health but not among those meeting screening criteria for GAD symptoms. That is, among personnel who met criteria for generalized anxiety symptoms, those who had not received mental health services were just as likely or less likely than those who had received them to perceive damage to their careers for seeking services.

Thus, personnel who received services were generally more likely to believe that having done so would not have a negative impact on their career than those who did not receive such services. However, among personnel needing further mental health evaluation who did receive services, less than half perceived that this would not damage their career (e.g., 45.1% anxiety symptoms, 44.0% depression evaluation). In other words, there was still strong concern even among those who received services that it would damage their career.

It is quite possible that the fear of negative career consequences is preventing some Service members from seeking mental health counseling. In recent years, the military has taken steps to reduce the stigma associated with receiving mental health care. One step in this process has been to increase awareness of the importance of mental fitness. Mental health has been recognized as an essential aspect of military readiness; recent directives have specified routine medical surveillance (including mental health) for active-duty Service members (DoD, 1997b) to monitor the health of this population and intervene when necessary. Under this policy, all Service members must be mentally fit to carry out their missions, and their mental health must be maintained, assessed, and protected. In addition, the rights of Service members referred for mental health evaluation are protected (DoD, 1997a; Litts & Roadman, 1997). Empirical evidence also suggests that mental health evaluation will not necessarily have a negative impact on an individual's military career. In a survey of 138 commanding and executive officers in the Navy and Marine Corps, the majority of these officers reported a neutral view of Service members who received mental health counseling (Porter & Johnson, 1994). Despite these efforts, it appears that more assurance may be

Table 9.15 **PERCEIVED DAMAGE TO MILITARY CAREER FOR SEEKING MENTAL HEALTH SERVICES, BY SELECTED MENTAL HEALTH MEASURES**

		Perceived Damage to Career			
Mental Health Measure	***N***	**Definitely Would**	**Probably Would**	**Probably Would Not**	**Definitely Would Not**
Perceived Need for Mental Health Counseling, Past 12 Months					
Received mental health services[a]	*1,664*	21.1 (1.4)	26.8 (1.4)	34.0 (1.5)	18.2 (1.3)
Did not receive services[b]	*1,069*	29.8 (1.8)	33.4 (1.9)	24.8 (1.7)	12.0 (1.7)
Met Screening Criteria for GAD Symptoms, Past 1 Month					
Received mental health services[c]	*620*	28.9 (2.8)	29.4 (1.9)	24.8 (2.4)	16.8 (2.5)
Did not receive services[d]	*1,159*	29.2 (1.6)	29.5 (1.8)	19.9 (1.6)	21.5 (1.9)
Need for Depression Evaluation, Past 12 Months					
Received mental health services[c]	*1,173*	26.4 (1.6)	29.6 (2.2)	27.4 (1.8)	16.6 (1.3)
Did not receive services[d]	*1,969*	29.1 (1.1)	29.8 (1.3)	24.6 (1.2)	16.5 (1.3)
Suicidal Ideation, Past 12 Months					
Received mental health services[c]	*352*	31.4 (5.1)	34.8 (3.9)	19.9 (3.2)	13.9 (2.6)
Did not receive services[d]	*311*	40.9 (2.9)	29.7 (3.3)	17.9 (3.5)	11.5 (3.1)
Activities Limited by Poor Mental Health, Past Month					
Received mental health services[e]	*218*	34.5 (4.2)	22.2 (4.2)	28.2 (5.1)	15.1 (2.3)
Did not receive services[f]	*162*	36.1 (5.3)	32.8 (5.2)	16.7 (3.9)	14.4 (4.1)

Note: Table displays the percentage of military personnel by mental health measure who reported the perceived damage to their career for seeking mental health services would be "definitely would," "probably would," "probably would not," and "definitely would not." The standard error of each estimate is presented in parentheses. Percent estimates within each row may not sum to 100 because of rounding.

[a]Unweighted number of respondents who perceived the need for mental health counseling in the past 12 months and received mental health services.

[b]Unweighted number of respondents who perceived the need for mental health counseling in the past 12 months and did not receive services.

[c]Unweighted number of respondents who revealed the need for depression/anxiety or reported suicidal ideation evaluation in the past 12 months and received mental health services.

[d]Unweighted number of respondents who revealed the need for depression/anxiety or reported suicidal ideation evaluation in the past 12 months and did not receive services.

[e]Unweighted number of respondents who reported their mental health limited usual activities for 11 or more days in the past 30 days and received mental health services.

[f]Unweighted number of respondents who reported their mental health limited usual activities for 11 or more days in the past 30 days and did not receive services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Perceived Damage to Career, Q107; Receipt of Mental Health Counseling Services, Q104A-F; Perceived Need for Counseling, Q103; Need for Further Depression Evaluation, Q94-Q96; Limited Usual Activities, Q87; PHQ, Q97; Suicidal Ideation, Q98A).

needed to combat the widely held concerns that seeking help will damage a career.

Personnel who are in need of mental health services that they are reluctant to seek likely are not performing at their optimal level on the job. Therefore, the resolution of this conflict (perhaps through education and assurance of anonymity) could increase the readiness of the U.S. military forces.

9.12 Summary

This chapter examined a variety of mental health issues among military personnel, including stress, coping mechanisms, symptoms of anxiety and depression, suicidal ideation, relations between alcohol use and mental health problems, and perceptions and receipt of mental health counseling.

9.12.1 Levels and Sources of Stress

Overall work and family stress levels have not significantly changed since 2002. Higher percentages of military personnel rated their jobs (32.5%) as more stressful than their personal lives (18.9%) (Table 9.1). When asked about the specific sources of stress, military personnel reported the following (Table 9.2):

- The most frequently indicated stressors for both men and women were being away from family (16.6%), deployment (13.4%), and increases in work load (12.9%).
- More women than men reported stress related to relationships at work and to personal and family problems. For example, women were more likely than men to report high stress related to divorce or breakup (9.0% vs. 5.2%), problems with supervisors (12.5% vs. 9.0%), and problems with coworkers (11.8% vs. 8.1%).
- Only deployment showed a significant increase as a source of stress from 2002 to 2005, but only among men.

9.12.2 Stress and Productivity Loss

Compared with their less-stressed counterparts, personnel experiencing high levels of job-related or family-related stress showed a greater prevalence of productivity loss in each of the domains assessed (Table 9.3):

- Working below normal performance level was reported by 38.2 % of the high-stress group, compared with 20.4% of the moderate/low-stress group. This difference was especially salient at the highest frequency (i.e., 4 or more days in the past year).
- Illness, injuries, and accidents in the workplace on 4 or more days in the past year were twice as common in the high-stress group (9.2%) as in the moderate/low-stress group (4.2%).

Beyond the issue of productivity loss, the Services should consider the impact of other potential negative outcomes of stress on military functioning, including attrition; lower morale; and medical treatment costs for substance abuse, health, and mental health problems.

9.12.3 Coping with Stress

The most commonly used strategies for coping with stress were thinking of a plan to solve the problem (81.0%), seeking social support (74.1%), and engaging in physical activity (61.5%) and/or a hobby (61.2%). These encouraging findings are tempered somewhat by the finding that more than a quarter of military personnel commonly used alcohol or tobacco to cope with stress, daily pressures, and feelings of depression (Tables 9.4 and 9.5):

- More men than women reported using alcohol (29.9% vs. 21.8%) and cigarettes (27.7% vs. 22.6%) as coping behaviors. Women were more likely than men to talk to a friend or family member (87.0% vs. 71.8%) or to use prayer (69.9% vs. 49.4 %) as a coping strategy. Women also were more likely than men to get something to eat as a coping strategy (50.8 % vs. 42.5%).
- An estimated 4.3% of military personnel had considered suicide as an option for dealing with stress and depression.

9.12.4 Mental Health and Suicidal Ideation

Consistent with findings from national psychiatric epidemiologic studies, the prevalence of anxiety and depression symptoms as measured by the screeners used

was 12.7% and 22.3%, respectively (Tables 9.6 and 9.8). As expected, the rates in this general population sample are lower than those found in recent studies of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) combat personnel (Hoge et al., 2004). Also consistent with the literature, a greater percentage of women scored above the thresholds on the anxiety and depression screeners than did men. Higher percentages of those who were younger, less educated, living without a spouse, and in the lower enlisted pay grades endorsed screening items indicative of the need for further evaluation for anxiety and depression. Recognizing that screening procedures may cast a wide net, results from screening instruments designed to measure serious psychological distress and need for further PTSD evaluation were examined (Table 9.10).

- An estimated 8.1% of military personnel met criteria for serious psychological distress, and 6.7% met screening criteria for need for further PTSD evaluation in the past 30 days.
- A small percentage of personnel had seriously considered or attempted suicide prior to joining the Service (7.7% and 2.9%, respectively).

It should be noted that there may be considerable overlap between individuals meeting screening criteria on mental health measures. Subsequent data analyses will examine the extent to which personnel report co-occurring conditions.

Because psychological problems can affect military readiness, the relationships among stress, productivity, and mental health were examined (Tables 9.7, 9.9, and 9.10). These analyses revealed some potentially important findings:

- Substantial percentages of personnel who met screening criteria for anxiety symptoms experienced “a lot” of stress associated with work (63.5%) and with family (41.5%). Similarly, personnel in need of further depression evaluation also indicated a lot of stress associated with work (63.0%) and with family (42.2%).
- Productivity loss was higher among personnel reporting suicidal ideation or in need of further evaluation for anxiety or depression than it was among those who did not need this evaluation (Table 9.11). Those who had suicidal ideation were almost 3 times more likely (25.9%) to be hurt on the job as those in the total population (8.6%). Similarly, almost half of those with suicidal ideation (49.8%), depressive symptoms (45.0%), and/or anxiety symptoms (42.5% worked below their normal performance level, compared with less than a third of personnel (27.4%) without these symptoms.

9.12.5 Physical and Sexual Abuse

Almost half of personnel experienced some type of physical or sexual abuse prior to joining the Service (46.1%) (Table 9.12). Most reported being physically punished or beaten by a parent, caretaker, or teacher such that they had been very frightened and thought they would be injured or were injured (27.7%). A reported 37.9% of active-duty women reported some lifetime experience of unwanted sexual contact, 12.2% occurring since they had entered the Service. Air Force rates of abuse were considerably lower than rates for the other Services.

9.12.6 Alcohol, Stress, and Mental Health

- Compared with their counterparts who did not drink, heavy users of alcohol had more problems with stress at work (41.1% vs. 28.4%) or in their families (24.7% vs. 15.3%), were more likely to exhibit anxiety symptoms (17.5% vs. 10.1%) and depressive symptoms (31.2% vs. 19.1%), and reported more limitations in activities because of poor mental health (4.8% vs. 2.0%) (Table 9.13). Heavy drinkers were also more likely than those who drank less to meet criteria for serious mental disorders and have a history of suicidal ideation and/or physical or sexual abuse.
- These findings show the strong comorbid relationship between heavy alcohol use and mental health problems and suggest that this area needs further assessment. In particular, it is important to understand the extent of this relationship; the risk factors that contribute to it; and the potential clinical, research, and policy actions that should be taken to address it.

9.12.7 Selected Mental Health Issues

Roughly 18% of personnel had perceived a need for mental health care in the 12 months prior to the survey, and about 15% received this care (Table 9.14). This is in

contrast to the findings of the 2002 survey (Bray et al, 2003) in which a similar percentage perceived a need for treatment (18.7%) but only 12.5% received care.

Although it appears that the gap between the perceived need for treatment and receipt of treatment may be closing, the continued reluctance to receive treatment may be due to personnel who perceived probable or definite damage to a Service member's military career after receiving mental health counseling (Table 9.15). Although personnel who received care were less likely (47.9%) than those who did not receive services (63.2%) to believe that counseling would damage a military career, clearly a large portion in both groups believed it would be detrimental to one's career. In addition, because of a gap between the need for further depression evaluation (22.3%) and perceived need for treatment (18.2%), to facilitate appropriate help-seeking behavior and targeted interventions, further research is needed to characterize those who are screening positive for mental health problems but who do not perceive a need for treatment.

Chapter 10: Other Health-Related Issues in the Military

This chapter presents findings on other health-related issues from the 2005 Department of Defense (DoD) survey. The areas of special interest are women's health issues, oral health, deployment, job satisfaction, and religiosity/spirituality. The discussion of women's health issues examines stress associated with being a woman in the military, pregnancy, and maternal and infant health. The oral health analysis assesses recency of dental check-ups, reasons for lack of dental check-ups, dental work prior to deployments, and tooth loss in the military. The section on deployment discusses problems associated with deployment, associations with stress and mental health, associations with substance use, and deployment-related changes in substance use and interpersonal relations. The discussion of job satisfaction examines sociodemographic rank, occupation, and Service correlates. In the religiosity/spirituality section, the relationship between degree of spirituality and selected health behavior and mental health measures such as substance use, risky behavior, need for mental health evaluation, and stress is explored.

10.1 Women's Health Issues

10.1.1 Stress Related to Serving as a Military Woman

In the total DoD, as shown in Table 10.1, 35.5% of military women reported being under a "great deal" or a "fairly large amount" of stress related to being a woman in the military. Women in the Marine Corps were most likely to report perceived high stress (49.3%), followed by women in the Army (40.0%). Women in the Navy (35.0%) and Air Force (30.3%) reported lower levels of perceived stress related to being a female in the military. One possible cause of this stress may relate to the fact that women are a relatively small proportion of military personnel; in 2005, women comprised 14.8% of the military overall (Table 2.4). Among Marine Corps personnel, whose women indicated the highest levels of stress, the proportion of women was lowest of all Services. Only 6.1% of Marine Corps personnel were women (Table 2.4).

In the total DoD, stress associated with being a woman in the military differed only slightly among racial/ethnic groups (Table 10.1). "Other" racial/ethnic groups among female Marines were more likely to report experiencing high levels of stress (62.3%), whereas "other" women in the Air Force (28.3%) and Navy (28.6%) did so least frequently. Indeed, women in the Marine Corps had the highest levels of perceived stress as a military woman among almost all sociodemographic groups. College graduates were less likely to report high stress than other educational groups; only about 28% of those with a college education reported high stress, compared with nearly 40% of those with a high school education or less. Women aged 20 or younger were most likely to report high stress (41.2%), while women aged 35 or older were least likely to report high stress (30.5%). Married women with their spouse not present (45.2%) were significantly more likely to report high levels of stress than those not married (36.1%) and those married with their spouse present (32.9%). Enlisted women (37.0%) were more likely to report high stress than officers (28.7%). This disparity was largest in the Marine Corps, where 50.8% of enlisted women reported high stress compared with 35.6% of officers. Army officers and enlisted women differed least among Services in this gender-related stress, with 40.2% of enlisted women and 38.9% of officers reporting high stress levels. Women stationed outside the continental United States (OCONUS) were more likely to report high stress than those stationed within the continental United States (CONUS) (41.0% vs. 33.7%, respectively).

Figure 10.1 presents comparisons of perceived stress between 2002 and 2005. As shown, there was a significant decrease in reported stress during this period in the total DoD, from 41.2% to 35.5%. Women in the Army and Navy reported significantly less stress as a woman in 2005 relative to 2002, women in the Marine Corps reported a nonsignificant increase, and stress among Air Force women was stable. Women in the Navy had the highest rate in 2002 of all Service women, whereas female Marines had the highest rate in 2005.

Table 10.1 **STRESS ASSOCIATED WITH BEING A WOMAN IN THE MILITARY, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic of Women	Service				
	Army	Navy	Marine Corps	Air Force	Total DoD
Race/Ethnicity					
White, non-Hispanic	37.1 (1.9)	38.5 (3.6)	47.2 (1.3)	30.7 (3.0)	35.2 (1.7)
African American, non-Hispanic	43.0 (4.1)	29.6 (1.6)	+ (+)	29.4 (4.0)	35.8 (2.3)
Hispanic	39.1 (4.5)	40.7 (3.1)	44.4 (6.1)	32.7 (6.3)	38.4 (2.6)
Other	41.9 (7.5)	28.6 (4.6)	62.3 (6.8)	28.3 (5.5)	34.0 (3.3)
Education					
High school or less	42.8 (3.0)	35.8 (2.0)	53.1 (3.5)	33.9 (2.8)	39.1 (1.6)
Some college	41.4 (2.7)	36.6 (2.2)	49.6 (4.3)	33.8 (2.7)	37.5 (1.5)
College graduate or higher	33.8 (5.7)	30.4 (4.3)	37.1 (5.2)	22.2 (4.5)	27.9 (2.9)
Age					
20 or younger	41.8 (7.5)	42.2 (3.4)	52.4 (5.4)	36.6 (5.1)	41.2 (3.4)
21-25	44.7 (3.4)	38.1 (1.9)	53.5 (2.5)	32.4 (2.8)	39.3 (1.6)
26-34	33.6 (5.3)	30.9 (4.1)	38.5 (7.4)	29.3 (4.3)	31.2 (2.6)
35 or older	37.3 (5.9)	30.1 (2.0)	+ (+)	24.5 (3.4)	30.5 (2.5)
Family Status[a]					
Not married	39.3 (3.6)	35.3 (2.4)	48.3 (3.2)	31.8 (3.2)	36.1 (1.7)
Married, spouse not present	47.9 (6.0)	+ (+)	57.7 (7.7)	+ (+)	45.2 (4.1)
Married, spouse present	38.6 (7.0)	34.0 (2.3)	48.5 (4.2)	27.6 (3.5)	32.9 (2.6)
Pay Grade					
Enlisted	40.2 (1.9)	36.5 (1.6)	50.8 (2.9)	32.5 (2.3)	37.0 (1.2)
Officer	38.9 (7.6)	27.3 (5.2)	35.6 (6.0)	21.7 (6.2)	28.7 (3.8)
Region					
CONUS[b]	37.7 (1.7)	32.1 (2.5)	49.5 (3.2)	29.8 (3.0)	33.7 (1.6)
OCONUS[c]	45.3 (1.0)	39.3 (2.1)	48.0 (4.7)	34.4 (1.1)	41.0 (1.3)
Total	40.0 (1.4)	35.0 (1.6)	49.3 (2.8)	30.3 (2.7)	35.5 (1.2)

Note: Table displays the percentage of women in the military by Service and sociodemographic characteristic who indicated "a great deal" or "a fairly large amount" of stress associated with being a woman in the military. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

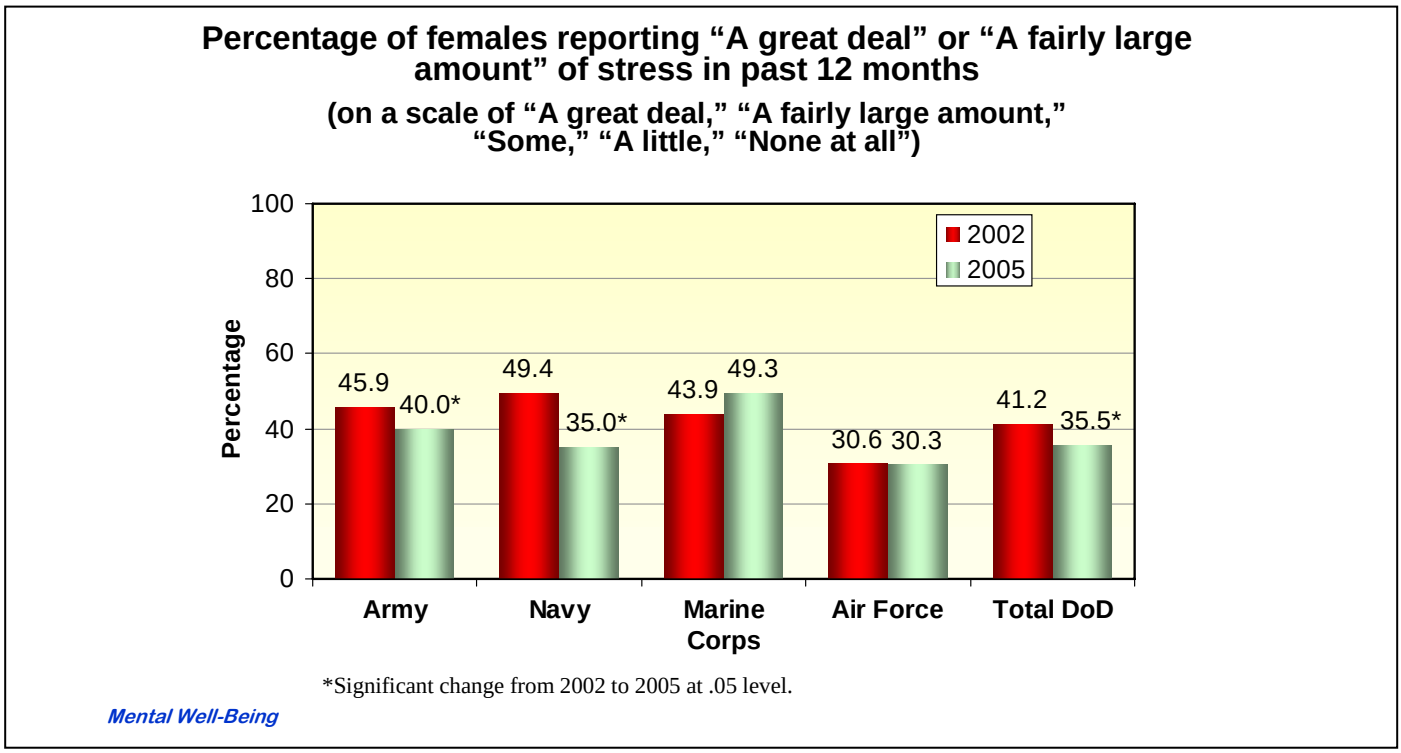
[b]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Stress Associated With Being a Woman in the Military, Q162; refer to Section 2.5.1 for descriptions of sociodemographic variables).

Figure 10.1 Stress associated with being a women in the military, 2002-2005



10.1.2 Maternal and Infant Health

Pregnancy. Having a baby was the most frequently cited source of stress in the past 12 months among both women and men and among women in all age groups (Tables 9.2-9.2d). As shown in Table 10.2, about 17% of military women reported that they had been pregnant within the past year or they were currently pregnant, and another 0.7% reported that they may have been pregnant at the time of the survey but were unsure. The percentage who had been pregnant within the past year includes those who had a live birth, those whose pregnancy was terminated, and those who were pregnant at the time of the survey. Across all the Services, 34.7% of military women had been pregnant within the past 5 years, although some of these pregnancies may have occurred prior to military service. The percentage of women who had been pregnant within the past year was highest in the Marine Corps (21.2%) and Army (17.9%). The Marine Corps had the highest percentage of women who had never been pregnant (50.9%). These differences in pregnancy by Service may be related to differences in age and other sociodemographic characteristics among women across the Services.

Regular prenatal care and the avoidance of substance use during pregnancy are important in ensuring maternal and infant health (American College of Obstetricians and Gynecologists [ACOG], 1994). Research studies consistently show that adequate prenatal care is associated with decreased infant mortality rates and improved birth outcomes (Stringer, 1998). For example, infants whose mothers received adequate prenatal care may be delivered later in the pregnancy, have higher birth weights, and have shorter hospital stays following birth (Amini, Catalano, & Mann, 1996). Use of substances during pregnancy, including tobacco and alcohol, has been linked to a variety of negative birth and developmental outcomes, such as prematurity, low birth weight, and congenital malformations (McGann & Spangler, 1997; National Institute on Drug Abuse [NIDA], 1995; Visscher, Bray, & Kroutil, 1999). Understanding factors that promote health among pregnant military women also is of interest because pregnancy and the health of female personnel affect military readiness.

Table 10.2 **PREGNANCY HISTORY AMONG MILITARY WOMEN**

Pregnancy History among Women	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Never been pregnant	44.1 (4.2)	47.0 (2.4)	50.9 (1.7)	47.5 (2.3)	46.5 (1.7)
May currently be pregnant[a]	1.2 (0.5)	0.8 (0.3)	0.5 (0.3)	0.2 (0.1)	0.7 (0.2)
Currently pregnant[b]	7.1 (1.1)	4.6 (0.7)	7.0 (1.3)	6.1 (1.0)	6.0 (0.6)
Past year but not now	10.8 (2.0)	11.4 (1.8)	14.2 (3.0)	9.3 (1.2)	10.5 (0.9)
1 to 2 years ago	4.9 (0.9)	7.8 (0.9)	7.5 (1.7)	6.4 (0.7)	6.4 (0.5)
2 to 5 years ago	12.3 (1.5)	10.3 (1.4)	10.5 (1.3)	12.7 (1.2)	11.8 (0.8)
More than 5 years ago[c]	19.7 (3.1)	18.2 (2.4)	9.4 (1.1)	17.8 (1.5)	18.0 (1.3)

Note: Table displays the percentage of women in the military by Service who indicated the pregnancy history response noted in the rows of the table. The standard error of each estimate is presented in parentheses. Estimates within each column may not sum to 100 because of rounding. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimate based on women who indicated that they may have been pregnant at the time of the survey but did not know for certain.

[b]Includes women who were pregnant at the time of the survey.

[c]Includes women who were pregnant but do not remember exactly when.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Pregnancy History, Q163).

Use of Prenatal Care Services. As shown in Table 10.3, sociodemographic characteristics were related to receipt of prenatal care. Overall, nearly 92% of women received prenatal care during their first trimester. Women in the Air Force were more likely than women in the other Services to receive prenatal care in their first trimester. African American women were slightly less likely than those in other racial/ethnic groups to have received their first prenatal visit in the first trimester. College graduates had a higher likelihood than those with less education to receive prenatal care early in pregnancy. Early prenatal care was also more common among older women. For example, only 88.8% of those aged 21 to 25 received prenatal services in the first trimester, while 95.0% of those 35 or older did. Married women and officers were more likely to get prenatal care in the first trimester than unmarried women and enlisted personnel.

Alcohol and Cigarette Use During Pregnancy. A *Healthy People 2010* objective is to increase abstinence from alcohol use during pregnancy to a target of greater than or equal to 94% of women who were pregnant during the past 5 years. Data collected in 2005 inform us regarding progress toward this goal (see Chapter 3 for discussion). As shown in Table 10.4, 94.9% of all military women who were pregnant in the past 5 years abstained from alcohol use during their most recent pregnancy. This percentage is higher than those reported in 2002 (89.9%). Overall, the objective of 94% from *Healthy People 2010* was reached in 2005. However, the percentage abstaining during pregnancy was lower among older women, those with a college degree, officers, and Marines. Age, rank, and education appear to have a negative relationship with the likelihood of drinking during one's most recent pregnancy: approximately 11% of officers and 10% of those aged 35 or older drank alcohol during their most recent pregnancy, and about 9% of Marines and those with a college degree. Although some of these pregnancies may have occurred prior to military service, these findings suggest groups of military women to whom educational efforts regarding the effects of alcohol on fetal development should be targeted.

A related *Healthy People 2010* objective states that the proportion of women who do not smoke during pregnancy should be greater than or equal to 99%. As shown in Table 10.4 (see also discussion in Chapter 3), 89.9% of military women who were pregnant during the past 5 years reported no cigarette use during their most recent pregnancy. Abstaining from cigarette use during the most recent pregnancy has continued to increase

Table 10.3 **RECEIPT OF PRENATAL CARE DURING MOST RECENT PREGNANCY RESULTING IN A LIVE BIRTH, PAST 5 YEARS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic of Women Who Were Pregnant in Past 5 Years	Trimester of First Prenatal Care Visit[a]	
	First	Second or Third
Service		
Army	86.7 (2.4)	13.3 (2.4)
Navy	92.4 (1.6)	7.6 (1.6)
Marine Corps	90.3 (2.4)	9.7 (2.4)
Air Force	95.6 (1.0)	4.4 (1.0)
Race/Ethnicity		
White, non-Hispanic	93.2 (1.2)	6.8 (1.2)
African American, non-Hispanic	88.3 (2.4)	11.7 (2.4)
Hispanic	91.7 (4.0)	8.3 (4.0)
Other	97.0 (1.5)	3.0 (1.5)
Education		
High school or less	91.1 (1.5)	8.9 (1.5)
Some college	89.9 (1.5)	10.1 (1.5)
College graduate or higher	97.5 (1.2)	2.5 (1.2)
Age		
20 or younger	91.9 (3.3)	8.1 (3.3)
21-25	88.8 (2.2)	11.2 (2.2)
26-34	93.5 (1.6)	6.5 (1.6)
35 or older	95.0 (2.4)	5.0 (2.4)
Family Status[b]		
Not married	87.9 (2.5)	12.1 (2.5)
Married, spouse not present	90.2 (3.7)	9.8 (3.7)
Married, spouse present	94.0 (1.5)	6.0 (1.5)
Pay Grade		
Enlisted	90.6 (1.0)	9.4 (1.0)
Officer	98.7 (0.8)	1.3 (0.8)
Total	91.8 (0.9)	8.2 (0.9)

Note: Table displays the percentage of military women by sociodemographic characteristic who indicated their first prenatal care visit occurred in the first or second/third/none trimester. Only women who were pregnant in the past 5 years (total DoD N = 1,328) were considered in these estimates. Estimates exclude women who were currently pregnant and who have not had a first prenatal care visit. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]First trimester = months 1 to 3 of pregnancy; second trimester = months 4 to 6 of pregnancy; third trimester = month 7 or later.

[b]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Receipt of Prenatal Care During Most Recent Pregnancy, Past 5 Years, Q163 and Q164; refer to Section 2.5.1 for descriptions of sociodemographic variables).

Table 10.4 **ALCOHOL AND CIGARETTE USE DURING MOST RECENT PREGNANCY RESULTING IN A LIVE BIRTH, PAST 5 YEARS, BY SELECTED SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic of Women Who Were Pregnant in Past 5 Years	Substance Users	
	Alcohol	Cigarettes
Service		
Army	4.9 (1.8)	12.2 (3.4)
Navy	4.4 (2.1)	9.9 (3.2)
Marine Corps	9.2 (1.7)	14.4 (4.9)
Air Force	5.0 (1.5)	7.8 (1.3)
Race/Ethnicity		
White, non-Hispanic	7.1 (1.8)	13.2 (2.1)
African American, non-Hispanic	2.5 (1.0)	5.4 (2.2)
Hispanic	4.8 (1.8)	11.7 (3.6)
Other	+ (+)	9.4 (3.6)
Education		
High school or less	4.9 (1.5)	14.0 (2.6)
Some college	3.6 (1.0)	11.2 (1.8)
College graduate or higher	9.3 (2.5)	1.7 (0.9)
Age		
20 or younger	+ (+)	13.9 (5.3)
21-25	6.0 (1.6)	12.9 (2.3)
26-34	3.8 (1.3)	8.6 (1.6)
35 or older	9.6 (4.4)	3.2 (1.7)
Family Status[a]		
Not married	5.9 (1.7)	11.1 (2.0)
Married, spouse not present	2.9 (1.8)	10.2 (4.3)
Married, spouse present	5.0 (1.3)	9.6 (1.7)
Pay Grade		
Enlisted	4.1 (0.9)	11.4 (1.6)
Officer	11.1 (3.0)	1.9 (1.0)
Prenatal Care[b]		
Any in first or second trimester	4.9 (1.0)	9.9 (1.5)
Third trimester or none	+ (+)	+ (+)
Total	5.1 (1.0)	10.1 (1.4)

Note: Table displays the percentage of military women by sociodemographic characteristic who indicated they used alcohol or cigarettes during their pregnancy. Only women who were pregnant in the past 5 years (total DoD N = 1,102) were considered in these estimates. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]First trimester = months 1 to 3 of pregnancy; second trimester = months 4 to 6 of pregnancy; third trimester = month 7 or later.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Use During Most Recent Pregnancy, Past 5 Years, Q163 and Q166; Cigarette Use During Most Recent Pregnancy, Past 5 Years, Q163 and Q165; refer to Section 2.5.1 for descriptions of sociodemographic variables).

since 1995, when 83.9% reported no use, and since 2002, when 88.5% reported no use. Although no subgroups met the very strict 99% objective, the following subgroups of military women had obtained the 90% or better level of not smoking at all during pregnancy: Navy and Air Force women, non-Hispanic African Americans, those of other race/ethnicity, college graduates, women aged 26 or older, married women with spouse present, and officers.

Greater preventive efforts need to be directed at those military women who used alcohol or smoked cigarettes during their most recent pregnancy. These efforts could be coupled with efforts to increase the percentage of women who receive prenatal care early in their pregnancies. The types of military women who drank during their last pregnancies, however, differ somewhat from those who smoked during their last pregnancy. This suggests that preventive efforts directed toward decreasing alcohol use or smoking during pregnancy should either be targeted to separate groups of military women or provided universally to all pregnant women.

10.2 Oral Health

Oral health and its relation to military readiness have become increasingly important in recent years. Respondents were asked a set of four questions pertaining to oral health issues. Table 10.5 presents survey findings on the recency of dental check-ups, reasons for the lack of dental check-ups, dental work prior to deployment, and tooth loss. As shown, approximately 81% of all military personnel had a dental check-up in the 12 months prior to the survey, with some notable differences among the Services. The percentage of personnel receiving a dental check-up in the previous year ranged from a high of 92.1% in the Air Force to a low of 73.4% in the Army. Of all military personnel across the total DoD, 33% were required to get dental work done in the past 12 months before they could be deployed at sea or in the field. The highest percentages were seen in the Marine Corps (46.3%) and the Army (40.1%); the Air Force had the lowest rate of needing predeployment dental work (21.6%).

Approximately 17% of all personnel had lost a permanent tooth since joining the military because of one or more of the following problems: gum disease, cavities, a mouth injury, or some other problem. A somewhat higher proportion of Army personnel (19.6%) had suffered a tooth loss because of one or more of those problems since they joined the military. More than 9% of all personnel had lost a tooth because of dental cavities. Cavities were the cause most often responsible for tooth loss from among the four problems (gum disease, 1.4%; cavities, 9.5%; mouth injury, 2.4%; some other problem, 7.2%).

Reasons for *not* having a dental check-up in the 12 months before the survey were plentiful. Table 10.5 shows that, of those 19% of personnel who did not have a dental check-up in the past 12 months, the most commonly reported reason was that they could not take time off from work (17.8%). An estimated 14.4% failed to have a check-up because they could not get an appointment with a military dentist. This reason was more likely to be cited in the Air Force (17.0%) and Army (16%) than in the other Services.

Other reasons reported for not having a dental checkup in the past 12 months included the following:

- They would have to wait too long before being seen (8.6%).
- They did not think they needed any treatment (10.6%).
- They did not like going to the dentist at their installation (7.0%).
- They did not like going to any dentists (16.1%).

As seen in a study of military academy cadets, those who received an intervention of repeated oral health care instructions combined with a single prophylaxis showed significant and relevant improvements in dental knowledge, attitude, reported behavior, and perceptions of their own gingival health (Tan, Ruiter, & Verhey, 1981). To encourage better oral health care, military personnel in all the Services can be made more aware of the benefits of regular annual check-ups and of recent advances in modern dentistry, including better pain control during dental exams and procedures. Repeated reinforcement of oral health care instructions can lead to improvements in personnel's knowledge, attitudes, and behavior.

Table 10.5 **SELECTED ORAL HEALTH ISSUES, TOTAL DOD**

Oral Health Measure	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Had a Dental Check-Up, Past 12 Months	73.4 (2.3)	78.4 (2.0)	80.6 (1.5)	92.1 (0.7)	81.0 (1.1)
Required to Get Dental Work Before Deployment, Past 12 Months[a]	40.1 (1.5)	25.7 (3.4)	46.3 (2.0)	21.6 (1.7)	32.7 (1.7)
Tooth Loss Since Joining Military					
Due to any problem	19.6 (1.2)	17.7 (1.1)	14.5 (0.8)	14.9 (0.7)	17.1 (0.5)
Due to gum disease	1.7 (0.3)	1.9 (0.1)	1.1 (0.2)	1.0 (0.2)	1.4 (0.1)
Due to dental cavities	11.5 (0.9)	10.0 (0.8)	7.8 (0.9)	7.4 (0.7)	9.5 (0.4)
Due to injury	3.1 (0.4)	2.0 (0.2)	2.6 (0.2)	2.1 (0.2)	2.4 (0.1)
Due to some other problem	7.4 (0.7)	7.7 (0.5)	6.4 (0.5)	6.8 (0.5)	7.2 (0.3)
Reasons for Not Having Dental Check-Up[b]					
Couldn't get time off from work	22.1 (2.0)	15.8 (3.5)	15.3 (2.6)	9.2 (2.0)	17.8 (1.6)
Couldn't get an appointment with a military dentist	16.0 (3.1)	11.4 (2.6)	13.3 (1.9)	17.0 (2.6)	14.4 (1.6)
Would have had to wait too long at military dental clinic before being seen	9.4 (1.1)	7.8 (1.4)	10.1 (1.8)	6.3 (2.2)	8.6 (0.8)
Do not have military dental clinic available at my location and don't know how else to obtain care	3.8 (1.2)	3.2 (0.9)	4.7 (1.2)	0.3 (0.2)	3.3 (0.6)
Do not have transportation	0.4 (0.2)	0.5 (0.4)	1.8 (1.0)	0.3 (0.3)	0.6 (0.2)
Didn't think I needed any treatment	10.3 (2.1)	10.9 (1.5)	12.7 (0.9)	8.7 (2.4)	10.6 (1.1)
Don't like going to the dentist at this installation	4.5 (1.3)	8.9 (2.1)	8.3 (1.3)	10.2 (1.9)	7.0 (1.0)
Don't like going to any dentists	12.3 (1.7)	22.8 (2.2)	11.2 (2.6)	18.7 (3.0)	16.1 (1.4)

Note: Table displays the percentage of military personnel by Service who reported the oral health measure indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]For these estimates, only those who were last deployed in the past 12 months were considered (total DoD N = 4,740).

[b]For these estimates, only those who reported they did not have a dental check-up in the past 12 months were considered (total DoD n =2,575).

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Dental Check-Up Past 12 Months, Q81; Required Dental Work Prior to Deployment, Q147; Tooth Loss, Q82; Reasons for Not Having Check-Up, Q81).

10.3 Deployment Issues

10.3.1 Deployment Problems

As shown in Table 2.4, 56.3% of the total DoD in 2005 had been deployed in the past 3 years. In the current high operational tempo, deployment issues have gained increasing importance. An inability to deploy and/or a need to make an unplanned return are critical aspects of military readiness. Table 10.6 shows that 7.3% of the total DoD were unable to deploy in the past 12 months. The remaining 92.7% were reportedly either able to deploy or were not ordered to deploy. Having an injury was the most common reason reported for being unable to deploy (2.3% of the total DoD or 31.1% of those who were unable to deploy). A reported 20.7% of those who could not deploy cited training as a reason (data not tabled). Another 2.6% of personnel returned early from deployment. The most common reason for early return was a family situation or problem (1.2% of the total DoD).

10.3.2 Stress, Mental Health, and Deployment

Recent studies of Army and Marine Corps personnel returning from Iraq and Afghanistan have linked operational stress and mental health problems to exposure to ground combat operations during deployment (Hoge et al., 2004; Hoge et al., 2006). The present data provide an assessment of the self-reported levels of work and family stress and potential mental health problems in the DoD as a whole and among,

Table 10.6 **DEPLOYMENT PROBLEMS, PAST 12 MONTHS, BY SERVICE**

Deployment Problem	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Reason Unable to Deploy					
Training	1.8 (0.8)	1.2 (0.3)	1.3 (0.3)	1.5 (0.3)	1.5 (0.3)
Leave/temporary duty	0.8 (0.3)	1.1 (0.3)	0.9 (0.3)	0.5 (0.1)	0.8 (0.1)
Pregnancy	1.3 (0.3)	0.9 (0.1)	1.2 (0.1)	1.8 (0.3)	1.3 (0.1)
Dental issue	1.3 (0.4)	0.3 (0.1)	0.7 (0.2)	1.1 (0.2)	0.9 (0.2)
No HIV test	0.3 (0.1)	0.3 (0.1)	0.4 (0.2)	– (–)	0.2 (0.1)
Family situation	0.7 (0.2)	0.7 (0.1)	1.1 (0.2)	0.9 (0.3)	0.8 (0.1)
Injury	2.2 (0.4)	1.5 (0.2)	4.3 (0.8)	2.1 (0.5)	2.3 (0.2)
Illness	1.1 (0.4)	0.8 (0.1)	1.2 (0.3)	1.7 (0.3)	1.2 (0.2)
Other	0.8 (0.2)	1.0 (0.3)	2.8 (0.6)	2.8 (0.3)	1.7 (0.2)
Total unable to deploy	6.4 (1.0)	4.7 (0.7)	9.0 (1.0)	9.9 (1.1)	7.3 (0.5)
Reason Returned Early					
Pregnancy	0.5 (0.1)	0.5 (0.1)	0.8 (0.4)	0.1 (0.1)	0.4 (0.1)
Dental issue	0.2 (0.1)	0.4 (0.1)	0.1 (0.1)	– (–)	0.2 (0.1)
Family situation	1.4 (0.4)	1.4 (0.3)	1.0 (0.4)	0.7 (0.3)	1.2 (0.2)
Injury	0.8 (0.3)	0.7 (0.2)	0.5 (0.3)	– (–)	0.5 (0.1)
Illness	0.4 (0.1)	0.4 (0.1)	0.5 (0.3)	– (–)	0.3 (0.1)
Mental health problems	0.3 (0.2)	0.3 (0.1)	0.2 (0.1)	– (–)	0.2 (0.1)
Other	1.1 (0.3)	1.9 (0.4)	1.0 (0.3)	0.4 (0.2)	1.1 (0.2)
Total returned early	3.1 (0.5)	3.4 (0.7)	2.6 (0.8)	1.4 (0.3)	2.6 (0.3)

Note: Table displays the percentage of total military personnel by Service who reported a deployment problem in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

– Estimate rounds to zero.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Unable to Deploy, Q148; Returned Early, Q149).

deployment-related subgroups. As shown in Table 10.7, the percentage of personnel (standardized by Service gender, age, education, and race/ethnicity to the total DoD population) that reported high levels of work and family stress, was significantly higher among those who had deployed at least once in the past 3 years, compared with those who had not deployed (34.4% vs. 29.3% and 20.2% vs. 17.3%, respectively). Those who had been deployed were also more likely to meet screening criteria for need for further depression evaluation (23.2% vs. 20.5%), meet screening criteria for generalized anxiety symptoms (13.6% vs. 11.4%), and PTSD symptoms (7.3% vs. 5.7%), and to admit to attempted suicide in the past year (1.0% vs. 0.5%).

When examined by theater of deployment, as shown in Table 10.8, those personnel who had ever served in Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) reported more work stress than those who had not served in any operational theater. Somewhat unexpectedly, there were no other significant differences in mental health variables by operational theater. This suggests that deployment itself rather than specific theater, was a stronger correlate of potential mental health problems in the general DoD population. Additional analyses are in progress to examine the influence of other variables in these associations. Future surveys will differentiate between combat deployments and exposures.

One support system that is implicated in the relation between mental health and deployment is social support. For example, in a study of deployment stressors among Gulf War veterans, interpersonal stressors were significantly associated with mental health outcomes and generally had a stronger impact on women's than men's emotional well-being (Vogt et al., 2005). As shown in Table 10.9, almost 20% of deployed personnel in the

Table 10.7 **STRESS AND MENTAL HEALTH ISSUES, BY DEPLOYMENT, STANDARDIZED ESTIMATES[a]**

	Number of Times Deployed in Past 3 Years					
Stress/Mental Health	**1 Time**	**2 Times**	**3 Times**	**1+ Time**	**Not Deployed**	**Total[b]**
High Stress at Work, Past 12 Months						
Yes	33.3 (1.0)	35.7 (1.1)	35.4 (1.4)	34.4 (0.7)[c]	29.3 (0.9)	33.4 (0.6)
No	66.7 (1.0)	64.3 (1.1)	64.6 (1.4)	65.6 (0.7)[c]	70.7 (0.9)	66.6 (0.6)
High Stress in Family, Past 12 Months						
Yes	20.8 (0.9)	19.0 (1.1)	19.4 (1.5)	20.2 (0.7)[c]	17.3 (0.7)	19.1 (0.5)
No	79.2 (0.9)	81.0 (1.1)	80.6 (1.5)	79.8 (0.7)[c]	82.7 (0.7)	80.9 (0.5)
Need for Further Depression Evaluation						
Yes	23.0 (0.9)	22.7 (1.5)	23.9 (1.4)	23.2 (0.6)[c]	20.5 (0.5)	22.5 (0.6)
No	77.0 (0.9)	77.3 (1.5)	76.1 (1.4)	76.8 (0.6)[c]	79.5 (0.5)	77.5 (0.6)
Met Screening Criteria for GAD Symptoms, Past 30 Days						
Yes	12.6 (0.7)	13.0 (1.1)	14.7 (0.9)	13.6 (0.5)[c]	11.4 (0.5)	12.9 (0.4)
No	87.4 (0.7)	87.0 (1.1)	85.3 (0.9)	86.4 (0.5)[c]	88.6 (0.5)	87.1 (0.4)
Serious Psychological Distress, Past 30 Days						
Yes	7.9 (0.5)	7.7 (0.6)	9.6 (1.0)	8.2 (0.4)	8.1 (0.5)	8.3 (0.3)
No	92.1 (0.5)	92.3 (0.6)	90.4 (1.0)	91.8 (0.4)	91.9 (0.5)	91.7 (0.3)
Met Screening Criteria for PTSD[d] Symptoms, Past 30 Days						
Yes	7.0 (0.6)	8.5 (1.1)	6.9 (0.9)	7.3 (0.5)[c]	5.7 (0.5)	7.0 (0.4)
No	93.0 (0.6)	91.5 (1.1)	93.1 (0.9)	92.7 (0.5)[c]	94.3 (0.5)	93.0 (0.4)
Suicidal Ideation, Past Year						
Yes	5.7 (0.4)	3.5 (0.3)	5.9 (0.7)	5.4 (0.4)	4.3 (0.4)	4.9 (0.2)
No	94.3 (0.4)	96.5 (0.3)	94.1 (0.7)	94.6 (0.4)	95.7 (0.4)	95.1 (0.2)
Attempted Suicide, Past Year						
Yes	1.1 (0.2)	0.8 (0.3)	1.4 (0.5)	1.0 (0.1)[c]	0.5 (0.1)	0.9 (0.1)
No	98.9 (0.2)	99.2 (0.3)	98.6 (0.5)	99.0 (0.1)[c]	99.5 (0.1)	99.1 (0.1)

Note: Table displays the percentage of military personnel by number of times deployed in the past three years that reported the stress and mental health problems indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Column group estimates may not sum to 100 due to rounding. Definitions and measures of mental health are given in Section 2.5.3.

[a]Estimates for each deployment group have been standardized by Service, gender, age, education and race/ethnicity to the total DoD distribution.

[b]Individuals with missing deployment are not included in these estimates.

[c]Comparisons between deployed 1+ time in past 3 years and not deployed are statistically significant at the 95% confidence level.

[d]PTSD means posttraumatic stress disorder.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Number of Times Deployed in Past Three Years, Q145; Stress at Work, Q88; Stress in Family, Q89; Need for Further Depression Evaluation, Q94-Q96; Anxiety Symptoms, Q97; Suicidal Ideation, Q98A; Serious Psychological Distress, Q100; PTSD Symptoms, Q102; Attempted Suicide, Q99A).

Table 10.8 **STRESS AND MENTAL HEALTH ISSUES, BY THEATER, STANDARDIZED ESTIMATES**

	Served in Operation Iraqi or Enduring Freedom	Did Not Serve in Operation Iraqi or Enduring Freedom	Did not Serve in Any Operation	Total[a]
High Stress at Work, Past 12 Months				
Yes	34.1 (0.9)[b]	34.0 (1.5)[b]	30.8 (1.0)[c,d]	32.9 (0.7)
No	65.9 (0.9)[b]	66.0 (1.5)[b]	69.2 (1.0)[c,d]	67.1 (0.7)
High Stress in Family, Past 12 Months				
Yes	19.5 (0.7)	19.2 (1.3)	18.0 (0.7)	18.9 (0.5)
No	80.5 (0.7)	80.8 (1.3)	82.0 (0.7)	81.1 (0.5)
Need for Further Depression Evaluation				
Yes	22.3 (0.6)	23.6 (1.1)	22.5 (0.9)	22.8 (0.6)
No	77.7 (0.6)	76.4 (1.1)	77.5 (0.9)	77.2 (0.6)
Met Criteria for GAD Symptoms, Past 30 Days				
Yes	13.3 (0.5)	13.8 (0.9)	12.1 (0.6)	13.0 (0.5)
No	86.7 (0.5)	86.2 (0.9)	87.9 (0.6)	87.0 (0.5)
Serious Psychological Distress, Past 30 Days				
Yes	8.0 (0.5)	7.8 (0.7)	8.2 (0.5)	8.0 (0.3)
No	92.0 (0.5)	92.2 (0.7)	91.8 (0.5)	92.0 (0.3)
Met Criteria for PTSD[e] Symptoms, Past 30 Days				
Yes	7.1 (0.6)	6.3 (0.6)	6.1 (0.6)	6.5 (0.3)
No	92.9 (0.6)	93.7 (0.6)	93.9 (0.6)	93.5 (0.3)
Suicidal Ideation, Past Year				
Yes	5.6 (0.4)	4.6 (0.4)	4.4 (0.4)	4.9 (0.2)
No	94.4 (0.4)	95.4 (0.4)	95.6 (0.4)	95.1 (0.2)
Attempted Suicide, Past Year				
Yes	1.0 (0.2)	0.9 (0.3)	0.6 (0.1)	0.8 (0.1)
No	99.0 (0.2)	99.1 (0.3)	99.4 (0.1)	99.2 (0.1)

Note: Table displays the percentage of military personnel by number of times deployed in the past three years that reported the stress and mental health problems indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Column group estimates may not sum to 100 because of rounding. Definitions and measures of mental health are given in Section 2.5.3. Estimates for each theater group have been standardized by Service, gender, age, education and race/ethnicity to the total DoD distribution.

[a]Individuals with missing deployment are not included in these estimates.

[b]Comparisons between this estimate and estimate for those who were not deployed are statistically significant at the 95% confidence level.

[c]Comparisons between this estimate and estimate for Iraqi and Enduring Freedom are statistically significant at the 95% confidence level.

[d]Comparisons between this estimate and estimate for those who deployed in some area but not Iraqi and Enduring Freedom are statistically significant at the 95% confidence level.

[e]PTSD means posttraumatic stress disorder.

Source: DoD Survey of Health Related Behaviors among Military Personnel, 2005 (Number of Times Deployed in Past Three Years, Q145; Stress at Work, Q88; Stress in Family, Q89; Need for Further Depression Evaluation, Q94-Q96; Anxiety Symptoms, Q97; Suicidal Ideation, Q98A; Serious Psychological Distress, Q100; PTSD Symptoms, Q102; Attempted Suicide, Q99A).

Table 10.9 **DEPLOYMENT-RELATED CHANGE IN INTERPERSONAL RELATIONS, PAST 12 MONTHS, BY SERVICE**

Relationship	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Relationship with spouse, fiancé, boyfriend, or girlfriend					
Argue more/more conflict since deployment	23.4 (2.9)	21.8 (2.0)	18.6 (1.6)	14.2 (1.6)	19.7 (1.2)
Get along about the same since deployment	59.7 (2.5)	59.0 (2.8)	63.8 (2.9)	75.4 (2.1)	64.5 (1.5)
Argue less/get along better since deployment	16.9 (0.8)	19.2 (1.7)	17.6 (2.4)	10.4 (1.4)	15.8 (0.9)
Divorced or separated from spouse, finance, boyfriend, or girlfriend since deployment					
Yes	16.9 (2.1)	15.1 (3.0)	14.9 (1.5)	10.6 (1.5)	14.4 (1.2)
No	83.1 (2.1)	84.9 (3.0)	85.1 (1.5)	89.4 (1.5)	85.6 (1.2)

Note: Table displays the percentage of military personnel by Service who reported a relationship change due to deployment as indicated in the rows of the table. Only those personnel deployed in the past year were considered in these estimates. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Change in Relationship; Q151; Divorced or Separated, Q152).

past year reported more conflict and/or arguments with their spouse, fiancé, boyfriend, or girlfriend since deploying. This is in contrast to the almost 16% who reported arguing less or getting along better since deployment. A reported 14.4% reported a divorce or separation since deployment. Among the Services, the Air Force had the least change in interpersonal relations due to deployment: 75% reported no change and only 10.6% reported a deployment-related divorce or separation.

10.3.3 Substance Use and Deployment

Recent research has shown that alcohol misuse was higher among soldiers after deployment in OEF/OIF than before deployment (Hoge et al., 2004). As shown in Table 10.10, compared with personnel who had not been deployed in the past 3 years, those who had been deployed one of more times had higher percentages of past-month heavy alcohol use and alcohol dependence. They also had higher percentages of past-year illicit drug use, cigarette smoking, heavy smoking, and nicotine dependence. Deployed Navy personnel had significantly higher rates of heavy alcohol use and dependence, any smoking, heavy smoking, and nicotine dependence than nondeployed Navy personnel. In contrast, deployed Marines had higher rates of illicit drug use than nondeployed Marines (15.5% vs. 9.4%).

As shown in Table 10.11, unlike estimates for mental health variables, there were significant differences in substance use variables by operational theater. Personnel who had served in OIF/OEF were more likely to report heavy alcohol use, any cigarette smoking, heavy smoking and meet criteria for nicotine dependence than those who did not serve in any operational theater. Those who had served in a theater other than OIF/OEF were more likely to report any illicit drug use and cigarette smoking than those who had not served in a theater.

Table 10.12 shows the percentage of personnel reporting substance use change in the past year because of deployment. Of all personnel who were deployed in the past year, 13.6% began using or increased their use of alcohol since being deployed and 17.1% stopped or decreased their alcohol use since deployment. This pattern, in which a somewhat higher percentage of personnel reported stopping or reducing their alcohol use during or after deployment than who reported beginning or increasing it, held for all the Services except for the Army. Almost 20% of Army personnel reported beginning or using more alcohol since deployment, and almost 19% stopped or used less. Both Army and Marine Corps deployed personnel were significantly more likely than deployed personnel in the Navy or Air Force to use more alcohol since deployment.

Table 10.10 **SUBSTANCE USE BY SERVICE AND DEPLOYMENT, STANDARDIZED ESTIMATES[a]**

Substance/Service	Number of Times Deployed in Past 3 Years: 1 Time	2 Times	3 Times	1+ Time	Not Deployed	Total[b]
Past 30 Day Heavy Alcohol Use						
Army	25.1 (2.0)	28.9 (2.9)	25.4 (2.1)	25.1 (1.6)	24.7 (2.0)	26.0 (1.2)
Navy	17.9 (2.6)	24.9 (1.7)	20.0 (2.3)	19.6 (1.3)[c]	13.0 (1.2)	18.9 (0.4)
Marine Corps	27.7 (2.0)	30.8 (3.9)	22.9 (2.2)	26.8 (1.6)	25.6 (2.6)	26.8 (0.9)
Air Force	9.7 (1.4)	12.2 (1.7)	11.6 (1.9)	10.7 (1.3)	9.7 (1.0)	10.8 (1.0)
Total	19.1 (1.1)	23.3 (1.2)	19.6 (1.1)	19.7 (0.7)[c]	17.4 (0.8)	19.8 (0.5)
Alcohol Dependence						
Army	3.6 (0.7)	7.7 (1.4)	5.6 (1.5)	4.4 (0.6)	3.7 (0.4)	5.1 (0.7)
Navy	3.2 (0.5)	5.9 (1.6)	5.9 (2.9)	4.1 (0.9)[c]	1.6 (0.3)	4.1 (1.0)
Marine Corps	3.9 (1.2)	3.5 (1.0)	6.0 (1.4)	4.9 (1.0)	2.9 (0.8)	4.0 (0.7)
Air Force	0.9 (0.3)	1.0 (0.6)	0.7 (0.3)	1.0 (0.3)	1.4 (0.2)	1.0 (0.2)
Total	2.8 (0.3)	4.8 (0.7)	4.3 (0.9)	3.4 (0.4)[c]	2.4 (0.2)	3.5 (0.4)
Past Year Any Illicit Drug Use						
Army	16.3 (1.6)	17.5 (1.7)	13.3 (1.7)	16.1 (1.3)	13.8 (0.9)	15.3 (0.6)
Navy	9.9 (2.4)	14.8 (1.7)	7.4 (1.1)	10.4 (2.4)	8.6 (0.8)	10.2 (1.1)
Marine Corps	15.4 (1.7)	12.6 (3.9)	14.3 (1.9)	15.5 (1.6)[c]	9.4 (1.0)	12.9 (1.4)
Air Force	6.1 (1.0)	5.4 (1.1)	5.6 (1.2)	6.2 (0.9)	6.0 (0.7)	5.8 (0.7)
Total	11.6 (0.9)	12.7 (0.9)	9.5 (0.7)	11.7 (0.8)[c]	9.6 (0.4)	10.9 (0.4)
Past Year Cigarette Smoking						
Army	51.7 (2.0)	49.5 (2.2)	54.0 (2.3)	51.4 (1.4)[c]	47.6 (1.9)	50.6 (1.0)
Navy	43.4 (1.9)	47.6 (1.4)	46.5 (2.5)	44.5 (1.4)[c]	36.8 (1.7)	43.6 (1.0)
Marine Corps	52.9 (1.7)	52.3 (2.4)	58.7 (2.4)	54.1 (1.7)[c]	46.7 (3.0)	52.6 (1.4)
Air Force	32.0 (1.4)	35.0 (1.6)	32.5 (2.5)	34.0 (1.5)[c]	29.2 (1.1)	32.2 (1.1)
Total	44.0 (1.0)	45.2 (1.0)	46.3 (1.3)	44.9 (0.8)[c]	39.3 (0.9)	43.6 (0.6)
Heavy Smoking						
Army	18.0 (1.2)	16.5 (2.6)	16.3 (2.0)	17.4 (1.0)[c]	12.9 (2.0)	15.9 (1.3)
Navy	9.9 (1.0)	8.5 (1.6)	13.4 (1.0)	10.2 (0.7)[c]	7.7 (0.9)	9.9 (0.6)
Marine Corps	12.5 (1.7)	12.8 (1.5)	10.7 (2.5)	12.8 (1.1)[c]	9.9 (1.5)	11.5 (1.0)
Air Force	6.6 (1.1)	11.0 (1.2)	8.7 (0.8)	8.1 (0.7)[c]	5.6 (0.8)	7.9 (0.3)
Total	11.8 (0.6)	12.3 (1.0)	12.5 (0.8)	12.2 (0.5)[c]	9.0 (0.7)	11.4 (0.5)
Nicotine Dependence						
Army	12.8 (0.9)	12.3 (1.6)	9.0 (1.3)	12.3 (0.8)	9.5 (1.3)	10.9 (0.7)
Navy	6.8 (0.8)	5.9 (0.9)	7.3 (1.0)	6.8 (0.3)[c]	5.5 (0.7)	6.4 (0.4)
Marine Corps	9.4 (1.7)	8.8 (2.3)	7.2 (2.8)	9.2 (1.5)	8.0 (0.9)	8.4 (1.3)
Air Force	5.3 (1.2)	6.8 (0.7)	4.8 (0.7)	5.3 (0.6)	4.1 (0.7)	5.2 (0.3)
Total	8.6 (0.5)	8.5 (0.7)	7.1 (0.6)	8.4 (0.4)[c]	6.7 (0.5)	7.7 (0.3)

Note: Table displays the percentage of military personnel by number of times deployed in the past three years that reported the substance use indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Column group estimates may not sum to 100 due to rounding. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates for each deployment group have been standardized by Service, gender, age, education and race/ethnicity to the total DoD distribution.

[b]Individuals with missing deployment are not included in these estimates.

[c]Comparisons between deployed 1+ time in past 3 years and not deployed are statistically significant at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors among Military Personnel, 2005 (Number of Times Deployed in Past Three Years, Q145;).

Table 10.11 **SUBSTANCE USE BY SERVICE AND THEATER, STANDARDIZED ESTIMATES[a]**

Substance/Service	Served in Operation Iraqi and Enduring Freedom	Served in Some Operation Other Than Iraqi and Enduring Freedom	Did not Serve in Any Operation	Total
Past 30 Day Heavy Alcohol Use				
Army	25.3 (1.6)	28.5 (2.8)	24.6 (1.5)	26.1 (1.5)
Navy	18.9 (1.8)[b]	20.4 (2.8)	14.7 (1.5)[c]	18.0 (1.1)
Marine Corps	27.8 (2.3)	22.6 (6.5)	23.7 (2.3)	24.7 (2.0)
Air Force	10.6 (1.4)	11.4 (2.1)	9.6 (1.1)	10.5 (1.1)
Total	19.7 (0.9)[b]	20.6 (1.5)	17.5 (0.8)[c]	19.3 (0.7)
Alcohol Dependence				
Army	4.8 (0.7)	7.3 (1.9)	4.1 (0.7)	5.4 (0.6)
Navy	4.3 (1.3)	2.7 (0.6)	2.3 (0.4)	3.1 (0.6)
Marine Corps	5.0 (1.3)[d]	2.8 (0.8)[c]	4.1 (0.9)	4.0 (0.7)
Air Force	0.7 (0.2)	1.0 (0.4)	1.3 (0.3)	1.0 (0.1)
Total	3.5 (0.4)	3.7 (0.6)	2.8 (0.3)	3.3 (0.3)
Past Year Any Illicit Drug Use				
Army	15.0 (1.0)	15.8 (0.9)	15.3 (0.9)	15.4 (0.5)
Navy	11.4 (3.0)	13.5 (1.5)[b]	7.9 (0.8)[d]	10.9 (1.5)
Marine Corps	15.5 (2.1)[b]	18.5 (3.0)[b]	9.4 (0.7)[c,d]	14.4 (1.3)
Air Force	6.4 (0.7)	6.2 (1.4)	6.2 (0.9)	6.3 (0.8)
Total	11.6 (0.9)	12.7 (0.7)[b]	10.0 (0.5)[d]	11.4 (0.5)
Past Year Cigarette Smoking				
Army	50.7 (1.9)	51.6 (1.9)	48.2 (2.1)	50.2 (1.3)
Navy	43.8 (1.7)	40.0 (2.2)	39.7 (1.9)	41.2 (1.5)
Marine Corps	55.2 (1.7)[b]	57.8 (2.4)[b]	45.9 (2.6)[c,d]	52.9 (1.7)
Air Force	34.1 (1.2)[b,d]	30.2 (1.9)[c]	28.6 (1.3)[c]	31.0 (1.2)
Total	44.7 (0.9)[b]	43.0 (1.1)[b]	40.0 (1.0)[c,d]	42.6 (0.7)
Heavy Smoking				
Army	18.0 (1.4)	14.2 (2.8)	14.7 (2.0)	15.6 (1.2)
Navy	9.7 (1.1)	10.6 (1.5)[b]	8.0 (0.9)[d]	9.4 (0.8)
Marine Corps	14.0 (1.1)[b]	12.6 (2.5)	8.7 (1.6)[c]	11.7 (1.3)
Air Force	7.7 (0.5)[b,d]	5.2 (0.7)[c]	5.4 (0.6)[c]	6.1 (0.4)
Total	12.3 (0.6)[b]	10.4 (1.0)	9.5 (0.7)[c]	10.7 (0.5)
Nicotine Dependence				
Army	12.8 (0.9)	15.2 (1.5)[b]	9.7 (1.8)[d]	12.6 (0.8)
Navy	7.1 (0.6)[b,d]	5.1 (0.6)[c]	5.2 (0.5)[c]	5.8 (0.4)
Marine Corps	10.0 (1.5)[b]	8.1 (1.8)	7.6 (1.3)[c]	8.6 (1.1)
Air Force	5.3 (0.5)[d]	3.1 (0.6)[c]	4.4 (0.7)	4.3 (0.4)
Total	8.8 (0.4)[b]	8.1 (0.6)	6.7 (0.6)[c]	7.9 (0.3)

Note: Table displays the percentage of military personnel by number of times deployed in the past 3 years that reported the substance use indicated in the rows of this table. The standard error of each estimate is presented in parentheses. Column group estimates may not sum to 100 due to rounding. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates for each theater group have been standardized by Service, gender, age, education and race/ethnicity to the total DoD distribution.

[b]Comparisons with column 3 statistically significant at the 95% confidence level.

[c]Comparisons with column 1 statistically significant at the 95% confidence level.

[d]Comparisons with column 2 statistically significant at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Number of Times Deployed in Past Three Years, Q145).

Table 10.12 **DEPLOYMENT-RELATED CHANGE IN SUBSTANCE USE, PAST 12 MONTHS, BY SERVICE**

Substance Use/Change	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Alcohol					
Began using since deployed	3.1 (0.9)	1.9 (0.5)	2.1 (0.5)	1.6 (0.7)	2.2 (0.4)
Using more since deployed	16.6 (2.3)	9.1 (2.8)	14.2 (2.5)	5.4 (0.7)	11.4 (1.1)
Stopped using since deployed	1.5 (0.4)	2.7 (0.4)	3.1 (1.1)	1.4 (0.5)	2.0 (0.3)
Using less since deployed	17.2 (1.6)	15.4 (2.3)	14.9 (1.4)	12.4 (2.2)	15.1 (1.0)
No change	61.6 (2.8)	71.0 (3.4)	65.7 (1.9)	79.3 (2.7)	69.3 (1.6)
Cigarettes					
Began using since deployed	4.9 (1.0)	3.2 (0.9)	2.9 (0.9)	1.1 (0.3)	3.1 (0.5)
Using more since deployed	11.2 (1.3)	5.2 (1.8)	7.6 (1.2)	4.0 (0.9)	7.2 (0.6)
Stopped using since deployed	4.8 (1.2)	5.8 (1.0)	7.6 (0.9)	4.4 (0.5)	5.4 (0.5)
Using less since deployed	7.7 (1.1)	7.2 (1.1)	8.1 (1.6)	5.1 (1.2)	7.0 (0.6)
No change	71.4 (2.6)	78.7 (2.5)	73.7 (3.4)	85.3 (2.1)	77.3 (1.4)
Smokeless Tobacco					
Began using since deployed	4.6 (1.4)	2.3 (0.5)	2.7 (0.7)	1.3 (0.4)	2.8 (0.6)
Using more since deployed	4.9 (0.9)	2.7 (0.6)	4.6 (0.7)	1.2 (0.4)	3.3 (0.4)
Stopped using since deployed	4.0 (1.0)	4.5 (0.9)	6.4 (1.8)	2.5 (0.7)	4.1 (0.5)
Using less since deployed	5.2 (1.6)	2.6 (0.7)	6.5 (0.3)	2.7 (0.8)	4.1 (0.6)
No change	81.3 (2.2)	88.0 (1.3)	79.9 (2.6)	92.3 (1.1)	85.6 (1.1)
Cigars and Pipes					
Began using since deployed	5.8 (0.8)	3.7 (0.4)	4.0 (0.7)	1.0 (0.4)	3.7 (0.4)
Using more since deployed	3.7 (0.7)	2.8 (0.5)	3.0 (0.5)	1.0 (0.4)	2.6 (0.3)
Stopped using since deployed	6.4 (1.3)	4.8 (1.5)	5.3 (0.9)	3.6 (0.7)	5.1 (0.6)
Using less since deployed	6.0 (1.5)	4.4 (0.5)	7.1 (0.7)	3.7 (1.1)	5.2 (0.6)
No change	78.0 (2.4)	84.2 (2.0)	80.6 (1.2)	90.7 (1.8)	83.4 (1.1)

Note: Table displays the percentage of military personnel by Service who reported a substance use change in the past year due to deployment as indicated in the rows of the table. Only those personnel deployed in the past year were considered in these estimates. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Change in Substance Use, Q150).

Of the military personnel who deployed in the past year, 10.3% began smoking cigarettes or increased their smoking since deploying. In contrast, 12.4% quit or reduced their cigarette use. Deployment-related changes in cigarette use varied by Service similar to the deployment-related changes in alcohol use. That is, a larger percentage of Army personnel began or increased their cigarette smoking (16.1%) than stopped or reduced their smoking since deploying (12.5%), whereas the opposite was reported for the other Services. Overall, Army personnel were also much more likely to increase their cigarette use since deployment than those in the other Services.

A reported 6.1% of deployed personnel began using or used more smokeless tobacco since deploying and 6.3% began or increased their cigar use. Of all the Services, the Army had the largest percentage of new or increased smokeless tobacco users (9.5%).

10.4 Job Satisfaction in the Military

Job satisfaction may play a critical role in determining military readiness. While a few studies investigate job satisfaction within specific military subpopulations, such as nurses (Robinson, Rodriguez, Sammons, & Keim, 1993; Kocher & Thomas, 1994; Allgood, O'Rourke, VanDerslice, & Hardy, 2000; Prevosto, 2001), training instructors (Carbone & Cigrang, 2001), and prevention personnel (Whorley, 1989, 1992), fewer have examined job satisfaction among the general military population. Those that have done so suggest that first-term personnel are less satisfied than mid-career personnel (General Accounting Office [GAO], 2001), that greater

satisfaction is predictive of intention to remain in the military (Lakhani, 1991), and that personnel are less satisfied if they perceive job pressures to be high and identify job-related issues to be a major problem (Sanchez, Bray, Vincus, & Bann, in press).

In the 2005 survey, respondents were asked a set of three questions geared toward identifying overall job satisfaction, as well as the likelihood that the respondent would continue to stay on active duty if given the choice. Table 10.13 presents survey findings on the relationship between overall job satisfaction and gender, age, rank, and occupation. Table 10.14 presents findings concerning likelihood to stay on active duty if given the choice, likelihood of serving at least an additional 20 years, and overall satisfaction with work assignment.

10.4.1 Overall Job Satisfaction

Table 10.13 displays job satisfaction by age group, gender, and job classification. As shown, an estimated 66.2% of all personnel were satisfied or very satisfied overall with their work assignment (a nonsignificant difference from 65.3% in 2002). There were no differences in rates of satisfaction between males (66.0%) and females (66.9%). Older age groups had greater satisfaction with their jobs than younger age groups: personnel under age 20 were less satisfied overall than personnel aged 35 or older, with a fairly linear increase in satisfaction with age.

Overall, officers report more job satisfaction than enlisted personnel. The enlisted job classification (other than nonoccupational) with the lowest percentage of satisfied or very satisfied personnel was “infantry, gun crew, or seamanship specialist” (54.2%), whereas the officer job classification (other than nonoccupational) with the lowest percentage of satisfied or very satisfied personnel was “intelligence officer” (75.5%). Enlisted job categories ranged from 54.2% to 70.9% (“functional support and administrative”) satisfied/very satisfied; officer job categories ranged from 75.5% to 92.2% (“general officer or executive”) satisfied/very satisfied.

10.4.2 Measures of Job Satisfaction

Table 10.14 illustrates three job satisfaction measures—likelihood of choosing to stay on active duty, likelihood of choosing to serve in the military at least 20 years, and overall satisfaction with work assignment—by Service and for the total DoD. Overall, 52.6% indicated that they would be “likely or very likely” to choose to stay on active duty. Among the Services, the Air Force had the highest percentage of personnel indicating that they would either “likely” or “very likely” choose to remain on active duty if given the choice (64.4%), and the Marine Corps had the lowest percentage for this measure (43.5%). The distribution for this measure was similar to that for the indicator addressing the likelihood of serving in the military for at least 20 years. The Air Force had the highest percentage reporting likely/very likely (58.9%), followed by the Navy (49.0%), the Marine Corps (39.4%), and the Army (38.7%).

Note that percentages of personnel indicating they would likely choose to stay on active duty were similar to percentages reporting they would likely choose to serve in the military for at least 20 years, suggesting that these items may be measuring somewhat similar constructs. As shown for the third measure of overall satisfaction with work assignments, the Air Force had the highest percentage of satisfaction (73.7%) and the Army had the lowest (57.9%).

10.5 Religiosity/Spirituality in the Military

A substantial body of literature exists regarding the positive relationship between spirituality or religion and physical/mental health. For instance, one study (Pardini, Plante, Sherman, & Stump, 2000) found a positive association between religious faith/spirituality and positive mental health attributes such as increased coping, resilience to stress, lower anxiety, and greater perceived social support among persons recovering from substance abuse disorders. These associations persisted even after controlling for social desirability of religion. Other studies have reported a relationship between religious faith and adaptive coping and increased resilience to stress (Hughes, McMollum, Sheftel, &

Table 10.13 **OVERALL JOB SATISFACTION, BY AGE, GENDER, RANK, AND OCCUPATION**

Characteristic	Overall Satisfaction with Work Assignment: Satisfied/Very Satisfied	Overall Satisfaction with Work Assignment: Dissatisfied/Very Dissatisfied
Gender and Age		
Males		
20 or younger	50.9 (2.9)	49.1 (2.9)
21-25	55.5 (1.8)	44.5 (1.8)
26-34	70.0 (1.6)	30.0 (1.6)
35+	83.3 (1.2)	16.7 (1.2)
Total males	66.0 (1.8)	34.0 (1.8)
Females		
20 or younger	58.0 (3.3)	42.0 (3.3)
21-25	57.6 (1.8)	42.4 (1.8)
26-34	72.4 (2.5)	27.6 (2.5)
35+	82.9 (2.1)	17.1 (2.1)
Total females	66.9 (1.5)	33.1 (1.5)
Rank and Occupation		
Enlisted		
Infantry, gun crew, or seamanship specialist	54.2 (2.8)	45.8 (2.8)
Electronic equipment repairman	65.8 (2.3)	34.2 (2.3)
Communications or intelligence specialist	62.6 (3.0)	37.4 (3.0)
Health care specialist	66.6 (2.3)	33.4 (2.3)
Other technical or allied specialist	64.2 (3.4)	35.8 (3.4)
Functional support and administrative	70.9 (1.7)	29.1 (1.7)
Electrical/mechanical	62.9 (2.1)	37.1 (2.1)
Craftsman	67.1 (2.9)	32.9 (2.9)
Service and supply handler	60.3 (2.9)	39.7 (2.9)
Nonoccupational	50.8 (5.2)	49.2 (5.2)
Officer		
General officer or executive	92.2 (2.7)	7.8 (2.7)
Tactical operations officer	81.8 (2.2)	18.2 (2.2)
Intelligence officer	75.5 (6.5)	24.5 (6.5)
Engineering or maintenance officer	79.7 (3.0)	20.3 (3.0)
Scientist or professional (not involved with health care)	86.2 (4.3)	13.8 (4.3)
Health care officer	84.3 (3.1)	15.7 (3.1)
Administrator	82.6 (2.8)	17.4 (2.8)
Supply, procurement, or allied officer	86.4 (4.5)	13.6 (4.5)
Nonoccupational	92.0 (3.0)	8.0 (3.0)
Total	66.2 (1.6)	33.8 (1.6)

Note: Table displays the percentage of military personnel by characteristic (gender, age group, rank, and occupation) who reported their overall satisfaction with their work assignment as satisfied/very satisfied or dissatisfied/very dissatisfied. Estimates within each row may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Satisfaction, Q156; Rank and Occupation, Q158).

Table 10.14 **JOB SATISFACTION, BY SERVICE**

Job Satisfaction Measure	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Would Choose to Stay on Active Duty					
Likely/very likely	44.4 (1.4)	54.1 (1.8)	43.5 (2.2)	64.4 (1.7)	52.6 (1.2)
Neither likely nor unlikely	11.9 (1.0)	11.8 (0.6)	13.8 (0.9)	11.1 (0.8)	11.9 (0.4)
Unlikely/very unlikely	43.8 (1.7)	34.0 (1.8)	42.7 (1.9)	24.5 (1.2)	35.5 (1.2)
Would Choose to Serve in Military at Least 20 Years					
Likely/very likely	38.7 (1.0)	49.0 (2.1)	39.4 (2.4)	58.9 (1.3)	47.3 (1.1)
Neither likely nor unlikely	11.1 (1.2)	9.6 (0.7)	12.4 (1.0)	8.6 (0.7)	10.2 (0.5)
Unlikely/very unlikely	42.8 (2.0)	31.9 (2.1)	44.3 (2.4)	21.7 (1.5)	34.0 (1.3)
Already have 20+ years of service	7.4 (1.1)	9.5 (1.0)	3.9 (0.5)	10.8 (0.9)	8.5 (0.5)
Overall Satisfaction with Work Assignment					
Satisfied/very satisfied	57.9 (3.2)	67.9 (1.5)	66.6 (1.9)	73.7 (2.3)	66.2 (1.6)
Dissatisfied/very dissatisfied	42.1 (3.2)	32.1 (1.5)	33.4 (1.9)	26.3 (2.3)	33.8 (1.6)

Note: Table displays the percentage of military personnel by Service who reported the job satisfaction measure as indicated in the rows of the table. Estimates within each column group may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Job Satisfaction, Q154-Q156).

Sanchez, 1994, as cited in Pardini et al., 2000; Kendler, Gardner, & Prescott, 1997; Park, Cohen, & Herb, 1990).

Despite the body of literature regarding spirituality among the general population, there is a paucity of this literature geared specifically toward the military population. A 2001 article by Parker et al. (2001b) examined the role of spirituality among soldiers and their families in terms of a developmental model. They noted more than 3 decades of research regarding "health and faith," as well as the relationship established during that time between regular religious practices and reduced disease morbidity. The authors observed that rarely is spirituality linked with health promotion initiatives within the military population and that including spirituality could potentially increase the effectiveness of current health promotion efforts. A second part to the article was published in July 2001 (Parker et al., 2001a) and followed up on these issues. The article presented a model of military health promotion and wellness that integrates successful aging, targeted efforts, and spirituality guided by life course development constructs. Spirituality was not addressed independently.

Similar to the lack of literature regarding spirituality of active-duty military personnel, little literature exists regarding the spirituality of military veterans. A Medline search using the terms "veteran," "religiosity," "spirituality," and other forms of these words yielded a single article, which described a chaplain's experiences with patients at a Veteran's Administration Medical Center in Vermont (LaPierre, 1994). Based on a set of structured questions asked of all interviewees, the author found the following:

- A large majority of patients believed in a "higher power."
- Between 5% and 15% of patients attended Sunday worship services in the hospital's chapel.
- Between 80% and 90% of patients welcomed prayer by the chaplain.
- Many patients seemed to have been more involved in their local church before or during their military service; they seemed to become less involved after completing their service.

These findings are consistent with both previous findings of the DoD survey (Bray et al., 2003) and those reported from the present survey (see Chapter 9) in which over half the respondents reported saying a prayer as a means of coping with stress. To further examine the association between religiosity and mental health, the 2005 DoD survey included items regarding religiosity

and spirituality of military personnel. Specifically, the items asked about the number of times the respondent attended religious services (other than special occasions), the importance of religious/spiritual beliefs in one's life, and the degree to which religious/spiritual beliefs influence decision making.

As presented in Table 10.15, about 20% of military personnel were categorized as having high religiosity/spirituality. More than half were categorized as having a medium level, and almost one-fourth were categorized as having low religiosity/spirituality. Some statistically significant differences between spirituality levels were noted when considering selected health and stress measures. For instance, persons categorized as being highly religious/spiritual were less likely to be heavy alcohol users, cigarette smokers, or illicit drug users. They were also less likely to engage in risky behaviors, to meet criteria for need of further evaluation for depression or anxiety, perceive "a lot" of stress at work or in their family, or indicate they had seriously considered suicide in the year prior to the survey than those categorized as having a low level of religiosity/spirituality.

10.6 Summary

This chapter investigated several other issues that may affect the health and readiness of the active force: women's health issues, including stress associated with being a woman in the military, pregnancy, and maternal and infant health; oral health; deployment issues; job satisfaction; and religiosity/spirituality. This section

Table 10.15 **SELECTED HEALTH BEHAVIOR AND STRESS MEASURES, PAST 12 MONTHS, AMONG PEOPLE WITH HIGH, MEDIUM, AND LOW RELIGIOSITY/SPIRITUALITY**

	Religiosity/Spirituality Index			
Health/Stress Measure	**High**	**Medium**	**Low**	**Total[a]**
Heavy Alcohol Use	8.4 (0.8)[b,c]	19.5 (1.3)[d]	23.7 (1.3)	18.4 (1.0)
Cigarette Use	18.1 (1.2)[b,c]	34.7 (1.4)	37.1 (1.2)	32.0 (1.1)
Any Illicit Drug Use	7.8 (0.8)[b,c]	10.8 (0.7)[d]	13.1 (1.0)	10.8 (0.7)
Risk Behaviors				
Drinking and driving	6.1 (0.8)[b,c]	13.6 (0.7)[d]	17.7 (0.9)	13.2 (0.6)
Seldom or never used seat belts	2.4 (0.3)[b,c]	3.5 (0.4)[d]	5.6 (0.7)	3.8 (0.4)
Seldom or never used helmet	1.3 (0.3)[b,c]	2.5 (0.3)	2.4 (0.4)	2.3 (0.2)
Need for Further Anxiety Evaluation	10.4 (0.9[b,c]	12.5 (0.5)[d]	14.5 (0.9)	12.6 (0.5)
Need for Further Depression Evaluation	19.5 (1.1)[a]	21.6 (1.0)[d]	25.8 (1.1)	22.3 (0.8)
Seriously Considered Suicide	3.5 (0.5)[a]	4.6 (0.3)[d]	6.8 (0.6)	5.0 (0.3)
Perceived Stress at Work				
A lot	31.4 (1.4)[a]	31.1 (0.9)[d]	36.2 (1.4)	32.5 (0.9)
Some	30.5 (1.1)	32.3 (0.8)[d]	29.2 (1.0)	31.2 (0.6)
A little/none at all	38.0 (1.5)	36.5 (1.1)	34.6 (1.8)	36.3 (1.1)
Perceived Stress in Family				
A lot	16.0 (0.9)[b,c]	19.0 (0.6)	21.2 (1.1)	19.0 (0.5)
Some	25.3 (1.0)	26.2 (0.7)	24.8 (0.9)	25.7 (0.6)
A little/none at all	58.7 (1.3)[b,c]	54.7 (0.9)	54.0 (1.3)	55.3 (0.8)
Total[e]	20.2 (0.7)	54.0 (0.7)	25.9 (0.7)	100.0 (0.0)

Note: Table displays the percentage of military personnel by religiosity/spirituality index who reported the health/stress measure as indicated in the rows of the table. The standard error of each estimate is presented in parentheses. Respondents were asked to what extent they agreed with two questions regarding importance of religious/spiritual beliefs and the degree to which religious/spiritual beliefs influence their decision making. Respondents were categorized as high if they reported "strongly agree" to both items, medium if they reported either "strongly agree" or "agree" to at least one of the questions, and low if they reported either "disagree" or "strongly disagree" to both questions.

[a]Individuals with missing religiosity/spirituality index are not included in these estimates.

[b]Comparisons between high and low are statistically significant at the 95% confidence level.

[c]Comparisons between high and medium are statistically significant at the 95% confidence level.

[d]Comparisons between medium and low are statistically significant at the 95% confidence level.

[e]This row displays the percentage of military personnel by religiosity/spirituality index. Estimates may not sum to 100 because of rounding.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Religiosity/Spirituality, Q108-Q110).

provides a brief summary of findings regarding these issues.

10.6.1 Women's Health Issues

Stress Serving as a Military Woman

- Some 36% of military women reported being under a "great deal" or a "fairly large amount" of stress related to being a woman in the military, a decrease from 41.2% in 2002 (Figure 10.1). In 2005, women in the Marine Corps had the highest rate (49.3%), followed by women in the Army (40.0%), Navy (35.0%), and Air Force (30.3%) (Table 10.1).
- In the total DoD, stress associated with being a woman in the military was higher among women who were younger, less well educated, married without a spouse present, enlisted, and serving in OCONUS assignments.

Maternal and Infant Health

- Nearly 17% of military women reported that they had been pregnant within the past year, and another 0.7% reported that they may have been pregnant at the time of the survey but were unsure (Table 10.2).
- Across all the Services, about 35% of military women had been pregnant within the past 5 years, although some of these pregnancies may have occurred prior to military service.
- Nearly 92% of military women reported receiving their first prenatal care during their first trimester (Table 10.3).
- Receipt of prenatal care varied with sociodemographic characteristics. Personnel less likely to have received prenatal care in the first trimester were those with less than a college degree and women who were enlisted.
- Some 95% of all military women who were pregnant in the past 5 years abstained from alcohol during their most recent pregnancy. Drinking during pregnancy appears to be more common among officers (11.1%), women aged 35 or older (9.6%), women with a college degree (9.3%), and Marines (9.2%) (Table 10.4).
- About 90% of military women who were pregnant during the past 5 years reported no cigarette use during their most recent pregnancy (Table 10.4). Women who smoked were more likely to be aged 34 or younger, to have less than a college degree, and to be enlisted.

10.6.2 Oral Health

- An estimated 81% of all military personnel had a dental check-up in the past 12 months. Of all military personnel across the total DoD, about one-third were required to get dental work done in the past 12 months before they could be deployed at sea or in the field (Table 10.5). This is notably higher than the approximately 16% required to have dental work before deployment reported in the 1998 survey.
- Approximately 17% of all personnel, since joining the military, had lost a permanent tooth or teeth because of one or more of the following problems: gum disease, cavities, a mouth injury, or some other problem. Cavities were the cause most often responsible for tooth loss from among the four problems (9.5%).
- Of those personnel who did not have a dental check-up in the past 12 months, almost 18% did not because they could not get time off from work. Approximately 16% of all personnel who did not have a dental check-up in the past 12 months did not because they did not like going to any dentists (Table 10.5).

10.6.3 Deployment Issues

- In the total DoD, 7.3% of personnel reported being unable to deploy in the past 12 months, and another 2.6% returned early from deployment. Injuries and family problems were the most frequently cited reasons (Table 10.6).
- Personnel who had deployed within the past 3 years had higher percentages of work and family stress, mental health symptoms (depression, anxiety, PTSD), and suicide attempts than those who had not deployed (Table 10.7). Greater work stress was reported more frequently among those who had served in OEF/OIF than those who had not served (Table 10.8).
- Almost 20% of deployed personnel in the past year reported more conflict and/or arguments with their spouse, fiancé, boyfriend, or girlfriend since deployment and 14.4% reported a divorce or

separation since deployment (Table 10.9). Approximately 16% of deployed personnel reported arguing less or getting along better after deployment.

- Personnel who had deployed within the past 3 years had higher percentages of heavy alcohol use and dependence, illicit drug use, and tobacco use and dependence than those not deployed (Table 10.10). Those who had served in OIF/OEF were more likely to report heavy alcohol use, illicit drug use, and cigarette smoking than those not serving in any theater (Table 10.11).
- Of personnel who were deployed in the past year, 13.6% reported that they began using or increased their use of alcohol since being deployed, and 17.1% stopped or decreased their alcohol use since deployment. A reported 10.3% began smoking cigarettes or increased their smoking since deploying, 6.1% began using or used more smokeless tobacco, and 6.3% began or increased their cigar or pipe use since deployment. The Army had the largest percentage of deployment-related new or increased substance users of the Services (Table 10.12).

10.6.4 Job Satisfaction in the Military

- Similar to 2002, an estimated 66.2% of military personnel indicated they were either "satisfied" or "very satisfied" overall with their current work assignment. Satisfaction was highest in the Air Force (73.7%) and lowest in the Army (57.9%). Men and women indicated similar job satisfaction. Older personnel and officers were more satisfied with their current work assignments than their counterparts (Tables 10.13 and 10.14).
- Air Force personnel were most likely to indicate that they would be "likely" or "very likely" to choose to remain on active duty if given the choice (64.4%), followed by the Navy (54.1%), Army (44.4%), and Marine Corps (43.5%) (Table 10.14).

10.6.5 Religiosity/Spirituality in the Military

- An estimated 20% of military personnel were categorized as being highly religious or spiritual. More than half (54%) were categorized as having a medium level of religiosity/spirituality, and about one-fourth of personnel were categorized as having low religiosity/spirituality (Table 10.15).
- Highly religious/spiritual personnel were significantly less likely than those categorized as low to report substance use or perceive "a lot" of stress at work or in their family.
- Personnel with high religiosity/spirituality were significantly less likely to meet screening criteria for need for or further evaluation of depression or anxiety or indicate that they had seriously considered suicide in the year prior to the survey than personnel categorized with low levels of religiosity/spirituality.

Taken together, these findings on health issues of special interest from the 2005 DoD survey suggest areas that will require further attention in coming years, particularly stress levels experienced by military women because of their gender. Increased health education efforts need to be targeted at reducing alcohol and tobacco use during pregnancy among women. The problem of getting time off from work to visit the dentist should be addressed and rectified so that more personnel make and keep appointments for preventive dental care. Additionally, the relationships between deployment and stress, mental health, substance use, and adverse changes in interpersonal relations suggest areas in need of targeted prevention and intervention efforts. Efforts to increase overall job satisfaction across the DoD and perhaps specifically within the Army may be warranted. Finally, additional investigation into the use of religiosity/spirituality as a potential coping mechanism and/or protective factor for stress and/or emotional problems and as a deterrent for substance use should be undertaken.

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Appendix A

Sampling Design

This appendix describes the methodology used to develop and implement the sampling design for the 2005 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel. Activities associated with the sampling design included acquiring and constructing the sampling frames, specifying and allocating the sample sizes, and selecting the sample.

A.1 Sampling Frames

A primary objective of the sampling design was to facilitate the planned on-site group administration of the survey questionnaire to selected sample members whenever possible. Because of the worldwide geographic distribution of military personnel, it was necessary to develop a dual-mode sampling design that called for the survey instrument to be group-administered at large installations, including aboard afloat ships (where hundreds of sample members could be assembled), and mailed to persons in smaller locations where it was not practical to conduct on-site group sessions. This approach resulted in the construction of two sampling frames for the study, one for each mode.

A.1.1 Installation-Level Sampling Frame

The construction of the installation-level frame began by obtaining a data file of counts of active-duty members by duty ZIP code and military unit (as identified by the Unit Identification Code [UIC]). This file was created from the September 2004 version of the Active Duty Master File (ADMF) maintained by the Defense Manpower Data Center (DMDC). The data file contained 22,553 unique duty ZIP-UIC combinations that accounted for 1,300,039 persons.

The personnel counts were used to identify persons in the active-duty population who were stationed at an installation with 500 or more persons. This partitioning of the population was done to facilitate the dual-mode approach to data collection. For the group-administered portion of the sample, installations were considered first-stage sampling units (FSUs) and persons were second-stage sampling units (SSUs).

To define a distinct geographic location, we used five-digit ZIP codes of duty locations in the continental United States (CONUS), Army Post Office (APO) and Fleet Post Office (FPO) numbers outside the continental United States (OCONUS), as well as Navy geo-location codes to identify the home ports of Naval afloat units. We identified 395 installations where 500 or more active-duty persons were stationed. These installations accounted for more than 1.18 million persons, or 91.0% of the active-duty population in 2004.

Many of the large installations (historically defined as those with a population exceeding 15,000 or containing 250 UICs or more) housed hundreds of operational units, making the coordination and notification of sample members within all the various UICs both time consuming and burdensome. Therefore, the number of units tasked to participate in the survey at large installations was limited by subdividing them into clusters of units that satisfied the minimum size requirement. Within each large installation, the list was sorted by UIC identifier and the units were sequentially combined to form the clusters. Subsequently, the UIC clusters were treated as separate FSUs.

In addition to Service, the installation frame was stratified by region of the world (i.e., CONUS vs. OCONUS) and, for Naval units, afloat status. These strata were used to control the worldwide distribution of the sample, an important cost consideration. Table A.1 shows the distribution of active-duty personnel by Service and type of duty location.

Table A.1 **DISTRIBUTION OF ACTIVE-DUTY PERSONNEL BY SERVICE, LOCATION, AND MODE OF ADMINISTRATION**

	Mode of Administration					
Service/Location	**On-Site[a]**		**Mail**		**Total**	
Army						
CONUS[b]	312,252		27,670		339,922	
OCONUS[c]	105,906		15,430		121,336	
	418,158	90.7%	43,100	9.3%	461,258	100.0%
Navy						
CONUS	152,132		27,888		180,020	
OCONUS	56,250		10,254		66,504	
Afloat[d]	113,101		833		113,934	
	321,483	89.2%	38,975	10.8%	360,458	100.0%
Marine Corps						
CONUS	121,201		15,692		136,893	
OCONUS	21,346		3,194		24,540	
	142,547	88.3%	18,886	11.7%	161,433	100.0%
Air Force						
CONUS	264,933		11,008		275,941	
OCONUS	38,859		2,090		40,949	
	303,792	95.8%	13,098	4.2%	316,890	100.0%
Total DoD	1,185,980	91.0%	114,059	9.0%	1,300,039	100.0%

[a]On-site administrations were done at duty locations with 500 or more persons on active-duty.

[b]CONUS = Refers to personnel who were stationed within the 48 contiguous states (excluding Alaska and Hawaii).

[c]OCONUS = Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

[d]The duty location of afloat units was their home port.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, September 2004 Active Duty Master File.

A.1.2 Person-Level Sampling Frame

A sample of 60 FSUs was selected for the on-site group administrations from the installation-level frame based on the September 2004 distribution of active-duty personnel. Although individuals frequently transfer in and out of units, the timeliness of the installation frame was not essential at this stage because an installation's total strength is likely to remain fairly static. Timeliness does become essential at the second stage, when individuals are selected. Therefore, specifications for the DMDC were developed to use the most current personnel files available (January 2005) to select stratified samples of active-duty personnel. The person-level sampling frame was stratified by the 12 cross-classifications of gender by pay grade group. The strata were used to control the sample distribution of active-duty members to meet the precision requirements described in the next section.

A.2 Sample Allocation

The sample allocation problem can be stated in terms of determining the number of installations and active-duty members to include in the sample such that the precision requirements set for the survey are met for the least cost. That is, the sample sizes determined by the sampling design are a balance between satisfying the analytical requirements of the survey and the fiscal constraints imposed on the survey.

The sample design of the 2005 DoD survey is a stratified two-stage design with the second-stage stratification nested within FSUs. The first-stage sampling frame was stratified into eight first-stage strata, indexed by h. The SSUs were stratified into 12 second-stage strata, indexed by j. The FSUs were selected with probability proportional to size (PPS); a simple random sample (SRS) of SSUs was selected independently within each second-stage stratum within each FSU.

When the total number of active-duty members M_d are known for the dth domain, p_d , the proportion of a certain attribute of the domain d population can be estimated using the following linear estimator:

$$\hat{P}_d = \bar{y}_d = \frac{1}{M_d}\hat{y}_d = \frac{1}{M_d}\sum_h^8 = 1\,\hat{y}_{dh} \quad , \tag{1}$$

where $\hat{y}_{dh}$ is the Horvitz-Thompson estimator of the total in the dth domain and h^{th} first-stage stratum is given by

$$\hat{y}_{dh} = \sum_i^{n_h} = 1\frac{\hat{y}_{dhi}}{\pi_{hi}} = \frac{1}{n_h}\sum_i^{n_h} = 1\frac{\hat{y}_{dhi}}{Z_{hi}} \quad . \tag{2}$$

Here, π_{hi} is the inclusion probability for the ith FSU in the first-stage stratum h. The single-draw selection probability for the same FSU is z_{hi}. The domain total for the ith FSU in the hth first-stage stratum can be estimated as

$$\hat{y}_{dhi} = \sum_{j\in D_d} M_{hij}\bar{y}_{hij} = \sum_{j\in D_d}\frac{M_{hij}}{m_{hij}}\sum_k^{m_{hij}} = 1\,y_{hijk} \quad , \tag{3}$$

where

m_{hij} = sample size in the jth second-stage stratum within the ith FSU of the hth first-stage stratum, and

M_{hij} = population total for the jth second-stage stratum within the ith FSU of the hth first-stage stratum.

Also defined above,

$$M_{dhi} = \sum_{j\in D_d} M_{hij}, M_{dh} = \sum_i^{N_h} = 1\,M_{dhi}, \textit{and } M_d = \sum_h^H = 1\,M_{dh} \quad .$$

A nonlinear optimization problem using the Kuhn-Tucker conditions (Chong & Zak, 1996) was set up to search for the optimal sample size and allocation. For a design like the 2002 DoD survey, the variance of the estimated proportion from domain d can be expressed as follows:

$$Var(\bar{y}_d) = \frac{1}{M_d^2} \sum_{h=1}^{N_h} \frac{1}{n_h} \left\{ \sum_{i=1}^{N_h} z_{hi} \left(\frac{Y_{dhi}}{z_{hi}} - Y_{dh} \right)^2 + \sum_{j \in D_d} \sum_{i=1}^{N_h} \frac{Var(\hat{y}_{hij})}{z_{hi}} \right\}$$

$$= \frac{1}{M_d^2} \sum_{h=1}^{8} \left\{ \sum_{i=1}^{N_h} z_{hi} \left(\frac{Y_{dhi}}{z_{hi}} - Y_{dh} \right)^2 \right\} + \frac{1}{M_d^2} \sum_{h=1}^{8} \frac{1}{n_h} \left\{ \sum_{j \in D_d} \sum_{i=1}^{N_h} \frac{Var(\hat{y}_{hij})}{z_{hi}} \right\} \qquad (4)$$

$$= Var_{PSU}(\bar{y}_d) + Var_{SSU}(\bar{y}_d) \ .$$

If the SSUs are drawn by stratified simple random sampling, then

$$Var_{PSU}(\bar{y}_d) = \frac{1}{M_d^2} \sum_{h=1}^{8} \frac{1}{N_h} \left\{ \sum_{j \in D_d} \sum_{i=1}^{N_h} \frac{M_{hij}^2 (1 - f_{hij})}{z_{hi}} \frac{S_{hij}^2}{m_{hij}} \right\}$$

$$= \frac{1}{M_d^2} \sum_{h=1}^{8} \sum_{j \in D_d} \sum_{i=1}^{N_h} \frac{M_{hij}^2 (1 - f_{hij}) S_{hij}^2}{\pi_{hi} m_{hij}} \ .$$

Because the sample size for the jth second-stage stratum, within the ith FSU and the hth first-stage stratum, is given by

$$m_{hij} = \frac{f_{hj} M_{hij}}{\pi_{hi}} = \frac{m_{hj} M_{hij}}{M_{hj} \pi_{hi}} \ ,$$

one gets

$$Var_{PSU}(\bar{y}_d) = \frac{1}{M_d^2} \sum_{h=1}^{H} \sum_{j \in D_d} \sum_{i=1}^{N} \frac{M_{hij} M_{hj} (1 - f_{hij}) S_{hij}^2}{m_{hj}} \ . \qquad (5)$$

Here,

S_{hij}^2 = population variance of the jth second-stage stratum within the ith FSU of the hth first-stage stratum;

m_{hj} = number of sampled individuals in the jth second-stage stratum within the hth first-stage stratum;

M_{hij} = total number of individuals in the jth second-stage stratum within the ith FSU of the hth first-stage stratum;

M_{hj} = total number of individuals in the jth second-stage stratum within the hth first-stage stratum; and

M_d = population size of the domain d.

The variance formula depends on the first- and second-stage sample size, n_h and m_{hi}, respectively. We can formulate the cost function for the survey in terms of n_h and m_{hj} as well:

$$C = C_0 + \sum_{h=1}^{8} \left\{ c_{1h} n_h + \sum_{j}^{12} = 1 \, c_{2hj} m_{hj} \right\} \qquad (6)$$

where C_0 is the fixed cost and is assumed zero for the optimization purpose. Parameters c_{1h} and c_{2hj} are the variable cost associated with adding an additional FSU and SSU, respectively.

If we denote the precision requirement for the sample proportion from the dth domain as V_d, the sample allocation problem then can be formulated as minimizing the cost function (4) subject to the following constraints:

$$Var(\hat{p}_d) \le V_d, \qquad d = 1,2,\ldots D, \tag{7}$$

and

$$n_h \ge 0, \quad m_{hj} \ge 0, \quad \text{for } h = 1,2,\ldots,8, \quad \text{and} \quad j = 1,2,\ldots,12. \tag{8}$$

where D is the number of domains under consideration. The variance constraints are given in the form of the variance components of (4). The variance components were estimated from data collected in the 1998 DoD survey and successfully implemented in the 2002 DoD survey. To provide stable estimates, three groups of outcomes were used in the estimation (Table A.2).

The variance components used in the variance constraints were calculated by averaging the estimated variance components of the outcome categories within each outcome group. Negative estimates were converted to zero. The variance constraints and the domains on which constraints were imposed are given in Table A.3.

In addition to the constraints in (4) and (5), the practical limitations that are listed in Table A.4 were imposed. For example, we set an upper limit on the number of SSUs (active-duty members) to be selected from an installation so that the group sessions would not become unmanageable. The sample allocation from the constrained optimization is given in Table A.5.

A.3 Sample Selection

Before selecting the sample of FSUs for on-site data collection, the composite size measure for the ith FSU in the hth first-stage stratum was calculated as the following:

$$S_{hi} = \sum_{j=1}^{12} f_{hj} N_{hij}, \qquad \text{for } i = 1,2,\ldots,n_h,\ h = 1,2,\ldots,8, \tag{9}$$

where

f_{hj} = sampling rate for the jth second-stage stratum within the hth first-stage stratum, and

N_{hij} = population total of the jth second-stage stratum within the ith FSU in the hth first-stage stratum.

Table A.2 **OUTCOME GROUPS USED IN CALCULATION OF VARIANCE CONSTRAINTS FOR SAMPLE ALLOCATION**

Outcome Group	Outcome Category
Drug Use	Marijuana Use
	Any Drug Except Marijuana
	Any Drug Use
Tobacco Use	Any Smoking in Past 30 Days
	Heavy Smoking in Past 30 Days
	Smokeless Tobacco Use (Males Only)
	Percent Attempted to Quit Smoking
Alcohol Use	Percent of Abstainers
	Percent of Infrequent to Light Drinkers
	Percent of Moderate Drinkers
	Percent of Moderate to Heavy Drinkers
	Percent of Any Drinking Versus Abstainers
	Percent with Serious Consequences Due to Alcohol
	Percent with Productivity Loss Due to Alcohol
	Percent with Alcohol Dependence Symptoms

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

Table A.3 **VARIANCE CONSTRAINTS USED IN SAMPLE ALLOCATION**

	Alcohol	Drug	Smoking
Service			
Army	6.77	8.76	6.63
Navy	9.98	6.50	11.40
Marine Corps	9.13	10.02	8.27
Air Force	7.59	4.65	7.73
Rank			
E2-E3	4.85		4.65
E4-E6	4.69		4.99
E7-E9	5.33		6.22
W1-W5	21.15		9.15
O1-O3	9.46	5.03	8.77
O4-O10	13.80	5.63	8.74
Service x Gender			
DoD, male	4.28		4.19
Army, male	8.14		10.77
Navy, female	11.93		27.37
Marine, female	12.04		17.47
Air Force, female	16.13		14.16

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

Table A.4 **DESIGN CONSTRAINTS USED IN SAMPLE ALLOCATION**

Design Constraints	Target	Achieved
Constraints on the Number of FSUs		
Minimum number of FSUs per stratum (≥)	2	2.0
Total number of FSUs (≤)	65	60.0
Maximum number of FSUs per Service (≤)	18	15.8
Maximum number of FSUs for Army OCONUS (<)	6	6.0
Maximum number of FSUs for Navy OCONUS (≤)	6	6.0
Maximum number of FSUs for Marine OCONUS (≤)	2	2.0
Maximum number of FSUs for Air Force OCONUS (≤)	4	4.0
Minimum number of FSUs per Service (≥)	12	13.8
Constraints on the Number of SSUs		
Maximum total SSUs (≤)	18,000	18,000.0
Minimum SSUs per cell (≥)		
Male	2	25.0
Female	1	10.0
Maximum SSUs per cell (≥)		
Male	1,300	830.0
Female	300	300.0
Minimum number of DoD female SSUs (≥)	4,000	4,281.9
Minimum number of SSUs per FSU (≥)	250	272.0
Maximum number of SSUs per FSU (≤)		
Army		
CONUS	300	299.6
OCONUS	350	327.4
Navy		
CONUS	300	295.0
OCONUS	350	350.0
Marine Corps		
CONUS	300	272.0
OCONUS	350	332.5
Air Force		
CONUS	300	288.9
OCONUS	350	350.0

Note: FSU = first-stage sampling unit; OCONUS = refers to personnel who were stationed outside the continental United States or aboard afloat ships; CONUS = refers to personnel who were stationed within the 48 contiguous states (excluding Alaska and Hawaii); SSU = second-stage sampling unit.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

Table A.5 **ROUNDED SAMPLE ALLOCATION FROM THE CONSTRAINED OPTIMIZATION FOR THE FIRST- AND SECOND-STAGE SAMPLE SIZES**

	Army		Navy		Marine Corps		Air Force		Total DoD	
	CONUS[a]	OCONUS[b]	CONUS	OCONUS[c]	CONUS	OCONUS	CONUS	OCONUS	CONUS	OCONUS
FSUs per Cost Stratum	10	6	10	6	12	2	10	4	60	
Males										
E2-E3	375	235	385	235	740	175	185	180	2,510	
E4-E6	750	635	785	635	830	175	785	480	5,075	
E7-E9	345	340	490	360	600	70	575	230	3,000	
W1-W5	235	120	35	35	90	35	0	0	550	
O1-O3	230	135	230	150	280	75	280	80	1,460	
O4-O10	190	90	190	135	190	25	220	80	1,120	
Females										
E2-E3	185	75	150	180	190	25	180	75	1,060	
E4-E6	235	150	250	250	190	25	300	130	1,530	
E7-E9	140	85	85	35	40	20	85	75	565	
W1-W5	30	30	10	10	10	10	0	0	100	
O1-O3	135	35	140	50	40	20	135	40	595	
O4-O10	85	35	140	35	10	10	85	30	430	
Summary										
FSUs/SSUs[c] per Service	16	4900.5	16	4,991.1	14	3,875.0	14	4,231.4	60	18,000
Total SSUs per stratum	2936.1	1964.4	2,891.1	2,100.0	3,210.0	665.0	2,831.4	1,400.0		
Average SSUs per FSU	299.6	327.4	295.0	350.0	272.0	332.5	288.9	350.0		
Total females per stratum	810.8	410.0	775.3	560.0	480.0	110.0	785.8	350.0		4,285
Total males per stratum	2,125.3	1,554.4	2,115.8	1,540.0	2,730.0	555.0	2,045.6	1,050.0		13,715

[a]Refers to personnel who were stationed within the 48 contiguous states in the continental United States.

[b]Refers to personnel who were stationed outside the continental United States or aboard afloat ships.

[c]OCONUS and afloat personnel. Additionally, "sample allocation" in this context refers to the expected number of completes.

FSU = first-stage sampling unit; SSU = second-stage sampling unit.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

Given the size measure, S_{hi}, the selection probability of the ith FSU in the hth first-stage stratum can be calculated as

$$\pi_{hi} = n_h \frac{S_{hi}}{S_{h+}} = n_h \frac{S_{hi}}{\sum_{i=1}^{n_h} S_{hi}}, \qquad \text{for } i = 1,2,...,n_h \text{ and } h = 1,2,...,8 , \qquad (10)$$

where

n_h = number of FSUs selected from the hth first-stage stratum, and

S_{h+} = total size measure of all FSUs in the hth first-stage stratum.

To facilitate the selection routine and the actual implementation of the on-site data collection, exceedingly large installations were divided into multiple FSUs using the UIC codes provided by DMDC. Then an independent sample was selected from each first-stage stratum with PPS. A systematic PPS sampling scheme (Kish, 1965) was used to ensure that the number of FSU subdivisions selected from each installation would be within one of the proportional allocations of the original FSU. This allowed the selection probability of the original FSU to be maintained across the FSU subdivisions. In all, 60 FSUs were selected from the September 2004 ADMF. An additional 20 FSUs were selected as alternate sample FSUs for substitution in the event that a primary installation was unable to participate.

The sample of active-duty members was selected from the January 2005 version of the ADMF file in combination with the Defense Enrollment Eligibility Reporting System (DEERS) file. In the 3 months between sample selection and data collection, some sample members were expected to become ineligible for the survey because they underwent a permanent change of station (PCS), separated from the Service, were absent without leave (AWOL), died, or had an unknown status. The sample sizes were inflated to account for the likely reduction in sample yield using the eligibility rates found in the 2002 DoD survey. The sample sizes were inflated by an additional factor to account for a higher PCS rate due to a fall data collection period.

Nonresponse is inevitable for a survey of the scale and complexity of the DoD survey series. To compensate for the anticipated nonresponse, the second-stage sample sizes were inflated to help attain the desired analysis domain sizes. Using the inflated sample sizes for each second-stage stratum, independent stratified random samples of active-duty members within each FSU were selected. Overall, a total of 36,000 active-duty members were selected for the on-site administration of the survey.

References for Appendix A

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Appendix B

Sample Weighting and Estimation Procedures

B.1 Sample Weighting

This appendix section describes how sampling weights were assigned to sampled members to reflect differences in sample selection rates, survey eligibility rates, and response rates.

B.1.1 Initial Sample Weights

Initial sample weights were calculated as the inverse of the probability of selection at each stage of the design. At the first stage, the expected frequency of selecting the ith first-stage sampling unit (FSU) from the hth first-stage stratum was

$$\pi_{hi} = n_h \bullet S_{hi} / S_{h+} \quad , \tag{1}$$

where

n_h = number of FSUs selected from the hth stratum,

S_{hi} = composite size measure assigned to the ith FSU, and

S_{h+} = sum of the composite size measures in the hth stratum.

At the second stage, simple random samples of personnel were selected from each gender and pay grade group with sampling rates that attained the desired stratum sizes, and whenever possible the overall selection probabilities assigned to personnel in the same first- and second-stage strata were made equal. The probability of selecting the kth person from the jth gender and pay grade stratum conditional on the selection of the ith FSU from the hth first-stage stratum was

$$\pi_{k \mid hij} = Min[1, m_{hij} / M_{hij}] \quad , \tag{2}$$

where

M_{hij} = total number of personnel in the jth gender and pay grade second-stage stratum of the ith FSU from the hth first-stage stratum, and

m_{hij} = targeted second-stage sample size for the jth gender and pay grade second-stage stratum for FSUs in the hth first-stage stratum.

Thus, the initial sample weight assigned to the kth person of the jth gender and pay grade second-stage stratum of the ith FSU was

$$w_{hi\,jk} = [\pi_{hi} \bullet \pi_{k \mid hij}]^{-1} \quad . \tag{3}$$

The initial sampling weight was assigned to each of the 40,000 personnel selected for the sample.

B.1.2 Adjustments for Survey Eligibility

As in previous surveys in this series, the 2005 DoD survey population comprised all military personnel on active duty in January 2005 and who were still on active duty when we conducted the survey (March 2005 through July 2005). The only exceptions were

- basic trainees,
- Service academy cadets and midshipmen,
- personnel undergoing a permanent change of station (PCS), and
- personnel absent without official leave (AWOL).

Basic trainees, academy cadets, and midshipmen were excluded because of their lack of military experience. Personnel who were either undergoing a PCS or were AWOL were excluded because of the difficulties associated with contacting them during the relatively short data collection period.

During the group administrations (Phase 1) of the survey questionnaire, the eligibility status of sampled members was determined. Personnel who had left active duty, were PCS, or were AWOL were ineligible for the survey. Personnel who were deployed, ill, on leave, or on temporary duty were eligible but unavailable for the survey. Personnel who were available but did not attend the group administrations were eligible. To give all eligible sampled members an opportunity to participate in the survey, questionnaires (Phase 2) were mailed to all eligible personnel not attending the group administrations.

The exact size of the survey population (i.e., the total number of personnel eligible for the survey) could not be determined because of the ever-changing assignment status of military personnel. Instead, we applied the observed eligibility rates for sampled members for the group administration to the January 2005 personnel counts provided by the Defense Manpower Data Center (DMDC) to obtain accurate estimates of the total number of eligible personnel in each of the 108 sampling strata defined by intersection of Service, region, gender, and pay grade group. To ensure stable sampling estimates, sampling strata with fewer than 25 respondents were collapsed to form post-strata. Then the observed eligibility rate for each post-stratum was applied to the corresponding personnel count to obtain the estimated number of eligible personnel.

The number of eligible personnel in each post-stratum was estimated using the group administration data as follows. First, we defined the following eligibility indicator for the kth sampled member in the jth pay grade group in the ith FSU of the hth first-stage stratum:

$$e_{hijk} = \begin{cases} 1 & \textit{if he/she was eligible for the survey, and} \\ 0 & \textit{otherwise.} \end{cases}$$

Table B.1 **COMPARISON OF TOTAL PERSONNEL AND ELIGIBLE PERSONNEL**

		Army		Navy		Marine Corps		Air Force		Total DoD	
		Total Personnel	Estimated Eligible Personnel	Total Personnel	Estimated Eligible Personnel	Total Personnel	Estimated Eligible Personnel	Total Personnel	Estimated Eligible Personnel	Total Personnel	Estimated Eligible Personnel
E2-E3	Male	74,649	58,783	64,886	54,672	61,996	52,087	48,260	40,627	249,791	206,171
			(2,123)		(1,830)		(1,054)		(1,694)		(3,441)
	Female	14,521	10,393	13,404	10,925	4,041	3,382	14,316	11,504	46,282	36,205
			(765)		(638)		(195)		(678)		(1,221)
E4-E6	Male	209,588	140,701	165,478	120,589	60,535	47,040	123,099	116,318	558,700	424,649
			(3,540)		(2,035)		(1,343)		(2,443)		(4,945)
	Female	36,605	23,569	28,332	20,246	4,046	3,213	31,612	30,485	100,595	77,515
			(1,039)		(539)		(144)		(824)		(1,439)
E7-E9	Male	45,012	30,518	30,897	22,456	12,517	8,802	29,633	26,919	118,059	88,696
			(1,188)		(421)		(246)		(460)		(1,365)
	Female	5,507	3,798	2,411	1,696	649	448	3,910	3,688	12,477	9,633
			(224)		(118)		(35)		(154)		(299)
W1-W5	Male	10,761	7,466	1,543	1,129	1,721	1,310	N/A	N/A	14,025	9,905
			(461)		(88)		(107)		(N/A)		(481)
	Female	825	626	86	63	112	85	N/A	N/A	1,023	776
			(99)		(14)		(42)		(N/A)		(109)
O1-O3	Male	30,315	22,281	26,796	19,337	9,499	10,184	30,392	25,715	97,002	77,519
			(1,549)		(1,081)		(584)		(1,141)		(2,283)
	Female	7,055	5,218	5,293	3,776	771	688	8,299	7,696	21,418	17,380
			(719)		(518)		(96)		(573)		(1,060)
O4-O10	Male	22,986	15,834	18,471	13,896	5,410	1,322	23,512	24,258	70,379	55,312
			(505)		(336)		(47)		(619)		(868)
	Female	3,434	2,381	2,861	2,116	136	22	3,857	3,564	10,288	8,085
			(106)		(91)		(0.2)		(184)		(231)
Total		461,258	321,576	360,458	270,907	161,433	128,589	316,890	290,778	1,300,039	1,011,852
			(4,856)		(3,155)		(1,845)		(3,502)		(7,014)

Note: Total personnel is the number of personnel, excluding cadets, midshipmen, and basic trainees, who were on active duty as of September 2004. Eligible personnel is the estimated number of these personnel who had some chance of being selected for the survey. The standard errors for the estimated number of eligible personnel are given in parentheses beneath the estimates.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

This indicator was set to 1 for the sampled members of the group administration who were classified as eligible for the survey. Then the number of eligible personnel in each post-stratum c was estimated as

$$\hat{N}_{ec} = \frac{\sum_{hjec}\sum_{ieh}\sum_{kej} w_{hijk} \bullet e_{hijk}}{\sum_{hjec}\sum_{ieh}\sum_{kej} w_{hijk}} \bullet N_c \ , \qquad (4)$$

where

N_c = January 2005 personnel count for post-stratum c.

Table B.1 compares these estimates to the entire active-duty population by Service, gender, and pay grade group. The next section describes how the initial sampling weights of survey participants were adjusted so that the sum of their adjusted weights within a post-stratum equaled the estimated number of eligible personnel in the post-stratum.

B.1.3 Adjustments for Nonresponse

A sampled member was considered to be a respondent if he/she returned a usable questionnaire (i.e., a questionnaire that contained enough information for weighting and analysis purposes). Accordingly, the following response indicator was assigned to the kth person of the jth pay grade stratum in the ith FSU of the hth first-stage stratum:

$$r_{hijk} = \begin{cases} 1 \ \textit{if he/she provided a usable questionnaire, and} \\ 0 \ \textit{otherwise.} \end{cases}$$

This indicator was set to 1 for the 16,359 sampled members who provided a usable questionnaire.

To force the sum of the adjusted weights of respondents to equal the estimated number of eligible personnel, the following adjustment factor was calculated for each post-stratum c:

$$A_c = \frac{\hat{N}_{ec}}{\sum_{hjec}\sum_{ieh}\sum_{kej} w_{hijk} \bullet r_{hijk}} \ . \qquad (5)$$

Then the adjustment factor was applied to the initial sampling weight of each respondent to obtain the following adjusted weight:

$$w^*_{\text{hijk}} = A_c \bullet w_{hijk} \bullet r_{hijk} \ . \qquad (6)$$

Nonzero values of this weight were assigned to the 16,359 respondents who provided questionnaires with usable information.

The demographic distributions of the weighted respondents were then compared with the population using 2005 statistics provided to us by DMDC. The distributions were then post-stratified for age, race, and ethnicity in the four Service branches to make the respondents proportionally representative of the larger population. Once all adjustments were made, the weights were smoothed using GEMS software to reduce some of the unequal weighting that naturally occurs through the study design, eligibility adjustments, nonresponse adjustments and post-stratification.

B.2 Estimation Procedures and Analysis Software

This section discusses the statistical estimation procedures used for the complex sample design of the 2005 survey. Estimates were produced for different reporting domains, such as sociodemographic groups defined by Service, race/ethnicity, gender, age, and family status. The main types of estimates produced are means, such as the average ounces of ethanol consumed, and percentages, such as the percentage of persons reporting marijuana use in the past 30 days. Differences were also computed, such as the change in mean ounces of alcohol (ethanol) consumed, or the change in the percentage of persons reporting drug use between 2002 and 2005. In addition, logistic regression models were fit to estimate the combined effect of sociodemographic variables on a variety of dependent variables.

The first step in the estimation process was the development of response-adjusted analysis weights (discussed in Section B.1). Next, frequencies of categorical variables were examined to ensure that there was an adequate sample size in each level. Frequencies of continuous variables were also examined, such as age and ethanol consumption, and unreasonably large or small values in the data were investigated and resolved.

Estimation procedures appropriate for the two-stage, deeply stratified, two-phase design were used (e.g., see Cochran [1977]). Estimates of population totals are linear statistics, and their variances can be expressed in closed form. Proportions and ratios, which are nonlinear statistics, comprise most of the tabular results presented in this report. Such ratios are estimated by separately estimating the numerators and denominators of the ratios, then dividing to obtain the ratio. Because ratio estimates are nonlinear statistics, their sampling variance cannot be expressed in closed form. Variance approximations were calculated using first-order Taylor series linearizations. The estimation of regression coefficients is a multivariate extension of the Taylor series linearization for ratios.

The majority of the estimates and the standard errors presented in the report were calculated using the SUDAAN analysis software. SUDAAN is a software package developed at Research Triangle Institute for the specific purpose of analyzing data from complex surveys (Research Triangle Institute, 2002). The approach used for calculating the standard errors is a first-order Taylor series approximation of the deviation of the estimates from their expected values (Woodruff, 1971). The estimates in this report were produced using the SUDAAN procedures DESCRIPT, CROSSTAB, and LOGISTIC.

The DESCRIPT procedure in SUDAAN calculates weighted estimates of proportions, means, and totals along with estimates of their standard errors. Estimates are calculated separately for specified population domains. DESCRIPT also has the capability of producing standardized estimates for comparing the characteristics of two populations with differing distributions of confounding attributes. The CROSSTAB procedure produces weighted frequencies, percentages, and estimates of their standard errors for specified domains.

For fitting the logistic regression models, the analysis used the SUDAAN procedure LOGISTIC, which (as suggested by Binder [1981]) fits logistic regression models using sample design weights and a design-consistent estimate of the model parameters and covariance matrix. The Horvitz-Thompson estimators (Cochran, 1977) of the regression coefficients are produced, as well as a Taylor series approximation of the variance-covariance matrix of the regression coefficients in which the mean square error between primary sampling units within strata is used to estimate the variance and covariance parameters. Tests of hypotheses about regression coefficients estimated using LOGISTIC were based on a Hotelling's T2-type statistic, which is assumed to have a transformed F-distribution in repeated samples (Shah, Holt, & Folsom, 1977).

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Appendix C

Estimated Sampling Errors

The procedures and methodology used for the 2005 Department of Defense (DoD) survey are described here to help the reader use the estimates of sampling errors that were calculated and printed for various proportions and means in this report. "Sampling errors" is the general term used to describe all the sources of difference between an estimate based on a sample and the true value for the population. The difference arises because, as with most surveys other than a census, only a sample was observed rather than every member of the population. At the time of data collection for the 2005 survey, approximately 1.3 million officers and enlisted personnel in the four Services were on active duty worldwide. Samples of 16,146 such military personnel generally clustered at a sample of 395 central installations with 500 or more active-duty personnel provided close, but less than perfect, estimates of the responses that the survey would have obtained had the study included all officers and enlisted personnel.

C.1 Confidence Intervals and Significant Differences

For any particular percentage resulting from a sampling survey, it is not possible to know the exact amount of error that has resulted from sampling. It is possible, however, to establish estimated "confidence intervals" (i.e., ranges very likely to include the true population value). For example, let's say that a table shows that 50.0% of military personnel reported a certain behavior with a standard error of 1.0%. It is possible to set up a 95% confidence interval, which means that 95% of the time a computed interval can be expected to include the true (population) percentage. As a general rule, the 95% confidence interval is formed by doubling the standard error (multiplying by 1.96 is the precise value to use), adding this result to the estimate to form the upper bound, and subtracting it from the estimate to form the lower bound. In this case, the lower and upper limits of the 95% interval are approximately 48.0% and 52.0%. A somewhat wider set of limits can be set up to indicate the 99% confidence interval.

It also is possible to construct a confidence interval for a difference between two estimated percentages. For example, let's say that the difference for some measure between 2002 and 2005 is 5.0% (Table 3.1), and the 95% confidence limits for that difference have been computed as ±3.0% of that estimate. In other words, we can be 95% certain that the true difference between the 2 years' populations is somewhere between 2.0% and 8%. Because that range does not include 0%, the estimated difference is considered "statistically significant" (i.e., the whole range is higher than 0% and one estimate is considered greater than the other). If the range had included 0%, the difference would not be considered significant.

C.2 Factors Influencing the Size of Confidence Intervals in This Report

From a statistical standpoint, the most straightforward types of samples are simple random samples. In such samples, the confidence limits for a percentage are simple functions of the percentage value and the size of the sample or subgroup on which it is based. For example, the 95% confidence interval for a proportion (p) can be approximated by $p \pm 1.96 \sqrt{p(1-p)/N}$. In a more complicated sample, such as the one used in this survey, other factors also determine confidence limits. This section discusses all of the factors, beginning with the basic ones and proceeding to more complex ones.

C.2.1 Number of Cases (N)

When other things are equal, the larger a sample or subgroup, the more precise will be an estimate based thereon and, therefore, the narrower will be the confidence levels. One of the factors is $1/\sqrt{N}$, the reciprocal of the square root of the size of the sample or the subgroup. Thus, a sample of 400 will, all things being equal, have a confidence interval just half as wide as that for a sample of 100 because $1/\sqrt{400}$ is just about half of $1/\sqrt{100}$.

C.2.2 Percentage Size

Other things again being equal, percentage values around 50% have the largest confidence intervals because $\sqrt{p(1-p)}$ (where p is a proportion between 0.0 and 1.0) also is a factor affecting the size of the confidence interval. This factor will be only three-fifths as large for 10% or 90% as large for 50% because $\sqrt{.1 \times .9}$ is 3/5 × $\sqrt{.5 \times .5}$.

C.3 Design Effects in Complex Samples

Under simple random sampling (SRS), a confidence interval can be determined from the two factors just described plus the appropriate constant for the confidence level desired (e.g., 1.96 for 95%). Where stratification, clustering, and differential weighting of responses are involved, as in this survey, all of these also influence sampling error. Stratification tends to increase precision, but the effects of clustering and weighting reduce it. The result is usually lower precision than would be obtained by using a simple random sample of the same size. Accordingly, using the simple formula generally underestimates the sampling error involved.

There are methods, however, to correct for this underestimation. Kish (1965, p. 258) defined a correction term known as the design effect (*DEFF*), where

$$DEFF = \frac{Actual\ sampling\ \text{var}iance}{SRS\ \text{var}iance} .$$

If, therefore, the actual sampling variance for a proportion p is four times the value computed for a simple random sample of the same size N, the *DEFF* is 4.0. Because a confidence interval is based on the square root of the variance, any confidence interval would have to be twice as wide as the corresponding interval from a simple random sample of the same size.

A simple way of using a *DEFF* value is to divide the actual sample or domain size by it and obtain the "effective N," the size of a simple random sample that would have resulted in the same degree of precision. For example, with a *DEFF* of 4.0 and an actual sample size of 4,000, the "effective N" is 1,000. The value of the "effective N" can be used in the simple formula $\sqrt{p(1-p)/N}$ to compute standard errors of estimates and confidence interval limits for proportions. It is therefore possible to use formulas and tables appropriate for simple random samples, regardless of the actual type of sample, by converting the sample size to the "effective N."

Actually, every statistic derived from a complex sample has its own design effect, different from all of the others. In practice, however, *DEFF* values are generally computed only for a cross-section of the statistics, and averages are computed and applied to those of the same types. Often, a single average *DEFF* is used for all percentages.

In this study, standard errors have been computed for estimated proportions. The appropriate (sub)sample sizes, proportions, and correction for design effects have been incorporated into our calculations.

C.4 Suppression Rule for Estimates

In this report, unreliable estimates (indicated with a plus sign [+] in tables and figures) were suppressed. That is, proportions and means that could not be reported with confidence because they were based on small sample sizes or had large sampling errors (i.e., had low precision) were suppressed. The sample size restriction used was to suppress an estimate when the number of observations on which it was based (i.e., the denominator sample size) was fewer than 30 cases. Two rules were used to suppress estimates with large sampling errors, one for means and one for proportions.

For estimates expressed as means (e.g., average ounces of ethanol), estimates with relative standard errors (*RSEs*) greater than 50% of the estimate were suppressed. The *RSE* is computed by dividing the standard error of the estimate by the estimate.

For estimates expressed as proportions (e.g., the proportion of heavy drinkers), a suppression rule based on the *RSE* of the natural log of the estimated proportion

(p) was suppressed. Specifically, estimates in tables and figures were suppressed when

$$RSE\ [-ln(p)] > 0.225 \text{ for } p \leq 0.5, \text{ and}$$

$$RSE\ [-ln(1-p)] > 0.225 \text{ for } p > 0.5.$$

Note that $RSE[-ln(p)] = RSE(p)/(-ln(p)) = SE(p)/(-p\ ln(p))$, where $SE(p)$ denotes the standard error of p, the estimated proportion.

This rule was chosen based on the natural log of the *RSE* rather than on the *RSE* itself because the latter has been observed to have some undesirable properties for proportions. Specifically, a rule based on the *RSE* of the estimate imposes a very stringent suppression requirement on small proportions but a very lax requirement on large proportions. That is, small proportions must have relatively large effective sample sizes to avoid being suppressed, whereas large proportions require much smaller sample sizes.

The rule based on the natural log of the *RSE* of the estimate is more liberal in allowing small proportions to avoid being suppressed but more stringent with regard to suppression of large proportions. For example, under the rule based on the $RSE[-ln(p)]$, percentages of about 1% would be suppressed unless they were based on an effective sample size of about 100 or more respondents, and percentages of 20% would be suppressed unless they were based on an effective sample size of about 30 respondents. Using a rule for proportions based on $RSE(p) > 0.50$ would require an effective sample size of 400 respondents for percentages of about 1% and an effective sample size of only 16 respondents for percentage estimates of about 20%.

Very small estimates (i.e., < 0.05%) that were not suppressed under these rules, but that rounded to zero, also were suppressed and are shown as (–) in the tables and figures.

Reference for Appendix C

Kish, L. (1965). *Survey sampling*. New York: John Wiley & Sons.

Appendix D

Supplemental Tables

Table D.1 **SUBSTANCE USE SUMMARY FOR THE ARMY, 1980-2005**

	Year of Survey								
Measure	**1980**	**1982**	**1985**	**1988**	**1992**	**1995**	**1998**	**2002**	**2005**
Alcohol Drinking Level									
Abstainer	15.5 (0.7)	11.7 (0.5)[a]	14.6 (0.7)[a]	17.0 (0.7)[a]	21.4 (1.4)[a]	20.6 (1.0)	23.1 (1.3)	23.9 (1.0)	19.3 (1.3)[a,b]
Infrequent/light	12.2 (0.9)	16.7 (1.0)[a]	16.4 (1.1)	16.8 (0.9)	17.2 (0.6)	18.0 (1.4)	18.8 (1.0)	18.3 (0.9)	16.3 (1.0)[b]
Moderate	19.9 (1.2)	16.6 (0.8)[a]	17.8 (0.7)	19.5 (0.7)	17.3 (0.8)[a]	18.0 (1.0)	16.9 (0.7)	16.8 (1.0)	15.5 (0.9)[b]
Moderate/heavy	32.0 (0.7)	30.3 (1.0)	25.7 (1.8)[a]	27.1 (0.8)	26.5 (1.4)	25.0 (1.1)	24.0 (0.8)	22.3 (0.6)	24.3 (1.1)[b]
Heavy	20.3 (1.6)	24.7 (1.4)[a]	25.5 (2.2)	19.7 (1.2)[a]	17.7 (1.6)	18.4 (1.8)	17.2 (1.6)	18.8 (2.1)	24.5 (2.1)
Any Illicit Drug Use[c]									
Past 30 days	30.7 (2.8)	26.2 (1.8)	11.5 (1.3)[a]	6.9 (0.7)[a]	3.9 (0.8)[a]	4.0 (0.9)	4.5 (0.8)	4.8 (0.9)[b]	
Past 30 days									6.9 (0.5)[d]
Past 12 months	39.4 (2.9)	32.4 (1.8)[a]	16.6 (1.3)[a]	11.8 (1.1)[a]	7.7 (0.8)[a]	9.2 (1.1)	9.8 (0.9)	10.4 (1.7)[b]	
Past 12 months									15.1 (0.7)[d]
Cigarette Use, Past 30 Days									
Any smoking	54.3 (0.7)	54.7 (1.8)	52.0 (1.8)	43.1 (1.1)	37.0 (2.0)[a]	34.1 (1.6)	31.1 (1.2)	35.6 (1.9)[a]	38.2 (1.5)[b]
Heavy smoking	35.2 (0.7)	34.6 (1.4)	33.6 (1.4)	22.8 (0.7)[a]	18.0 (1.1)[a]	17.0 (1.0)	14.1 (0.8)[a]	14.5 (0.7)	15.3 (1.5)[b]
Alcohol Use Negative Effects									
Serious consequences	17.9 (1.6)	16.3 (1.2)	13.5 (2.0)	10.3 (0.8)	8.0 (1.1)[e]	7.9 (0.9)	8.5 (0.9)	10.3 (1.1)	10.8 (1.0)[b]
Productivity loss	23.8 (1.3)	33.1 (0.8)[a]	27.2 (1.3)[a]	22.0 (1.0)[a]	14.8 (1.4)[a]	16.5 (1.5)	13.4 (0.7)[a]	16.0 (1.4)	15.4 (1.1)[b]
Dependence symptoms[f]	8.8 (1.0)	10.1 (0.8)	12.1 (1.5)	7.2 (0.6)	5.4 (0.7)	6.4 (0.9)	6.2 (0.5)		
Dependence symptoms[g]								13.0 (1.6)	
Dependence symptoms[h]									4.1 (0.6)

Note: Table displays the percentage of military personnel in the Army by survey year who reported use of the substance displayed in each row. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[c]Any nonmedical use of marijuana, PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs also are included for 1988, 1992, 1995, 1998, 2002, and 2005.

[d]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

[e]This estimate was incorrectly reported as 8.3 (1.2) in the 1995 report.

[f]Having experienced alcohol dependence symptoms on at least 48 days during the year.

[g]Having experienced four or more alcohol dependence symptoms at any time during the past year.

[h]Alcohol Use Disorders Identification Test (AUDIT) score of greater than 20, indicative of possible alcohol dependence.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Alcohol Drinking Levels, Q18-Q21 and Q23-Q26; Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68 and Q69; Cigarette Use, Past 30 Days: Any Smoking, Q49 and Q52, Heavy Smoking, Q53; Alcohol Use Negative Effects, Past 12 Months: Serious Consequences, Q37 and Q38, Productivity Loss, Q36).

Table D.2 **SUBSTANCE USE SUMMARY FOR THE NAVY, 1980-2005**

Measure	Year of Survey 1980	1982	1985	1988	1992	1995	1998	2002	2005
Alcohol Drinking Level									
Abstainer	10.0 (0.5)	10.5 (1.4)	9.6 (0.8)	15.7 (0.6)[a]	19.6 (1.9)	19.0 (0.9)	24.1 (1.0)[a]	22.4 (0.8)	22.9 (2.0)[b]
Infrequent/light	11.7 (0.6)	20.7 (2.3)[a]	18.8 (2.0)	18.2 (0.9)	18.6 (0.9)	18.7 (1.1)	19.3 (0.9)	18.4 (1.1)	18.2 (0.8)[b]
Moderate	20.5 (1.3)	15.1 (1.1)[a]	18.7 (1.0)[a]	20.7 (1.2)	20.2 (1.2)	19.2 (0.9)	18.8 (1.2)	18.0 (1.1)	18.6 (0.9)
Moderate/heavy	32.2 (1.6)	26.1 (1.5)[a]	27.9 (1.4)	30.7 (1.5)	27.4 (0.7)[a]	24.0 (1.6)	24.3 (1.0)	22.9 (0.8)	23.3 (1.2)[b]
Heavy	25.6 (2.3)	27.7 (2.9)	25.0 (1.4)	14.7 (2.0)[a]	14.2 (1.7)	19.1 (1.5)[a]	13.5 (1.8)[a]	18.3 (1.2)[a]	17.0 (1.4)[b]
Any Illicit Drug Use[c]									
Past 30 days	33.7 (2.1)	16.2 (2.2)[a]	10.3 (1.7)[a]	5.4 (0.7)[a]	4.0 (0.9)	3.6 (0.6)	1.8 (0.3)[a]	3.7 (0.3)[a,b]	
Past 30 days									4.6 (1.2)[d]
Past 12 months	43.2 (2.1)	28.1 (1.7)[a]	15.9 (2.3)[a]	11.3 (2.1)	6.6 (1.9)	7.3 (0.8)	4.2 (0.5)[a]	7.1 (0.3)[a,b]	
Past 12 months									10.1 (1.9)[d]
Cigarette Use, Past 30 Days									
Any smoking	53.8 (1.2)	55.4 (1.0)	47.9 (1.2)[a]	43.8 (1.8)	37.1 (1.7)[a]	34.9 (1.6)	30.6 (1.5)	36.0 (2.4)	32.4 (1.9)[b]
Heavy smoking	37.3 (1.3)	35.7 (1.4)	34.8 (1.6)	24.6 (2.0)[a]	20.4 (0.5)[a]	16.3 (1.4)[a]	14.8 (1.1)	13.3 (1.1)	9.9 (0.9)[a,b]
Alcohol Use Negative Effects									
Serious consequences	22.1 (2.1)	17.6 (1.4)	13.5 (2.0)	10.4 (1.5)	8.4 (3.2)[e]	8.6 (0.9)	4.8 (0.6)[a]	10.8 (1.2)[a]	6.9 (0.8)[a,b]
Productivity loss	34.7 (2.1)	41.8 (1.8)[a]	35.5 (2.4)[a]	26.4 (3.1)[a]	20.1 (4.1)	20.1 (1.9)	14.1 (1.5)[a]	22.8 (1.5)[a]	13.4 (1.7)[a,b]
Dependence symptoms[f]	9.7 (1.0)	11.6 (1.0)	6.8 (0.8)	7.2 (1.3)	5.2 (1.0)	6.1 (0.8)	3.3 (0.5)[a,b]		
Dependence symptoms[g]								13.0 (0.7)	
Dependence symptoms[h]									2.8 (0.6)

Note: Table displays the percentage of military personnel in the Army by survey year who reported use of the substance displayed in each row. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[c]Any nonmedical use of marijuana, PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs also are included for 1988, 1992, 1995, 1998, 2002, and 2005.

[d]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

[e]This estimate was incorrectly reported as 9.1 (3.9) in the 1995 report.

[f]Having experienced alcohol dependence symptoms on at least 48 days during the year.

[g]Having experienced four or more alcohol dependence symptoms at any time during the past year.

[h]Alcohol Use Disorders Identification Test (AUDIT) score of greater than 20, indicative of possible alcohol dependence.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Alcohol Drinking Levels, Q18-Q21 and Q23-Q26; Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68 and Q69; Cigarette Use, Past 30 Days: Any Smoking, Q49 and Q52, Heavy Smoking, Q53; Alcohol Use Negative Effects, Past 12 Months: Serious Consequences, Q37 and Q38, Productivity Loss, Q36).

Table D.3 **SUBSTANCE USE SUMMARY FOR THE MARINE CORPS, 1980-2005**

	Year of Survey								
Measure	**1980**	**1982**	**1985**	**1988**	**1992**	**1995**	**1998**	**2002**	**2005**
Alcohol Drinking Level									
Abstainer	10.4 (1.0)	13.5 (2.0)	10.8 (2.5)	18.0 (0.9)[a]	14.6 (0.5)[a]	16.4 (0.7)[a]	19.1 (0.8)[a]	18.8 (1.1)	18.5 (1.2)[b]
Infrequent/light	11.0 (0.5)	13.2 (1.8)	13.6 (1.7)	16.1 (2.9)	14.4 (1.2)	13.9 (0.7)	17.5 (0.8)[a]	15.5 (1.6)	17.9 (1.2)[b]
Moderate	17.6 (1.2)	14.9 (0.3)[a]	15.1 (2.1)	13.9 (1.0)	19.5 (1.5)[a]	17.2 (1.1)	17.3 (1.2)	16.0 (1.1)	13.9 (1.2)[b]
Moderate/heavy	32.4 (1.4)	27.8 (0.7)[a]	31.1 (1.8)	27.6 (1.9)	25.4 (1.9)	24.0 (0.9)	23.1 (1.1)	22.1 (1.4)	24.2 (0.9)[b]
Heavy	28.6 (2.5)	30.6 (0.9)	29.4 (3.7)	24.4 (4.2)	26.0 (1.3)	28.6 (2.5)	23.0 (2.1)	27.7 (4.3)	25.4 (1.3)
Any Illicit Drug Use[c]									
Past 30 days	37.7 (3.0)	20.6 (2.0)[a]	9.9 (3.2)[a]	4.0 (0.7)	5.6 (1.0)	3.6 (0.8)	3.3 (0.4)	3.8 (0.5)[b]	
Past 30 days									6.2 (1.1)[d]
Past 12 months	48.0 (3.1)	29.9 (3.2)[a]	14.7 (3.8)[a]	7.8 (1.0)	10.7 (1.3)	7.3 (1.2)	7.2 (0.8)	7.9 (1.3)[b]	
Past 12 months									12.6 (1.5)[d]
Cigarette Use, Past 30 Days									
Any smoking	53.4 (0.6)	48.7 (0.4)[a]	42.6 (3.1)	41.3 (1.8)	39.2 (2.3)	35.0 (1.8)	34.9 (2.1)	38.7 (4.1)	36.3 (2.3)[b]
Heavy smoking	34.5 (0.9)	31.6 (0.7)[a]	26.1 (0.8)[a]	18.7 (2.2)[a]	20.7 (1.8)	15.0 (1.2)[a]	13.5 (1.1)	14.6 (2.4)	11.1 (1.4)[b]
Alcohol Use Negative Effects									
Serious consequences	26.2 (2.2)	19.7 (1.0)[a]	12.3 (1.7)[a]	17.0 (3.4)	14.8 (2.1)[e]	14.7 (1.6)	12.5 (1.3)	15.2 (3.7)	14.5 (1.3)[b]
Productivity loss	34.1 (1.6)	37.6 (1.2)	29.0 (5.0)	32.0 (3.8)	25.6 (1.9)	21.8 (1.9)	19.2 (1.3)	23.7 (3.3)	19.8 (1.4)[b]
Dependence symptoms[f]	11.8 (1.2)	10.2 (1.8)	7.6 (1.4)	9.8 (1.7)	11.2 (1.7)	9.6 (1.1)	8.2 (1.2)		
Dependence symptoms[g]								20.3 (3.6)	
Dependence symptoms[h]									4.2 (0.9)

Note: Table displays the percentage of military personnel in the Marine Corps by survey year who reported use of the substance displayed in each row. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[c]Any nonmedical use of marijuana, PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs also are included for 1988, 1992, 1995, 1998, 2002, and 2005.

[d]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

[e]This estimate was incorrectly reported as 15.7 (1.8) in the 1995 report.

[f]Having experienced alcohol dependence symptoms on at least 48 days during the year.

[g]Having experienced four or more alcohol dependence symptoms at any time during the past year.

[h]Alcohol Use Disorders Identification Test (AUDIT) score of greater than 20, indicative of possible alcohol dependence.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Alcohol Drinking Levels, Q18-Q21 and Q23-Q26; Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68 and Q69; Cigarette Use, Past 30 Days: Any Smoking, Q49 and Q52, Heavy Smoking, Q53; Alcohol Use Negative Effects, Past 12 Months: Serious Consequences, Q37 and Q38, Productivity Loss, Q36).

Table D.4 **SUBSTANCE USE SUMMARY FOR THE AIR FORCE, 1980-2005**

Measure	Year of Survey 1980	1982	1985	1988	1992	1995	1998	2002	2005
Alcohol Drinking Level									
Abstainer	15.0 (1.0)	12.6 (0.7)[a]	15.6 (1.0)[a]	18.4 (0.8)[a]	21.1 (0.8)[a]	24.2 (0.9)[a]	26.6 (1.1)	24.4 (1.9)	26.2 (1.1)[b]
Infrequent/light	12.6 (0.5)	17.3 (0.8)[a]	15.4 (0.8)	18.1 (0.8)[a]	21.3 (0.9)[a]	20.5 (0.9)	21.1 (0.8)	19.5 (0.7)	20.1 (0.8)[b]
Moderate	24.9 (1.2)	19.8 (0.7)[a]	20.9 (1.2)	19.7 (0.8)	21.5 (0.7)	20.5 (0.7)	19.4 (1.0)	20.3 (0.8)	20.8 (1.2)[b]
Moderate/heavy	33.2 (0.9)	32.6 (0.8)	31.5 (1.2)	29.2 (1.1)	25.4 (0.8)[a]	24.5 (1.0)	21.3 (0.9)[a]	23.5 (1.0)	22.6 (0.8)[b]
Heavy	14.3 (1.4)	17.7 (1.2)	16.5 (1.4)	14.5 (1.0)	10.6 (0.8)[a]	10.4 (1.1)	11.7 (1.0)	12.3 (1.0)	10.3 (1.3)[b]
Any Illicit Drug Use[c]									
Past 30 days	14.5 (1.1)	11.9 (1.5)	4.5 (0.8)[a]	2.1 (0.4)[a]	1.2 (0.2)[a]	1.0 (0.2)	1.2 (0.1)	1.0 (0.2)[b]	
Past 30 days									2.8 (0.4)[d]
Past 12 months	23.4 (1.7)	16.4 (1.8)[a]	7.2 (0.9)[a]	3.8 (0.6)[a]	2.3 (0.3)[a]	2.5 (0.4)	2.4 (0.2)	1.8 (0.3)[b]	
Past 12 months									6.1 (0.7)[d]
Cigarette Use, Past 30 Days									
Any smoking	43.2 (1.8)	44.1 (1.6)	39.0 (2.3)	35.8 (1.2)	29.2 (1.4)[a]	25.1 (1.3)[a]	25.7 (1.5)	27.0 (2.7)	23.3 (1.8)[b]
Heavy smoking	29.7 (1.3)	30.6 (1.2)	26.8 (1.7)	22.0 (0.8)[a]	14.6 (1.0)[a]	11.2 (0.8)[a]	11.2 (1.0)	10.4 (1.0)	7.0 (0.6)[a,b]
Alcohol Use Negative Effects									
Serious consequences	9.0 (0.8)	8.0 (0.8)	4.7 (0.5)	3.9 (0.5)	3.5 (0.4)[e]	3.7 (0.5)	3.6 (0.3)	4.9 (0.5)[a]	3.3 (0.3)[a,b]
Productivity loss	20.7 (1.2)	28.0 (2.7)[a]	19.4 (1.1)	15.5 (0.8)[a]	10.6 (0.5)[a]	9.9 (0.6)	10.8 (1.1)	10.6 (1.0)	7.4 (0.6)[a,b]
Dependence symptoms[f]	4.3 (0.6)	3.7 (0.7)	3.3 (0.5)	3.8 (0.4)	2.7 (0.3)	3.0 (0.6)	2.8 (0.5)		
Dependence symptoms[g]								6.8 (0.6)	
Dependence symptoms[h]									1.1 (0.2)

Note: Table displays the percentage of military personnel in the Air Force by survey year who reported use of the substance displayed in each row. The standard error of each estimate is presented in parentheses. Significance tests were done between consecutive survey years (e.g., 1980 and 1982) and between 1980 and 2005. Definitions and measures of substance use are given in Section 2.5.3.

[a]Comparisons between this survey and the preceding survey are statistically significant at the 95% confidence level.

[b]Comparisons between 1980 and 2005 (2002 for illicit drug use) are statistically significant at the 95% confidence level.

[c]Any nonmedical use of marijuana, PCP/LSD/hallucinogens, cocaine, amphetamines/stimulants, tranquilizers, barbiturates/sedatives, heroin/other opiates, analgesics, or inhalants. "Designer" drugs also are included for 1988, 1992, 1995, 1998, 2002, and 2005.

[d]Because of wording changes in the questionnaire, the 2005 data on illicit drug use are not comparable with data from prior survey years.

[e]This estimate was incorrectly reported as 3.8 (0.4) in the 1995 report.

[f]Having experienced alcohol dependence symptoms on at least 48 days during the year.

[g]Having experienced four or more alcohol dependence symptoms at any time during the past year.

[h]Alcohol Use Disorders Identification Test (AUDIT) score of greater than 20, indicative of possible alcohol dependence.

Source: DoD Surveys of Health Related Behaviors Among Active Duty Military Personnel, 1980 to 2005 (2005 Questions: Alcohol Drinking Levels, Q18-Q21 and Q23-Q26; Any Illicit Drug Use: Past 30 Days, Q68 and Q70, Past 12 Months, Q68 and Q69; Cigarette Use, Past 30 Days: Any Smoking, Q49 and Q52, Heavy Smoking, Q53; Alcohol Use Negative Effects, Past 12 Months: Serious Consequences, Q37 and Q38, Productivity Loss, Q36).

Table D.5 **DRINKING LEVEL, TOTAL DOD, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Drinking Level: Abstainer	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Gender					
Male	20.3 (0.8)	16.9 (0.5)	17.2 (0.6)	25.0 (0.6)	20.6 (1.0)
Female	32.9 (1.6)	25.2 (1.0)	20.3 (1.1)	15.0 (0.6)	6.6 (0.8)
Race/Ethnicity					
White, non-Hispanic	18.6 (0.8)	17.8 (0.6)	18.4 (0.7)	25.2 (0.7)	20.0 (1.1)
African American, non-Hispanic	33.0 (1.8)	17.2 (1.1)	16.6 (1.1)	21.3 (1.6)	11.9 (1.6)
Hispanic	21.5 (1.5)	20.6 (1.4)	14.9 (1.0)	20.1 (1.2)	22.8 (1.8)
Other	27.4 (2.2)	19.8 (1.2)	17.4 (1.4)	19.2 (1.5)	16.2 (1.5)
Education					
High school or less	21.8 (1.4)	15.8 (0.7)	13.6 (0.7)	22.1 (1.0)	26.8 (1.1)
Some college	22.7 (0.8)	18.7 (0.6)	18.2 (0.7)	23.2 (0.8)	17.2 (1.2)
College graduate or higher	21.7 (1.3)	20.4 (0.8)	22.8 (1.1)	26.3 (1.1)	8.8 (1.5)
Age					
20 or younger	37.7 (2.8)	15.7 (1.2)	10.1 (1.0)	15.2 (1.2)	21.3 (2.6)
21-25	12.5 (0.7)	16.1 (0.7)	15.9 (0.9)	25.8 (0.8)	29.7 (1.3)
26-34	22.2 (1.0)	19.4 (0.6)	19.5 (0.9)	25.0 (1.0)	13.9 (1.1)
35 or older	26.0 (1.0)	20.6 (0.7)	22.3 (0.9)	23.5 (0.9)	7.5 (0.7)
Family Status[a]					
Not married	20.8 (1.2)	15.0 (0.7)	15.5 (0.7)	22.5 (0.7)	26.1 (1.0)
Married, spouse not present	19.5 (2.0)	18.4 (1.5)	17.7 (1.5)	22.6 (1.5)	21.8 (2.4)
Married, spouse present	23.6 (0.8)	20.9 (0.7)	19.7 (0.8)	24.7 (0.7)	11.1 (1.0)
Pay Grade					
E1-E3	25.9 (1.8)	16.0 (0.9)	13.2 (0.7)	19.5 (1.5)	25.5 (1.6)
E4-E6	20.8 (0.9)	18.5 (0.5)	16.7 (0.6)	23.5 (0.8)	20.6 (1.0)
E7-E9	26.1 (1.1)	18.0 (1.0)	21.3 (1.2)	24.6 (1.4)	9.9 (0.8)
W1-W5	18.7 (3.5)	18.7 (3.2)	25.4 (2.7)	27.8 (3.4)	9.4 (2.6)
O1-O3	17.9 (1.9)	18.8 (1.5)	23.8 (1.9)	28.2 (1.4)	11.3 (2.6)
O4-O10	19.8 (1.5)	21.9 (1.0)	26.0 (1.4)	29.5 (1.4)	2.8 (0.5)
Region					
CONUS[b]	22.9 (0.9)	19.1 (0.6)	18.7 (0.7)	23.6 (0.5)	15.7 (1.0)
OCONUS[c]	20.4 (1.7)	16.0 (0.8)	15.5 (0.9)	23.3 (1.3)	24.8 (2.3)
Total	22.1 (0.8)	18.1 (0.5)	17.7 (0.6)	23.5 (0.5)	18.5 (1.0)

Note: Table displays the percentage of military personnel by sociodemographic characteristic who were classified in the drinking levels as indicated in the columns of this table. Estimates within each row may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Drinking Levels, Q18-Q21 and Q23-Q26).

Table D.6 **DRINKING LEVEL FOR THE ARMY, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Drinking Level: Abstainer	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Gender					
Male	17.1 (0.9)	14.7 (1.0)	15.1 (1.0)	25.9 (1.3)	27.2 (2.1)
Female	32.5 (4.2)	25.5 (2.6)	18.2 (2.4)	15.1 (1.4)	8.8 (1.6)
Race/Ethnicity					
White, non-Hispanic	15.4 (0.9)	15.1 (1.0)	16.6 (1.3)	25.4 (1.5)	27.5 (2.5)
African American, non-Hispanic	29.1 (2.9)	17.7 (2.4)	14.3 (1.7)	23.9 (3.4)	15.0 (3.0)
Hispanic	19.8 (2.9)	18.9 (2.7)	10.9 (1.6)	21.2 (1.9)	29.2 (3.2)
Other	22.7 (2.6)	18.1 (1.6)	16.5 (2.2)	21.5 (2.7)	21.2 (3.0)
Education					
High school or less	16.8 (2.6)	14.1 (1.4)	11.8 (1.0)	23.8 (1.9)	33.5 (1.7)
Some college	21.3 (1.2)	17.4 (1.5)	16.7 (1.0)	23.6 (1.8)	21.0 (3.1)
College graduate or higher	19.9 (2.7)	17.9 (1.7)	19.4 (1.7)	26.6 (2.2)	16.3 (3.9)
Age					
20 or younger	28.7 (5.6)	17.0 (1.9)	10.7 (1.7)	15.0 (2.1)	28.6 (5.8)
21-25	9.0 (1.0)	13.8 (0.9)	13.8 (1.5)	27.7 (1.0)	35.7 (2.4)
26-34	21.4 (1.2)	17.7 (1.4)	16.7 (1.8)	25.1 (1.6)	19.1 (2.7)
35 or older	25.0 (1.7)	17.6 (1.9)	20.8 (1.3)	25.7 (1.4)	10.8 (1.5)
Family Status[a]					
Not married	18.5 (2.1)	15.0 (1.4)	12.8 (1.2)	21.8 (1.2)	32.0 (1.5)
Married, spouse not present	15.7 (3.1)	17.2 (1.9)	19.1 (2.4)	24.7 (2.8)	23.4 (4.3)
Married, spouse present	21.2 (1.2)	17.8 (1.8)	18.0 (1.7)	27.6 (1.1)	15.4 (2.7)
Pay Grade					
E1-E3	22.7 (3.2)	16.0 (1.7)	12.6 (1.1)	17.9 (3.4)	30.7 (3.9)
E4-E6	17.6 (1.2)	16.2 (1.3)	13.7 (1.0)	24.9 (1.2)	27.7 (1.9)
E7-E9	26.1 (2.0)	14.5 (1.8)	21.3 (2.9)	27.0 (3.1)	11.1 (1.8)
W1-W5	19.4 (4.5)	16.8 (4.2)	26.5 (3.4)	29.0 (4.4)	8.4 (3.1)
O1-O3	11.7 (2.3)	17.7 (2.1)	19.7 (3.4)	26.3 (3.0)	24.7 (5.5)
O4-O10	20.8 (4.0)	19.1 (3.0)	21.4 (3.4)	33.6 (3.9)	5.2 (1.4)
Region					
CONUS[b]	20.2 (2.1)	16.8 (1.4)	17.0 (1.0)	25.8 (1.0)	20.2 (2.6)
OCONUS[c]	18.0 (1.8)	15.4 (1.3)	13.4 (1.0)	22.1 (1.8)	31.1 (2.5)
Total	19.3 (1.3)	16.3 (1.0)	15.5 (0.9)	24.3 (1.1)	24.5 (2.1)

Note: Table displays the percentage of military personnel in the Army by sociodemographic characteristic who were classified in the drinking levels as indicated in the columns of this table. Estimates within each row may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Drinking Levels, Q18-Q21 and Q23-Q26).

Table D.7 **DRINKING LEVEL FOR THE NAVY, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Drinking Level: Abstainer	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Gender					
Male	21.4 (2.0)	16.9 (1.0)	18.4 (0.9)	24.5 (1.3)	18.9 (1.4)
Female	31.7 (3.2)	26.0 (1.7)	20.2 (2.0)	16.5 (1.1)	5.6 (1.6)
Race/Ethnicity					
White, non-Hispanic	19.3 (2.5)	16.8 (1.1)	18.0 (1.1)	26.4 (1.5)	19.5 (1.2)
African American, non-Hispanic	33.0 (2.6)	17.6 (0.9)	18.4 (2.0)	20.5 (1.8)	10.5 (3.4)
Hispanic	23.3 (3.1)	25.0 (1.7)	19.1 (2.9)	16.8 (1.6)	15.9 (1.3)
Other	25.5 (2.8)	21.4 (2.3)	21.6 (2.3)	16.3 (1.5)	15.1 (2.3)
Education					
High school or less	24.7 (3.0)	16.4 (1.4)	16.2 (1.5)	20.1 (1.8)	22.6 (1.6)
Some college	23.5 (2.1)	18.3 (0.7)	17.6 (1.0)	23.7 (1.8)	16.9 (2.2)
College graduate or higher	18.1 (1.7)	21.3 (1.2)	25.6 (2.0)	28.6 (2.1)	6.4 (0.9)
Age					
20 or younger	43.3 (6.9)	12.6 (1.9)	11.6 (2.3)	15.4 (2.3)	17.0 (5.6)
21-25	14.5 (1.5)	17.0 (0.7)	16.0 (1.5)	24.4 (2.0)	28.1 (2.2)
26-34	19.9 (1.7)	19.6 (1.0)	19.6 (1.4)	26.1 (1.9)	14.7 (1.3)
35 or older	25.9 (2.2)	20.5 (1.0)	23.9 (1.7)	22.6 (2.3)	7.0 (0.8)
Family Status[a]					
Not married	22.2 (3.3)	14.4 (1.6)	16.4 (0.9)	22.3 (1.7)	24.6 (2.3)
Married, spouse not present	23.5 (2.4)	20.7 (2.4)	16.0 (2.1)	20.8 (2.5)	19.0 (1.7)
Married, spouse present	23.4 (1.7)	21.3 (1.1)	20.9 (1.2)	24.6 (1.4)	9.7 (0.6)
Pay Grade					
E1-E3	29.2 (5.3)	14.5 (1.0)	14.5 (1.0)	19.3 (2.8)	22.5 (3.7)
E4-E6	21.7 (1.4)	19.4 (0.8)	17.4 (1.0)	22.2 (1.9)	19.3 (1.6)
E7-E9	24.4 (3.1)	17.8 (1.7)	22.6 (2.4)	24.9 (2.7)	10.3 (1.0)
W1-W5	+ (+)	28.0 (7.1)	24.5 (6.6)	23.2 (5.7)	9.1 (2.9)
O1-O3	16.8 (2.8)	18.0 (2.1)	24.0 (2.1)	34.0 (3.5)	7.1 (1.5)
O4-O10	15.5 (2.4)	22.3 (1.7)	30.6 (1.6)	30.4 (3.0)	1.2 (0.6)
Region					
CONUS[b]	25.5 (1.9)	20.3 (1.1)	20.0 (1.7)	22.0 (1.2)	12.2 (1.2)
OCONUS[c]	19.9 (3.5)	15.8 (1.0)	17.1 (1.0)	24.8 (2.1)	22.4 (3.0)
Total	22.9 (2.0)	18.2 (0.8)	18.6 (0.9)	23.3 (1.2)	17.0 (1.4)

Note: Table displays the percentage of military personnel in the Navy by sociodemographic characteristic who were classified in the drinking levels as indicated in the columns of this table. Estimates within each row may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Drinking Levels, Q18-Q21 and Q23-Q26).

Table D.8 **DRINKING LEVEL FOR THE MARINE CORPS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Drinking Level: Abstainer	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Gender					
Male	17.4 (1.2)	17.4 (1.2)	14.0 (1.2)	24.9 (1.0)	26.3 (1.3)
Female	35.9 (2.9)	26.6 (2.5)	12.7 (2.8)	13.7 (2.0)	11.1 (1.8)
Race/Ethnicity					
White, non-Hispanic	15.0 (1.1)	18.3 (1.6)	13.3 (1.1)	25.1 (1.3)	28.3 (1.3)
African American, non-Hispanic	33.1 (2.8)	11.5 (0.9)	14.8 (2.8)	24.4 (2.3)	16.2 (2.2)
Hispanic	17.9 (1.8)	19.3 (1.9)	15.2 (1.6)	21.0 (2.7)	26.6 (3.1)
Other	26.7 (6.6)	20.6 (3.5)	15.2 (4.2)	22.4 (4.2)	15.1 (4.2)
Education					
High school or less	19.2 (1.4)	16.4 (0.9)	11.1 (0.9)	21.3 (1.5)	32.0 (2.0)
Some college	18.0 (1.7)	19.6 (1.7)	17.2 (2.4)	25.1 (1.7)	20.0 (1.7)
College graduate or higher	17.1 (2.4)	19.5 (4.7)	15.1 (2.1)	33.8 (2.5)	14.4 (3.8)
Age					
20 or younger	29.2 (2.6)	19.2 (2.0)	9.2 (2.3)	20.2 (1.9)	22.2 (2.5)
21-25	10.2 (0.9)	15.9 (2.6)	11.4 (1.4)	24.9 (2.1)	37.6 (3.1)
26-34	20.2 (2.3)	19.6 (1.7)	19.2 (2.9)	27.2 (2.2)	13.7 (1.8)
35 or older	26.4 (2.9)	19.8 (2.0)	20.9 (1.9)	22.4 (1.2)	10.5 (2.0)
Family Status[a]					
Not married	15.9 (1.2)	15.5 (1.2)	11.9 (1.3)	24.3 (1.4)	32.4 (1.0)
Married, spouse not present	19.3 (4.3)	18.7 (5.2)	12.4 (3.8)	17.5 (2.3)	32.1 (5.1)
Married, spouse present	21.2 (1.8)	21.0 (1.5)	16.8 (2.3)	25.4 (1.3)	15.7 (1.8)
Pay Grade					
E1-E3	17.9 (2.0)	17.4 (1.6)	10.1 (1.9)	24.0 (1.1)	30.6 (1.2)
E4-E6	18.0 (2.9)	17.3 (0.8)	16.7 (1.2)	22.4 (1.6)	25.6 (1.8)
E7-E9	31.5 (1.7)	19.7 (1.6)	17.1 (1.7)	20.5 (1.2)	11.3 (0.7)
W1-W5	18.3 (5.2)	21.4 (3.4)	20.0 (5.2)	24.9 (4.7)	+ (+)
O1-O3	13.9 (3.3)	21.4 (7.2)	14.1 (3.0)	35.5 (3.2)	15.1 (5.4)
O4-O10	12.1 (2.0)	18.3 (1.6)	31.5 (2.4)	34.1 (3.1)	4.0 (1.4)
Region					
CONUS[b]	17.0 (1.8)	18.5 (1.4)	13.5 (1.4)	24.7 (1.2)	26.4 (1.7)
OCONUS[c]	25.1 (3.2)	15.7 (0.8)	15.7 (1.6)	22.1 (1.2)	21.3 (0.4)
Total	18.5 (1.2)	17.9 (1.2)	13.9 (1.2)	24.2 (0.9)	25.4 (1.3)

Note: Table displays the percentage of military personnel in the Marine Corps by sociodemographic characteristic who were classified in the drinking levels as indicated in the columns of this table. Estimates within each row may not sum to 100 because of rounding. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Drinking Levels, Q18-Q21 and Q23-Q26).

Table D.9 **DRINKING LEVEL FOR THE AIR FORCE, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Drinking Level: Abstainer	Infrequent/ Light	Moderate	Moderate/ Heavy	Heavy
Gender					
Male	24.3 (1.2)	19.1 (1.0)	20.3 (1.3)	24.6 (1.0)	11.6 (1.5)
Female	33.6 (1.2)	24.3 (1.3)	23.2 (1.5)	14.0 (1.0)	4.9 (0.9)
Race/Ethnicity					
White, non-Hispanic	22.5 (1.1)	20.8 (0.9)	22.3 (1.3)	24.1 (1.2)	10.2 (1.6)
African American, non-Hispanic	39.4 (3.7)	17.6 (1.7)	18.9 (2.6)	17.0 (1.7)	7.0 (1.3)
Hispanic	26.5 (1.9)	19.9 (3.2)	17.2 (1.9)	21.3 (3.5)	15.2 (2.0)
Other	34.7 (5.5)	18.7 (2.1)	13.7 (2.6)	19.4 (3.8)	13.6 (2.8)
Education					
High school or less	30.2 (2.8)	17.5 (2.5)	15.3 (1.7)	23.3 (2.5)	13.8 (1.8)
Some college	24.7 (1.1)	19.9 (1.1)	20.3 (1.6)	21.8 (1.1)	13.2 (1.5)
College graduate or higher	26.1 (2.1)	22.2 (1.1)	25.4 (2.3)	23.4 (1.8)	2.9 (0.5)
Age					
20 or younger	61.8 (3.2)	12.7 (3.1)	7.1 (1.7)	9.3 (3.0)	9.0 (2.0)
21-25	16.4 (1.4)	18.4 (1.5)	21.7 (2.2)	25.3 (1.6)	18.2 (1.6)
26-34	25.3 (2.1)	20.6 (0.9)	21.8 (1.8)	23.3 (1.9)	8.9 (1.4)
35 or older	26.8 (1.3)	23.2 (0.9)	22.5 (1.8)	22.6 (1.4)	4.9 (0.9)
Family Status[a]					
Not married	25.8 (1.5)	15.4 (0.7)	20.8 (1.4)	22.8 (1.4)	15.1 (1.1)
Married, spouse not present	24.8 (3.6)	18.3 (3.8)	21.7 (5.0)	24.5 (3.4)	10.7 (4.4)
Married, spouse present	26.3 (1.4)	22.9 (0.9)	20.9 (1.5)	22.4 (1.1)	7.4 (1.5)
Pay Grade					
E1-E3	34.7 (2.9)	16.2 (2.4)	15.6 (1.4)	17.0 (2.8)	16.5 (1.9)
E4-E6	24.4 (1.6)	20.7 (0.8)	19.4 (1.4)	23.4 (0.9)	12.1 (1.5)
E7-E9	25.7 (0.9)	21.6 (1.6)	21.5 (1.3)	23.2 (1.0)	8.0 (1.0)
W1-W5	N/A (N/A)	N/A (N/A)	N/A (N/A)	N/A (N/A)	N/A (N/A)
O1-O3	25.0 (3.2)	19.4 (2.5)	30.0 (4.1)	23.5 (2.2)	2.2 (0.6)
O4-O10	22.0 (1.7)	23.6 (1.1)	26.1 (2.1)	26.2 (1.0)	2.1 (0.8)
Region					
CONUS[b]	25.9 (1.2)	20.3 (0.9)	21.3 (1.4)	22.5 (0.9)	9.9 (1.4)
OCONUS[c]	27.8 (1.9)	18.7 (1.9)	17.2 (1.1)	23.1 (0.6)	13.2 (3.8)
Total	26.2 (1.1)	20.1 (0.8)	20.8 (1.2)	22.6 (0.8)	10.3 (1.3)

Note: Table displays the percentage of military personnel in the Air Force by sociodemographic characteristic who were classified in the drinking levels as indicated in the columns of this table. Estimates within each row may not sum to 100 due to rounding. The standard error of each estimate is presented in parentheses. Definitions and measures of substance use are given in Section 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Alcohol Drinking Levels, Q18-Q21 and Q23-Q26).

Table D.10 **HEAVY ALCOHOL USE, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	27.2 (2.1)	18.9 (1.4)	26.3 (1.3)	11.6 (1.5)	20.6 (1.0)
Female	8.8 (1.6)	5.6 (1.6)	11.1 (1.8)	4.9 (0.9)	6.6 (0.8)
Race/Ethnicity					
White, non-Hispanic	27.5 (2.5)	19.5 (1.2)	28.3 (1.3)	10.2 (1.6)	20.0 (1.1)
African American, non-Hispanic	15.0 (3.0)	10.5 (3.4)	16.2 (2.2)	7.0 (1.3)	11.9 (1.6)
Hispanic	29.2 (3.2)	15.9 (1.3)	26.6 (3.1)	15.2 (2.0)	22.8 (1.8)
Other	21.2 (3.0)	15.1 (2.3)	15.1 (4.2)	13.6 (2.8)	16.2 (1.5)
Education					
High school or less	33.5 (1.7)	22.6 (1.6)	32.0 (2.0)	13.8 (1.8)	26.8 (1.1)
Some college	21.0 (3.1)	16.9 (2.2)	20.0 (1.7)	13.2 (1.5)	17.2 (1.2)
College graduate or higher	16.3 (3.9)	6.4 (0.9)	14.4 (3.8)	2.9 (0.5)	8.8 (1.5)
Age					
20 or younger	28.6 (5.8)	17.0 (5.6)	22.2 (2.5)	9.0 (2.0)	21.3 (2.6)
21-25	35.7 (2.4)	28.1 (2.2)	37.6 (3.1)	18.2 (1.6)	29.7 (1.3)
26-34	19.1 (2.7)	14.7 (1.3)	13.7 (1.8)	8.9 (1.4)	13.9 (1.1)
35 or older	10.8 (1.5)	7.0 (0.8)	10.5 (2.0)	4.9 (0.9)	7.5 (0.7)
Family Status[a]					
Not married	32.0 (1.5)	24.6 (2.3)	32.4 (1.0)	15.1 (1.1)	26.1 (1.0)
Married, spouse not present	23.4 (4.3)	19.0 (1.7)	32.1 (5.1)	10.7 (4.4)	21.8 (2.4)
Married, spouse present	15.4 (2.7)	9.7 (0.6)	15.7 (1.8)	7.4 (1.5)	11.1 (1.0)
Pay Grade					
E1-E3	30.7 (3.9)	22.5 (3.7)	30.6 (1.2)	16.5 (1.9)	25.5 (1.6)
E4-E6	27.7 (1.9)	19.3 (1.6)	25.6 (1.8)	12.1 (1.5)	20.6 (1.0)
E7-E9	11.1 (1.8)	10.3 (1.0)	11.3 (0.7)	8.0 (1.0)	9.9 (0.8)
W1-W5	8.4 (3.1)	9.1 (2.9)	+ (+)	N/A (N/A)	9.4 (2.6)
O1-O3	24.7 (5.5)	7.1 (1.5)	15.1 (5.4)	2.2 (0.6)	11.3 (2.6)
O4-O10	5.2 (1.4)	1.2 (0.6)	4.0 (1.4)	2.1 (0.8)	2.8 (0.5)
Region					
CONUS[b]	20.2 (2.6)	12.2 (1.2)	26.4 (1.7)	9.9 (1.4)	15.7 (1.0)
OCONUS[c]	31.1 (2.5)	22.4 (3.0)	21.3 (0.4)	13.2 (3.8)	24.8 (2.3)
Total	24.5 (2.1)	17.0 (1.4)	25.4 (1.3)	10.3 (1.3)	18.5 (1.0)

Note: Table displays the percentage of military personnel by service and sociodemographic characteristic who were classified as heavy alcohol users. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Heavy Alcohol Use, Q18–Q21 and Q23–Q26).

Table D.11 **ESTIMATES OF AVERAGE DAILY OUNCES OF ETHANOL, AMONG ENTIRE POPULATION AND DRINKERS ONLY, BY SERVICE**

	Service				
Population	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Entire Population, per Year	1.9 (0.2)[a,b]	1.4 (0.2)[b,c,d]	1.9 (0.1)[a,b]	0.7 (0.1)[a,c,d]	1.4 (0.1)
Drinkers Only, per Year	2.4 (0.3)[a,b]	1.8 (0.2)[b,c,d]	2.3 (0.1)[a,b]	1.0 (0.1)[a,c,d]	1.8 (0.1)
Drinkers Only, per Drinking Day	8.7 (0.7)[a,b]	6.6 (0.3)[b,c,d]	8.9 (0.4)[a,b]	4.5 (0.4)[a,c,d]	7.0 (0.3)

Note: Table entries for average daily ounces of ethanol are average values among military personnel by Service. The standard error of each estimate is presented in parentheses. Pairwise significance tests were conducted between all possible Service combinations (e.g., Army vs. Navy, Navy vs. Marine Corps). Differences that were statistically significant are indicated.

[a]Estimate is significantly different from the Navy at the 95% confidence level.

[b]Estimate is significantly different from the Air Force at the 95% confidence level.

[c]Estimate is significantly different from the Army at the 95% confidence level.

[d]Estimate is significantly different from the Marine Corps at the 95% confidence level.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Average Daily Ounces of Ethanol, Q18-Q26 and Q32-Q34).

Table D.12 **ANY ILLICIT DRUG USE, PAST 12 MONTHS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	15.5 (0.7)	9.7 (2.1)	12.5 (1.6)	5.7 (0.7)	10.9 (0.8)
Female	12.9 (1.3)	12.6 (1.2)	13.4 (1.7)	7.9 (1.0)	11.0 (0.7)
Race/Ethnicity					
White, non-Hispanic	16.1 (0.8)	10.2 (2.0)	13.3 (2.0)	6.0 (0.8)	11.0 (0.8)
African American, non-Hispanic	11.6 (1.0)	8.0 (1.8)	8.0 (1.9)	5.0 (0.7)	8.7 (0.8)
Hispanic	20.1 (1.7)	11.5 (2.1)	12.7 (2.2)	4.2 (1.3)	13.7 (1.4)
Other	10.9 (2.1)	11.6 (2.6)	13.2 (2.3)	10.2 (1.5)	11.3 (1.2)
Education					
High school or less	22.5 (1.5)	12.7 (2.3)	14.1 (2.5)	9.1 (1.3)	15.8 (1.3)
Some college	14.0 (0.5)	9.7 (2.2)	13.6 (2.4)	7.4 (0.9)	10.6 (0.7)
College graduate or higher	5.0 (0.7)	5.9 (1.4)	3.2 (0.6)	1.8 (0.5)	3.8 (0.4)
Age					
20 or younger	24.2 (2.0)	13.3 (5.6)	18.1 (3.8)	12.6 (2.0)	18.5 (1.9)
21-25	19.6 (1.1)	13.7 (2.9)	14.3 (2.1)	8.4 (1.2)	14.5 (1.0)
26-34	10.1 (0.9)	8.3 (1.1)	7.4 (0.8)	4.2 (0.6)	7.4 (0.5)
35 or older	7.0 (1.1)	6.3 (0.7)	6.4 (1.1)	4.4 (0.7)	5.8 (0.5)
Family Status[a]					
Not married	19.4 (0.8)	12.5 (2.8)	15.0 (1.9)	7.8 (1.1)	14.2 (1.0)
Married, spouse not present	13.6 (1.8)	11.9 (2.4)	15.9 (5.2)	9.7 (2.9)	13.0 (1.4)
Married, spouse present	10.2 (0.7)	7.5 (1.4)	9.1 (1.4)	4.8 (0.7)	7.4 (0.6)
Pay Grade					
E1-E3	25.5 (2.3)	14.6 (3.4)	19.7 (3.3)	11.8 (1.8)	18.3 (1.5)
E4-E6	16.4 (0.9)	10.3 (2.1)	8.8 (1.0)	6.5 (1.0)	11.1 (0.9)
E7-E9	6.6 (1.3)	6.1 (0.9)	6.5 (0.7)	4.2 (0.9)	5.8 (0.6)
W1-W5	+ (+)	+ (+)	2.4 (1.3)	N/A (N/A)	4.5 (2.6)
O1-O3	2.2 (0.8)	4.6 (1.7)	1.8 (1.0)	1.2 (0.7)	2.4 (0.6)
O4-O10	3.9 (1.5)	3.5 (0.6)	1.7 (0.6)	1.3 (0.3)	2.6 (0.5)
Region					
CONUS[b]	13.3 (0.8)	8.8 (0.9)	13.2 (1.9)	6.0 (0.8)	9.7 (0.6)
OCONUS[c]	17.8 (1.0)	11.5 (3.8)	10.0 (0.9)	6.9 (0.4)	13.4 (1.8)
Total	15.1 (0.7)	10.1 (1.9)	12.6 (1.5)	6.1 (0.7)	10.9 (0.7)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who were classified as any illicit drug users in the past 12 months. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Sections 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Illicit Drug Use: Q68-Q70).

Table D.13 **PATTERNS OF CIGARETTE SMOKING, PAST 30 DAYS, BY SMOKING LEVEL**

	Service				
Smoking Level	**Army**	**Navy**	**Marine Corps**	**Air Force**	**Total DoD**
Didn't smoke	57.7 (2.3)	63.9 (1.9)	59.1 (2.5)	73.9 (1.8)	64.1 (1.3)
½ pack or less/day (1-15 cigarettes)	26.7 (1.4)	26.1 (1.3)	29.6 (2.0)	18.9 (1.4)	24.7 (0.8)
About 1 pack/day (16-25 cigarettes)	10.9 (1.1)	7.6 (0.8)	8.9 (1.4)	5.8 (0.6)	8.3 (0.6)
About 1½ packs/day (26-35 cigarettes)	3.3 (0.6)	1.4 (0.2)	1.6 (0.3)	1.2 (0.2)	2.0 (0.2)
About 2 or more packs/day (>36 cigarettes)	1.3 (0.3)	1.1 (0.2)	0.9 (0.2)	0.2 (0.1)	0.9 (0.1)

Note: Table displays the percentage of military personnel by Service who reported the indicated smoking level in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Smoking Level, Q53).

Table D.14 **ANY CIGARETTE SMOKING, PAST 30 DAYS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	40.2 (1.4)	34.0 (2.0)	36.8 (2.4)	23.4 (2.0)	33.5 (1.2)
Female	25.9 (2.6)	23.3 (2.3)	27.6 (2.1)	23.0 (1.6)	24.2 (1.2)
Race/Ethnicity					
White, non-Hispanic	44.5 (2.0)	37.3 (2.3)	41.7 (2.0)	24.6 (2.1)	36.0 (1.4)
African American, non-Hispanic	23.5 (1.8)	18.1 (1.6)	23.1 (5.6)	14.3 (1.6)	19.7 (1.1)
Hispanic	33.0 (2.4)	25.0 (2.5)	27.3 (3.9)	20.8 (2.9)	27.7 (1.5)
Other	36.4 (5.9)	35.3 (2.3)	27.8 (3.6)	30.3 (4.2)	33.2 (2.1)
Education					
High school or less	53.5 (1.9)	41.1 (1.7)	44.1 (2.8)	36.3 (2.1)	45.2 (1.3)
Some college	37.1 (1.5)	33.7 (2.3)	33.2 (3.0)	26.9 (1.4)	32.4 (1.1)
College graduate or higher	14.8 (2.0)	12.2 (1.4)	12.1 (1.9)	8.2 (1.0)	11.5 (1.0)
Age					
20 or younger	48.8 (2.8)	38.2 (3.6)	41.0 (3.8)	36.7 (3.1)	42.8 (1.8)
21-25	44.6 (2.3)	41.4 (2.2)	43.2 (3.8)	34.4 (2.4)	41.0 (1.3)
26-34	37.7 (1.7)	32.2 (2.1)	27.9 (0.9)	19.1 (1.6)	29.0 (1.3)
35 or older	19.9 (2.0)	19.0 (2.0)	17.7 (2.3)	13.8 (1.6)	17.3 (1.1)
Family Status[a]					
Not married	43.0 (1.3)	38.0 (2.4)	41.4 (3.2)	29.0 (1.6)	38.1 (1.1)
Married, spouse not present	37.1 (4.1)	33.5 (5.1)	29.9 (4.5)	27.5 (4.2)	33.9 (2.9)
Married, spouse present	32.5 (3.3)	27.1 (1.8)	30.9 (2.1)	19.8 (2.2)	26.4 (1.4)
Pay Grade					
E1-E3	52.5 (1.4)	43.0 (3.2)	48.5 (3.5)	37.9 (2.2)	45.9 (1.5)
E4-E6	43.6 (1.7)	35.1 (1.2)	32.4 (2.2)	26.7 (1.6)	35.2 (1.3)
E7-E9	25.6 (2.0)	25.7 (1.7)	19.6 (1.2)	17.8 (1.7)	22.6 (1.2)
W1-W5	21.6 (2.9)	+ (+)	21.6 (4.3)	N/A (N/A)	21.0 (2.5)
O1-O3	14.2 (2.8)	13.3 (1.7)	11.8 (2.5)	7.1 (1.9)	11.2 (1.3)
O4-O10	2.7 (1.0)	4.7 (1.5)	6.3 (1.8)	4.1 (0.6)	3.9 (0.6)
Region					
CONUS[b]	36.8 (2.6)	28.4 (3.2)	35.7 (2.6)	23.5 (2.0)	30.1 (1.5)
OCONUS[c]	40.3 (2.3)	36.8 (2.1)	38.6 (2.9)	21.7 (2.0)	36.7 (1.9)
Total	38.2 (1.5)	32.4 (1.9)	36.3 (2.3)	23.3 (1.8)	32.2 (1.1)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who smoked cigarettes in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Smoking, Q52-Q53).

Table D.15 **HEAVY CIGARETTE SMOKING, PAST 30 DAYS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	16.5 (1.5)	10.5 (1.0)	11.3 (1.4)	7.5 (0.7)	11.7 (0.8)
Female	8.1 (1.4)	6.1 (0.6)	8.1 (1.2)	5.3 (0.9)	6.5 (0.6)
Race/Ethnicity					
White, non-Hispanic	20.4 (2.4)	13.0 (0.9)	14.1 (1.5)	8.2 (0.8)	13.9 (1.1)
African American, non-Hispanic	6.1 (0.9)	3.7 (0.8)	3.8 (1.5)	2.0 (0.9)	4.3 (0.5)
Hispanic	6.5 (0.7)	4.6 (1.3)	5.9 (2.4)	2.9 (0.8)	5.3 (0.7)
Other	12.6 (3.1)	7.1 (2.7)	7.5 (2.2)	8.4 (1.5)	8.8 (1.4)
Education					
High school or less	24.1 (1.9)	12.9 (0.7)	14.1 (1.4)	12.6 (1.2)	17.0 (1.2)
Some college	13.7 (1.4)	10.1 (1.4)	9.9 (2.1)	8.2 (0.6)	10.5 (0.7)
College graduate or higher	3.5 (0.9)	3.1 (0.8)	2.4 (0.9)	1.3 (0.3)	2.5 (0.4)
Age					
20 or younger	19.4 (2.8)	12.0 (2.2)	12.4 (2.1)	10.9 (4.1)	14.9 (1.7)
21-25	17.9 (1.7)	10.6 (1.4)	12.3 (1.7)	9.4 (1.2)	13.0 (0.8)
26-34	15.4 (2.2)	8.5 (1.5)	10.3 (2.7)	5.7 (1.0)	9.8 (1.1)
35 or older	7.5 (1.6)	9.7 (1.5)	5.8 (0.6)	5.2 (0.5)	7.2 (0.7)
Family Status[a]					
Not married	17.6 (2.0)	10.6 (1.4)	12.8 (1.6)	8.2 (0.6)	12.8 (1.0)
Married, spouse not present	13.7 (2.0)	10.0 (3.5)	6.5 (3.2)	10.6 (2.9)	11.3 (1.6)
Married, spouse present	12.8 (1.6)	9.2 (1.3)	9.5 (2.3)	6.2 (1.0)	9.1 (0.8)
Pay Grade					
E1-E3	21.0 (3.3)	11.2 (0.9)	15.0 (1.6)	10.0 (1.4)	14.6 (1.3)
E4-E6	18.6 (1.3)	11.1 (1.0)	10.0 (2.1)	8.5 (0.6)	12.7 (0.9)
E7-E9	8.6 (1.5)	12.7 (1.5)	8.5 (1.6)	7.6 (0.7)	9.3 (0.8)
W1-W5	7.5 (2.0)	+ (+)	5.5 (1.7)	N/A (N/A)	7.1 (1.7)
O1-O3	1.3 (0.8)	1.7 (0.7)	1.3 (0.8)	0.7 (0.3)	1.2 (0.3)
O4-O10	0.6 (0.6)	1.2 (0.5)	0.9 (0.3)	0.9 (0.4)	0.9 (0.3)
Region					
CONUS[b]	14.9 (2.4)	9.1 (1.6)	11.0 (1.7)	7.2 (0.6)	10.3 (1.0)
OCONUS[c]	15.9 (1.3)	10.7 (1.1)	11.6 (0.9)	5.7 (1.1)	12.3 (1.2)
Total	15.3 (1.5)	9.9 (0.9)	11.1 (1.4)	7.0 (0.6)	11.0 (0.8)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who were classified as heavy cigarette smokers in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Heavy Cigarette Smoking, Q53).

Table D.16 **CIGARETTE USE DURING PAST 30 DAYS, BY PAY GRADE**

Pay Grade/ Smoking Measure	Service: Army	Navy	Marine Corps	Air Force	Total DoD
E1-E3					
Any smoking	52.5 (1.4)	43.0 (3.2)	48.5 (3.5)	37.9 (2.2)	45.9 (1.5)
Heavy smoking	21.0 (3.3)	11.2 (0.9)	15.0 (1.6)	10.0 (1.4)	14.6 (1.3)
E4-E6					
Any smoking	43.6 (1.7)	35.1 (1.2)	32.4 (2.2)	26.7 (1.6)	35.2 (1.3)
Heavy smoking	18.6 (1.3)	11.1 (1.0)	10.0 (2.1)	8.5 (0.6)	12.7 (0.9)
E7-E9					
Any smoking	25.6 (2.0)	25.7 (1.7)	19.6 (1.2)	17.8 (1.7)	22.6 (1.2)
Heavy smoking	8.6 (1.5)	12.7 (1.5)	8.5 (1.6)	7.6 (0.7)	9.3 (0.8)
W1-W5					
Any smoking	21.6 (2.9)	+ (+)	21.6 (4.3)	N/A (N/A)	21.0 (2.5)
Heavy smoking	7.5 (2.0)	+ (+)	5.5 (1.7)	N/A (N/A)	7.1 (1.7)
O1-O3					
Any smoking	14.2 (2.8)	13.3 (1.7)	11.8 (2.5)	7.1 (1.9)	11.2 (1.3)
Heavy smoking	1.3 (0.8)	1.7 (0.7)	1.3 (0.8)	0.7 (0.3)	1.2 (0.3)
O4-O10					
Any smoking	2.7 (1.0)	4.7 (1.5)	6.3 (1.8)	4.1 (0.6)	3.9 (0.6)
Heavy smoking	0.6 (0.6)	1.2 (0.5)	0.9 (0.3)	0.9 (0.4)	0.9 (0.3)
Total DoD					
Any smoking	38.2 (1.5)	32.4 (1.9)	36.3 (2.3)	23.3 (1.8)	32.2 (1.1)
Heavy smoking	15.3 (1.5)	9.9 (0.9)	11.1 (1.4)	7.0 (0.6)	11.0 (0.8)

Note: Table displays the percentage of military personnel by Service and pay grade who smoked any cigarettes or were considered a heavy smoker in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services.

+ Low precision.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Smoking, Q52-Q53).

Table D.17 **ANY SMOKELESS TOBACCO USE, PAST 30 DAYS, BY SOCIODEMOGRAPHIC CHARACTERISTICS**

Sociodemographic Characteristic	Service: Army	Navy	Marine Corps	Air Force	Total DoD
Gender					
Male	21.5 (1.6)	12.8 (0.7)	23.6 (1.8)	11.4 (1.2)	16.8 (0.8)
Female	2.7 (1.0)	1.0 (0.2)	2.3 (1.1)	– (–)	1.2 (0.3)
Race/Ethnicity					
White, non-Hispanic	26.0 (2.1)	15.6 (1.0)	29.2 (1.8)	11.3 (1.2)	19.1 (1.0)
African American, non-Hispanic	3.1 (1.0)	1.6 (0.4)	4.9 (1.5)	0.8 (0.6)	2.3 (0.5)
Hispanic	10.3 (2.9)	5.9 (2.1)	12.3 (2.2)	4.8 (1.4)	8.6 (1.3)
Other	17.9 (1.8)	6.8 (1.8)	10.6 (2.0)	9.2 (1.9)	10.7 (1.1)
Education					
High school or less	24.3 (1.4)	14.4 (1.3)	27.5 (2.2)	10.3 (1.2)	19.7 (1.0)
Some college	15.6 (1.4)	10.6 (1.3)	17.8 (2.4)	11.5 (1.1)	13.2 (0.7)
College graduate or higher	15.5 (2.2)	5.6 (1.1)	14.2 (1.9)	4.5 (0.9)	9.0 (1.2)
Age					
20 or younger	20.2 (2.4)	16.2 (1.0)	25.6 (3.0)	11.7 (4.5)	18.9 (1.4)
21-25	23.3 (1.3)	13.3 (1.4)	24.1 (1.9)	10.1 (1.3)	17.6 (1.0)
26-34	18.0 (2.4)	9.8 (1.1)	18.8 (2.8)	10.0 (1.7)	13.2 (1.1)
35 or older	11.7 (2.2)	7.4 (1.0)	17.1 (2.7)	6.7 (1.3)	9.0 (0.9)
Family Status[a]					
Not married	19.6 (1.3)	12.8 (0.5)	22.9 (2.0)	10.2 (1.3)	16.1 (0.8)
Married, spouse not present	14.2 (3.0)	10.0 (2.8)	19.4 (4.3)	9.6 (4.1)	13.2 (1.9)
Married, spouse present	19.0 (2.4)	9.7 (1.0)	22.3 (2.3)	8.6 (1.1)	13.2 (0.9)
Pay Grade					
E1-E3	23.0 (3.1)	13.4 (1.5)	28.7 (3.1)	12.3 (3.8)	19.4 (1.5)
E4-E6	18.5 (1.2)	11.5 (0.8)	18.0 (2.5)	10.4 (1.6)	14.2 (0.8)
E7-E9	16.6 (2.7)	10.6 (1.2)	18.1 (3.7)	7.6 (0.9)	12.5 (1.1)
W1-W5	9.2 (2.7)	+ (+)	17.7 (5.4)	N/A (N/A)	10.5 (2.3)
O1-O3	19.7 (2.5)	8.0 (2.2)	15.6 (2.4)	3.7 (1.3)	10.8 (1.7)
O4-O10	13.0 (2.3)	3.1 (1.3)	15.0 (2.0)	5.5 (1.4)	7.3 (1.1)
Region					
CONUS[b]	17.5 (1.9)	8.8 (1.2)	22.1 (2.2)	9.0 (1.2)	13.3 (0.9)
OCONUS[c]	20.8 (1.6)	13.6 (0.5)	23.4 (1.1)	10.9 (1.5)	17.0 (1.2)
Total	18.8 (1.4)	11.1 (0.6)	22.3 (1.8)	9.2 (1.1)	14.5 (0.7)

Note: Table displays the percentage of military personnel by Service and sociodemographic characteristic who used smokeless tobacco in the past 30 days. The standard error of each estimate is presented in parentheses. Estimates have not been adjusted for sociodemographic differences among Services. Definitions and measures of substance use are given in Sections 2.5.3.

[a]Estimates by family status after 1998 are not strictly comparable to those from previous survey years. Personnel who reported that they were living as married (after 1998) were classified as "not married." Before 1998, the marital status question did not distinguish between personnel who were married and those who were living as married.

[b]Refers to personnel stationed within the 48 contiguous states in the continental United States.

[c]Refers to personnel stationed outside the continental United States or aboard afloat ships.

+ Low precision.

– Estimate rounds to zero.

N/A: Not applicable.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005 (Any Smokeless Tobacco, Q62 and Q64).

Appendix E

Calculation of Alcohol Summary Measures

This appendix provides details about the construction of two summary measures of alcohol use that are used throughout this report. Both of these measures combine information on quantity and frequency of alcohol consumption across three types of beverages: beer, wine, and liquor. First the drinking-level classification measure is described, followed by the average daily ounces of ethanol index.

E.1 Drinking-Level Classification Measure

The drinking-level classification scheme was adapted from Mulford and Miller (1960; also see Rachal et al., [1980]; Rachal, Hubbard, Williams, & Tuchfeld, [1976]) and used previously in the 1982, 1985, 1988, 1992, 1995, 1998, and 2002 DoD surveys (Bray et al., 1983, 1986, 1988, 1992, 1995, 1999, 2003). The classification scheme used (a) the "quantity per typical drinking occasion" and (b) the "frequency of drinking" for the type of beverage (beer, wine, or liquor) with the largest amount of absolute alcohol consumed per day to fit individuals into 1 of the 10 categories resulting from all combinations of quantity and frequency of consumption.[1] The 10 categories describe whether individuals abstained, drank once a month, three to four times a month, or at least once a week and whether small, medium, or large amounts of alcohol were drunk during a typical drinking occasion.

The second step in forming the classification scheme was to combine the 10 quantity/frequency categories into five drinking levels: abstainers, infrequent/light drinkers, moderate drinkers, moderate/heavy drinkers, and heavy drinkers. The resulting five drinking levels and their definitions are presented in Table E.1.

E.2 Average Daily Ounces of Ethanol Index

The average daily ethanol consumption index used in this study combines measures of both the typical drinking pattern of an individual over the past 30 days and any episodes of heavier consumption during the past year. For all respondents, daily volume was computed separately for beer, wine, and liquor, using parallel procedures. The first step in these calculations was to determine the frequency with which respondents consumed each beverage during the past 30 days (Questions 18, 21, and 24). Each frequency was computed in terms of the daily probability of consuming the given beverage. The response alternatives and corresponding frequency codes are listed in Table E.2.

The second step in computing the daily volume resulting from typical drinking days was to determine the typical quantity (*Qn*) of each beverage that respondents consumed during the past 30 days, on days when they consumed the given beverage (Questions 20, 23, and 26). For quantities up through eight beers, glasses of wine, or drinks of liquor, the code used was the exact number that the respondent indicated on Questions 20, 23, and 26.

For larger quantities of each beverage for which the answer was a range, the value used was the midpoint of the range (e.g., 9 to 11 beers were coded as 10). The codes used for the highest quantity were 22 beers, 15 glasses (for wine), and 22 drinks (for liquor). The size of a glass of wine was specified as 4 ounces (standard wine glass). Two additional questionnaire items were employed to account for variations in the size of beer

[1] Calculations to identify the beverage with the largest amount of absolute alcohol consumed per day in the past 30 days were changed slightly compared with how this measure was calculated in the 1980 and 1982 surveys. For the 1980 and 1982 surveys, calculations for beer were based on reported consumption of beer only in 8-, 12-, and 16-ounce containers. For the 1985 and subsequent data, the algorithm for calculating the drinking-level index was modified slightly to take into account information about consumption of beer in 32-ounce containers in the 1985 to 1995 surveys and consumption of beer in 32- and 40-ounce containers in the 1998, 2002 and 2005 surveys.

Table E.1 **DRINKING-LEVEL CLASSIFICATION SCHEME**

Drinking-Level Groups	Definition
Abstainer	Drinks once a year or less
Infrequent/Light Drinker	Drinks 1 to 4 drinks per typical drinking occasion 1 to 3 times per month
Moderate Drinker	Drinks 1 drink per typical drinking occasion at least once a week, *or* 2 to 4 drinks per typical drinking occasion 2 to 3 times per month, *or* 5 or more drinks per typical drinking occasion once a month or less
Moderate/Heavy Drinker	Drinks 2 to 4 drinks per typical drinking occasion at least once a week *or* 5 or more drinks per typical drinking occasion 2 to 3 times per month
Heavy Drinker	Drinks 5 or more drinks per typical drinking occasion at least once a week

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

Table E.2 **FREQUENCY CODES FOR TYPICAL DRINKING DAYS**

Response Alternative[a]	Frequency Code (*F*)	Method of Calculation
28-30 Days (About Every Day)	0.967	29/30
20-27 Days (5-6 Days a Week, Average)	0.786	5.5/7
11-19 Days (3-4 Days a Week, Average)	0.500	3.5/7
4-10 Days (1-2 Days a Week, Average)	0.214	1.5/7
2-3 Days in the Past 30 Days	0.083	2.5/30
Once in the Past 30 Days	0.033	1/30
Didn't Drink Any Beer/Wine/Liquor in the Past 30 Days	0.000	0/30

[a]Frequency of consumption of given beverage during past 30 days.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

containers (Question 19) and strength of drinks containing liquor (Question 25). Respondents indicated the size can or bottle of beer they usually drank (Question 19), with alternatives of 8-, 12-, 16-, 32-, or 40-ounce containers,[2] and the number of ounces of liquor in their average drink (Question 25), with alternatives of 1, 1.5, 2, 3, 4, and 5 or more (coded as 5) ounces.

Using the measures described in the preceding paragraph, typical quantities for beer and liquor were determined by multiplying (a) the number of cans or drinks typically consumed by (b) the number of ounces of the given beverage they contained. Because we used the standard 4-ounce size for wine glasses, the typical quantity for wine was simply 4 times the number of glasses consumed on a typical day when the respondent drank wine. Once the typical quantity for each beverage was determined, it was multiplied by the code for the frequency of drinking that beverage. The resulting product constituted a measure of the average number of ounces of the given beverage consumed daily as a result of the individual's typical drinking behavior.

The final step in measuring typical volume was to transform the number of ounces of beer, wine, and liquor consumed daily to ounces of ethanol for each beverage. The transformations were made by weighting ounces of beer by 0.04, wine by 0.12, and liquor by 0.43. We determined these weights by using the standard alcohol content (by volume) of the three beverages. There was one exception to this weighting procedure. Because individuals consuming large quantities of wine on a regular basis may typically drink a "fortified" wine with a higher alcohol content than regular "table" wine, we included a question to measure the type of wine usually consumed by the respondent during the past 30 days (i.e., regular or fortified; see Question 22). If the respondent indicated fortified wine, the weight we used for ethanol content was 0.18 (rather than 0.12).

The procedures described above measure daily ethanol volume resulting from the individual's typical drinking days. Many people who drink also experience "atypical" days during which they consume larger quantities of alcohol than what they usually consume. To the extent that the amounts consumed on those days are close to the individual's typical volume, or that the number of atypical days is very small, the impact of such days on daily volume indices is minimal. As the quantity of alcohol consumed or the number of atypical days becomes larger, however, these episodes of heavier drinking can have a considerable impact on the individual's mean daily volume. Moreover, estimates of mean daily volume in the total population will be incomplete if they ignore the episodic heavier consumption of such individuals.

In light of the importance of accounting for the volume of alcohol consumed on atypical days, the frequency of consuming eight or more cans, glasses, or drinks of beer, wine, or liquor in the past year was also measured (Questions 33-34). Because the intention was to measure episodic behavior, the frequency questions pertained to the past year (rather than the past 30 days, the time period used to measure typical consumption). The quantity of ethanol consumed was coded on such atypical drinking days as 5 ounces (i.e., 10 cans, glasses, or drinks, each containing 0.5 ounce of ethanol). The response alternatives and corresponding frequency codes for these questions are listed in Table E.3. The sum of these three frequency codes (beer, wine, and liquor) constitutes the measure of the "frequency of heavy drinking" (i.e., days of atypical high consumption).

The volumes resulting from typical and atypical consumption days were combined in a straightforward manner. For each beverage, the number of days during the past year on which the beverage was consumed was estimated by multiplying the likelihood of consuming it on a given day (F) by 365. We then partitioned this number into the number of days on which atypical high consumption occurred, (D), according to the frequency codes in Table E.3, and the number of typical days,

[2] As for the drinking-level index, the algorithm for calculating the ethanol index was modified beginning in 1998 to take into account information about consumption of beer in 32-ounce containers in the 1985 to 1995 surveys and consumption of beer in 32- and 40-ounce containers in the 1998, 2002, and 2005 surveys. Thus, the trend data presented for average ounces of ethanol show slightly different estimates from those presented in prior reports.

Table E.3 **FREQUENCY CODES FOR ATYPICAL HIGH-CONSUMPTION DAYS**

Response Alternative[a]	Frequency Code (*D*)	Method of Calculation
About Every Day	338	6.5 x 52
5-6 Days a Week	286	5.5 x 52
3-4 Days a Week	182	3.5 x 52
1-2 Days a Week	78	1.5 x 52
2-3 Days a Month	30	2.5 x 12
About Once a Month	12	12
7-11 Days in the Past 12 Months	9	9
3-6 Days in the Past 12 Months	4.5	4.5
Once or Twice in the Past 12 Months	1.5	1.5
Never in the Past 12 Months	0	0

[a]Frequency of a typical high consumption for given beverage during past year.

Source: DoD Survey of Health Related Behaviors Among Active Duty Military Personnel, 2005.

365 x *F*, minus the number of atypical days. If the respondent typically consumed eight or more drinks of the given beverage (i.e., had a *Qn* greater than or equal to 5), the number of atypical days for that beverage was 0. If the number of atypical days was greater than or equal to the number of typical days, the term (365 x *F* - *D*) was set to 0. Each number of days was then multiplied by the ounces of ethanol consumed on such days (i.e., 5 for atypical days and the typical quantity *Qn* for typical days). We summed these products and then divided by 365. The resulting composite estimates refer to daily volume for the given beverage. The formula may be written as

$$AQnF = \frac{5D + Qn\,(365 \times F - D)}{365} \qquad (1)$$

where

AQnF = average daily volume of ethanol consumed in the form of the given beverage,

D = number of atypical high consumption days for the given beverage (0 if Qn is greater than or equal to 5 for the given beverage),

Qn = volume of ethanol consumed on typical drinking days for the given beverage, and

F = probability of consuming the given beverage on a given day.

We then summed the composite volume measures for the three beverages to equal the total average daily volume measure. In so doing, we applied the following constraints: (a) the composite and total volume measures were not computed for individuals for whom any typical beverage-specific volume could not be calculated, and (b) the maximum value permitted for the composite and total volume measures was 30 ounces of ethanol per day.

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Appendix F

Technical Discussion of Standardization Approach and Multivariate Analyses

In this appendix, the technical details of the standardization procedures and multivariate analyses used in this report are presented. First the standardization approach is detailed, followed by a discussion of logistic regression.

F.1 Standardization Approaches

An important part of many analyses is the assessment of differences between two or more groups with respect to a population characteristic. For instance, in this report substance use was compared between branches of military Services, between the military and the civilian populations, and between the military population in 2005 and prior years. However, when estimating such differences it is often necessary or informative to take into account other confounding factors, for example, sociodemographic characteristics, such as age, race/ethnicity, gender, marital status, and education.

Standardization is a technique commonly used to account for differences in population composition that may affect estimates of an outcome measure (Kalton, 1968; Konijn, 1973). The standardized estimate (or adjusted mean) can be interpreted as the estimate that would have been obtained had the population had the distribution of the standardizing population with respect to those characteristics being controlled for, all other things being equal (Little, 1982).

Direct standardization was incorporated into statistical comparisons presented in this report (Kalton, 1968). With direct standardization, cells are defined by the complete cross-classification of the standardizing variables. Then, means calculated for each cell are weighted by the proportions in the standardizing population to calculate the standardized (or adjusted) overall mean. Direct standardization requires separate estimates to be created for each cell defined by the cross-classification of adjustment factors; this can limit the number of variables that can be used. The 2005 sample was sufficiently large such that sample size allocated to each cell defined by the cross-classification of age, race, gender, marital status, and education was adequate for this method. In particular, the oversampling of women in 2005 resulted in adequate cell sizes to permit the cross-tabulation of gender with other variables.

The SUDAAN software (Research Triangle Institute, 2004) for the analysis of cluster correlated data has capabilities that allow for incorporating the complex sample design, as well as direct standardization that was used for this report. In particular, the DESCRIPT procedure was used to provide standardized and unstandardized, design-based estimates and their respective standard errors. Statistical significance of the differences between comparison groups (e.g., military and civilian populations, Services) was assessed using a t-statistic, also calculated through the DESCRIPT procedure.

F.1.1 Sociodemographic Variables Included in Standardizations

The following sociodemographic characteristics were incorporated into the standardization: age, race/ethnicity, gender, educational attainment, and marital status. It should be noted that the same set of sociodemographic variables were not necessarily used in all of the standardized comparisons presented in this report. For standardization to have an impact on estimates, the distribution of the confounding variable in question should differ between the two populations, and the outcome variable must be associated with the potential confounder. For example, if the racial/ethnic composition of the military population in 2005 was similar to that of the population in prior years, then standardization by race/ethnicity would have little impact on estimates were an adjustment to be made. Similarly, if the estimates of the outcome variable are similar for men and women, for example, then it makes no difference in the standardized estimate if gender is included.

Including the same set of sociodemographic variables in every standardization would have been ideal for the sake of consistency; however, the inclusion of possibly unnecessary confounders may increase the variance of the estimate without appreciably changing the estimate. Further, incorporating additional confounders increases the number of standardizing cells and thus decreases the sample size for each cell.

F.1.2 Standardized Comparisons in This Report

Standardization of the 1982 through 2005 Department of Defense Distributions to the 1980 Distribution. In examining trends in substance use that took into account sociodemographic changes in the military since 1980, all Department of Defense (DoD) survey data (1982 and later) were standardized to the 1980 population distribution of Service, age, education, and marital status. In this case, the 1980 population was considered the "control," or baseline, population for adjusting the characteristics of the other populations. Prior examination of sociodemographic changes in the military indicated that age, education, and marital status were the characteristics that exhibited the greatest change since 1980 (Bray, Kroutil, & Marsden, 1995).

For each outcome measure (e.g., proportion of illicit drug users, proportion of smokers, ounces of ethanol), an initial estimate for each year (other than 1980) was calculated for each of the standardization cells. Those estimates were then adjusted by the estimated proportion of the 1980 military population that fell into each cell. Hence, for example, the 2005 data were standardized to the joint population distribution in 1980 of the standardizing variables, and the standardized estimate was an estimate of what that particular outcome measure may have been in 2005 if the 2005 military population had a distribution similar to that of the military population in 1980. Gender and race/ethnicity were not included in the standardization of these design-based estimates. Although the proportion of women in the military increased from approximately 9% in 1980 to 14.8% in 2005 (Table 2.4), these increases were not large ones, and the military population in the 1990s continued to be predominantly male. Similarly, 19% of the military population in 1980 was non-Hispanic African American (Bray et al., 1995) compared with 17.6% in 2005 (Table 2.4). These data suggest that the inclusion or exclusion of these variables would have had little effect on the standardized estimates.

Standardization of Services to the DoD Distribution for Service-Level Comparisons of Substance Use in 2005. Examination of estimates of substance use by demographics indicates that differences in rates of use exist among the Services and also among sociodemographic groups. Further, the sociodemographic distributions of age, race/ethnicity, gender, education, and family status differed by Service. For this reason, comparisons of Service-specific estimates were made after standardizing to the overall DoD distribution of these five sociodemographic characteristics. Sample sizes were sufficiently large to produce stable estimates, with standardizing cells formed by the cross of gender, age, race/ethnicity, educational attainment, and marital status.

Standardization of Civilian Data to the Military Distribution. Data on substance use from the 2004 National Survey on Drug Use and Health (NSDUH) (Office of Applied Studies, 2005) was compared with that from the 2005 military population. For the purpose of comparison in this analysis, rates of substance use in the civilian population were standardized to match the 2005 military population. For comparability, the estimates created from the NSDUH were restricted to persons between the ages of 18 and 55 who were not currently on active duty in the military, and similarly the military data were restricted to persons between the ages of 18 and 55 who were stationed in the United States (including Alaska and Hawaii) but were not deployed at sea at the time of data collection. Sample sizes were sufficient to permit the use of direct standardization, with standardizing cells formed by the cross of gender, age, race/ethnicity, educational attainment, and marital status.

F.2 Multivariate Regression Analyses

For Chapters 4, 5, and 6, multivariate logistic regression was used to examine the independent relationships between different sociodemographic characteristics and

the binary outcome measures heavy alcohol use, illicit drug use, and cigarette smoking, respectively. Multiple logistic regression expresses the natural logarithm of the individual's odds (i.e., $ln[p/1-p]$, where p represents the probability of an individual having the outcome of interest) of exhibiting the outcome behavior as a linear function of the independent variables.

When considering binary outcome variables, there are several reasons for using logistic regression instead of simple linear regression:

- It assumes a more reasonable nonlinear relationship between the independent variables and the probability of the outcome.
- It does not permit negative predicted probabilities or probabilities greater than one.
- It makes the proper assumption that the error has a binomial rather than a normal distribution. (Note, however, that the methods used by the SUDAAN linear regression procedure do not depend on homoscedasticity.)

In its natural form, the parameters of a logistic model indicate the magnitude of change in the log odds due to a one-unit change in the independent variable. When the independent variable is a 0/1 indicator variable (e.g., no illicit drug use = 0; any illicit drug use = 1), the parameter indicates the difference in the log odds between the two categories for that independent variable. An estimated parameter that is not significantly different from 0 indicates that the associated independent variable is not significantly associated with the outcome measure, given the model being used; a significant negative estimated regression parameter indicates a negative relationship with the outcome probability; and a significant positive estimated regression indicates a positive relationship with the outcome probability.

It is easier to interpret the parameters of a logistic regression model if the original parameters are exponentiated (i.e., $\exp(\beta)$) because the exponentiated parameters indicate the relative change in the odds for each unit increase in the associated independent variable. For a 0/1 indicator variable, the transformed parameter indicates the odds ratio of the outcome occurring for the category coded 1 to the odds of the outcome occurring for the category coded 0 (assuming that 0 is the reference category).

As discussed above, separate logistic regression models were fitted for heavy alcohol use in the past 30 days, any illicit drug use in the past 12 months, and cigarette smoking in the past 30 days. For each of the models, the outcome variable was modeled as a function of the following sociodemographic variables: Service, gender, race/ethnicity, education, age, family status (i.e., marital status and presence/absence of spouse if married), pay grade, and region (i.e., stationed within the continental United States [CONUS] or outside the continental United States [OCONUS]). Because of the high correlation coefficients between age, education, and pay grade, age was dropped from the models to avoid multicollinearity problems.

The SUDAAN LOGISTIC procedure (discussed in Appendix B) was used to create the necessary logistic modeling parameters and respective standard errors. The results of the logistic regression analyses were expressed as odds ratios, or the odds of a comparison group (e.g., Army personnel) having the outcome of interest (e.g., heavy alcohol use), relative to the odds for the reference group (e.g., Air Force personnel). The odds ratios of the reference groups were expressed as 1.00. Odds ratios greater than 1.00 indicate a greater likelihood of the comparison group exhibiting the outcome of interest (e.g., heavy alcohol use) relative to the reference group, while an odds ratio less than 1.00 indicates a lower likelihood of the comparison group exhibiting the outcome of interest.

Also shown are 95% confidence intervals for the odds ratios based on these logistic regression models. If the odds of a person being a heavy alcohol user, illicit drug user, or smoker in a comparison group (e.g., Army, Navy, or Marine Corps) were significantly different from the odds of a person in the reference group being a heavy alcohol user, then the odds ratio of the comparison group to the reference group (e.g., Army vs. Air Force) was significantly different from 1.00. An odds ratio that is significantly different from 1.00 (with an alpha of .05) will have a 95% confidence interval that does not include 1.00 in the possible range of values.

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Appendix G

2005 DoD Survey Liaison Officers

2005 DoD Survey Liaison Officers

ARMY COL Tom Rich (HLO)		NAVY CAPT Edward Kilbane (HLO) LCDR Thomas Luke (HLO)	
Mr. Garry Anthony	Mrs. Lois Mason	BUC (SCW) Peter Atkins	LT Thomas Miller
CPT Daniel Bequillard	Ms. Darlene McCain	CDR James Barnes	LT Dean J Moran
MAJ Erik Borgeson	CPT Joe Meek	R/LCDR Dale Bennet	CDR Kurush Morris
Mr. William Buhmann	SSG John Miller	LT Erica Berrios	CDR John Nell
CW5 Tommy Daughtry	MAJ Vonnette Monteith	LT Douglas Buxton	LT Mike Pitkin
1LT Raymond Devoe	1LT Demetrius Morgan	Mr. Russell Chang	CMC Jeffery Rowe
LTC Brent Goodwin	MAJ Tony Perry	LTJG Tilford Clark	LT Tim Samuelson
Mr. Richard Green	MAJ Francisco Portals	CDR Terry Finnerty	ENS Vince Sanchez
MSG Andrew Hamre	CPT C. Prichard-Allen	CDR David Gray	CDR Raymond Spaw
LTC Mark Harris	MAJ Harold Riggins	CMDCM Frank Hood	CDR Cindy Talbert
Mr. Ulysses Harris	Ms. Margaret Robinson	LCDR Kathleen Knight	LT C Varona
Mr. Antonio Harris	CPT Robert Sholl	Mr. Andrew Lewis	MSgt P Vaughn
CPT Melisa Hartigan	MAJ Anastasia Stipe	Mr. Robert Liepelt	LT Keith Venglar
MAJ Janet Holiday	SFC Grisel Thomas	CDR Ronald Luhmann	HMCM DarrinWay
LTC Paul Kennedy	MAJ D. Upshaw-Combs	CDR Frank Mellott	LCDR Ed White
SFC Natasha Looper	SSG Darline Uzzlecarter		
1LT(P) Amy Lynch	Mr. Eddie Wadlington		

MARINE CORPS Ms. Erica Flores (HLO)	AIR FORCE Col Wayne Talcott (HLO)
Ms. Beth Ayash	Maj Alicia Adams
Maj Matt Baker	Lt. Col. Diane Beck
Ms. Beverly Bieber	Capt Christopher Bishop
Maj Billy Bob Brown	Capt Amy Carpenter
Ms. Susan Della-Corte	Ms. Adrian Cercenia
Ms. Ginger Gold	Maj Carolyn Green
Dr. Ceabert Griffith	Maj Ward Hinger
Mr. Wynn Hildreth	Lt. Col. Phillip Kleinman
Capt Stan Horton	Capt Maiya Kraus
Maj Scott Macfarlane	Ms. Nancy Leggett
Mr. George Mangual	Maj Eileen Loflin
Mr. Gy Mark Mitchell	Mr. Kevin McCal
Maj Brian Pinckard	Maj Julian McLeod
LCDR Janet Spira	MSgt Peggy Patterson
Capt Lee Weiner	Capt Stephanie Ryder
1stSgt Efrem Whitehead	Maj Carol Lynn Shaffer
Mr. William York	Chief Iris Teasley
	Maj John Woods

Note: Names below each Service are the Military Liaison Officers who coordinated data collection field operations at participating installations.

HLO = Headquarters Liaison Officer.

Appendix H

2005 DoD Survey Questionnaire

RCS # DD-HA(AR)2189
Expiration: November 30, 2007

2005 DEPARTMENT OF DEFENSE SURVEY OF HEALTH RELATED BEHAVIORS AMONG MILITARY PERSONNEL

HEALTH AFFAIRS

INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

- **Most questions provide a set of answers. Read all the printed answers before marking your choice. If none of the printed answers exactly applies to you, place an "X" on the square for the one answer that best fits your situation.**
- **Use a pencil or blue or black pen.**
- **Put an "X" on the center of the square for your answer.**

CORRECT MARK	INCORRECT MARKS
☒	✓ ○
CORRECT ANSWER	**INCORRECT ANSWER**
☒	■

- **If you make a mistake and are using a pen, please completely black out the wrong answer and put an "X" in the correct box. Erase cleanly any answer you wish to change.**
- **Do not make stray marks of any kind anywhere in this booklet.**
- **For many questions, you should place an "X" in only one square for your answer in the column below the question, as shown here:**

EXAMPLE: How would you describe your health?

☐ Excellent ☐ Fair
☒ Good ☐ Poor

Now, begin answering questions here.

1. What Service are you in?

☐ Army ☐ Marine Corps
☐ Navy ☐ Air Force

2. What is your pay grade?

ENLISTED
☐ E1-E3
☐ E4-E6
☐ E7-E9

OFFICER
☐ Trainee ☐ O1-O3
☐ W1-W5 ☐ O4-O10

3. What is your highest level of education now?

☐ Did not graduate from high school
☐ GED or ABE certificate
☐ High school diploma
☐ Trade or technical school graduate
☐ Some college but not a 4-year degree
☐ 4-year college degree (BA, BS, or equivalent)
☐ Graduate or professional study but no graduate degree
☐ Graduate or professional degree

If you are asked to give numbers for your answer, please enter your response as shown below:

EXAMPLE: During the past 30 days, how many full 24-hour days were you deployed at sea or in the field?

Enter the number of days in the boxes. Use both boxes, ONE number to a box.

[0][5] **DAYS**

4. How old were you on your last birthday?

Enter your age in the boxes. Use both boxes, ONE number to a box.

[ ][ ] **YEARS OLD**

5. Are you male or female?

☐ Male
☐ Female

6. What is your marital status?

☐ Married
☐ Living as married (living with fiancé, boyfriend or girlfriend but not married)
☐ Separated and not living as married
☐ Divorced and not living as married
☐ Widowed and not living as married
☐ Single, never married, and not living as married

7. What is your race? (Mark one or more races to indicate what you consider yourself to be.)

☐ White
☐ Black or African American
☐ American Indian or Alaska Native
☐ Asian (e.g., Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)
☐ Native Hawaiian or other Pacific Islander (e.g., Samoan, Guamanian, Chamorro)
☐ Other

8. Are you Spanish/Hispanic/Latino?

- ☐ No, not Spanish/Hispanic/Latino
- ☐ Yes, Mexican/Mexican-American/Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino

9. Is your spouse or live-in fiancé, boyfriend or girlfriend now living with you at your present duty location?

- ☐ Yes
- ☐ No
- ☐ I have no spouse or live-in fiancé, boyfriend or girlfriend

10. Is your spouse also on active duty?

- ☐ Yes
- ☐ No
- ☐ I do not have a spouse

11. Do you have any children living with you?

- ☐ I have no children
- ☐ Yes
- ☐ No

12. In what type of housing do you currently live? (If your dependents are with you, mark type of family housing.)

- ☐ Housing that you rent or lease
- ☐ Housing that you own
- ☐ On board ship
- ☐ Military barracks/dormitory or bachelor quarters
- ☐ Military family housing
- ☐ OCONUS quarters in theater
- ☐ Other (e.g., embassy housing)

Sometimes you will be asked to "Place an 'X' on each line." For these questions, record an answer for each part of the question, as shown here:

EXAMPLE: How often do you do each of the following? *(Place an "X" on each line)*

	Often	Sometimes	Never
Swim	☐	☒	☐
Bowl	☒	☐	☐
Play tennis	☐	☐	☒

13. Here are some statements about things that happen to people. How many times in the past 12 months did each of the following happen to you?

(Place an "X" on each line)

	Number of Times in the Past 12 Months			
	3 or More	2	1	0
I had an illness that kept me from duty for a week or longer.	☐	☐	☐	☐
I had an injury or pain that restricted my duty or physical activity for a week or longer.	☐	☐	☐	☐
I was injured (accidental or overuse) in an accident during or because of physical training.	☐	☐	☐	☐
I was injured (accidental or overuse) during or because of any activity other than unit physical training.	☐	☐	☐	☐
I didn't get promoted when I thought I should have been.	☐	☐	☐	☐
I got a lower score than I expected on my efficiency report or performance rating.	☐	☐	☐	☐
I received UCMJ punishment (Court Martial, Article 15, Captain's Mast, Office Hours).	☐	☐	☐	☐
I was arrested for a driving violation.	☐	☐	☐	☐
I was arrested for an incident not related to driving.	☐	☐	☐	☐
I spent time in jail, stockade, correctional custody or brig.	☐	☐	☐	☐
I caused an accident where someone else was hurt or property was damaged.	☐	☐	☐	☐
I hit my spouse, my live-in fiancé, boyfriend or girlfriend, or the person I date.	☐	☐	☐	☐
I hit my child(ren) for a reason other than discipline (spanking).	☐	☐	☐	☐
I got into a fight where I hit someone other than a member of my family.	☐	☐	☐	☐
My spouse or live-in fiancé, boyfriend or girlfriend threatened to leave me or left me.	☐	☐	☐	☐
My spouse or live-in fiancé, boyfriend or girlfriend asked me to leave or I did leave.	☐	☐	☐	☐

14. The statements below are about some other things that happen to people. How many times in the past 12 months did each of the following happen to you?

(Place an "X" on each line)	Number of Times in the Past 12 Months: 3 or More	2	1	0
I had heated arguments with family or friends	☒	☒	☒	☒
I got into a loud argument in public	☒	☒	☒	☒
I had trouble on the job	☒	☒	☒	☒
I was involved in a motor vehicle accident while I was driving (regardless of who was responsible)	☒	☒	☒	☒
I drove unsafely	☒	☒	☒	☒
I had health problems	☒	☒	☒	☒
I neglected my family responsibilities	☒	☒	☒	☒
I had serious money problems	☒	☒	☒	☒
I had trouble with the police (civilian or military)	☒	☒	☒	☒
I found it harder to handle my problems	☒	☒	☒	☒
I had to have emergency medical help (for any reason)	☒	☒	☒	☒

15. Please indicate how much each statement below describes you.

(Place an "X" on each line)	Quite a Lot	Some	A Little	Not at All
I often act on the spur of the moment without stopping to think	☒	☒	☒	☒
I get a real kick out of doing things that are a little dangerous	☒	☒	☒	☒
You might say I act impulsively	☒	☒	☒	☒
I like to test myself every now and then by doing something a little chancy	☒	☒	☒	☒
Many of my actions seem to be hasty	☒	☒	☒	☒
I'm always up for a new experience	☒	☒	☒	☒
I like to try new things just for the excitement	☒	☒	☒	☒
I go for the thrills in life when I get a chance	☒	☒	☒	☒
I like to experience new and different sensations	☒	☒	☒	☒

The next group of questions is about past and current use of alcoholic beverages–that is, beer, wine, and liquor. If the answers provided are more exact than you can remember, mark your best estimate. If you can't decide between two answer choices because you drink different amounts at different times, answer for the time you drank the most.

Some questions may seem redundant or similar. We are testing some questions in order to simplify future surveys. We appreciate your understanding.

16. During the past 30 days, on how many days did you drink alcohol?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Didn't drink any alcohol in the past 30 days

17. When you drank alcohol in the past 30 days, about how many drinks did you typically have? (By "drink" we mean a bottle or can of beer, a wine cooler or a glass of wine, a shot of liquor, or a mixed drink or cocktail.)

- ☒ 12 or more drinks
- ☒ 10 to 11 drinks
- ☒ 8 to 9 drinks
- ☒ 6 to 7 drinks
- ☒ 5 drinks
- ☒ 4 drinks
- ☒ 2 to 3 drinks
- ☒ 1 drink
- ☒ Less than 1 drink
- ☒ Didn't drink alcohol in the past 30 days

18. During the past 30 days, on how many days did you drink beer?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Didn't drink any beer in the past 30 days

19. During the past 30 days, what size cans or bottles of beer did you usually drink? (Beer is most commonly sold and served in 12-ounce cans, mugs, bottles, or glasses in the U.S.)

- ☒ 8-ounce can, bottle, or glass
- ☒ Standard 12-ounce can, bottle, or mug
- ☒ 16-ounce ("tall boy") can, bottle, or mug (1/2 liter)
- ☒ Liter or quart (32-oz.) bottle or mug
- ☒ 40-ounce bottle (a "forty")
- ☒ Some other size
- ☒ Didn't drink any beer in the past 30 days

20. Think about the days when you drank beer in the past 30 days. How much beer did you usually drink on a typical day when you drank beer?

- ☒ 18 or more beers
- ☒ 15-17 beers
- ☒ 12-14 beers
- ☒ 9-11 beers
- ☒ 8 beers
- ☒ 7 beers
- ☒ 6 beers
- ☒ 5 beers
- ☒ 4 beers
- ☒ 3 beers
- ☒ 2 beers
- ☒ 1 beer
- ☒ Didn't drink any beer in the past 30 days

21. During the past 30 days, on how many days did you drink wine?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Didn't drink any wine in the past 30 days

22. During the past 30 days, did you usually drink a regular wine or a fortified wine?

- ☒ Regular wine (also called "table" or "dinner" wine)
- ☒ Fortified wine (such as Thunderbird, Night Train, sherry, port, vermouth, brandy, Dubonnet, champagne, etc.)
- ☒ Wine cooler (such as Bartles & Jaymes, etc.)
- ☒ Didn't drink any wine in the past 30 days

23. Think about the days when you drank wine in the past 30 days. How much wine did you usually drink on a typical day when you drank wine? (The standard wineglass holds about 4 ounces of wine. The standard wine bottle holds about 6 glasses of wine.)

- ☒ 12 or more wineglasses (2 bottles or more)
- ☒ 9-11 wineglasses
- ☒ 8 wineglasses
- ☒ 7 wineglasses
- ☒ 6 wineglasses (about 1 bottle)
- ☒ 5 wineglasses
- ☒ 4 wineglasses
- ☒ 3 wineglasses (about 1/2 a bottle)
- ☒ 2 wineglasses
- ☒ 1 wineglass
- ☒ Didn't drink any wine in the past 30 days

24. During the past 30 days, on how many days did you drink liquor?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Didn't drink any liquor in the past 30 days

25. During the past 30 days, about how many ounces of liquor did you usually have in your average drink? (The average bar drink, mixed or straight, contains a "jigger" or 1 1/2 ounces of liquor.)

- ☒ 5 or more ounces
- ☒ 4 ounces
- ☒ 3 ounces (a "double")
- ☒ 2 ounces
- ☒ 1 1/2 ounces (a "jigger")
- ☒ 1 ounce (a "shot")
- ☒ Didn't drink any liquor in the past 30 days

26. Think about the days when you drank liquor in the past 30 days. How much liquor did you usually drink on a typical day when you drank liquor?

- ☒ 18 or more drinks
- ☒ 15-17 drinks
- ☒ 12-14 drinks
- ☒ 9-11 drinks
- ☒ 8 drinks
- ☒ 7 drinks
- ☒ 6 drinks
- ☒ 5 drinks
- ☒ 4 drinks
- ☒ 3 drinks
- ☒ 2 drinks
- ☒ 1 drink
- ☒ Didn't drink any liquor in the past 30 days

27. During the past 30 days, what was the largest number of drinks you had on any occasion?

Enter the number of drinks in the boxes. Use both boxes, ONE number to a box.

☐☐ **NUMBER OF DRINKS**

28. During the past 30 days, on how many days did you have 5 or more drinks of beer, wine, or liquor on the same occasion (4 or more if you are a woman)? (By "drink," we mean a bottle or can of beer, a wine cooler or a glass of wine, a shot of liquor, or a mixed drink or cocktail. By "occasion," we mean at the same time or within a couple of hours of each other.)

- ☐ 28-30 days (about every day)
- ☐ 20-27 days (5-6 days a week, average)
- ☐ 11-19 days (3-4 days a week, average)
- ☐ 4-10 days (1-2 days a week, average)
- ☐ 2-3 days in the past 30 days
- ☐ Once in the past 30 days
- ☐ I drank during the past 30 days, but I never had 5 or more drinks on the same occasion
- ☐ Didn't drink in the past 30 days

29. Think about times when you had 5 or more drinks on the same occasion during the past 30 days. Who was with you the last time you drank 5 or more drinks on the same occasion?

- ☐ With 2 or more people
- ☐ With a date, spouse/fiancé or boyfriend/girlfriend or friend only
- ☐ No one/I was alone
- ☐ I drank during the past 30 days, but I never had 5 or more drinks on the same occasion
- ☐ Didn't drink in the past 30 days

30. Think about times when you had 5 or more drinks on the same occasion during the past 30 days. *Where* were you the last time you drank 5 or more drinks on the same occasion?

- ☐ Where I live (living quarters, military housing, my own home, etc.)
- ☐ At someone else's living quarters or house, including a party
- ☐ At work or duty station
- ☐ In a bar, club, or restaurant
- ☐ At a sporting event or recreational event
- ☐ At a ceremonial or formal occasion
- ☐ In a vehicle
- ☐ Other place
- ☐ I drank during the past 30 days, but I never had 5 or more drinks on the same occasion
- ☐ Didn't drink in the past 30 days

31. On those days when you worked during the past 30 days, how often did you have a drink while you were working (on-the-job), during your lunch break, or during a work break?

- ☐ Every workday
- ☐ Most workdays
- ☐ About half of my workdays
- ☐ Several workdays
- ☐ 1 or 2 workdays
- ☐ Didn't drink during workday in the past 30 days

The next set of four questions asks about your use of beer, wine, and liquor during the past 12 months, that is, since this time last year.

32. During the past 12 months, how often did you drink 8 or more cans, bottles, or glasses of beer (3 quarts or more) in a single day?

- ☐ About every day
- ☐ 5-6 days a week
- ☐ 3-4 days a week
- ☐ 1-2 days a week
- ☐ 2-3 days a month
- ☐ About once a month
- ☐ 7-11 days in the past 12 months
- ☐ 3-6 days in the past 12 months
- ☐ Once or twice in the past 12 months
- ☐ Never in the past 12 months
- ☐ Don't drink beer

33. During the past 12 months, how often did you drink 8 or more glasses of wine (more than a standard wine bottle) in a single day?

- ☐ About every day
- ☐ 5-6 days a week
- ☐ 3-4 days a week
- ☐ 1-2 days a week
- ☐ 2-3 days a month
- ☐ About once a month
- ☐ 7-11 days in the past 12 months
- ☐ 3-6 days in the past 12 months
- ☐ Once or twice in the past 12 months
- ☐ Never in the past 12 months
- ☐ Don't drink wine

34. During the past 12 months, how often did you drink 8 or more drinks of liquor (a half-pint or more) in a single day?

- ☒ About every day
- ☒ 5-6 days a week
- ☒ 3-4 days a week
- ☒ 1-2 days a week
- ☒ 2-3 days a month
- ☒ About once a month
- ☒ 7-11 days in the past 12 months
- ☒ 3-6 days in the past 12 months
- ☒ Once or twice in the past 12 months
- ☒ Never in the past 12 months
- ☒ Don't drink liquor

35. During the past 12 months, how often did you drink enough alcohol to feel drunk?

- ☒ Every day or nearly every day
- ☒ 3-4 times a week
- ☒ Once or twice a week
- ☒ 1-3 times a month
- ☒ 7-11 times in the past 12 months
- ☒ 3-6 times in the past 12 months
- ☒ Twice in the past 12 months
- ☒ Once in the past 12 months
- ☒ Never in the past 12 months
- ☒ Don't drink

Now think about your use of beer, wine, or liquor over the past 12 months – that is, since this time last year. The term "workday," as used in this questionnaire, refers to days when you worked at your duty station or were on quick-response (30 minutes or less) call.

36. Please indicate on how many workdays in the past 12 months these things ever happened to you.

(Place an "X" on each line)	Number of Workdays in the Past 12 Months: 2 or More	1	None	Don't Drink
I was hurt in an on-the-job accident because of my drinking.	☒	☒	☒	☒
I was late for work or left work early because of drinking, a hangover, or an illness caused by drinking.	☒	☒	☒	☒
I did not come to work at all because of a hangover, an illness, or a personal accident caused by drinking.	☒	☒	☒	☒
I worked below my normal level of performance because of drinking, a hangover, or an illness caused by drinking.	☒	☒	☒	☒
I was drunk while working.	☒	☒	☒	☒
I was called in during off-duty hours and reported to work feeling drunk.	☒	☒	☒	☒

37. Here are some statements about things that happen to people while or after drinking, or because of using alcohol. How many times in the past 12 months did each of the following happen to you?

(Place an "X" on each line)	Number of Times in the Past 12 Months: 3 or More	2	1	0	Don't Drink
I didn't get promoted because of my drinking.	☒	☒	☒	☒	☒
I got a lower score on my efficiency report or performance rating because of my drinking.	☒	☒	☒	☒	☒
I had an illness connected with my drinking that kept me from duty for a week or longer.	☒	☒	☒	☒	☒
I received UCMJ punishment (Court Martial, Article 15, Captain's Mast, Office Hours) because of my drinking.	☒	☒	☒	☒	☒
I was arrested for driving under the influence of alcohol.	☒	☒	☒	☒	☒
I was arrested for a drinking incident not related to driving.	☒	☒	☒	☒	☒
I spent time in jail, stockade, or brig because of my drinking.	☒	☒	☒	☒	☒
I was hurt in any kind of accident because of my drinking.	☒	☒	☒	☒	☒
My drinking caused an accident where someone else was hurt or property was damaged.	☒	☒	☒	☒	☒
I got into a fight where I hit someone other than a member of my family when I was drinking.	☒	☒	☒	☒	☒
My spouse or live-in fiancé, boyfriend or girlfriend threatened to leave me or left me because of my drinking.	☒	☒	☒	☒	☒
I was asked to leave or did leave my spouse or live-in fiancé, boyfriend or girlfriend because of my drinking.	☒	☒	☒	☒	☒

38. The statements below are about some other things that happen to people because of using alcohol. How many times in the past 12 months did each of the following happen to you?

(Place an "X" on each line)	Number of Times in the Past 12 Months: 3 or More	2	1	0	Don't Drink
I received detoxification treatment because of my drinking ("detoxes" often occur in a hospital or residential center, where you stay 24 hours a day, but they can also occur in an outpatient setting; people who go through detox are going through withdrawal).	☒	☒	☒	☒	☒
I had trouble on the job because of my drinking.	☒	☒	☒	☒	☒
I had trouble with the police (civilian or military) because of my drinking.	☒	☒	☒	☒	☒
I found it harder to handle my problems because of my drinking.	☒	☒	☒	☒	☒
I had to have emergency medical help because of my drinking.	☒	☒	☒	☒	☒
I was hospitalized because of my drinking.	☒	☒	☒	☒	☒

39. In the past 12 months, did you . . .

(Place an "X" on each line)	Yes, But Only 1 Time	Yes, 2 or 3 Times	Yes, More Than 3 Times	No	Don't Drink
Drive a car or other vehicle when you had too much to drink?	☒	☒	☒	☒	☒
Ride in a car or other vehicle driven by someone who had too much to drink?	☒	☒	☒	☒	☒
Drive or ride in a boat, canoe, or other watercraft when you had too much to drink?	☒	☒	☒	☒	☒
Operate power tools or machinery when you had too much to drink?	☒	☒	☒	☒	☒

40. The following list includes some of the reasons people give for drinking beer, wine, or liquor. Please tell us how important each reason is to you, for your drinking.

(Place an "X" on each line)	Very Important	Somewhat Important	Not at All Important	Don't Drink
As a way to celebrate	☒	☒	☒	☒
To relax	☒	☒	☒	☒
To be sociable	☒	☒	☒	☒
Because it helps you enjoy a party	☒	☒	☒	☒
To fit in with people you like	☒	☒	☒	☒
Because you feel more self-confident and sure of yourself	☒	☒	☒	☒
So you won't feel left out	☒	☒	☒	☒
Because it makes social gatherings more fun	☒	☒	☒	☒
To forget about your problems	☒	☒	☒	☒
To cheer up when you're in a bad mood	☒	☒	☒	☒
Because your friends pressure you to drink	☒	☒	☒	☒
So that others won't kid/tease you about not drinking	☒	☒	☒	☒

41. The following list includes some of the reasons people give for limiting how much they drink. Please tell us how important each reason is to you for limiting (or being careful about) your drinking.

(Place an "X" on each line)	Very Important	Somewhat Important	Not at All Important	Don't Drink
Drinking is bad for my health	☒	☒	☒	☒
It costs too much	☒	☒	☒	☒
My family/friends get upset	☒	☒	☒	☒
It might interfere with my military career	☒	☒	☒	☒
It goes against my basic values or beliefs	☒	☒	☒	☒
I'm afraid of becoming an alcoholic	☒	☒	☒	☒
It makes me do things I'm sorry for later	☒	☒	☒	☒
It can make me feel sick	☒	☒	☒	☒
Drinking can get me in trouble with police	☒	☒	☒	☒
It leads to losing control over my life	☒	☒	☒	☒

42. How often do you have a drink containing alcohol?

- ☒ Four or more times a week
- ☒ Two to three times a week
- ☒ Two to four times a month
- ☒ Monthly or less
- ☒ Never

43. How many drinks containing alcohol do you have on a typical day when you are drinking?

- ☒ 10 or more
- ☒ 7 to 9
- ☒ 5 or 6
- ☒ 3 or 4
- ☒ 1 or 2
- ☒ Don't drink

44. For each question below, please indicate how often you do the following.

(Place an "X" on each line)	Never	Less than Monthly	Monthly	Weekly	Daily or Almost Daily
How often do you have six or more drinks on one occasion?	☒	☒	☒	☒	☒
How often during the past year have you found that you were not able to stop drinking once you had started?	☒	☒	☒	☒	☒
How often during the past year have you failed to do what was normally expected of you because of drinking?	☒	☒	☒	☒	☒
How often during the past year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	☒	☒	☒	☒	☒
How often during the past year have you had a feeling of guilt or remorse after drinking?	☒	☒	☒	☒	☒
How often during the past year have you been unable to remember what happened the night before because you have been drinking?	☒	☒	☒	☒	☒

45. For each question below, please indicate if you have experienced the following because of drinking.

(Place an "X" on each line)	No	Yes, But Not in the Last Year	Yes, During the Past Year
Have you or someone else been injured as a result of your drinking?	☒	☒	☒
Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?	☒	☒	☒

The word "installation," as used in this questionnaire, refers to your post, camp, base, station, or other geographic duty location. Navy and Marines assigned to ships: The word "installation" refers to your ship when in home port.

46. Please indicate how much you agree or disagree with each of the following statements.

(Place an "X" on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
It's hard to "fit in" in my command if you don't drink.	☒	☒	☒	☒	☒
Drinking is part of being in my unit.	☒	☒	☒	☒	☒
Drinking is part of being in the Military.	☒	☒	☒	☒	☒
Drinking is just about the only recreation available at this installation.	☒	☒	☒	☒	☒
At parties or social functions at this installation, everyone is encouraged to drink.	☒	☒	☒	☒	☒
At parties or social functions at this installation, non-alcoholic beverages are always available.	☒	☒	☒	☒	☒
Leadership is tolerant of off-duty alcohol intoxication or drunkenness.	☒	☒	☒	☒	☒

47. About how old were you when you first began to use alcohol once a month or more often?

Enter your age in the boxes. Use both boxes, ONE number to a box.

☐☐ **YEARS OLD**

☒ I have never used alcohol at least once a month.

48. How is your drinking now compared to your drinking prior to entering the Military?

☒ Drank before entering the Military but drink more now
☒ Drink about the same as before entering the Military (and I do drink)
☒ Drank before entering the Military but drink less now (but I do still drink)
☒ Drank before entering the Military but do not drink now
☒ Did not drink before entering the Military but do drink now
☒ Did not drink before entering the Military and do not drink now

Now we would like to ask some questions about cigarettes and other tobacco products.

49. Have you smoked at least 100 cigarettes in your entire life? (That would be 5 packs or more in your entire life.)

☒ Yes
☒ No

50. How old were you when you first started smoking cigarettes fairly regularly? (Smoking regularly means smoking at least one cigarette a day for 30 days or longer.)

Enter the age in the boxes. Use both boxes, ONE number to a box.

☐☐ **YEARS OLD**

☒ I have never smoked at least one cigarette a day for 30 days or longer.

51. Have you started smoking cigarettes since joining the Military?

- ☒ Yes
- ☒ No

52. When was the last time you smoked a cigarette?

- ☒ Today
- ☒ During the past 30 days
- ☒ 5-8 weeks ago
- ☒ 2-3 months ago
- ☒ 4-6 months ago
- ☒ 7-12 months ago
- ☒ 1-3 years ago
- ☒ More than 3 years ago
- ☒ Never smoked cigarettes

53. Think about the past 30 days. How many cigarettes did you usually smoke on a typical day?

- ☒ About 2 packs or more a day (more than 36 cigarettes)
- ☒ About 1 1/2 packs a day (26-35 cigarettes)
- ☒ About 1 pack a day (16-25 cigarettes)
- ☒ About 1/2 pack a day (6-15 cigarettes)
- ☒ 1-5 cigarettes a day
- ☒ Less than 1 cigarette a day, on the average
- ☒ Did not smoke any cigarettes in the past 30 days

54. During the past 12 months, did you make a serious attempt to stop smoking cigarettes; that is, did you go for a period of time without smoking?

- ☒ Yes, I did not smoke for 24 hours
- ☒ Yes, I did not smoke for at least a week
- ☒ No
- ☒ Didn't smoke cigarettes in the past 12 months
- ☒ Never smoked cigarettes

55. Are you seriously intending to quit smoking?

- ☒ Yes, in the next 30 days
- ☒ Yes, in the next 6 months
- ☒ No
- ☒ Don't smoke cigarettes

56. How soon after you wake up do you smoke your first cigarette?

- ☒ After 60 minutes
- ☒ 31-60 minutes
- ☒ 6-30 minutes
- ☒ Within 5 minutes
- ☒ Don't smoke cigarettes

57. Do you smoke more frequently during the first hours after awakening than during the rest of the day?

- ☒ Yes
- ☒ No
- ☒ Don't smoke cigarettes

58. Do you find it difficult to refrain from smoking in places where it is forbidden (e.g., in church, in cinema, etc.)?

- ☒ Yes
- ☒ No
- ☒ Don't smoke cigarettes

59. Which cigarette would you hate most to give up?

- ☒ First one in the morning
- ☒ One later in the morning
- ☒ One at midday
- ☒ One in the afternoon
- ☒ One at the end of the duty day
- ☒ One in the evening
- ☒ One late at night
- ☒ One before bedtime
- ☒ Don't smoke cigarettes

60. How many cigarettes per day do you smoke?

- ☒ 10 or less
- ☒ 11 to 20
- ☒ 21 to 30
- ☒ 31 or more
- ☒ Don't smoke cigarettes

61. Do you smoke even if you are so ill that you are in bed most of the day?

- ☒ Yes
- ☒ No
- ☒ Don't smoke cigarettes

62. When was the last time you used chewing tobacco or snuff or other smokeless tobacco?

- ☒ During the past 30 days
- ☒ More than 1 month ago but within the past 6 months
- ☒ More than 6 months ago but within the past year
- ☒ More than 1 year ago but within the past 2 years
- ☒ More than 2 years ago
- ☒ Never used smokeless tobacco

63. Have you started using smokeless tobacco since joining the military?

- ☒ Yes
- ☒ No
- ☒ Don't use smokeless tobacco

64. During the past 12 months, how often on the average have you used chewing tobacco, snuff, or other smokeless tobacco?

- ☒ About every day
- ☒ 5-6 days a week
- ☒ 3-4 days a week
- ☒ 1-2 days a week
- ☒ 2-3 days a month
- ☒ About once a month
- ☒ 7-11 days in the past 12 months
- ☒ 3-6 days in the past 12 months
- ☒ Once or twice in the past 12 months
- ☒ Never in the past 12 months
- ☒ Never used smokeless tobacco

65. During the past 12 months, how often on the average have you smoked cigars or pipes?

- ☒ About every day
- ☒ 5-6 days a week
- ☒ 3-4 days a week
- ☒ 1-2 days a week
- ☒ 2-3 days a month
- ☒ About once a month
- ☒ 7-11 days in the past 12 months
- ☒ 3-6 days in the past 12 months
- ☒ Once or twice in the past 12 months
- ☒ Never in the past 12 months
- ☒ Never used cigars or pipes

66. Please indicate how much you agree or disagree with each of the following statements.

(Place an "X" on each line)	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know/No Opinion
The number of places to buy cigarettes at this installation makes it easy to smoke	☒	☒	☒	☒	☒
Most of my friends in the Military smoke	☒	☒	☒	☒	☒
Smoking is part of being in the Military	☒	☒	☒	☒	☒
My spouse, live-in fiancé, boyfriend or girlfriend, or the person I date disapproves of my smoking (or would disapprove if I did smoke)	☒	☒	☒	☒	☒
I don't like being around people when they're smoking	☒	☒	☒	☒	☒
Use of tobacco is against my basic values or beliefs	☒	☒	☒	☒	☒

67. The following list includes reasons that people sometimes give for why they started smoking cigarettes regularly. If you have ever smoked cigarettes regularly, please tell us how important each reason was for you starting to smoke.

(Place an "X" on each line)	Very Important	Somewhat Important	Not at All Important	Never Smoked Regularly
To fit in with my friends	☒	☒	☒	☒
To fit in with my Military unit	☒	☒	☒	☒
To rebel against my parents or others in authority	☒	☒	☒	☒
To look "cool" or be "cool"	☒	☒	☒	☒
To help relieve stress	☒	☒	☒	☒
To help me relax or calm down	☒	☒	☒	☒
To relieve boredom	☒	☒	☒	☒
So I wouldn't want to eat as much	☒	☒	☒	☒
To look or feel like an adult	☒	☒	☒	☒
Because most people in my family smoked cigarettes	☒	☒	☒	☒
To prove I could handle it	☒	☒	☒	☒
To be like someone I admired	☒	☒	☒	☒
To show I was tough	☒	☒	☒	☒
To avoid gaining weight	☒	☒	☒	☒

The next set of questions is about use of drugs for nonmedical purposes. Below we list the types of drugs we are interested in, along with some of their most common trade and clinical names. Although some of the drugs listed below may be prescribed for medical reasons, the questions that follow refer to use of these drugs for nonmedical purposes. By nonmedical purposes, we mean any use of these drugs on your own–that is, either without a doctor's prescription, or in greater amounts or more often than prescribed, or for any reasons other than a doctor said you should take them, such as to get high, for thrills or kicks, to relax, to give insight, for pleasure, or curiosity about the drug's effect.

Please take your time and answer the questions as accurately as possible. Remember, *NO ONE will ever link your answers with your identity*.

DRUG TYPES	COMMON TRADE/CLINICAL NAMES
Marijuana or Hashish	Cannabis, THC, "pot", "weed", "chronic"
Hallucinogens	LSD ("acid"), Phencyclidine (PCP) ("angel dust"), Mescaline, Peyote, Psilocybin, "mushrooms" (or "shrooms"), Ketamine ("K" or "Special K"), MDMA ("ecstasy"), MDA ("Adam"), MDEA ("Eve"), and Tryptamines (AMT, 5-MeO-DiPT, "Foxy")
Cocaine	Cocaine (including "crack")
Amphetamines, Methamphetamines, or Other Stimulants	Ice or crystal meth ("speed", "crank"), Preludin, Benzedrine, Biphetamine, Cylert, Desoxyn, Dextroamphetamine, Dexamyl, Dexedrine, Eskatrol, Ionamin, Methedrine, Obedrin-LA, Plegine, Pondimin, Pre-Sate, Ritalin, Sanorex, Tenuate, Tepanil, Voranil, Didrex
Tranquilizers or Other Depressants	Ativan, Meprobamate, Librium, Valium, Atarax, Equanil, Libritabs, Meprospan, Miltown, Serax, SK-Lygen, Thorazine, Tranxene, Verstran, Vistaril, Xanax, Halcion, Rohypnol ("rufies", R-2, Mexican Valium)
Barbiturates or Other Sedatives/Hypnotics	Seconal, Alurate, Amobarbital, Amytal, Buticaps, Butisol, Carbrital, Dalmane, Doriden, Eskabarb, Luminal, Mebaral, Methaqualone, Nembutal, Noctec, Noludar, Optimil, Parest, Pentobarbital, Phenobarbital, Placidyl, Quaalude, Secobarbital, Sopor, Tuinal, and GHB ("liquid ecstasy", "date rape drug")
Heroin or Other Opiates	Heroin, Morphine, Opium
Analgesics or Other Narcotics	Darvon, Darvocet, Demerol, Percodan, Percocet, Tylox, Tylenol with Codeine, Codeine, Cough Syrups with Codeine, Dilaudid, Dolene, Dolophine, Leritine, Levo-Dromoran, Methadone, Propoxyphene, SK-65, Talwin, Oxycodone, OxyContin, Hydrocodone, Vicodin, Lorcet, Lortab, Phenaphen, Fentanyl
Inhalants	Lighter fluids, aerosol sprays (like Pam, deodorant, hair spray), glue, toluene, amyl nitrite, gasoline, poppers, locker room deodorizers, spray paints, paint thinner, halothane, ether or other anesthetics, nitrous oxide ("laughing gas"), correction fluids, cleaning fluids, degreasers, "whippets"
Anabolic Steroids	Testosterone, Methyltestosterone, or other drugs taken to improve or enhance physical strength/ performance
Sexual enhancers	Viagra

68. When did you last use each type of drug listed below for nonmedical purposes?

	Last Used this Type of Drug			
(Place an "X" on each line)	**1-30 Days Ago**	**1-12 Months Ago**	**More Than 1 Year Ago**	**Never Used**
Marijuana or hashish	☒	☒	☒	☒
Hallucinogens (e.g., LSD, PCP, ecstasy)	☒	☒	☒	☒
Cocaine (including crack)	☒	☒	☒	☒
Amphetamines, Methamphetamines or other stimulants (e.g., speed, crystal meth, "uppers")	☒	☒	☒	☒
Tranquilizers or other depressants (e.g., Xanax, Valium, "rufies")	☒	☒	☒	☒
Barbiturates or other sedatives/hypnotics (e.g., "downers," Quaaludes, GHB, prescription sleeping pills)	☒	☒	☒	☒
Heroin or other opiates (e.g., morphine, opium)	☒	☒	☒	☒
Analgesics or other narcotics (e.g., prescription pain relievers)	☒	☒	☒	☒
Inhalants (e.g., aerosol sprays, gasoline, poppers, "whippets")	☒	☒	☒	☒
Anabolic steroids (e.g., Testosterone)	☒	☒	☒	☒
Sexual enhancers (e.g., Viagra)	☒	☒	☒	☒

69. On the average, how often in the past 12 months have you taken each of the following drugs for nonmedical purposes?

(Place an "X" on each line)	Number of Days Used This Type of Drug in Past 12 Months						
	52 Days or More	25-51 Days	12-24 Days	6-11 Days	3-5 Days	1-2 Days	Never in Past Year
Marijuana or hashish	☒	☒	☒	☒	☒	☒	☒
Hallucinogens (e.g., LSD, PCP, ecstasy)	☒	☒	☒	☒	☒	☒	☒
Cocaine (including crack)	☒	☒	☒	☒	☒	☒	☒
Amphetamines, Methamphetamines or other stimulants (e.g., speed, crystal meth, "uppers")	☒	☒	☒	☒	☒	☒	☒
Tranquilizers or other depressants (e.g., Xanax, Valium, "rufies")	☒	☒	☒	☒	☒	☒	☒
Barbiturates or other sedatives/hypnotics (e.g., "downers," Quaaludes, GHB, prescription sleeping pills)	☒	☒	☒	☒	☒	☒	☒
Heroin or other opiates (e.g., morphine, opium)	☒	☒	☒	☒	☒	☒	☒
Analgesics or other narcotics (e.g., prescription pain relievers)	☒	☒	☒	☒	☒	☒	☒
Inhalants (e.g., aerosol sprays, gasoline, poppers, "whippets")	☒	☒	☒	☒	☒	☒	☒
Anabolic steroids (e.g., Testosterone)	☒	☒	☒	☒	☒	☒	☒
Sexual enhancers (e.g., Viagra)	☒	☒	☒	☒	☒	☒	☒

70. During the past 30 days, on about how many days did you use each of the following drugs for nonmedical purposes?

(Place an "X" on each line)	Number of Days Used This Type of Drug in Past 30 Days			
	11 or More Days	4-10 Days	1-3 Days	Never in Past 30 Days
Marijuana or hashish	☒	☒	☒	☒
Hallucinogens (e.g., LSD, PCP, ecstasy)	☒	☒	☒	☒
Cocaine (including crack)	☒	☒	☒	☒
Amphetamines, Methamphetamines or other stimulants (e.g., speed, crystal meth, "uppers")	☒	☒	☒	☒
Tranquilizers or other depressants (e.g., Xanax, Valium, "rufies")	☒	☒	☒	☒
Barbiturates or other sedatives/hypnotics (e.g., "downers," Quaaludes, GHB, prescription sleeping pills)	☒	☒	☒	☒
Heroin or other opiates (e.g., morphine, opium)	☒	☒	☒	☒
Analgesics or other narcotics (e.g., prescription pain relievers)	☒	☒	☒	☒
Inhalants (e.g., aerosol sprays, gasoline, poppers, "whippets")	☒	☒	☒	☒
Anabolic steroids (e.g., Testosterone)	☒	☒	☒	☒
Sexual enhancers (e.g., Viagra)	☒	☒	☒	☒

71. How is your drug use now compared to your drug use prior to entering the Military?

- ☒ Used drugs before but use more now
- ☒ Use drugs about the same as before (and I do use)
- ☒ Used drugs before but use less now (but I do still use)
- ☒ Used drugs before entering the Military but do not use now
- ☒ Did not use drugs before entering the Military but do use now
- ☒ Did not use drugs before entering the Military and do not use now

For the next three questions, we have defined a "random, unannounced drug test" as a drug test that you were not supposed to know about ahead of time.

72. When was the last time you had to give a urine sample for a random, unannounced drug test?

- ☒ In the past 30 days
- ☒ 5-7 weeks ago
- ☒ 2-6 months ago
- ☒ 7-12 months ago
- ☒ 13 months to 3 years ago
- ☒ More than 3 years ago
- ☒ I've never given a urine sample for a random, unannounced drug test

73. Think about the last time you had to give a urine sample for a random, unannounced drug test. How easy was it for you to predict that you were going to be tested?

- ☒ Very easy to predict
- ☒ Somewhat easy to predict
- ☒ Somewhat hard to predict
- ☒ Very hard to predict
- ☒ I've never given a urine sample for a random, unannounced drug test

74. If the Military stopped random, unannounced drug testing, how likely do you think you would be to use drugs?

- ☒ Very likely
- ☒ Somewhat likely
- ☒ Somewhat unlikely
- ☒ Very unlikely
- ☒ Definitely wouldn't use drugs

The next set of questions asks about injuries you may have sustained and your use of seatbelts and helmets.

75. In the past 12 months, did you have any overnight hospital stays for treatment of an unintentional (accidental or overuse) injury?

- ☒ Yes, due to a car or motorcycle accident
- ☒ Yes, due to another cause
- ☒ No

76. How often do you use seat belts when you drive or ride in a car?

- ☒ Always
- ☒ Nearly always
- ☒ Sometimes
- ☒ Seldom
- ☒ Never
- ☒ Don't drive or ride in a car

77. In the past 12 months, how many times did you drive or ride on a motorcycle?

- ☒ 40 or more times
- ☒ 21-39 times
- ☒ 11-20 times
- ☒ 1-10 times
- ☒ Never in the past 12 months

78. In the past 12 months, how often did you wear a helmet when you drove or rode on a motorcycle?

- ☒ Always
- ☒ Nearly always
- ☒ Sometimes
- ☒ Seldom
- ☒ Never
- ☒ Didn't drive or ride on a motorcycle in the past 12 months

79. In the past 12 months, how many times did you ride a bicycle?

- ☒ 40 or more times
- ☒ 21-39 times
- ☒ 11-20 times
- ☒ 1-10 times
- ☒ Never in the past 12 months

80. In the past 12 months, how often did you wear a helmet when you rode a bicycle?

- ☒ Always
- ☒ Nearly always
- ☒ Sometimes
- ☒ Seldom
- ☒ Never
- ☒ Didn't ride a bicycle in the past 12 months

The next questions deal with dental treatment and general health behaviors.

81. During the past 12 months, what was the main reason you did not receive any dental treatment (including a dental check-up)?

- ☒ I have had dental treatment or a dental check-up in the past 12 months
- ☒ I could not get time off from work
- ☒ I could not get an appointment at my local military dental clinic
- ☒ I would have had to wait too long at the military dental clinic before being seen for my appointment
- ☒ I did not have a military dental clinic available at my location and I don't know how else to obtain care
- ☒ I did not have transportation
- ☒ I didn't think I needed any treatment
- ☒ I don't like going to the dentist(s) at this installation
- ☒ I don't like going to any dentists
- ☒ Other

82. Since you joined the Military, have you ever lost any permanent teeth (not counting wisdom teeth) because of . . .

(Place an "X" on each line)	Yes	No
Gum disease?	☒	☒
Cavities?	☒	☒
An injury to your mouth?	☒	☒
Tooth crowding or braces?	☒	☒
Corrective jaw surgery?	☒	☒
Some other reason?	☒	☒

83. During the past 30 days, how often did poor physical health keep you from doing your usual activities, such as work or recreation?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Never in the past 30 days

84. During the past 30 days, for leisure-time physical activity, how often did you usually do each of the following?

(Place an "X" on each line)	About Every Day	5 or 6 Days a Week	3 or 4 Days a Week	1 or 2 Days a Week	1 or 3 Days per Month	Never in the Past Month
Moderate Physical Activity–Any activity that burns 3.5 to 7 kcal/min or the equivalent of 3 to 6 metabolic equivalents (METs) and results in achieving 60 to 73 percent of peak heart rate. Examples of moderate physical activity include walking briskly, mowing the lawn, dancing, swimming, or bicycling on level terrain. A person should feel some exertion but should be able to carry on a conversation comfortably during the activity.	☒	☒	☒	☒	☒	☒
Vigorous Physical Activity–Any activity that burns more than 7 kcal/min or the equivalent of 6 or more metabolic equivalents (METs) and results in achieving 74 to 88 percent of peak heart rate. Examples of vigorous physical activity include jogging, mowing the lawn with a nonmotorized push mower, chopping wood, participating in high impact aerobic dancing, swimming continuous laps, or bicycling uphill.	☒	☒	☒	☒	☒	☒

85. During the past 30 days, when you did leisure-time physical activity, how long did you usually do each of the following?

(Place an "X" on each line)	60 or More Minutes	30 or More Minutes	At Least 20 Minutes	Less than 20 Minutes	Never in the Past Month
Moderate Physical Activity–Any activity that burns 3.5 to 7 kcal/min or the equivalent of 3 to 6 metabolic equivalents (METs) and results in achieving 60 to 73 percent of peak heart rate. Examples of moderate physical activity include walking briskly, mowing the lawn, dancing, swimming, or bicycling on level terrain. A person should feel some exertion but should be able to carry on a conversation comfortably during the activity. . .	☒	☒	☒	☒	☒
Vigorous Physical Activity–Any activity that burns more than 7 kcal/min or the equivalent of 6 or more metabolic equivalents (METs) and results in achieving 74 to 88 percent of peak heart rate. Examples of vigorous physical activity include jogging, mowing the lawn with a nonmotorized push mower, chopping wood, participating in high impact aerobic dancing, swimming continuous laps, or bicycling uphill.	☒	☒	☒	☒	☒

The next questions ask about some things that affect people on their work days and in their family lives.

86. Please indicate on how many work days in the past 12 months these things ever happened to you.

	Number of Work Days in Past 12 Months								
(Place an "X" on each line)	40 or More	21-39	12-20	7-11	4-6	3	2	1	None
I was late for work by 30 minutes or more.	☒	☒	☒	☒	☒	☒	☒	☒	☒
I left work early for a reason other than an errand or early holiday leave.	☒	☒	☒	☒	☒	☒	☒	☒	☒
I was hurt in an on-the-job accident.	☒	☒	☒	☒	☒	☒	☒	☒	☒
I worked below my normal level of performance.	☒	☒	☒	☒	☒	☒	☒	☒	☒
I did not come to work at all because of an illness or a personal accident.	☒	☒	☒	☒	☒	☒	☒	☒	☒

87. During the past 30 days, how often did poor mental health keep you from doing your usual activities, such as work or recreation?

- ☒ 28-30 days (about every day)
- ☒ 20-27 days (5-6 days a week, average)
- ☒ 11-19 days (3-4 days a week, average)
- ☒ 4-10 days (1-2 days a week, average)
- ☒ 2-3 days in the past 30 days
- ☒ Once in the past 30 days
- ☒ Never in the past 30 days

88. During the past 12 months, how much stress did you experience at work or while carrying out your military duties?

- ☒ A lot
- ☒ Some
- ☒ A little
- ☒ None at all

89. During the past 12 months, how much stress did you experience in your family life or in a relationship with your spouse, live-in fiancé, boyfriend or girlfriend, or the person you date seriously?

- ☒ A lot
- ☒ Some
- ☒ A little
- ☒ None at all

90. During the past 12 months, how much did stress at work interfere with your ability to perform your military job?

- ☒ A lot
- ☒ Some
- ☒ A little
- ☒ None at all
- ☒ Had no stress at work in the past 12 months

91. During the past 12 months, how much did stress in your family life interfere with your ability to perform your military job?

- ☒ A lot
- ☒ Some
- ☒ A little
- ☒ Not at all
- ☒ Had no stress in the family in the past 12 months

92. During the past 12 months, how much stress did you experience from each of the following?

(Place an "X" on each line)	Amount of Stress in the Past 12 Months			
	A Lot	**Some**	**A Little**	**None at All**
Being deployed at sea, in the field or on a remote (include combat-related experiences)	☒	☒	☒	☒
Having a permanent change of station (PCS)	☒	☒	☒	☒
Problems in my relationships with the people I work with	☒	☒	☒	☒
Problems in my relationship with my immediate supervisor(s)	☒	☒	☒	☒
Concern about my performance rating	☒	☒	☒	☒
Increases in my work load	☒	☒	☒	☒
Decreases in my work load	☒	☒	☒	☒
Conflicts between my military and family responsibilities	☒	☒	☒	☒
Insufficient training	☒	☒	☒	☒
Being away from my family	☒	☒	☒	☒
Having a baby	☒	☒	☒	☒
Finding childcare/daycare	☒	☒	☒	☒
Death in the family	☒	☒	☒	☒
Divorce or breakup	☒	☒	☒	☒
Problems with money	☒	☒	☒	☒
Problems with housing	☒	☒	☒	☒
Health problems that I had	☒	☒	☒	☒
Health problems that my family members had	☒	☒	☒	☒
Behavior problems in some of my children	☒	☒	☒	☒
Unexpected events/problems (i.e., hurricane, flood, home robbery)	☒	☒	☒	☒

93. When you feel pressured, stressed, depressed, or anxious, how often do you engage in each of the following activities?

(Place an "X" on each line)	**Frequently**	**Sometimes**	**Rarely**	**Never**
Talk to a friend or family member	☒	☒	☒	☒
Light up a cigarette	☒	☒	☒	☒
Have a drink	☒	☒	☒	☒
Say a prayer	☒	☒	☒	☒
Exercise or play sports	☒	☒	☒	☒
Engage in a hobby	☒	☒	☒	☒
Get something to eat	☒	☒	☒	☒
Smoke marijuana or use other illegal drugs	☒	☒	☒	☒
Think of a plan to solve the problem	☒	☒	☒	☒
Think about hurting myself or killing myself	☒	☒	☒	☒

94. Below is a list of ways you might have felt or behaved. Please indicate how often you felt this way during the past 7 days:

(Place an "X" on each line)	Most or All of the Time (5-7 Days)	Occasionally or a Moderate Amount of Time (3-4 Days)	Some or a Little of the Time (1-2 Days)	Rarely or None of the Time (Less Than 1 Day)
I felt depressed	☒	☒	☒	☒
My sleep was restless	☒	☒	☒	☒
I enjoyed life	☒	☒	☒	☒
I had crying spells	☒	☒	☒	☒
I felt sad	☒	☒	☒	☒
I felt that people disliked me	☒	☒	☒	☒

95. In the past 12 months, have you had 2 weeks or more during which you felt sad, blue, or depressed, or lost pleasure in things that you usually cared about or enjoyed?

☒ Yes
☒ No

96. Have you had 2 or more years in a row in your entire life when you felt depressed or sad most days, even if you felt okay sometimes?

☒ Yes ⇨ **If yes, have you felt depressed or sad much of the time in the past 12 months?**
☒ No

☒ Yes
☒ No

97. During the past 30 days, how often have you been bothered by the following?

(Place an "X" on each line)	Not at All	Several Days	More than Half of the Days
Feeling nervous, anxious, on edge, or worrying a lot about different things	☒	☒	☒
Getting tired very easily	☒	☒	☒
Muscle tension, aches, or soreness	☒	☒	☒
Trouble falling asleep or staying asleep	☒	☒	☒
Trouble concentrating on things, such as reading a book or watching TV	☒	☒	☒
Becoming easily annoyed or irritable	☒	☒	☒
Feeling restless so that it is hard to sit still	☒	☒	☒

98. Have you seriously considered suicide?

(Place an "X" on each line)	Yes	No
Within the past year	☒	☒
Not within the past year but since joining the Military	☒	☒
Not within the past year but before joining the Military	☒	☒

If you are having any suicidal thoughts, please seek help immediately. We encourage you to contact your unit's chaplain or a mental health professional. If you are in the United States, you also could contact the counseling hotline: 1-800-784-2433 (1-800-SUICIDE: an anonymous, civilian hotline).

99. Have you ever attempted suicide?

(Place an "X" on each line)	Yes	No
Within the past year	☒	☒
Not within the past year but since joining the Military	☒	☒
Not within the past year but before joining the Military	☒	☒

100. During the past 30 days, how often did you feel

(Place an "X" on each line)	None of the Time	A Little of the Time	Some of the Time	Most of the Time	All of the Time
Nervous	☒	☒	☒	☒	☒
Hopeless	☒	☒	☒	☒	☒
Restless or fidgety	☒	☒	☒	☒	☒
So depressed nothing could cheer you up	☒	☒	☒	☒	☒
That everything was an effort	☒	☒	☒	☒	☒
Worthless	☒	☒	☒	☒	☒

101. The following questions ask about events that may be extraordinarily stressful or disturbing for almost everyone. Please indicate at what ages you experienced any of the following.

Mark all that apply

	Happened Before 18 Years of Age	Happened Between Age 18 and Time Entered Military	Happened Since Entering the Military	Never Happened
Were you ever physically punished or beaten by a parent, caretaker, or teacher so that: you were very frightened; or you thought you would be injured; or you received bruises, cuts, welts, lumps or other injuries?	☒	☒	☒	☒
Not including any punishments or beatings you already reported above, have you ever been attacked, beaten, or mugged by anyone, including friends, family members, or strangers?	☒	☒	☒	☒
Has anyone ever made or pressured you into having some type of unwanted sexual contact? By sexual contact we mean any contact between someone else and your private parts or between you and someone else's private parts.	☒	☒	☒	☒

102. Below is a list of problems and complaints that people sometimes have in response to stressful experiences. Please indicate how much you have been bothered by each problem in the past month.

(Place an "X" on each line)	Not at All	A Little Bit	Moderately	Quite a Bit	Extremely
Repeated, disturbing memories, thoughts or images of a stressful experience	☒	☒	☒	☒	☒
Repeated, disturbing dreams of a stressful experience	☒	☒	☒	☒	☒
Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)	☒	☒	☒	☒	☒
Feeling very upset when something reminded you of a stressful experience	☒	☒	☒	☒	☒
Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience	☒	☒	☒	☒	☒
Avoiding thinking about or talking about a stressful experience or avoiding having feelings related to it	☒	☒	☒	☒	☒
Avoiding activities or situations because they reminded you of a stressful experience	☒	☒	☒	☒	☒
Trouble remembering important parts of a stressful experience	☒	☒	☒	☒	☒
Loss of interest in activities you used to enjoy	☒	☒	☒	☒	☒
Feeling distant or cut off from other people	☒	☒	☒	☒	☒
Feeling emotionally numb or being unable to have loving feelings for those close to you	☒	☒	☒	☒	☒
Feeling as if your future somehow will be cut short	☒	☒	☒	☒	☒
Trouble falling or staying asleep	☒	☒	☒	☒	☒
Feeling irritable or having angry outbursts	☒	☒	☒	☒	☒
Having difficulty concentrating	☒	☒	☒	☒	☒
Being "superalert" or watchful or on guard	☒	☒	☒	☒	☒
Feeling jumpy or easily startled	☒	☒	☒	☒	☒

For these next questions, "mental health professional" refers to a psychologist, psychiatrist, clinical social worker, or other mental health counselor.

103. At any time in the past 12 months, did you feel you needed counseling or therapy from a mental health professional (either military or civilian)?

☒ Yes
☒ No

104. In the past 12 months, did you receive counseling or therapy for mental health or substance abuse from the following?

(Place an "X" on each line)	Yes	No
Mental health professional at a military facility *(see the above box)*	☒	☒
General medical doctor at a military facility	☒	☒
Military chaplain	☒	☒
Civilian mental health professional *(see the above box)*	☒	☒
General medical doctor at a civilian facility	☒	☒
Civilian pastor, rabbi, or other pastoral counselor	☒	☒
Self-help group (AA, NA)	☒	☒

105. For what concerns did you seek help? (Mark all that apply.)

- ☒ Depression
- ☒ Anxiety
- ☒ Family problems
- ☒ Substance use problems
- ☒ Anger or stress management
- ☒ Other
- ☒ Did not seek help from a mental health professional

106. Have you been prescribed medication for depression, anxiety, or sleeping problems by a doctor or other health professional in the past 6 months?

- ☒ Yes
- ☒ No

107. Do you think it would damage a person's military career to seek mental health counseling through the Military, regardless of the reason for seeking counseling?

- ☒ It definitely would damage a person's career
- ☒ It probably would damage a person's career
- ☒ It probably would not damage a person's career
- ☒ It definitely would not damage a person's career

The next questions ask about your religious or spiritual practices.

108. During the past 12 months, how many times did you attend religious/spiritual services? (Please do not include special occasions, such as weddings, christenings, funerals, or other special events in your answer.)

- ☒ 0 times
- ☒ 1-2 times
- ☒ 3-5 times
- ☒ 6-24 times
- ☒ 25-52 times
- ☒ More than 52 times

109. My religious/spiritual beliefs are a very important part of my life.

- ☒ Strongly disagree
- ☒ Disagree
- ☒ Agree
- ☒ Strongly agree

110. My religious/spiritual beliefs influence how I make decisions in my life.

- ☒ Strongly disagree
- ☒ Disagree
- ☒ Agree
- ☒ Strongly agree

The next set of questions refers to your eating habits, height, weight, and general health.

111. Typically, in the past 12 months, which meals did you eat regularly and where do you usually eat them?

Mark all that apply

(Place an "X" on each line)	Eat at Least Twice a Week at Home or Food Brought From Home	Eat at Least Twice a Week in Military Dining Facility or Take Out From Military Dining Facility	Eat at Least Twice a Week in Restaurant or Restaurant Take Out	Skip this Meal at Least Twice a Week
Breakfast	☒	☒	☒	☒
Lunch	☒	☒	☒	☒
Dinner	☒	☒	☒	☒

112. In an average week, how often do you eat the following foods? (Note: Only a few examples of each category are listed to remind you of the types of foods-many more are possible.)

(Place an "X" on each line)	1 or 2 Times per Week	3 to 6 Times per Week	1 or 2 Times per Day	3 or More Times per Day	Rarely or Never
Fruit: fresh, frozen, canned or dried, or 100% fruit juices	☒	☒	☒	☒	☒
Vegetables: fresh, frozen, canned, cooked or raw: dark green vegetables (broccoli, spinach, most greens), orange vegetables (carrots, sweet potatoes, winter squash, pumpkin), legumes (dry beans, chick peas, tofu), starchy vegetables (corn, white potatoes, green peas), and other (tomatoes, cabbage, celery, cucumber, lettuce, onions, peppers, green beans, cauliflower, mushrooms, summer squash, etc.)	☒	☒	☒	☒	☒
Whole Grains: rye, whole wheat, or heavily seeded bread, popcorn, brown or wild rice, whole wheat pasta or crackers, oatmeal, corn tacos	☒	☒	☒	☒	☒
Other Grains: white bread or rolls, plain pasta, white rice, plain tortillas	☒	☒	☒	☒	☒
Dairy (1): low or reduced fat milk (2%, 1%, 1/2 % or skim), yogurt, cottage cheese, low fat cheese, frozen low fat yogurt, soy milk	☒	☒	☒	☒	☒
Dairy (2): regular or whole milk, cheese, ice cream	☒	☒	☒	☒	☒
Lean Protein: baked or broiled chicken breasts (no skin) or fish, baked or broiled lean pork, beef and other seafood, eggs, natural peanut butter, nuts, cooked or dried beans, other legumes, tofu, turkey- or chicken-based hot dogs, sausage, ground meat, or lunch meat products	☒	☒	☒	☒	☒
Other Protein: fried chicken, fried fish, regular ground beef, sausage, regular hot dogs, heavily marbled beef, lamb, ham, salami or lunch meats, peanut butter with oil and sugar added	☒	☒	☒	☒	☒
Snack foods/sweets: chips, pretzels, power bars, candy bars, other candy, cake, pie, regular or diet soda	☒	☒	☒	☒	☒
Fast food: pizza, hot dogs, hamburgers, cheeseburgers, tacos, breakfast biscuits/croissants with sausage or bacon, cheese, etc., fried chicken/fish, French fries, donuts, hash brown potatoes	☒	☒	☒	☒	☒

113. During the past 12 months, did you use any of the following complementary or alternative medicine treatments?

(Place an "X" on each line)	Yes	No
Acupuncture	☒	☒
Homeopathy	☒	☒
Herbal medicines (such as St. John's Wort, Gingko Biloba, Echinacea)	☒	☒
Chiropractic	☒	☒
Massage therapy	☒	☒
Exercise/movement therapy (such as Tai Chi, yoga)	☒	☒
High dose megavitamins	☒	☒
Spiritual healing by others (such as healing ritual or sacrament)	☒	☒
Lifestyle diet (such as vegetarian, diet without preservatives or additives, heart-healthy, or diabetic)	☒	☒
Relaxation techniques	☒	☒
Guided imagery therapy (such as meditation or aromatherapy)	☒	☒
Energy healing (such as reiki, polarity therapy)	☒	☒
Folk remedies (such as Native American Healing, curanderismo)	☒	☒
Biofeedback	☒	☒
Hypnosis (self or led by practitioner)	☒	☒
Art/music therapy	☒	☒
Self-help group	☒	☒
Hyperbaric oxygen therapy	☒	☒
Prayer for your own health	☒	☒
Other	☒	☒

114. In the past 12 months, how often did you take any of the following supplements? (Note: only a few examples of each category are listed-many more are possible.)

(Place an "X" on each line)	Two or More Times a Day	Once a Day	Every Other Day	Once a Week	Once a Month	Never in the Past 12 Months
Multiple vitamins and minerals with at least 6 nutrients in each product (such as Centrum, One-A-Day, Theragran M)	☒	☒	☒	☒	☒	☒
Individual vitamins or minerals (such as calcium, iron, selenium, zinc, boron, vitamin E, vitamin C)	☒	☒	☒	☒	☒	☒
Antioxidants (such as combinations of beta-carotene vitamin E, vitamin C)	☒	☒	☒	☒	☒	☒
Body-building supplements (such as amino acids, protein powders, Creatine, "Andro", weight gain products, testosterone, 100% Soy Protein, 100% Whey)	☒	☒	☒	☒	☒	☒
Herbal supplements (such as St. John's Wort, Ginkgo Biloba, Echinacea, Ginseng, Saw Palmetto)	☒	☒	☒	☒	☒	☒
Weight loss products (such as Chromium Picolinate, Ripped Fuel, caffeine, Dexatrim, Acutrim, Metabolife, Metabolite Plus, Xenadrine, Cortislim, Hydroxycut, Guarana/Mate)	☒	☒	☒	☒	☒	☒
Joint health/arthritis products (such as Glucosamine, Chondroitin Sulfate, Flexion)	☒	☒	☒	☒	☒	☒
Performance-Enhancing Products (such as Choline/Alpha GPC, CoQ10, Glutamine, Hydroxymethyl Butyrate/MHB, NO2, Synephrine/Citrus aurantium, Tyrosine)	☒	☒	☒	☒	☒	☒
Other supplements	☒	☒	☒	☒	☒	☒

115. In the past 12 months, what were your reasons for taking the following supplements?

	To Supplement my Diet/ Improve Overall Health	To Improve my Mental Health	To Improve my Cognitive Function (such as Memory and Concentration)	To Improve my Physical Performance	To Increase Muscle Mass	To Lose Weight	To Help with a Specific Health Problem	Did Not Take this Kind of Supplement in the Past 12 Months
Multiple vitamins and minerals with at least 6 nutrients in each product (such as Centrum, One-A-Day, Theragran M) . . .	☒	☒	☒	☒	☒	☒	☒	☒
Individual vitamins or minerals (such as calcium, iron, selenium, zinc, boron, vitamin E, vitamin C)	☒	☒	☒	☒	☒	☒	☒	☒
Antioxidants (such as combinations of beta-carotene vitamin E, vitamin C)	☒	☒	☒	☒	☒	☒	☒	☒
Body-building supplements (such as amino acids, protein powders, Creatine, "Andro", weight gain products, testosterone, 100% Soy Protein, 100% Whey)	☒	☒	☒	☒	☒	☒	☒	☒
Herbal supplements (such as St. John's Wort, Ginkgo Biloba, Echinacea, Ginseng, Saw Palmetto)	☒	☒	☒	☒	☒	☒	☒	☒
Weight loss products (such as Chromium Picolinate, Ripped Fuel, caffeine, Dexatrim, Acutrim, Metabolife, Metabolite Plus, Xenadrine, Cortislim, Hydroxycut, Guarana/Mate) . .	☒	☒	☒	☒	☒	☒	☒	☒
Joint health/arthritis products (such as Glucosamine, Chondroitin Sulfate, Flexion) .	☒	☒	☒	☒	☒	☒	☒	☒
Performance-Enhancing Products (such as Choline/ Alpha GPC, CoQ10, Glutamine, Hydroxymethyl Butyrate/MHB, NO2, Synephrine/Citrus aurantium, Tyrosine)	☒	☒	☒	☒	☒	☒	☒	☒
Other supplements	☒	☒	☒	☒	☒	☒	☒	☒

116. During the past 12 months, did you let any of the following conventional medical professionals know about your use of dietary supplements?

(Place an "X" on each line)	Yes	No	I Did Not Take Supplements in the Past 12 Months
Your Medical Doctor (M.D.)	☒	☒	☒
Your nurse practitioner or physician assistant	☒	☒	☒
Your psychiatrist	☒	☒	☒
Your dentist	☒	☒	☒
Other military health professional	☒	☒	☒
Other non-military health professional	☒	☒	☒
Indicated use of dietary supplements on a personal health record	☒	☒	☒

117. Where do you receive most of your information about dietary supplements? Please select only one answer.

- ☒ Magazines
- ☒ TV programs/commercials
- ☒ Radio
- ☒ Newspapers
- ☒ Professional journals
- ☒ Books
- ☒ Internet sites
- ☒ Sales store associates
- ☒ Friends/family
- ☒ Health professionals (such as a physician, pharmacist, chiropractor, dietician, nurse, physician assistant)

118. In thinking about your weight, do you consider yourself to be:

- ☒ Overweight
- ☒ About the right weight
- ☒ Underweight

119. About how tall are you without shoes on?

Enter your height in the boxes. Use all three boxes, ONE number to a box.

☐ **FEET** ☐☐ **INCHES**

120. About how much do you weigh without shoes on?

(WOMEN: If you are currently pregnant, please enter your usual weight before you became pregnant.) Enter your weight in the boxes. Use all three boxes, ONE number to a box.

☐☐☐ **POUNDS**

121. Are you currently trying to:

- ☒ Lose weight
- ☒ Gain weight
- ☒ Neither

122. Are you currently enrolled in a mandatory weight control/management program?

- ☒ Yes
- ☒ No

123. How many times have you tried to lose weight?

(Place an "X" on each line)	1 Time	2 Times	3 or More Times	Never/ Not Applicable
Prior to joining the Military	☒	☒	☒	☒
Since joining the Military	☒	☒	☒	☒

124. Do you have difficulty meeting your service weight and/or body fat standard?

- ☒ Yes
- ☒ No

125. Did you have to lose weight to join the Military?

- ☒ Yes
- ☒ No

126. If you gained weight in the past year, did any of the following trigger the weight gain?

(Place an "X" on each line)	Yes	No	I Did Not Gain Weight in the Past Year
A medical profile (required reduction in physical activity as a result of injury)	☒	☒	☒
Return home from deployment	☒	☒	☒
Reassignment (PCS)	☒	☒	☒
Marriage	☒	☒	☒
Divorce	☒	☒	☒
Quit smoking	☒	☒	☒
Child birth/pregnancy	☒	☒	☒
Stress	☒	☒	☒
Death of family member or friend	☒	☒	☒

127. Did you pass your most recent physical fitness test?

- ☒ Yes
- ☒ No
- ☒ I've never had a physical fitness test/I was exempt from my last physical fitness test

128. When was the last time you were told by a doctor or other health professional that you have any of the following:

(Place an "X" on each line)	Prior to Entering Military Service	Since Entering Military Service	Never Had Checked	Never Told Had a Problem	Don't Know/ Don't Remember
High blood pressure	☒	☒	☒	☒	☒
High blood sugar	☒	☒	☒	☒	☒
High cholesterol	☒	☒	☒	☒	☒
Low HDL cholesterol (good cholesterol)	☒	☒	☒	☒	☒
High triglycerides (blood fat)	☒	☒	☒	☒	☒

129. When was the last time you had your blood pressure checked by a doctor or other health professional?

- ☒ Within the past 2 years
- ☒ More than 2 years ago
- ☒ Don't know/don't remember
- ☒ Never had my blood pressure checked

130. The last time you had your blood pressure checked, did the doctor or other health professional say your blood pressure was high, low, or normal?

- ☒ High
- ☒ Low
- ☒ Normal
- ☒ Something else
- ☒ Not told
- ☒ Don't know/don't remember
- ☒ Never had my blood pressure checked

131. When was the last time you had your cholesterol checked by a doctor or other health professional?

- ☒ Within the past 5 years
- ☒ More than 5 years ago
- ☒ Don't know/don't remember
- ☒ Never had my cholesterol checked

132. Has a doctor or other health professional ever advised you to take any of the following actions to help lower your blood pressure?

(Place an "X" on each line)	Yes	No
Diet to lose weight	☒	☒
Cut down on salt or sodium in my diet	☒	☒
Exercise	☒	☒
Stop smoking	☒	☒
Cut down on my use of alcohol	☒	☒
Take prescribed blood pressure medicine	☒	☒

133. Are you currently taking any of the following actions to help lower your blood pressure?

(Place an "X" on each line)

To lower my blood pressure, I am currently:	Yes	No
Dieting to lose weight	☒	☒
Cutting down on salt or sodium in my diet	☒	☒
Exercising	☒	☒
Not smoking	☒	☒
Cutting down on my use of alcohol	☒	☒
Taking prescribed blood pressure medicine	☒	☒

134. On average, how many hours of sleep did you get each night in the past 12 months?

- ☒ 7 hours or more
- ☒ 5 or 6 hours
- ☒ 3 or 4 hours
- ☒ 2 hours or less

135. Did you have a sexually transmitted disease, such as gonorrhea, syphilis, chlamydia, or genital herpes in the:

(Place an "X" on each line)	Yes	No
Past 12 months	☒	☒
In your entire life	☒	☒

The next set of questions asks about sexual behavior. By sex, we mean vaginal, oral, or anal sex. Please remember that your answers are strictly confidential and NO ONE will link your answers with your identity.

136. The last time you had sex, did you or your sex partner use a condom?

- ☒ Yes
- ☒ No
- ☒ I have never had sex

137. The last time you had sex, was the condom used . . .

- ☒ To prevent pregnancy?
- ☒ To prevent disease like syphilis, gonorrhea, and AIDS?
- ☒ For both of these reasons?
- ☒ For some other reason?
- ☒ I/my sex partner did not use a condom the last time I had sex
- ☒ I have never had sex

138. For this survey, we use the term "main sexual partner" to describe someone who is your spouse, lover, or anyone else you feel committed to or have a special relationship with. The last time you had sex, was it with your main sexual partner?

- ☒ Yes
- ☒ No
- ☒ I have never had sex

139. In the past 12 months, how many people have you had sex with?

- ☒ 20 or more people
- ☒ 10-19 people
- ☒ 5-9 people
- ☒ 2-4 people
- ☒ 1 person
- ☒ I did not have sex in the past 12 months

140. How many new sex partners did you have during the past 12 months? A new sex partner is someone you had sex with for the first time in the past 12 months.

Enter the number of new sex partners you had during the past 12 months in the boxes. Use both boxes, ONE number to a box. If you have never had sex or did not have any new sex partners in the past 12 months, enter 00.

☐☐ **NUMBER OF NEW SEX PARTNERS**

141. In the past 12 months, did you cause or have an unintended pregnancy?

- ☒ Yes
- ☒ No

This next set of questions deals mainly with your length of service, deployments, military job, and job satisfaction.

142. As of today, how many months have you been assigned to your present permanent post, base, ship, or duty station? ***(Include any extension of your present tour. Do not count previous tours at this duty station.)***

- ☒ 1 month or less
- ☒ 2-3 months
- ☒ 4-6 months
- ☒ 7-12 months
- ☒ 13-18 months
- ☒ 19-24 months
- ☒ 25-36 months
- ☒ More than 3 years

143. How many days during the past 12 months have you been away from your permanent duty station (berthed out of the area, not at home) for activities such as deployment, work ups, training, or TAD/TDY?

- ☒ None
- ☒ 1-30 (one month or less)
- ☒ 31-60 (between 1-2 months)
- ☒ 61-120 (between 3-4 months)
- ☒ 121-180 (between 5-6 months)
- ☒ 181-240 (between 7-8 months)
- ☒ More than 240 days (more than 8 months)

144. How long have you been on active duty? (If you had a break in service, count current time and time in previous tours, but not time during the break in service.)

For partial year periods of less than 6 months, round down to the last full year of service. For partial year periods of 6 months or more, round up to the next year.

Enter the number of years in the boxes. Use both boxes, ONE number to a box.

☐☐ **YEARS**

145. How many times have you been deployed in the past 3 years?

- ☐ 1 time
- ☐ 2 times
- ☐ 3 or more times
- ☐ I was not deployed in the past 3 years

146. When were you last deployed?

- ☐ I've never been deployed
- ☐ In the past 12 months
- ☐ Between 12 and 36 months ago
- ☐ More than 36 months ago

147. In the past 12 months, were you required to get dental work done before you could be deployed at sea or in the field?

- ☐ Yes
- ☐ No
- ☐ I wasn't deployed in the past 12 months

148. During the past 12 months, I was unable to deploy because of the following reason(s):

(Place an "X" on each line)	Yes	No	I was Able to Deploy/I Was Not Ordered to Deploy
Training	☐	☐	☐
Leave/TAD/TDY	☐	☐	☐
Pregnancy	☐	☐	☐
Dental issue	☐	☐	☐
No HIV test	☐	☐	☐
Family situation	☐	☐	☐
Injury	☐	☐	☐
Illness	☐	☐	☐
Other	☐	☐	☐

149. During the past 12 months, I returned early from deployment (before the rest of my unit) because of the following reason(s):

(Place an "X" on each line)	Yes	No	I Did Not Deploy	I Deployed But Did Not Return Early
Pregnancy	☐	☐	☐	☐
Dental work or dental problems	☐	☐	☐	☐
Family situation	☐	☐	☐	☐
Injury	☐	☐	☐	☐
Illness	☐	☐	☐	☐
Mental health problems	☐	☐	☐	☐
Other	☐	☐	☐	☐

150. Comparing your alcohol, cigarette, smokeless tobacco, and cigar use before your last deployment to now, how has it changed?

(Place an "X" on each line)	Used Before my Last Deployment but Use More Now	Used About the Same as Before my Last Deployment (and I Do Use)	Used Before my Last Deployment but Use Less Now (but I do Still Use)	Used Before my Last Deployment but Do Not Use Now	Did Not Use Before my Last Deployment but Do Use Now	Did Not Use Before my Last Deployment and Do Not Use Now	I Have Never Been Deployed
Alcohol	☐	☐	☐	☐	☐	☐	☐
Cigarettes	☐	☐	☐	☐	☐	☐	☐
Smokeless Tobacco	☐	☐	☐	☐	☐	☐	☐
Cigars	☐	☐	☐	☐	☐	☐	☐

151. Comparing your relationship with your spouse, fiancé, boyfriend, or girlfriend before your last deployment to now, how has it changed?

- ☒ We argue more/have more conflict
- ☒ We get along about the same
- ☒ We argue less/have less conflict/get along better
- ☒ I have never been deployed

152. Have you divorced or separated from your spouse, fiancé, boyfriend, or girlfriend since your last deployment?

- ☒ Yes
- ☒ No
- ☒ I have never been deployed

153. During the past 30 days, how much of the time did you work in jobs outside your current primary MOS/PS/Rating/Designator/AFSC?

- ☒ All of the time
- ☒ Most of the time
- ☒ About half of the time
- ☒ Some but less than half of the time
- ☒ None of the time

154. Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?

- ☒ Very likely
- ☒ Likely
- ☒ Neither likely nor unlikely
- ☒ Unlikely
- ☒ Very unlikely

155. If you could stay on active duty as long as you want, how likely is it that you would choose to serve in the Military for at least 20 years?

- ☒ I already have 20 or more years of service
- ☒ Very likely
- ☒ Likely
- ☒ Neither likely nor unlikely
- ☒ Unlikely
- ☒ Very unlikely

156. All in all, how satisfied or dissatisfied are you with your work assignment?

- ☒ Very satisfied
- ☒ Satisfied
- ☒ Dissatisfied
- ☒ Very dissatisfied

157. Did you serve with the Military in any of the following areas?

(Place an "X" on each line)	**Yes**	**No**
Operations Desert Shield or Desert Storm (e.g., The Persian Gulf)	☒	☒
Operation Just Cause (e.g., Panama)	☒	☒
Operation Restore Hope (e.g., Somalia)	☒	☒
Operation Uphold Democracy (e.g., Haiti)	☒	☒
Operations Joint Endeavor or Joint Guard (e.g., Bosnia)	☒	☒
Operation Safe Haven (e.g., Cuba)	☒	☒
Operation Enduring Freedom (e.g., Afghanistan)	☒	☒
Operation Iraqi Freedom (e.g., Iraq)	☒	☒
Tsunami Relief (e.g., South Asia)	☒	☒
Other combat and/or peace-keeping mission	☒	☒
Other remote	☒	☒

158. Which of the following categories best describes your current military job? (If you need to, please refer to the list of examples below for different job categories.) *(Place an "X" on only one square)*

ENLISTED

- ☐ Infantry, Gun Crew, or Seamanship Specialist
- ☐ Electronic Equipment Repairman
- ☐ Communications or Intelligence Specialist
- ☐ Health Care Specialist
- ☐ Other Technical or Allied Specialist
- ☐ Functional Support and Administration
- ☐ Electrical/Mechanical Equipment Repairman
- ☐ Craftsman
- ☐ Service and Supply Handler
- ☐ Non-Occupational

OFFICER

- ☐ General Officer or Executive
- ☐ Tactical Operations Officer
- ☐ Intelligence Officer
- ☐ Engineering or Maintenance Officer
- ☐ Scientist or Professional (not involved with health care)
- ☐ Health Care Officer
- ☐ Administrator
- ☐ Supply, Procurement, or Allied Officer
- ☐ Non-Occupational

JOB CATEGORIES	
ENLISTED CATEGORY	**EXAMPLES**
Infantry, Gun Crew, or Seamanship Specialist	Individual weapons specialists, crew-served artillery specialists, armor and amphibious crew, specialists in combat engineering and seamanship, air crew, and installation security personnel
Electronic Equipment Repairman	Specialists in the maintenance and repair of electronic equipment, such as radio, radar, sonar, navigation, weapons, and computers
Communications or Intelligence Specialist	Specialists in the operation and monitoring of radio, radar, sonar, and gathering and interpretation of intelligence
Health Care Specialist	Specialists in patient care and treatment, medical support, and related medical and dental services
Other Technical or Allied Specialist	Specialists in skills not classified elsewhere, such as photography, mapmaking, weather, ordnance disposal, laboratory analysis, and music
Functional Support and Administration	General administrative, clerical, and professional specialists, including administrative specialists in data processing, functional support specialists (in areas such as supply, transportation, and flight operations), chaplain's assistants, and public affairs specialists
Electrical/Mechanical Equipment Repairman	Specialists in the maintenance and repair of aircraft, automotive equipment, missile systems, marine engines and boilers, power-generating equipment, and other mechanical and electrical equipment
Craftsman	Metalworkers, construction workers, plumbers, electricians, heating and cooling specialists, lithographers, and other trades
Service and Supply Handler	Personnel in food service, operation of motor transport, shipping and receiving, law enforcement, laundry and dry cleaning
Non-Occupational	Includes officer candidates, authorizations for personnel in a student status, or personnel serving in duties of a special or otherwise undesignated nature
OFFICER CATEGORY	**EXAMPLES**
General Officer or Executive	Includes all officers of General/Flag rank, all Marine Corps full Colonels, and all directors, planners, or executive not classified elsewhere
Tactical Operations Officer	Includes pilots and aircraft crews, such as navigators; infantry, artillery, armor, and close support officers; Naval ship commanders; missile systems officers and missile unit commanders; and combat and operations officers
Intelligence Officer	Includes strategic, general, and communications intelligence officers, and counterintelligence officers
Engineering or Maintenance Officer	Includes civil engineers and architects; electrical and electronic engineers; communications engineers and communications officers; aircraft maintenance officers and aeronautical engineers; weapons engineering and maintenance officers; missile maintenance officers; ground, aviation, and weapons safety officers; chemical engineers; topographic engineers, and cartographic and aerial mapping officers
Scientist or Professional (not involved with health care)	Includes chemists, biological scientists, physicists, geologists, meteorologists, social or behavioral scientists, lawyers, chaplains, mathematicians and statisticians, and military college faculty members
Health Care Officer	Includes physicians, dentists, nurses, veterinarians, allied health officers, and health services administration officers
Administrator	Includes general administrative officers, manpower and personnel managers, comptrollers and accounting officers, data processing officers, public and internal information officers, police, Inspector General and technical inspection positions, morale and welfare officers, and officers engaged in the planning, management, and operation of training programs
Supply, Procurement, or Allied Officer	Includes officers in supply, procurement and production, transportation, food service, and related logistical activities
Non-Occupational	Includes law students, medical students, flight students, other trainees, and billet designators

159. What is the ZIP code or APO or FPO number for the post, base, ship, or other duty station where you spent most of your duty time during the past 12 months?

Enter the ZIP/APO/FPO number in the boxes. Use all five boxes, ONE number to a box.

☐☐☐☐☐ **ZIP/APO/FPO**

MALES PLEASE STOP HERE.
THANK YOU VERY MUCH FOR YOUR TIME, EFFORT, AND COOPERATION IN COMPLETING THIS QUESTIONNAIRE.

FEMALES, PLEASE CONTINUE WITH QUESTION 160.

160. When was the last time you had a Pap test or Pap smear to check for cancer of the cervix?

- ☐ Within the past year
- ☐ More than 1 year ago but within the past 2 years
- ☐ More than 2 years ago but within the past 3 years
- ☐ More than 3 years ago
- ☐ Don't know/don't remember
- ☐ Never had a Pap test

161. Have you had a hysterectomy or operation to remove your uterus?

- ☐ Yes
- ☐ No

162. In the past 12 months, how much stress did you experience as a woman in the Military?

- ☐ A great deal
- ☐ A fairly large amount
- ☐ Some
- ☐ A little
- ☐ None at all

163. To the best of your knowledge, when was the last time you were pregnant?

- ☐ Currently pregnant
- ☐ May be pregnant now but don't know for certain
- ☐ Within the past year but not now
- ☐ More than 1 year ago but within the past 2 years
- ☐ More than 2 years ago but within the past 5 years
- ☐ More than 5 years ago
- ☐ Never been pregnant

The next set of questions refers to the last time you were pregnant and did not have an abortion or miscarriage. If you are currently pregnant, please answer these questions for this pregnancy. "Pregnancy checkups" refer to checkups for weight, blood pressure, physical exams, procedures such as ultrasound, or other medical procedures related to pregnancy.

164. Think about your last pregnancy that resulted in a live birth (or your current pregnancy). How long after you became pregnant did you have your first pregnancy checkup?

- ☐ Within the first 3 months after becoming pregnant
- ☐ 4-6 months after becoming pregnant
- ☐ More than 6 months after becoming pregnant
- ☐ Did not have any pregnancy checkups or have not had first checkup
- ☐ Been pregnant but never had a live birth
- ☐ Never been pregnant

165. During your last pregnancy that resulted in a live birth (or your current pregnancy), about how often did you smoke a cigarette, even if one or two puffs?

- ☐ Daily
- ☐ Almost daily, or 3-6 days a week
- ☐ 1-2 days a week
- ☐ Several times a month (but less than once a week)
- ☐ Once a month or less (but at least once)
- ☐ Never smoked cigarettes during last (or current) pregnancy
- ☐ Been pregnant but never had a live birth
- ☐ Never been pregnant

166. During your last pregnancy that resulted in a live birth (or your current pregnancy), about how often did you drink alcoholic beverages (i.e., beer, wine, or liquor)?

- ☐ Daily
- ☐ Almost daily, or 3-6 days a week
- ☐ 1-2 days a week
- ☐ Several times a month (but less than one time a week)
- ☐ Once a month or less (but at least one time a week)
- ☐ Never drank alcohol during last (or current) pregnancy
- ☐ Been pregnant but never had a live birth
- ☐ Never been pregnant

THANK YOU VERY MUCH FOR YOUR TIME, EFFORT, AND COOPERATION IN COMPLETING THIS QUESTIONNAIRE.

PLEASE PLACE THE QUESTIONNAIRE IN THE BOX AS YOU LEAVE.

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FSU

Survey Phase:

- ☒ I
- ☒ II

Absence Codes:

- ☒ TDY/TAD
- ☒ LV
- ☒ DEP
- ☒ HOSP
- ☒ INC
- ☒ NS

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